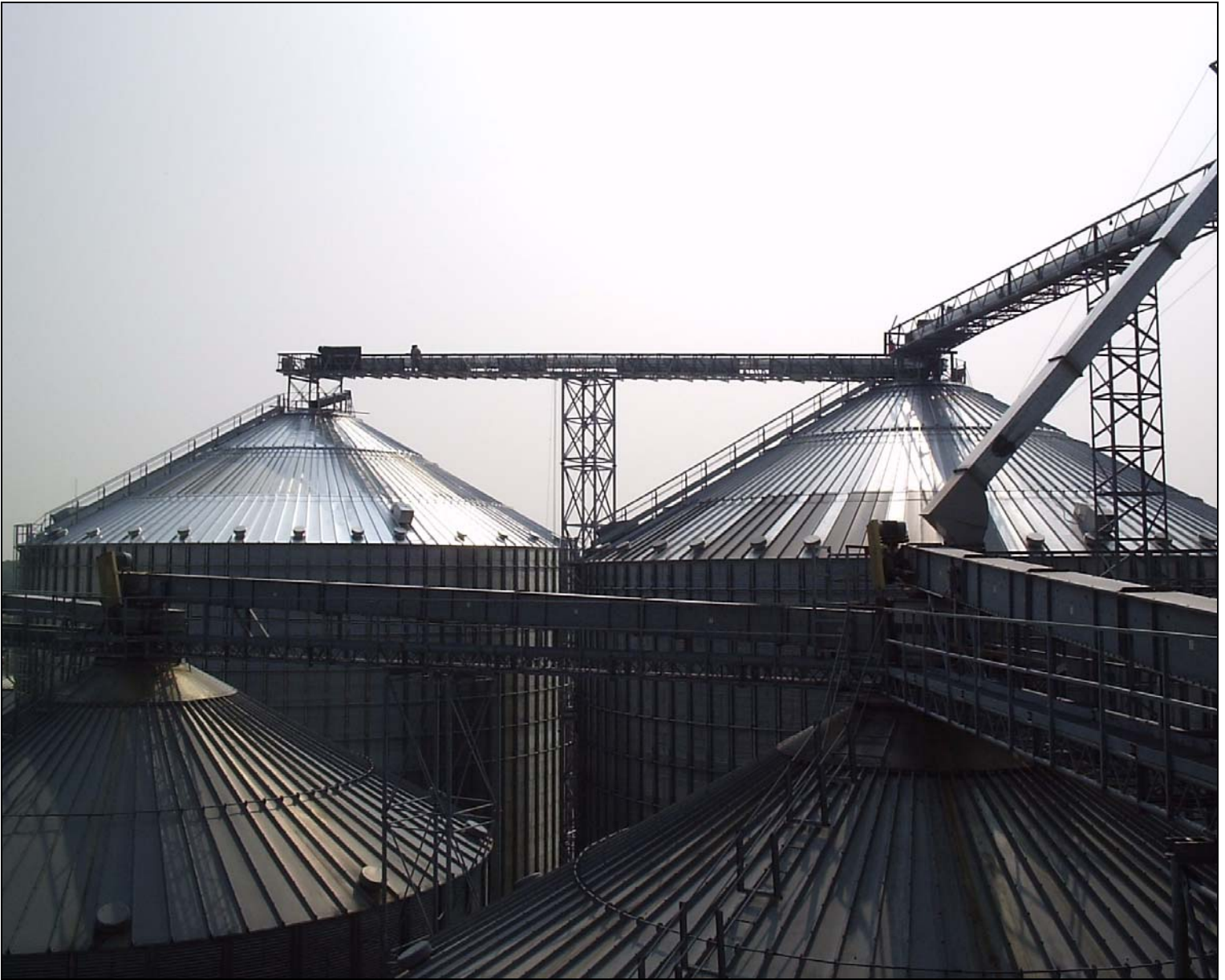




# DRAG CONVEYOR

## ALL MODELS

### ASSEMBLY & OPERATION



Read this manual before using product. Failure to follow instructions and safety precautions can result in serious injury, death, or property damage. Keep manual for future reference.

Part Number: IDCM0308-R0

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# 1. Introduction

Union Iron Works En Masse Chain-Flight Conveyors are tough, dependable, and provide efficient handling capacity for conveying a wide variety of bulk materials with minimum product degradation.

The falt bottom design increases conveying capacity, and special Union Iron features substantially reduce the product-to-product contamination that you find with other designs. Product features include:

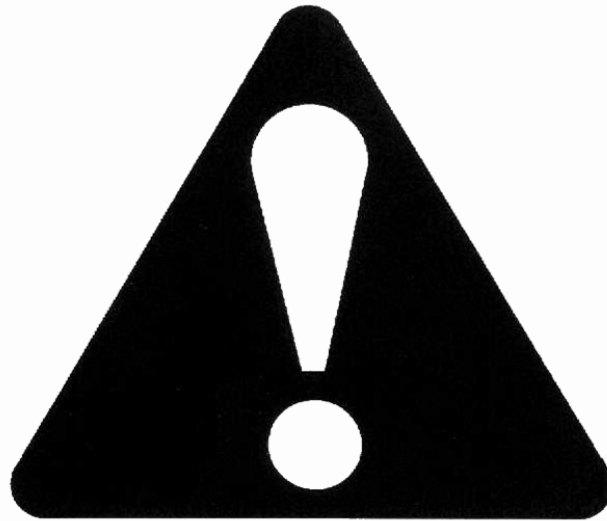
- Rugged, heavy-duty steel construction for durability in the most demanding applications.
- Dust and weather-tight construction to maintain product quality against the elements and prevent dust from escaping.
- UHMW polyethylene flights to reduce metal-to-metal contact and provide quiet, efficient operation.
- Replaceable bottoms and side liners.
- Head and tail are equipped with removable end plates to facilitate maintenance.

Before using the Drag Conveyor, give this manual to the people who will be operating and maintaining this equipment. Reading and understanding the manual will reduce downtime and equipment failure, as well as ensure safe and efficient operation. A sign-off form is provided on the inside front cover for your convenience.

The serial number plates are located on the head assembly side plate on the opposite side of the drive, and on the tail assembly side plate. Please mark the number in the space provided for easy reference.

<b>Model#</b>	
<b>Serial #</b>	
<b>Production Year</b>	

## 2. Safety First



The Safety Alert symbol identifies important safety messages on the product and in the manual. When you see this symbol, be alert to the possibility of personal injury or death. Follow the instructions in the safety messages.

Why is SAFETY important to you?

Three big reasons:

- Accidents disable and kill.
- Accidents cost.
- Accidents can be avoided.

### **SIGNAL WORDS**

Note the use of the signal words **DANGER**, **WARNING**, **CAUTION**, and **NOTICE** with the safety messages. The appropriate signal word for each message has been selected using safety as a guideline.

This Safety Alert symbol means **ATTENTION, BE ALERT!, YOUR SAFETY IS INVOLVED.**

**DANGER**

**DEFINITION:** Indicates an imminently hazardous situation that, if not avoided, will result in serious injury or death. This signal word is limited to the most extreme situations.

**WARNING**

**DEFINITION:** Indicates a hazardous situation that, if not avoided, could result in serious injury or death.

**CAUTION**

**DEFINITION:** Indicates a hazardous situation that, if not avoided, may result in minor or moderate injury.

**NOTICE**

**DEFINITION:** Indicates a potentially hazardous situation that, if not avoided, may result in property damage.

**YOU** are responsible for the **SAFE** use and maintenance of your product. **YOU** must ensure that you and anyone else who is going to work around the product be familiar with all procedures and related **SAFETY** information contained in this manual.

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.

- Product owners must give instructions to employees before allowing them to operate or use the product.
- The most important safety device on this product is a **SAFE** user or operator. It is the user/operator's responsibility to read and understand

**ALL** safety instructions in the manual and to follow them. All accidents can be avoided.

- A person who has not read and understood all safety instructions is not qualified to operate or use the product. Untrained users/operators expose themselves and bystanders to possible serious injury or death.
- Do not modify the product in any way. Unauthorized modification may impair the function and/or safety, and could affect the life of the product. Any modification to the product voids the warranty.
- Use this product for its intended purposes only.
- Think SAFETY! Work SAFELY!

## 2.1. GENERAL SAFETY

**Important:** *The general safety section includes instructions that apply to all safety practices. Any instructions specific to a certain safety practice (e.g. assembly safety), can be found in the appropriate section.*



- Read and understand all safety instructions, safety decals, and manual(s) before assembling or operating equipment.
- Only trained, competent people shall operate or use the product. An untrained operator is not qualified to operate equipment.
- Have a first-aid kit available for use should the need arise, and know how to use it.
- Provide a fire extinguisher for use in case of an accident. Store in a highly visible place.
- Do not allow children, spectators, or bystanders within the work area.



- Wear appropriate protective gear. This list includes, but is not limited to:

- a hard hat
- protective shoes with slip-resistant soles
- protective goggles
- hearing protection



- For powered products: before servicing, adjusting, or repairing, unplug, place all controls in neutral or off position, stop the engine or motor, remove ignition key or lock out power source, and wait for all moving parts to stop.
- Review safety information initially and annually with all personnel who will be using the product.
- Follow good shop practices:
  - Keep service area clean and dry.
  - Be sure electrical outlets and tools are properly grounded.
  - Use adequate light for the job at hand.



## 2.2. ASSEMBLY SAFETY

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- Have 2 people handle the heavy, bulky components.
- Check all equipment for damage immediately upon arrival. Do not attempt to install a damaged item.
- If the equipment must have an open housing as a condition of its use and application, it must be guarded by a railing or fence.
- Use **rugged gratings** where necessary. If the distance between the grating and moving elements is less than 4", the grating opening must not exceed 1/2" x 1" (or 1/2" x 2" for hopper gratings). Covers, guards, and gratings at inlet points must be installed so that personnel cannot be injured in any way.
  - Use solid covers that are designed and installed so that personnel is not exposed to accidental contact with any of the equipment's moving parts.
  - Connect inlet and discharge openings to other equipment in order to completely enclose the equipment.
- As required by the applicable laws, standards, and good practice, the purchaser/owner is responsible for:
  - guarding all rotating equipment such as drives, gears, shafts, and couplings
  - purchasing and providing safety devices and controls
- Before power is connected to the drive, perform a pre-start-up safety check to ensure the equipment and area is safe and that all guards are in place and secure.
- Electrical equipment must conform to the National Electric Code or National Electrical Safety Code, including requirements for the environment. Also consider:
  - *Overflow devices* (electrical interlocks) to warn personnel and shut off power when discharge from conveyor is interrupted.
  - *Overload protection* for devices (shear pins, torque limiters, etc.) and *no-speed protection* (zero-speed switches) to shut off power in the event of an incident that might cause the conveyor to stop operating.
  - *Safety shut-off switch* with power lockout provisions at conveyor drive.
  - *Emergency stop switches* that are readily accessible.
  - *Electrical interlocking* to shut down feeding conveyors whenever a receiving conveyor stops.
  - *Signal devices* to warn personnel of imminent start up of conveyor, especially if started from a remote location.

## 2.3. OPERATIONAL & MAINTENANCE SAFETY

---

Electrical controls, machinery guards, railings, walkways, arrangement of installation, training of personnel, etc., are necessary for a safe working environment. It is the responsibility of the contractor, installer, owner, and user to supplement the materials and services furnished with the necessary items to make the conveyor installation comply with the law and accepted standards.

- Do not operate conveyors unless all covers/guards are in place.
- Advise all operating personnel of the location and operation of all emergency controls and devices. Maintain clear access to these controls and devices.
- Do not place hands, feet, or any part of your body or clothing in the conveyor.
- Never walk on conveyor covers, gratings, or guards.
- Do not use conveyor for any purpose other than that which it was intended.
- Do not poke or prod material into the conveyor with a bar or stick inserted through the openings.
- Conveyors are not normally manufactured or designed to handle materials that are hazardous to personnel (explosive, flammable, toxic, or otherwise dangerous). However, conveyors may be designed to handle these materials. Also, conveyors are not manufactured to comply with local, state, or federal codes for unfired pressure vessels. If hazardous material is to be conveyed or if the conveyor is to be subjected to internal or external pressure, consult Union Iron Works prior to any modifications.
- Be aware of hazardous locations where, without protection, people may be injured by contact with conveyor or material. If conveyor blocks a walkway, provide a crossover stairway or ramp for passage of personnel. If installed overhead, minimum clearance should be 7" for safety.
- Handling foodstuff subjects conveyors to special codes for construction, location, and accessibility. Investigate before ordering standard components! Food conveyors often require hinged access doors for drop-bottom trough cleaning, and such doors require special safety controls and procedures by customer to prevent personnel injuries. Extensive use of padlocks, with keys in the hands of only management personnel, is one means frequently used.
- Do not attempt a field modification of conveyor or components.
- Perform frequent inspections of these controls and devices, covers, guards, and equipment to ensure proper working order and correct positioning.

The Conveyor Equipment Manufacturer's Association (CEMA) has produced an audiovisual presentation entitled "Safe Operation of Screw Conveyors, Drag Conveyors, and Bucket Elevators." Union Iron Works encourages acquisition and use of this source of safety information.

### 2.3.1. LOCKOUT AND TAGOUT PROCEDURES

---

To minimize possibility of serious injury or death to workers from hazardous energy release (for example, when restarting the equipment) and prevent worker deaths from all forms of hazardous energy release, follow all lockout and tagout procedures when installing and servicing equipment. Ensure that all OSHA procedures are adhered to; for example:

- De-energize, block, and dissipate all sources of hazardous energy.
- Lock out and/or tag out all forms of hazardous energy.
- Ensure that only 1 key exists for each assigned lock, and that you are the only one that holds that key.
- After verifying all energy sources are de-energized, service or installation may be performed.
- Ensure that all personnel are clear before turning on power to equipment.

For more information on occupational safety practices, see [www.osha.gov](http://www.osha.gov).

## 2.4. SAFETY DECAL LOCATIONS

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- Keep safety decals clean and legible at all times.
- Replace safety decals that are missing or have become illegible.
- Replaced parts must display the same decal(s) as the original part.
- Safety decals are available from your distributor, dealer, or factory.

### 2.4.1. DECAL INSTALLATION

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1. Installation area must be clean and dry, with a temperature above 10°C (50°F).
2. Decide on the exact position before you remove the backing paper.
3. Align the decal over the specified area and carefully press the small portion with the exposed sticky backing in place.
4. Slowly peel back the remaining paper and carefully smooth the remaining portion of the decal in place.
5. Small air pockets can be pierced with a pin and smoothed out using the piece of sign backing paper.

## 2.4.2. DECAL LOCATIONS

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



DECAL 1 -  
P200-0017



DECAL 2 -  
P200-0007



DECAL 3 -  
P200-0013



DECAL 4 -  
P200-0020



DECAL 4 -  
P200-0019

- Place decal 1 (General Equipment Warning) in a convenient location on the equipment.
- Place decal 2 (Rotating Parts Hazard) on and behind the belt or chain guard.
- Place decal 3 (Moving Parts Hazard) on all head, tail, and intermediate section covers, as well as all inspection and access opening covers.
- Place decal 4 in a convenient location on the equipment.
- Place decal 5 (Electrocution Hazard) on the motor conduit boxes.

# 3. Installation

## WARNING

Before continuing, please reread the safety information relevant to this section at the beginning of this manual. Failure to follow the safety instructions can result in serious injury, death, or property damage.

## SHIPPING CHECK

Immediately check that all items in the shipment have been received and are undamaged (check for bent or dented casing sections, and look over the covers, buckets, chain guards, drives, etc.).

**Note:** *Mark claims for damaged parts on the shipping papers and immediately file a claim. **Do not attempt to install a damaged item.***

## 3.1. LIFTING AND MOVING

---

Take extreme care to prevent damage when moving assembled conveyors or components. Spreader bars with slings are the recommended support method for lifting. The unsupported span should be no longer than 10'–12'.

Never lift a conveyor with only one support point. When choosing support points for especially heavy items such as drives or gates, consider the weight of an item in relation to load balance and its bending effect.

## 3.2. ASSEMBLY

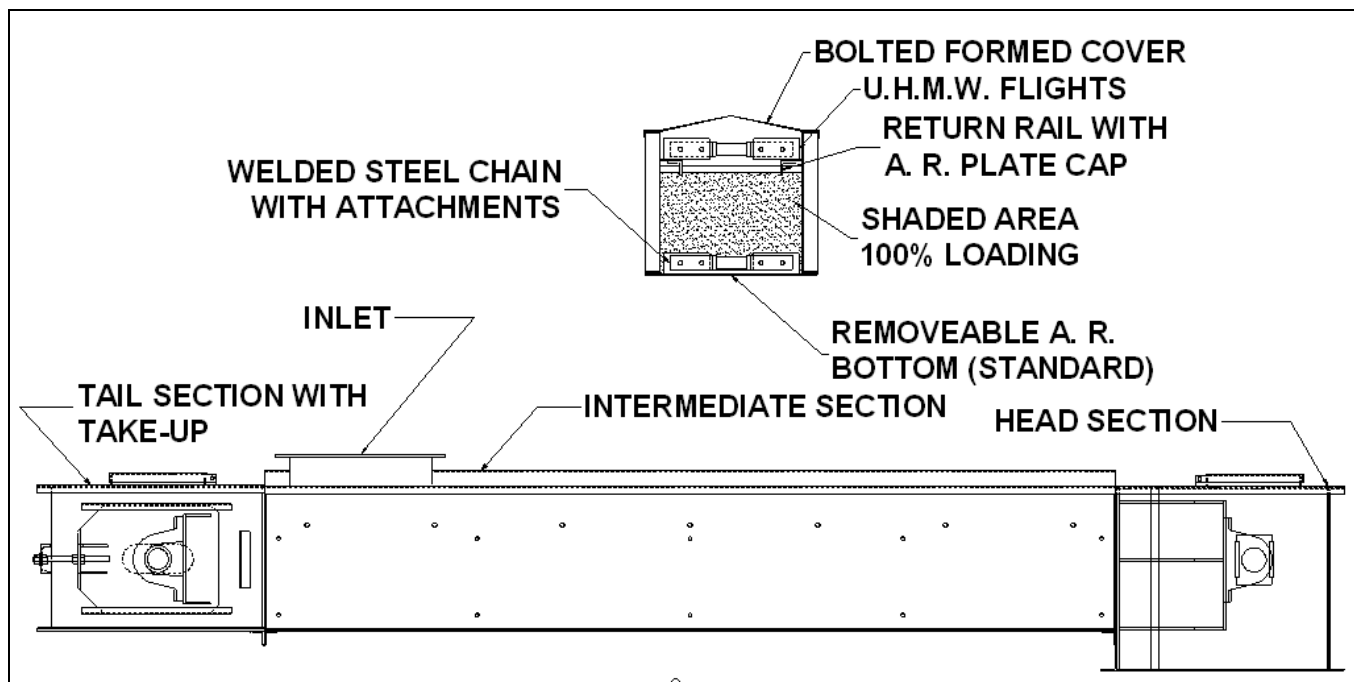


Figure 3.1

Figure 3.1 is a representative drawing only. It is the responsibility of the purchaser to consult contract drawings for specific items on each conveyor.

For safety and proper operation, drag conveyors must be assembled and erected straight and true. The purchaser is responsible for ensuring all support and mounting surfaces are straight and level so there is no distortion in the conveyor.

All component pieces (or conveyor sections) should be placed in proper sequence before assembly is started.

## 3.3. INSTALLATION

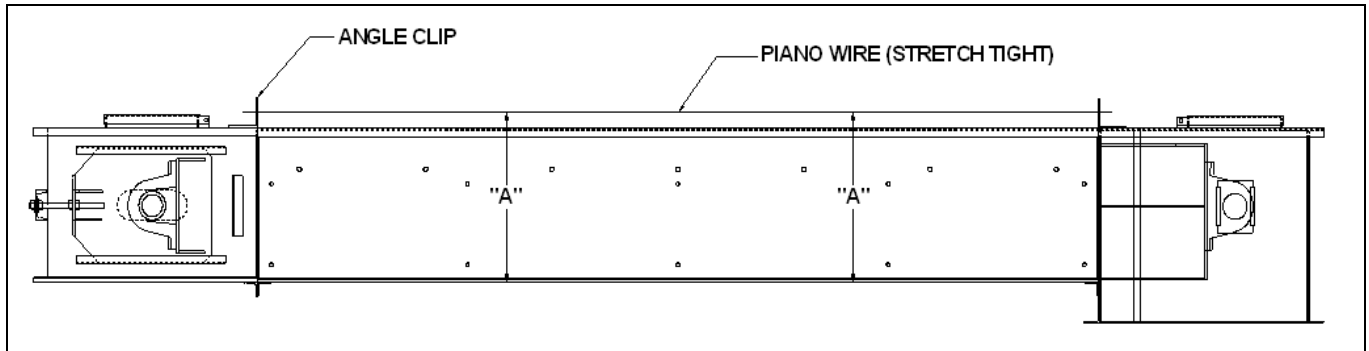
For shop-assembled conveyors, units are match marked and shipped in the longest sections practical for shipment.

Field assembly can be accomplished by connecting marked joints in accordance with the packing list and/or drawing if applicable. In field erection, the mounting surfaces for supporting the conveyor must be level and true so there is no distortion in the conveyor. Shims or grout should be used when required. Frequently check for straightness during assembly.

For conveyor assemblies purchased as parts or merchandise, assemble according to the following procedure:

1. Place conveyor troughs in proper sequence with tail, bypass inlet, and head in proper location.

2. Connect the trough flanges loosely. Do not tighten bolts.
3. Align the trough bottom centerlines perfectly using piano wire (or equivalent); then tighten flange bolts.
4. Tighten all anchor bolts.



**Figure 3.2**

**Note:** *In Figure 3.2, "A" dimension should be equal for full length of trough; bottom must be smooth through joints.*

5. Before connecting the top section of chain, loosen take-up as much as possible. Check sprocket alignment. Check set screws and bearing bolts for tightness.
6. Connect top section for the chain. (On long conveyors, a come-a-long may be necessary.)
7. Adjust take-up to remove excess slack from chain making sure that adjustment screws have been tightened equally to prevent misalignment.
8. Install trough covers in the proper sequence. Handle covers with reasonable care to avoid warping or bending. Covers should be securely fastened.
9. Install drive at the proper location and in accordance with separate instructions provided.
10. Rotate conveyor by hand to ensure that no binding occurs.
11. Check for proper direction of chain and flight travel after electrical connections have been made and before attempting to handle material.
12. If necessary, after lock out / tag out, reconnect electrical leads to reverse direction of material flow. Material should be pushed by the flight and attachment.
13. Attach all gates, feed chute, discharge chute, etc., and connect all safety devices and controls according to the assembly drawing for your conveyor, included as an insert in this manual. **Carefully test to ensure proper operation.**

# 4. Operation

## WARNING

Before continuing, please reread the safety information relevant to this section at the beginning of this manual. Failure to follow the safety instructions can result in serious injury, death, or property damage.

**Important:** *Do not operate drag Conveyors unless the conveyor housing completely encloses the conveyor's moving elements and power transmission guards are in place.*

## 4.1. PRE-OPERATION

---

Before operating the Drag Conveyor, lubricate all bearings and drives per service instructions. Bearings and gear reducers are normally shipped without lubricant. Refer to bearing and gear reducer service instructions for recommended lubricant.

Check conveyor to ensure:

- Remove all tools and foreign materials.
- Install all covers, guards, safety devices or controls, and any interlock to other equipment and ensure they are operating properly.

## 4.2. START-UP

---

Operate the empty conveyor for several hours as a break-in period. Look for bearing heat, unusual noises, or drive misalignment. Should any of these occur, check the following and take corrective steps.

1. When anti-friction bearings are used, check for proper lubrication. Insufficient or excessive lubricant will cause high operating temperatures.

## NOTICE

Loose chains and misalignment of troughs and sprockets can require excessive maintenance and cause poor life expectancy.

2. Check assembly and mounting bolts and set screws; tighten if necessary.

After running the conveyor, stop it, lock out all power, and check discharge to ensure it is clear and material flow through the discharge will not be impeded in any way.

1. Restart the conveyor and gradually feed material. Gradually increase feed rate until the design capacity is reached.


**Important:** *Do not overload conveyor. Do not exceed conveyor speed, capacity, material density, or rate of flow for which the conveyor and drive were designed.*

2. Cut off feed and allow the conveyor to empty. Lock out power supply. Check all bolts and all alignments. Realign as necessary, tighten all bolts, and check chain adjustment.
3. Check motor amperage frequently.
4. Check chain tension periodically. It may be necessary to readjust chain tension after running material in the conveyor.
5. If the conveyor won't be operated for a prolonged period of time, operate until cleared of all material. This is particularly important when the material conveyed tends to harden, become more viscous or sticky, or spoils if allowed to stand for a period of time.

### 4.3. GENERAL

---

- Run the conveyor empty for a few minutes periodically to check for excessive vibration, loose fasteners, security of covers and guards, noise, and bearing and drive temperature.
- Always operate the conveyor with covers, guards, and safety labels in place.
- Always practice good housekeeping and keep a clear view of the conveyor loading, discharges, and all safety devices.

<b>DANGER</b>	
	<p>Rotating parts hazard!</p> <p>To avoid serious injury or death: Keep body, hair, and clothing away from rotating pulleys, belts, chains, and sprockets. Keep all guards in place and in good working order. Lock out power before removing guard.</p>

## 4.4. EXTENDED SHUTDOWN/STORAGE

---

If the conveyor will be shutdown for more than one month, perform the following:

1. Remove all foreign material from the conveyor and check that the surface coatings are in good order.
2. Lubricate and protect all bearings and drives according to the manufacturer's instructions.
3. Rotate the gear reducer periodically according to the manufacturer's instructions.
4. Protect the conveyor from weather, moisture, and extreme temperatures as required. Do not use plastic or other coverings that promote condensation under the covering.
5. Coat all exposed metal surfaces with rust preventative oil according to the manufacturer's instructions.
6. Prior to start-up, perform the installation and operation instructions in this manual.

# 5. Maintenance

## WARNING

Before continuing, please reread the safety information relevant to this section at the beginning of this manual. Failure to follow the safety instructions can result in serious injury, death, or property damage.

## CAUTION



Before performing any internal inspections or maintenance, ensure that a mechanical lockout is in place on the motor starter.

Establish routine periodic inspections of the entire conveyor to ensure continuous maximum operating performance.

### TO REPLACE OR SHORTEN A CONVEYOR CHAIN SECTION:

1. Lock out power.
2. Locate the cotter pin section of the chain and rotate the chain until it is on the top.
3. Loosen the take-up fully, remove the cotter pin, and remove the desired length.
4. To reassemble, follow the above steps in reverse order.

Replacement parts can be identified from a copy of the original packing list, invoice, or drawing.

### PERIODIC INSPECTIONS SHOULD BE MADE ON THE FOLLOWING:

Trough	<ul style="list-style-type: none"> <li>• Check for wear and alignment.</li> <li>• Tighten all bolts.</li> </ul>
Shafts	<ul style="list-style-type: none"> <li>• Check for wear.</li> </ul>
Flights	<ul style="list-style-type: none"> <li>• Check edges for wear or damage.</li> </ul>
Bolts and Nuts	<ul style="list-style-type: none"> <li>• Check for wear and tightness.</li> </ul>
Seals	<ul style="list-style-type: none"> <li>• Check for leakage, adjustment, and wear.</li> </ul>
Bearings	<ul style="list-style-type: none"> <li>• Check for lubrication and noise.</li> </ul>
Sprockets	<ul style="list-style-type: none"> <li>• Check for wear and alignment.</li> </ul>
Chain	<ul style="list-style-type: none"> <li>• Check for worn pins and damaged sidebars.</li> </ul>

Trough	<ul style="list-style-type: none"><li>• Check for wear and alignment.</li><li>• Tighten all bolts.</li></ul>
Take-up	<ul style="list-style-type: none"><li>• Check chain tension. (If take-up is fully adjusted, a link of chain will need to be removed.)</li></ul>
Gear Reducer	<ul style="list-style-type: none"><li>• Check for oil level and noise.</li></ul>
V-belt/Chain Drive	<ul style="list-style-type: none"><li>• Check belt/chain tension and adjust as required.</li></ul>
Guards	<ul style="list-style-type: none"><li>• Check for oil level (if applicable). Check nuts and bolts for tightness.</li></ul>

# 6. Troubleshooting

PROBLEM	CAUSE	REMEDY
Premature trough failure.	<ul style="list-style-type: none"> <li>Gauge too light.</li> </ul>	<ul style="list-style-type: none"> <li>Increase thickness. Consult Union Iron Works for recommendations.</li> </ul>
	<ul style="list-style-type: none"> <li>Worn flights.</li> </ul>	<ul style="list-style-type: none"> <li>Replace flights.</li> </ul>
	<ul style="list-style-type: none"> <li>Excessive chain speed.</li> </ul>	<ul style="list-style-type: none"> <li>Check chain speed.</li> </ul>
Accelerated flight wear.	<ul style="list-style-type: none"> <li>Excessive heat.</li> </ul>	<ul style="list-style-type: none"> <li>Change flight material. UHMW is limited to 175° F.</li> </ul>
	<ul style="list-style-type: none"> <li>Speed too high.</li> </ul>	<ul style="list-style-type: none"> <li>Reduce speed. Consult Union Iron Works to determine proper chain speed.</li> </ul>
	<ul style="list-style-type: none"> <li>Foreign objects.</li> </ul>	<ul style="list-style-type: none"> <li>Remove foreign objects.</li> </ul>
Chain breakage,	<ul style="list-style-type: none"> <li>Worn chain.</li> </ul>	<ul style="list-style-type: none"> <li>Replace chain if worn.</li> </ul>
	<ul style="list-style-type: none"> <li>Take-up is loose.</li> </ul>	<ul style="list-style-type: none"> <li>Adjust take-up.</li> </ul>
	<ul style="list-style-type: none"> <li>Obstruction in conveyor.</li> </ul>	<ul style="list-style-type: none"> <li>Remove obstruction.</li> </ul>
	<ul style="list-style-type: none"> <li>Sprocket misalignment.</li> </ul>	<ul style="list-style-type: none"> <li>Align sprockets.</li> </ul>
	<ul style="list-style-type: none"> <li>Plugged discharge.</li> </ul>	<ul style="list-style-type: none"> <li>Remove plug.</li> </ul>
	<ul style="list-style-type: none"> <li>Overloading conveyor.</li> </ul>	<ul style="list-style-type: none"> <li>Regulate feed into conveyor.</li> </ul>
Drive shaft breakage.	<ul style="list-style-type: none"> <li>Excessive torque.</li> </ul>	<ul style="list-style-type: none"> <li>Recalculate horsepower requirements.</li> </ul>
	<ul style="list-style-type: none"> <li>Insufficient torque capacity.</li> </ul>	<ul style="list-style-type: none"> <li>Increase diameter of shaft.</li> <li>Change shaft material.</li> </ul>
	<ul style="list-style-type: none"> <li>Obstruction in conveyor.</li> </ul>	<ul style="list-style-type: none"> <li>Remove obstruction.</li> </ul>
	<ul style="list-style-type: none"> <li>Overloading conveyor.</li> </ul>	<ul style="list-style-type: none"> <li>Regulate feed into conveyor.</li> </ul>
Bearing Failure	<ul style="list-style-type: none"> <li>Material getting into bearing</li> </ul>	<ul style="list-style-type: none"> <li>Add or upgrade seal to keep material out of bearing.</li> <li>Change to outboard bearing.</li> </ul>
	<ul style="list-style-type: none"> <li>Insufficient/excessive lubrication.</li> </ul>	<ul style="list-style-type: none"> <li>Lubricate properly.</li> </ul>

<b>PROBLEM</b>	<b>CAUSE</b>	<b>REMEDY</b>
Motor/heaters overload.	<ul style="list-style-type: none"><li>• Amp demand excessive for motor.</li></ul>	<ul style="list-style-type: none"><li>• Recheck horsepower calculations.</li><li>• Check material characteristics.</li><li>• Check capacity.</li><li>• Regulate feed.</li></ul>
Drastic capacity loss.	<ul style="list-style-type: none"><li>• Missing flights.</li></ul>	<ul style="list-style-type: none"><li>• Replace flights.</li></ul>

## LIMITED WARRANTY

Seller warrants that all of the goods sold hereunder will conform to their description in Seller's published literature current at the time the Buyer's order is accepted, that Seller will use good material and workmanship in the manufacture of such goods, and that such goods will conform to applicable laws and regulations regarding purity.

Seller will repair or replace, at its discretion, any nonconforming goods (or refund their purchase price at Seller's option), but only if Seller receives written notice of nonconformity within 60 days after shipment and Buyer's remedies hereunder are expressly so limited.

**Seller makes no other warranties of any kind with respect to such goods or any part thereof, express or implied. All implied warranties of merchantability and fitness for a particular purpose are hereby disclaimed by seller and excluded from this agreement, and such goods are sold "as is" and with all faults.**

**Seller will have no liability for consequential damages of any kind, including damages arising from bodily injury or the loss of use of such goods or other property. Buyer releases all claims for such damages, whether based on contract, warranties, strict liability, or negligence.**



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