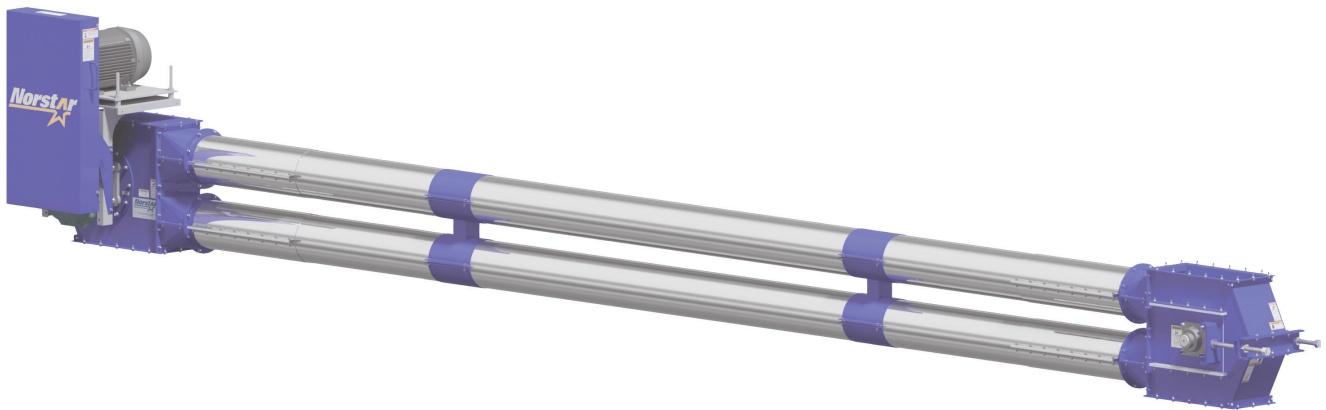




Twinline



Owner/Operator's Manual and Installation/Maintenance Guide

NORSTAR INDUSTRIES

LIMITED WARRANTY

Norstar Industries expressly warrants each new Tinline 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 Twinlines 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 Tinline 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**

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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 TWINLINE CHAIN CONVEYOR

WARRANTY REGISTRATION FORM & INSPECTION REPORT

WARRANTY REGISTRATION

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

Customer's Name _____ Dealer's Name _____

Address _____ Address _____

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

Phone Number (____) _____

Chain Conveyor 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 _____

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Introduction

Congratulations on your purchase of a Norstar Industries Chain Conveyor 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 handling of material.

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



This manual covers the Twinline Chain Conveyor 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 Chain Conveyor on the Head side.

About This Manual and Your Shipment

The purpose of this manual is to help in the following areas regarding your Norstar Industries Chain Conveyor.

- 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 10-19 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 Chain Conveyor as it is standing.
- The directions left and right, as mentioned throughout the manual, are as seen when standing facing the Chain Conveyor on the Head side.
- Names of components and parts have been capitalized throughout the Manual (i.e. Paddle, 1/2” Nylon Lock-nut) 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

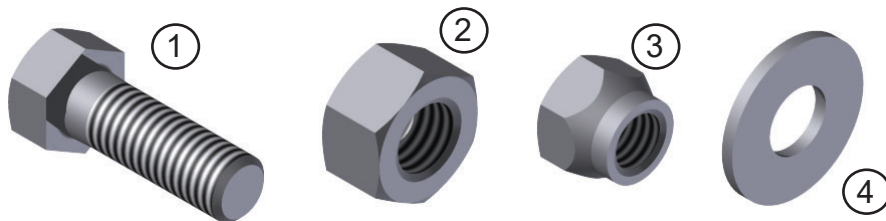


IMPORTANT! No hardware substitutions are permitted unless noted.

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 Chain Conveyor 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 Chain Conveyor components.

Your Chain Conveyor shipment should include assemblies in **Figure 2**:

1. Drive Section
2. Take-Up End Section
3. Tube Section(s)
4. Parts Box



IMPORTANT! The Serial Number Sticker is located on a the Gearbox Side of the Head Section. See Figure 3.

PICTURES COMING SOON

Figure 2
Shipment Parts Identification

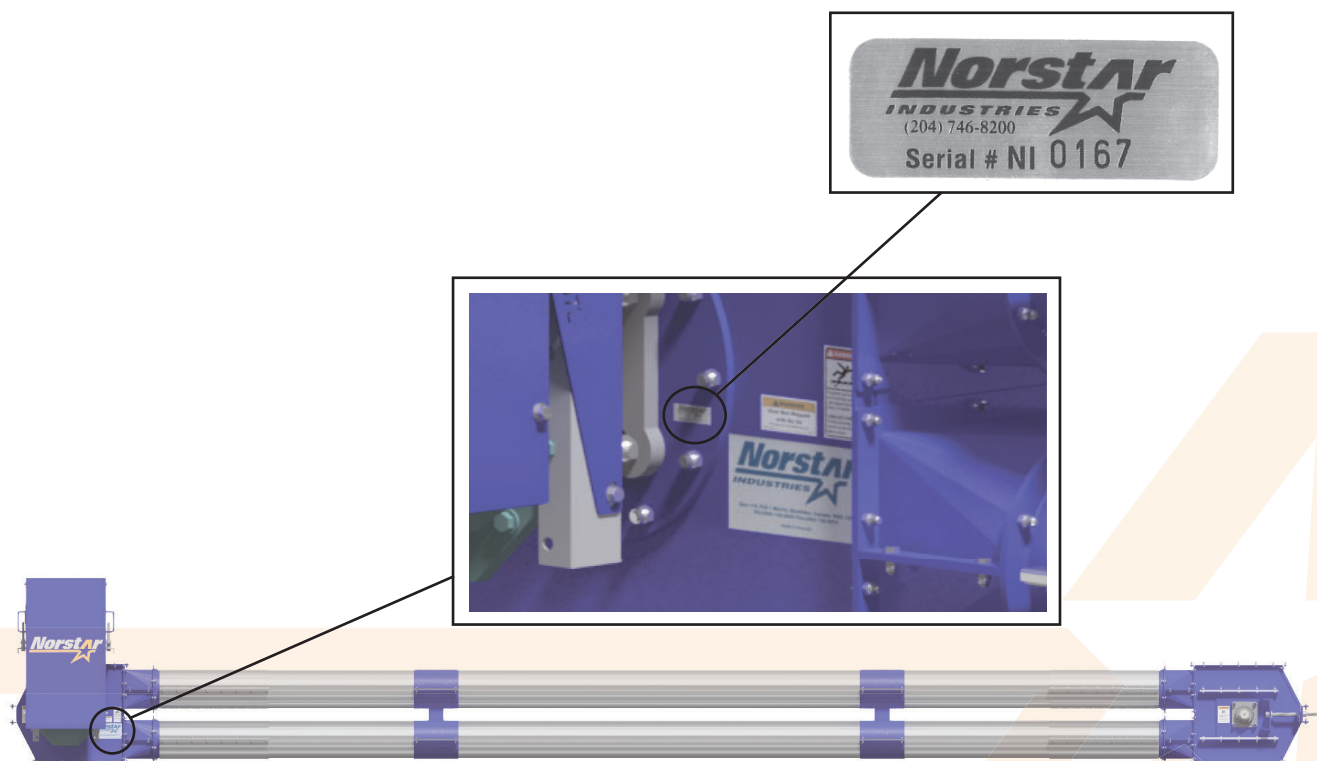


Figure 3
Serial Number Location

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 Chain Conveyor 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 Chain Conveyor, 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 Chain Conveyor Operator can easily obtain it. Contact your Norstar Industries Dealer or Norstar Industries to replace this Manual should it become lost or damaged.

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Safety

Introduction to Safety

YOU are responsible for the **SAFE** operation and maintenance of your Norstar Industries Chain Conveyor. **YOU** must ensure that you and anyone else who is going to operate, maintain or work around the Chain Conveyor 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 Chain Conveyor.

Remember, **YOU** are the key to safety. Good safety practices not only protect you but also the people around you. Make these practices a working part of your safety program. Be certain that **EVERYONE** operating this 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.

- Chain Conveyor 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 Chain Conveyor.
2. Only trained, competent persons shall operate the Chain Conveyor. 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 Conveyor.

Safety

9. Feed/Grain openings for shovel, front loaders or other manual/mechanical equipment should be covered by a grating. In the case that a grating cannot be used, the exposed section of the Chain Conveyor should be guarded by a railing or fence with a warning sign posted.
10. Do not place hands, feet, or any part of your body into the Chain Conveyor 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 Chain Conveyor.
11. Do not walk on Chain Conveyor covers or guards.
12. Do not poke or prod material in the Chain Conveyor with a bar or stick inserted through the openings.

Operation Safety

Refer also to the Operation section on **Page 23** of this Manual

Norstar Industries Chain Conveyors 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 Chain Conveyor and this Manual and its Safety/Operational practices should be permitted to operate this Chain Conveyor. Always operate the Chain Conveyor in accordance with the instructions in this Manual and Chain Conveyor Safety Decals.

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



WARNING! Do NOT attempt to clear a Chain Conveyor jam until power has been LOCKED OUT.



DANGER! If the Chain Conveyor is to be inspected, cleaned, serviced, adjusted or observed, all Chain Conveyor 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 Chain Conveyor 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 Chain Conveyor until all persons are clear of the equipment.

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



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

Schedule and maintain a Safety training and operations program for all Chain Conveyor 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 Chain Conveyor 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 Chain Conveyor. Do not overload the Chain Conveyor or use it for anything except its intended use. The Chain Conveyor is designed for free flowing, dry materials. Using the machine for any other purpose may break or damage the Chain Conveyor.

Chain Conveyor 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 Chain Conveyor. 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 Conveyor.

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 Conveyor 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 Chain Conveyor operation.

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



IMPORTANT! Refer to the more detailed Maintenance section in Pages 24-27 of this Manual.

Chain Conveyor 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 Chain Conveyor 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 Chain Conveyor.

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 Chain Conveyor'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 Chain Conveyor. Norstar Industries will not be liable for failure of the Chain Conveyor 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 Chain Conveyor 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 Chain Conveyor Head Section and Tail Section.



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.*

Chain Conveyor 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 Chain Conveyor and associated equipment to resume operation.



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

Disconnect electrical power, LOCK OUT and TAG OUT power, BEFORE inspecting or servicing the Chain Conveyor.

Components supplied for the system but not manufactured by Norstar Industries, and added as a part of the Chain Conveyor system, are not the responsibility of Norstar Industries.

Determine the cause of stoppage before restarting the Chain Conveyor. 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.

Under no circumstances shall the safety characteristics of the Chain Conveyor 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 Chain Conveyor caused by items such as long hair, loose clothing, and jewelry.

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

Safety

Sign-off Form

Norstar Industries follows the general Safety Standards specified by the American Society of Agricultural Engineers (ASAE) and the Occupational Safety and Health Administration (OSHA). Anyone who will be operating and/or maintaining the Chain Conveyor must read and clearly understand ALL Safety, Operating and Maintenance information presented in this Manual.

Do not operate or allow anyone else to operate this equipment until such information has been reviewed. Annually review this information before the season start-up.

Make these periodic reviews of Safety and Operation a standard practice for all of your equipment. We feel that an untrained operator is unqualified to operate this machine.

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

[illegible]

Safety

Safety Decals



IMPORTANT! Along with your shipment will be DANGER, WARNING and CAUTION Decals which will be placed on the Twinline. Read and follow all Safety Decal information in this Manual. Confirm that all Safety Decals are in place and secure before operating the Twinline. 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 Twinline as shown in the Manual drawings.

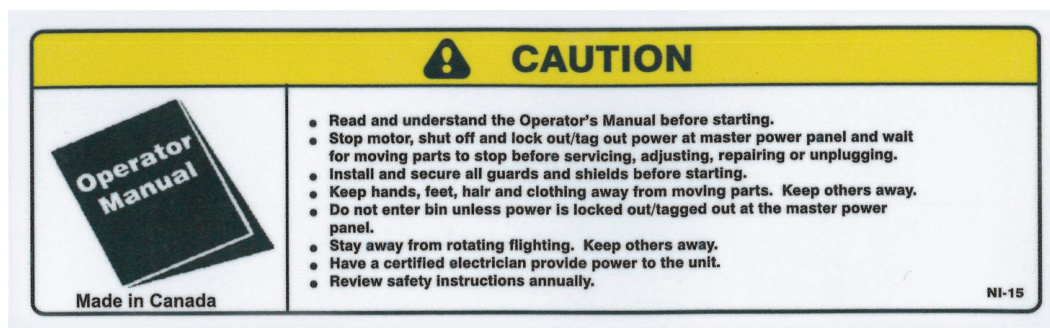


Figure 4
Operator's Manual
Decal NI-15

Operator's Manual

The Operator's Manual Decal NI-15 in **Figure 4** is located on top of the Belt Guard. 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 Twinline. 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 Belt Guard. In addition, this decal should be placed at any and all locations where there is potential exposure to electric power for the Twinline.

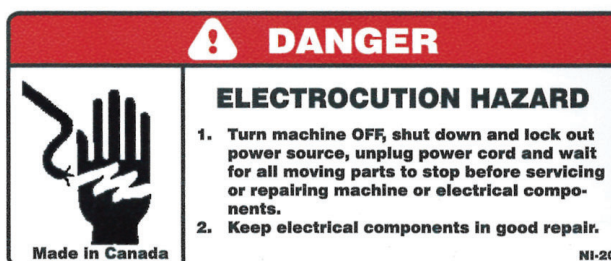


Figure 5
Electrocution Hazard Decal NI-20

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 Chain Conveyor 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

Moving Chain and Rotating Part Hazard



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



Figure 7
Moving Chain Hazard NI-40

The Rotating Part Hazard Decal NI-16 in **Figure 8** is located on both sides of the Drive Section and Take-Up Section, along with the side of 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.

Avoid contact with moving parts while the Twinline is in operation.

Never wear loose-fitting clothing or flowing scarves/jewelry around moving parts or equipment.

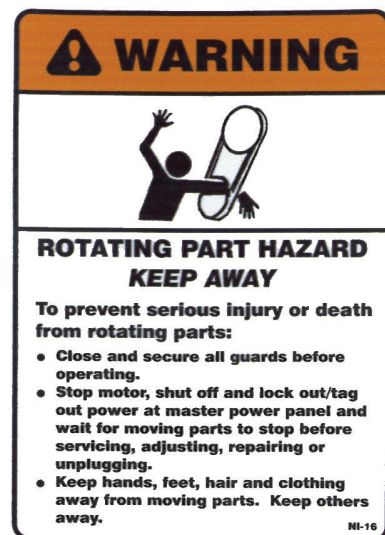


Figure 8
Rotating Part Hazard
Decal NI-16

Gearbox Oil



Figure 9
Gearbox Oil Decal NI-31



WARNING! DO NOT operate the Twinline without gear oil. Gearboxes are shipped dry or without gear oil. Refer to page 27 for proper filling and maintenance. Failure to add the proper type/amount of lubricant BEFORE STARTING the Twinline will cause permanent damage to the Gearbox and will void the Warranty.

The Gearbox Oil Decal NI-31 in **Figure 9** is located on both sides of the Drive Section. Always ensure the Gearbox has oil in it before operating the Twinline. Failure to do so could result in damage to the machine.



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

Flying Material Hazard Decal



WARNING! Eye protection should be worn at all times when in proximity to the Chain Twinline. Failure to wear protective equipment could result in serious injury.

The Flying Material Hazard Decal NI-28 in **Figure 10** is located on the End Panels on the Drive section and Take-Up Section. Covers and gratings are used to protect from moving components. In addition, this decal should be placed at any all locations where there is potential for flying material to make human contact.



Figure 10
Flying Material Hazard NI-28

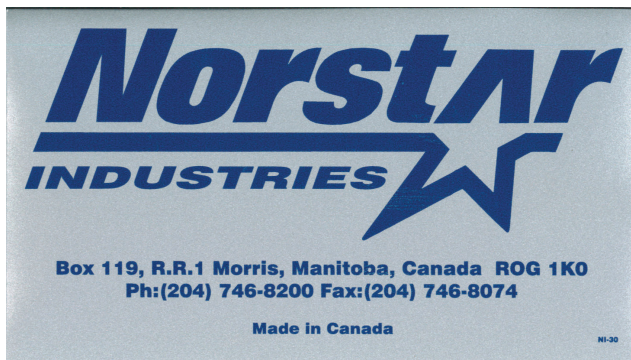


Figure 11
Norstar Info NI-30

Norstar Info

The Norstar Info Decal NI-30 in **Figure 11** is located on both sides of the Drive Section. It contains contact information for Norstar Industries.



Figure 12
Serial Number

Serial Number

The Norstar Serial Number Sticker in **Figure 12** is located on the gearbox mounting plate. It contains the Serial Number of the Chain Twinline.



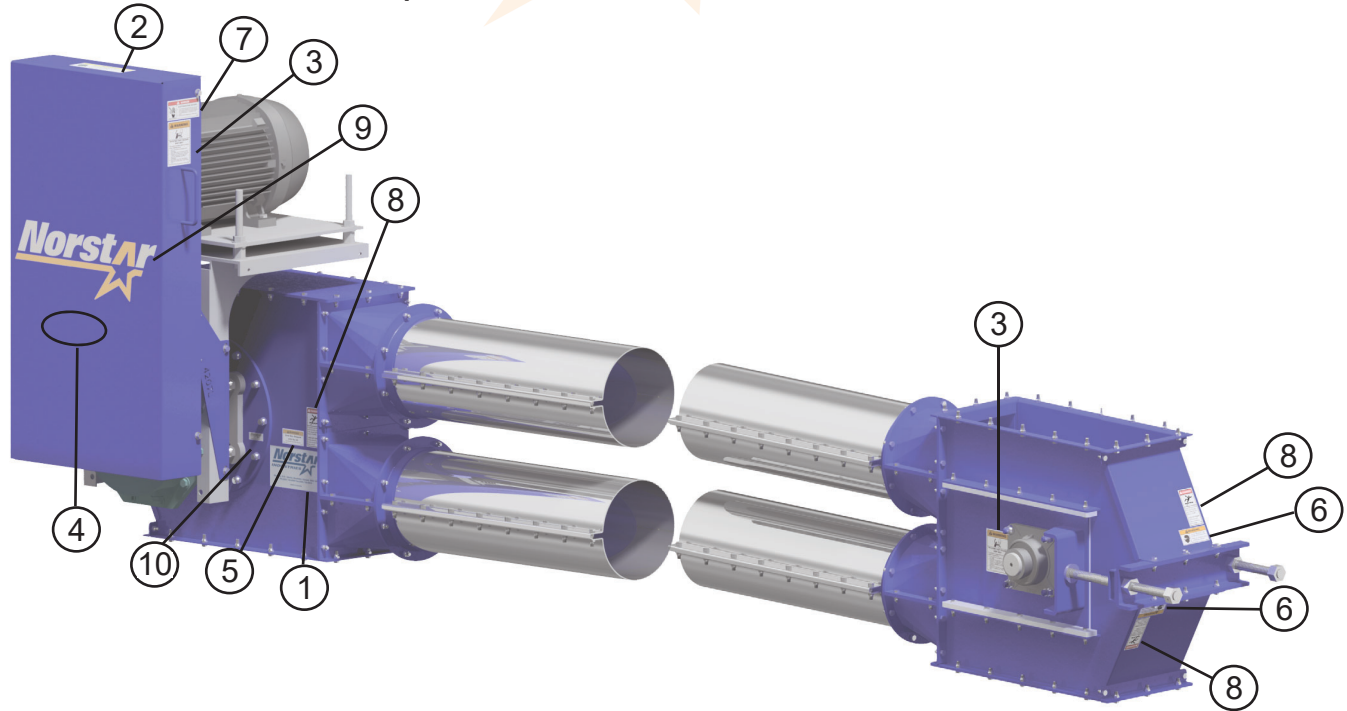
IMPORTANT! If Safety Decals have been damaged, removed, become illegible or parts replaced without decals, new decals must be applied. New decals are available from your authorized dealer

Safety

Safety Decal Placement



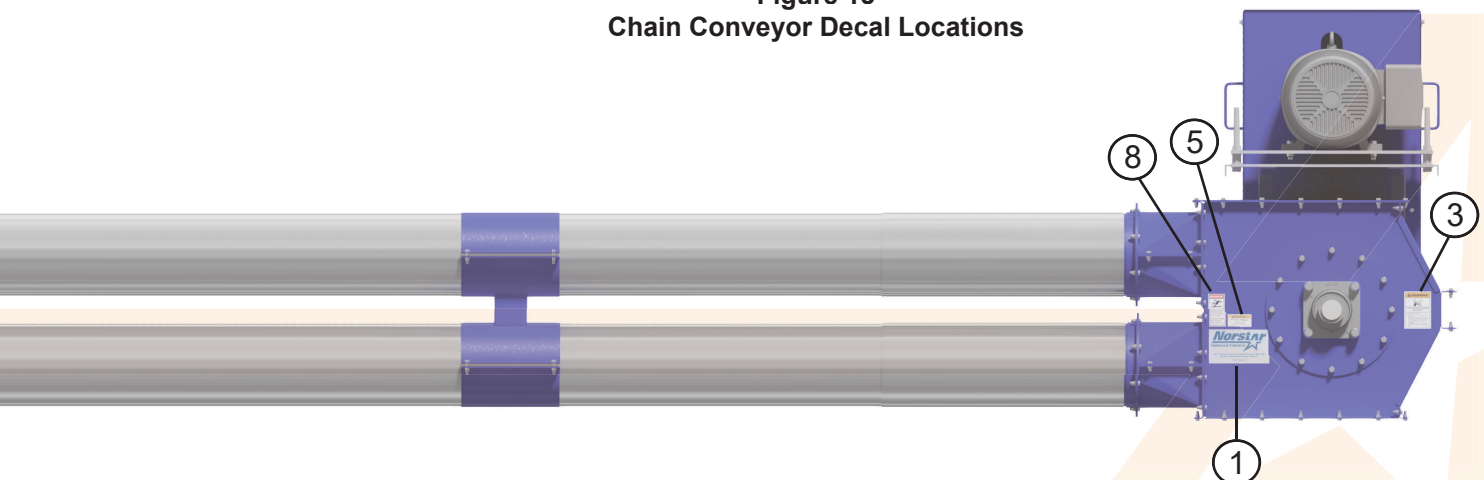
IMPORTANT! Check equipment for **WARNING**, **DANGER** and **CAUTION** decals and their proper placement, **BEFORE** equipment is operated. **NEVER** use equipment if signs are missing, hidden, improperly placed, damaged or altered. Keep them clean and grease-free. Contact your Norstar Dealer for replacements.



Item	Decal Description
1	Norstar Information Decal NI-30
2	CAUTION Read Operator's Manual NI-15
3	WARNING Rotating Part Hazard NI-16
4	DANGER Missing Guard Hazard NI-17
5	WARNING Gearbox No Oil NI-31
6	WARNING Flying Material Hazard NI-28

Item	Decal Description
7	DANGER Electrocution Hazard NI-20
8	DANGER Chain Hazard NI-40
9	Norstar Decal 4" x 11 1/2" NI-10 (varies per Norstar Decal 7" x 19 3/4" NI-12 gearbox size) Norstar Decal 9" x 25 1/4" NI-13
10	Serial # Sticker NIXXXX

Figure 13
Chain Conveyor 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

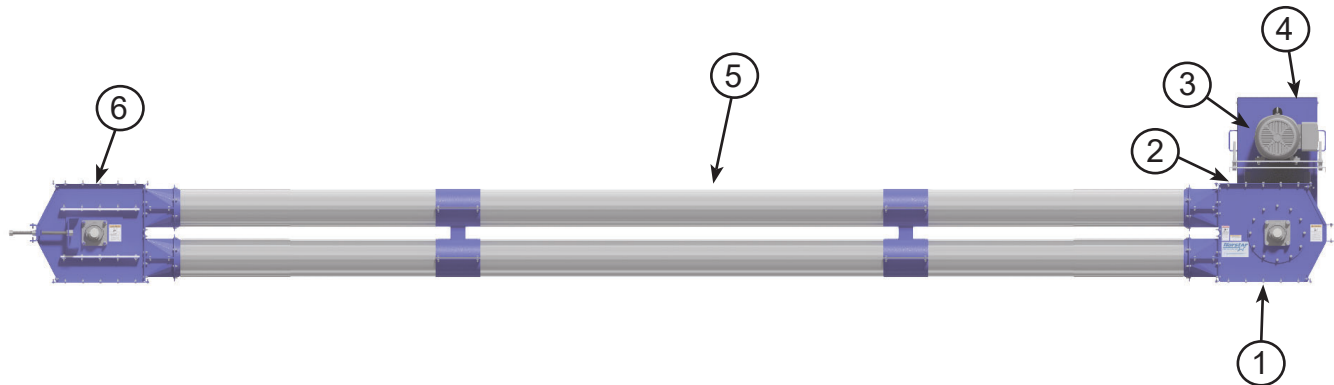
Chain Conveyor Horizontal Overview

Chain Conveyor Features

- 81X and 81XHH Chain
 - Self-Cleaning Tail (Optional)
 - Shaft-mounted gearbox
 - Up to 60 degree incline
- End Slide Gates
 - Bypass Inlet
 - Intermediate Discharge Gates

Standard Specifications

Items	6"	8"	10"	12"
Head Section Drive	Belt Drive or Direct Drive			
Paddle Size	Ø5"	Ø7"	Ø9"	Ø11"
Paddle Thickness	3/8"		1/2"	
Capacity (bu/h) up to	1,500	4,000	6,000	10,000
Chain Speed (FPM) up to	325			400
Shaft RPM up to	125	107	94	92



Item	Description
1	Drive End Section
2	Gearbox
3	Motor
4	Belt Guard

Item	Description
5	Tube Section
6	Take-Up End Section

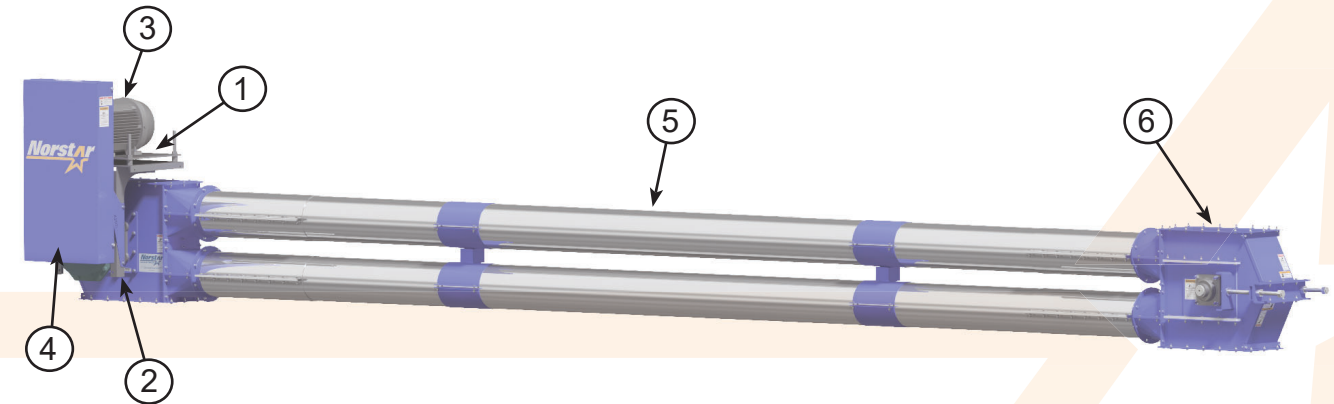


Figure 14
Chain Conveyor Components

Chain



IMPORTANT! It is important to properly tension the Chain. Improper adjusting could result in premature wear and/or damage to the Chain or Conveyor.

Chain Assembly

The Conveyor Chain comes pre-assembled in 10ft sections. To connect Sections of Chain together, locate the connector link and pin. Bring the two (2) Sections of Chain together and connect with the Connecting Link and Pins.

Chain Installation

Insert the Chain into the Bottom Tube Section and run it to the Tail Sprocket.



IMPORTANT! Ensure that the Chain orientation is such that the Paddle Mounting Brackets are positioned behind the Paddles in the direction that material will be flowing. See **Figure 15**

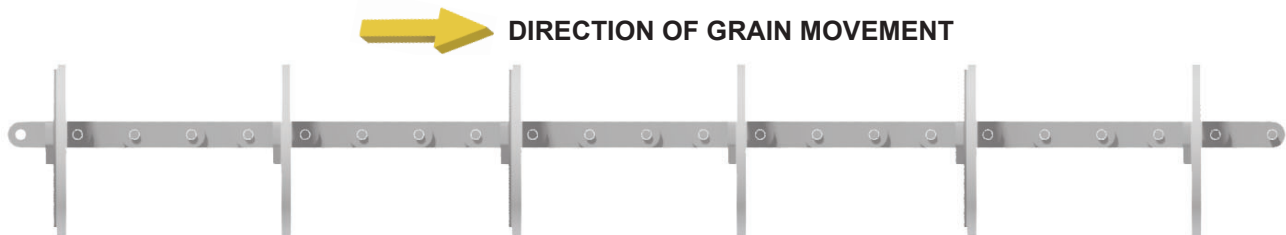


Figure 15
Chain Installation

Wrap around the Sprocket and run the Chain through the Top Tube Section to the Head Sprocket. Once the Chain has been run, connect both ends of the Chain together with a Connecting Link and Pins.



IMPORTANT! It is recommended to run a rope through the tube section to help pull the chain through the Tubes. An RC Car can help run the rope from one end of the Tube to the other.

Chain Tension

Loosen the Jam Nuts on the Tensioner Rods (see **Figure 16**). From the Nut at the end of the Tensioner Rod, rotate to adjust the Tensioner Slide until the Chain is tight.

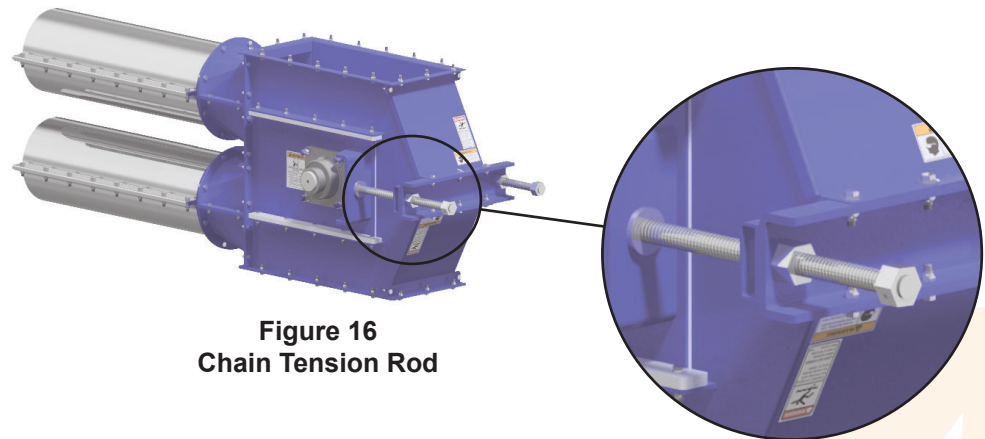


Figure 16
Chain Tension Rod

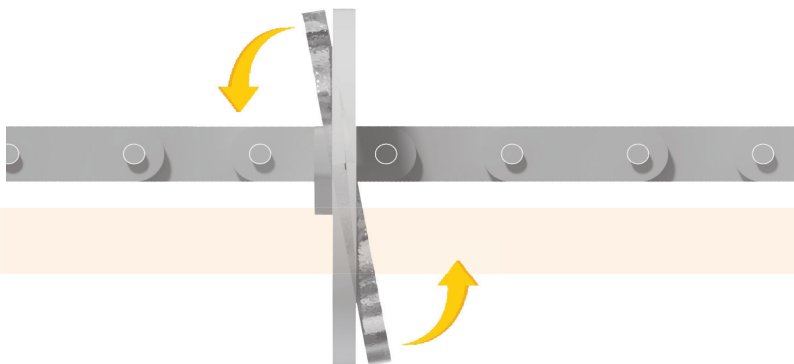


Figure 17
Chain Paddle

To check the Chain Tension, grab and try to rotate a Paddle. If the Chain is properly tensioned, the Paddle should have very little rotational movement. If the Paddle cannot be moved at all, the Chain Tension should be relieved. See **Figure 17**

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 Chain Conveyor Motor.*

Controls

The Owner must provide for appropriate electrical controls (ex. motor controller, etc.) that meet all specifications of the Norstar Industries Chain Conveyor. 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 Chain Conveyors shall have a GROUND connection. Make sure electrical equipment and the Chain Conveyor 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 Chain Conveyor or failure of equipment due to improper electrical installation.*

All electrical devices used with this Chain Conveyor 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 Chain Conveyor. 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 Chain Conveyor 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 10-19 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 Chain Conveyor operation under normal conditions.
- Instruction in Chain Conveyor stopping / location in emergency situations.

Personnel should be alerted to the potential hazard of entanglement in the Chain Conveyor 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 Chain Conveyor. 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 Chain Conveyor and one for Safety) present during each start-up of the Chain Conveyor.

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 Chain Conveyor operation.

Use the Chain Conveyor only for loads it is designed to handle safely. Chain Conveyor 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 Chain Conveyor running unattended.
- Should any damage to the Chain Conveyor occur, shut off, lock out and tag out power immediately.
- Do **NOT** restart the Chain Conveyor until necessary inspections and repairs have been made.
- Shut off, lock out and tag out all power after using the Chain Conveyor.

Operation Procedure

1. Start the Chain Conveyor.
2. Run the Chain Conveyor empty and listen for any banging noises. Should they exist, the problem must be fixed before major damage or premature wear occur.
3. Start grain flow into the Chain Conveyor.
4. Run the Chain Conveyor until the desired amount of grain/material has been moved.
5. Stop grain/material flow.
6. Allow all grain/material to run through the Chain Conveyor until no more grain/material exits through the discharge.
7. Stop the Chain Conveyor.



IMPORTANT! If the Chain Conveyor is to be inoperative for a prolonged period of time, before shutting down, operate the Chain Conveyor 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 Chain Conveyor. Practice safe maintenance.

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

Instruction of Personnel

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

- The reading of the Manual, with particular emphasis on the section “**Safety**” on pages 10-19 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 Chain Conveyor.

Chain Conveyors shall not be maintained or serviced while in operation unless proper maintenance or service requires the Chain Conveyor 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 Chain Conveyor has been STOPPED and the power LOCKED OUT and TAGGED OUT. Wear safety glasses when cleaning or servicing the Chain Conveyor. 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 Chain Conveyor 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 Chain Conveyor is restarted for normal operation (see **Figure 18**).

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 Chain Conveyor with any Guards or Covers off.

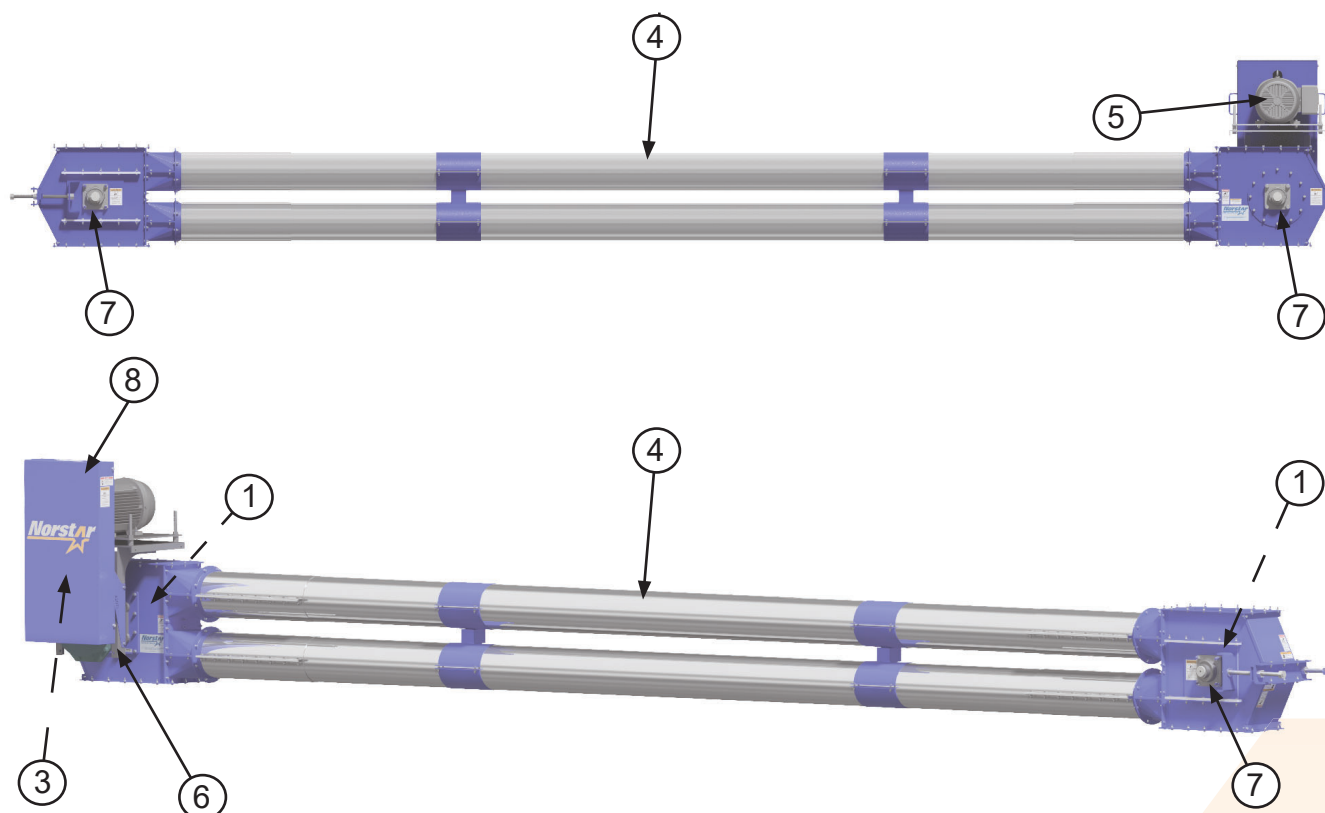


Figure 18
Inspection Locations

Item	Description	Inspect For:	Item	Description	Inspect For:
1	Sprockets	wear and damage	5	Head Motor	wiring good, tight bolts
2	Chain	wear and damage	6	Gearbox	wear and damage, tight bolts
3	Pulleys	wear and damage	7	Bearing	wear and damage, tight bolts
4	Tube	wear and damage	8	Belt Guard	replace when finished

TA-2 Gearbox Overview

The Dodge TA-2 shaft mount reducer design delivers a longer life in demanding applications. It provides maximum reliability with less maintenance to increase operating time. In addition, the Torque-Arm II line has a patented, harsh duty, premium sealing system that uses a harsh duty oil seal protected by a metal excluder seal with rubbing lip. A perfect fit for today's harsh duty industries such as aggregates, mining, cement, asphalt, mixing & milling, grain, and ethanol.



Figure 19
TA-2 Gearbox

TA-2 Gearbox Maintenance

For average industrial operating conditions, the lubricant should be changed every 2500 hours of operation or every 6 months, whichever occurs first. Drain reducer, and flush with kerosene, clean magnetic drain plug and refill to proper level with new lubricant.

Under extreme operating conditions, such as rapid rise and fall of temperature, dust, dirt, chemical particles, chemical fumes, or oil sump temperatures of over 200°F, the oil should be changed every 1 to 3 months, depending on severity of conditions.

When placing the reducer into service:

1. Fill the unit to the proper oil level using recommended lubricant. (*The VCI Oil will NOT affect the new lubricant.*)
2. Clean the shaft extensions with petroleum solvents.
3. Assemble the vent plug into the proper hole.
4. Follow instructions in TA-2 Manual.

See **Lubricants Section** for oil volumes



SCAN THE QR CODE FOR
TA-2 Gearbox Manual

TA-2 Gearbox Storage

During long periods of storage or installation of other equipment, special care should be taken to protect a gear reducer to have it ready to be in the best condition when placed into service.

Preparation:

1. Drain oil from the unit. Add a vapor phase corrosion inhibiting oil (VCI-105 oil by Daubert Chemical Co.) in accordance with **Figure 20**.
2. Seal the unit airtight. Replace the vent plug with a standard pipe plug and wire the vent to the unit.
3. Cover all unpainted exterior parts with a waxy rust preventative compound that will keep oxygen away from bare metal.
4. The instruction manual and lubrication tags are paper and must be kept dry. Either remove those documents and store inside or cover the unit with a durable waterproof cover.
5. Protect reducer from dust, moisture, and other contaminants by storing unit in a dry area.
6. In damp environments, the reducer should be packed inside a moisture-proof container or an envelope of polyethylene containing a desiccant material. If the reducer is to be stored outside, cover the entire exterior with a rust preventative.

Reducer Size	Quantity (Ounces / Milliliter)
TA0107L	1 / 30
TA1107H	1 / 30
TA2115H	1 / 30
TA3203H	1 / 30
TA4207H	1 / 30
TA5215H	2 / 59
TA6307H	2 / 59
TA7315H	3 / 89

Figure 20
Quantities of VCI #105 Oil

Lubricants

Check these points weekly or every fifty (50) hours of operation. Check oil levels in gearboxes and add oil as required (**USE ONLY 80/90 GEAR OIL**). Too much or too little lubricant will cause high operating temperatures that may damage the Chain Conveyor.



WARNING! DO NOT operate the Chain Conveyor without gear oil. GEARBOXES are shipped DRY or WITHOUT GEAR OIL. Refer to specifications above for proper filling and maintenance of the gearbox. Failure to add the proper amount of lubricant BEFORE STARTING the Chain Conveyor will cause permanent damage to the Gearbox and will void the Warranty.

To fill the Chain Conveyor gearbox, remove the plug from the gearbox and fill up to the hole (see **Figure 22**).

- For a TA0107H Gearbox, fill the gearbox with **44.8oz** of oil.
- For a TA1107H Gearbox, fill the gearbox with **54.4oz** of oil.
- For a TA2115H Gearbox, fill the gearbox with **86.4oz** of oil.
- For a TA3203H Gearbox, fill the gearbox with **131.2oz** of oil.
- For a TA4207H Gearbox, fill the gearbox with **236.8oz** of oil.
- For a TA5215H Gearbox, fill the gearbox with **422.4oz** of oil.
- For a TA6307H Gearbox, fill the gearbox with **515.2oz** of oil.
- For a TA7315H Gearbox, fill the gearbox with **720.0oz** of oil.

Gearboxes are not shipped with oil, so immediate filling is required. After an initial operation of about 2 weeks, the oils should be changed. After the initial break in period, the lubricant should be drained, magnetic drain plug cleaned, gear case flushed and refilled ever 2500 hours or every 6 months, whichever occurs first, under average industrial operating conditions.

Check these points weekly or every fifty (50) hours of operation.

Lack of lubricant can lead to premature surface fatigue failure of the balls and/or races. Over lubrication can damage seals and result in premature failure from contamination due to the inability of damaged seals to keep foreign material out of the bearing. When lubricating bearings, add grease in small amounts until the bearing is full. The following chart provides a general guide for lubrication. See **Figure 23**.

Operating Condition	Lubrication Cycle	
	Bearing Temperature	Grease Interval
Clean	32°F to 120°F	6 - 12 Months
	120°F to 150°F	1 - 3 Months
	150°F to 200°F	2 - 4 Weeks
Dirty	32°F to 150°F	2 - 4 Weeks
	150°F to 200°F	Daily to 1 Week
Wet	32°F to 200°F	Daily to 1 Week



Figure 23
Bearing Grease Zerk

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.
- Make sure no tools get left on or around the Chain Conveyor after maintenance.



Figure 21
Gearbox Oil Decal



Figure 22
Gearbox Oil Plug

Troubleshooting

General Troubleshooting

Trouble	Possible Cause	Solution
Incorrect Capacity	Is it due to the Conveyor	Find out if the problem has always existed or if it is a new problem. Take off Head and Tail Covers and any Covers around Inlets to check if levels are correct.
	Improper Chain Speed	Check the Head Shaft RPM. If not possible, check correct Pulley sizes, Gearbox ratio and Motor label RPM.
	Improper Inlet	Inlet is too small. Increase size.
	Loose Chain	Check Chain tension.
	Bent or missing Paddles	Straighten or replace.
Conveyor is making noise	Body Misalignment	Ensure that the section joints align with each other to ensure the paddles don't make contact.
	Chain Misalignment	Check to make sure that the sprocket is centered in the Head/Tail sections.
	Bent Paddles	Check to see if any paddles are bent. Straighten or replace as needed.
	Loose Paddles	Tighten or replace nuts and bolts securing the paddles.
	Worn Sprocket	Replace with a new Sprocket
Product is moving past intermediate discharge gate	Flowability of product and particle size	There is ALWAYS the chance of some material carryover due to material balancing on the chain links and paddles. A ground of sticky product will have more carryover than a whole material. Use a rubber drape or reclaim cups.
	Gate not opening all the way	Find reason for the problem. Remove blockages, re-adjust gate or repair gate as needed.
Chain is breaking	Pins seem loose in side plates	Product being conveyed is abrasive or corrosive and is seizing in between the pin so that they rotate improperly. Replace with different style of chain.
	Chain side plates are splitting open or pulling apart	Verify parameters to see what may have changed. Possible the wrong chain is sized for the application. Chain may be catching somewhere.
	Rollers breaking on chain	Factory probably over hardened rollers. You should be able to hit the roller with a hammer without breaking. If it does break, replace with new chain.

General Troubleshooting Cont'd

Trouble	Possible Cause	Solution
Conveyor is plugging	See if the problem is with the conveyor first.	Find out if the problem has always existed or if it is a new problem. Take off Head and Tail Covers and any Covers around Inlets to check if levels are correct.
	Product not discharging from head or intermediate gate fast enough	Check to see if the discharge transition has too small of an opening and correct transition. If transition seems okay check to see if the conveyor is feeding something that cannot handle the capacity. Is the conveyor speed outputting too much material?
	Intermediate gates are left open and carrying product past after bins are full	Ensure bin fill is being monitored so that the conveyor doesn't overfeed the gate.
Uneven Paddle Wear	Conveyor misalignment	Check to make sure that the conveyor is straight and that the section joints aren't offset at all.
	Sprocket misalignment	Check to see if Sprockets are centered in the Head and Tail. Center if necessary.
Uneven Sprocket Wear	Worn Chain	Replace the chain
	Improper alignment	Check the sprocket alignment to ensure it is centered in the Head and Tail and make sure it is square to the chain travel.

Electrical Troubleshooting

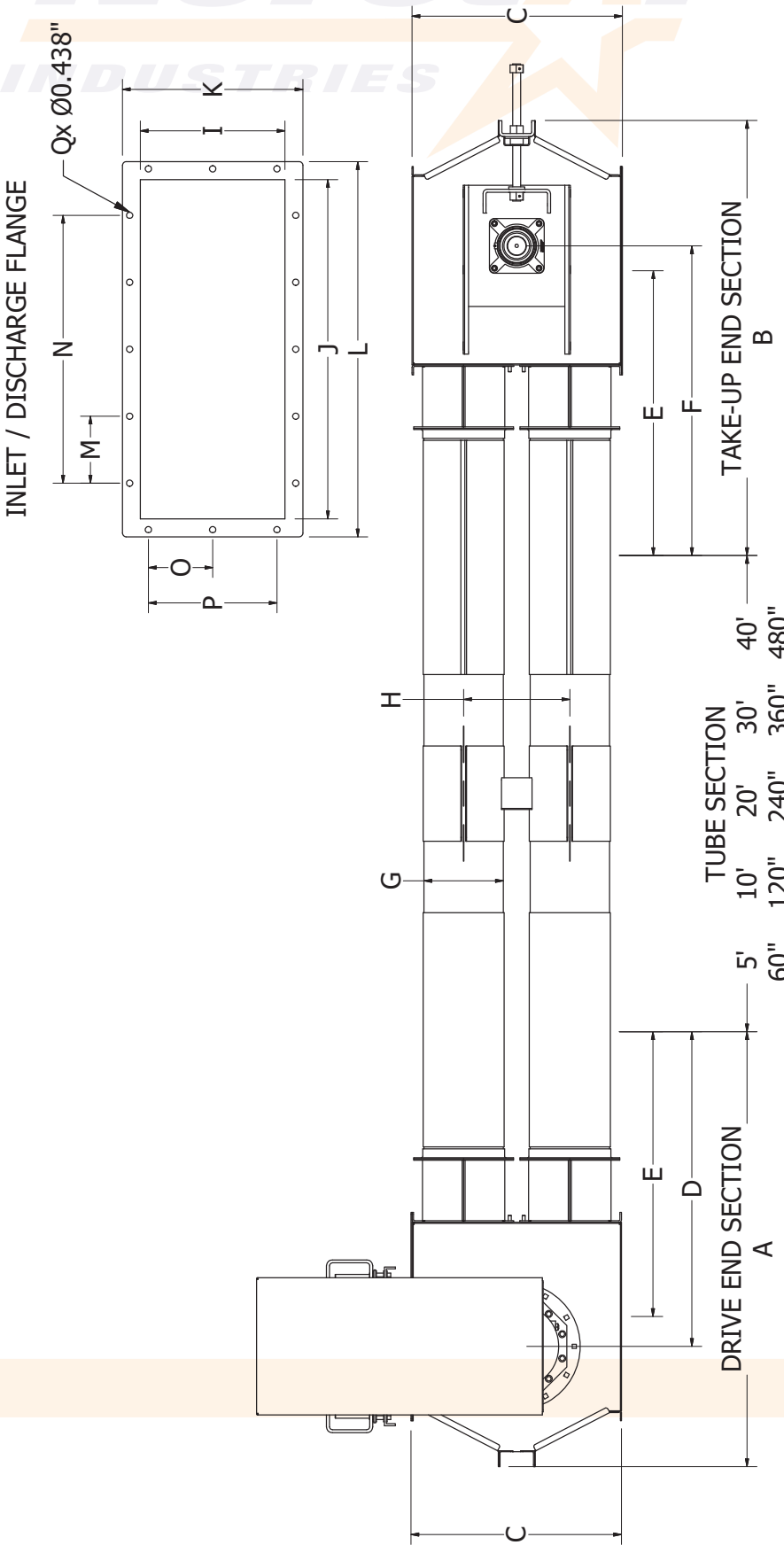
Trouble	Possible Cause	Solution
Low Capacity <i>Material not unloading at full capacity</i>	Low voltage in power source	Check voltage at the motor input. Voltage in power lines may be low. Consult an electrician and/or power company.
Slow Speed <i>Chain Conveyor operating below normal speed</i>	Blown 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.

Speed Reducer Troubleshooting

Trouble	Possible Cause	Solution
Overheating	Load exceeds drive capacity	Check the rated capacity of drive. Replace with drive of sufficient capacity or reduce load.
	Insufficient oil	Check the oil level and increase as needed.
	Too much oil in the drive caused churning and excessive heat is generated by the fluid friction of the churning oil	Check the oil level and remove as needed.
	Wrong grade of oil	Flush and refill to the indicated oil level with the grade specified.
Noise and Vibration	Improper torque arm installation	Check mounting bolts and tighten.
	Failing/worn out bearings	Replace worn bearings.
	Excessively worn gears	Determine if the load exceeds name plate rating. If overloaded, reduce load or replace with reducer of sufficient capacity. Replace gearbox.
	A low oil level reduces the muffling effect of the oil	Check the oil level and increase as needed.
	Loose parts	Inspect drive for broken parts, loose bolts, nuts and screws. Check all keys for proper size and fit. Replace parts as necessary.
Oil leakage	Excessive oil	Check oil level and drain to the indicated oil level
	Clogged breather	Clean or replace breather. Clean breather hole with pipe cleaner and a suitable non-flammable solvent.
	Worn seals	Replace seals.
Shaft Slippage	Missing key or loose bushing	Replace key and/or tighten bushing.
Excessive Shaft End Play	Worn bearings	Worn bearing balls and raceways have a dulled appearance. Replace worn bearings. Clean and flush drive and replace oil.
Excessive Backlash	Worn gears or loose parts	Replace worn gears and keys. Tighten loose screws.

Spec Sheet

Chain Twinline Spec Sheet



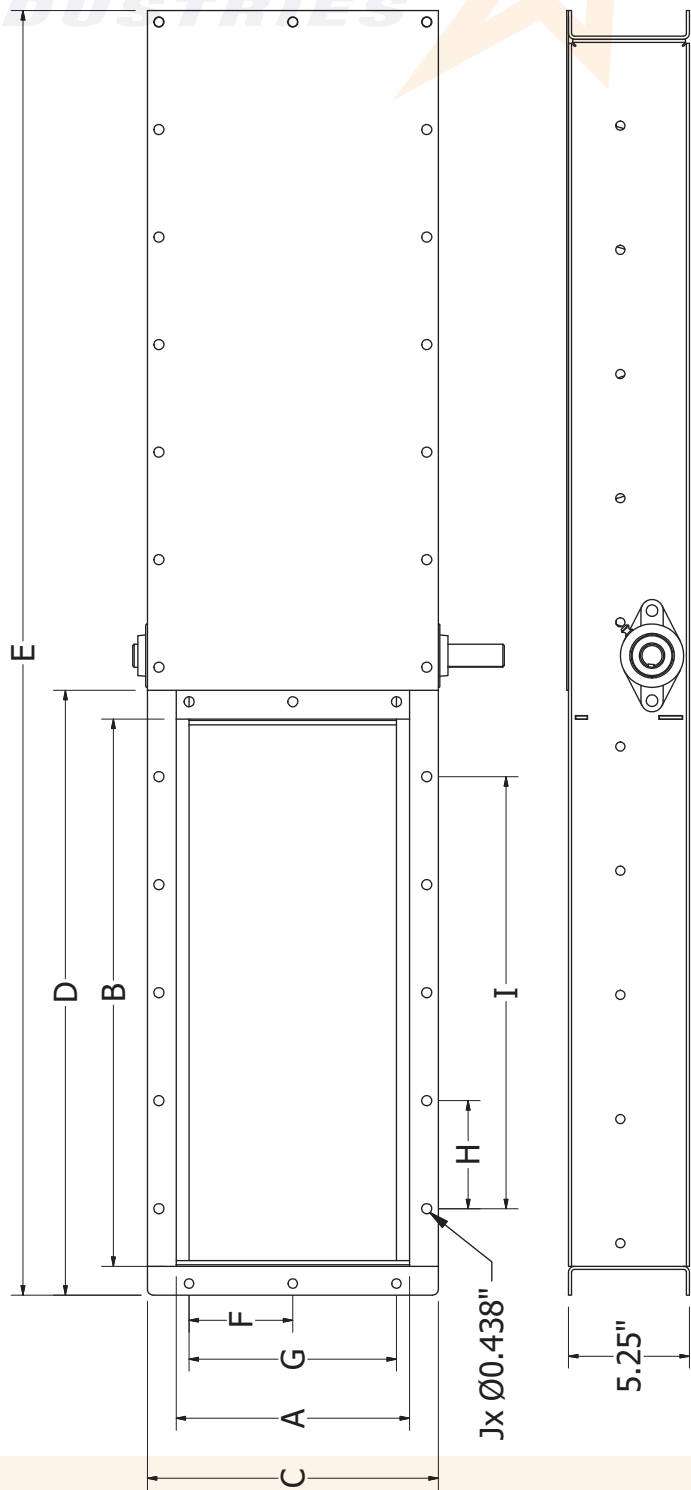
MODEL	A	STD TAKE-UP	SC TAKE-UP	C	D	E	MIN	MAX	G	H
6"	47"	47"	55.5"	18.5"	34.125"	32"	30.5"	35"	6"	10"
8"	52.75"	52.75"	64.75"	22.75"	39.5"	34.875"	33"	39"	8"	11.75"
10"	54.875"	54.875"	67.375"	26.375"	39.625"	35.875"	33"	39"	10"	13.375"
12"	60.188"	60.188"	73.688"	31.688"	43.25"	38"	35"	41"	12"	16.688"

MODEL	I	J	K	L	M	N	O	P	Q
6"	6.125"	16"	8.625"	18.5"	5.5"	11"	3"	6"	12
8"	8.125"	21.75"	10.625"	24.25"	5.583"	16.75"	3.5"	7"	14
10"	10.125"	23.75"	12.625"	26.25"	4.688"	18.75"	4.5"	9"	16
12"	12.125"	28"	15.125"	31"	5.75"	23"	5.5"	11"	16

Spec Sheet

Chain Twinline Spec Sheet

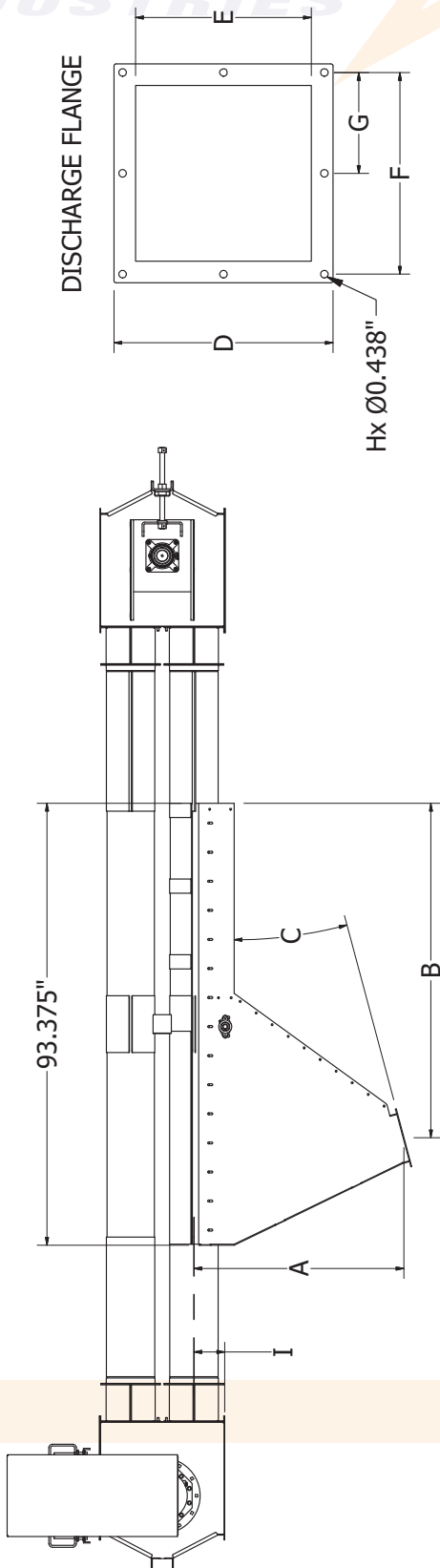
End Discharge Gate



MODEL	A	B	C	D	E	F	G	H	I	J
6" Standard End	6.125"	16"	8.625"	18.5"	40.25"	3"	6"	5.5"	11"	12
6" SC Take-up End	6.125"	24.5"	8.625"	27"	57.25"	3"	6"	6.5"	19.5"	14
8" Standard End	8.125"	21.75"	10.625"	24.25"	51.75"	3.5"	7"	5.583"	16.75"	14
8" SC Take-up End	8.125"	33.75"	10.625"	36.25"	75.75"	3.5"	7"	7.188"	28.75"	16
10" Standard End	10.125"	23.75"	12.625"	26.25"	55.75"	4.5"	9"	4.688"	18.75"	16
10" SC Take-up End	10.125"	36.25"	12.625"	38.75"	80.75"	4.5"	9"	6.25"	31.25"	18
12" Standard End	12.125"	28"	15.125"	31"	64.75"	5.5"	11"	5.75"	23"	16
12" SC Take-up End	12.125"	41.5"	15.125"	44.5"	91.75"	5.5"	11"	7.3"	36.5"	18

Spec Sheet

Chain Twinline Spec Sheet
Intermediate Discharge Gate

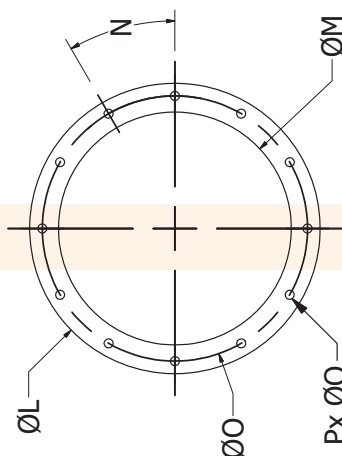
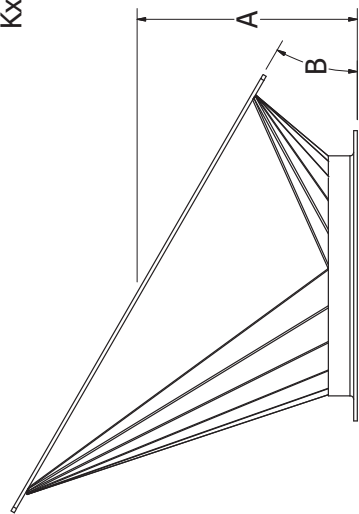
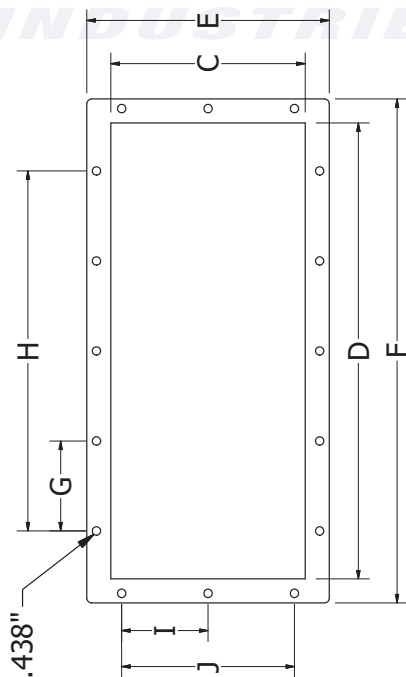


MODEL	A	B	C	D	E	F	G	H	I
6" x 0°	44.188"	91.188"	0°	8.625"	6.125"	7.625"	3.813"	8	4.5"
6" x 15°	43.405"	71.483"	15°	8.625"	6.125"	7.625"	3.813"	8	4.5"
6" x 30°	42.662"	58.615"	30°	8.625"	6.125"	7.625"	3.813"	8	4.5"
6" x 45°	42.011"	48.562"	45°	8.625"	6.125"	7.625"	3.813"	8	4.5"
8" x 0°	45.188"	91.188"	0°	10.625"	8.125"	9.625"	4.813"	8	5.5"
8" x 15°	44.146"	71.073"	15°	10.625"	8.125"	9.625"	4.813"	8	5.5"
8" x 30°	43.162"	58.097"	30°	10.625"	8.125"	9.625"	4.813"	8	5.5"
8" x 45°	42.304"	48.121"	45°	10.625"	8.125"	9.625"	4.813"	8	5.5"
10" x 0°	46.188"	91.188"	0°	12.625"	10.125"	11.625"	5.813"	8	6.5"
10" x 15°	44.887"	70.663"	15°	12.625"	10.125"	11.625"	5.813"	8	6.5"
10" x 30°	43.662"	57.579"	30°	12.625"	10.125"	11.625"	5.813"	8	6.5"
10" x 45°	42.597"	47.679"	45°	12.625"	10.125"	11.625"	5.813"	8	6.5"
12" x 0°	47.188"	90.188"	0°	15.125"	12.125"	14"	4.66"	12	7.5"
12" x 15°	45.628"	69.253"	15°	15.125"	12.125"	14"	4.66"	12	7.5"
12" x 30°	44.162"	56.061"	30°	15.125"	12.125"	14"	4.66"	12	7.5"
12" x 45°	42.890"	46.238"	45°	15.125"	12.125"	14"	4.66"	12	7.5"

Spec Sheet

Chain Twinline Spec Sheet

Discharge to Round Transition

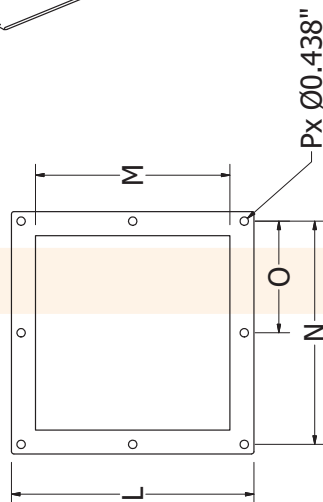
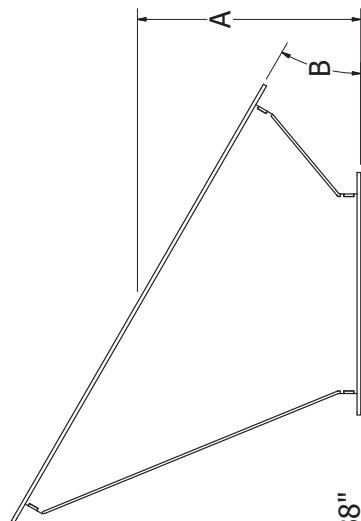
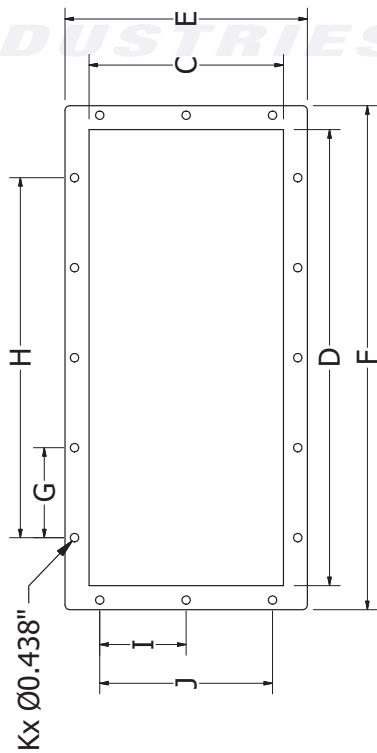


MODEL	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
6" x 0°	10.443"	0°	6.125"	16"	8.625"	18.5"	5.5"	11"	3"	6"	12	8.563"	6.063"	60°	7.5"	6	3/8"
6" x 15°	9.422"	15°	6.125"	16"	8.625"	18.5"	5.5"	11"	3"	6"	12	8.563"	6.063"	60°	7.5"	6	3/8"
6" x 30°	9.479"	30°	6.125"	16"	8.625"	18.5"	5.5"	11"	3"	6"	12	8.563"	6.063"	60°	7.5"	6	3/8"
6" x 45°	10.402"	45°	6.125"	16"	8.625"	18.5"	5.5"	11"	3"	6"	12	8.563"	6.063"	60°	7.5"	6	3/8"
6" x 60°	10.875"	60°	6.125"	16"	8.625"	18.5"	5.5"	11"	3"	6"	12	8.563"	6.063"	60°	7.5"	6	3/8"
8" x 0°	11.443"	0°	8.125"	21.75"	10.625"	24.25"	5.583"	16.75"	3.5"	7"	14	12.563"	10.063"	45°	11.5"	8	3/8"
8" x 15°	10.405"	15°	8.125"	21.75"	10.625"	24.25"	5.583"	16.75"	3.5"	7"	14	12.563"	10.063"	45°	11.5"	8	3/8"
8" x 30°	10.537"	30°	8.125"	21.75"	10.625"	24.25"	5.583"	16.75"	3.5"	7"	14	12.563"	10.063"	45°	11.5"	8	3/8"
8" x 45°	11.286"	45°	8.125"	21.75"	10.625"	24.25"	5.583"	16.75"	3.5"	7"	14	12.563"	10.063"	45°	11.5"	8	3/8"
8" x 60°	13.573"	60°	8.125"	21.75"	10.625"	24.25"	5.583"	16.75"	3.5"	7"	14	12.563"	10.063"	45°	11.5"	8	3/8"
10" x 0°	12.693"	0°	10.125"	23.75"	12.625"	26.25"	4.688"	18.75"	4.5"	9"	16	15.125"	12.125"	30°	13.813"	12	7/16"
10" x 15°	11.380"	15°	10.125"	23.75"	12.625"	26.25"	4.688"	18.75"	4.5"	9"	16	15.125"	12.125"	30°	13.813"	12	7/16"
10" x 30°	11.470"	30°	10.125"	23.75"	12.625"	26.25"	4.688"	18.75"	4.5"	9"	16	15.125"	12.125"	30°	13.813"	12	7/16"
10" x 45°	13.127"	45°	10.125"	23.75"	12.625"	26.25"	4.688"	18.75"	4.5"	9"	16	15.125"	12.125"	30°	13.813"	12	7/16"
10" x 60°	15.223"	60°	10.125"	23.75"	12.625"	26.25"	4.688"	18.75"	4.5"	9"	16	15.125"	12.125"	30°	13.813"	12	7/16"
12" x 0°	14.693"	0°	12.125"	28"	15.125"	31"	5.75"	23"	5.5"	11"	16	17.125"	14.125"	30°	15.813"	12	7/16"
12" x 15°	12.829"	15°	12.125"	28"	15.125"	31"	5.75"	23"	5.5"	11"	16	17.125"	14.125"	30°	15.813"	12	7/16"
12" x 30°	13.394"	30°	12.125"	28"	15.125"	31"	5.75"	23"	5.5"	11"	16	17.125"	14.125"	30°	15.813"	12	7/16"
12" x 45°	14.364"	45°	12.125"	28"	15.125"	31"	5.75"	23"	5.5"	11"	16	17.125"	14.125"	30°	15.813"	12	7/16"
12" x 60°	17.330"	60°	12.125"	28"	15.125"	31"	5.75"	23"	5.5"	11"	16	17.125"	14.125"	30°	15.813"	12	7/16"

Spec Sheet

Chain Twinline Spec Sheet

Discharge to Square Transition



MODEL	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
6" x 0°	9.875"	0°	6.125"	16"	8.625"	18.5"	5.5"	11"	3"	6"	12	8.625"	6.125"	7.625"	3.813"	8
6" x 15°	9.155"	15°	6.125"	16"	8.625"	18.5"	5.5"	11"	3"	6"	12	8.625"	6.125"	7.625"	3.813"	8
6" x 30°	9.452"	30°	6.125"	16"	8.625"	18.5"	5.5"	11"	3"	6"	12	8.625"	6.125"	7.625"	3.813"	8
6" x 45°	10.103"	45°	6.125"	16"	8.625"	18.5"	5.5"	11"	3"	6"	12	8.625"	6.125"	7.625"	3.813"	8
6" x 60°	10.574"	60°	6.125"	16"	8.625"	18.5"	5.5"	11"	3"	6"	12	8.625"	6.125"	7.625"	3.813"	8
8" x 0°	12.375"	0°	8.125"	21.75"	10.625"	24.25"	5.583"	16.75"	3.5"	7"	14	10.625"	8.125"	9.625"	4.813"	8
8" x 15°	11.466"	15°	8.125"	21.75"	10.625"	24.25"	5.583"	16.75"	3.5"	7"	14	10.625"	8.125"	9.625"	4.813"	8
8" x 30°	11.876"	30°	8.125"	21.75"	10.625"	24.25"	5.583"	16.75"	3.5"	7"	14	10.625"	8.125"	9.625"	4.813"	8
8" x 45°	12.608"	45°	8.125"	21.75"	10.625"	24.25"	5.583"	16.75"	3.5"	7"	14	10.625"	8.125"	9.625"	4.813"	8
8" x 60°	13.597"	60°	8.125"	21.75"	10.625"	24.25"	5.583"	16.75"	3.5"	7"	14	10.625"	8.125"	9.625"	4.813"	8
10" x 0°	12.375"	0°	10.125"	23.75"	12.625"	26.25"	4.688"	18.75"	4.5"	9"	16	12.625"	10.125"	11.625"	5.813"	8
10" x 15°	11.298"	15°	10.125"	23.75"	12.625"	26.25"	4.688"	18.75"	4.5"	9"	16	12.625"	10.125"	11.625"	5.813"	8
10" x 30°	11.635"	30°	10.125"	23.75"	12.625"	26.25"	4.688"	18.75"	4.5"	9"	16	12.625"	10.125"	11.625"	5.813"	8
10" x 45°	12.550"	45°	10.125"	23.75"	12.625"	26.25"	4.688"	18.75"	4.5"	9"	16	12.625"	10.125"	11.625"	5.813"	8
10" x 60°	13.706"	60°	10.125"	23.75"	12.625"	26.25"	4.688"	18.75"	4.5"	9"	16	12.625"	10.125"	11.625"	5.813"	8
12" x 0°	14.375"	0°	12.125"	28"	15.125"	31"	5.75"	23"	5.5"	11"	16	15.125"	12.125"	14"	4.66"	12
12" x 15°	13.127"	15°	12.125"	28"	15.125"	31"	5.75"	23"	5.5"	11"	16	15.125"	12.125"	14"	4.66"	12
12" x 30°	13.376"	30°	12.125"	28"	15.125"	31"	5.75"	23"	5.5"	11"	16	15.125"	12.125"	14"	4.66"	12
12" x 45°	14.436"	45°	12.125"	28"	15.125"	31"	5.75"	23"	5.5"	11"	16	15.125"	12.125"	14"	4.66"	12
12" x 60°	15.738"	60°	12.125"	28"	15.125"	31"	5.75"	23"	5.5"	11"	16	15.125"	12.125"	14"	4.66"	12

Bolt Torque

CHECKING BOLT TORQUE

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

ENGLISH TORQUE SPECIFICATION

Bolt Diameter	Bolt Torque*					
	SAE 2		SAE 5		SAE 8	
"A"	N.m.	(lb-ft)	N.m.	(lb-ft)	N.m.	(lb-ft)
1/4"	8	(6)	12	(9)	17	(12)
5/16"	13	(10)	25	(19)	36	(27)
3/8"	27	(20)	45	(33)	63	(45)
7/16"	41	(30)	72	(53)	100	(75)
1/2"	61	(45)	110	(80)	155	(115)
9/16"	95	(70)	155	(115)	220	(165)
5/8"	128	(95)	215	(160)	305	(220)
3/4"	225	(165)	390	(290)	540	(400)
7/8"	230	(170)	570	(420)	880	(650)
1"	345	(225)	850	(630)	1320	(970)



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

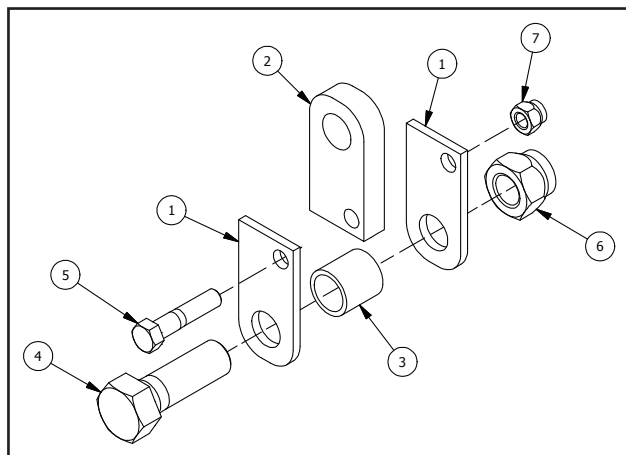
*Torque value for bolts and capscrews are identified by their head markings.

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

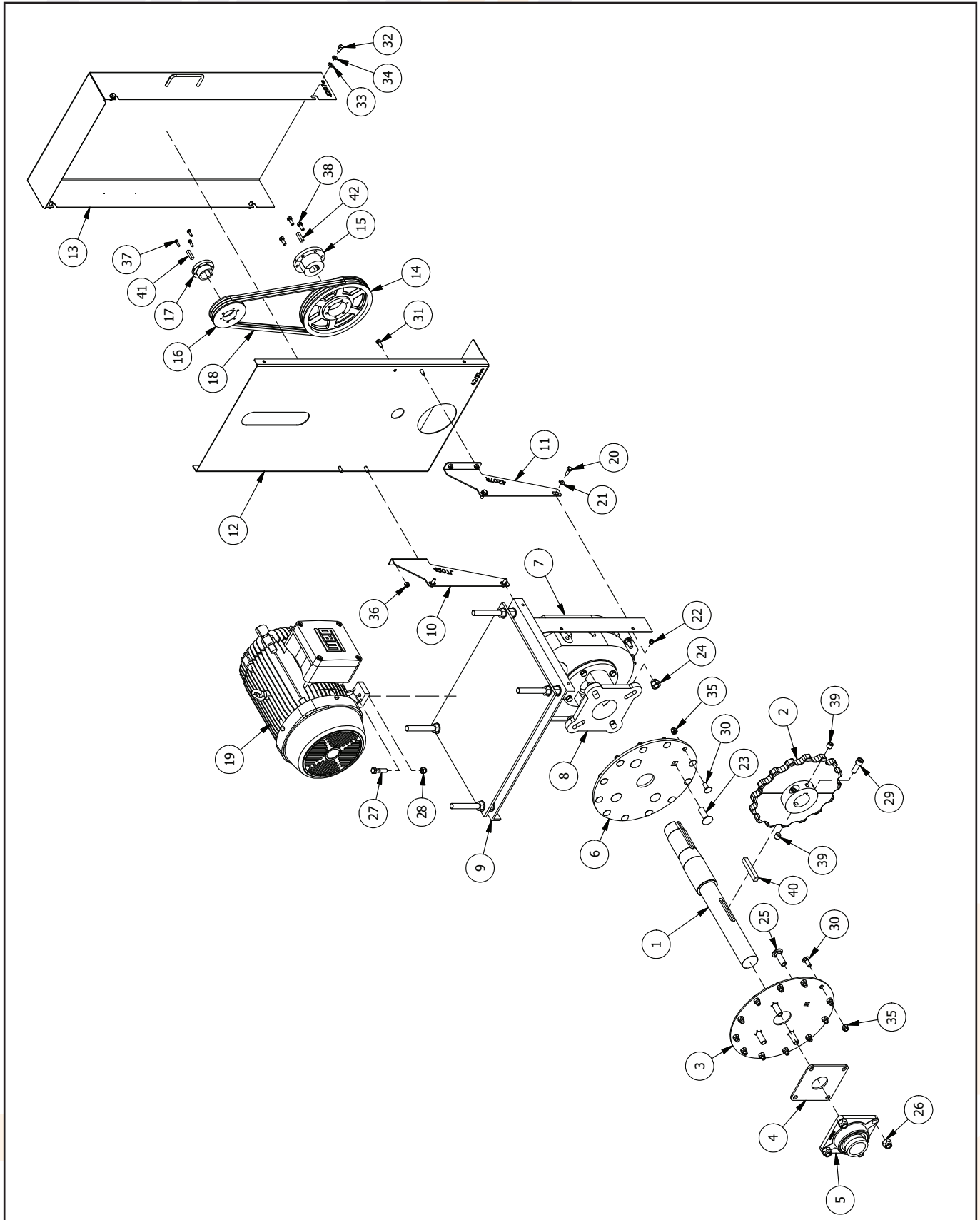
The part number is the number by which the component may be identified and ordered from your dealer.

QUANTITY

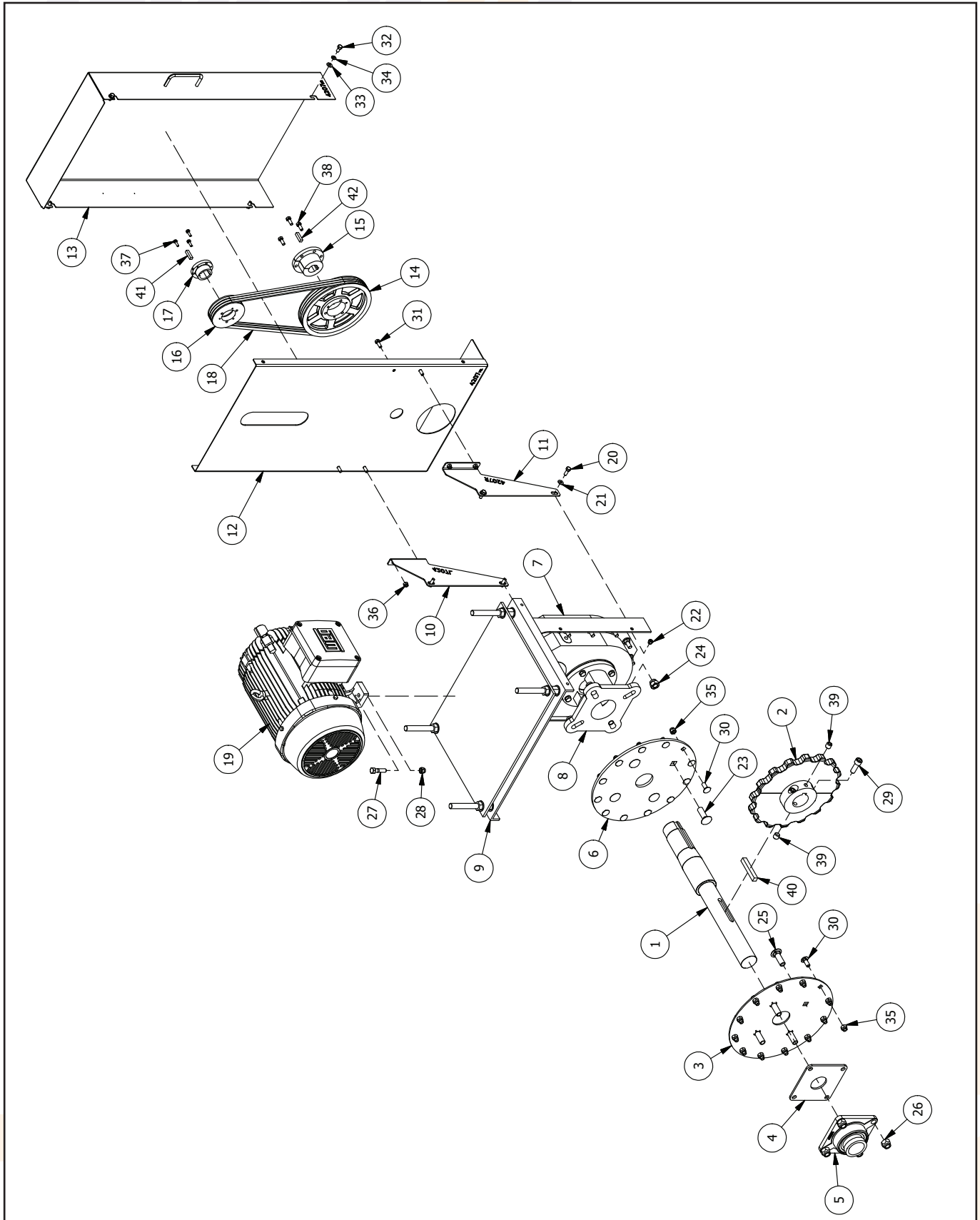
This column contains the quantity of the items in the assembly.

#s	DESCRIPTION	PART #	QTY
Shaft			
1	Drive: 70377, 73073, 73074	57903	1
	Drives: 70378, 70379	57904	1
	Drive: 70380	57905	1
	Drive: 70381	57908	1
Sprocket			
2	Drives: 70377, 70378, 70379, 73073, 73074	63317	1
	Drive: 70380, 70381	63318	1
Bearing Mount Plate			
3	Drives: 70377, 70378, 70379, 73073, 73074	70370	1
	Drive: 70380, 70381	70371	1
Bearing Seal			
4	Drives: 70377, 70378, 70379, 73073, 73074	57781	1
	Drive: 70380, 70381	57782	1
Bearing			
5	Drives: 70377, 70378, 70379, 73073, 73074	11068	1
	Drive: 70380, 70381	13693	1
CEMA Mount Plate			
6	Drives: 70377, 70378, 70379, 73073, 73074	70361	1
	Drive: 70380, 70381	70362	1
Gearbox			
7	Drive: 70377, 73073, 73074	35983	1
	Drives: 70378, 70379, 70380	35987	1
	Drive: 70381	35989	1
CEMA Adapter			
8	Drive: 70377, 73073, 73074	25182	1
	Drives: 70378, 70379, 70380	25186	1
	Drive: 70381	25190	1
Motor Mount Assembly			
9	Drive: 70377, 73073, 73074	25183	1
	Drives: 70378, 70379, 70380	25187	1
	Drive: 70381	25191	1
Left Belt Guard Mount			
10	Drive: 70377, 73073, 73074	22303	1
	Drives: 70378, 70379, 70380	22305	1
	Drive: 70381	22307	1
Right Belt Guard Mount			
11	Drive: 70377, 73073, 73074	22304	1
	Drives: 70378, 70379, 70380	22306	1
	Drive: 70381	22308	1

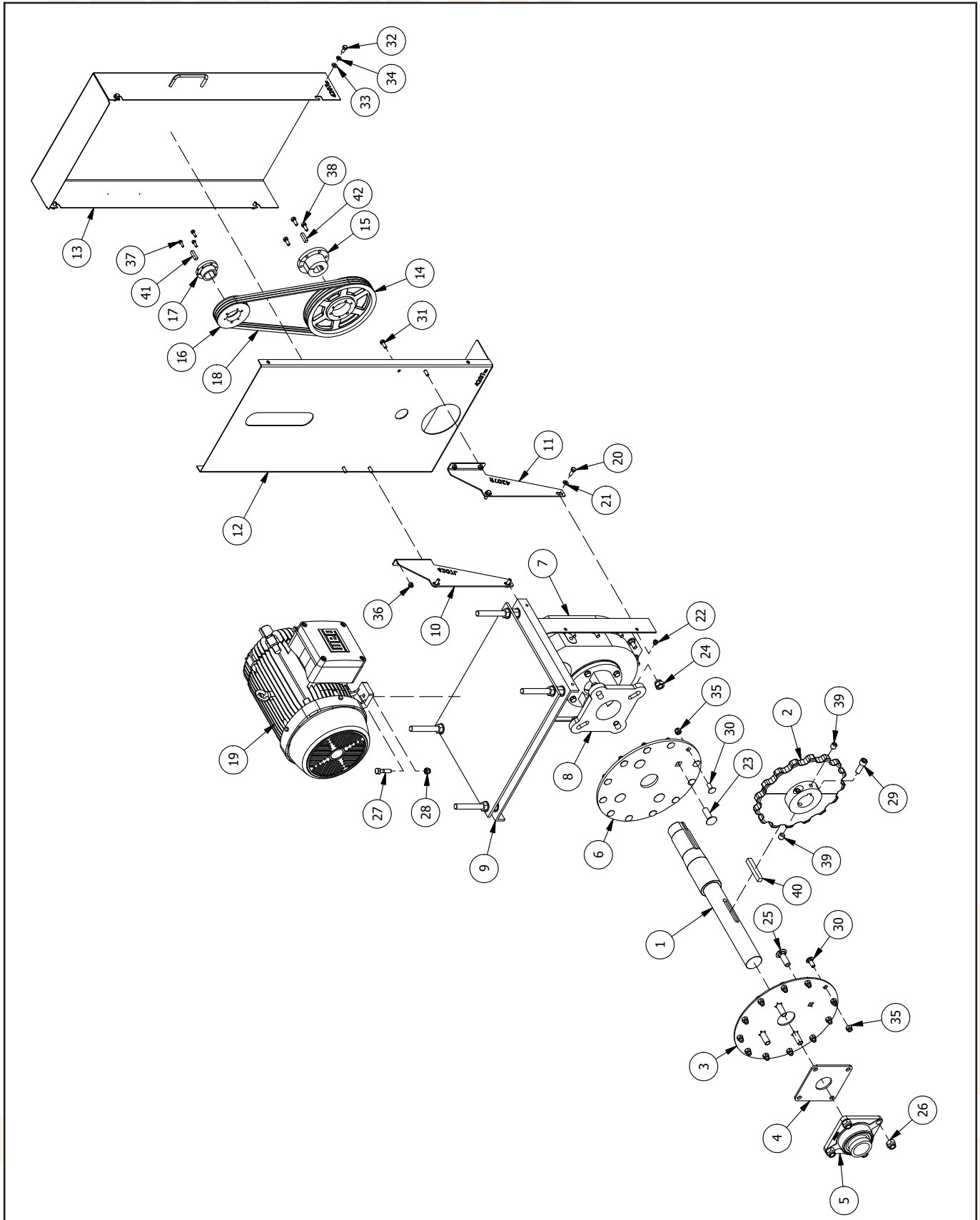
#s	DESCRIPTION	PART #	QTY
Rear Belt Guard			
12	Drives: 70377, 73073, 73074	57793	1
	Drives: 70378, 70379, 70380	57794	1
	Drive: 70381	22284	1
Front Belt Guard			
13	Drives: 70377, 73073, 73074	57811	1
	Drives: 70378, 70379, 70380	57812	1
	Drive: 70381	23894	1
14	Pulley	see next page	
15	Pulley Hub	see next page	
16	Motor Pulley	see next page	
17	Motor Pulley Hub	see next page	
18	Belt	see next page	
19	Motor	varies	1
20	3/8 x 1 1/4" Bolt	10311	4
21	3/8" Flatwasher	10275	4
22	3/8" Nylon Locknut	10274	4
23	5/8 x 2" Carriage Bolt	34349	4
24	5/8" Nylon Locknut	10313	4
25	1/2 x 1 3/4" Carriage Bolt	31614	4
	Drives: 70377, 70378, 70379, 73073, 73074		
	5/8 x 2" Carriage Bolt	34349	4
26	Drives: 70380, 70381		
	1/2" Nylon Locknut	10318	4
	Drives: 70377, 70378, 70379, 73073, 73074		
27	5/8" Nylon Locknut	10313	4
	Drives: 70380, 70381		
	5/16 x 1 3/4" Bolt	48925	4
28	Drives: 73073, 73074		
	3/8 x 1 3/4" Bolt	15780	4
	Drives: 70377, 70378, 70379, 70380, 70381		
29	5/16" Nylon Locknut	10290	4
	Drives: 73073, 73074		
	3/8" Nylon Locknut	10274	4
30	Drives: 70377, 70378, 70379, 70380, 70381		



#s	DESCRIPTION	PART #	QTY
29	Sprocket Socket Head Cap Screw	c/w sprocket	4
30	1/2 x 1 1/4" Carriage Bolt	34004	24
31	3/8 x 1" Bolt	10277	4
32	3/8 x 3/4" Bolt	10369	4
33	3/8" Flatwasher SM OD	10275	4
34	3/8" Lockwasher	10276	4
35	1/2" Nylon Locknut	10318	24
36	3/8" Nylon Locknut	10274	4
37	Motor Hub Bolt	c/w motor hub	n/a
38	Hub Bolt	c/w hub	n/a
Setscrew			
39	Drives: 70377, 570378, 70379, 73073, 73074	23716	4
	Drives: 70380, 70381	35980	4
Key			
40	Drives: 70377, 70378, 70379, 73073, 73074	63482	1
	Drives: 70380, 70381	63483	1
41	Motor Hub Key	c/w motor hub	1
42	Hub Key	c/w hub	1



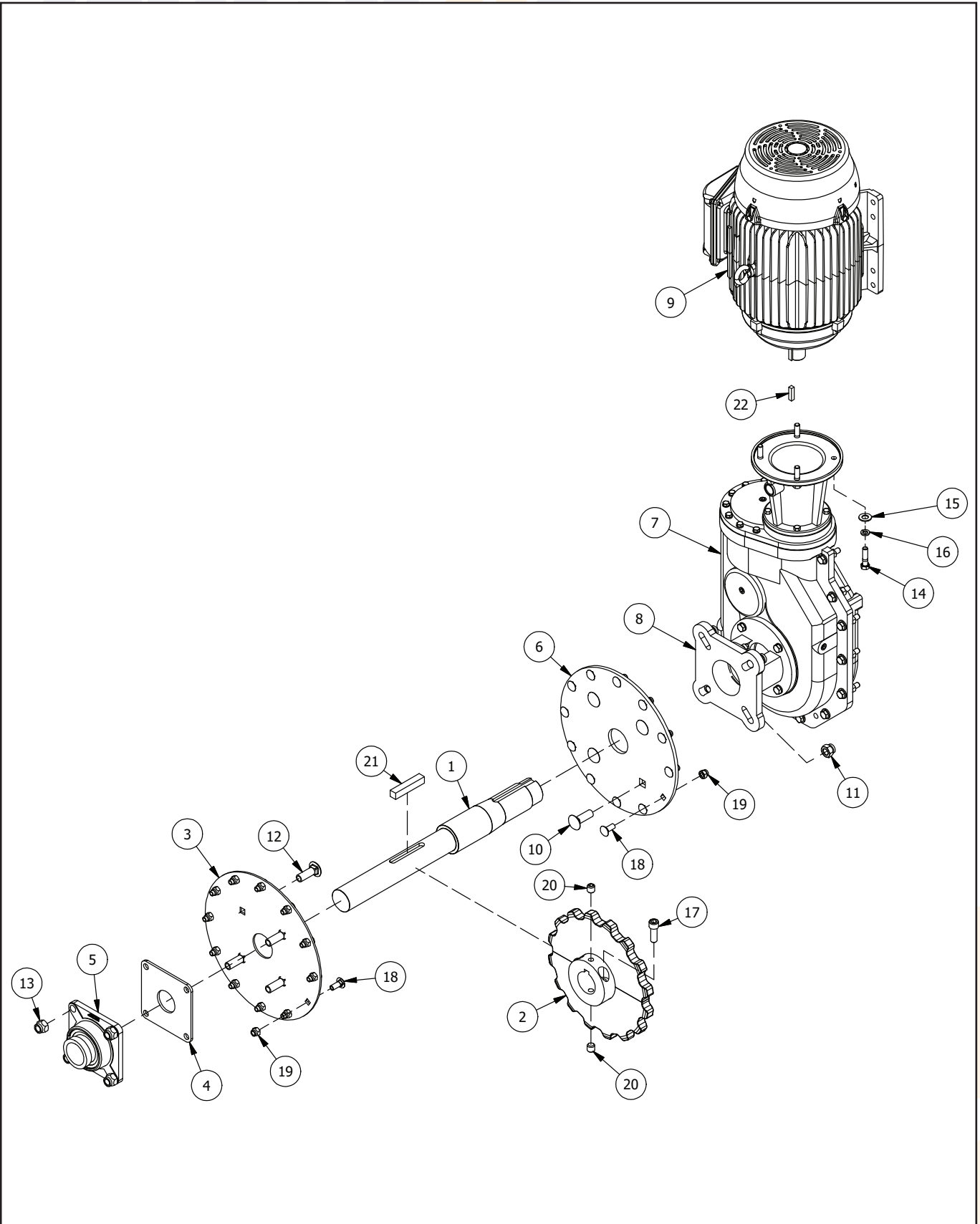
Drive Part #	Item 14 - Pulley			Item 15 - Hub			Item 16 - Motor Pulley			Item 17 - Motor Hub			Item 18 - Belts		
	SIZE	PART #	QTY	SIZE	PART #	QTY	SIZE	PART #	QTY	SIZE	PART #	QTY	SIZE	PART #	QTY
70377	3V562	17880	1	SH1	19757	1	3V3652	57278	1	SH118	17932	1	3VX530	20459	2
70378	3V562	17880	1	SH1	19757	1	3V3652	57278	1	SH118	17932	1	3VX530	20459	2
70379	3V563	17881	1	SDS1	19746	1	3V3653	62955	1	SH138	13832	1	3VX560	20460	3
70380	3V693	17894	1	SDS1	19746	1	3V453	17868	1	SDS138	17923	1	3VX600	20462	3
70381	3V693	17894	1	SDS118	17922	1	3V453	17868	1	SDS138	17923	1	3VX530	20459	3
73073	3V4121	65494	1	SH1	19757	1	3V2651	65497	1	JA78	64923	1	3VX450	22762	1
73074	3V4122	17865	1	SH1	19757	1	3V2652	73097	1	JA78	64923	1	3VX450	22762	2



#s	DESCRIPTION	PART #	QTY
Shaft			
1	Drives: 70382, 70383	57907	1
	Drive: 70384	57908	1
Sprocket			
2	Drives: 70382, 70383	63317	1
	Drive: 70384	63318	1
Bearing Mount Plate			
3	Drives: 70382, 70383	70370	1
	Drive: 70384	70371	1
Bearing Seal			
4	Drives: 70382, 70383	57781	1
	Drive: 70384	57782	1
Bearing			
5	Drives: 70382, 70383	11068	1
	Drive: 70384	13693	1
CEMA Mount Plate			
6	Drives: 70382, 70383	70361	1
	Drive: 70384	70362	1
Gearbox			
7	Drive: 70382	49693	1
	Drives: 70383, 70384	58780	1
8	CEMA Adapter	25190	1
9	Motor	varies	1
10	5/8 x 2" Carriage Bolt	34349	4

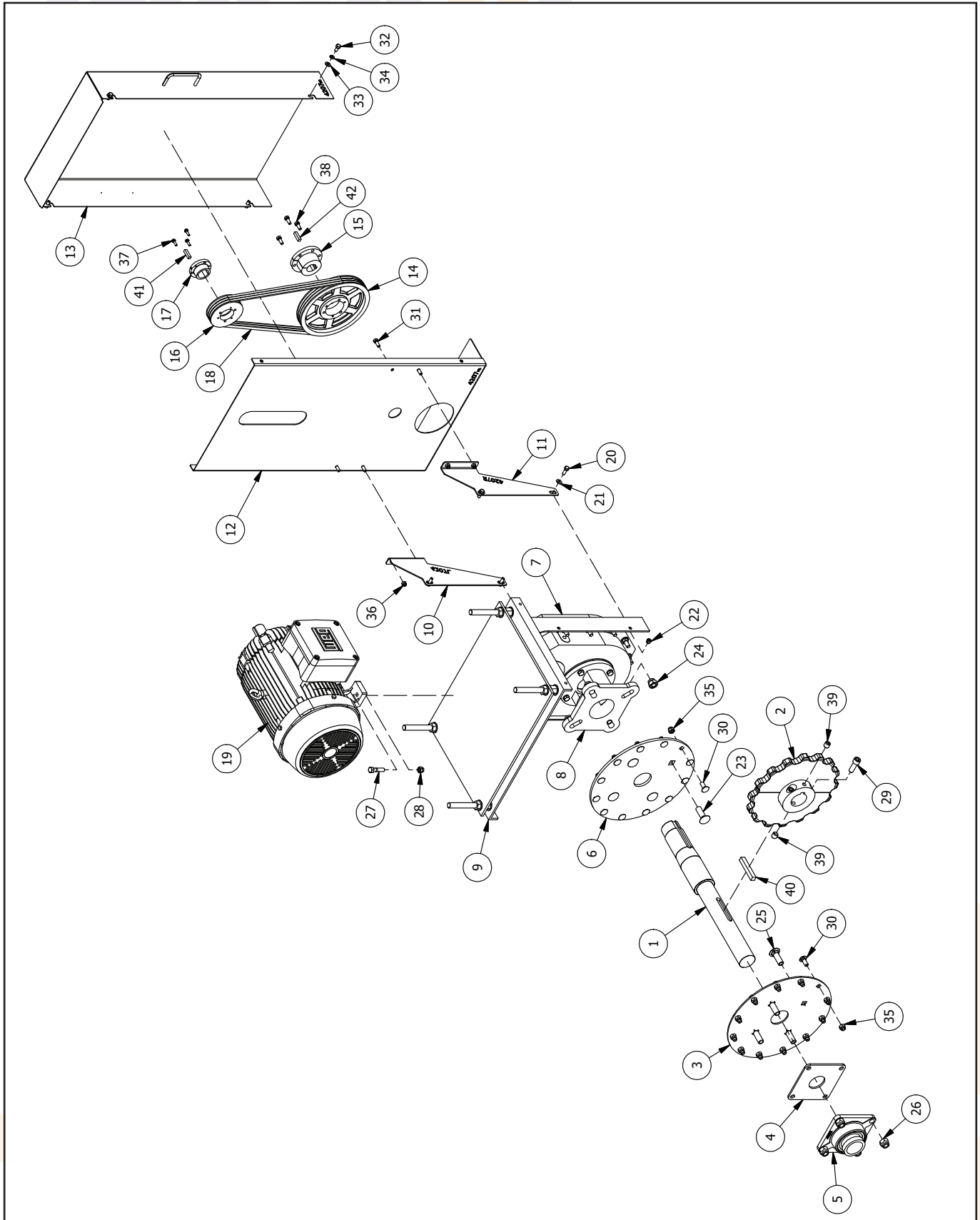
#s	DESCRIPTION	PART #	QTY
11	5/8" Nylon Locknut	10313	4
	1/2 x 1 3/4" Carriage Bolt	31614	4
	Drives: 70382, 70383		
12	5/8 x 2" Carriage Bolt	34349	4
	Drive: 70384		
	1/2" Nylon Locknut	10318	4
	Drives: 70382, 70383		
13	5/8" Nylon Locknut	10313	4
	Drive: 70384		
14	1/2 x 1 1/4" Bolt	10964	4
15	1/2" Flatwasher	20181	4
16	1/2" Lockwasher	14490	4
17	Sprocket Socket Head Cap Screw	c/w sprocket	4
18	1/2 x 1 1/4" Carriage Bolt	34004	24
19	1/2" Nylon Locknut	10318	24
Setscrew			
20	Drives: 70382, 70383	23716	4
	Drive: 70384	35980	4
Key			
21	Drives: 70382, 70383	63482	1
	Drive: 70384	63483	1
22	Key	c/w motor	1

Norstar

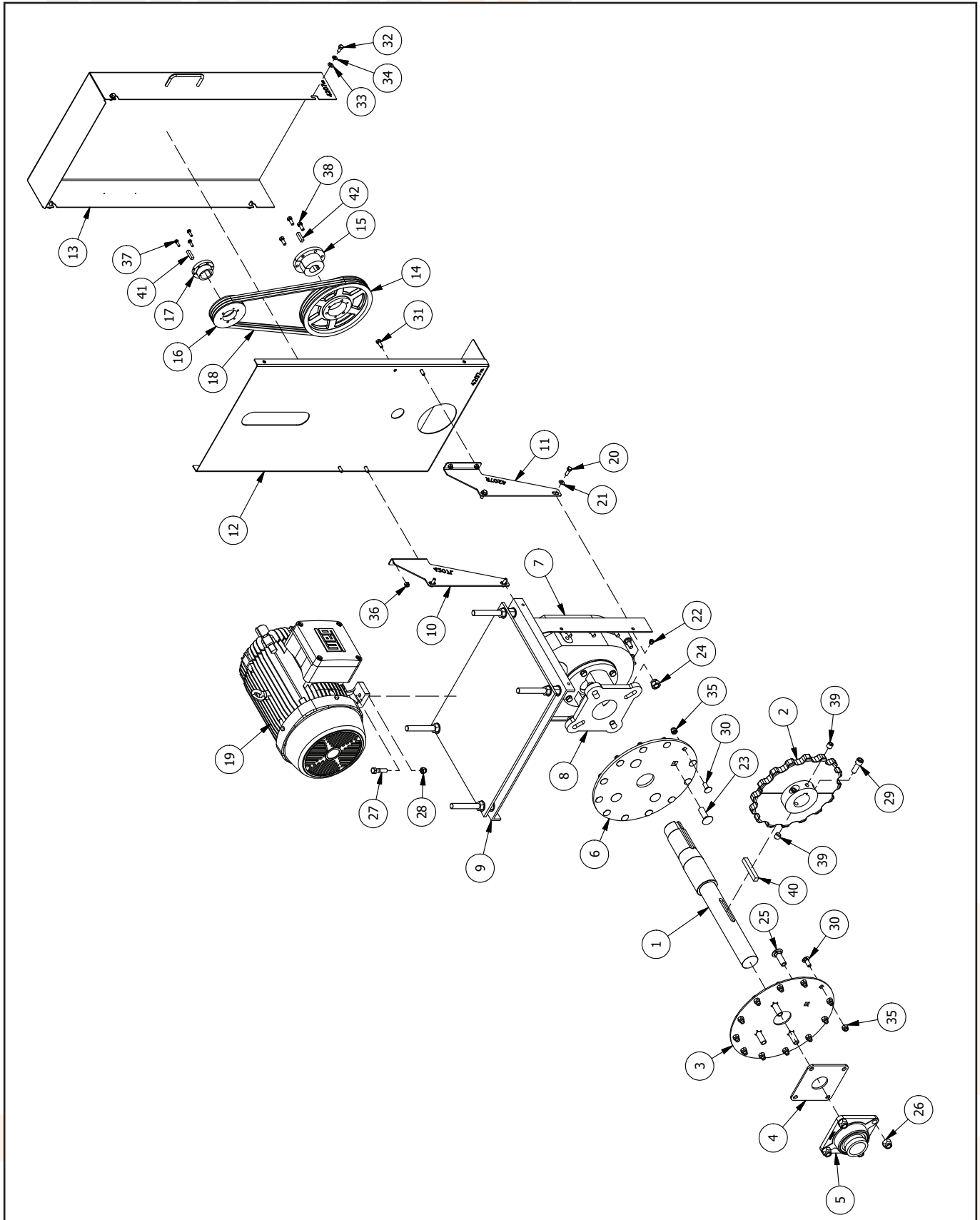


#s	DESCRIPTION	PART #	QTY
Shaft			
1	Drives: 70385, 73077	57906	1
	Drives: 70386, 70387	57909	1
	Drive: 70388	57914	1
	Drives: 70389, 70390	57922	1
	Drives: 73075, 73076	73130	1
Sprocket			
2	Drives: 70385, 70386, 70387, 70388, 73075, 73076, 73077	63323	1
	Drives: 70389, 70390	63324	1
Bearing Mount Plate			
3	Drives: 70385, 70386, 70387, 70388, 73075, 73076, 73077	70372	1
	Drives: 70389, 70390	70373	1
Bearing Seal			
4	Drives: 70385, 70386, 70387, 70388, 73075, 73076, 73077	57782	1
	Drives: 70389, 70390	57783	1
Bearing			
5	Drives: 70385, 70386, 70387, 70388, 73075, 73076, 73077	13693	1
	Drives: 70389, 70390	13694	1
CEMA Mount Plate			
6	Drives: 70385, 70386, 70387, 73075, 73076, 73077	70363	1
	Drive: 70388	70364	1
	Drives: 70389, 70390	70365	1
Gearbox			
7	Drive: 70385, 73077	19696	1
	Drives: 70386, 70387	19698	1
	Drive: 70388	19700	1
	Drives: 70389, 70390	19702	1
	Drive: 73075, 73076	35984	1
CEMA Adapter			
8	Drives: 70385, 73077	25186	1
	Drives: 70386, 70387	25190	1
	Drive: 70388	25203	1
	Drives: 70389, 70390	25209	1
	Drives: 73075, 73076	25182	1
Motor Mount Assembly			
9	Drives: 70385, 73077	25187	1
	Drives: 70386, 70387	25191	1
	Drive: 70388	25204	1
	Drives: 70389, 70390	25210	1
	Drives: 73075, 73076	25183	1

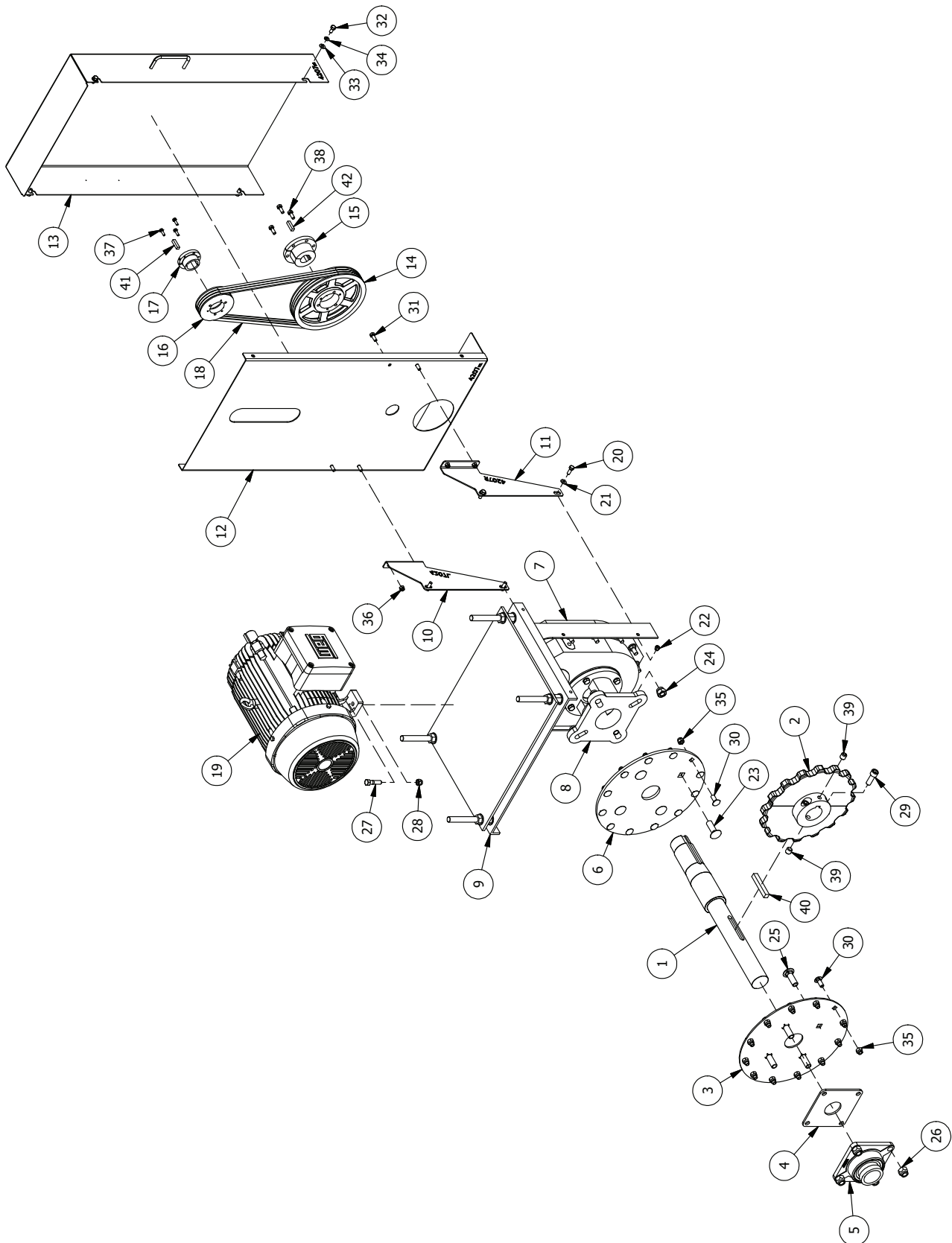
#s	DESCRIPTION	PART #	QTY
Left Belt Guard Mount			
10	Drives: 70385, 73077	22305	1
	Drives: 70386, 70387	22307	1
	Drive: 70388	22309	1
	Drives: 70389, 70390	22311	1
	Drives: 73075, 73076	22303	1
Right Belt Guard Mount			
11	Drives: 70385, 73077	22306	1
	Drives: 70386, 70387	22308	1
	Drive: 70388	22310	1
	Drives: 70389, 70390	22312	1
	Drives: 73075, 73076	22304	1
Rear Belt Guard			
12	Drives: 70385, 73077	57794	1
	Drives: 70386, 70387	57795	1
	Drive: 70388	57796	1
	Drives: 70389, 70390	22286	1
	Drives: 73075, 73076	57793	1
Front Belt Guard			
13	Drives: 70385, 73077	57812	1
	Drives: 70386, 70387	57813	1
	Drive: 70388	57814	1
	Drives: 70389, 70390	23896	1
	Drives: 73075, 73076	57811	1
14	Pulley	see next page	
15	Pulley Hub	see next page	
16	Motor Pulley	see next page	
17	Motor Pulley Hub	see next page	
18	Belt	see next page	
19	Motor	varies	1
20	3/8 x 1 1/4" Bolt	10311	4
	Drives: 70385, 70386, 70387, 70388, 73075, 73076, 73077		
	7/16 x 1 1/4" Bolt	23519	4
21	Drives: 70389, 70390		
	3/8" Flatwasher	10275	4
	Drives: 70385, 70386, 70387, 70388, 73075, 73076, 73077		
22	7/16" Flatwasher	19756	4
	Drives: 70389, 70390		
	3/8" Nylon Locknut	10274	4
	Drives: 70385, 70386, 70387, 70388, 73075, 73076, 73077		
	7/16" Nylon Locknut	15779	4
	Drives: 70389, 70390		



#s	DESCRIPTION	PART #	QTY
23	5/8 x 2" Carriage Bolt	34349	4
24	5/8" Nylon Locknut	10313	4
25	5/8 x 2" Carriage Bolt	34349	4
26	5/8" Nylon Locknut	10313	4
	5/16 x 1 3/4" Bolt	48925	4
	Drives: 73075, 73076		
	3/8 x 1 3/4" Bolt	15780	4
27	Drives: 70385, 70386, 73077		
	1/2 x 2 1/2" Bolt	10361	4
	Drives: 70387, 70388, 70389, 70390		
	5/16" Nylon Locknut	10290	4
	Drives: 73075, 73076		
28	3/8" Nylon Locknut	10274	4
	Drives: 70385, 70386, 73077		
	1/2" Nylon Locknut	10318	4
	Drives: 70387, 70388, 70389, 70390		
29	Sprocket Socket Head Cap Screw	c/w sprocket	4
30	1/2 x 1 1/4" Carriage Bolt	34004	24
31	3/8 x 1" Bolt	10277	4
32	3/8 x 3/4" Bolt	10369	4
33	3/8" Flatwasher SM OD	10275	4
34	3/8" Lockwasher	10276	4
35	1/2" Nylon Locknut	10318	24
36	3/8" Nylon Locknut	10274	4
37	Motor Hub Bolt	c/w motor hub	n/a
38	Hub Bolt	c/w hub	n/a
	Setscrew		
39	Drives: 70385, 70386, 70387, 70388, 73075, 73076, 73077	35980	4
	Drives: 70389, 70390	35981	4
	Key		
40	Drives: 70385, 70386, 70387, 70388, 73075, 73076, 73077	63483	1
	Drives: 70389, 70390	63484	1
41	Motor Hub Key	c/w motor hub	1
42	Hub Key	c/w hub	1



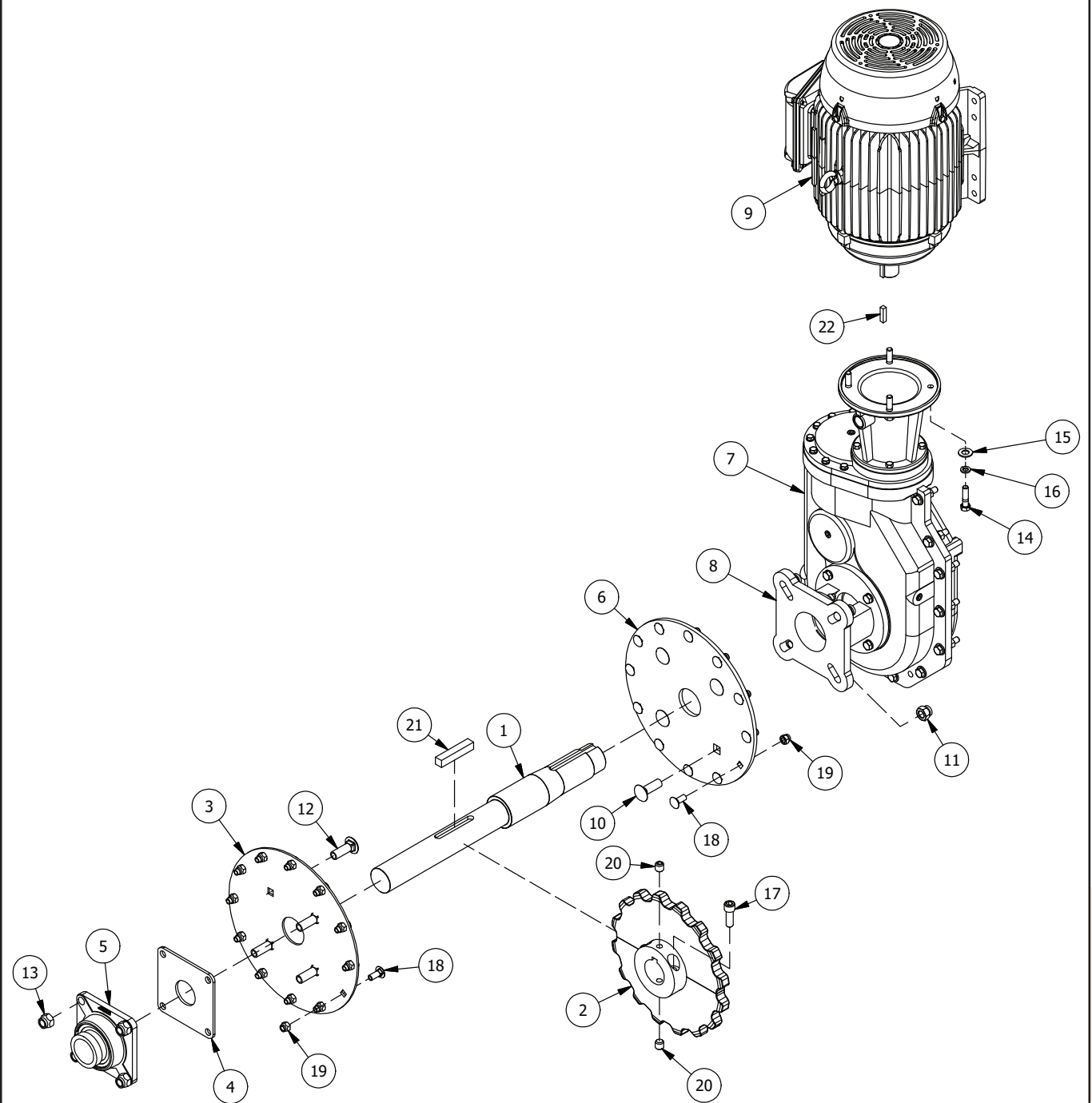
Drive Part #	Item 14 - Pulley			Item 15 - Hub			Item 16 - Motor Pulley			Item 17 - Motor Hub			Item 18 - Belts		
	SIZE	PART #	QTY	SIZE	PART #	QTY	SIZE	PART #	QTY	SIZE	PART #	QTY	SIZE	PART #	QTY
70385	3V652	17889	1	SDS1	19746	1	3V602	17884	1	SH138	13832	1	3VX600	20462	2
70386	3V652	17889	1	SDS118	17922	1	3V602	17884	1	SH138	13832	1	3VX600	20462	2
70387	3V653	17890	1	SDS118	17922	1	3V603	17885	1	SDS158	13839	1	3VX630	20458	3
70388	3V653	17890	1	SDS138	17923	1	3V603	17885	1	SDS158	13839	1	3VX630	20458	3
70389	3V653	17890	1	SDS1716	17925	1	3V603	17885	1	SDS158	13839	1	3VX630	20458	3
70390	3V654	13811	1	SK1716	17938	1	3V604	17886	1	SK178	17937	1	3VX630	20458	4
73075	3V3651	64921	1	SH1	19757	1	3V3351	65498	1	JA78	64923	1	3VX475	55994	1
73076	3V3652	57278	1	SH1	19757	1	3V3352	65505	1	SH118	17932	1	3VX500	22763	2
73077	3V3652	57278	1	SH1	19757	1	3V3352	65505	1	SH118	17932	1	3VX500	22763	2



#s	DESCRIPTION	PART #	QTY
Shaft			
	Drives: 70391, 70392, 73078	57909	1
1	Drive: 70393	57914	1
	Drives: 70394, 70395	57915	1
	Drives: 70396, 70397	57922	1
Sprocket			
2	Drives: 70391, 70392, 70393, 73078	63323	1
	Drives: 70394, 70395, 70396, 70397	63324	1
Bearing Mount Plate			
3	Drives: 70391, 70392, 70393, 73078	70372	1
	Drives: 70394, 70395, 70396, 70397	70373	1
Bearing Seal			
4	Drives: 70391, 70392, 70393, 73078	57782	1
	Drives: 70394, 70395, 70396, 70397	57783	1
Bearing			
5	Drives: 70391, 70392, 70393, 73078	13693	1
	Drives: 70394, 70395, 70396, 70397	13694	1
CEMA Mount Plate			
6	Drives: 70391, 70392, 73078	70363	1
	Drive: 70393	70364	1
	Drives: 70394, 70395, 70396, 70397	70365	1
Gearbox			
	Drive: 70391	58782	1
	Drive: 70392	58796	1
7	Drives: 70393, 70394	58817	1
	Drive: 70395	58826	1
	Drive: 70396	58837	1
	Drive: 70397	58851	1
	Drive: 73078	58770	1

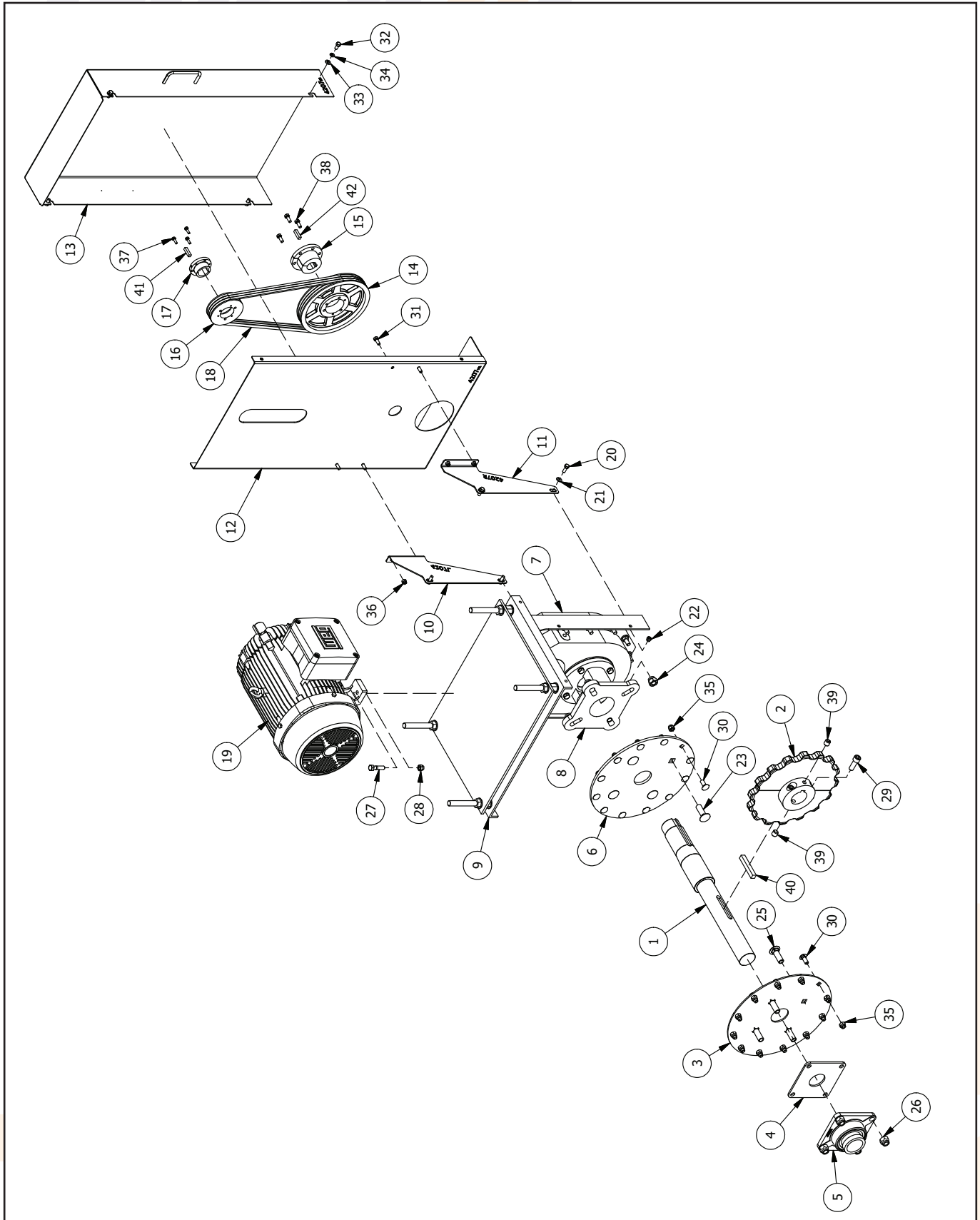
#s	DESCRIPTION	PART #	QTY
CEMA Adapter			
8	Drives: 70391, 70392, 73078	25190	1
	Drives: 70393, 70394, 70395	25203	1
	Drives: 70396, 70397	25209	1
9	Motor	varies	1
10	5/8 x 2" Carriage Bolt	34349	4
11	5/8" Nylon Locknut	10313	4
12	5/8 x 2" Carriage Bolt	34349	4
13	5/8" Nylon Locknut	10313	4
	1/2 x 1 1/4" Bolt	10964	4
14	Drives: 70391, 70392, 70393, 70394, 70396, 73078		
	1/2 x 1 3/4" Bolt	10365	4
	Drives: 70395, 70397		
15	1/2" Flatwasher	20181	4
16	1/2" Lockwasher	14490	4
17	Sprocket Socket Head Cap Screw	c/w sprocket	4
18	1/2 x 1 1/4" Carriage Bolt	34004	24
19	1/2" Nylon Locknut	10318	24
Setscrew			
20	Drives: 70391, 70392, 70393, 73078	35980	4
	Drives: 70394, 70395, 70396, 70397	35981	4
Key			
21	Drives: 70391, 70392, 70393, 73078	63483	1
	Drives: 70394, 70395, 70396, 70397	63484	1
22	Key	c/w motor	1

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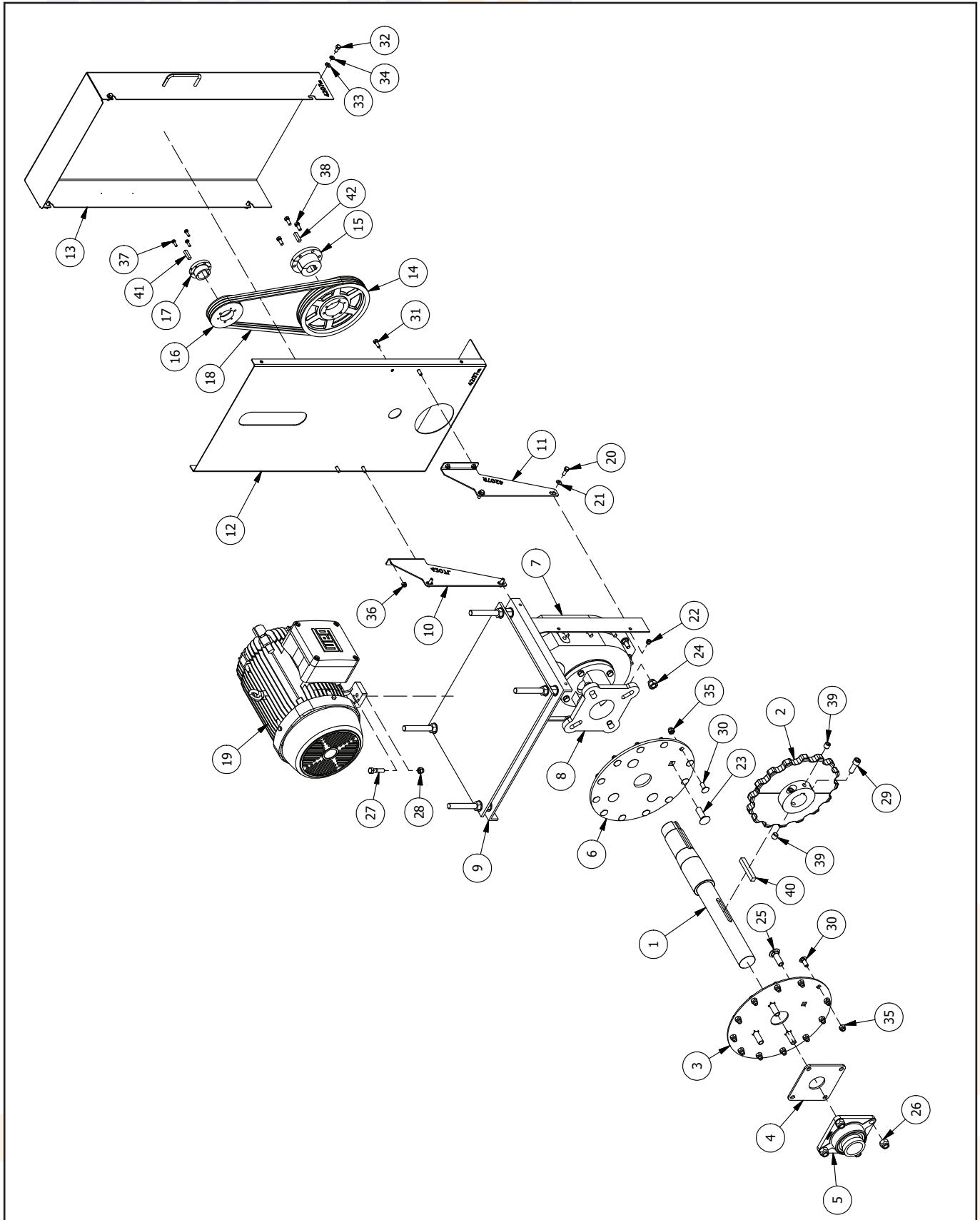
#s	DESCRIPTION	PART #	QTY
Shaft			
1	Drives: 70402, 70403	57924	1
	Drive: 70404	57932	1
	Drives: 70398, 73083	64756	1
	Drives: 70399, 70400	64757	1
	Drive: 70401	64758	1
	Drives: 73079, 73080	73131	1
	Drives: 73081, 73082	73133	1
Sprocket			
2	Drives: 70398, 70399, 70400, 70401, 73079, 73080, 73081, 73082, 73083	63329	1
	Drives: 70402, 70403, 70404	63330	1
Bearing Mount Plate			
3	Drives: 70398, 70399, 70400, 70401, 73079, 73080, 73081, 73082, 73083	70374	1
	Drives: 70402, 70403, 70404	70375	1
Bearing Seal			
4	Drives: 70398, 70399, 70400, 70401, 73079, 73080, 73081, 73082, 73083	57783	1
	Drives: 70402, 70403, 70404	57784	1
Bearing			
5	Drives: 70402, 70403, 70404	24088	1
	Drives: 70398, 70399, 70400, 70401, 73079, 73080, 73081, 73082, 73083	13694	1
CEMA Mount Plate			
6	Drives: 70399, 70400, 70401	70367	1
	Drives: 70398, 73079, 73080, 73081, 73082, 73083	70366	1
	Drives: 70402, 70403, 70404	70368	1
Gearbox			
7	Drives: 70398, 73083	19698	1
	Drives: 70399, 70400	19700	1
	Drives: 70401, 70402, 70403	19702	1
	Drive: 70404	19704	1
	Drives: 73079, 73080	35984	1
	Drives: 73081, 73082	19696	1
	CEMA Adapter		
	Drives: 70398, 73083	25190	1
8	Drives: 70399, 70400	25203	1
	Drives: 70401, 70402, 70403	25209	1
	Drive: 70404	25215	1
	Drives: 73079, 73080	25182	1
	Drives: 73081, 73082	25186	1

#s	DESCRIPTION	PART #	QTY
Motor Mount Assembly			
9	Drives: 70398, 73083	25191	1
	Drives: 70399, 70400	25204	1
	Drives: 70401, 70402, 70403	25210	1
	Drive: 70404	25216	1
	Drives: 73079, 73080	73093	1
	Drives: 73081, 73082	73094	1
	Left Belt Guard Mount		
	Drives: 70398, 73083	22307	1
10	Drives: 70399, 70400	22309	1
	Drives: 70401, 70402, 70403	22311	1
	Drive: 70404	22313	1
	Drives: 73079, 73080	22303	1
	Drives: 73081, 73082	22305	1
Right Belt Guard Mount			
11	Drives: 70398, 73083	22308	1
	Drives: 70399, 70400	22310	1
	Drives: 70401, 70402, 70403	22312	1
	Drive: 70404	22314	1
	Drives: 73079, 73080	22304	1
	Drives: 73081, 73082	22306	1
Rear Belt Guard			
12	Drives: 70398, 73083	57795	1
	Drives: 70399, 70400	57796	1
	Drives: 70401, 70402, 70403	22286	1
	Drive: 70404	22287	1
	Drives: 73079, 73080	73102	1
	Drives: 73081, 73082	73103	1
Front Belt Guard			
13	Drives: 70398, 73083	57813	1
	Drives: 70399, 70400	57814	1
	Drives: 70401, 70402, 70403	23896	1
	Drive: 70404	23897	1
	Drives: 73079, 73080	73100	1
	Drives: 73081, 73082	73101	1
	14 Pulley	see next page	
	15 Pulley Hub	see next page	
16	Motor Pulley	see next page	
	17 Motor Pulley Hub	see next page	
	18 Belt	see next page	
19	Motor	varies	1

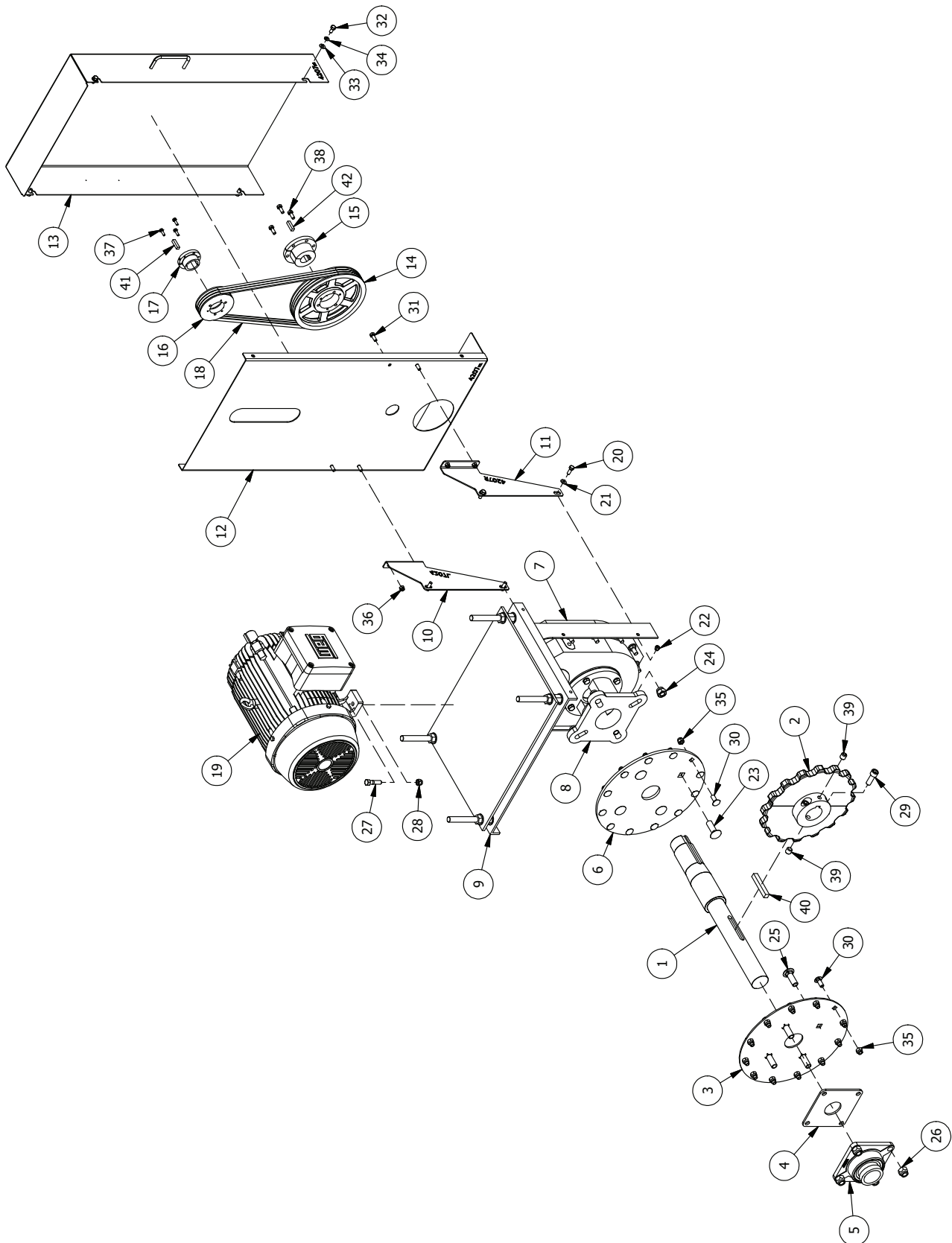


#s	DESCRIPTION	PART #	QTY
20	3/8 x 1 1/4" Bolt	10311	4
	Drives: 70398, 70399, 70400, 70404, 73079, 73080, 73081, 73082, 73083		
21	7/16 x 1 1/4" Bolt	23519	4
	Drives: 70401, 70402, 70403		
21	3/8" Flatwasher	10275	4
	Drives: 70398, 70399, 70400, 70404, 73079, 73080, 73081, 73082, 73083		
22	7/16" Flatwasher	19756	4
	Drives: 70401, 70402, 70403		
22	3/8" Nylon Locknut	10274	4
	Drives: 70398, 70399, 70400, 70404, 73079, 73080, 73081, 73082, 73083		
23	7/16" Nylon Locknut	15779	4
	Drives: 70401, 70402, 70403		
23	5/8 x 2" Carriage Bolt	34349	4
	Drives: 70398, 70399, 70400, 70401, 73079, 73080, 73081, 73082, 73083		
24	3/4 x 2 1/2" Carriage Bolt	50499	4
	Drives: 70402, 70403, 70404		
24	5/8" Nylon Locknut	10313	4
	Drives: 70398, 70399, 70400, 70401, 73079, 73080, 73081, 73082, 73083		
25	3/4" Nylon Locknut	10320	4
	Drives: 70402, 70403, 70404		
25	5/8 x 2" Carriage Bolt	34349	4
	Drives: 70398, 70399, 70400, 70401, 73079, 73080, 73081, 73082, 73083		
26	3/4 x 2 1/2" Carriage Bolt	50499	4
	Drives: 70402, 70403, 70404		
26	5/8" Nylon Locknut	10313	4
	Drives: 70398, 70399, 70400, 70401, 73079, 73080, 73081, 73082, 73083		
26	3/4" Nylon Locknut	10320	4
	Drives: 70402, 70403, 70404		

#s	DESCRIPTION	PART #	QTY
27	3/8 x 1 3/4" Bolt	15780	4
	Drives: 73079, 73080, 73081, 73082, 73083		
27	1/2 x 2 1/2" Bolt	10361	4
	Drives: 70398, 70399, 70400, 70401, 70402, 70403, 70404		
28	3/8" Nylon Locknut	10274	4
	Drives: 73079, 73080, 73081, 73082, 73083		
28	1/2" Nylon Locknut	10318	4
	Drives: 70398, 70399, 70400, 70401, 70402, 70403, 70404		
29	Sprocket Socket Head Cap Screw	c/w sprocket	4
30	1/2 x 1 1/4" Carriage Bolt	34004	24
31	3/8 x 1" Bolt	10277	4
32	3/8 x 3/4" Bolt	10369	4
33	3/8" Flatwasher SM OD	10275	4
34	3/8" Lockwasher	10276	4
35	1/2" Nylon Locknut	10318	24
36	3/8" Nylon Locknut	10274	4
37	Motor Hub Bolt	c/w motor hub	n/a
38	Hub Bolt	c/w hub	n/a
39	Setscrew		
	Drives: 70398, 70399, 70400, 70401, 73079, 73080, 73081, 73082, 73083	35981	4
39	Drives: 70402, 70403, 70404	35982	4
40	Key		
	Drives: 70398, 70399, 70400, 70401, 73079, 73080, 73081, 73082, 73083	63484	1
40	Drives: 70402, 70403, 70404	63485	1
41	Motor Hub Key	c/w motor hub	1
42	Hub Key	c/w hub	1



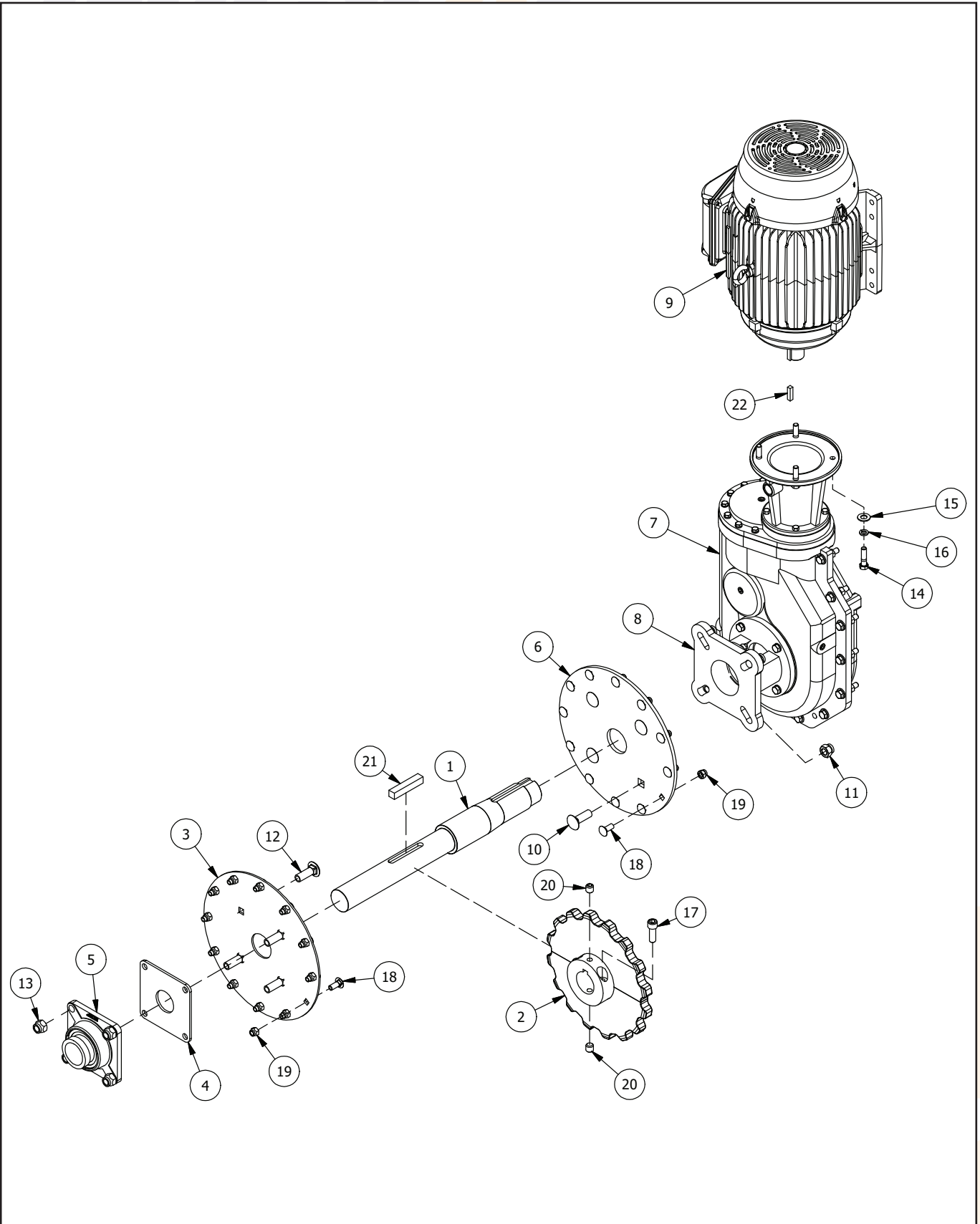
Drive Part #	Item 14 - Pulley			Item 15 - Hub			Item 16 - Motor Pulley			Item 17 - Motor Hub			Item 18 - Belts		
	SIZE	PART #	QTY	SIZE	PART #	QTY	SIZE	PART #	QTY	SIZE	PART #	QTY	SIZE	PART #	QTY
70398	3V693	17894	1	SDS118	17922	1	3V563	17881	1	SDS158	13839	1	3VX630	20458	3
70399	3V693	17894	1	SDS138	17923	1	3V563	17881	1	SDS158	13839	1	3VX630	20458	3
70400	3V694	13812	1	SK138	13833	1	3V564	17882	1	SDS158	13839	1	3VX630	20458	4
70401	3V694	13812	1	SK1716	17938	1	3V564	17882	1	SDS158	13839	1	3VX630	20458	4
70402	3V694	13812	1	SK1716	17938	1	3V564	17882	1	SDS178	17924	1	3VX630	20458	4
70403	3V695	13813	1	SK1716	17938	1	3V565	17883	1	SK178	17937	1	3VX630	20458	5
70404	3V695	13813	1	SK158	13840	1	3V565	17883	1	SK178	17937	1	3VX650	20461	5
73079	3V451	65501	1	SH1	19757	1	3V3651	64921	1	SH118	17932	1	3VX600	20462	1
73080	3V452	17867	1	SH1	19757	1	3V3652	57278	1	SH118	17932	1	3VX600	20462	2
73081	3V452	17867	1	SH1	19757	1	3V3652	57278	1	SH118	17932	1	3VX560	20460	2
73082	3V453	17868	1	SDS1	19746	1	3V3653	62955	1	SH138	17933	1	3VX560	20460	3
73083	3V692	17893	1	SDS118	17922	1	3V562	17880	1	SH138	17933	1	3VX630	20458	2



#s	DESCRIPTION	PART #	QTY
	Shaft		
	Drives: 70405, 73084, 73085	64756	1
1	Drive: 70406	64757	1
	Drive: 70407	64758	1
	Drive: 70408	57924	1
	Drive: 70409	57932	1
	Sprocket		
2	Drives: 70405, 70406, 70407, 73084, 73085	63329	1
	Drives: 70408, 70409	63330	1
	Bearing Mount Plate		
3	Drives: 70405, 70406, 70407, 73084, 73085	70374	1
	Drives: 70408, 70409	70375	1
	Bearing Seal		
4	Drives: 70405, 70406, 70407, 73084, 73085	57783	1
	Drives: 70408, 70409	57784	1
	Bearing		
5	Drives: 70405, 70406, 70407, 73084, 73085	13694	1
	Drives: 70408, 70409	24088	1
	CEMA Mount Plate		
6	Drives: 70405, 73084	70366	1
	Drives: 70406, 70407	70367	1
	Drives: 70408, 70409	70368	1
	Gearbox		
	Drive: 70405	58797	1
	Drive: 70406	58818	1
7	Drive: 70407	58834	1
	Drive: 70408	58846	1
	Drive: 73084	58771	1
	Drive: 73085	58783	1
	CEMA Adapter		
	Drives: 70405, 73084, 73085	25190	1
8	Drive: 70406	25203	1
	Drives: 70407, 70408	25209	1
	Drive: 70409	25215	1

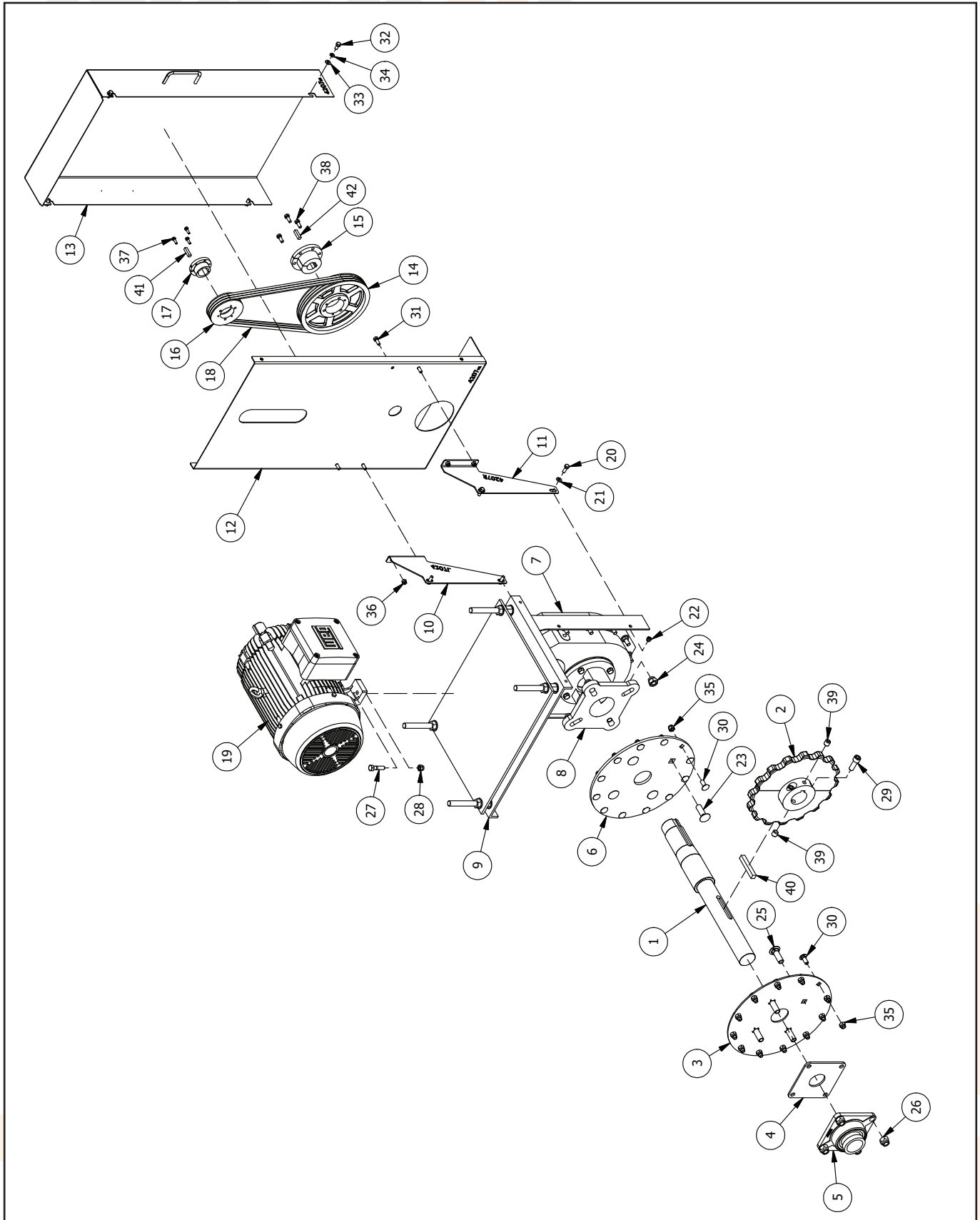
#s	DESCRIPTION	PART #	QTY
9	Motor	varies	1
	5/8 x 2" Carriage Bolt	34349	4
	Drives: 70405, 70406, 70407, 73084, 73085		
10	3/4 x 2 1/2" Carriage Bolt	50499	4
	Drives: 70408, 70409		
	5/8" Nylon Locknut	10313	4
	Drives: 70405, 70406, 70407, 73084, 73085		
11	3/4" Nylon Locknut	10320	4
	Drives: 70408, 70409		
	5/8 x 2" Carriage Bolt	34349	4
	Drives: 70405, 70406, 70407, 73084, 73085		
12	3/4 x 2 1/2" Carriage Bolt	50499	4
	Drives: 70408, 70409		
	5/8" Nylon Locknut	10313	4
	Drives: 70405, 70406, 70407, 73084, 73085		
13	3/4" Nylon Locknut	10320	4
	Drives: 70408, 70409		
	1/2 x 1 1/4" Bolt	10964	4
	Drives: 70405, 70406, 70407, 73084		
14	1/2 x 1 3/4" Bolt	10365	4
	Drives: 70408, 70409		
15	1/2" Flatwasher	20181	4
16	1/2" Lockwasher	14490	4
17	Sprocket Socket Head Cap Screw	c/w sprocket	4
19	1/2 x 1 1/4" Carriage Bolt	34004	24
20	1/2" Nylon Locknut	10318	24
	Setscrew		
21	Drives: 70405, 70406, 70407, 73084, 73085	35981	4
	Drives: 70408, 70409	35982	4
	Key		
22	Drives: 70405, 70406, 70407, 73084, 73085	63484	1
	Drives: 70408, 70409	63485	1
23	Key	c/w motor	1

Norstar



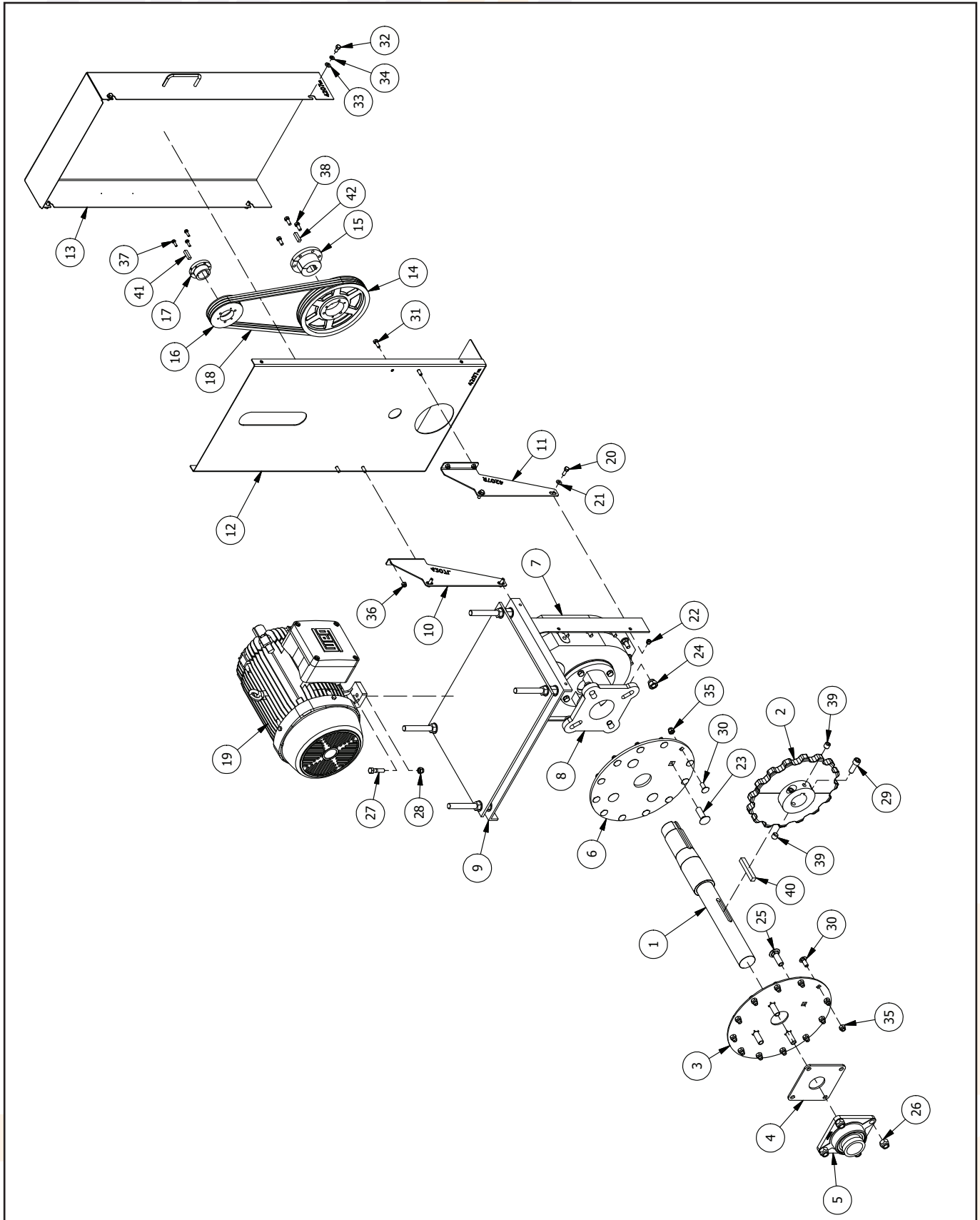
#s	DESCRIPTION	PART #	QTY
1	Shaft		
	Drive: 70410	57918	1
	Drives: 70411, 70412	57926	1
	Drives: 70413, 70414, 70416	57934	1
	Drives: 70415, 70827	57940	1
	Drive: 73086	73132	1
	Drives: 73087, 73088	73134	1
	Drive: 73089	73135	1
2	Sprocket	64234	1
3	Bearing Mount Plate	70376	1
4	Bearing Seal	57785	1
5	Bearing	56743	1
6	CEMA Mount Plate		
	Drives: 70410, 70411, 70412, 70413, 70414, 70415, 70416, 70827	70369	1
	Drives: 73086, 73087, 73088, 73089	73136	1
7	Gearbox		
	Drive: 70410	19700	1
	Drives: 70411, 70412	19702	1
	Drives: 70413, 70414, 70416	19704	1
	Drives: 70415, 70827	35996	1
	Drive: 73086	35984	1
	Drives: 73087, 73088	19696	1
8	CEMA Adapter		
	Drive: 70410	25203	1
	Drives: 70411, 70412	25209	1
	Drives: 70413, 70414, 70416	25215	1
	Drives: 70415, 70827	25220	1
	Drive: 73086	25182	1
	Drives: 73087, 73088	25186	1
	Drive: 73089	25190	1
9	Motor Mount Assembly		
	Drive: 70410	73096	1
	Drives: 70411, 70412	25210	1
	Drives: 70413, 70414, 70416	25216	1
	Drives: 70415, 70827	25221	1
	Drive: 73086	73093	1
	Drives: 73087, 73088	73094	1
	Drive: 73089	73095	1

#s	DESCRIPTION	PART #	QTY
10	Left Belt Guard Mount		
	Drive: 70410	22309	1
	Drives: 70411, 70412	22311	1
	Drives: 70413, 70414, 70416	22313	1
	Drives: 70415, 70827	22315	1
	Drive: 73086	22303	1
	Drives: 73087, 73088	22305	1
	Drive: 73089	22307	1
11	Right Belt Guard Mount		
	Drive: 70410	22310	1
	Drives: 70411, 70412	22312	1
	Drives: 70413, 70414, 70416	22314	1
	Drives: 70415, 70827	22316	1
	Drive: 73086	22304	1
	Drives: 73087, 73088	22306	1
12	Rear Belt Guard		
	Drive: 70410	57796	1
	Drives: 70411, 70412	57797	1
	Drives: 70413, 70414, 70416	22287	1
	Drives: 70415, 70827	22288	1
	Drive: 73086	73102	1
	Drives: 73087, 73088	73103	1
13	Front Belt Guard		
	Drive: 70410	57814	1
	Drives: 70411, 70412	57815	1
	Drives: 70413, 70414, 70416	23897	1
	Drives: 70415, 70827	23898	1
	Drive: 73086	73100	1
	Drives: 73087, 73088	73101	1
14	Drive: 73089	57813	1
	14 Pulley	see next page	
	15 Pulley Hub	see next page	
	16 Motor Pulley	see next page	
	17 Motor Pulley Hub	see next page	
	18 Belt	see next page	
	19 Motor	varies	1

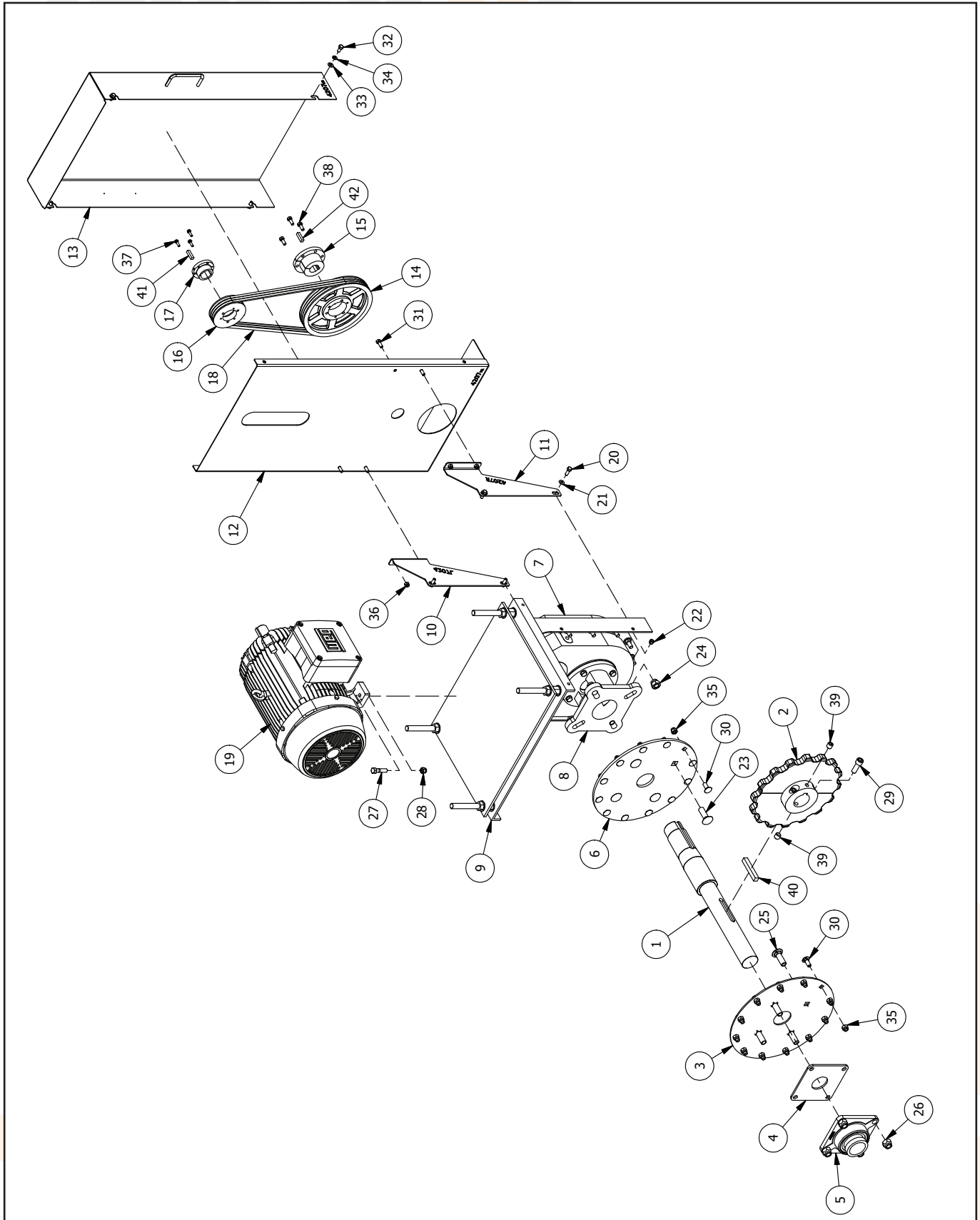


#s	DESCRIPTION	PART #	QTY
20	3/8 x 1 1/4" Bolt	10311	4
	Drives: 70410, 70413, 70414, 70416, 73086, 73087, 73088, 73089		
	7/16 x 1 1/4" Bolt	23519	4
	Drives: 70411, 70412		
	1/2 x 1 1/4" Bolt	10964	4
	Drives: 70415, 70827		
	3/8" Flatwasher	10275	4
	Drives: 70410, 70413, 70414, 70416, 73086, 73087, 73088, 73089		
	7/16" Flatwasher	19756	4
	Drives: 70411, 70412		
	1/2" Flatwasher	10297	4
	Drives: 70415, 70827		
	3/8" Nylon Locknut	10274	4
	Drives: 70410, 70413, 70414, 70416, 73086, 73087, 73088, 73089		
	7/16" Nylon Locknut	15779	4
	Drives: 70411, 70412		
	1/2" Nylon Locknut	10318	4
	Drives: 70415, 70827		
	3/4 x 2 1/2" Carriage Bolt	50499	4
	3/4" Nylon Locknut	10320	4
	3/4 x 2 1/2" Carriage Bolt	50499	4
	3/4" Nylon Locknut	10320	4

#s	DESCRIPTION	PART #	QTY
27	1/2 x 2 1/2" Bolt	10361	4
	Drives: 70410, 70411, 70412, 70413, 73086, 73087, 73088, 73089		
	5/8 x 2 1/2" Bolt	15047	4
	Drives: 70414, 70415, 70416, 70417		
	1/2" Nylon Locknut	10318	4
	Drives: 70410, 70411, 70412, 70413, 73086, 73087, 73088, 73089		
	5/8" Nylon Locknut	10313	4
	Drives: 70414, 70415, 70416, 70417		
	Sprocket Socket Head Cap Screw	c/w sprocket	4
	1/2 x 1 1/4" Carriage Bolt	34004	24
	3/8 x 1" Bolt	10277	4
	3/8 x 3/4" Bolt	10369	4
	3/8" Flatwasher SM OD	10275	4
	3/8" Lockwasher	10276	4
	1/2" Nylon Locknut	10318	24
	3/8" Nylon Locknut	10274	4
	Motor Hub Bolt	c/w motor hub	n/a
	Hub Bolt	c/w hub	n/a
	Setscrew	59249	4
	Key	63514	1
	Motor Hub Key	c/w motor hub	1
	Hub Key	c/w hub	1



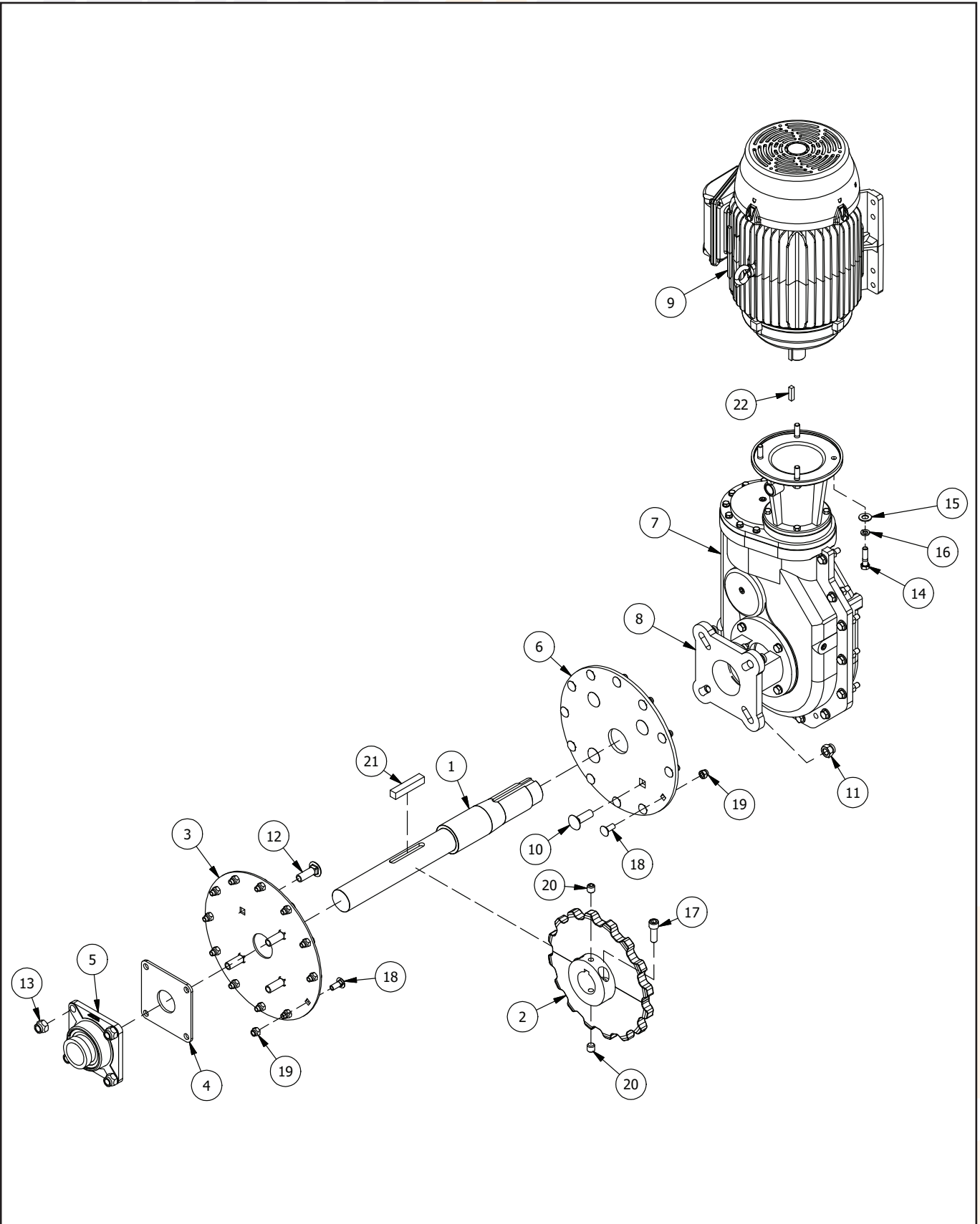
Drive Part #	Item 14 - Pulley			Item 15 - Hub			Item 16 - Motor Pulley			Item 17 - Motor Hub			Item 18 - Belts		
	SIZE	PART #	QTY	SIZE	PART #	QTY	SIZE	PART #	QTY	SIZE	PART #	QTY	SIZE	PART #	QTY
70410	5V752	41094	1	SK138	13833	1	5V592	47175	1	SDS158	13839	1	5VX660	36082	2
70411	5V902	36075	1	SK1716	17938	1	5V712	47158	1	SK158	13840	1	5VX750	41103	2
70412	5V902	36075	1	SK1716	17938	1	5V712	47158	1	SK178	17937	1	5VX750	41103	2
70413	5V902	36075	1	SK158	13840	1	5V712	47158	1	SK178	17937	1	5VX690	44652	2
70414	5V903	19744	1	SF158	60884	1	5V713	47176	1	SF218	19747	1	5VX710	41102	3
70415	5V903	19744	1	SF2316	18811	1	5V713	47176	1	SF218	19747	1	5VX750	41103	3
70416	5V1133	17904	1	SF158	60884	1	5V903	19744	1	SF238	17928	1	5VX800	36084	3
70417	5V1133	17904	1	SF2316	18811	1	5V903	19744	1	SF238	17928	1	5VX830	36085	3
73086	3V602	17884	1	SH1	19757	1	3V4752	17870	1	SH118	17932	1	3VX630	20458	2
73087	3V602	17884	1	SH1	19757	1	3V4752	17870	1	SH118	17932	1	3VX600	20462	2
73088	3V602	17884	1	SH1	19757	1	3V4752	17870	1	SH138	17933	1	3VX630	20458	2
73089	3V602	17884	1	SH118	17932	1	3V4752	17870	1	SH138	17933	1	3VX600	20462	2



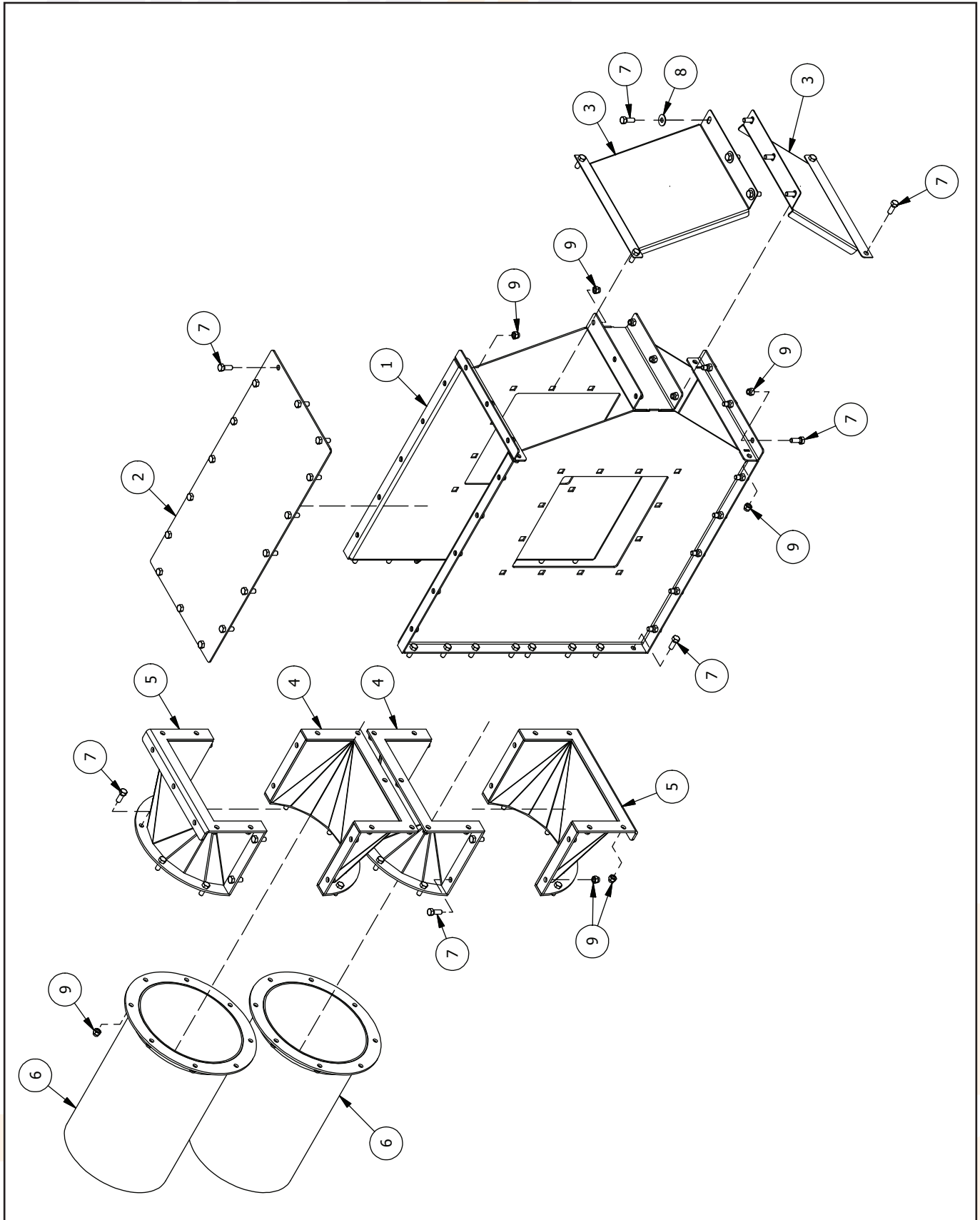
#s	DESCRIPTION	PART #	QTY
1	Shaft		
	Drive: 70828	57918	1
	Drives: 70829, 70830, 70831	57926	1
	Drives: 70832, 70833	57934	1
	Drives: 70834, 70835	57940	1
	Drives: 73090, 73091	73135	1
2	Sprocket	64234	1
3	Bearing Mount Plate	70376	1
4	Bearing Seal	57785	1
5	Bearing	56743	1
6	CEMA Mount Plate		
	Drives: 70828, 70829, 70830, 70831, 70832, 70833, 70834, 70835	70369	1
	Drives: 73090, 73091	73136	1
7	Gearbox		
	Drive: 70828	58818	1
	Drive: 70829	58834	1
	Drive: 70830	63846	1
	Drive: 70831	58846	1
	Drive: 70832	59435	1
	Drive: 70833	58893	1
	Drive: 70834	63847	1
	Drive: 70835	58928	1
	Drive: 73090	58771	1
8	CEMA Adapter		
	Drive: 70828	25203	1
	Drives: 70829, 70830, 70831	25209	1
	Drives: 70832, 70833	25215	1
	Drives: 70834, 70835	25220	1
	Drives: 73090, 73091	25190	1

#s	DESCRIPTION	PART #	QTY
9	Motor	varies	1
10	3/4 x 2 1/2" Carriage Bolt	50499	4
11	3/4" Nylon Locknut	10320	4
12	3/4 x 2 1/2" Carriage Bolt	50499	4
13	3/4" Nylon Locknut	10320	4
14	1/2 x 1 1/4" Bolt	10964	4
	Drives: 70828, 70829, 73090, 73091		
	1/2 x 1 3/4" Bolt	10365	4
	Drives: 70830, 70831, 70832		
15	5/8 x 2" Bolt	12167	8
	Drives: 70833, 70834, 70835		
	1/2" Flatwasher	20181	4
	Drives: 70828, 70829, 70830, 70831, 70832, 73090, 73091		
16	5/8" Flatwasher	10285	8
	Drives: 70833, 70834, 70835		
	1/2" Lockwasher	14490	4
	Drives: 70828, 70829, 70830, 70831, 70832, 73090, 73091		
17	5/8" Lockwasher	15027	8
	Drives: 70833, 70834, 70835		
17	Sprocket Socket Head Cap Screw	c/w sprocket	4
18	1/2 x 1 1/4" Carriage Bolt	34004	24
19	1/2" Nylon Locknut	10318	24
20	Setscrew	59249	4
21	Key	63514	1
22	Key	c/w motor	1

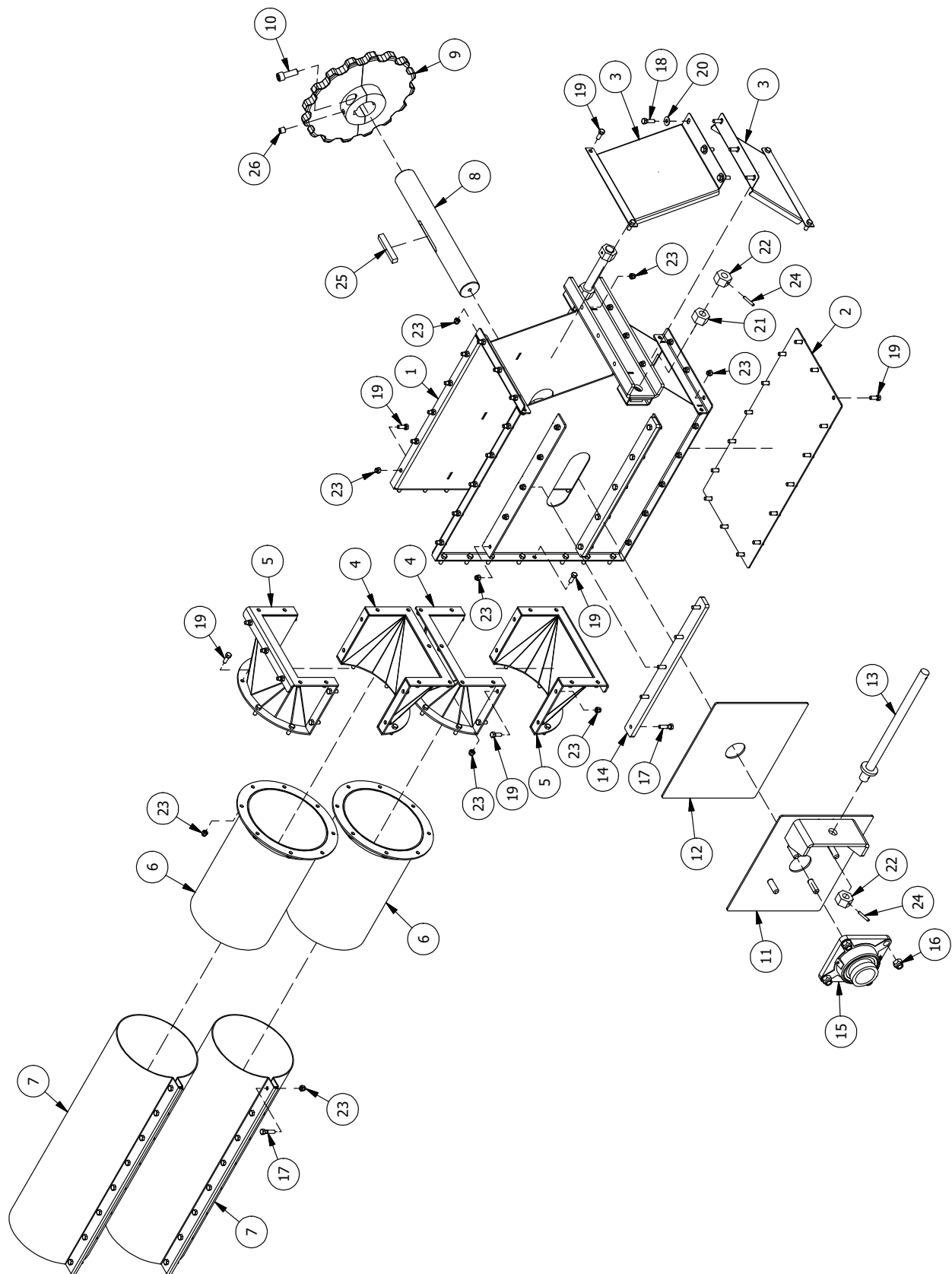
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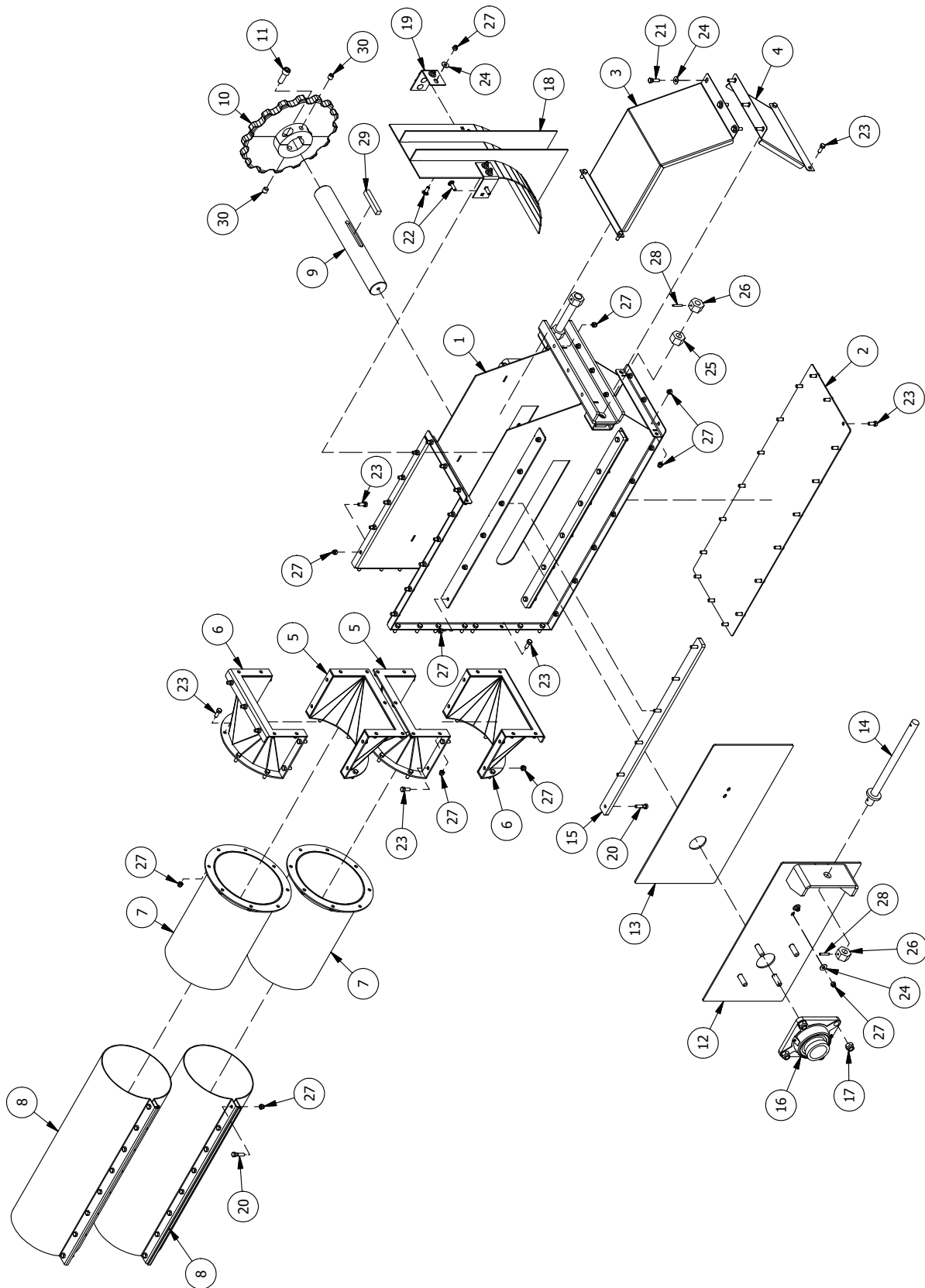
#s	DESCRIPTION	6" PART #	QTY	8" PART #	QTY	10" PART #	QTY	12" PART #	QTY
Body Weldment									
1	Models: 12 ga.	63869	1	63870	1	-		-	
	Models: 10 ga.	-		63871	1	63872	1	63874	1
	Models: 3/16"	-		-		63873	1	63875	1
Cover									
2	Models: 12 ga.	64091	1	64094	1	-		-	
	Models: 10 ga.	-		64095	1	64099	1	64104	1
	Models: 3/16"	-		-		64100	1	64105	1
3	End Cover	64215	2	64216	2	64217	2	64218	2
4	Half Transition STD	57505	2	57506	2	57507	2	57508	2
5	Half Transition Flanged	63953	2	63954	2	63955	2	63956	2
Connection Pipe									
6	Models: 12 ga.	57519	2	57521	2	-		-	
	Models: 10 ga.	57520	2	57522	2	57523	2	57524	2
	Models: 3/16"	-		-		57523	2	57524	2
7	3/8 x 1" Bolt	10277	70	10277	78	10277	82	10277	90
8	3/8" Flatwasher	10304	6	10304	6	10304	6	10304	6
9	3/8" Nylon Locknut	10274	72	10274	80	10274	84	10274	94



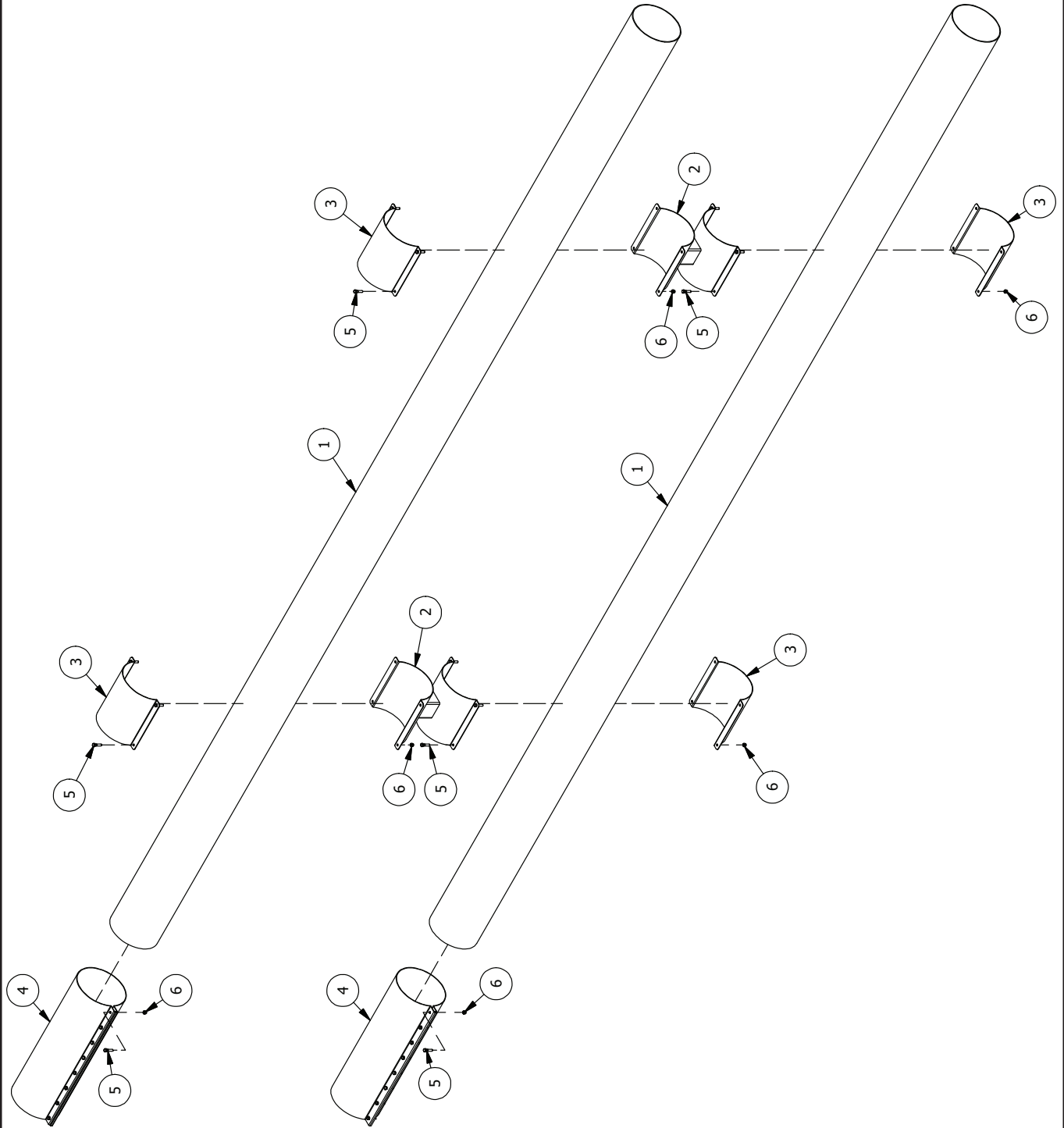
#s	DESCRIPTION	6" PART #	QTY	8" PART #	QTY	10" PART #	QTY	12" PART #	QTY
Body Weldment									
1	Models: 12 ga.	63876	1	63877	1	-		-	
	Models: 10 ga.	-		63878	1	63879	1	63881	1
	Models: 3/16"	-		-		63880	1	63882	1
Cover									
2	Models: 12 ga.	64091	1	64094	1	-		-	
	Models: 10 ga.	-		64095	1	64099	1	64104	1
	Models: 3/16"	-		-		64100	1	64105	1
3	End Cover	64215	2	64216	2	64217	2	64218	2
4	Half Transition STD	57505	2	57506	2	57507	2	57508	2
5	Half Transition Flanged	63953	2	63954	2	63955	2	63956	2
Connection Pipe									
6	Models: 12 ga.	57519	2	57521	2	-		-	
	Models: 10 ga.	57520	2	57522	2	57523	2	57524	2
	Models: 3/16"	-		-		57523	2	57524	2
7	Splice Clamp	58357	2	58358	2	58359	2	58360	2
8	Shaft	58012	1	58013	1	58020	1	58010	1
9	Sprocket	63317	1	63323	1	63329	1	64234	1
10	Sprocket Socket Head Bolt	c/w sprocket	4	c/w sprocket	4	c/w sprocket	4	c/w sprocket	4
11	Tensioner Weldment	63961	2	63963	2	63965	2	63967	2
12	Tensioner Seal	63977	2	63982	2	63983	2	63984	2
13	Tensioner Threaded Rod	63989	2	63990	2	63991	2	63992	2
14	Tensioner Slide Plastic	64223	4	64225	4	64225	4	64229	4
15	Bearing	11068	2	13693	2	13694	2	56743	2
Bearing Nylon Locknut									
16	3/4" Nylon Locknut	-		-		-		10320	8
	5/8" Nylon Locknut	-		-		10313	8	-	
	1/2" Nylon Locknut	10318	8	10318	8	-		-	
17	3/8 x 1 1/2" Bolt	10293	32	10293	32	10293	36	10293	36
18	3/8 x 1 1/4" Bolt	10311	6	10311	6	10311	6	10311	6
19	3/8 x 1" Bolt	10277	68	10277	72	10277	76	10277	76
20	3/8" Flatwasher	10304	6	10304	6	10304	6	10304	6
21	ACME Hex Nut	58116	2	58116	2	58116	2	58116	2
22	ACME Hex Nut Holed	58629	4	58629	4	58629	4	58629	4
23	3/8" Nylon Locknut	10274	108	10274	112	10274	120	10274	122
24	Spring Pin	63519	4	63519	4	63519	4	63519	4
25	Key	63482	1	63483	1	63484	1	63514	1
26	Setscrew	23716	4	35980	4	35981	4	59249	4



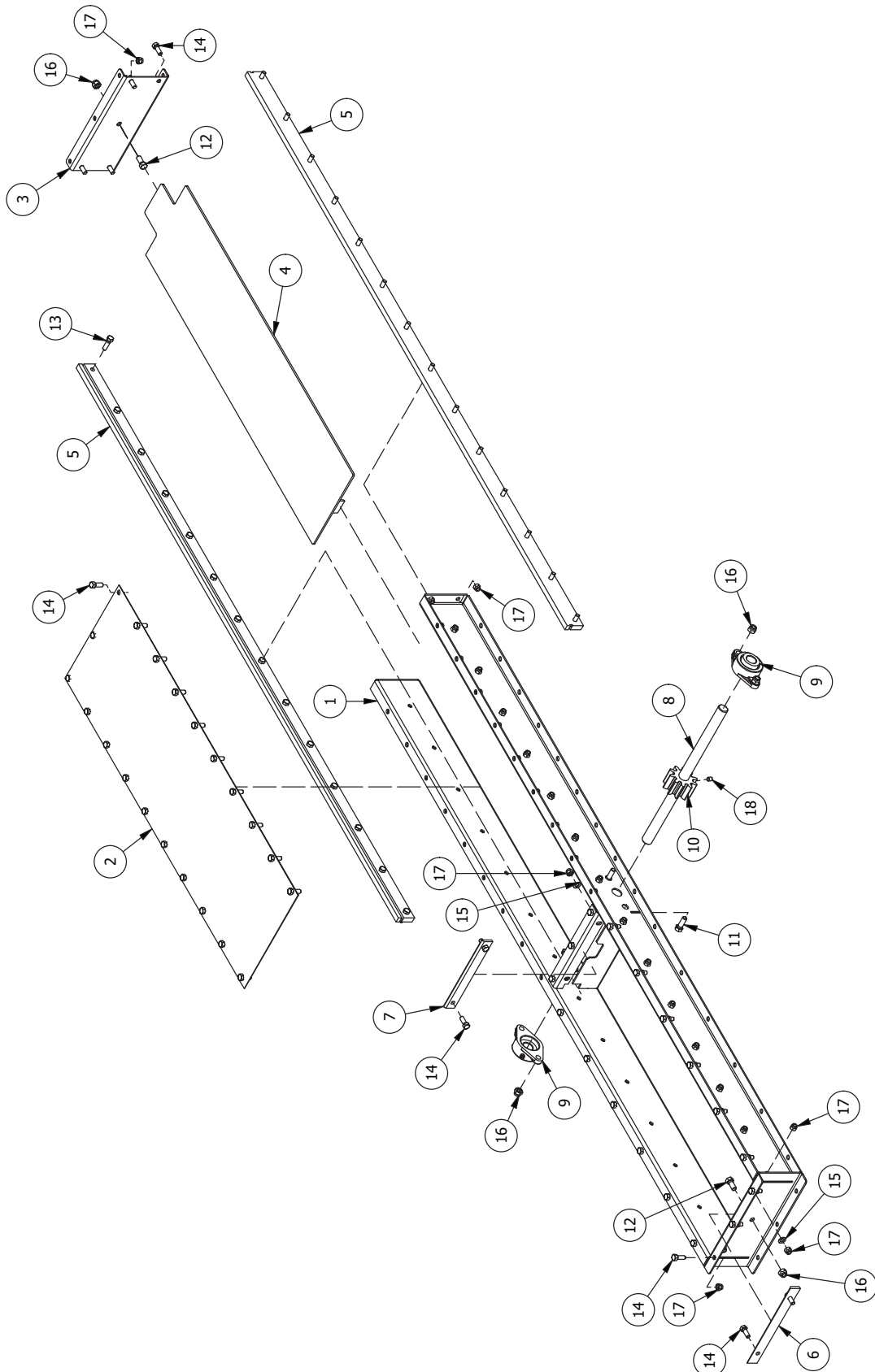
#s	DESCRIPTION	6" PART #	QTY	8" PART #	QTY	10" PART #	QTY	12" PART #	QTY
Body Weldment									
1	Models: 12 ga.	63883	1	63884	1	-		-	
	Models: 10 ga.	-		63885	1	63886	1	63888	1
	Models: 3/16"	-		-		63887	1	63889	1
Cover									
2	Models: 12 ga.	64092	1	64096	1	-		-	
	Models: 10 ga.	-		64097	1	64101	1	64106	1
	Models: 3/16"	-		-		64102	1	64107	1
3	End Top Cover	64219	1	64220	1	64221	1	64222	1
4	End Bottom Cover	64215	1	64216	1	64217	1	64218	1
5	Half Transition STD	57505	2	57506	2	57507	2	57508	2
6	Half Transition Flanged	63953	2	63954	2	63955	2	63956	2
Connection Pipe									
7	Models: 12 ga.	57519	2	57521	2	-		-	
	Models: 10 ga.	57520	2	57522	2	57523	2	57524	2
	Models: 3/16"	-		-		57523	2	57524	2
8	Splice Clamp	58357	2	58358	2	58359	2	58360	2
9	Shaft	58012	1	58013	1	58020	1	58010	1
10	Sprocket	63317	1	63323	1	63329	1	64234	1
11	Sprocket Socket Head Bolt	c/w sprocket	4	c/w sprocket	4	c/w sprocket	4	c/w sprocket	4
12	Tensioner Weldment	63962	2	63964	2	63966	2	63968	2
13	Tensioner Seal	63978	2	63979	2	63980	2	63981	2
14	Tensioner Threaded Rod	63989	2	63990	2	63990	2	63993	2
15	Tensioner Slide Plastic	64224	4	64226	4	64228	4	64230	4
16	Bearing	11068	2	13693	2	13694	2	56743	2
Bearing Nylon Locknut									
17	3/4" Nylon Locknut	-		-		-		10320	8
	5/8" Nylon Locknut	-		-		10313	8	-	
	1/2" Nylon Locknut	10318	8	10318	8	-		-	
18	Back Wall	63999	1	64000	1	64001	1	64002	1
19	Back Wall Holder	64231	2	64231	2	64232	2	64233	2
20	3/8 x 1 1/2" Bolt	10293	36	10293	40	10293	40	10293	44
21	3/8 x 1 1/4" Bolt	10311	6	10311	6	10311	6	10311	6
22	3/8 x 1 1/4" Carriage Bolt	11358	8	11358	8	11358	8	11358	8
23	3/8 x 1" Bolt	10277	66	10277	74	10277	78	10277	86
24	3/8" Flatwasher	10304	14	10304	14	10304	14	10304	14
25	ACME Hex Nut	58116	2	58116	2	58116	2	58116	2
26	ACME Hex Nut Holed	58629	4	58629	4	58629	4	58629	4
27	3/8" Nylon Locknut	10274	118	10274	130	10274	134	10274	148
28	Spring Pin	63519	4	63519	4	63519	4	63519	4
29	Key	63482	1	63483	1	63484	1	63514	1
30	Setscrew	23716	4	35980	4	35981	4	59249	4



#s	DESCRIPTION	6" PART #	QTY	8" PART #	QTY	10" PART #	QTY	12" PART #	QTY
Pipe									
Models: 12 ga.									
	5ft	64647	2	64651	2	-		-	
	10ft	57527	2	57543	2	-		-	
	20ft	57526	2	57542	2	-		-	
	30ft	64646	2	64650	2	-		-	
1	40ft	57525	2	57541	2	-		-	
Models: 10 ga.									
	5ft	64649	2	64653	2	64655	2	64657	2
	10ft	57535	2	57551	2	57559	2	57567	2
	20ft	57534	2	57550	2	57558	2	57566	2
	30ft	64648	2	64652	2	64654	2	64656	2
	40ft	57533	2	57549	2	57557	2	57565	2
Clamp Spacer									
	5ft	64203	1	64204	1	64205	1	64206	1
2	10ft	64203	1	64204	1	64205	1	64206	1
	20ft	64203	2	64204	2	64205	2	64206	2
	30ft	64203	3	64204	3	64205	3	64206	3
	40ft	64203	4	64204	4	64205	4	64206	4
Clamp Band									
	5ft	64207	2	64208	2	64209	2	64210	2
3	10ft	64207	2	64208	2	64209	2	64210	2
	20ft	64207	4	64208	4	64209	4	64210	4
	30ft	64207	6	64208	6	64209	6	64210	6
	40ft	64207	8	64208	8	64209	8	64210	8
4	Splice Clamp	58357	2	58358	2	58359	2	58360	2
3/8 x 1 1/2" Bolt									
	5ft	10293	24	10293	24	10293	24	10293	24
5	10ft	10293	24	10293	24	10293	24	10293	24
	20ft	10293	32	10293	32	10293	32	10293	32
	30ft	10293	40	10293	40	10293	40	10293	40
	40ft	10293	48	10293	48	10293	48	10293	48
3/8" Nylon Locknut									
	5ft	10274	24	10274	24	10274	24	10274	24
6	10ft	10274	24	10274	24	10274	24	10274	24
	20ft	10274	32	10274	32	10274	32	10274	32
	30ft	10274	40	10274	40	10274	40	10274	40
	40ft	10274	48	10274	48	10274	48	10274	48

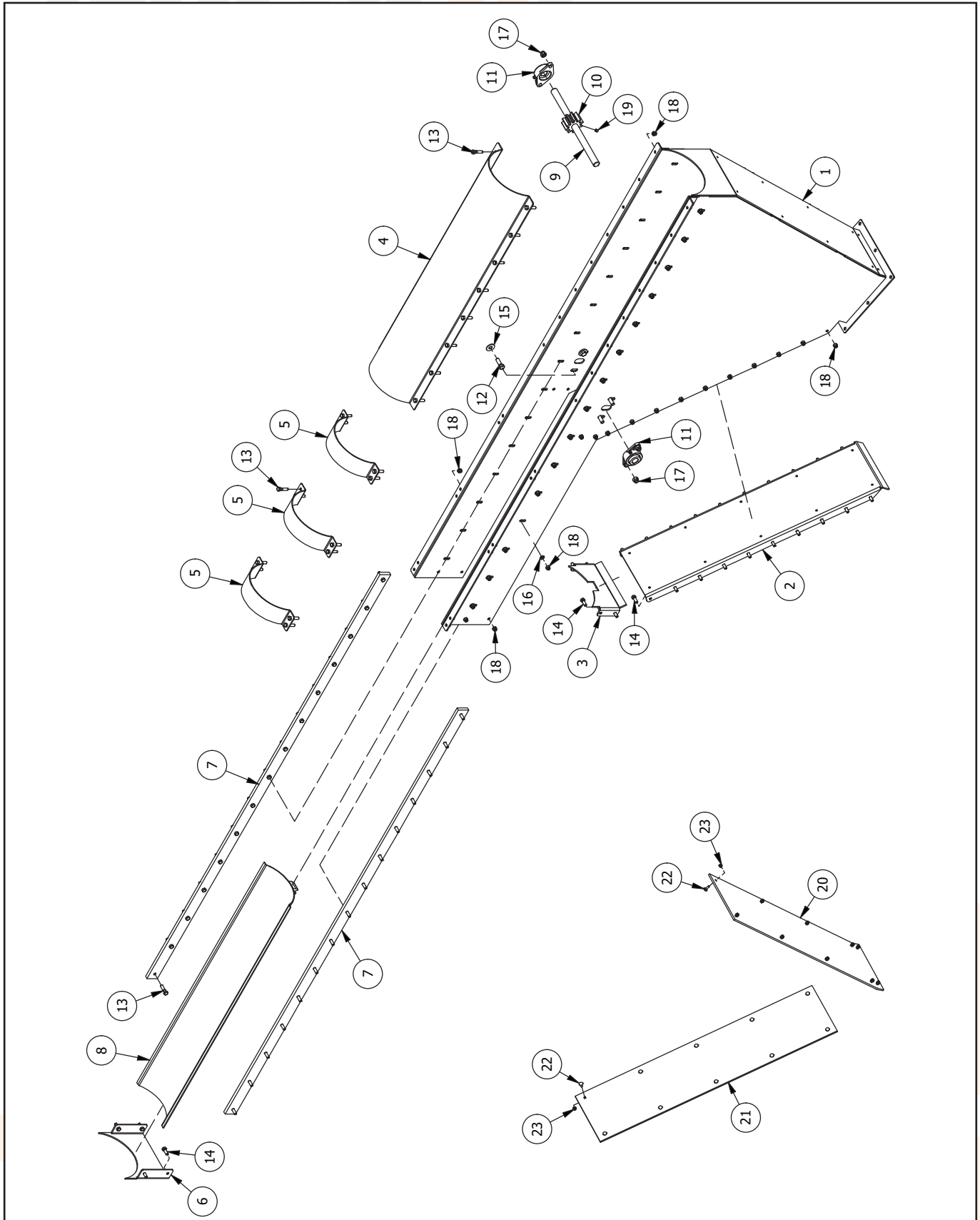


#s	DESCRIPTION	6" PART #	QTY	8" PART #	QTY	10" PART #	QTY	12" PART #	QTY
End Slide Gate Frame									
1	Model: Standard Gate	79934	1	79935	1	79936	1	79937	1
	Model: SC Takeup Gate	79938	1	79939	1	79940	1	79941	1
Cover Plate									
2	Model: Standard Gate	79974	1	79975	1	79976	1	79977	1
	Model: SC Takeup Gate	79978	1	79979	1	79980	1	79981	1
3	Gate Wall Bolt	79943	1	79945	1	79947	1	79949	1
Gates									
4	Model: Standard Gate	79994	1	79995	1	79996	1	79997	1
	Model: SC Takeup Gate	79998	1	79999	1	81500	1	81501	1
Plastic Slider									
5	Model: Standard Gate	79982	2	79983	2	79984	2	79985	2
	Model: SC Takeup Gate	79986	2	79987	2	79988	2	79989	2
6	End Plastic	81518	1	81520	1	81522	1	81524	1
7	Center Plastic	81519	1	81521	1	81523	1	81525	1
8	Gate Shaft	23627	1	23628	1	23629	1	14591	1
9	Bearing	41963	2	41963	2	41963	2	41963	2
10	Pinion	14494	1	14494	1	14494	1	14494	1
7/16" x 1 1/4" Bolt									
11	Model: Standard Gate	23519	4	23519	4	23519	4	23519	4
	Model: SC Takeup Gate	23519	4	23519	4	23519	4	23519	4
7/16" x 1" Bolt									
12	Model: Standard Gate	20402	2	20402	2	20402	2	20402	2
	Model: SC Takeup Gate	20402	2	20402	2	20402	2	20402	2
3/8 x 1 1/4" Bolt									
13	Model: Standard Gate	10311	14	10311	18	10311	20	10311	22
	Model: SC Takeup Gate	10311	20	10311	26	10311	28	10311	30
3/8 x 1" Bolt									
14	Model: Standard Gate	10277	33	10277	37	10277	39	10277	45
	Model: SC Takeup Gate	10277	37	10277	45	10277	47	10277	53
3/8" Flatwasher SM OD									
15	Model: Standard Gate	10275	4	10275	4	10275	4	10275	8
	Model: SC Takeup Gate	10275	4	10275	4	10275	4	10275	8
7/16" Nylon Locknut									
16	Model: Standard Gate	15779	6	15779	6	15779	6	15779	6
	Model: SC Takeup Gate	15779	6	15779	6	15779	6	15779	6
3/8" Nylon Locknut									
17	Model: Standard Gate	10274	47	10274	55	10274	59	10274	67
	Model: SC Takeup Gate	10274	57	10274	71	10274	75	10274	83
18	3/8" Setscrew	23716	1	23716	1	23716	1	23716	1



#s	DESCRIPTION	6" PART #	QTY	8" PART #	QTY	10" PART #	QTY	12" PART #	QTY
Discharge Gate Frame									
1	Models: 0° No Liners	58147	1	58148	1	58149	1	58150	1
	Models: 0° With Liners	58151	1	58152	1	58153	1	58154	1
	Models: 15° No Liners	81866	1	81869	1	81872	1	81875	1
	Models: 15° With Liners	81878	1	81881	1	81884	1	81887	1
	Models: 30° No Liners	81867	1	81870	1	81873	1	81876	1
	Models: 30° With Liners	81879	1	81882	1	81885	1	81888	1
	Models: 45° No Liners	81868	1	81871	1	81874	1	81877	1
	Models: 45° With Liners	81880	1	81883	1	81886	1	81889	1
Angled Wall									
2	Models: 0° No Liners	58182	1	58183	1	58184	1	58185	1
	Models: 0° With Liners	58186	1	58187	1	58188	1	58189	1
	Models: 15° No Liners	81944	1	81947	1	81950	1	81953	1
	Models: 15° With Liners	81956	1	81959	1	81962	1	81965	1
	Models: 30° No Liners	81945	1	81948	1	81951	1	81954	1
	Models: 30° With Liners	81957	1	81960	1	81963	1	81966	1
	Models: 45° No Liners	81946	1	81949	1	81952	1	81955	1
	Models: 45° With Liners	81958	1	81961	1	81964	1	81967	1
Divider Wall									
3	Models: 0°	58207	1	58208	1	58209	1	58210	1
	Models: 15°	81968	1	81971	1	81974	1	81977	1
	Models: 30°	81969	1	81972	1	81975	1	81978	1
	Models: 45°	81970	1	81973	1	81976	1	81979	1
4	Gate Cover	58194	1	58195	1	58196	1	58197	1
5	Clamp Band	58198	3	58199	3	58200	3	58201	3
6	End Plate	58202	1	58203	1	58204	1	58205	1
7	Plastic Slider	58206	2	58206	2	58206	2	58206	2
8	Gate	58173	1	58174	1	58175	1	58176	1
9	Shaft	58190	1	58191	1	58192	1	58193	1
10	Pinion	14494	1	14494	1	14494	1	14494	1
11	Bearing	41963	2	41963	2	41963	2	41963	2
12	1/2 x 1 1/2" Bolt	10294	4	10294	4	10294	4	10294	4
13	3/8 x 1 1/2" Bolt	10293	58	10293	58	10293	58	10293	58
14	3/8 x 1" Bolt	10277	28	10277	28	10277	28	10277	28
15	1/2" Flatwasher	10324	4	10324	4	10324	4	10324	4
16	3/8" Flatwasher SM OD	10275	30	10275	30	10275	30	10275	30
17	1/2" Nylon Locknut	10318	4	10318	4	10318	4	10318	4
18	3/8" Nylon Locknut	10274	86	10274	86	10274	86	10274	86
19	Setscrew	23716	1	23716	1	23716	1	23716	1

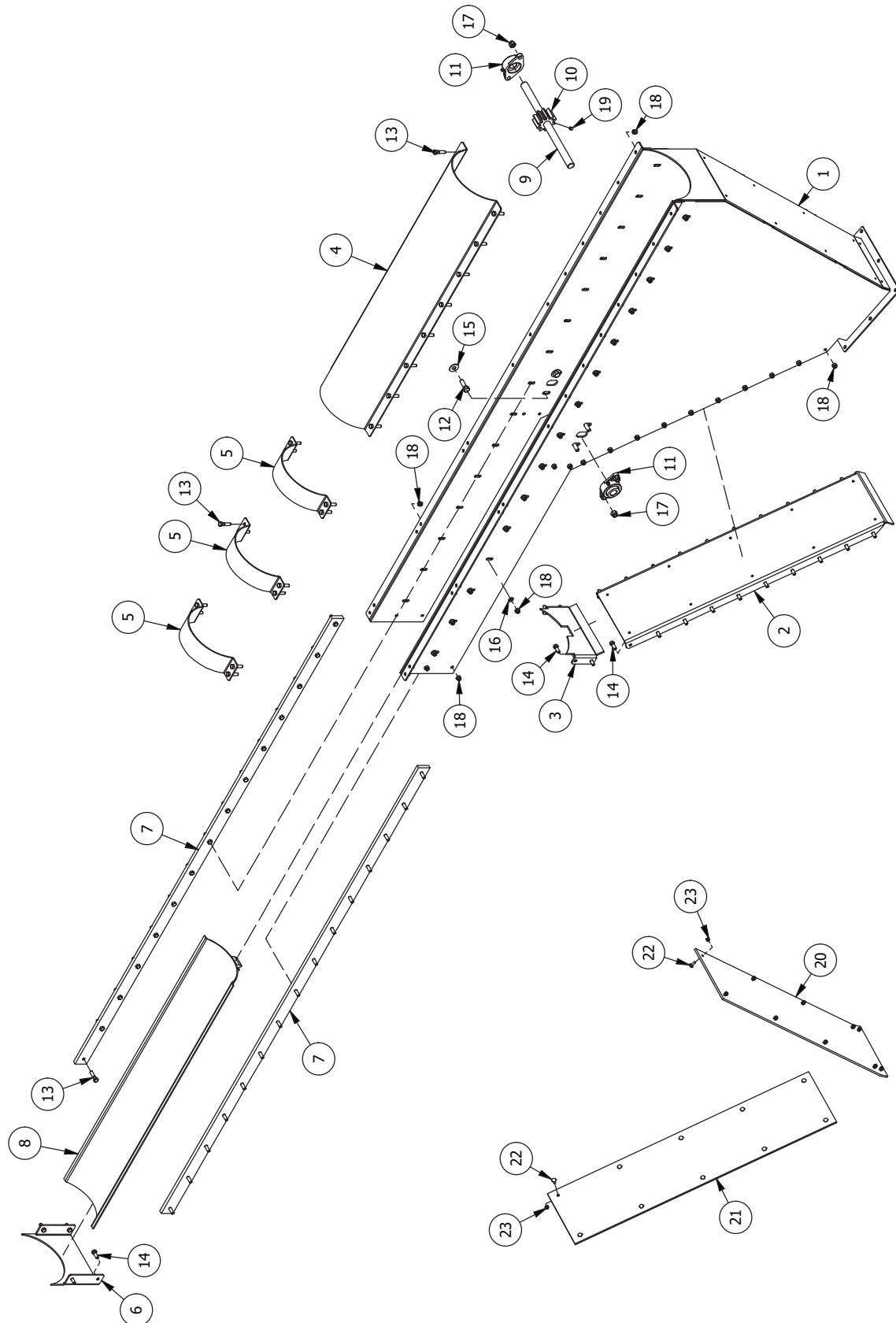
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Liners (optional)

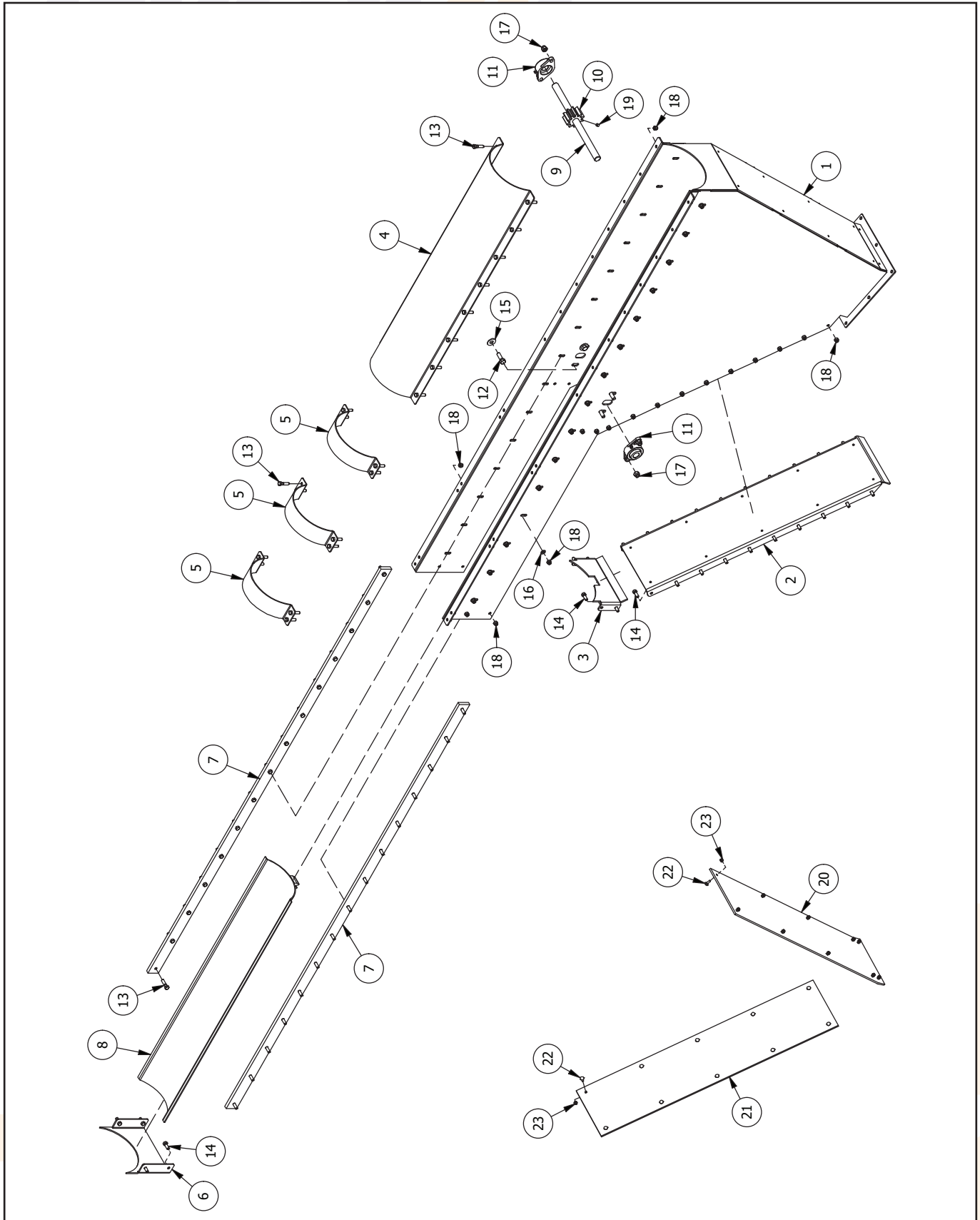
#s	DESCRIPTION	6" PART #	QTY	8" PART #	QTY	10" PART #	QTY	12" PART #	QTY
0° End Liners									
	1/4" UHMW	58489	1	58494	1	58499	1	58504	1
	10 ga. AR200	58490	1	58495	1	58500	1	58505	1
	10 ga. AR400	58492	1	58497	1	58502	1	58507	1
	3/16" AR200	58491	1	58496	1	58501	1	58506	1
	3/16" AR400	58493	1	58498	1	58503	1	58508	1
15° End Liners									
	1/4" UHMW	82143	1	82152	1	82161	1	82170	1
	10 ga. AR200	82144	1	82153	1	82162	1	82171	1
	10 ga. AR400	82493	1	82499	1	82505	1	82511	1
	3/16" AR200	82145	1	82154	1	82163	1	82172	1
	3/16" AR400	82494	1	82500	1	82506	1	82512	1
30° End Liners									
	1/4" UHMW	82146	1	82155	1	82164	1	82173	1
	10 ga. AR200	82147	1	82156	1	82165	1	82174	1
	10 ga. AR400	82495	1	82501	1	82507	1	82513	1
	3/16" AR200	82148	1	82157	1	82166	1	82175	1
	3/16" AR400	82496	1	82502	1	82508	1	82514	1
45° End Liners									
	1/4" UHMW	82149	1	82158	1	82167	1	82176	1
	10 ga. AR200	82150	1	82159	1	82168	1	82177	1
	10 ga. AR400	82497	1	82503	1	82509	1	82515	1
	3/16" AR200	82151	1	82160	1	82169	1	82178	1
	3/16" AR400	82498	1	82504	1	82510	1	82516	1

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#s	DESCRIPTION	6" PART #	QTY	8" PART #	QTY	10" PART #	QTY	12" PART #	QTY
0° End Liners									
	1/4" UHMW	58469	1	58474	1	58479	1	58484	1
	10 ga. AR200	58470	1	58475	1	58480	1	58485	1
	10 ga. AR400	58472	1	58477	1	58482	1	58487	1
	3/16" AR200	58471	1	58476	1	58481	1	58486	1
	3/16" AR400	58473	1	58478	1	58483	1	58488	1
15° End Liners									
	1/4" UHMW	82179	1	82188	1	82197	1	82206	1
	10 ga. AR200	82180	1	82189	1	82198	1	82207	1
	10 ga. AR400	82517	1	82523	1	82529	1	82535	1
	3/16" AR200	82181	1	82190	1	82199	1	82208	1
21	3/16" AR400	82518	1	82524	1	82530	1	82536	1
30° End Liners									
	1/4" UHMW	82182	1	82191	1	82200	1	82209	1
	10 ga. AR200	82183	1	82192	1	82201	1	82210	1
	10 ga. AR400	82519	1	82525	1	82531	1	82537	1
	3/16" AR200	82184	1	82193	1	82202	1	82211	1
	3/16" AR400	82520	1	82526	1	82532	1	82538	1
45° End Liners									
	1/4" UHMW	82185	1	82194	1	82203	1	82212	1
	10 ga. AR200	82186	1	82195	1	82204	1	82213	1
	10 ga. AR400	82521	1	82527	1	82533	1	82539	1
	3/16" AR200	82187	1	82196	1	82205	1	82214	1
	3/16" AR400	82522	1	82528	1	82534	1	82540	1
1/4 x 3/4" Carriage Bolt									
	Model: 0°	35998	18	35998	18	35998	18	35998	18
22	Model: 15°	35998	20	35998	20	35998	20	35998	20
	Model: 30°	35998	22	35998	22	35998	22	35998	22
	Model: 45°	35998	22	35998	22	35998	22	35998	22
1/4" Nylon Locknut									
	Model: 0°	11341	18	11341	18	11341	18	11341	18
23	Model: 15°	11341	20	11341	20	11341	20	11341	20
	Model: 30°	11341	22	11341	22	11341	22	11341	22
	Model: 45°	11341	22	11341	22	11341	22	11341	22

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