



EN-MASSE CHAIN CONVEYOR

ALL MODELS

ASSEMBLY, OPERATION, SAFETY, AND MAINTENANCE MANUAL

This manual applies to:

Conveyors

Model G™, Model RB™, Bulk-Flo™, Vapour Tight Models



ORIGINAL INSTRUCTIONS



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: TEM001 R01

Revised: Oct/15



This product has been designed and constructed according to general engineering standards. Other local regulations may apply and must be followed by the operator. We strongly recommend that all personnel associated with this equipment be trained in the correct operational and safety procedures required for this product. Periodic reviews of this manual with all employees should be standard practice. For your convenience, we include this sign-off sheet so you can record your periodic reviews.

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1. Introduction

Thank you for purchasing a Tramco En-Masse Chain Conveyor. This equipment will allow safe and efficient operation when you read and follow all of the instructions contained in this manual. With proper care, your En-Masse Chain Conveyor will provide you with many years of trouble-free operation.

Keep this manual handy for frequent reference and to review with new personnel. A sign-off form is provided on the inside front cover for your convenience. If any information in this manual is not understood or if you need additional information, please contact your local distributor or dealer for assistance.

This manual should be regarded as part of the equipment. Suppliers of both new and second-hand equipment are advised to retain documentary evidence that this manual was provided with the equipment.

Always give your dealer the serial number on your equipment when ordering parts or requesting service or other information. The serial number is located on the head assembly of the conveyor. Please record this information in the table below for easy reference.

Model Number	
Serial Number	
Date Received	

1.1. Equipment Purpose

This manual covers four En-Masse Chain Conveyor manuals. The MODEL G™ is frequently used in industries such as chemical, coal, food, grain, municipal solid waste, mining, plastic, paper, pulp, and rubber. The Model RB™ is specifically designed for the handling of soft stock or materials that are easily crumbled or broken, such as seed, feed, pellets, and other fragile material. And lastly, the BULK-FLO™ is designed to handle a wide variety of challenging materials such as wet and sticky products, those with varying sizes and densities, and abrasive or corrosive materials.

1.1.1. Intended Use

This equipment is designed solely for use in customary agricultural or similar operations. Use in any other way is considered as contrary to the intended use. Compliance with and strict adherence to the conditions of operation and maintenance as specified by the manufacturer, also constitute essential elements of the intended use.

This equipment should be operated, maintained, serviced, and repaired only by persons who are familiar with its particular characteristics and who are acquainted with the relevant safety procedures.

Accident prevention regulations and all other generally recognized regulations on safety and occupational medicine must be observed at all times.

Any modifications carried out to this equipment may relieve the manufacturer of liability for any resulting damage or injury.

2. Safety

2.1. Safety Alert Symbol and Signal Words



This safety alert symbol indicates important safety messages in this manual. When you see this symbol, be alert to the possibility of injury or death, carefully read the message that follows, and inform others.

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 the definitions below as a guideline.



DANGER Indicates an imminently hazardous situation that, if not avoided, will result in serious injury or death.



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



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



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

2.2. General Safety



The safety information found throughout this complete Safety Section of the manual applies to all safety practices. Additional instructions specific to a certain safety practice (such as Operation Safety), can be found in the appropriate section.

YOU are responsible for the **SAFE** use and maintenance of your equipment. **YOU** must ensure that you and anyone else who is going to work around the equipment understands 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. All accidents can be avoided.

- It is the equipment owner, operator, and maintenance personnel's responsibility to read and understand **ALL** safety instructions, safety decals, and manuals and follow them when assembling, operating, or maintaining the equipment.
- Equipment owners must give instructions and review the information initially and annually with all personnel before allowing them to operate this product. Untrained users/operators expose themselves and bystanders to possible serious injury or death.
- This equipment is not intended to be used by children.
- Use this equipment for its intended purposes only.
- Do not modify the equipment in any way without written permission from the manufacturer. Unauthorized modification may impair the function and/or safety, and could affect the life of the equipment. Any unauthorized modification of the equipment will void the warranty.



2.3. Drag Conveyor Safety

WARNING

- Keep body, hair, and clothing away from moving conveyor.
- Do not climb, sit, stand or walk on conveyor at any time.
- Shut off and remove key or lock out power source before inspecting or servicing machine.

2.4. Rotating Parts Safety

WARNING

- Keep body, hair, and clothing away from rotating pulleys, belts, chains, and sprockets.
- Do not operate with any guard removed or modified. Keep guards in good working order.
- Shut off and remove key or lock out power source before inspecting or servicing machine.

2.5. Guards Safety

WARNING

- Install guards to prevent contact with moving parts.
- Do not operate equipment unless all guards are in place.
- Do not walk or step on guards.
- Lock out power before removing a guard.
- Ensure all guards are replaced after performing maintenance.

2.6. Ladder Safety

WARNING

Consider the following when using a ladder for installation, operating or maintenance related duties:

- Identify possible risks before using the ladder.
- Use belts and hoists to lift material up a ladder; maintain three points of contact with the ladder at all times.
- Ensure rungs are free from ice or material build up that makes climbing difficult

2.7. Working Alone

WARNING

Working alone can be dangerous. Consider the following:

- Identify the risks for working alone in your workplace and ensure a plan is in place to mitigate them.
- Do not operate, assemble, or maintain equipment alone.
- Ensure that maintenance is performed in accordance with all workplace safety programs and be sure all workers are aware of any maintenance work being performed.

2.8. Personal Protective Equipment (Required to be Worn)

Hard Hat

- Wear a hard hat to help protect your head.



Ear Protection

- Wear ear protection to prevent hearing damage.



Safety Glasses

- Wear safety glasses at all times to protect eyes from debris.



Coveralls

- Wear coveralls to protect skin.



Work Gloves

- Wear work gloves to protect your hands from sharp and rough edges.



Steel-Toe Boots

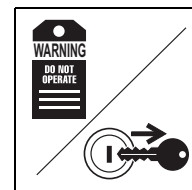
- Wear steel-toe boots to protect feet from falling debris.



2.9. Drives and Lockout/Tagout Safety

Inspect the power source(s) before using and know how to shut down in an emergency. Whenever you service or adjust your equipment, make sure you shut down your power source and follow lockout and tagout procedures to prevent inadvertent start-up and hazardous energy release. Know the procedure(s) that applies to your equipment from the following power sources. For example:

- De-energize, block, and dissipate all sources of hazardous energy.
- Lock out and 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 maintenance may be performed.



- Ensure that all personnel are clear before turning on power to equipment.

For more information on occupational safety practices, contact your local health and safety organization.

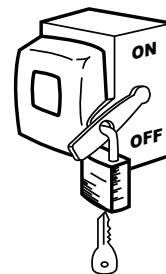
2.9.1. Electric Motor Safety

WARNING

Power Source

- Electric motors and controls shall be installed and serviced by a qualified electrician and must meet all local codes and standards.
- A magnetic starter should be used to protect your motor.
- You must have a manual reset button.
- Reset and motor starting controls must be located so that the operator has full view of the entire operation.
- Locate main power disconnect switch within reach from ground level to permit ready access in case of an emergency.
- Motor must be properly grounded.
- Guards must be in place and secure.
- Ensure electrical wiring and cords remain in good condition; replace if necessary.
- Use a totally enclosed electric motor if operating in extremely dusty conditions.

SERVICE DISCONNECT



Lockout

- The main power disconnect switch should be in the locked position during shutdown or whenever maintenance is performed.
- If reset is required, disconnect all power **before** resetting motor.

3. Assembly



Before continuing, ensure you have completely read and understood this manual's Safety chapter, in addition to the safety information in the section(s) below.

3.1. Assembly Safety

WARNING

- Do not take chances with safety. The components can be large, heavy, and hard to handle. Always use the proper tools, rated lifting equipment, and lifting points for the job.
- Read and understand the assembly instructions to get to know the sub-assemblies and hardware that make up the equipment before proceeding to assemble the product.
- Carry out assembly in a large open area with a level surface.
- Always have two or more people assembling the equipment.
- Make sure you have sufficient lighting for the work area.
- Tighten all fasteners according to their specifications. Do not replace or substitute bolts, nuts, or other hardware that is of lesser quality than the hardware supplied by the manufacturer.

3.2. Check Shipment

Unload the parts at the assembly site and inspect them thoroughly while comparing the packing list to the shipment. Ensure that all items have arrived and that none are damaged.

It is important to report missing or damaged parts immediately to ensure that proper credit is received from either the manufacturer or from your distributor/dealer, and to ensure that any missing parts can be shipped quickly to avoid delaying the assembly process.

Note: Do not attempt to assemble or install a damaged component.

3.2.1. Guidelines for Lifting and Moving the Conveyor

Observe the following guidelines to prevent damage to the drag conveyor when lifting or moving it during assembly and installation.

- Tramco recommends using spreader bars with slings to support the equipment during a lift.
- The unsupported span must not exceed 3 m.
- Lifts must be performed with a minimum of two support points.

NOTICE

Lifting the conveyor without proper support could damage the conveyor or its components.



WARNING

When choosing support points for especially heavy items such as drives or gates, consider the weight of the item in relation to load balance and bending effect.

3.3. En-Masse Chain Conveyor Components

3.3.1. Model G™



Figure 3.1

Each Model G™ chain conveyor consists of the following components:

- Head discharge section with drive shaft
- Tail section with take-up assembly
- Intermediate trough section
- Conveyor chain & flights
- Assembly bolts & alignment pins

Refer to Figure 3.2 - 3.8 for graphical representations of the components of the MODEL G™ chain conveyor.

Note: The graphical representations of the components of the MODEL G™ chain conveyor are representative drawings only. It is the responsibility of the purchaser to consult contract drawings for specific items on each conveyor.

Head Discharge Section with Drive Shaft

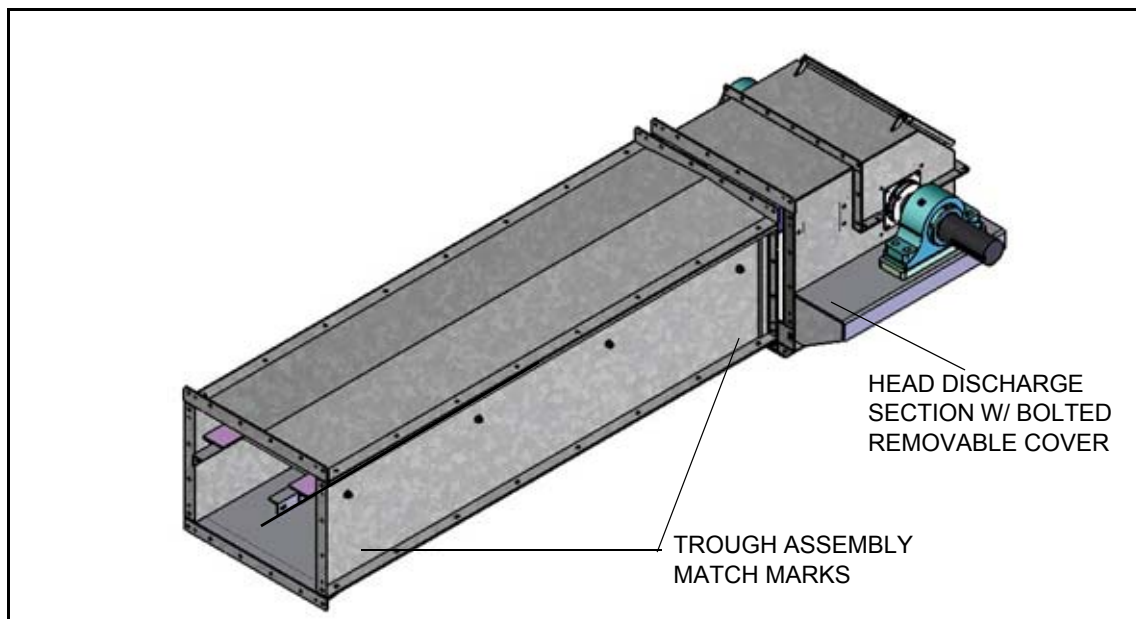


Figure 3.2

Tail Section with Take-up Assembly

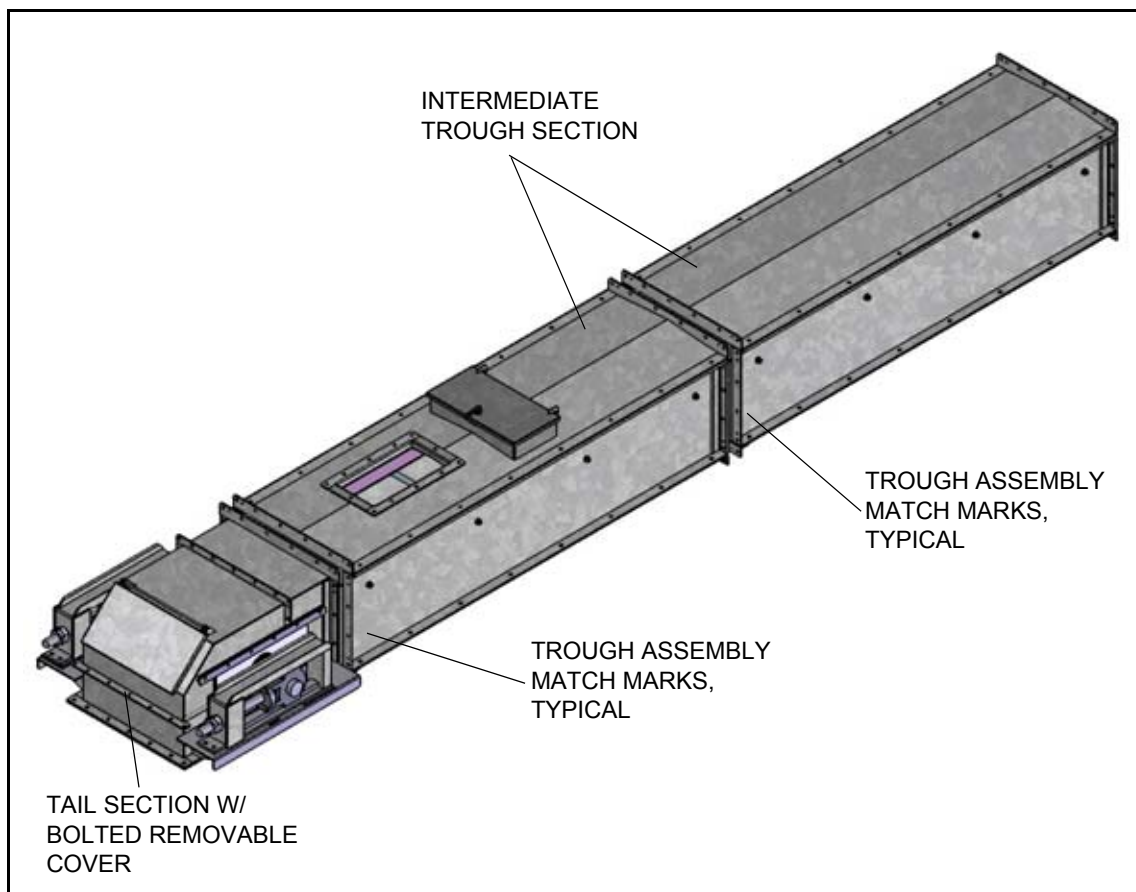


Figure 3.3

Intermediate Trough Section

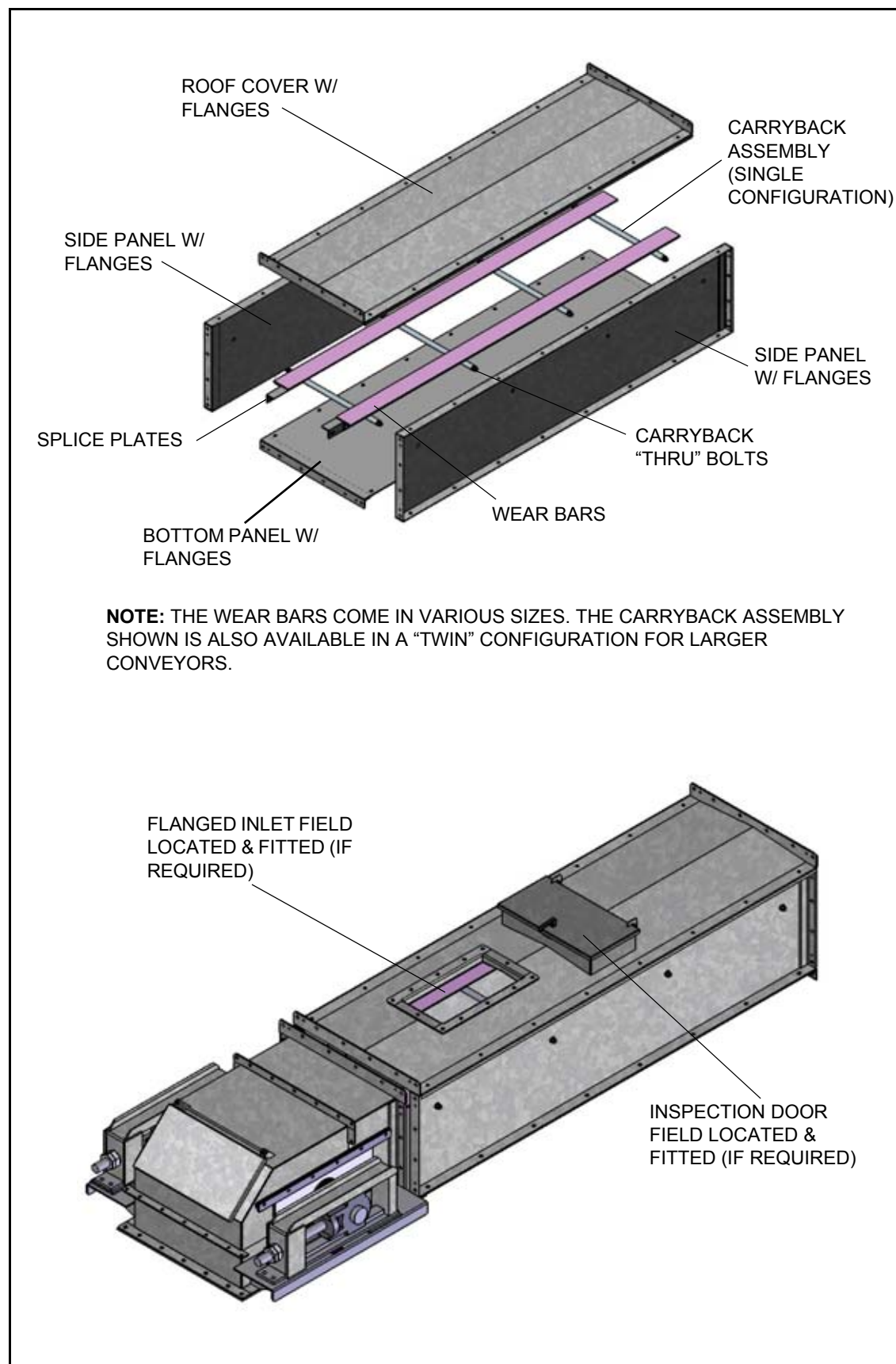


Figure 3.4

Rino Seals

a. Head Seal

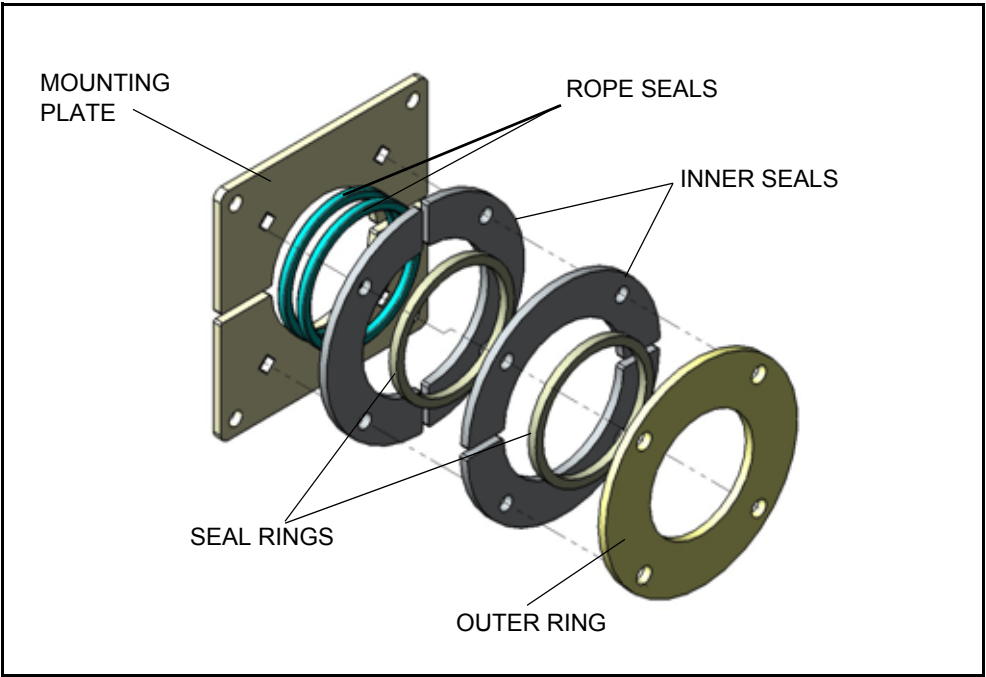


Figure 3.5

b. Tail Rino Seal

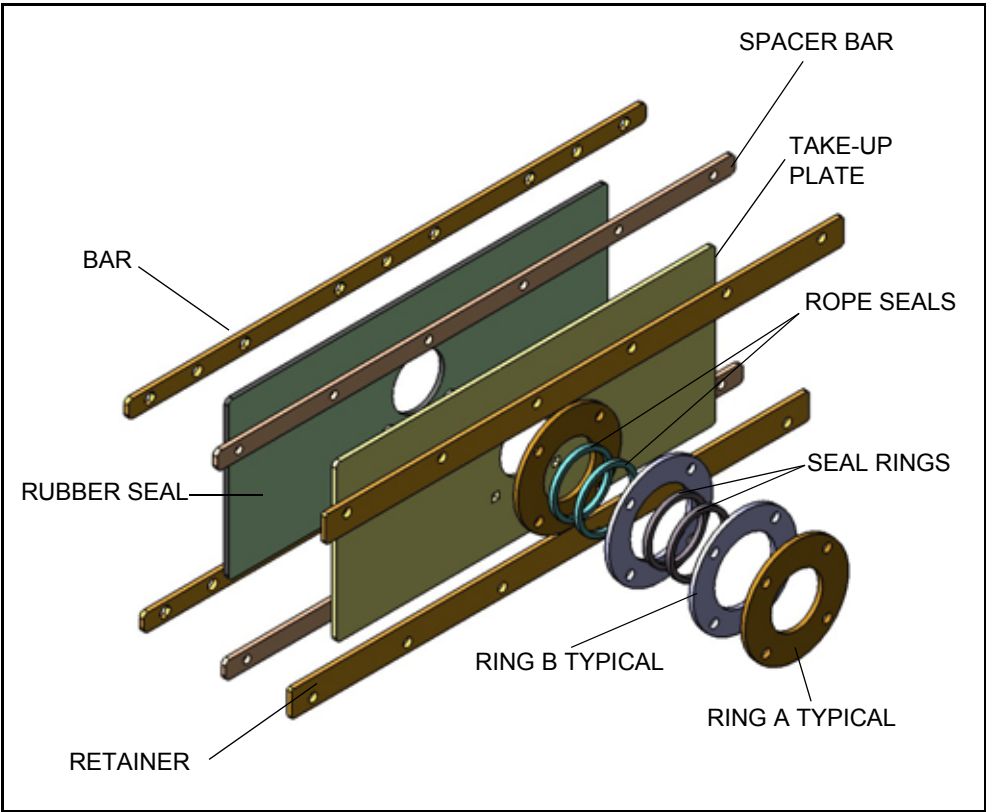


Figure 3.6

Conveyor Chain and Flights

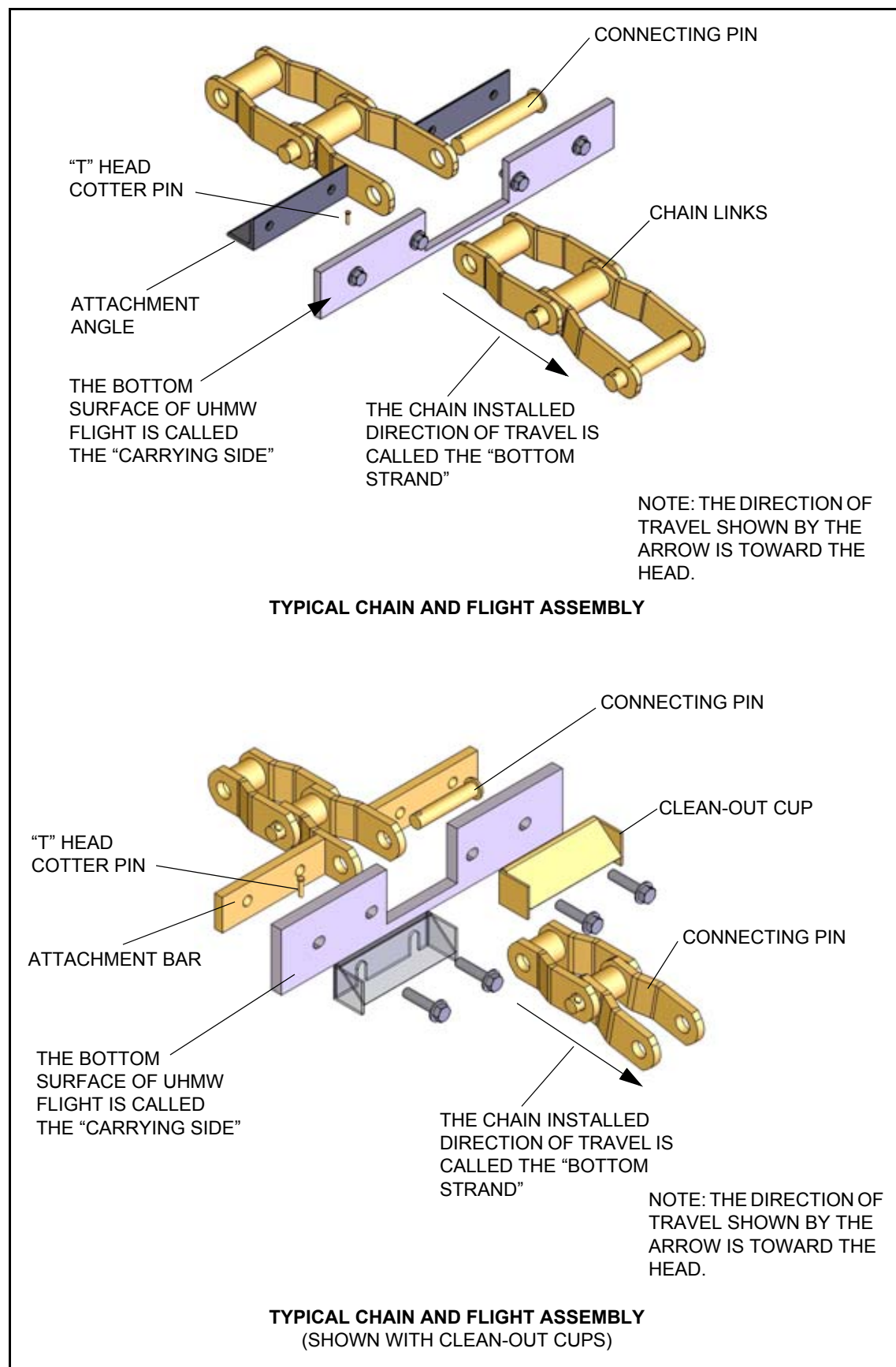


Figure 3.7

Assembly Bolts & Alignment Pins

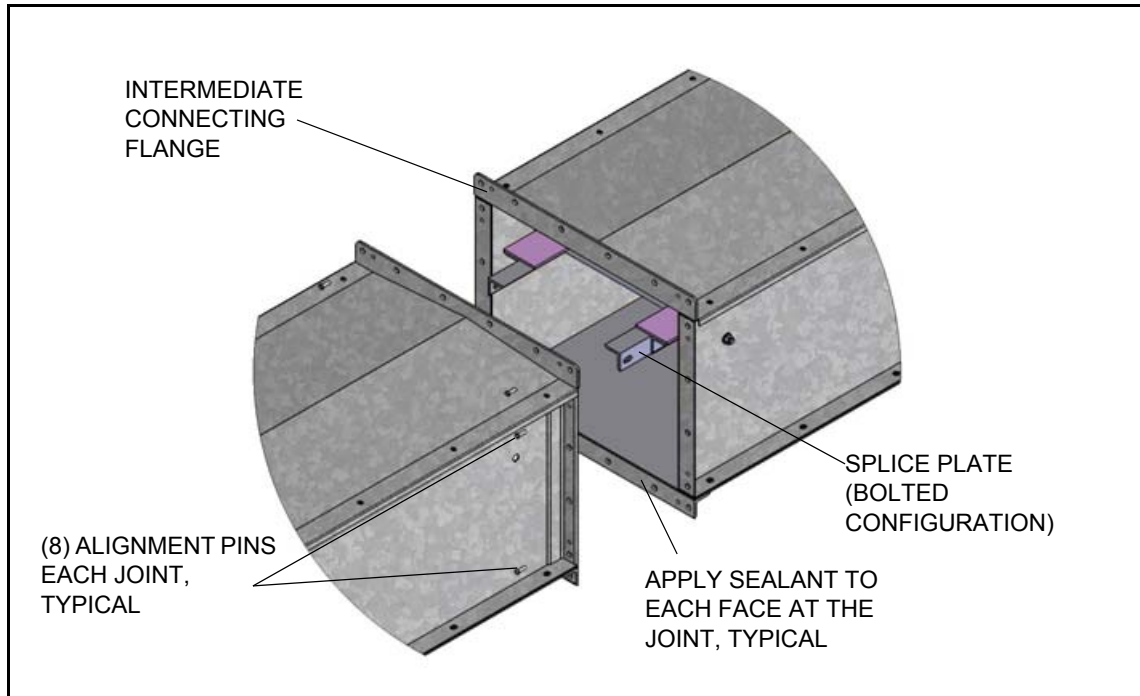


Figure 3.8

Note: Care should be exercised when joining sections of the conveyor to see that the “Carryback”, “Return Rails” and/or “Splice Plates” are properly aligned. The top surface of the joints should be flush and smooth with no projecting lips to catch the flights or flight facings. If there is a misalignment, loosen the “trough” bolts and adjust as required.

3.3.2. Model RB™



Figure 3.9

Each Model RB™ chain conveyor consists of the following components:

- Head discharge section with drive shaft
- Tail section with take-up assembly
- Intermediate trough section

- Conveyor chain & flights
- Assembly bolts & alignment pins

Refer to Figure 3.10 - 3.15 for graphical representations of the components of the Model RB™ chain conveyor.

Note: The graphical representations of the components of the Model RB™ chain conveyor are representative drawings only. It is the responsibility of the purchaser to consult contract drawings for specific items on each conveyor.

Head Discharge Section with Drive Shaft

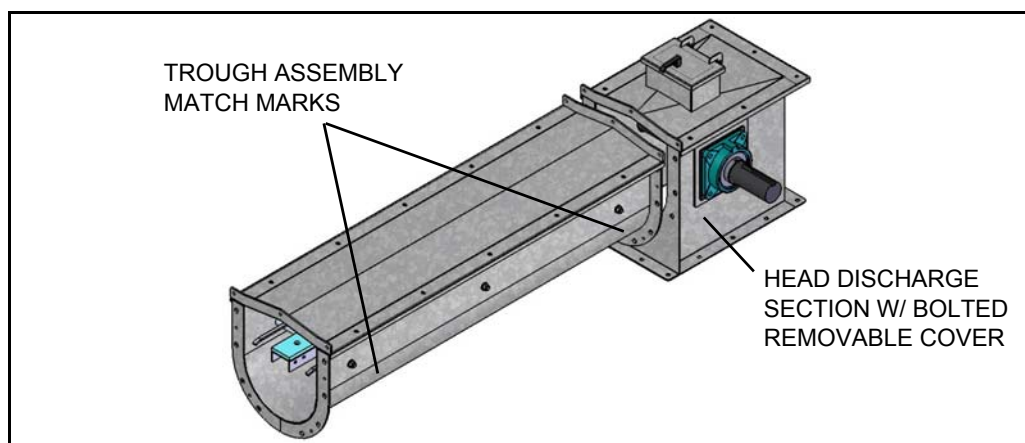


Figure 3.10

Tail Section with Take-Up Assembly

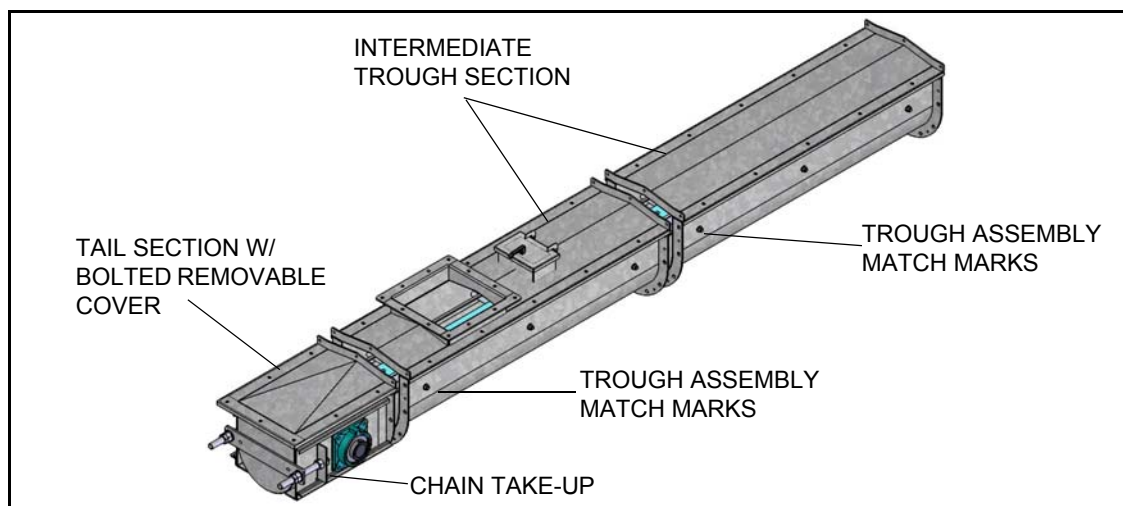


Figure 3.11

Intermediate Trough Section

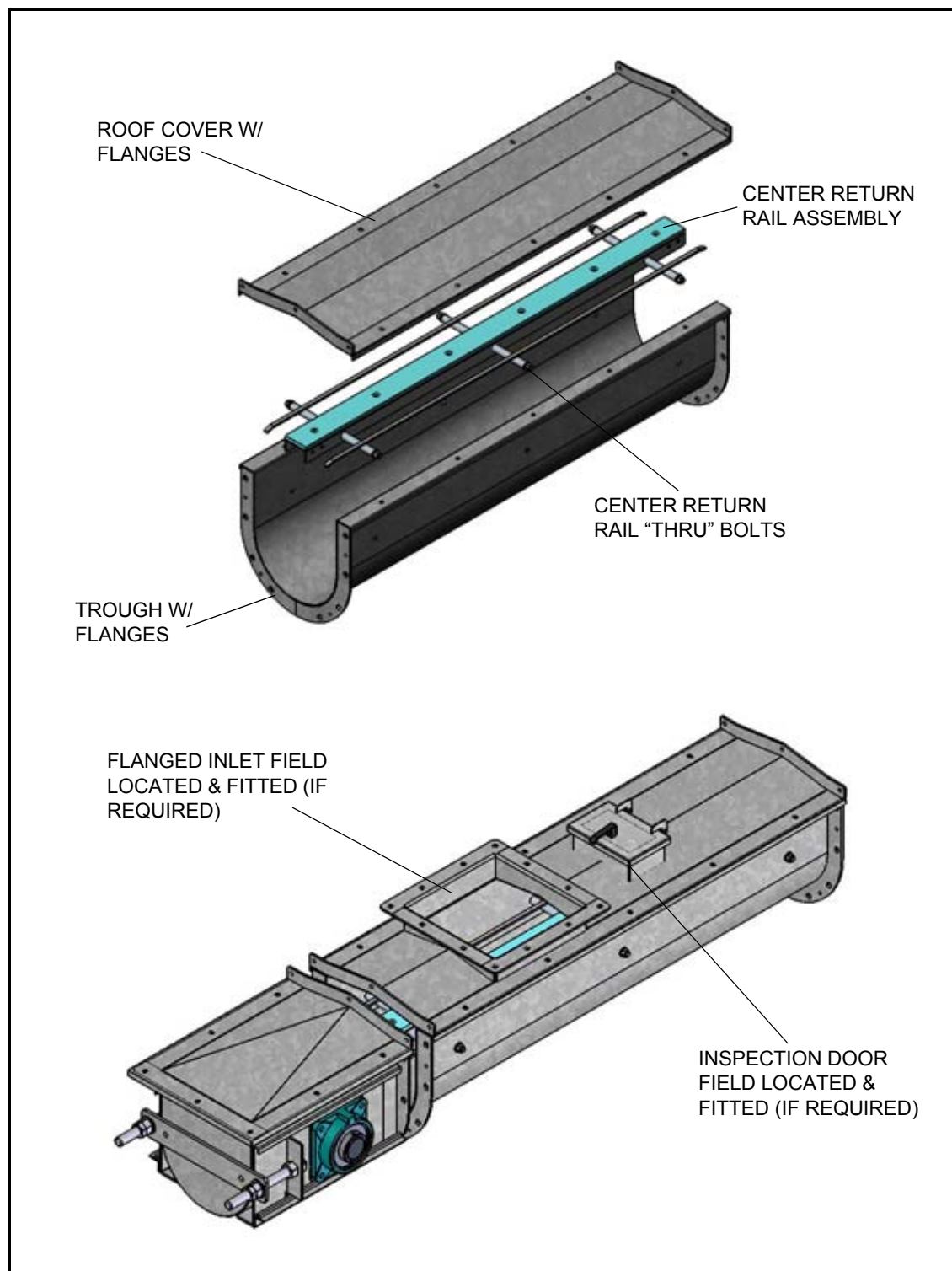


Figure 3.12

Seals

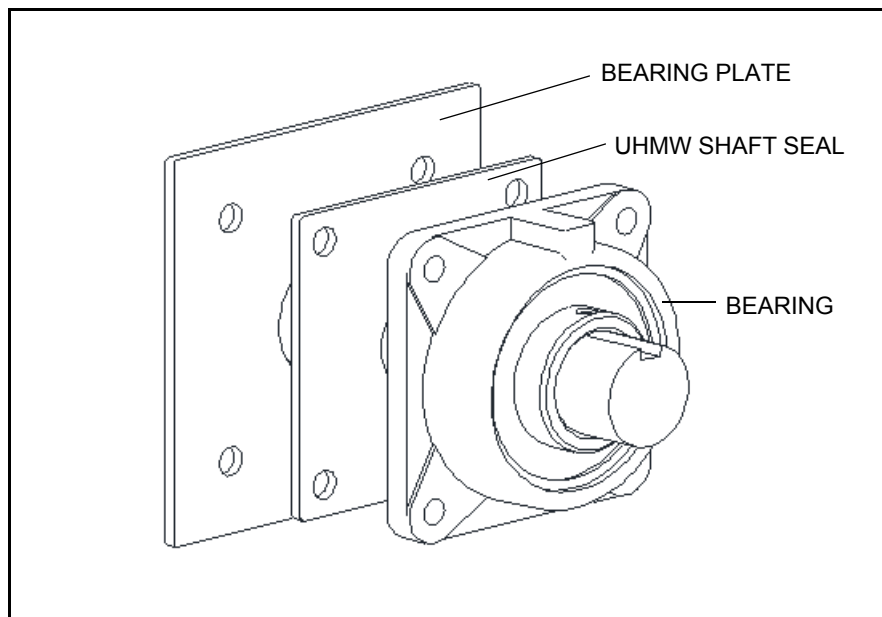


Figure 3.13

Conveyor Chain and Flights

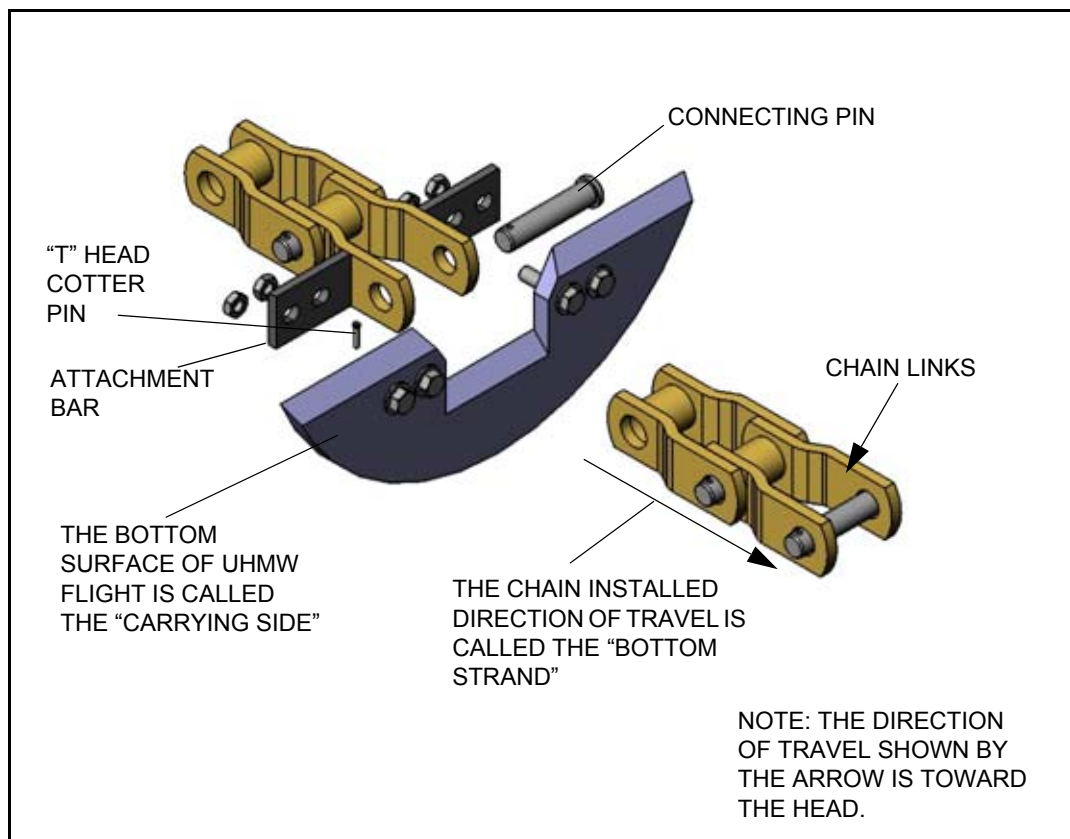


Figure 3.14

Assembly Bolts and Alignment Pins

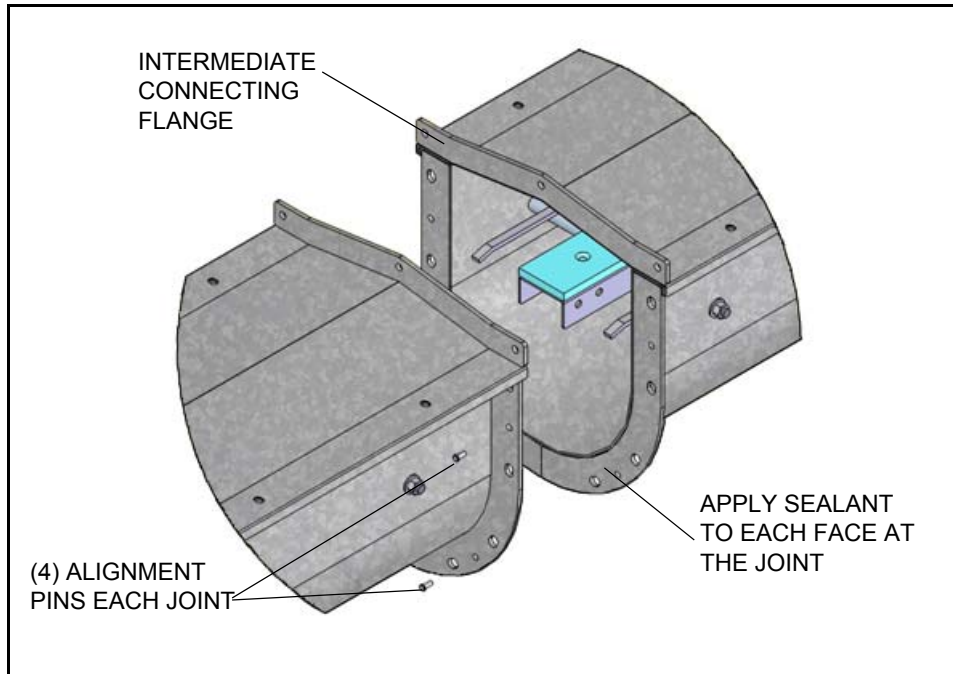


Figure 3.15

Note: Care should be exercised when joining sections of the conveyor to see that the “Carryback”, “Return Rails” and/or “Splice Plates” are properly aligned. The top surface of the joints should be flush and smooth with no projecting lips to catch the flights or flight facings. If there is a misalignment, loosen the “trough” bolts and adjust as required.

3.3.3. Bulk-Flo™

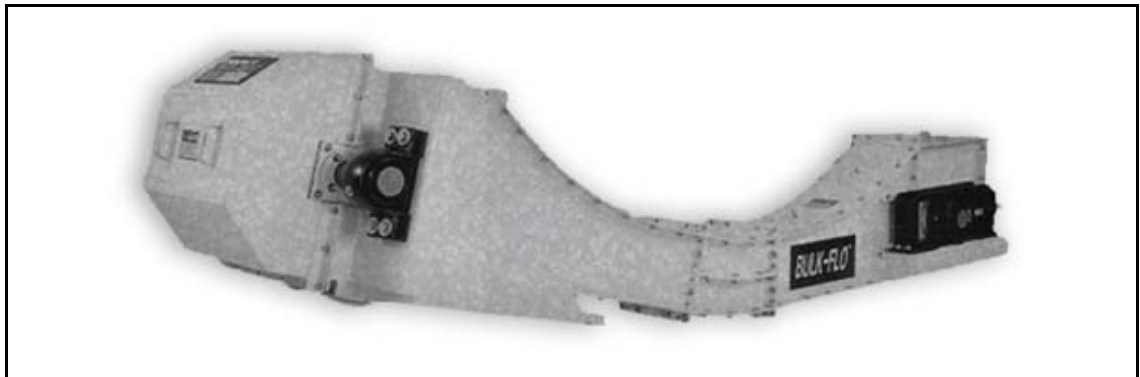


Figure 3.16

Important: For information on the Vapour Tight model see page 41.

Each BULK-FLO™ chain conveyor consists of the following components:

- Head discharge section with drive shaft
- Tail section with take-up assembly
- Intermediate trough section
- Conveyor chain & flights
- Assembly bolts & alignment pins

Refer to Figure 3.17 - 3.23 for graphical representations of the components of the BULK-FLO™ chain conveyor.

Note: The graphical representations of the components of the BULK-FLO™ chain conveyor are representative drawings only. It is the responsibility of the purchaser to consult contract drawings for specific items on each conveyor.

Head Discharge Section with Drive Shaft

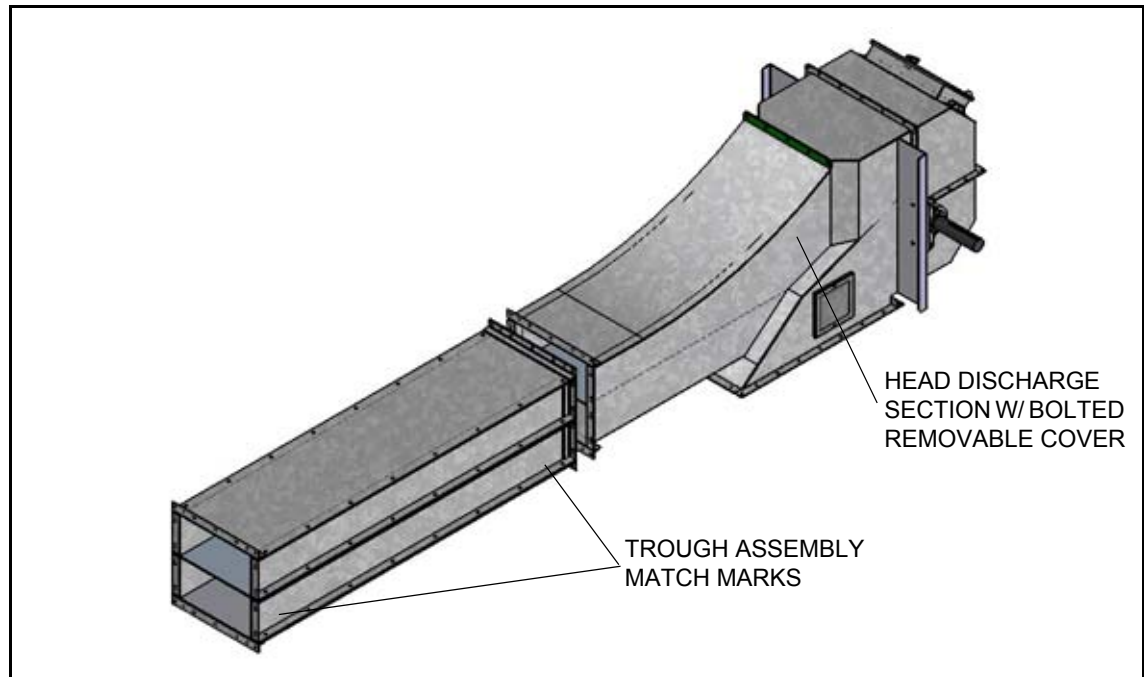


Figure 3.17

Tail Section with Take-Up Assembly

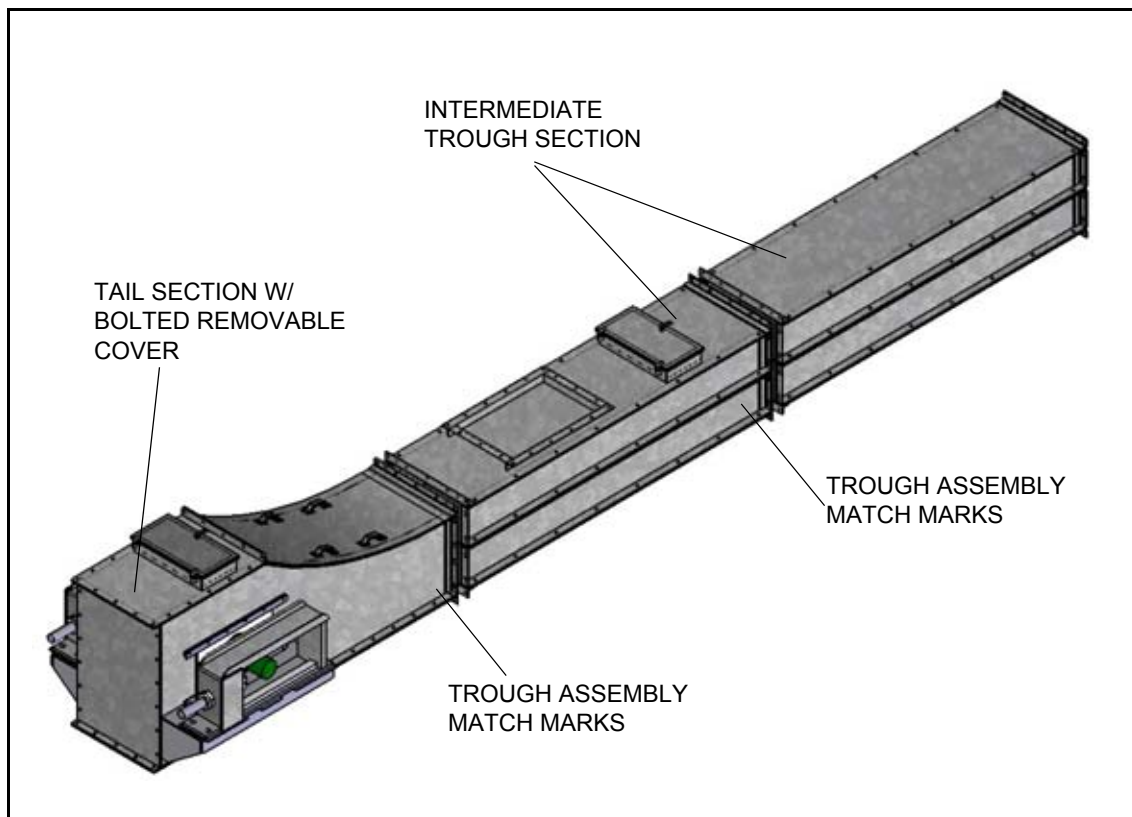


Figure 3.18

Intermediate Section

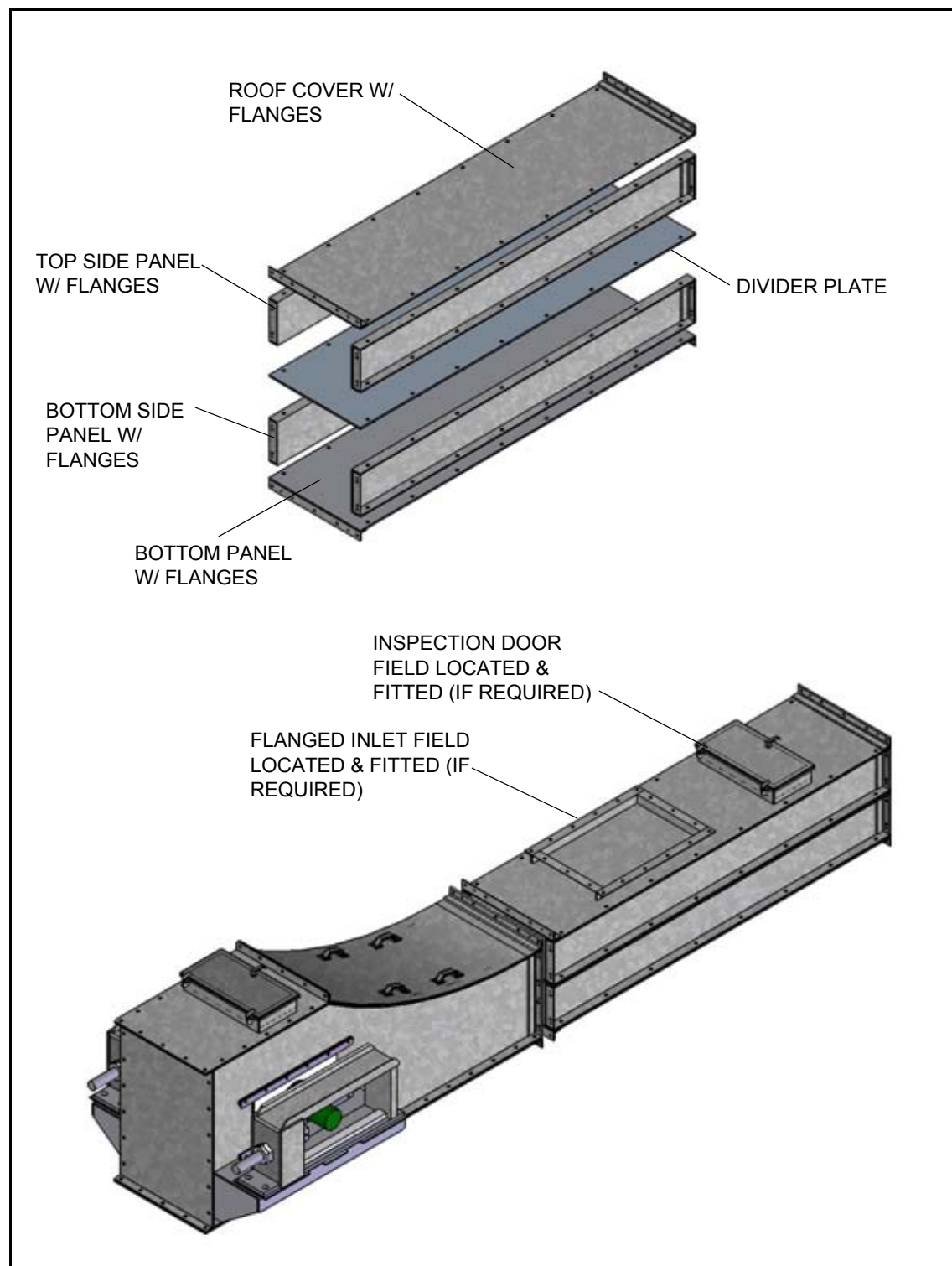


Figure 3.19

Rino Seals

a. Head Seal

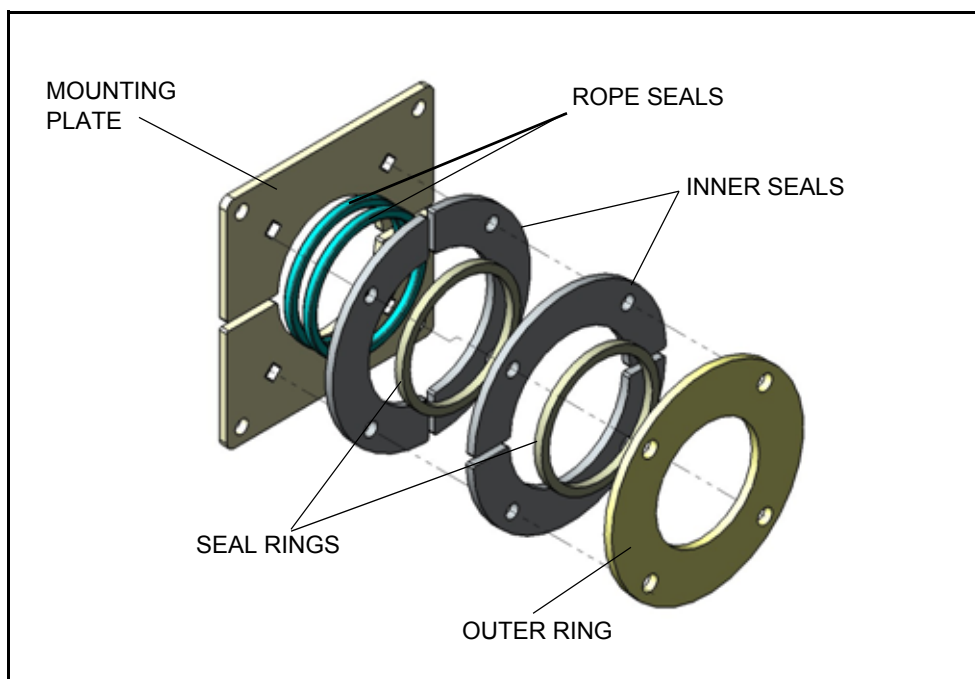


Figure 3.20

b. Tail Rino Seal

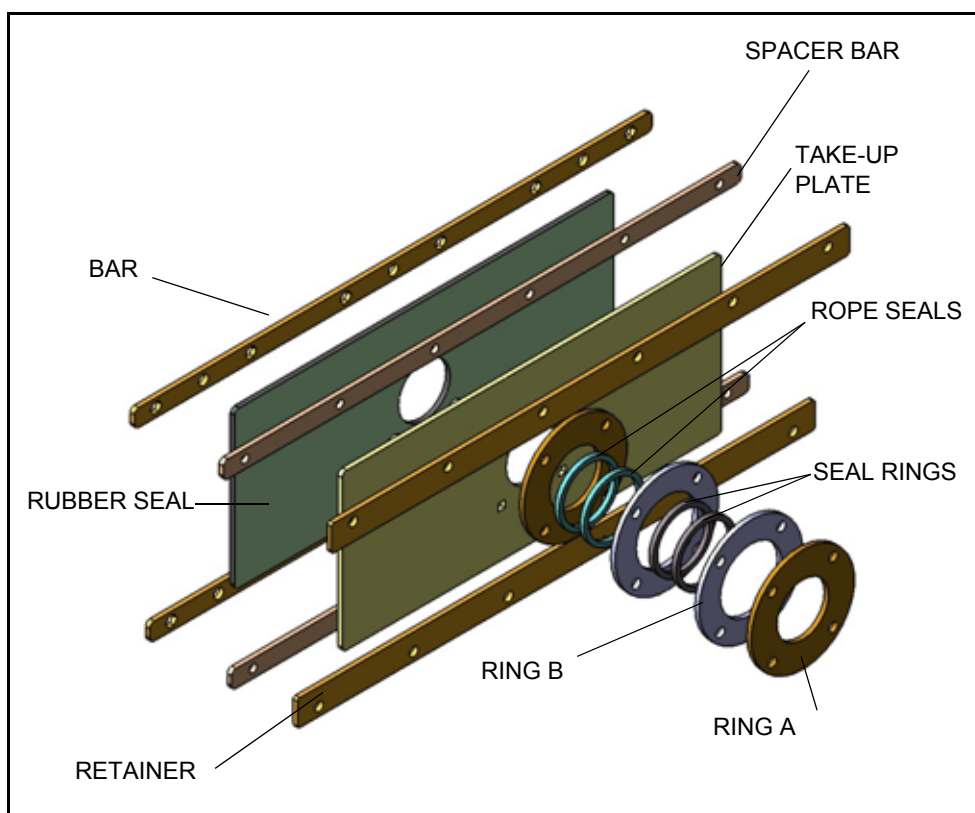


Figure 3.21

Conveyor Chain and Flights

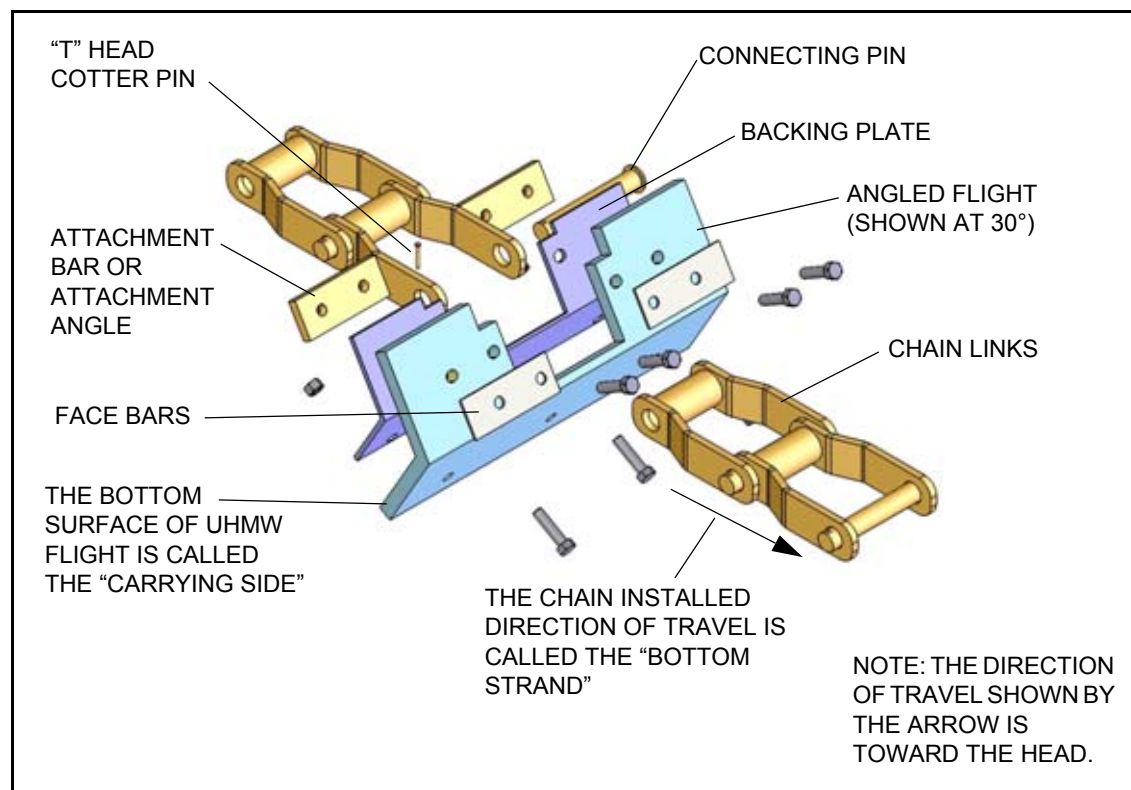


Figure 3.22

Note: Flight assembly configurations with straight flights and 15° angled flights are available.

Assembly Bolts and Alignment Pins

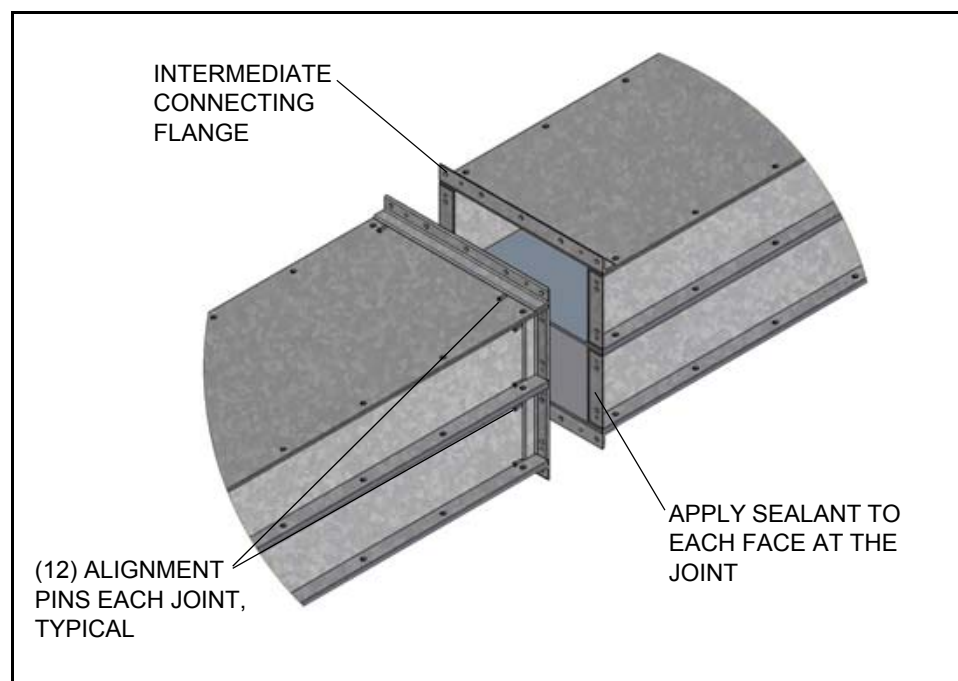


Figure 3.23

3.4. General Assembly Instructions

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

NOTICE

Operating a misaligned conveyor can damage the components. Ensure the conveyor is assembled straight and level.

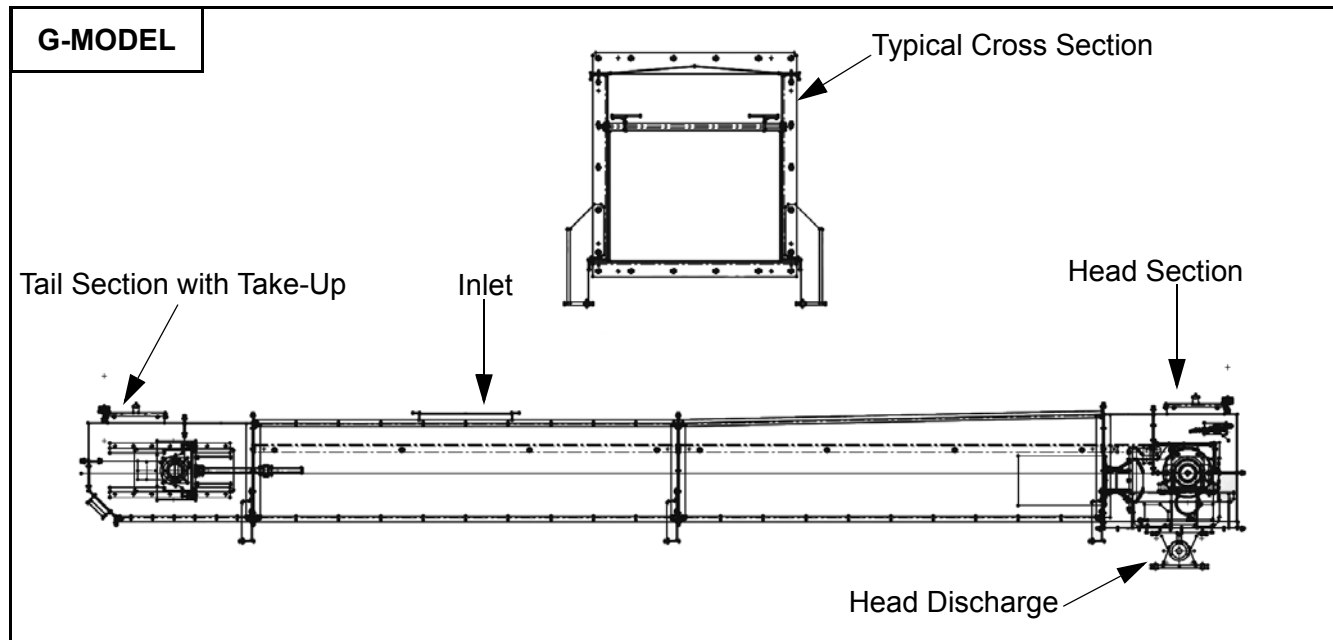


Figure 3.24

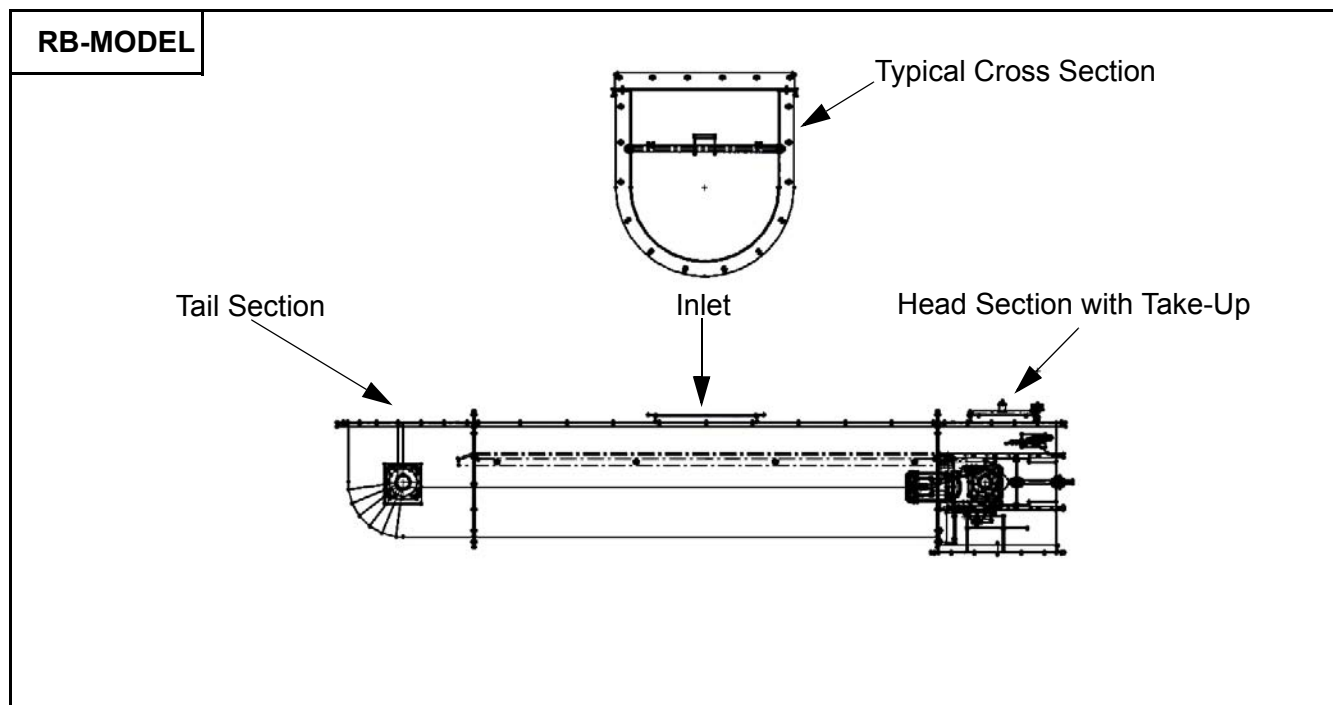


Figure 3.25

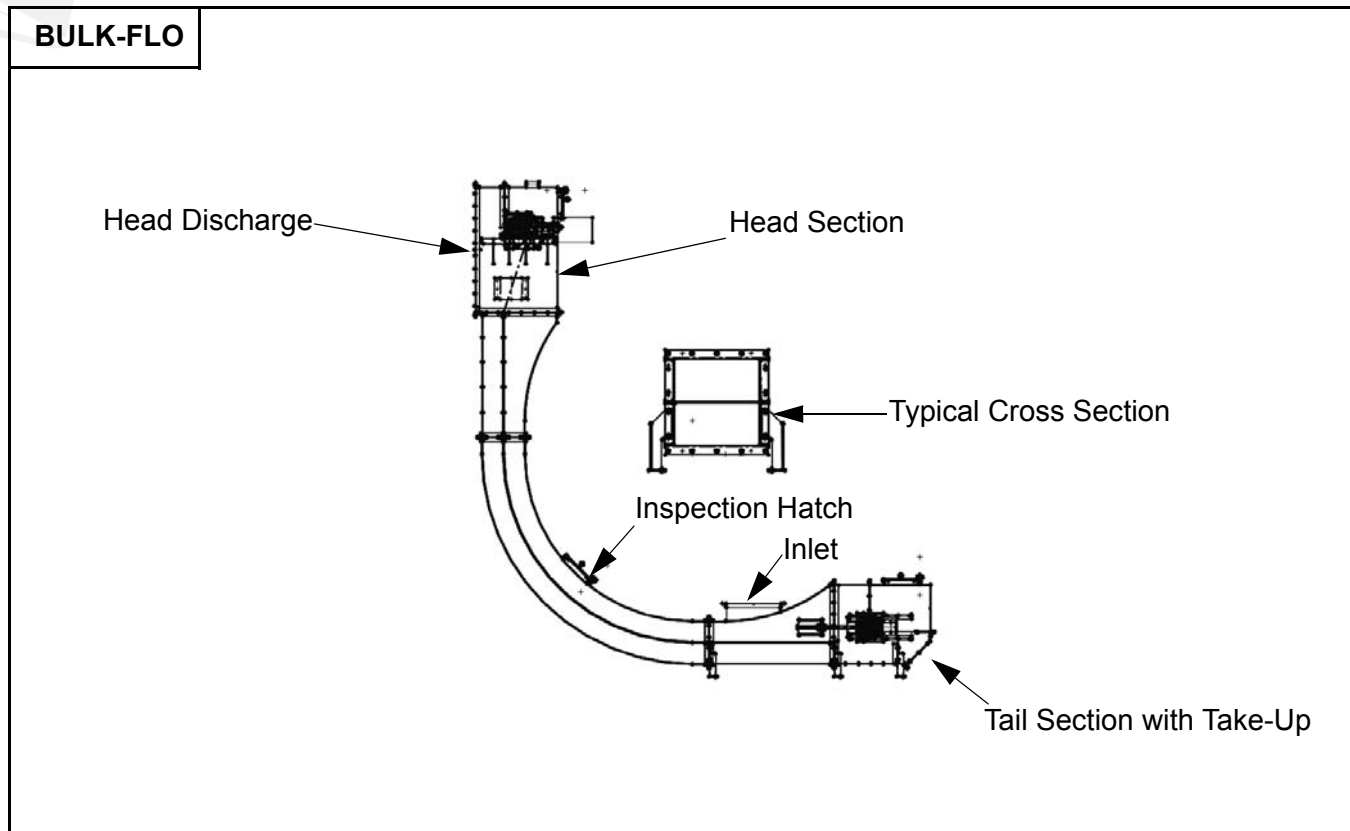


Figure 3.26

Note: Figures 3.24, 3.25 and 3.26 are a representative drawing only. It is the responsibility of the purchaser to consult contract drawings for specific items on each conveyor.

3.4.1. Shop-Assembled Conveyors

1. 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.
2. 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.

3.4.2. Conveyor Purchased as Parts/Merchandise

1. Use the trough assembly match marks to place the conveyor troughs in proper sequence with the tail section, the bypass inlet (if applicable), and the head section in their proper locations. Connect the trough flanges loosely. Do not tighten bolts.
2. Align the trough bottom centerlines perfectly using the alignment pins; apply appropriate sealant (caulking, silicon, Gortex, or neoprene); then tighten flange bolts.
3. Tighten all anchor bolts.
4. Before connecting the top section of the chain, loosen take-up as much as possible. Check sprocket alignment. Check set screws and bearing bolts for tightness.
5. Connect top section for the chain. Refer to the next section for chain assembly and installation.

Note: On long conveyors, the use of a come-a-long may be necessary.

NOTICE

Dragging the conveyor casing on the ground can damage flanges and casing sections.

Note: When lifting any assembly of the chain conveyor parts i.e. the head and casing, or an assembly of casing, the line of the lifting force should be in line with the narrowest part of a casing section.

3.4.3. Chain Assembly

The chain can be assembled manually (Figure 3.27) or with an air assist hydraulic clamp (Figure 3.28). The easiest and most effective way of connecting the 3m chain sections is using a portable air assist hydraulic clamp. Listed below are the instructions for both methods.

A. Manual Installation:

1. Oil pin thoroughly with 30 weight motor oil before you attempt to assemble. It is recommended to lubricate the pins with appropriate lubricant to assist installation.
2. It is important to use a heavy back up bar counter board to receive the pin.
3. Manually insert the pin through both sidebars to ensure a proper alignment.

Note: The connecting pins have a shoulder diameter at the head end of the pin, there is a correspondingly larger hole at one side of the chain link, thus providing an interference fit between the links and pin. Therefore, care must be taken to assemble the pin from the correct side of the link.

NOTICE

Do not grind or modify the chain connecting pins

4. Strike the head of the pin with a mighty force until the pin head is flush with the sidebar.
5. After the connecting pins are in place, fit and bend the clevis pin to lock in place. Finally, check that the joined links do not bind or kink the chain. If this happens, hit the tail end of the pin with a hammer to release the side load on the pin

B. Hydraulic Clamp:

1. Oil pin thoroughly with 30 weight motor oil before you attempt to assemble. It is recommended to lubricate the pins with appropriate lubricant to assist installation.
2. Be sure to use the correct chain adapters for the chain being assembled. Adapters are labeled with the chain number.
3. Place pin in chain joint to be assembled by hand as far as possible. Line up pin locking flats where applicable; tap pin with hammer to "Snug-up" (Improper alignment could shear hole).

Note: The connecting pins have a shoulder diameter at the head end of the pin, there is a correspondingly larger hole at one side of the chain link, thus providing an interference fit between the links and pin. Therefore, care must be taken to assemble the pin from the correct side of the link.

4. Place chain joint securely in saddle with pin head facing toward ram.
5. Apply pressure by pumping hand pump. Be sure that ram is squarely on pin head.

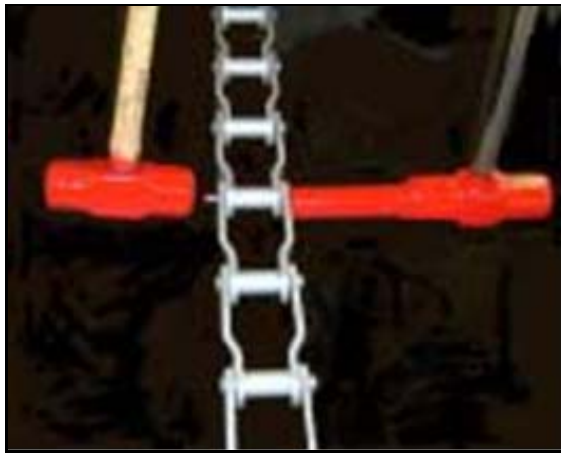


Figure 3.27



Figure 3.28

3.4.4. Chain Installation

The safest install position for the chain may depend upon the conveyor shape and its install position in the plant. It is therefore necessary for the supervisor to be consulted and the necessary Risk Assessments prepared prior to assembling the chain.

1. Ensure that any lifting, supporting, or any other method of securing the chain is suitable for the application.
2. Prior to splitting the chain at the head of an incline conveyor, the chain must be secured at both sides of the split position to prevent the chain from falling into the conveyor.
3. Begin assembling 3m sections of chain together and pull it into the conveyor through the tail section or at an accessible position through the top of the conveyor
4. Continue adding sections of chain while feeding and pulling chain through the conveyor. The chain should be passed under the tail sprocket, through the bottom trough, towards the head end, then around the head sprocket and back to the tail section.
5. The final connecting pin may be installed at the tail sprocket with the tail quarter section cover removed.
6. Adjust take-up to remove excess slack from chain making sure that adjustment screws have been tightened equally to prevent misalignment

3.4.5. Chain Tension

Chain tension is perhaps the single most important element for longevity of chain life. It is much better to have the chain too loose than too tight. When the chain is set too tight, it has negative effects on the sprockets, shaft, bearing and the chain itself.

When the tension on the chain is properly set, the chain will have some knuckling or accordion type action at the head chain stripper or carryback assembly. As a result, the chain flight should be **free to rock approximately 30° total**. For example, a 15m long conveyor will have a shortened area of knuckling or accordion type action (approximately 600mm or less). However, a 90m conveyor may see an area of knuckling or accordion type action of 3m or more.

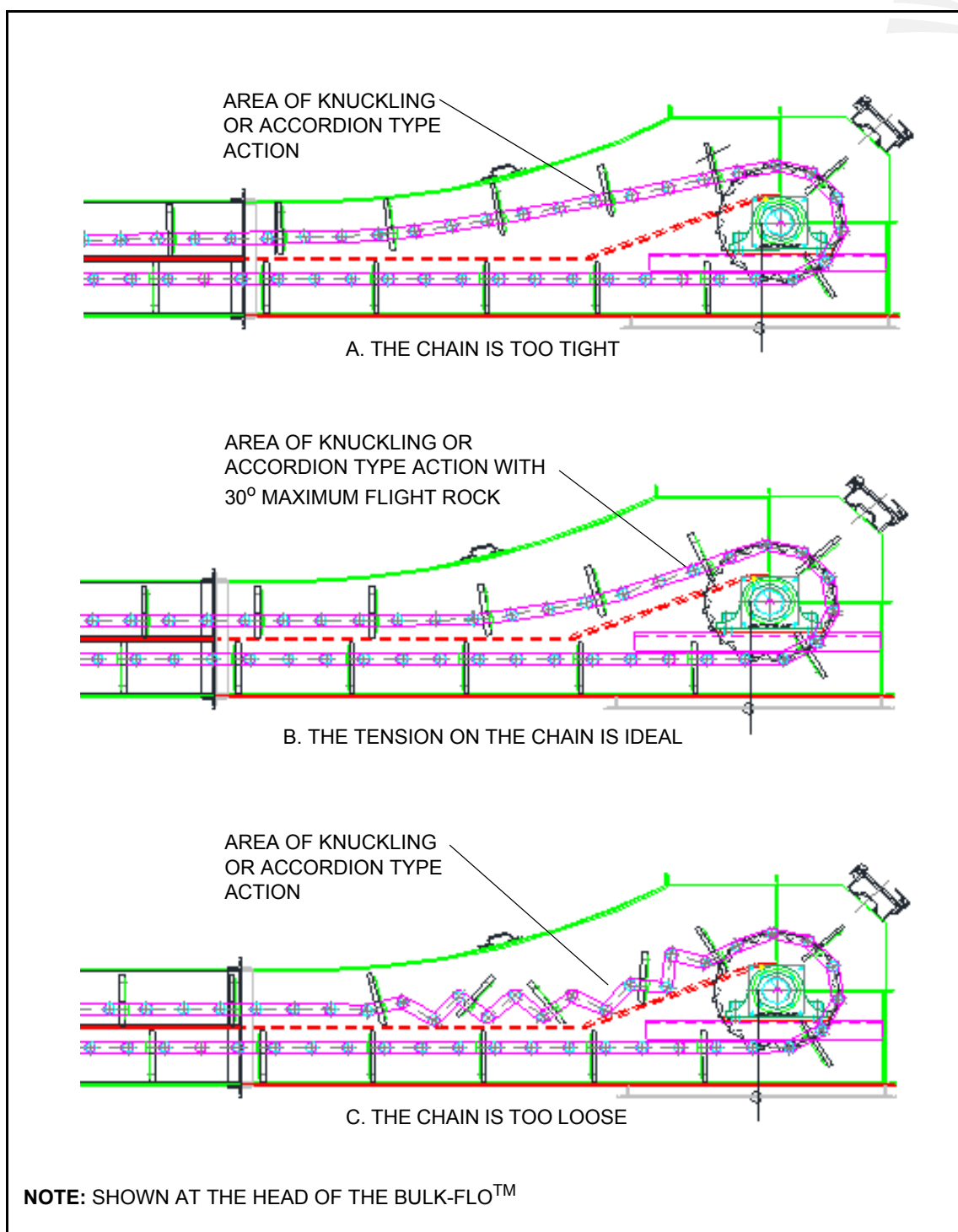


Figure 3.29

Note: The chain tension conditions shown in the figures above are representative. The 30° maximum flight rock applies to all models of En Masse Chain Conveyors. There are many different locations, based on the layout of the conveyor, where the chain tension can be inspected.

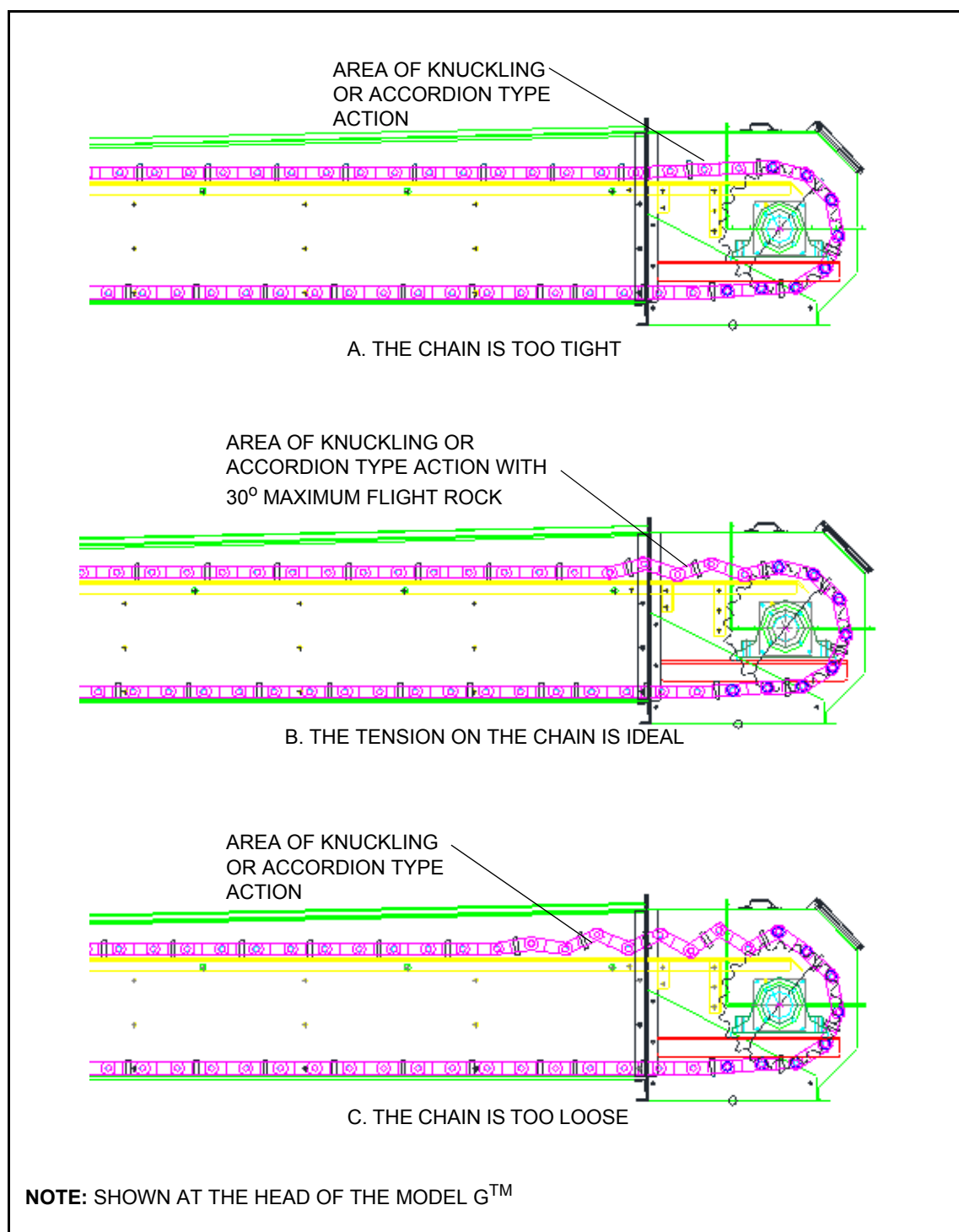


Figure 3.30

Note: The chain tension conditions shown in the figures above are representative. The 30° maximum flight rock applies to all models of En Masse Chain Conveyors. There are many different locations, based on the layout of the conveyor, where the chain tension can be inspected.

3.5. Trough Cover

1. Install trough covers in the proper sequence, refer to general arrangement drawing for proper cover installation locations. Handle covers with reasonable care to avoid warping or bending.

2. Ensure covers are centered on intermediate sections. Cover should not extend past the intermediate sections. Covers should be securely fastened with supplied hardware.

3.6. Motor Mount, Speed Reducer and Drive Guard Installations

Install drive at the proper location in accordance with the general arrangements drawing provided by Tramco and following the drive manufacturers instructions.

3.7. Check Conveyor Rotation

1. Rotate conveyor manually to ensure that no binding occurs.
2. Check for proper direction of chain and flight travel after electrical connections have been made and before attempting to handle material.
3. If necessary, after lockout/ tagout, reconnect electrical leads to reverse direction of material flow. Material should be pushed by the flight and attachment.

3.8. Other Components Installation

1. Attach all gates, feed chute, discharge chute, etc., and connect all safety devices and controls according to the assembly drawing of your conveyor. Carefully test each to ensure proper operation.
2. Refer to general arrangements drawing for specific location for each gate.

3.9. Component Information

3.9.1. Drive

Installation

Depending on the type and size of the drive, and the customer order, it may be necessary to site fabricate a support/ torque absorption point from a suitable structure. Fit the drive per the instructions in the ***drive manufacturer's manual***.

Replacement

Refer to the ***drive manufacturer's manual***. Consult contract drawings for specific drive details used on the conveyor. Note the weight for lifting purposes. Follow the Lockout/ Tagout procedures in this manual.

3.9.2. Bearings

Installation

Install the bearings per the instructions in the ***bearing manufacturer's manual***.

Replacement

Refer to the ***bearing manufacturer's manual*** for replacement recommendations for bearings operating at low speed. Consult contract drawings for specific bearing details used on the conveyor.

3.9.3. Seals

Installation

Refer to the appropriate section of this manual for an exploded isometric view of the head and tail seals. Install the Rino seals as shown in this manual.

Replacement

The head section and tail section Rino seals can be replaced by sliding the inner and outer rings along the shaft, prying out the rope seal, and fitting a new rope seal.

4. Operation



Before continuing, ensure you have completely read and understood this manual's Safety chapter, in addition to the safety information in the section(s) below.



WARNING To prevent serious injury or death, ensure the housing completely encloses moving elements; ensure power transmission guards are in place.

4.1. Pre-operation/Checklist

Before operating the chain conveyor check to ensure:

1. Lubricate all bearings and drives.
2. Check the interior of the chain conveyor to ensure all tools, foreign materials, and other obstructions have been removed.
3. Check that all hardware is secure.
4. Check all set screws on pulleys, bearings, sprockets, sheaves, gear reducers, etc. Although some set screws may have been installed at the factory, shipment, handling, and installation could have loosened them. We cannot be responsible for damage caused by loose set screws.
5. Check that the head shaft is level.
6. Check for proper rotation of motor and gear reducer.
7. Adjust take-up screws so that there is no slack in the chain and so that the tail shaft is level.
8. Lubricate all bearings and drives according to service instructions. Bearings and gear reducers are normally shipped without lubricant. Refer to bearing and gear reducer manufacturer's service instructions for recommended lubricant.
9. 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

To prevent excessive maintenance and lowered equipment life expectancy, ensure chains are tight and troughs and sprockets are properly aligned.

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


Important: 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.

3. 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.

4. Cut off feed and allow the conveyor to empty. Lock out power supply. Check all bolts and all alignments. Re-align as necessary, tighten all bolts, and check chain adjustment.
5. Check motor amperage frequently.
6. Check chain tension periodically. It may be necessary to re-adjust chain tension after running material in the conveyor.

4.3. General Operation

 **WARNING** To prevent serious injury or death, keep body, hair, and clothing away from rotating pulleys, belts, chains, and sprockets.

1. 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.
2. Always operate the conveyor with covers, guards, and safety labels in place.
3. Always practice good housekeeping and keep a clear view of the conveyor loading, discharges, and all safety devices.
4. 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, becomes more viscous or sticky, or spoils if allowed to stand for a long period of time.

4.4. 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. Follow all the manufacturer's instructions that come with the rust preventative oil.
6. Prior to a subsequent start-up, perform the installation and operation instructions in this manual.

5. Maintenance



Before continuing, ensure you have completely read and understood this manual's Safety chapter, in addition to the safety information in the section(s) below.



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

Proper maintenance habits on the conveyor mean a longer life, better efficiency, and safer operation. Please follow the guidelines below.

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

5.1. To Replace or Shorten a Conveyor Chain Section

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

5.2. Periodic Inspection

Trough	Check for wear and alignment.
	Tighten all bolts to manufacturer's torque specifications .
Shafts	Check for wear.
Flights	Check for wear or damage.
Nuts & Bolts	Check for wear and tightness.
Seals	Check for leakage, adjustment, and wear.
Bearings	Check for lubrication and noise.
Sprockets	Check for wear and alignment.
Chain	Check for worn pins and damaged side bars
Take-up	Check chain tension, (If take-up is fully adjusted, a link chain will need to be removed).
Gear Reducer(s)	Check for oil level and noise.
Chain Drive	Check chain tension and adjust as required.
Guards	Check for oil level (if applicable). Check nuts and bolts for tightness.
Motors	Check amperage frequently. Verify it is within operating parameters.

5.3. Chain and Flights

5.3.1. Examination for Wear

Periodically, the chain should be examined for wear. The period between examinations may vary based on the power used, abrasiveness of material, shape of the conveyor, planned maintenance stops, etc. At a minimum, the chain should be checked twice a year. In practice, maintenance records provide the best indication of chain deterioration. It's normal for chain and flights to **'bed in'** during the first month or so of constant running. Measuring, comparing, and recording the pin wear regularly is likely to show that the chain wear remains relatively stable after the chain has **'bedded in'**. If that's not the case, examine the pin to see if corrosion or abrasion is the main problem. Once the problem is determined, call Tramco about the results.

With good Maintenance Records, it's easier to predict when to replace the chain in any particular conveyor.

5.3.2. Replacement

Here is a list of some indications that a chain is nearing its replacement point.

- If possible, remove a conveyor cover, measure the distance between pin centers over 20 links. Compare the length of 20 chain pitches with the measured length. If the chain has worn +5%, it should be changed.
- Remove a pin from the chain and examine the outside diameter. Normal bedding in will occur and is not a problem unless the pin has a significant step. Measure and record the pin diameter on the Maintenance Record.
- Examine the flights. If the UHMW (if used) has worn down to the supporting metal, the flights must be changed. If there are cracks in the flights, they must be changed.
- Remove the accessible old flights, replace with new flights. Clear all tools etc. from inside the conveyor. **Note:** If the conveyor flights have stainless steel locknuts fitted, they must be replaced.
- Examine the welds - attachment bar to link side bar. If cracks are evident, the chain link must be changed.

5.4. Sprockets

5.4.1. Examination for Wear

Periodically, examine the sprockets for signs of wear. Normal bedding in will occur and is not a problem until the driving face flank of the tooth begins to wear into a 'hook' shape. A worn sprocket will cause premature chain wear through bad contact and a rubbing action on the chain barrels and should be replaced. In extreme cases, the hook will drive the chain down past its normal release point causing damage to the Carry-Backs, Intermediate plate or causing the chain to wrap around the sprocket and break.

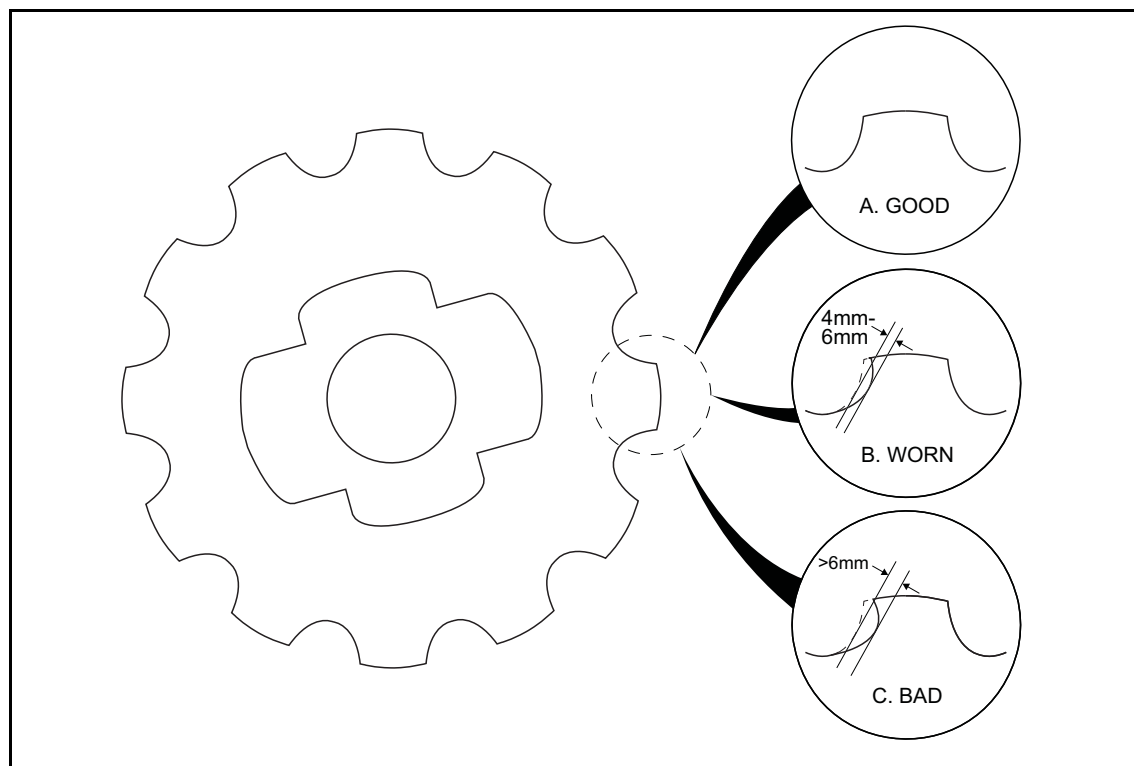


Figure 5.1

The figures above represent the wear conditions of the sprockets. After the sprocket is worn or hooked from (As shown in Figure 5.1), it is very important to replace the sprockets in order to avoid irreversible harm to the barrel of the chain. If the wear condition of the sprocket meets or exceeds the condition shown in Figure 5.1 C, not only do the sprockets need to be replaced, but further examination of the individual chain components is required. Tramco sprockets are split for easy removal.

5.4.2. Replacement

- Remove the head or tail access covers.
- Split the chain. Refer to page 28 for information on chain installation.
- In the case of inclined conveyors, support both halves of the sprocket so they cannot fall into the conveyor.
- Remove fasteners and sprocket halves. Retain the shaft drive key. Clean up the shaft.
- Loose fit the two halves of the new sprocket onto the shaft using new self-locking fasteners.
- Position the Sprocket in the center of the head casing and fully tighten the fasteners. Check that the sprocket is on the conveyor centerline.

6. Troubleshooting



Before continuing, ensure you have completely read and understood this manual's Safety chapter, in addition to the safety information in the section(s) below.

In the following section, we have listed some causes and solutions to some of the problems you may encounter in the field.

If you encounter a problem that is difficult to solve, even after having read through this troubleshooting section, please contact your local dealer or distributor. Before you contact them, please have this operation manual and the serial number from your machine ready.



WARNING

Fully disengage and lock out the power source before attempting any modifications or repairs.

PROBLEM	CAUSE	SOLUTION
Premature Trough Failure	Gauge too thin	Increase thickness. Consult Tramco for recommendations
	Worn flights	Replace flights
	Excessive chain speed	Check chain speed
Accelerated Flight Wear	Excessive heat	Change flight material. UHMW is limited to 80° C
	Speed too high	Reduce speed. Consult Tramco to determine proper chain speed.
	Foreign objects	Remove foreign objects
Chain Breakage	Worn chain	Replace chain if worn
	Take-up is loose	Adjust take-up
	Obstruction in conveyor	Remove obstruction
	Sprocket misalignment	Align sprockets
	Plugged discharge	Remove material from discharge
	Overloading conveyor	Regulate feed into conveyor
Drive Shaft Breakage	Excessive torque	Recalculate horsepower requirements
	Insufficient torque capacity	Increase shaft diameter
		Change shaft material
	Obstruction in conveyor	Remove obstruction
Bearing Failure	Material getting into bearing	Add or upgrade seal to keep material out of bearing
		Change outboard bearing
	Insufficient/Excessive lubrication	Lubricate properly
Motor/Heaters Overload	Amp demand too excessive for motor Incorrect motor size	Recheck horsepower calculations
		Check material characteristics
		Check capacity
		Regulate feed
Drastic Capacity Loss	Missing flights	Replace flights

7. Appendix

7.1. Vapour Tight Model

The following information details installation and maintenance information related to Tramco's Vapour Tight Conveyor.

7.1.1. Appendix Overview

Table 7.1. Appendix Overview

Page	Topic
page 41	Recommended Lubricants
page 42	Recommended Gland Seal Packings
page 43	Lubrication of Head Shaft Seals
page 44	Lubrication of Head Shaft Bearings
page 44	Lubrication of Tail Shaft Take-Up Bearings
page 45	Tail Rotation Sensor
page 46	Removal & Replacement of UHMW Seal Plate

7.1.2. Recommended Lubricants

Table 7.2. Lubricant Reference Table

Component	Lubricant
Head Shaft Seals	Kluber Barrierta L55-2
Head Shaft Bearings	Morris Lubricants EP K42
Tail Shaft Take-Up Seals	Kluber Barrierta L55-2
Tails Shaft Take-Up Bearings	Kluber Barrierta L55-2

Important: Please see attached manufacturer's literature.

7.1.3. Recommended Gland Seal Packings

Table 7.3 Gland Seal Packing Reference Table

Component	Packing
Head Shaft Seals	9.5mm Square Section Flexitallic 43
Tail Shaft Take-Up Glands	8.0mm Square Section Flexitallic 43

Important: Please see attached manufacturer's literature.

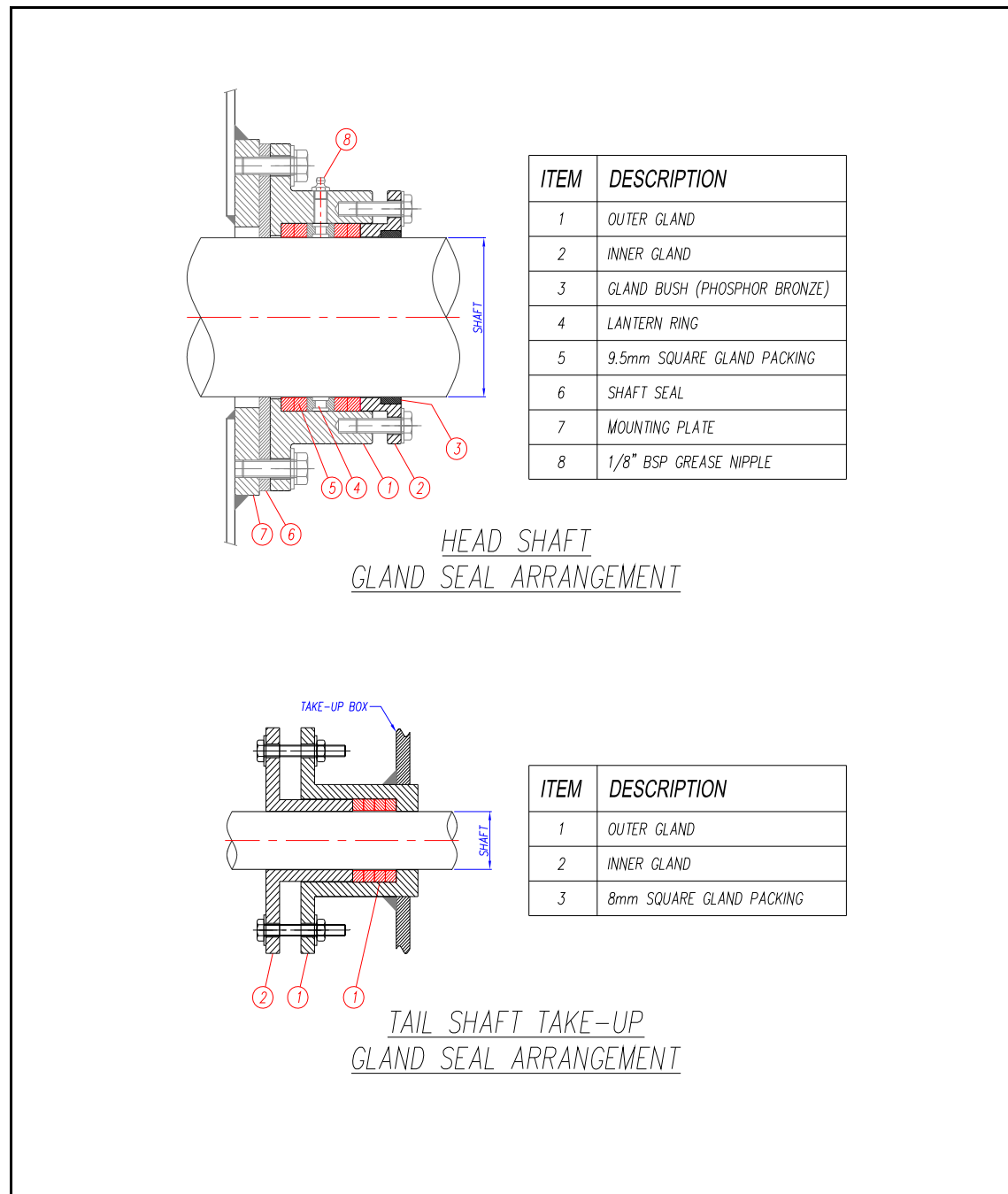


Figure 7.1 Gland Packing

7.1.4. Lubrication of Head Shaft Seals

Lubrication of the head shaft seals (gland packings) is done via the grease nipples located on the exterior of the head shaft seal casing (one each side).

Attach the grease gun and apply the recommended lubricant (or equivalent).

Important: Hexane resistant grease must be used.

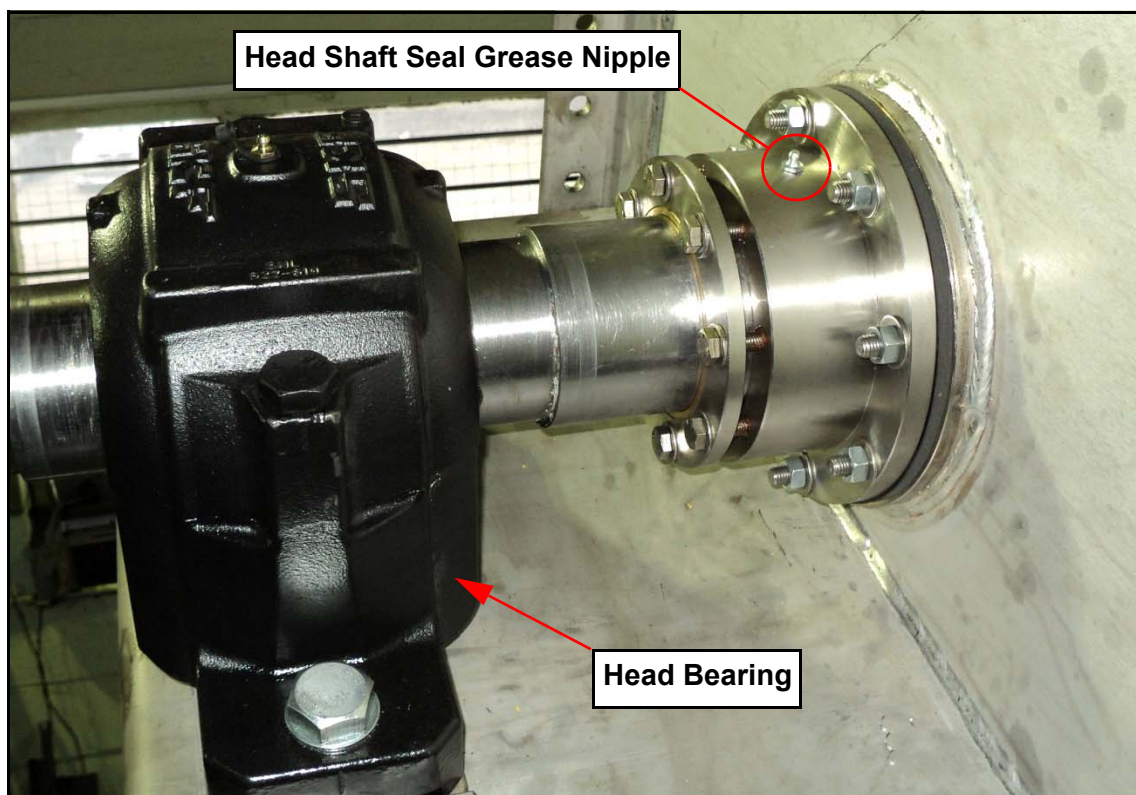


Figure 7.2

7.1.5. Lubrication of Tail Shaft Take-Up Bearings

Lubrication of these bearings is done remotely via the grease nipples located on the exterior of the take-up box and flexible hoses located inside.

Attach the grease gun and apply the recommended lubricant (or equivalent).

Important: Hexane resistant grease must be used.

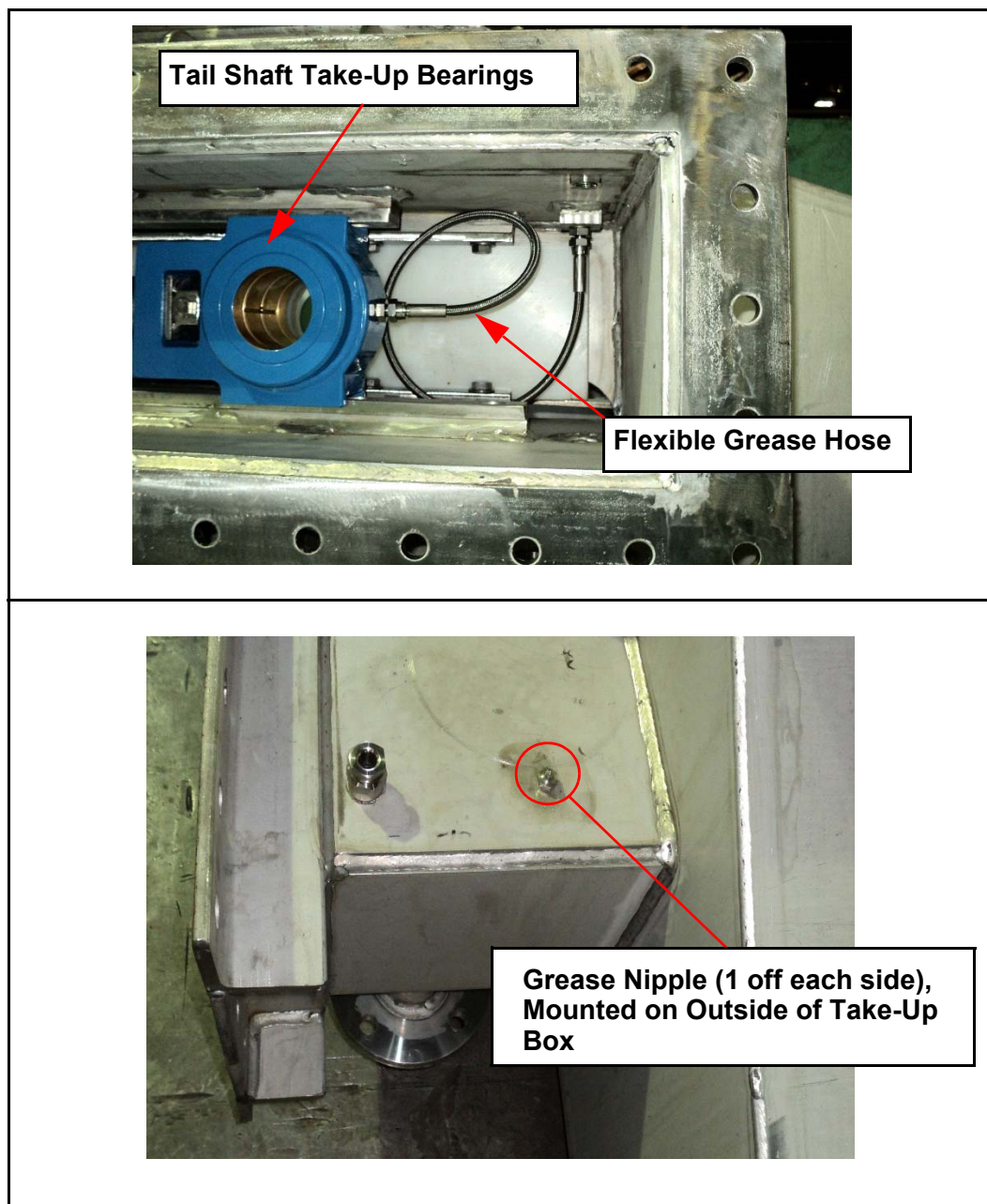


Figure 7.3

7.1.6. Tail Rotation Sensor

The tail shaft rotation sensor is located inside the take-up box and detects the rotation of the tail shaft via a four blade flag attached to the end of the shaft. The cable exits through a cable gland mounted on the top of the take-up box.

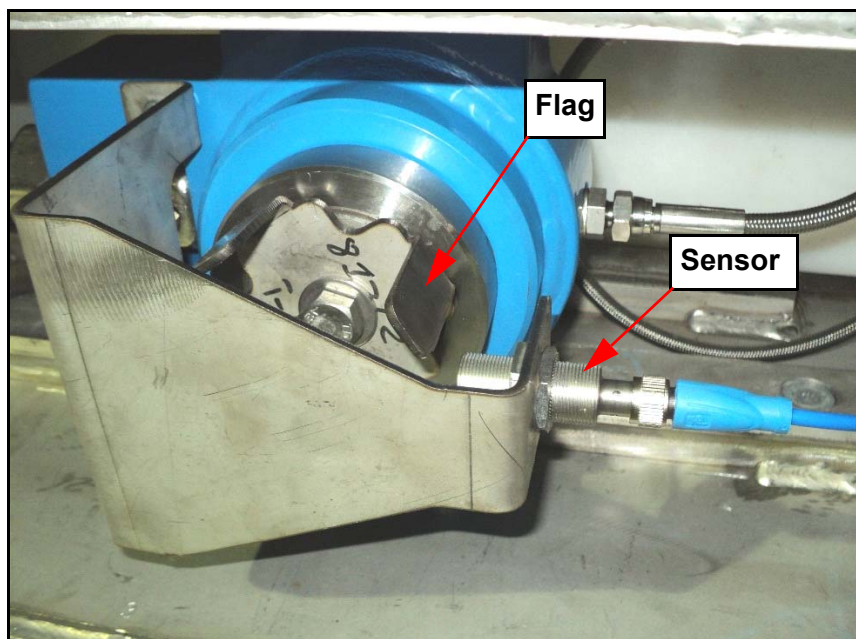


Figure 7.4

Important: Please refer to the manufacturer's documentation for installation and set-up instructions.

7.1.7. Removal and Replacement of UHMW Sliding Seal Plate

1. Remove bearings.
2. Undo bolts and remove the bearing slide bars.
3. Undo bolts and remove seal retainer bars.
4. Pull the sliding seal plate off the tail shaft.

Note: Reverse steps 1 - 4 for re-fitting.

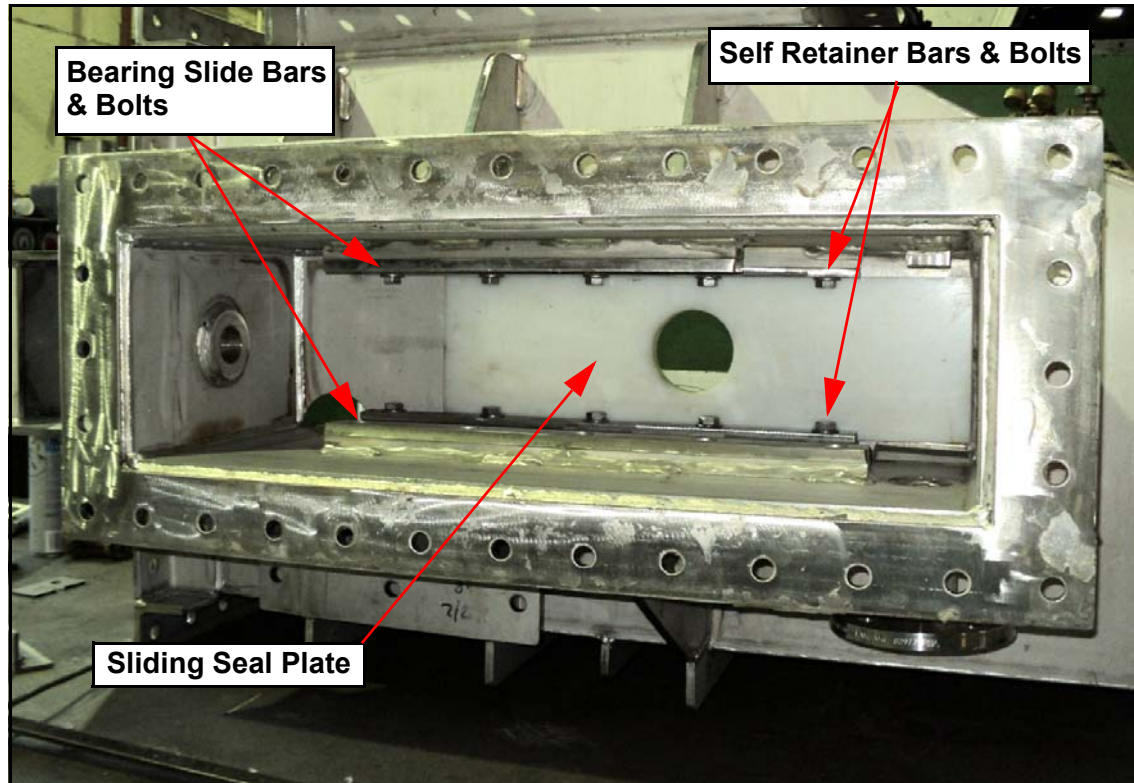


Figure 7.5



TERMS AND CONDITIONS OF SALE

TERMS OF SALE

All prices quoted, unless otherwise noted, are in GBP, and Ex Works. Hull, England.

PAYMENT TERMS

To be agreed upon.

SHIPMENT

[X] weeks after acceptance of the purchase order and receipt of approval drawings. To be agreed upon.

NORMAL SHIPPING PRACTICE

Head and tail sections will be bolted to their respective adjoining intermediate sections. Intermediate sections will have the chain assembled and placed inside the trough, secured and wired in place. All conveyor components are completely preassembled and 'matched marked' prior to shipment.

Other items: Limit switches, motion sensors, inlet flanges, support legs, drive components, etc., if required, are shipped loose and must be installed in the field at the owner's expense.

FREIGHT OPTIONS

Collect: The carrier will bill you directly, based on your discount. If you do not have a discount, they will apply our discount.

Prepaid & Add: The carrier will bill us, and we will then send you a bill for the freight.

PAINTING/GALVANIZING

Surface Preparation: All surfaces are adequately cleaned.

Paint Application: The Paint Application will be done over the exterior surfaces. The standard exterior finish consists of One (1) Coat 50/150 DFT Primer, One (1) coat Gloss Alkyd Enamel in a Regal Yellow Colour.

Galvanized: Conforms to EN ISO 1461.

PRICE AND ACCEPTANCE

All quotations are valid only for thirty (30) days from date of quotation. Sale of goods is not considered complete until the order is accepted by TRAMCO EUROPE LTD, HULL, ENGLAND. All orders are subject to credit approval.

TAXES

This quotation does not include excise or taxes of any kind.

WARRANTY

Goods manufactured by Seller shall conform to the description and specifications set out herein, shall be fit for the ordinary purposes for which such goods are used, and shall be free of defects in workmanship and material at time of shipment.

Providing such equipment is properly installed with competent supervision, and within the load limits for which it was sold, and provided further the equipment is free from critical speed, torsional or other type vibration, no matter how induced.

THERE ARE NO WARRANTIES OF MERCHANTABILITY OR OTHERWISE, EXCEPT OF TITLE, WHICH EXTEND BEYOND THAT STATED ABOVE.

REMEDIES

- a. Seller's liability and Buyer's remedy for breach of warranty or otherwise is expressly limited to repair or replacement of non-conforming machinery or machinery parts of Seller's manufacture when the same are returned F.O.B. Seller's factory within twelve (12) month of shipment hereunder or refund of the purchase price thereof after charging, in either instance, for the service rendered by the non-conforming product.
- b. Seller's liability with respect to any item not of Seller's manufacture shall be limited to that of the Vendor thereof.
- c. Repairs to, alterations of, or work done on equipment warranted hereunder without Seller's prior written authorisation shall void all warranties applicable thereto.
- d. In no event shall Seller's liability exceed the purchase price of the non-conforming item.

SAFETY DEVICES

The products are provided with only those safety devices identified herein. IT IS THE RESPONSIBILITY OF PURCHASER TO FURNISH APPROPRIATE GUARDS FOR MACHINERY PARTS in compliance with OSHA standards, as well as any other safety devices desired by Purchaser and/or required by law.

DELAYS

The Seller shall not be liable for loss of damage resulting from any delay or failure to make delivery of all or any part of the equipment purchased. If shipment is delayed by Purchaser, Seller reserves the right to invoice Purchaser and store the products at Purchaser's expense.

CLERICAL ERROR

Right is reserved to make any corrections in prices quoted due to stenographic or clerical errors on the part of the Seller.

ENTIRE AGREEMENT

This agreement is the entire and only agreement between Purchaser and the Seller; and, no oral statement or agreements not confirmed herein, or by a subsequent written agreement, shall be binding on either Purchaser or the Seller.

CANCELLATION

All orders are considered firm contracts and are not subject to cancellation except on terms that would indemnify Seller against loss.

APPLICABLE LAW

This quotation shall be interpreted and governed in all respects by the law of England. Any part of this agreement contrary to the law of any state shall not invalidate any other part of this agreement in such state.



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