INSTALLATION, OPERATION, MAINTENANCE MANUAL

MHS CONVEYOR

Belt Conveyor

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PURPOSE

It is the intent of MHS Conveyors, through this manual, to provide information that acts as a guide in the installation, operation and maintenance of MHS Conveyors Belt conveyor.

This manual describes basic installation practices, assembly arrangements, preventive maintenance and assists in replacement parts identification.

This service manual is intended for use by personnel who are knowledgeable of installation and safe working practices on conveyor systems.

Not all applications and conditions can be covered; therefore, this manual is to be used ONLY as a guide.

If additional copies of this manual are needed or if you have any question concerning the conveyor please contact your Business Partner or MHS Conveyors' Customer Support at 231-798-4547 or Fax 231-798-4146.

EQUIPMENT WARRANTY

MHS Conveyors warrants that the material and workmanship entering into its equipment is merchantable and will be furnished in accordance with the specifications stated.

MHS Conveyors agrees to furnish the purchaser without charge any part proved defective within 2 years from date of shipment or before the equipment has forty-one hundred (4100) hours of running use, whichever period is shorter, provided the purchaser gives MHS Conveyors immediate notice in writing and examination proves the claim that such materials or parts were defective when furnished. For drive components specific to XenoROL® (i.e. Xeno belts, slave Xeno belts, drive spools, standard and speed-up, and spacers), this warranty shall be extended to five years or ten thousand (10,000) hours of running use, whichever period is shorter, provided the conveyors are applied, installed and maintained in accordance with MHS Conveyors published standards. Other than the above, there are no warranties which extend beyond the description on the face hereof. Consequential damages of any sort are wholly excluded.

The liability of MHS Conveyors will be limited to the replacement cost of any defective part. All freight and installation costs relative to any warranted part will be at the expense of the purchaser. Any liability of MHS Conveyors under the warranties specified above is conditioned upon the equipment being installed, handled, operated, and maintained in accordance with the written instructions provided or approved in writing by MHS Conveyors.

The warranties specified above do not cover, and MHS Conveyors makes no warranties which extend to, damage to the equipment due to deterioration or wear occasioned by chemicals, abrasion, corrosion or erosion; Purchaser's misapplication, abuse, alteration, operation or maintenance; abnormal conditions of temperature or dirt; or operation of the equipment above rated capacities or in an otherwise improper manner.

All equipment and components not manufactured by MHS Conveyors carry only such warranty as given by the manufacturer thereof, which warranty MHS Conveyors will assign or otherwise make available to Purchaser without recourse to MHS Conveyors, provided that such warranty is assignable or may be made available.

IMPORTANT

For service on motors, reduction units, electrical components, controls, air or hydraulic cylinders, contact the local authorized sales and service representative of respective manufacturer. If none is available in your locality, contact the MHS Conveyors representative. MHS Conveyors will not be responsible for units that have been tampered with or disassembled by anyone other than the authorized representative of the respective manufacturer.

THERE ARE NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, EXTENDING BEYOND THOSE SET FORTH IN THIS STATEMENT OF WARRANTY.

Rev 04/08/2009

WARNINGS & SAFETY INSTRUCTIONS

Failure to follow the instructions, warnings, and cautions throughout this book, and warning labels on the conveyor may result in injury to personnel or damage to the equipment.

Your MHS Conveyors conveyor is powered by a motor and can be stopped only by turning off electrical power to the motor. As with all powered machinery, the drive related components including sprockets, chains, shafts, universal joints and pneumatically actuated devices present a danger. We have installed or provided guards to prevent inadvertent contact with these components along with warning labels to identify the hazards.

Special attention must be paid to the following areas of this manual:

WARNING

This is a notice which, if not followed, could result in serious injury or death.

CAUTION

This is a notice which, if not followed, could result in damage to equipment.

NOTE

This is where you will be notified of helpful information.

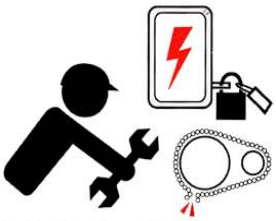
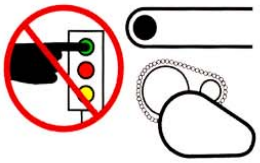
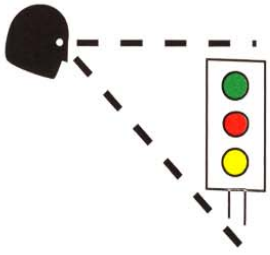
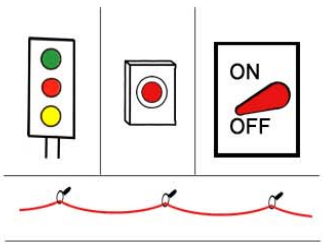
After maintenance, REPLACE guards immediately. Keep ALL warning labels clean and clear of any obstructions. Never remove, deface or paint over WARNING or CAUTION labels. Any damaged label will be replaced by MHS Conveyors at no cost by contacting the Customer Support Department.

It is very important to instruct personnel in proper conveyor use including the location and function of all controls. Special emphasis must be given to emergency stop procedures. It is important to establish work procedures and access areas which do not require any part of a person to be under the conveyor. It should be required that long hair is covered by caps or hair nets. Walking on or riding moving conveyor is prohibited. Lock out power before removing any guarding. **Loose clothing, long hair, and jewelry must be kept away from moving equipment.**

Maintain enough clearance on each side of all conveyor units for safe adjustment and maintenance of components. Provide crossovers or gates at sufficient intervals to eliminate the temptations to climb over or under any conveyor. Prohibit riding or walking on conveyor by anyone.

Belt conveyors provide smooth, continuous flow of product under positive control and are commonly used for horizontal transportation or to change elevation by inclining or declining. Belt conveyor also provides a continuous, smooth, flat surface for conveying small or odd shaped items, a braking surface to create accumulation on a preceding roller conveyor or for gapping, metering and indexing.

Package Conveyors

 Do Not Climb, Sit, Stand, Walk, Ride, or Touch the Conveyor at Any Time	 Do Not Perform Maintenance on Conveyor Until Electrical, Air, Hydraulic and Gravity Energy Sources Have Been Locked Out and Blocked	 Operate Equipment Only With All Approved Covers and Guards in Place
 Do Not Load a Stopped Conveyor or Overload a Running Conveyor	 Ensure That All Personnel Are Clear of Equipment Before Starting	 Allow Only Authorized Personnel To Operate or Maintain Material Handling Equipment
 Do Not Modify or Misuse Conveyor Controls	 Keep Clothing, Body Parts and Hair Away from Conveyors	 Remove Trash, Paperwork and Other Debris Only When Power is Locked Out
 Ensure That ALL Controls and Pull Cords are Visible and Accessible	 Know the Location and Function of All Stop and Start Controls	 Report All Unsafe Conditions

POST IN PROMINENT AREA

INTRODUCTION

The operation and maintenance of your conveyor is very important. As part of your overall operation, the conveyor is a vital part of production. Experience has taught us that two factors lead to the most reliable and productive use of any material handling equipment.

1. Proper operation by trained personnel within the conveyor's designed purpose and capabilities.
2. The establishment of a regular and thorough program of careful preventive maintenance.

THIS SERVICE MANUAL IS INTENDED TO BE USED BY PERSONNEL WHO ARE KNOWLEDGEABLE OF INSTALLATION AND SAFE WORKING PRACTICES ON BELT CONVEYOR SYSTEMS.

Not all applications and conditions can be covered; therefore, this manual is to be used as a guide only.

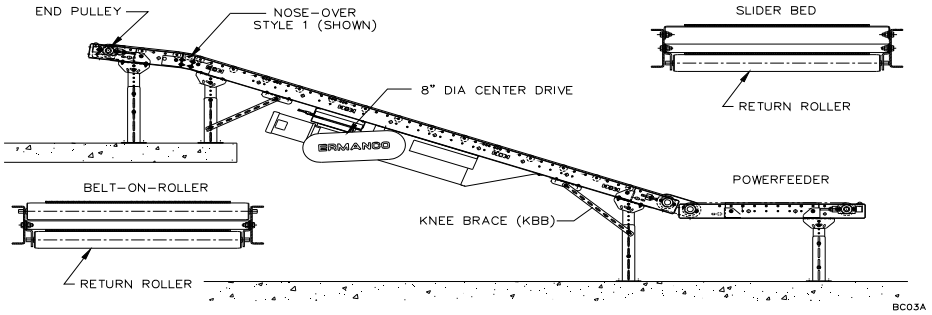
Specific questions relating to your belt conveyor can be addressed to your local MHS Conveyors Business Partner who is familiar with your system and can render immediate assistance if required.

Be sure to read and heed the Warnings at the beginning of this manual. Warnings and Cautions are included in appropriate places throughout this manual and are defined as follows:

Warning - A notice which, if not followed, could result in serious injury to personnel.

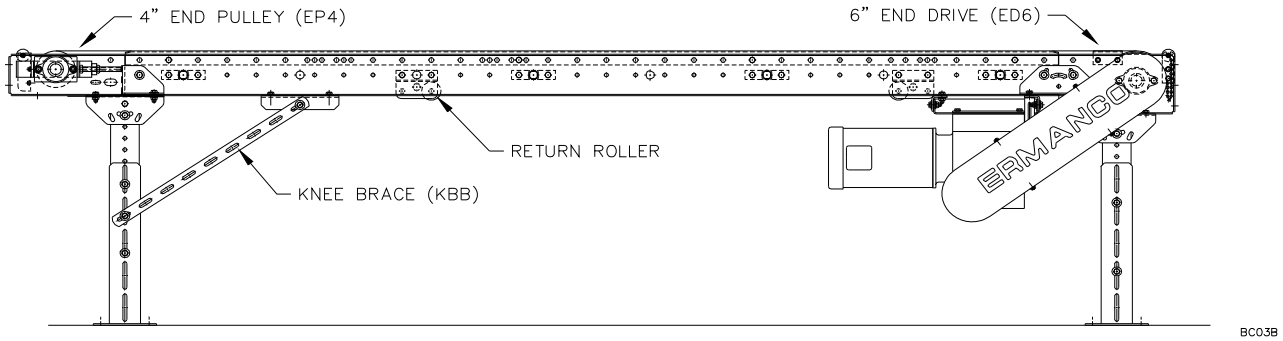
Caution - A notice which, if not followed, could result in damage to equipment.

A thorough understanding and compliance with these Warnings and Cautions will greatly reduce the possibility of personnel injury or equipment damage.



There are two types of belt conveyor: Slider Bed (SB) conveyor and Belt-on-Roller (BR) conveyor. With SB the belt rides over a metal pan fastened to a channel frame. This type of construction is used for smooth movement, quietness, low maintenance and its braking effect on declines and inclines.

With BR the belt rides on rollers supported by a channel frame. BR is used for its lower friction resulting in reduced horsepower requirements and reduced belt pull for heavier live loads and longer component life.



RECEIVING AND SITE PREPARATION

General

MHS Conveyors belt conveyors are shipped in a series of subassemblies. These subassemblies are packaged to guard against damage in shipment.

Upon receipt, the equipment should be stored in a dry location. Rolls of belting should be stored on a pallet, not on the floor. It is advisable not to lay the belt on its edge.

Examination should show if any damage was caused during shipment. If damage is evident, claims for recovery of expenses to repair damage or replace components must be made against the carrier immediately. While unloading, a check must be made against the Bill of Lading, or other packing lists provided, to confirm full receipt of listed items.

CAUTION

TAKE CARE DURING THE REMOVAL OF EQUIPMENT FROM THE CARRIER. Remove small items and boxes first. Pull and lift only on the skid, not on the frame, crossmember or any part of the equipment. Be sure the skid is free of other materials which may be on top or against the side of the skid to be removed.

If a layout drawing is available, use it to determine the location of each size and type of conveyor to be installed.

PREPARATION OF SITE

After the conveyor is received, move it to the installation or designated storage area as soon as possible. Clean up all packing material immediately before parts get lost in it. Loose parts should remain in the shipping boxes until needed.

Prior to starting assembly of the belt conveyor, carefully check the installation path to be sure there are no obstructions that will cause an interference. Check for access along the route to bring in bed sections and components closest to the point where they are needed. It is often necessary to give the area along the system path a general cleanup to improve installation efficiency, access and accuracy.

For ceiling-hung belt conveyor, header steel should be installed well ahead of the conveyor frame installation to minimize congestion. In addition to having header steel installed ahead of time, you will be able to locate holes in the header steel for the drop angles.

SUBASSEMBLIES

Belt conveyors are shipped as subassemblies. Each subassembly is shipped complete except for belting. Drives with motors and return rollers are shipped mounted to a bed. Powerfeeders, powertails and nose-overs are shipped flat and will require angle adjustments at installation.

Segregate the conveyor subassemblies by types for inventory and ease of locating during installation. Arrange the subassemblies on the floor with all parts in the proper position and proper orientation. The following parameters should be known:

a. Direction of Product Flow
b. Receive and Discharge Elevations
c. Orientation of the Drive

PARTS INVENTORY & IDENIFICATION

An identification label is attached to the inside of one side channel close to one end of each conveyor bed and on all drive packages. (See below.) This label contains: job number, model description, item number, tag number (if specified), assembler's initials and date of manufacture. On supports, the tag is located on the bottom side of the foot. On special devices, it is located on a convenient flat surface that is not offensive to the appearance of the equipment, but is still accessible for viewing.

Identification labels on bed and drive package

IT#: 25024410
DSC:BED, CDR SLIDER 24"W X 10'-0"
JOB:C009856 4/21/95
TAG: #BC5

DSC:DR, CTR 8" 24W 1 HP BRKMTR 60
JOB:C009856 4/21/95
TAG: BC5

Make an inventory of primary subassemblies and parts. Refer to the layout for arrangements and the illustrations throughout this manual for identification. You must have all frames and supports for a particular conveyor before starting to install that conveyor. It is cost-effective to identify and procure any missing parts before they are needed for assembly. Small items like nuts and bolts are not practical to inventory and are easily obtained if necessary.

GENERAL PROCEDURES

The installation should be supervised by an installer experienced with conveyor. The following procedures are to be used as guidelines only for conveyor installation. Specific methods will vary somewhat depending on available equipment on site and each installer's preferences based on past experience.

DIMENSIONAL REFERENCE POINTS

The path of each conveyor in the system is determined by establishing a reference point at each end. The center line of the conveyor is established and a chalk line is snapped between these points.

Conveyors should be installed with the center line of the bed matching the center line of the conveyor path. Use a template and plumb line or other acceptable means to ensure accuracy.

ELEVATIONS

All conveyors should be installed in accordance with the elevations shown on the drawings. In addition, all conveyors must be level across the frame width and length (if horizontal). Leveling of the frames is best done using a rotating laser level or a builder's level.

CAUTION

Consult the building architect or a structural engineer regarding ceiling loading or structural limitations of the building.

WARNING

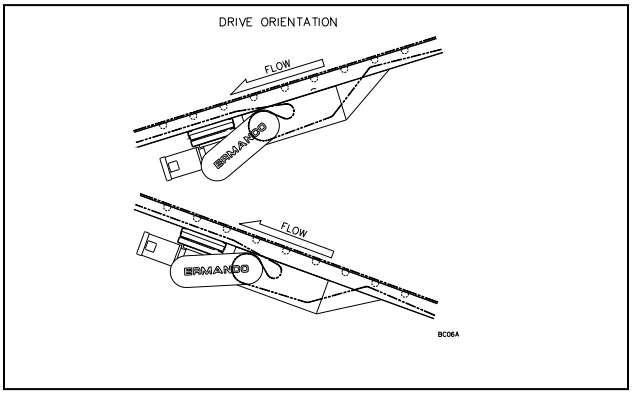
The Installation Supervisor must be qualified in the mechanics of the equipment and enforce safe working procedures for the protection of the crew personnel, the customer and the customer's property.

After the first elevation is established at a critical point, the elevation of all other points shall be related to this first point. Normal practice is to dimension elevations from the floor at each point of support. As a system proceeds onto another floor or into another building or room, a new elevation will be dimensioned from the floor at that point. This new elevation will then become the reference for subsequent elevations.

When installing an overhead system, the first elevation is dimensioned from the floor and becomes the reference elevation point until a change in elevation is shown on the layout. This new elevation is then dimensioned from the floor and becomes the new reference point. The process is repeated each time an elevation change occurs.

DRIVE ORIENTATION

On inclined conveyors the drive bed should be mounted so that the motor is on the downstream side of the flow direction. This minimizes the load on snubber rollers. However, it is more important to orientate the drive chain guard to provide maintenance access.



SUPPORTING ARRANGEMENTS

FLOOR SUPPORTS

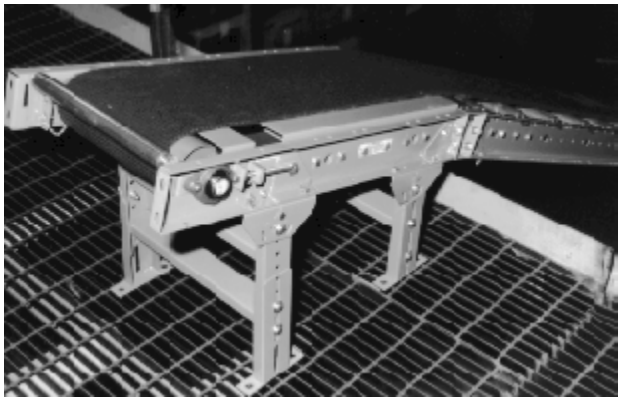
General

Install the bolts so the nut is on the bottom of the conveyor. The stand head bolts should be left fingertight on the frame while the conveyor is being assembled.

There are various frame rail depths and belt thicknesses. Floor supports are ordered by nominal height range, which is the dimension from the floor to the top of the support. Conveyors are specified and shown on the layout stating top of belt elevations. This difference must be recognized when setting the support elevations. Most MHS Conveyors belt conveyors are slightly more than 5" from top-of-support to top-of-belt.

It is important that conveyor frames be installed level to facilitate belt tracking. Floor supports will accommodate normal irregularities in the floor surface. Adjustment for elevation in floor supports is accomplished with metal-on- metal bolt clamping force. To achieve the support's stated load rating, it is necessary to tighten the elevation adjustment bolts (3/8" diameter) to 23 ft/lb of torque.

On inclined conveyors, supports should always be installed in the vertical position and any variations due to pitch or slope be compensated for in the pivoting stand head of the support.



On end beds, install one support completely on the frame, so that the center of the upright is 6" from the end. All intermediate supports are installed centered on the conveyor bed joints.

Methods for Anchoring

a. Concrete Floors

Anchoring will be accomplished by drilling into the floor and inserting the suitable anchor bolt. The hole diameter and depth must be in accordance with the anchor bolt manufacturer's instructions.

Anchor intermediate floor supports with two anchor bolts, one through each support boot using minimum 3/8" diameter anchor bolts. For floor supports over 5' high or when supporting drives, 1/2" diameter anchor bolts are recommended.

Stagger anchors from front of leg on one side of each support to rear of leg on opposite side.

Anchor bolts for equipment subject to impact loads (i.e. case stops) should be a minimum of 1/2" diameter.

b. Wood Floors

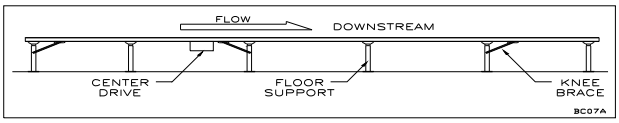
Anchoring will be accomplished using suitable lag bolts. If floors are in good condition, lag bolt diameters should be the same as the anchor bolt diameters used in concrete floors described above.

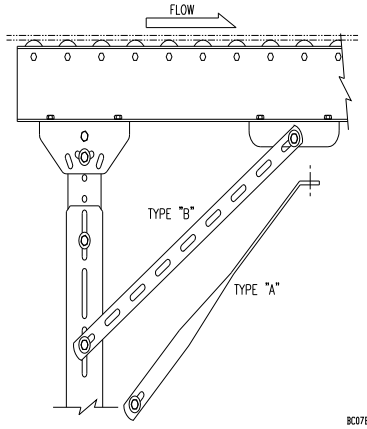
KNEE BRACES

Longitudinal stability is achieved with knee braces. Braces resist stresses caused by flow direction, drives, stops and starts.

Every support does not require bracing. They should be used at the ends of straight runs and approximately every 30' in between. The braces should be located on the "DOWNSTREAM" side of the supports, putting them in tension.

Starting the conveyor puts opposite stresses on the supports, which is resisted by installing braces near the drive, back toward the receiving end (UPSTREAM).

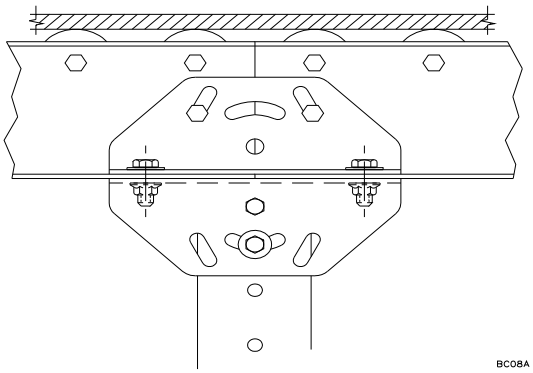




For best results the brace strap to frame angle should not exceed 45°, or be less than 30°. On short supports where a small angle results, the brace strap may be shortened.

CONNECTORS

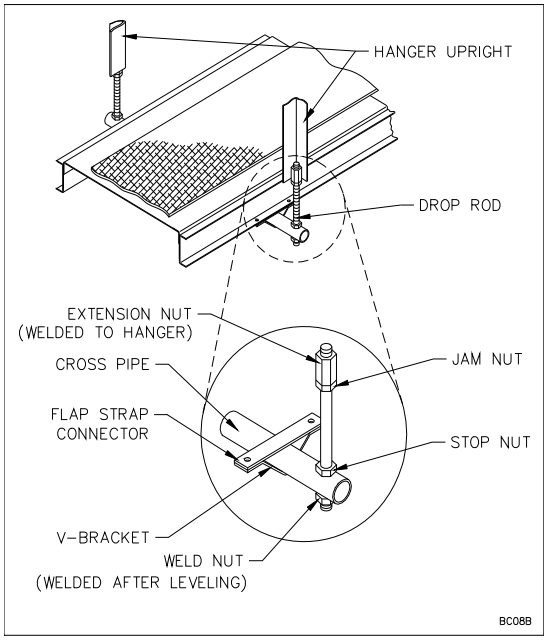
The adjoining beds of a belt conveyor are connected using stand head connector plates (one on each side). The beds should be temporarily supported while the support and connectors are installed.



Beds should be checked for squareness before final tightening of bolts.

The bolts used to fasten the support to the conveyor frame also pass through the flange of the connector. In addition, there are two bolts in each connector installed through the connector and conveyor channel web with one in each adjoining frame.

CEILING HANGERS



Drop rods and nuts are optional. The extension nut is welded into angle upright during installation.

WARNING

Consult the building architect or a structural engineer regarding ceiling loading or structural limitations of the building for sizing header steel.

Bed Joints

Normally, only cross pipes, V-brackets and flat strap connectors are provided for hanger installations. Threaded 3/4" rod and attaching nuts are available as an option.

If hangers are field fabricated, they should be a minimum of 1-1/2" x 1-1/2" x 3/16" angle.

WARNING

Consult your Distributor or a structural engineer to determine what size hangers should be used to support your maximum anticipated load.

If a cross pipe support cannot be mounted below a bed joint, place the cross pipe as close as possible to the joint but not more than one foot from the joint and use connectors at the bed joint.

After the hangers are installed and the heavy extension nuts welded to the hangers, thread the drop rods into the extension nuts. Thread the jam nuts and stop nuts on the drop rods far enough up the rods to allow installation of the cross pipe and lower weld nuts.

While still on the floor, loosely attach a cross pipe, V-brackets, flat strap connectors and side connector plates to one end of a bed section. Hoist the bed section between the drop rods guiding the rods through the mounting holes in the cross pipe. Thread the weld nuts on the drop rods to support the bed. Hoist the next bed section to the first and connect them using the side connector plates, flat strap connectors and V-brackets. Level the bed lengthwise and side to side by threading the weld nuts up or down. Tighten the jam nuts against the extension nuts and the stop nuts against the cross pipe. Weld the weld nuts to the drop rods to prevent loosening. Continue for the length of the conveyor.

METHODS OF ANCHORING

Open Building Steel

Reference the American Institute for Steel Construction manual (AISC).

Welding of auxiliary steel (stringers or headers) to building steel is prohibited.

Drilling and bolting to building steel is not recommended and will be done only with the customer's written permission.

Clamping of stringers or headers to building trusses will normally be done only at panel points. Specific customer permission and load calculations by a qualified engineer are necessary to safely clamp between panel points.

Headers when used for short spans, such as between roof purlins, will be securely clamped to building steel. Stringers when used between headers may be welded or bolted to the headers directly or with suitable angle clips.

CONCRETE CEILINGS

Accomplish anchoring by drilling into the concrete ceiling and inserting suitable bolt anchors. The hole diameter and depth must be in accordance with the lag bolt manufacturer's instructions.

Anchor each hanger with four bolts (two per upright) minimum size 1/2" diameter. Consult your Distributor or structural engineer to determine your needs.

WARNING
Do not use explosive type anchors.

For heavier concentrated load like drives or points where movement or vibration can occur, use 5/8" diameter through bolts with backup plates. If this is not permissible or possible, then header steel must be installed using several anchor bolts to spread the load.

Wood Joists/Beams

Hangers may be attached directly to the joists providing the load rating of the building will permit. Attach hangers to the vertical side of the joist in two places, one above the other, on each hanger upright. Anchoring is accomplished by drilling through the joist in the upper position and using a 1/2" diameter through bolt with a backup plate or heavy washer. A 1/2" diameter lag screw may be used in the lower position.

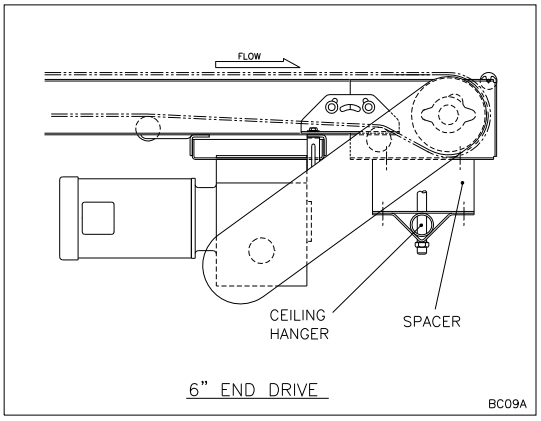
When a header is required to support the load, it must bridge across two or more joists. This header will be attached to each joist in the manner specified in paragraph above. Hanger uprights should then be bolted or welded securely to the headers. **Consult a structural engineer to determine which method should be used for your load requirements.**

Concrete/Masonry Walls

Equipment may be supported from concrete walls through use of suitable bolts and anchors or by bolting through the wall if the condition of the wall or load dictates it. A 1/2" diameter through bolt should be used with a backing plate.

END DRIVES

For ceiling mounting a 6" end drive unit, bolt a pair of spacer channels (one for each side) to the end drive mounting brackets. Attach the cross pipe and V-brackets to the spacer channels.



When ceiling hanging end drives, a channel spacer is required for the hanger cross pipe to clear the chain guard. When floor supporting, the spacer is not required.

SWAY BRACING

1. Sway bracing should be a minimum of 1-1/2" x 1-1/2" x 3/16" angle.

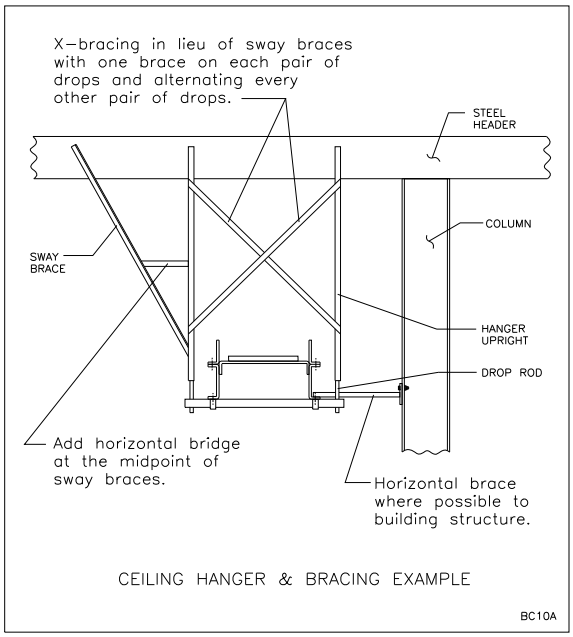
2. Sway bracing will be secured to the hanger upright near the conveyor support and extend upward at an angle of approximately 30 degrees from the upright. The sway brace angle should not be over 45 degrees. When hangers are installed adjacent to building columns, a horizontal brace may be installed securely to the column.

3. Hanger uprights over 12'-0" in length must have horizontal bridging angles connected between the upright and the sway brace at approximately the half way point.

4. Sway bracing should be installed on every third hanger (maximum of 30'-0" centers).

5. If sway bracing cannot be placed on the outside of the uprights, alternate X-bracing between every other pair of uprights.

6. Additional bracing should be used:
   - Before and after curves
   - At drives
   - At product diverting points



CAUTION
Before adding X-braces between uprights, check for adequate product clearance.

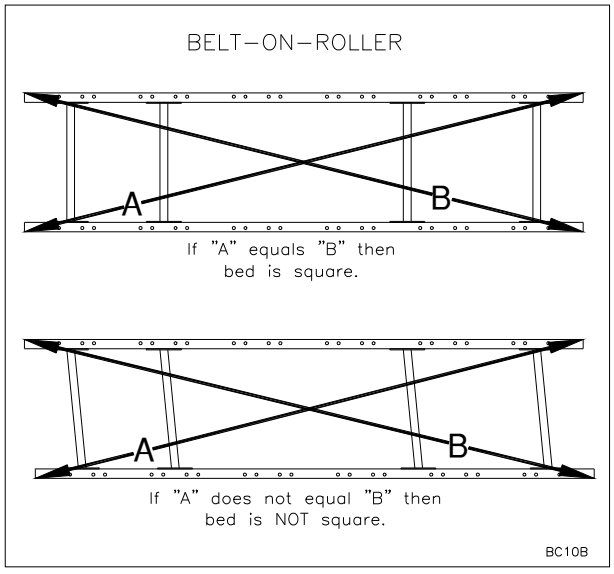
COMPONENT ASSEMBLY

PREASSEMBLY

One of the first steps is to gather the required parts, accessories and subassemblies for the conveyor.

On belt-on-roller conveyors, the bed frame should be checked for squareness before installing it into the system. To check for squareness, measure from a corner of one side diagonally across the frame to the opposite corner. Then measure the opposite corners in the same manner. If the bed is square, the two measurements will be the same. If the measurements are not identical, the bed frame must be squared. To square the bed loosen the crossmember bolts on one side and move the frame channel until the measurements are equalized. Retighten bolts.

Belt-on-roller and slider beds are interchangeable and may be mixed in a single conveyor. Check the layout drawing for specific bed locations.



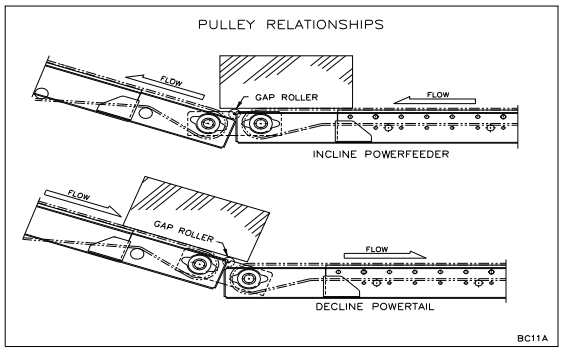
POWERFEEDER/POWERTAIL

The difference between a feeder and tail is the belt speed and pulley height relationship. It is very important to ensure that the proper unit is attached to the conveyor.

A powerfeeder runs 12% slower than the main unit, while a powertail runs 12% faster. If in doubt remove the chain guard from the adjoining drive and driven pulleys. The smaller sprocket will be on the faster pulley. Leave the chain guard off until the angle and pulley relationships are adjusted.

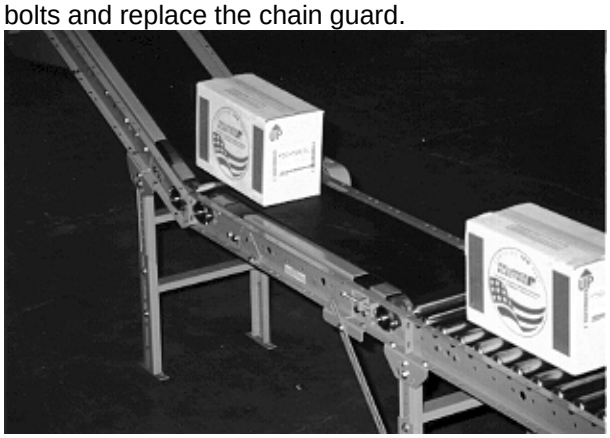
An incline or decline conveyor is best assembled on the floor, starting with the powerfeeder and fastening it to the adjoining roller or slider bed. With the floor support mounted to the free standing end of the powerfeeder/powertail, attach it to the adjoining conveyor bed by the connecting brackets and the support stand head.

Adjust the attaching brackets to their approximate angle by removing the chain guard and loosening the bearing mounting bolts enough to allow the bracket to pivot.

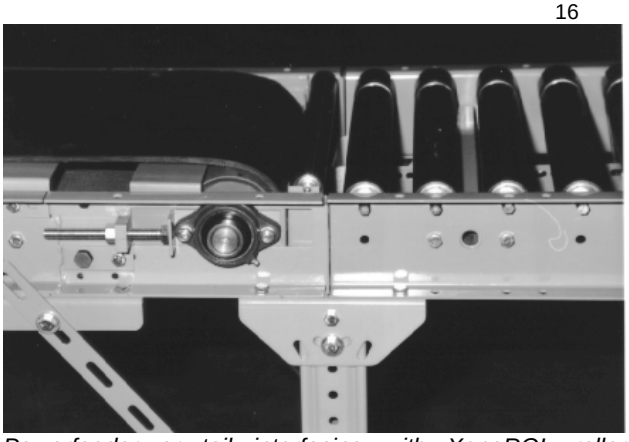


On powerfeeders set the pulleys level. With powertails set the second pulley lower so the product contacts the tail belt where it leaves the pulley.

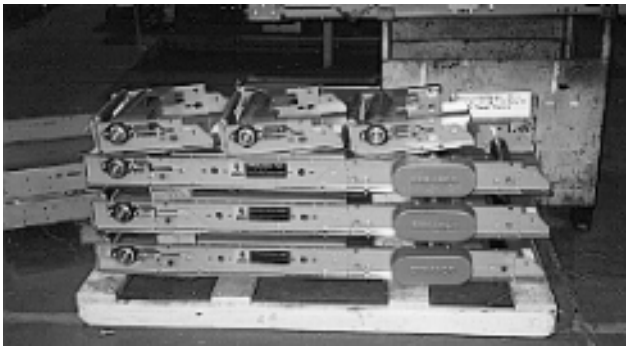
After the conveyor is set up and angles are checked, securely tighten the powerfeeder/powertail bearing bolts and replace the chain guard.



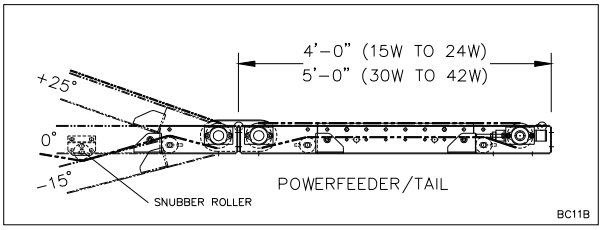
Powerfeeder adjoining 22° incline belt, receiving product from XenoROL®.



Powerfeeder or tail interfacing with XenoROL roller conveyor.



The powerfeeder/powertail subassembly is shipped with the belt mounted but not tracked. (See Belt Tracking Section).



Wider belts require longer beds to maintain belt tracking. The snubber roller (2-1/2" dia.) must be mounted 12" from the end of the adjoining bed. This roller and brackets are found in the loose parts.

CAUTION

The end pulley on the main unit which is connected to and driving a powerfeed/powertail cannot be used for belt tensioning.

WARNING

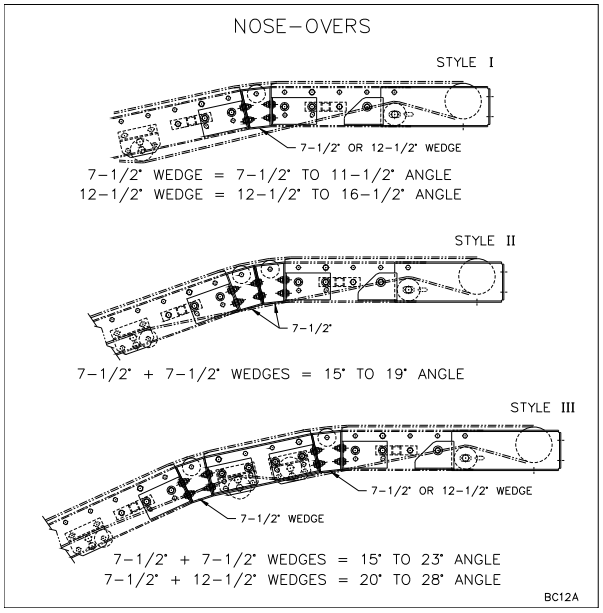
Replace any change guard removed to make adjustments.

NOSE-OVERS

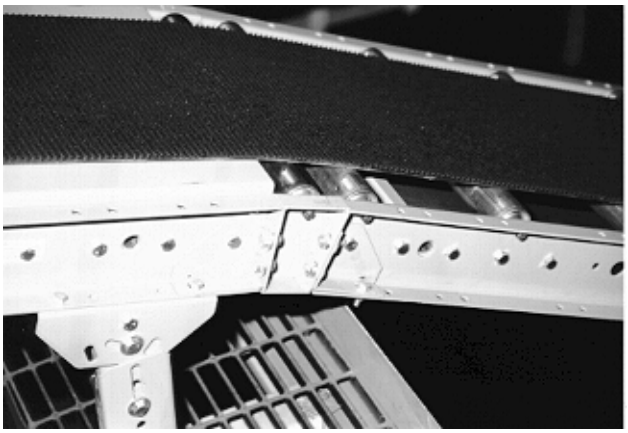
Nose-overs consist of a 2" dia. carrier roller mounted between two wedge plates of either 7-1/2° or 12-1/2°. They are used in three styles to progressively reduce the angle at the top of an inclined conveyor. Both wedge sections are adjustable an additional 2° at each bed connection bracket which is slotted.

Styles I, II and III

Attach the nose-over assembly to the appropriate adjoining beds on the floor. Install the attaching bolts but do not tighten. Lift the nose-over and adjoining beds into position. While supporting both beds, adjust the nose-over angle using the slots provided in the side plates. The nose-over angle should be set at approximately one-half of the conveyor's main incline angle. After the nose-over angle is adjusted, finish tightening all of the side plate mounting bolts.

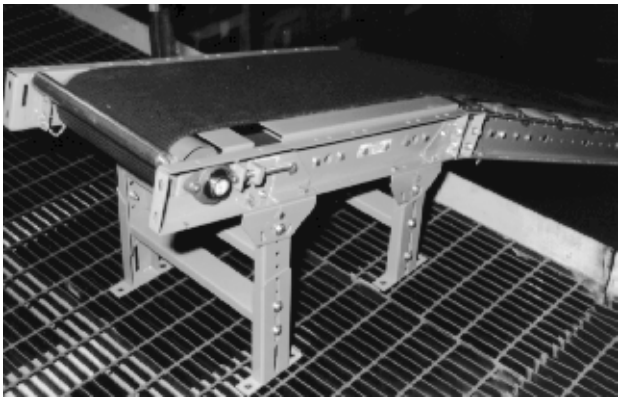


Nose-over Styles I and II have two bed connector plates per side providing up to 4° additional adjustment. Style III has four connector plates for 8° adjustment. Note: the 12" long bed between wedge plates is always a slider bed and contains a return roller or two snubber rollers (as shown).



The nose-over wedge plate shown here between belt-on-roller and slider beds provides an adjustable splice. It consists of a wedge and two bed connectors on each side and a roller between the wedges supports the belt.

CAUTION
Ensure that the nose-over section is properly supported before removing any temporary support.



Style I with single 7-1/2° wedge and connector plates for main bed angle from 15° to 23° and nose-over bed at 7-1/2° to 11-1/2°.

Style III nose-overs consist of a 12" long slider conveyor bed with a nose-over wedge assembly attached to each end. These three components should be preassembled.

CAUTION
Ensure that the double nose-over section is properly supported before removing any tem-porary support.
Horizontal Take-up

HORIZONTAL TAKE-UP

Horizontal take-ups are used with end drive assemblies to provide belt take-up capability for conveyors over approximately 15' in length where end pulley travel alone is insufficient to tension the belt properly.

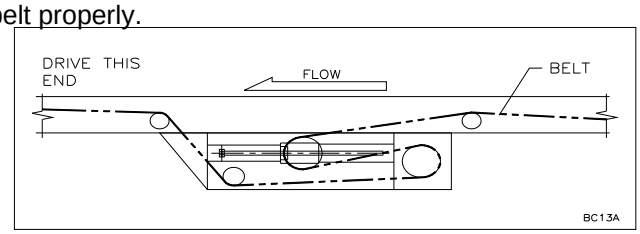


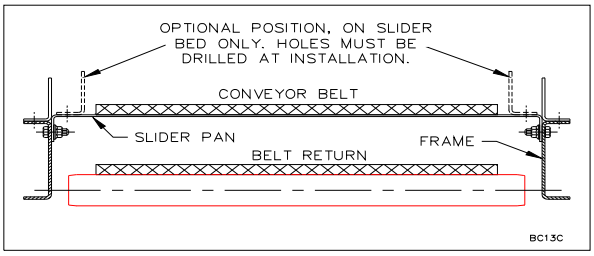
Illustration shows orientation and belt path.

Any conveyor with an end drive and powerfeeder/powertail must have a horizontal take-up. Horizontal take-ups should be mounted near the drive.

ANGLE GUARD RAIL

Angle guard rails are bolted to the frame top flange. They are mounted with the horizontal leg "out" (as shown below) for minimum clearance or with leg "in" for maximum product clearance.

For minimum clearance, the horizontal leg of the angle is bolted on top of the channel with the vertical leg in line with the channel web. For maximum clearance, the angle is turned around and attached with truss head bolts. The horizontal leg may be placed under the top flange of the frame for additional product to bolt head clearance.



Angle guard rail is offered in standard heights of 2", 4" 6"

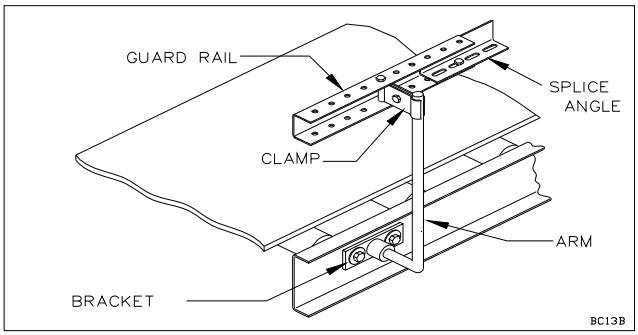
Mounting holes in the frame and angle guard are oversized to allow some horizontal movement of the angle. Care must be taken at the joints to place the vertical leg of the upstream angle inside the downstream angle to avoid a product catch point. Start with an offset at the bottom, then check the top edge. The top edge may need to be bent to maintain this offset. This may be more difficult on the 6" high angle, where it may be necessary to place a tack weld near the top edge. On the outside, grind and paint.

Pop-out rollers, 1-3/8" diameter, are located at the ends of the belt conveyor. The angle guard rail must not hold these rollers in place. A gap must be left over these rollers or the guard rail must be notched on the bottom to allow the roller to freely lift out preventing a pinch point.

ADJUSTABLE CHANNEL GUARD RAIL

The adjustable channel guard rail components are shipped as loose parts. The major parts include:

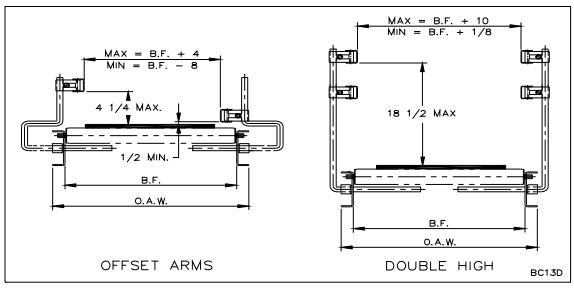
- Guard Rail
- Arm
- Clamp
- Bracket
- Splice



Bolt the brackets to the frame and insert the horizontal leg of the arms into the brackets. Attach the clamps to the arms at the proper height and attach the guard rail to the clamps. Set the width between the guard rails and tighten the screws in the brackets. Splice angles are used when joining guard rails together.

Determine the bracket/arm location relative to the end of each bed. Normally the span between arms, over the bed joint and splice, is less than the span in the middle of the bed. The bracket and arms should be 18" and 30" from the bed joint.

Other Arrangements:

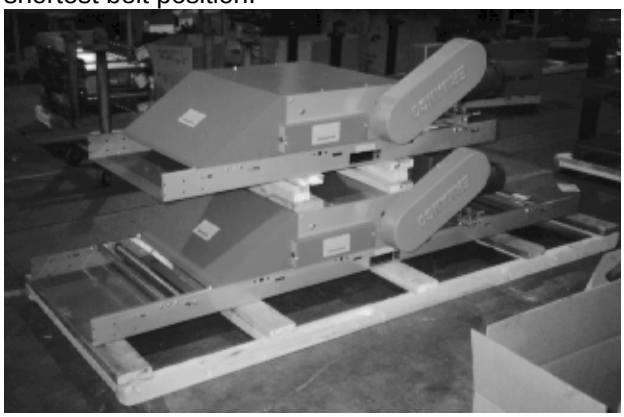


On some overhead applications, angle guard rail is combined with double high adjustable channel. The angle, bolted to the top of the frame, guides the product while the channels set slightly out from the angle serve as tip guards for taller product.

BELT INSTALLATION

PRE-INSTALLATION

The conveyor should be completely installed less belt. This means that the conveyor should be in final position with the rollers installed in belt-on-roller beds. . To facilitate belt installation, do not install any bottom pans and remove take-up guards from drives. Start with all take-up pulleys back toward the shortest belt position.



Center drives ready for shipment. Bottom guards and take-up covers are mounted at the factory for their protection and must be removed before belt installation.

At this time check the elevation at both ends of the conveyor. The bed must be level from one side to the other. Incline or decline beds should not exceed the angle shown on the layout.

It is important to make sure that your belt-on-roller beds are square using corner to corner measurements.

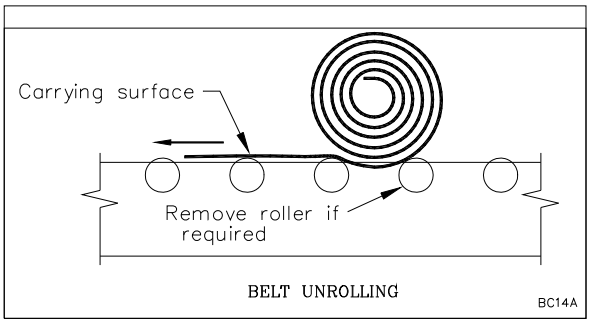
All pulley assemblies and rollers must be checked to make sure they are square to the frame. Clean the pulleys and rollers to prevent contamination of belting from grease and oil.

Before installation of belt, it should be relaxed (unrolled) for a few hours on the conveyor. The relative position of the top and bottom covers or surfaces of the belt should be considered when positioning the roll for threading.

Belts as shipped from MHS Conveyors are cut to length with lacing installed. Belts are coiled with the carrying surface inside. The proper carrying surface will be up by placing the belt coil on the carrier rollers or slider bed and unrolling the belt.

Belts should be stored on edge on a pallet. Never leave a belt where it may absorb moisture. Remove any tight shipping banding immediately upon arrival.

Once the roll of belting has been brought to the point of installation on a slider bed, it may be mounted on a shaft for



In some cases (where head room does not permit maneuvering a roll) the belt may have to be pulled off the roll and layed out in flat loops (reefed). Great care should be exercised to see that the loops have large bends to avoid kinking or placing undue strain on the belt. Weight should never be placed on the belt when it is in this position.

Set screws in all pulley support bearings must be checked for tightness.

Double decked inclined belt conveyors ready for belt installation.

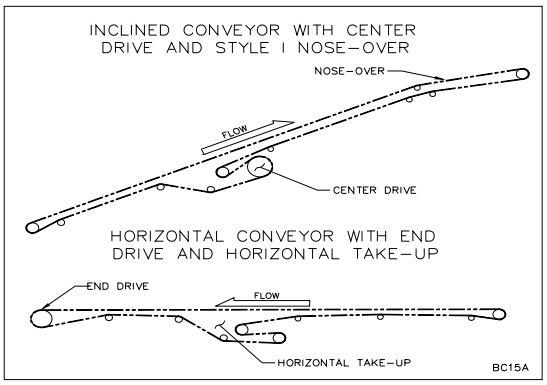
BELT THREADING

Threading the belt should be undertaken only after the conveyor has been properly aligned to avoid the possibility of an out-of-line bed causing erratic tracking and belt damage.

Adjust all take-up pulleys and end pulleys to the minimum position for maximum available belt slack before joining the belt ends.

Start at one end of the conveyor and thread the belt underneath the end pulley, over the snubber and return rollers, and around the drive and take-up pulleys as shown in the illustrations. The number of return rollers will vary depending on the length of the conveyor.

Pull the belt up and over the end pulley and bring the ends together on top of the bed as near to an end idler/take-up pulley as possible.



Normal Belt Paths

Remove the lacing pin from one end of the belt. Join the ends of the belt together so that the sides of the belt are even. Mesh the loops on one end of the belt with the loops on the other end and install the lacing pin. If the ends will not readily join together, use a belt tensioning device which distributes the tensile load over the width of the belt. "Come-alongs" which do not evenly distribute the load can damage the belt and result in poor tracking characteristics.

After the belt has been laced, center it throughout the conveyor length before the pulleys are tightened. Re-squaring pulleys may be necessary after tightening.

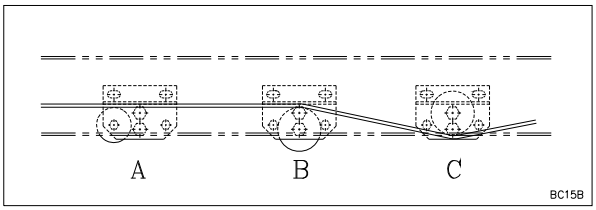
Pre-tension the belt prior to starting the conveyor for tracking. When tightening the belt, remember that the belt only has to be tight enough to drive the product. Any excess tightening will shorten the life of the belt and components. A feel for tensioning is developed by experience. If in doubt, leave belt on the loose side and tighten more if required.

RETURN BELT ROLLERS

Return belt idler rollers are 2" in diameter and carry the return belt. They are mounted in brackets that simply bolt to the bottom of the conveyor section. Be sure that the roller is perpendicular to the frame.

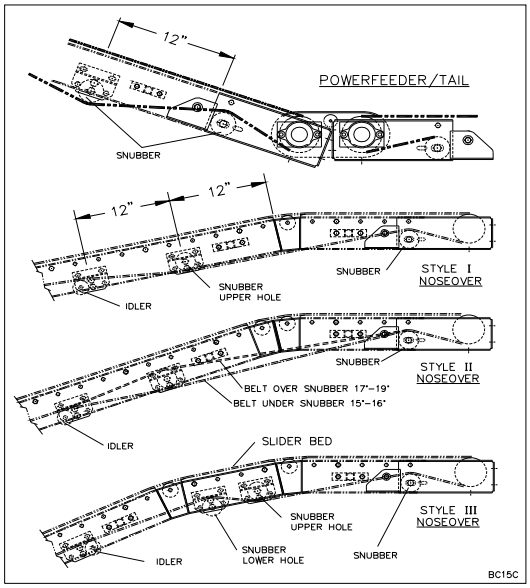
Snubber rollers are used when the "break" of the belt is over 10°, such as at a vertical bend. The resultant forces of the belt require a higher capacity roller. Be sure that the roller is perpendicular to the frame. When the belt is properly tracked, all bolts must be securely tightened.

Three applications of belt return rollers and brackets:



A. Belt return idler roller 2" dia. x 7/16" hex axle carrying belt with less than 10° snub angle.
B. Belt return snubber roller 2-1/2" dia. x 11/16" hex axle in lower hole to carry belt on top side.
C. Belt return snubber roller 2-1/2" dia. x 11/16" hex axle in upper hole to snub belt on underside.

Note: Always use the bracket hole position which results in adequate belt clearance at least belt snub angle. When snubber rollers are used with end pulleys, including powerfeeders or powertails, the belt exits in line with the frame crossmember. The belt must then be snubbed down to a lower height for clearance.



BELT TRACKING

GENERAL

All pulleys and rollers must be squared to the conveyor frame; the belt should then track with only minor adjustments required. This will result in a conveyor in which the belt is not tracking perfectly but the belt can be operated without belt damage long enough to accomplish the tracking procedure.

Conveyor frames must be true and level. Incorrect belt tracking is easy to detect because the belt shows a tendency to creep or "climb" toward one side of the conveyor. In extreme cases, the belt may even be rubbing against the side frame of the conveyor.

Belt adjustments usually fall into two categories:

- Tension adjustment (in which the overall belt tension is checked and adjusted).
- Tracking adjustments (which are made to ensure the correct position of the belt over its support and drive pulleys).

If the belt is out of adjustment in either category, the result can be excessive belt wear. Excessive belt tension can also cause premature wear to pulley bearings, pulley lagging and belt lacing.

When tightening the belt, remember the belt only has to be tight enough to drive the product. Any excess tightening will shorten the belt and components life.

Belt tension can be checked by observing the way it hangs between the return idler rollers on the underside of the conveyor. Assuming a 36" wide belt with return rollers on 10' centers, the belt should have about 1/2" of slack in the center, measured from a straight line drawn between the carrying surfaces of the return rollers. Narrower, lighter belts and belts supported closer than every 10' will, of course, show less slack between the rollers. Belt tension adjustments are usually made at the center drive or end pulley assembly. Two adjusting rods, one on each side of the center drive package, are turned to tighten the belt. Make the required adjustments in small increments. Be sure that each side is adjusted an equal amount. When adjustment is satisfactory, tighten all locking nuts.

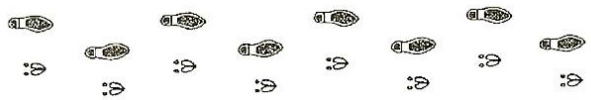
It is recommended, when possible, that the belt be installed, centered and tensioned for a period of time before starting the conveyor. This allows the belting to take a set to the conveyor and can save tracking time.

After the belt has the correct tension, watch it run for a few minutes to make sure that it is tracking properly.

WARNING

Belt tracking must be checked while the conveyor is running. All adjustments must be made with the conveyor stopped. Make sure all personnel are clear before restarting the conveyor. Only TRAINED and QUALIFIED personnel should perform this function. They must be instructed to remain alert for any unsafe condition and use extreme care when tracking the belt. REPLACE ALL GUARDS.

TRACKING PROCEDURES



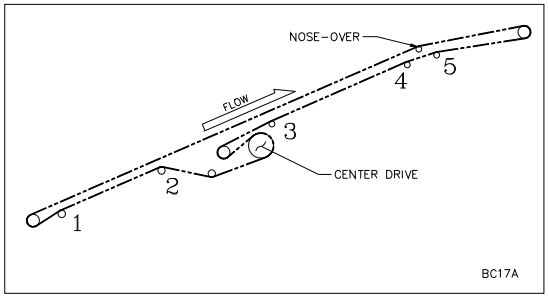
When tracking a conveyor belt, remember: **"The belt moves toward that end of a roller or pulley it contacts first."**

If the conveyor appears to be true and all rollers appear to be perpendicular to the conveyor center line and severe belt tracking problems persist, shut down the system. Establish a centerline on the belt. Then draw a line perpendicular to the belt centerline extending to the edges of the belt. Check and adjust each individual pulley, snubber roller, etc., parallel with the perpendicular line. Once this is accomplished, the belt should track well enough to accomplish the tracking procedure.

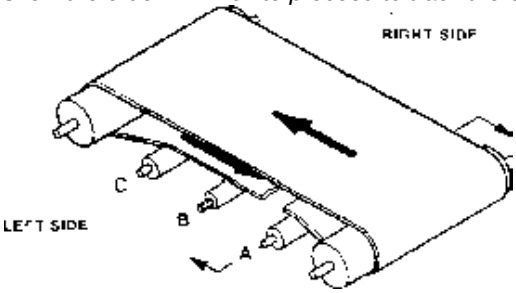
Occasionally, there may be a serious adjustment problem which will throw the belt off track far enough to cause belt damage. It may be necessary to shut the conveyor down, make any adjustments indicated, and then restring and reposition the belt before start-up. In any case, it is extremely important to avoid belt damage.

RULES TO REMEMBER

- Return rollers and snubber rollers are the primary means of tracking the belts. Slots are provided in the mounting brackets to allow tracking adjustments.
- If the belt is not centered on a return belt idler roller, go to the preceding idler roller, loosen the idler bracket bolts so that the bracket can be moved by tapping it but will not move from the drag of the belt alone. Adjustment of rollers is merely steering the belt. Thinking of riding a bicycle will help in determining the direction of adjustment required.
- Start at the end of the belt return run and work toward the beginning moving from roller to roller in the opposite direction to return belt travel. Cock the roller in the same direction you want the belt to go.
- The rollers used at vertical bends on incline/decline conveyors can have a dramatic effect on belt tracking due to the pressure exerted against these rollers. You must always be sure that the conveyor rollers at vertical bends are level and square.
- End pulley adjustment is used only as a last resort. Never use the drive pulley or drive take-up pulley for belt tracking.
- Make only small adjustments and permit the belt to run for several revolutions after each adjustment is made to determine if additional adjustment is required. If the belt has overcorrected, it should be restored by moving back the same roller and not by adjusting additional rollers. Do not be misled by a small amount of belt wander during each travel cycle.



The adjustment rollers in the illustration are numbered to show the order in which to proceed to track the belt.



This simplified conveyor bed shows the belt tracking to the right. Skew return roller (A) so that the left side of the roller contacts the belt first. If more adjustment is necessary, proceed to roller (B), then roller (C).

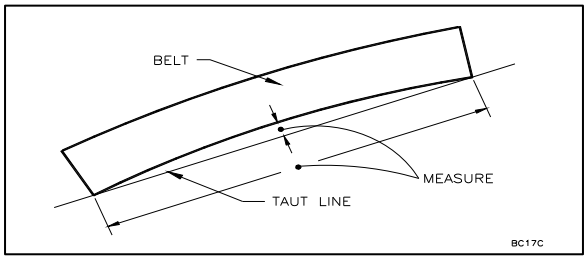
- Double-check all fasteners for tightness. After tracking is complete, run the conveyor fully loaded.

In rare cases, you may receive a belt with a built-in camber. Excessive camber will cause tracking problems regardless of corrective actions taken. Check for excessive camber in the following manner.

- Roll the belt out on a flat surface.
- Grasping one end, drag the belt in a straight line for approximately 10'. Camber will cause the belt to assume a curved shape.
- Draw a taut line from one end of the belt to the other end on the inside of the curve.
- Measure the distance from the taut line to the belt at the center point of the line.
- Compute camber as follows:

$$\% \text{ of camber} = \frac{\text{Distance from line to belt (in.)}}{\text{Length of line (in.)}} \times 100$$

- If the percent camber exceeds one-half of 1% (0.5%), replace the belt.



This incline belt-on-roller is tracking slightly to the right. A small adjustment to the bottom snubber should be all that is required to complete the tracking.

BOTTOM GUARDS

Bottom guards must be installed after the belt is tracked. Bottom guards should always be used when the conveyor height is between approximately 3'-0" and 7'-0" to protect personnel from nip points on return rollers and snubbers. Bottom guards are typically 2'-0" to 10'-0" lengths on 1'-0" increments, for each width.

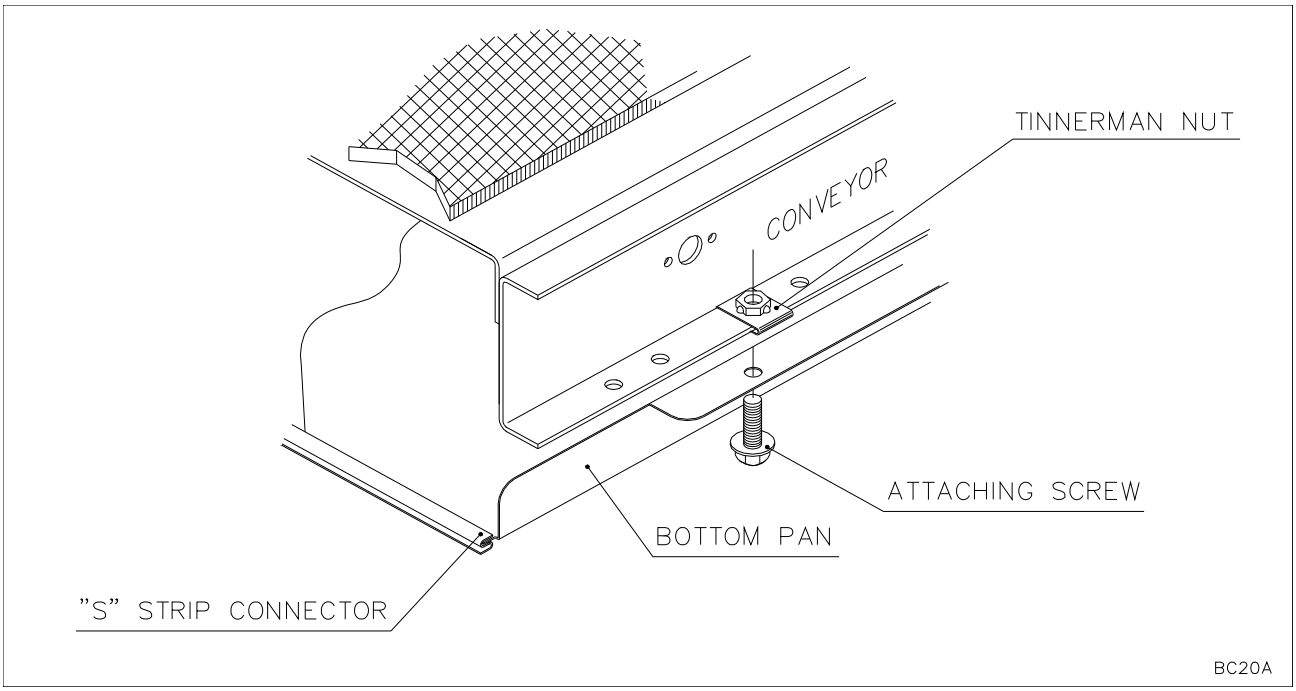
Install Tinnerman nuts (provided in the loose parts kit) on the bottom flange of the conveyor bed at the holes provided with the nut to the inside of the flange.

Place the first bottom guard against the bottom of the conveyor bed, align the holes in the guard with the holes in the bed and install the attaching screws.

Install an S-strip on the end of the guard. Slip the end of the next guard into the S-strip. Align the holes and install the attaching screws.

The bottom guard is "hat" shaped to clear the belt return support rollers and belt. Each corner of the bottom guard has the flange cut back to clear the support. Certain component arrangements may require length modifications at the installation site. Bottom guards are formed from 22 ga. requiring large sheet metal shears or fine teeth power saw to modify the length to fit.

WARNING
Sharp edges on bottom guards can cause severe lacerations during handling and installation. Wear protective gloves and handle bottom guards with extreme caution.



BELT REPLACEMENT

Pre-cut and laced replacement belt or bulk belting may be ordered through your Distributor. If bulk belting is used, the following procedures will help you properly size and lace the belt for your conveyor.

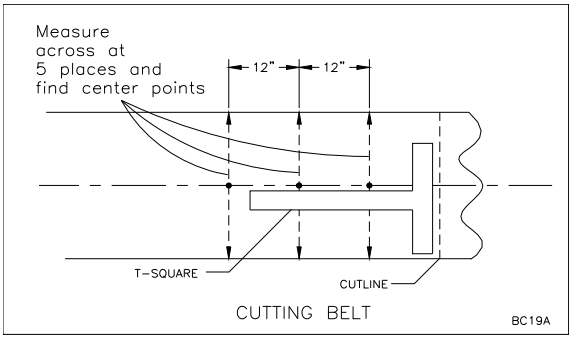
MEASURING BELT LENGTH

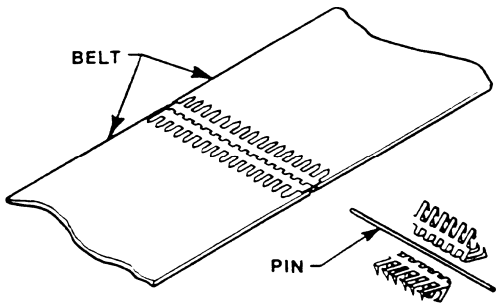
The most accurate method of measuring belt length is to adjust the take-ups within 1" of the minimum position and thread a tape measure or rope onto the conveyor following the belt path. The extra 1" take-up will allow enough slack in the belt to join the ends. If this method is impractical, ask your Distributor. He has the data to calculate the proper length.

SQUARING AND CUTTING THE BELT

Accurate squaring of the belt ends prior to lacing is essential to correct belt tracking and helps distribute stress evenly throughout the joint. Belt ends are not necessarily square when they are shipped. Further, the width-wise fabric weaving is not necessarily square to the belt's longitudinal axis. These cannot be used as guides to cut the belt.

Using a pencil or chalk, mark the center point of the belt width at 1' intervals for a distance of 5' starting at one end of the belt. Using a straight edge and pencil or chalk, mark an average centerline through the center points. Using a carpenter square or "Tee" square, draw a cut line across the width of the belt, perpendicular to the centerline (not the edge of the belt).





1. Lay the belting on a flat surface for cutting.

2. At the end perpendicular to the length of the belt, measure across the width and mark the exact center of the width.

3. Move back about 3 to 4 feet from the end of the belt and repeat Step 2 and connect the two marks to determine the centerline of the belt.

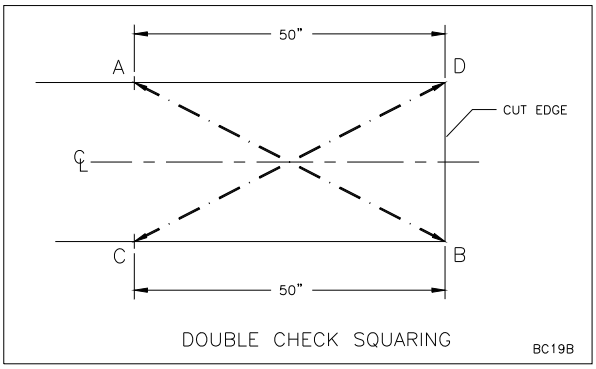
4. Using the centerline just found and a framing square, score a line (do not attempt to cut completely through belting) across the width of the belt and perpendicular to the centerline.

5. Place the scored end of the belt on a block of wood slightly longer than the belt width. The elevated position will cause the cut in the belt to "open up" which reduces the drag on the knife when cutting.

6. Progressively draw the knife through the cut until the belt is cut completely through.

7. Miter the corners of the belt approximately 1/4".

It is always a good idea to double-check the accuracy of the squared and cut end. Measure 50" along each edge from the end of the belt, then utilizing a tape measure, check the two diagonals. They should be equal and should intersect on the belt centerline.

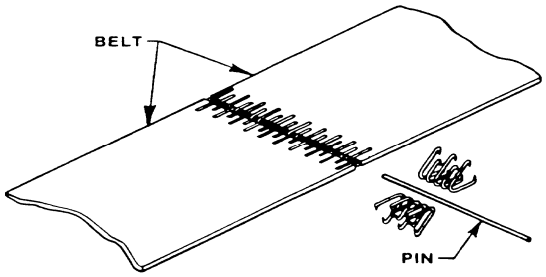


BELT LACING

A belt is only as strong as its splice. The splice strength depends a lot on how the splice was installed. The most common method of joining belt ends is with a metal fastener such as "Clipper" lacing or "Alligator" type metal hinge. Consult the manufacturer's catalogs to determine the proper size and method of application.

"Alligator" type hinge lacing is installed with a hammer. Center the lacing across the belt, holding the lacing against the gauge pin over a block of wood. Using a hammer, first drive the teeth at each edge to hold the lacing square. Hold the lacing firmly against the gauge and drive the remaining teeth half way into the belt. Now hammer all teeth flush with the top of belt without hitting the lacing bar. To finish, turn the belt over on a metal block and clinch the protruding teeth over.

The "Clipper" type wire lacing consists of a row of wires machine clamped to the belt end. The ends are brought together and secured with a lacing pin.



NOTE:
On rough top belting, the rough top must be removed from the area where the lacing is to be installed. This is most easily accomplished using a skiving knife, available from the lacing manufacturer.

The belting can be pulled onto the conveyor by either attaching it to one end of the old belt which has been cut, threading by hand, or first threading a rope or cable around the idlers and pulleys and subsequently connecting the rope or cable to the new belt by means of a clamp which will evenly distribute the tensile load over the width of the belt. "Come-alongs" which do not evenly distribute the tensile load over the width of the belt can cause damage to the new belt which can result in poor tracking characteristics.

The take-up should be adjusted so that the belt is tight enough NOT TO SLIP on the drive pulley, but is NOT TOO TIGHT. Excessively tight belts will cause premature stretch which shortens belt life plus the possibility that bearings or shafts may fail from excessive tension.

Reference Belt Tracking procedure.

CAUTION
Improper tracking and belt damage may occur if belt lacing is improperly installed. Follow belt manufacturer's instructions carefully.

CLIPPER LACING SELECTION CHART

Hook Size	Belt Thickness	Minimum Pulley Dia.	Recommended Connecting Pin		Recommended Lacer	
	Inches	Inches	Size	Diameter	Manual	Power
#25	up to 1/16"	15/16"	#25	.054 to .065	#925 LW#95 W/ #25 Retainer	Electric Hydraulic 12", 25", W/ #25 Hook Retainer
#25 Long Point	1/16 "- 1/8"	15/16"	#25	.054 to .065		
#25 Long Leg	1/16" - 1/8"	2"	#25	.054 to .065		
#1-D	1/16" - 3/32"	2"	#13	.054 to .093	#12 Lace W/ #1 Hook Retainer LW #95 W/ #1 Retainer	Electric Hydraulic 12", 25", W/ #1 Hook Retainer
#1-A	3/32" - 1/8"	2"	#13	.054 to .093		
#1	1/8" - 3/32"	2"	#13	.054 to .093		
#1 Long Leg	1/16" - 5/32"	3"	#13	.054 to .093		
#2 Short Point	1/8" - 5/32"	3"	#13	0.093	LW #95 and #12 Lacer With Chain Drive Attachment	Electric Hydraulic 12", 25"
#2	5/32" - 3/16"	3"	#13	0.093		
#3	3/16" - 7/32"	3"	#13	0.093		
#3-4-1/2" - 6	7/32" - 1/4"	3-1/2"	#13	0.093		
#4	5/32" - 3/16"	4"	#12	0.109		
#4-2	5/32" - 3/16"	4"	#13	0.093		
#4-1/2	1/4" - 9/32"	4"	#11	0.125		
#5	9/32" - 5/16"	5"	#10	0.141		
#6	5/16" - 3/8"	6"	#9	0.156		
#7	3/8" - 13/32"	6"	#8	0.172		

ELECTRICAL

WARNING
All electrical controls must be installed, wired and connected by a licensed electrician only.

All motor controls and wiring must conform to the National Electrical Code as published by the National Fire Protection Association and approved by the American National Standards Institute, Inc. In addition, since specific electrical codes vary from one area to another, be sure to check with the proper authorities before starting the electrical wiring.

The electrical voltage of the motor will be stamped on the metal name plate. This voltage should be checked to see that it matches your available voltage. Many motors, both single phase and three phase, are dual voltage. Consult the wiring diagram on the motor for the proper connections. If the motor on a single direction conveyor runs the wrong direction, the leads must be switched to reverse rotation.

WARNING
Do not connect the motor to any other voltage than that on its label. Personnel may experience electrical shock; the motor may malfunction.

Consult the wiring diagram on the inside cover of the starter and pushbutton for the proper electrical connections.

Three phase drives require transformers to reduce the pushbutton and control circuit to 115 volt. If primary voltage is changed, the transformer must be changed according to the wiring diagram found on the transformer.

NOTE:
All controls equipment is covered by the original manufacturer's equipment warranty.

NEMA type enclosure rating designations are as follows.

NEMA 1 - Indoor use, provides protection against contact with internal components. Suitable for use in warehouse and distribution environments.

Gasketed NEMA 1 - Same use as NEMA 1, but with additional protection against dust and dirt.

NEMA 3 - Outdoor use, designed to keep out rain and dust.

NEMA 4 - Indoor and outdoor use, designed to keep out rain and dust.

NEMA 12 - Indoor use, provides protection against dust, dirt and oil seepage and dripping of noncorrosive liquids. Suitable for use in industrial environments.

NEMA 13 - Indoor use, provides protection against dust, dirt, sprayed oil and noncorrosive liquids.

CONVEYOR CONTROLS – SAFETY GUIDELINES

The following are basic conveyor control safety guidelines for common controls equipment.

WARNING
All safety devices, including wiring of electrical safety devices, shall be arranged to operate in a "fail safe" manner. That is, if power failure or failure of the device itself would occur, a hazardous condition must not result.

START-UP WARNING HORN - Ideally, all conveyors should be within sight of the conveyor start pushbutton. This allows the operator to verify that no one is on the conveyor or would be in danger if the conveyor were to start up.

If all conveyor being started cannot be seen from the start pushbutton location, then an audible warning device is required. It could be a horn, buzzer, or bell unique to that conveyor for that location. It must be loud enough to be heard at any point on the conveyor being started. It should sound for a duration of five seconds after the start pushbutton is pushed, prior to the conveyor starting. Any auxiliary equipment such as vertical lifts, turntables, etc., must be included in the warning circuitry.

All conveyor sections that stop and restart automatically should be marked with appropriate signs or labels. If it is not easy to distinguish the difference between a fully stopped conveyor system and a momentarily stopped conveyor section, then it is advisable to add a warning horn.

START PUSHBUTTONS - Start pushbuttons should be the flush type or guarded such that inadvertently leaning against them will not actuate them. They should be provided with a legend plate clearly defining which conveyors will be started.

STOP PUSHBUTTONS - Stop pushbuttons should be the extended type such that any contact with it is sufficient to stop the conveyor. They should have a legend plate defining which conveyors will be stopped.

OPERATOR CONTROLS - Additional operator controls should be designed into the system with the same guidelines that go into start and stop pushbuttons, depending upon their function. Devices which are repeated on multiple control stations, such as emergency stops, should be located at the same relative location on each station. All operator controls shall be clearly marked or labeled to indicate the function controlled.

EMERGENCY STOPS - All locations where an operator must work directly at the conveyor should be protected by an emergency stop. Operators should not have to leave their position to actuate the emergency stop.

Conveyor in areas of high pedestrian traffic should also be protected by emergency stop devices.

For protection of equipment or product, emergency stops may be located throughout a system such that it is possible to shut down the system. The location will depend on likely observation points and areas with special devices and interfaces between equipment.

Emergency stops can be of the pushbutton or cable operated switch type. The pushbutton type should be a red, mushroom head maintained, pushbutton which requires resetting after it is actuated. Cable operated switches should trip by pulling the cable and require resetting at the switch.

An emergency stop should normally stop all conveyors in the system. Very large systems may involve dividing a system into zones of control based on proximity of personnel, safety hazards, walls, obstacles, etc.

Actuating an emergency stop must drop-out the start circuit, requiring restarting the system using the start pushbuttons provided.

WARNING

Before restarting a conveyor which has been stopped because of an emergency, an inspection of the conveyor shall be made and the cause of the stoppage determined. The starting device shall be locked out before any attempt is made to correct the cause of stoppage.

CONTROLS LOGIC - Solid state controls logic devices, such as programmable controllers are used extensively for conveyor control. They are very reliable, but a hardware failure or software bug could cause an output to function erratically. For this reason, start circuits, warning horn circuits, and emergency stops should usually be configured using conventional relay logic.

SAFETY SWITCHES - All conveyor control cabinets and motors should be provided with safety (or disconnect) switches. These switches must have provisions for padlocking. As required for maintenance, equipment should be locked in the off position.

SPECIAL DEVICES - Special devices and equipment such as vertical lifts, turntables, high speed conveyors, etc. all have unique design and safety requirements. These should be looked at in each case to determine what the requirements might be.

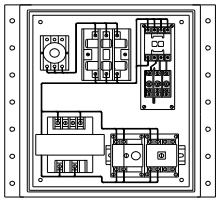
MHS Conveyors CONTROL MODULES

SAVE COST ON CONVEYOR CONTROLS AND WIRING USING COMPACT CONTROL MODULES

Smaller systems requiring only basic controls located at or near each conveyor drive can utilize MHS Conveyors control modules. The MHS Conveyors Control Module (ECM) and accessory components fulfill the need for basic control devices in a compact, standard package. This provides substantial savings over individual components.

ECM-2
Includes pre-wired:
- lockable 30 AMP disconnect
- 3 pole fuseblock
- 3 phase starter

Provides additional space to mount: Transformer, relay and timer, on a DIN rail provided.



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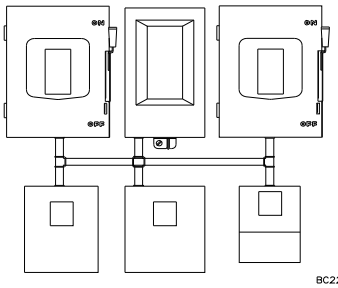


REPLACES THIS

Separately enclosed, mounted and field wired:
- fused disconnect switch
- transformer
- relay
- timer

Controls engineering quotation is available upon request. Please contact Customer Support .

COMMISSIONING OF EQUIPMENT

Commissioning of the equipment can best be defined as being the final adjustments and test of the installed equipment required for its proper operation. The need for commissioning is inherent, since the individual components of equipment are brought together at the installation site to operate as a system.

Mechanical and electrical commissioning is most often carried out simultaneously. Commissioning must simulate the actual operation of the system as close as possible to demonstrate the ability to perform reliably at the specified rate in the prescribed operational sequence.

During the Commissioning Phase, it is necessary to load the equipment with product to be conveyed, which provides the means of detecting those areas requiring adjustment. Personnel will be required to support operational functions and may serve as part of operator training and familiarity with the system. Listed below are some of the final adjustments commonly associated with the Commissioning Phase.

COMMISSIONING OF MECHANICAL INSTALLATION

- Check belt tracking
- Check belt direction
- Check guard rail clearance
- Eliminate catch points
- Check conveyor elevations
- All pop-out rollers functional
- Powerfeeders/tails in correct relationship to flow and speed
- Belts do not slip under full load
- All bolts and set screws tight
- Check belt clearance to all structural members
- Snubber and idler rollers in proper locations on belt return side
- Check product clearances
- Simulate all operational functions with actual products.
- All necessary lubrication performed
- All chains properly tensioned
- All sprockets aligned
- All appropriate guards in place with proper clearance
- All OSHA required guards in place on walkways, catwalks, ladder-ways, floor openings, etc.
- All labels and warning signs in proper place
- Any spare parts shipped with conveyors turned over to appropriate personnel

COMMISSIONING OF ELECTRICAL INSTALLATION

- Adjust timing functions
- Adjust limit switches
- Adjust photo controls * (see below)
- Verify circuitry
- Verify proper line voltage
- Verify function of all safety shut-off devices
- Verify sequence of operation
- Verify each motor has lockable disconnect switch
- Verify all motor brakes controlled in a fail safe manner in the event of power failure
- Check audible system start-up warning signals
- Verify all national, state, and local codes are met

***** Adjust photoeyes as follows:

1. Adjust for the worst case, usually smallest item, by loosening photoeye mounting nut and aligning while making sure photoeye has unobstructed view of reflector.

2. Move the target in and out of the field of detection to ensure that the photoeye energizes and de-energizes.

3. Re-adjust as required and tighten mounting nut.

After commissioning conduct operator training on all safety and operational aspects of the system. This must include system start-up, location of emergency stops, and familiarity with all operator controls.

MAINTENANCE

GENERAL

The key to ensuring the expected return on investment is to protect against premature failure with a well planned program of preventive maintenance.

Preventive maintenance programs examine what may fail and then formulate action plans which will prevent failure or downtime. This kind of maintenance includes lubrication and system replacement or repair of parts before failure but after expected life has been attained.

Preventive maintenance will help save you expensive downtime and wasted energy. It will increase the life of components. Along with preventive maintenance should be a record-keeping system. You must know what problems you have had in the past and when different components were serviced.

A visual and hearing inspection should be taken every day. By looking you can see if a chain is loose, oil leaking, sprocket worn, or by listening you can hear a bad bearing, noisy chain or any other noise that might indicate a problem. When something major goes wrong with some component, a note should be made to see if a pattern to the problem occurs.

All personnel working in close proximity to the conveyor should inform maintenance or their supervisor of any unusual noise.

WARNING

Do not perform maintenance on the conveyor until the start-up controls are locked out and cannot be turned on by any person other than the one performing the maintenance. If more than one member of a crew is working on the conveyor, EACH CREW MEMBER SHOULD HAVE A LOCK ON THE POWER LOCK OUT. The air pressure should be turned off to the work area.

Make sure personnel are clear of all conveyor equipment before restarting the system.

MOTOR AND GEARCASE

The drive unit should be checked monthly. Check the motor gearcase for leaking seals. If reducer is other than Reliance Relialube, check the gearcase for proper oil level and add the approved oil for your particular unit. Check the breather (if used) on the gearcase.

With Reliance Relialube reducers, change oil only when performing maintenance that requires gearbox disassembly using Mobil SHC-634. When replacing the motor, relubricate using Fel-Pro C5A Anti-Seize or Mobiltemp 78 grease in the reducer bore and on the motor shaft.

CHAINS AND SPROCKETS

Chains and sprockets should be checked monthly. Look for correct alignment. In time, set screws may loosen and allow the sprockets to become misaligned. Use a straight edge held parallel to both sprockets to check alignment. Shift one of the sprockets if the straight edge shows it is necessary.

WARNING

REPLACE ANY CHAIN GUARD REMOVED in order to adjust, check or lubricate chain and sprockets. Guards are furnished and installed to prevent personal injury during operation; maintain them on the unit.

Keep the chain clean and lubricated. Chains may be cleaned by wiping with a rag soaked in nonflammable cleaning solvent.

Lubrication of roller chains is essential to effectively minimize metal-to-metal bearing contact of pin-bushing joints of the chain. Oil should be applied to outside plate and inside plate edges, since access to pin-bushing area is possible only through clearances between the outside plates and the inside plates. Oil applied on the center line of the rollers cannot reach pin-bushing joints.

A good grade of non-detergent petroleum base oil is recommended. Heavy oils and greases are generally too stiff to enter and fill the chain joints. The following table indicates the proper lubricant viscosity for various surrounding temperatures.

Temperature' Degrees F	Recommended Lubricant
20 to 40	SAE 20
40 to 100	SAE 30
100 to 120	SAE 40
120 to 140	SAE 50

WARNING

Do not use gasoline or kerosene for cleaning. Use nonflammable solvent only.

During the monthly check, look for damaged or worn links in the chain and wear spots on sprockets. If either the chain or sprockets are worn, then both of them should be replaced and the cause of wear corrected. This will help prolong the life of the new item.

If chains have stretched so that above adjustments cannot be made, remove a link and reconnect. If removal of one link makes the chain too short, add offset half link and reconnect. Chains should be tightened till there is 1/2" total movement (1/4" each way of center).

New chains should be installed under slight tension as they will elongate a small amount due to seating of pins and bushings during the first few days of operation. Chains on drives having near vertical centers should be kept reasonably tight with idler sprockets.

ROLLERS

Rollers require lubrication every six months. If the rollers have unsealed bearings, lubricate them by removing them from the bed and place one or two drops of a good grade oil in the small opening around the inner race hub. Repeat for each end of the roller. Roughness in a bearing may indicate that dirt has gotten into the ball races. To remove this dirt, immerse each end of the roller in a solvent, spinning the axle until all dirt is flushed out. Spin the axle to air dry the bearing. Then relubricate as described above. Periodically removing the rollers has an added benefit of distributing the wear on the bearing inner race by rotating the axle to a new position.

Do not allow tape, banding, shrinkwrap, etc. to build up on roller or pulleys. This can cause rollers to jam and belt mistrack. If this is a common occurrence due to the product packaging, clean up on a regular schedule.

BELTS

Belts normally need very little care. However, keeping them clean adds greatly to their effective service life. If compressed air is available, it can be used monthly to clean off the belt. If not available, a monthly "dusting" with a stiff, dry brush will remove dirt and abrasive particles which will eventually cause excessive wear should they be allowed to accumulate.

CAUTION

DO NOT USE GASOLINE, KEROSENE, NAPHTHA, BENZENE, OR CARBON TETRACHLORIDE TO CLEAN THE CONVEYOR BELTS. Should any of these substances come in contact with the belt, remove immediately by washing with detergent solution.

REGREASEABLE BEARINGS

The drive unit and powerfeeder bearings should be lubricated approximately every six months.

When lubricating bearings, grease should be pumped in slowly until slight beads form around the seal. This will indicate the correct amount of lubricant. When excessive pressure is used, the grease will force its way past the seals and will permanently damage the seal.

MOTOR CONTROL CENTERS (MCC)

Inspection (Semi-Yearly)

WARNING

Before servicing or performing any work in the motor control panel, disconnect and lockout the main incoming service. If only the panel disconnect is off, the incoming side will still be hot.

Excessive overheating is indicated by discoloration of components. Most often these symptoms are a sign of loose connections. If left uncorrected this can eventually cause arcing between components, leading to destruction of the MCC. It is normal to find the interior to the MCC quite warm when it is first opened.

The condition of contacts must be checked on all contactors, starters, and relays to ensure that they are free of dust and are not excessively pitted or burned. Contacts can operate properly even if they are as rough as sandpaper. When badly burned or worn, the contacts must be replaced.

In the course of inspecting contact condition, spring pressure should be checked. As contact surface wears down, spring pressure can be lost because of the overheating. Contact spring resiliency can usually be detected by fingertip pressure.

Check for faulty door gaskets especially when there are excessive deposits of foreign materials. Particular attention should be given to conductive deposits because they can cause flash-overs and premature component failure when allowed to collect to any great extent. Either reposition or replace defective gaskets and clean the MCC.

CAUTION

Avoid touching components until they have had time to cool. Some may still be hot.

Check all overload settings on motor starters.

Torque any loose connections. Connections are front accessible; however, Lexan shields must be removed for component accessibly. Torque the following components:

1. Mounting bolts for components torque to 32 ft/lb
2. Incoming line connections torque to 85 ft/lb
3. Incoming connections of fusible disconnects torque to 25 ft/lb

CLEANING

When cleaning a motor control center, it is best to use a vacuum cleaner rather than compressed air; it removes rather than redistributes dust and dirt. Compressed air can damage and displace relay contacts and springs.

MAINTENANCE SCHEDULE

Periodic maintenance intervals shown may vary with load, speed, hours of daily operation, ambient temperature, humidity, etc. Intervals can be established by fairly frequent maintenance at first, then lengthen the intervals as justified by observation of need based on history. The following is based on 5 days per week, 8 hours per day under normal conditions.

Daily

- Listen to everything for unusual noises.
- Visually inspect to see that conveyor sections are clear and free of debris.
- Visually check belting for build-up of foreign substance or spillage.
- Verify all pulleys and rollers are turning freely.
- Check to see that all safety guards are in place.
- Check any oil leakage.
- Check any unusual noises or vibration.
- Check for loose bolts or parts.

Weekly

- Inspect belt for proper tracking and tension.
- Inspect belt lacings for secureness.
- Inspect belt edges for shredding (indication of poor tracking or improper tension).
- Inspect bearings, gear reducers and motors for excessive noise or heat.
- Clean breather cap on gear motor (if used).
- Check operation of all electrical controls.
- Inspect motor mounting bolts.

WARNING

- Prohibit riding on conveyor by anyone.
- Think before making any adjustments. It may eliminate an injury. Remember, all moving components are potentially dangerous.
- Protect yourself from unexpected starts when working on a stopped unit by locking and tagging the control panel or disconnect switch that applied power to the unit.

NOTE:
If corrections require replacing either sprockets or chain, replace both to avoid continued damage to the new part.

Monthly

- Clean chains and sprockets and lubricate with S.A.E. 30 weight oil or equivalent. (Check chain tension and tightness of all adjusting screws.)
- Clean belt with compressed air or stiff, dry brush.
- Check drive unit for leaking seals and oil level in gearcase (if applicable).
- Check pulley lagging for signs of wear.

Semi-Yearly

- Clean belt and all surfaces of unit with detergent and water.
- Lubricate drive pulley and end pulley bearings with grease. (Caution: Do not overgrease.)
- Lubricate rollers with unsealed bearings with light oil.
- Drain and flush gearcase after each 2,500 hours of normal operation or at least every 6 months (if applicable).
- Grease motor shaft bearings.
- Inspect and clean motor control centers.

Yearly

- Inspect tightness of all nuts and bolts on units. Readjust and, if necessary, retighten.
- Check for plumb and level. Shims have been known to vibrate out from under supports in isolated incidents.
- Touch up paint that has been chipped. Unpainted surfaces will rust.

CAUTION

- Check that tools and foreign objects have not been left on or inside the conveyor.
- Check that all loosened parts have been retightened.
- Check that all guards have been installed

TROUBLESHOOTING GUIDE - BELT

	Problem Belt	Possible Cause	Remedy
1.	Belt stopped or moving slower than normal, reducer output shaft is turning properly and all electrical components are operating normally.	Chain is loose and is skipping sprocket teeth	Tension chain. Check sprocket alignment, check for worn teeth.
		Belt has separated	Replace the entire belt or cut out damaged portion and add new piece with extra lacings.
		Bearings have failed	Locate and replace the bearings
		Belt slipping on drive pulley	See #2 below
		Belt lacing pulled out	See #3 below
		Improper belt tension	Re-tension take-up pulley
		Drive sprocket loose on shaft	Re-tighten sprocket and check for shaft wear
		Belt jammed due to obstruction	Check belt path and remove any obstruction
		Belt mistracked on return side	Reference Belt Tracking procedure.
2.	Belt slipping on drive pulley	Take-up pulley not adjusted properly	Adjust take-up cam in small increments. Do not over-tighten.
		Drive pulley lagging or pulley side of belt is slippery	Replace pulley if lagging worn smooth. If slipping is caused by foreign substances in the lagging or bottom of belt, clean by scraping or wire brushing. Do not use solvents on belt or pulley lagging.
		New belt has stretched	Normal. Re-adjusted take-up.
		Seized end pulley or snubber roller bearings	Check and replace as required
		Load too heavy	Remove as required. Re-analyze needs.
		Belt threaded improperly	Check belt path per this manual
3.	Belt lacing pulling out	Tension too high	Reduce belt tension at take-up pulley
		Obstruction	Remove obstruction
		Lacing worn out	Replace lacing

TROUBLESHOOTING GUIDE - BELT

	Problem Belt	Possible Cause	Remedy
4.	Belt runs to one side	Rollers preceding and at trouble point are not square	Check alignment of pulleys and rollers. Adjust pulleys and rollers as required. See Belt Tracking section of this manual.
		Build-up of foreign material on rollers and pulleys	Clean rollers and pulleys. Do not use solvents.
		Conveyor not level	Level conveyor bed
		Bowed belt	If belt is new, load tension may straighten it. Otherwise, replace.
		Pulley bearing set screws loose allowing pulleys to walk to one side	Loosen belt and reposition the pulley centered in the frame. Retighten the set screws and center the belt on the pulley.
		Worn bearings	Check and replace.
		Belt not joined securely at lacing	Re-cut belt ends square and re-lace.
		Off center loading	Correct loading conditions.
5.	Rips at or near edge of belting	Obstruction	Remove obstruction
		Belt running against conveyor frame	See Belt Tracking section of this manual.
		Loose lacing	Check lacing for tightness and general condition. Check if belt is chamfered on corners.
6.	Conveyor belt jerks during operation	Too much slack in drive chain which is jumping the sprocket	Adjust chain tension, check for worn sprockets.
		Chain climbing the sprocket	See “Chains & Sprockets” #8
7.	Gouging of top cover	Obstruction	Locate and remove obstruction
		Damaged return idler or snubber pulley	Verify return idlers and snubber pulleys are spinning freely and have no material build-up.
8.	Severe wear on drive pulley side of belting	Belt slipping on drive pulley	See #2 above
		Frozen or sticking rollers or pulleys	Replace bad pulleys or rollers
		Slider bed damage or misalignment	Check slider bed for smoothness and alignment at joints
9.	Excessive belt stretching	Tension too great	Reduce belt tension by take-up adjustment

TROUBLESHOOTING GUIDE – MOTOR/REDUCER

	Problem - Motor/Reducer	Possible Cause	Remedy
1.	Motor will not start	No line voltage	Check emergency stops and reset. Check fuses and wiring for open circuit. Check thermal overload protection device. Check limit switches, starter and relays for faulty contacts or mechanical fault. Check voltage at source. Check control circuit voltage.
		Low line voltage	Check for low resistance short on line.
		Conveyor overloaded or jammed	Check for foreign material in chain and sprockets. Check for material between belt and pulleys. Check conveyor belt tension. Remove product overloading from conveyor and address cause. Check chain tension.
		Burned out motor	Replace motor with spare and send defective motor to authorized repair station.
		Failure of electrical component	Check photoelectric control relay, timing modules and start/stop pushbuttons.
2.	Motor running excessively hot **NOTE: Temperature up to 175º (hot to touch) is normal.**	Drag on conveyor	Inspect entire conveyor for obstruction or falling bearings.
		Lack of reducer lubricant	Check oil level in gear case. Be sure breather plug is open (if used).
		Too much lubrication	Drain off excess
		Frozen pulley or roller	Check all pulleys and bearings for free rotation. Replace if frozen or difficult to rotate.
		Wrong grade oil	Drain and refill with proper grade
		Electrical	Check wiring and circuits. Take ampere reading and compare with motor rating on name plate.
		Key ramped up on the motor shaft, causing excessive bearing load.	Remove motor to reducer mounting belts. Pull motor back and reposition key, push motor back onto reducer. Binding or excessive resistance should not be felt.
		Overloaded conveyor	Remove excess product. Address cause.
		Mis-threading belt path	Reroute belt path correctly

TROUBLESHOOTING GUIDE – MOTOR/REDUCER

	Problem - Motor/Reducer	Possible Cause	Remedy
3.	Reducer runs – drive pulley does not turn	Drive chain broken or disconnected	Replace chain or repair
		Sprockets loose. Also see “Bearings” #8, Chain & sprockets #2 and #6.	Check key and tighten set screws
4.	Reducer leaks oil	Defective oil seals on output shaft	Install new oil seals. Replace reducer with spare and send defective reducer to authorized repair facility.
		Oil level too high	Drain off excess
		Loose bearing cover bolts	Tighten as required
		Incorrect size	Check size and replace if necessary
5.	Thermal protectors kicking out	Short in motor	See “Motor Will Not Start”
		Excessive amps being pulled	Reset starter and check ampere draw. Check for conveyor overload.
6.	Starter overloads kicking out	Poor ventilation in control panel	Add vents or fan
		Electrical	Check circuits and panel. Check heater size.
7.	Repeated stalling	Excessive product loads	Check if loads or rates have increased since purchase of conveyor
		Motor wiring	Check motor wiring
		Overload on motor	Check conveyor for obstruction causing drag or bearing failure. Check for excessive product load.
8.	Slow to start	Electrical	Check circuits and panel. Take ampere reading.
9.	Excessive noise or motor hums	Lack of lubrication	Check oil level in gear case
		Damaged gears	Replace reducer
		Loose mounting	Tighten bolts
		Faulty bearing	Replace bearing
10.	Motor will run but reducer does not turn	Worn gear in reducer	Replace reducer with spare and send defective reducer to authorized repair station.
		Key between motor and reducer missing	Replace key
11.	Electrical shorts	Loose connection	Check all wire connections. Check fuses.

TROUBLESHOOTING GUIDE – CHAIN & SPROCKET

	Problem - Chain & Sprocket	Possible Cause	Remedy
1.	Excessive slack	Normal wear	Expect rapid chain growth in first two weeks of operation. Check sprocket alignment and re-tension.
2.	Sprocket loose on shaft	Loose set screws	Realign sprockets with straight edge and tighten set screws. Check for worn components.
3.	Wear on tips of sprocket teeth	Chain elongated	Replace chain and sprockets
4.	Abnormal wear on chain or sprockets	Excessive chain tension	Align sprockets and reduce tension to 1/4” chain slack each way of center
		Sprockets misaligned	Realign with straight edge across sprocket faces
		Chain not adequately lubricated	Lubricate chain with approved lubricant; wipe away excess lubricant.
		Damaged sprocket or chain	Replace damaged component. Check alignment.
		Dirty chain	Clean thoroughly and use approved lubricant

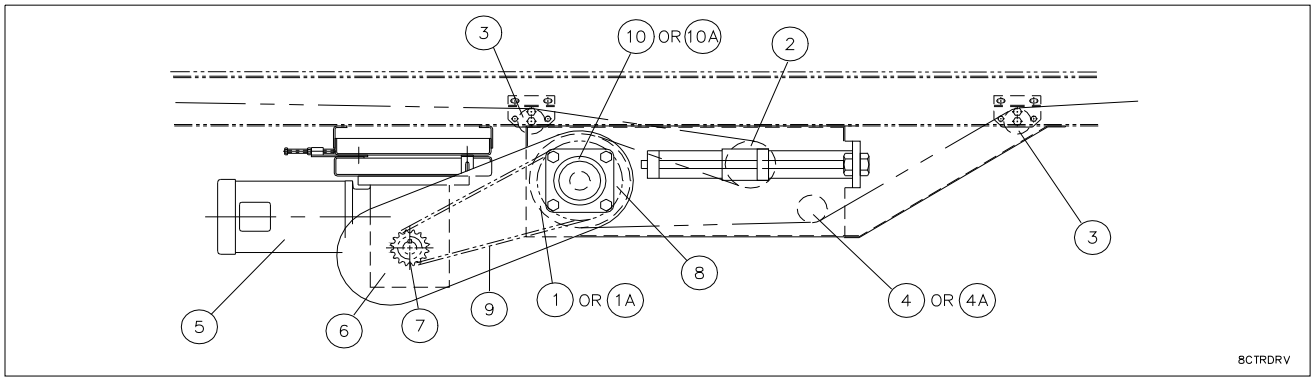
PARTS IDENTIFICATION

This section is used to identify parts that may require replacement during the life of the conveyor. Drive components are identified for standard speed and horsepower combinations.

A "Recommended Spare Parts List" is published for all conveyor orders of $10,000 or more. This spare parts list is sent to the originator of the purchase order approximately (2) weeks after the order is received. It includes part numbers, description, price and recommended quantity to be kept for maintenance.

PARTS IDENTIFICATION

8” CENTER DRIVE

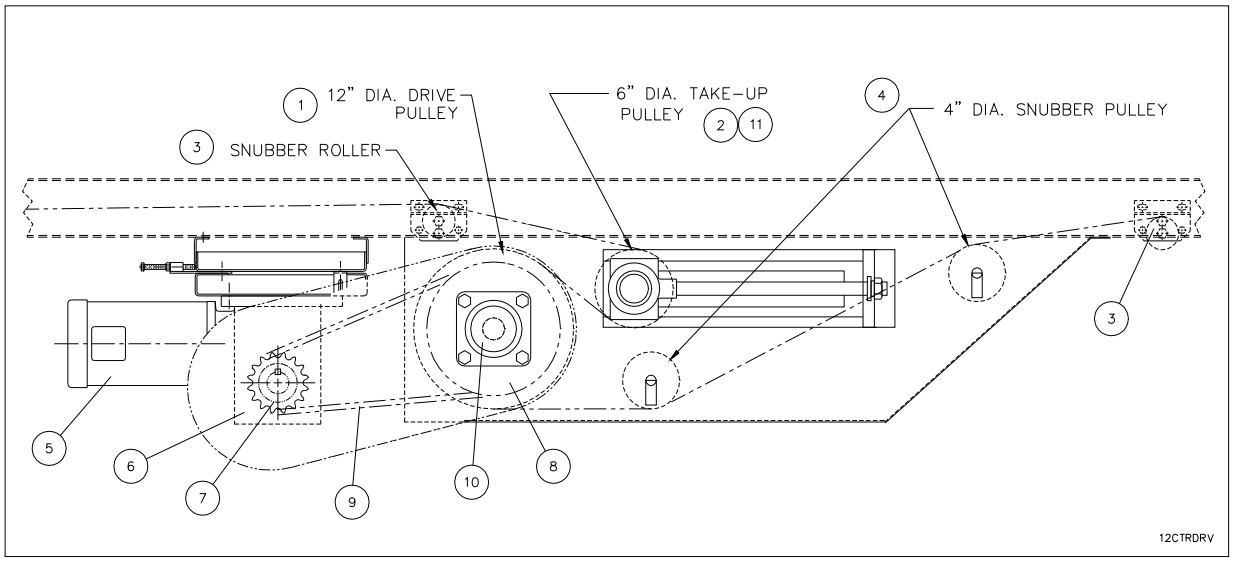


Item No.	Description	Part Number by Width					
		15-1/2	18-1/2	24-1/2	30-1/2	36-1/2	42-1/2
1 1A	8" Pulley 1-7/16" Shaft 8" Pulley 1-3/16" Shaft	25515008 25615008	25518008 25618008	25524008 25624008	25530008 25630008	25536008 25636008	25542008 25642008
2	Pulley Take-up 6" Dia.	25740215	25740218	25740224	25740230	25740236	25740242
3	Snubber 2-1/2" Dia. x 11/16" Hex	18214001	18217001	18223001	18229001	18235001	18241001
4 4A	Snubber 2-1/2" Dia. x 11/16" Hex Snubber 2-1/4" Dia. x 1/2" Rnd	25210015 25200015	25210018 25200018	25210024 25200024	25210030 25200030	25210036 25200036	25210042 25200042
5	Motor	SEE CHART BELOW					
6	Reducer						
7	Drive Sprocket						
8	Driven Sprocket						
9	Chain						
10 10A	Bearing, 4 Bolt Flg 1-7/16" Bore Bearing, 4 Bolt Flg 1-3/16" Bore	90050211 90050204					

5 H.P.	FPM	6 Reducer	7 Drive Sprocket	Bore	8 Driven Sprocket	Bore	9 Chain Size
1/2	30	56/262-60LH	H6012T	1-1/8	H6027T	1-3/16 or 1-7/16	60
3/4	30	56/262-60LH	H8010T	1-1/8	H8021T	1-3/16 or 1-7/16	80
1/2	45	56/200-40LH	H5016T	1	H5034T	1-3/16 or 1-7/16	50
3/4	45	56/262-40LH	H6013T	1-1/8	H6027T	1-3/16 or 1-7/16	60
1	45	56/262-40LH	H8010T	1-1/8	H8021T	1-3/16 or 1-7/16	80
1/2	60	56/200-30LH	H5016T	1	H5034T	1-3/16 or 1-7/16	50
3/4	60	56/200/30LH	H5016T	1	H5034T	1-3/16 or 1-7/16	50
1	60	56/262-30LH	H6013T	1-1/8	H6027T	1-3/16 or 1-7/16	60
1-1/2	60	56/350-30LH	H8010T	1-1/2	H8021T	1-3/16 or 1-7/16	80
1/2	75	56/200-30LH	H5020T	1	H5034T	1-3/16 or 1-7/16	50
3/4	75	56/200-30LH	H5020T	1	H5034T	1-3/16 or 1-7/16	50
1	75	56/262-30LH	H6016T	1-1/8	H6027T	1-3/16 or 1-7/16	60
1-1/2	75	56/350-30LH	H8012T	1-1/2	H8021T	1-3/16 or 1-7/16	80
1/2	90	56/200-30LH	H5024T	1	H5034T	1-3/16 or 1-7/16	50
3/4	90	56/200-30LH	H5024T	1	H5034T	1-3/16 or 1-7/16	50
1	90	56/262-30LH	H6019T	1-1/8	H6027T	1-3/16 or 1-7/16	60
1-1/2	90	56/350-30LH	H6019T	1-1/2	H6027T	1-3/16 or 1-7/16	60
1/2	120	56/200-20LH	H4025T	1	H4041T	1-3/16 or 1-7/16	40
3/4	120	56/200-20LH	H5021T	1	H5034T	1-3/16 or 1-7/16	50
1	120	56/200-20LH	H5021T	1	H5034T	1-3/16 or 1-7/16	50
1-1/2	120	56/262-20LH	H6017T	1-1/8	H6027T	1-3/16 or 1-7/16	60
2	120	56/262-15LH	H6013T	1-1/8	H6027T	1-3/16 or 1-7/16	60

PARTS IDENTIFICATION

12” CENTER DRIVE

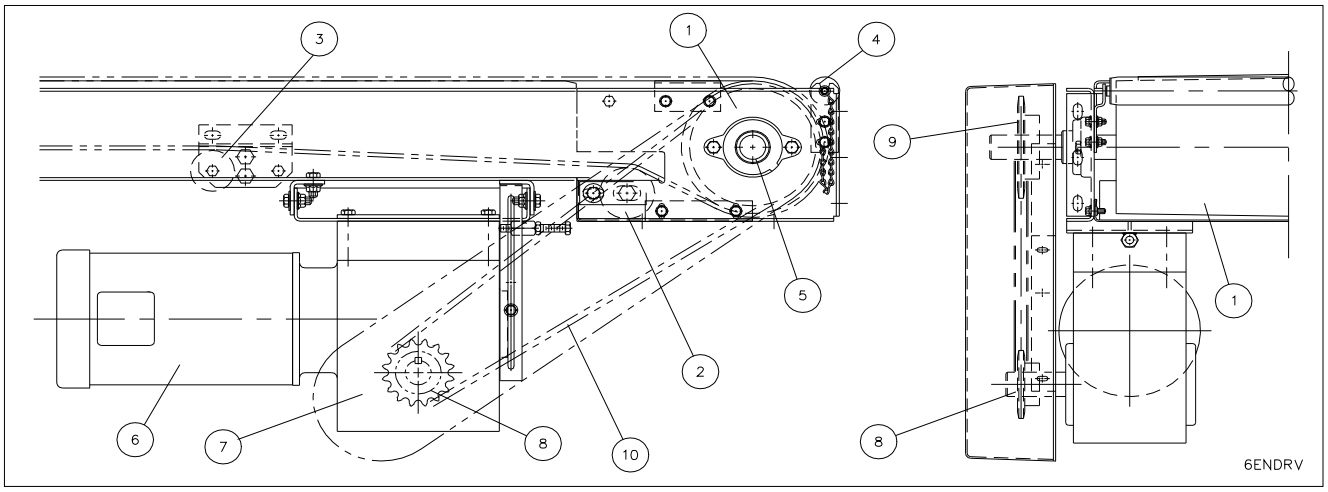


Item No.	Description	Part Number by Width					
		15-1/2	18-1/2	24-1/2	30-1/2	36-1/2	42-1/2
1	Pulley/Shaft WLDMT 12" Dia.	-	25618112	25624112	25630112	25636112	25642112
2	Pulley Take-up 6" Dia.	-	25618106	25624106	25630106	25636106	25642106
3	Snubber,2-1/2" Dia. x 11/16 Hex	-	18217001	18223001	18229001	18235001	18241001
4	Pulley, Snubber 4" Dia.	-	25740218	25740224	25740230	25740236	25740242
5	Motor	-	SEE CHART BELOW				
6	Reducer	-					
7	Drive Sprocket	-					
8	Driven Sprocket	-					
9	Chain	-	90140040				
10	Bearing, Flg 4 -Bolt 1-15/16" Bore		90050207				
11	Bearing, Take-up 1-15/16" Bore		90050209				

HP	FPM	Motor Part Number	Reducer PN Ratio	Drive Part Number Size- Teeth- Bore	Driven Part Number Size- Teeth- Bore
3/4	30	90480111	90655036 56/262-60L1	90801012 80-10-1-1/8	90801060 80-32-1-15/16
1	30	90480116	90655030 56/350-50L1	90801014 80-10-1-1/2	
1	45			90801026 80-13-1-1/2	
1-1/2	45	90480120			
1-1/2	60			90801029 80-17-1-1/2	
2	60	90480127	90655043 56/350-40L1	90801026 80-13-1-1/2	
1-1/2	75	90480120	90655030 56/350-50L1	90801044 80-21-1-1/2	
2	75	90480127	90655043 56/350-40L1	90801029 80-17-1-1/2	
2	90			90801041 80-20-1-1/2	
2	120		90655060 56/350-30L1		
3	120	90480130	90655075 180/350-25L1	90801029 80-17-1-1/2	

PARTS IDENTIFICATION

6” END DRIVE

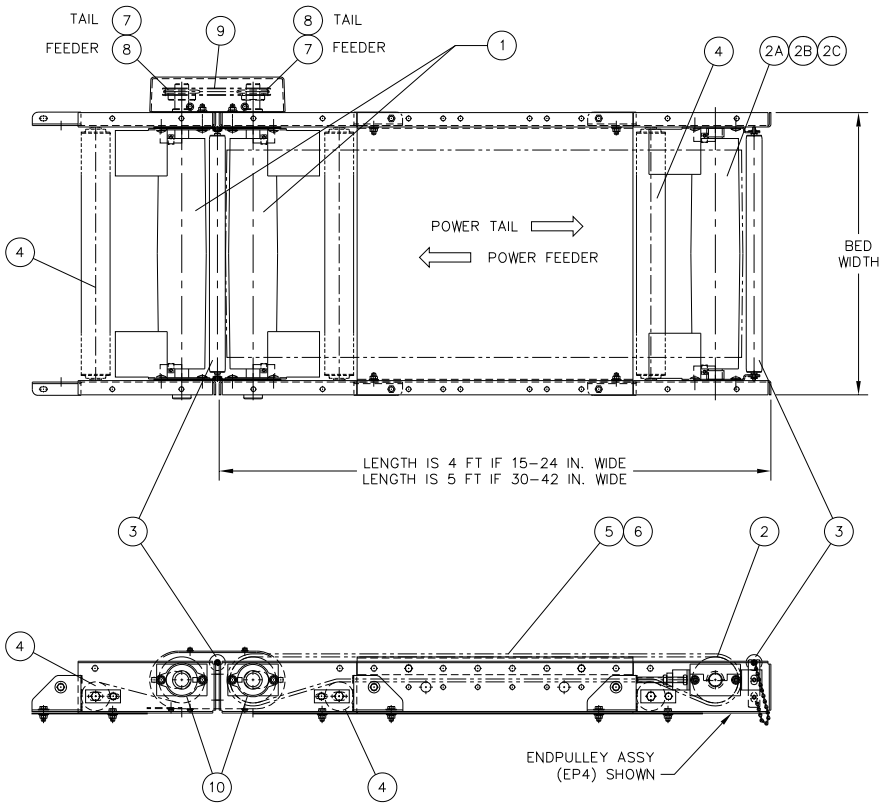


Item No.	Description	Part Number by Width					
		15-1/2	18-1/2	24-1/2	30-1/2	36-1/2	42-1/2
1	Pulley/Shaft WLDMT 6" Dia.	25615026	25618026	25624026	25630026	25636026	25642026
2	Snubber 2-1/2" Dia. x 11/16" Hex	18215001	18218001	18224001	18230001	18236001	18242001
3	Roller, Idler 2" Dia.	25211501	25214501	25220501	25226501	25232501	25238501
4	Roller 1-3/8" Dia.	14214018	14217018	14223018	14229018	14235018	14241018
5	Bearing, 2 Bolt 1-3/16" Bore	90050206					
6	Motor	SEE CHART BELOW					
7	Reducer						
8	Drive Sprocket						
9	Driven Sprocket						
10	Chain						

6 H.P.	FPM	7 Reducer	8 Drive Sprocket	Bore	9 Driven Sprocket	Bore	10 Chain Size
1/2	30	56/262-60LH	H6010T	1-1/8	H6017T	1-3/16	60
1/2	45	56/175-40LH	H5014T	7/8	H5023T	1-3/16	50
3/4	45	56/262-40LH	H6010T	1-1/8	H6017T	1-3/16	60
1/2	60	56/175-30LH	H5014T	7/8	H5023T	1-3/16	50
3/4	60	56/200-30LH	H5014T	1	H5023T	1-3/16	50
1/2	75	56/175-30LH	H5018T	7/8	H5023T	1-3/16	50
3/4	75	56/200/30LH	H5018T	1	H5023T	1-3/16	50
1	75	56/262-30LH	H6013T	1-1/8	H6017T	1-3/16	60
1-1/2	75	56/350-30LH	H6013T	1-1/2	H6017T	1-3/16	60
1/2	90	56/175-30LH	H5021T	7/8	H5023T	1-3/16	50
3/4	90	56/200-30LH	H5021T	1	H5023T	1-3/16	50
1	90	56/262-30LH	H6016T	1-1/8	H6017T	1-3/16	60
1-1/2	90	56/350-30LH	H6016T	1-1/2	H6017T	1-3/16	60
1/2	120	56/175-20LH	H5019T	7/8	H5023T	1-3/16	50
3/4	120	56/175-20LH	H5019T	7/8	H5023T	1-3/16	50
1	120	56/175-20LH	H5019T	7/8	H5023T	1-3/16	50
1-1/2	120	56/262-20LH	H6014T	1-1/8	H6017T	1-3/16	60

PARTS IDENTIFICATION

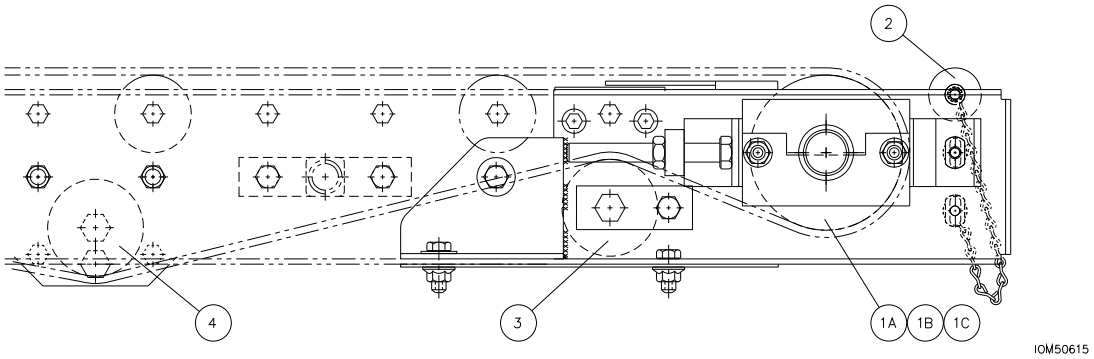
POWERFEEDER/POWERTAIL



Item No.	Description	Part Number by Width					
		15-1/2	18-1/2	24-1/2	30-1/2	36-1/2	42-1/2
1	Pulley/WLDMT 4" dia.	25615028	25618028	25624028	25630028	25636028	25642028
2A	Pulley, 4" dia.	25400155	25400185	25400245	25400305	25400365	25400425
2B	Shaft, 4" end pulley	25710215	25710218	25710224	25710230	25710236	25710242
2C	Collar, eccentric lock	90140052 - Required per pulley assembly					
3	Roller, Gap 1-3/8" dia.	14214018	14217018	14223018	1429018	14235018	1421018
4	Snubber 2-1/2" dia. 11/16 Hex	18215001	18218001	18224001	18230001	18236001	18242001
5	Belt, 7'-11" smooth top	25902095	25903095	25904095			
6	Belt, 9'-11" smooth top				25905119	25906119	25907119
7	Sprocket 16T, 1-3/16" bore	90800493					
8	Sprocket 18T, 1-3/16" bore	90800495					
9	Chain RC 40	90140027					
10	Bearing, 2 bolt fig 1-3/16"	90050206					

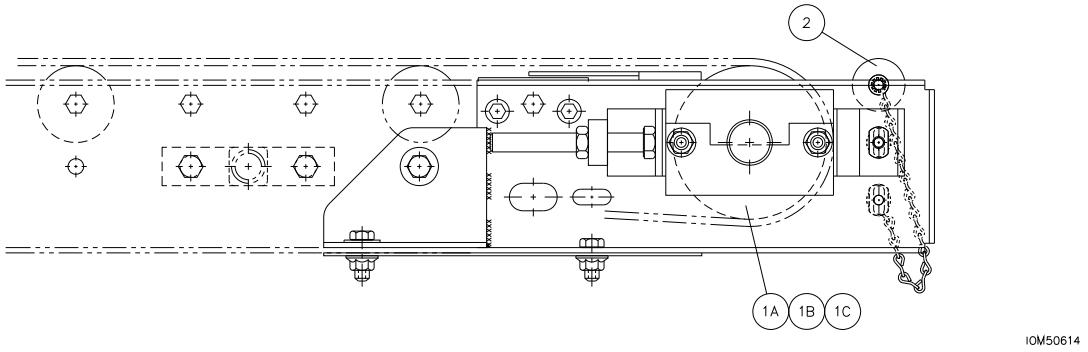
PARTS IDENTIFICATION

4” ADJUSTABLE END PULLEY WITH SNUBBER



Item No.	Description	Part Number by Width					
		15-1/2	18-1/2	24-1/2	30-1/2	36-1/2	42-1/2
2	Gap, Roller 1-3/8 dia.	14214018	14217018	14223018	14229018	14235018	14241018
1A	Pulley 4" dia.	25400155	25400185	25400245	25400305	25400365	25400425
1B	Shaft, 4" end pulley	25710215	25710218	25710224	25710230	25710236	25710242
1C	Collar, eccentric lock	90140052 - (2) Required per pulley assembly					
3	Snubber 2-1/2" dia. x 11/16" hex	18214001	18217001	18223001	18229001	18235001	18241001
4	Snubber 2-1/2" dia. x 11/16" hex	18215001	18218001	18224001	18230001	18236001	18242001

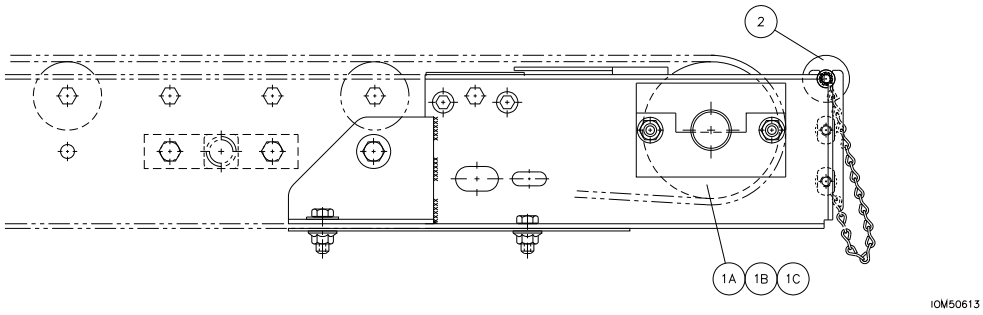
4” ADJUSTABLE END PULLEY WITHOUT SNUBBER



Item No.	Description	Part Number by Width					
		15-1/2	18-1/2	24-1/2	30-1/2	36-1/2	42-1/2
1A	Pulley 4" dia.	25400155	25400185	25400245	25400305	25400365	25400425
1B	Shaft, 4" end pulley	25710215	25710218	25710224	25710230	25710236	25710242
1C	Collar, eccentric lock	90140052 - (2) Required per pulley assembly					
2	Gap, Roller 1-3/8 dia.	14214018	14217018	14223018	14229018	14235018	14241018

PARTS IDENTIFICATION

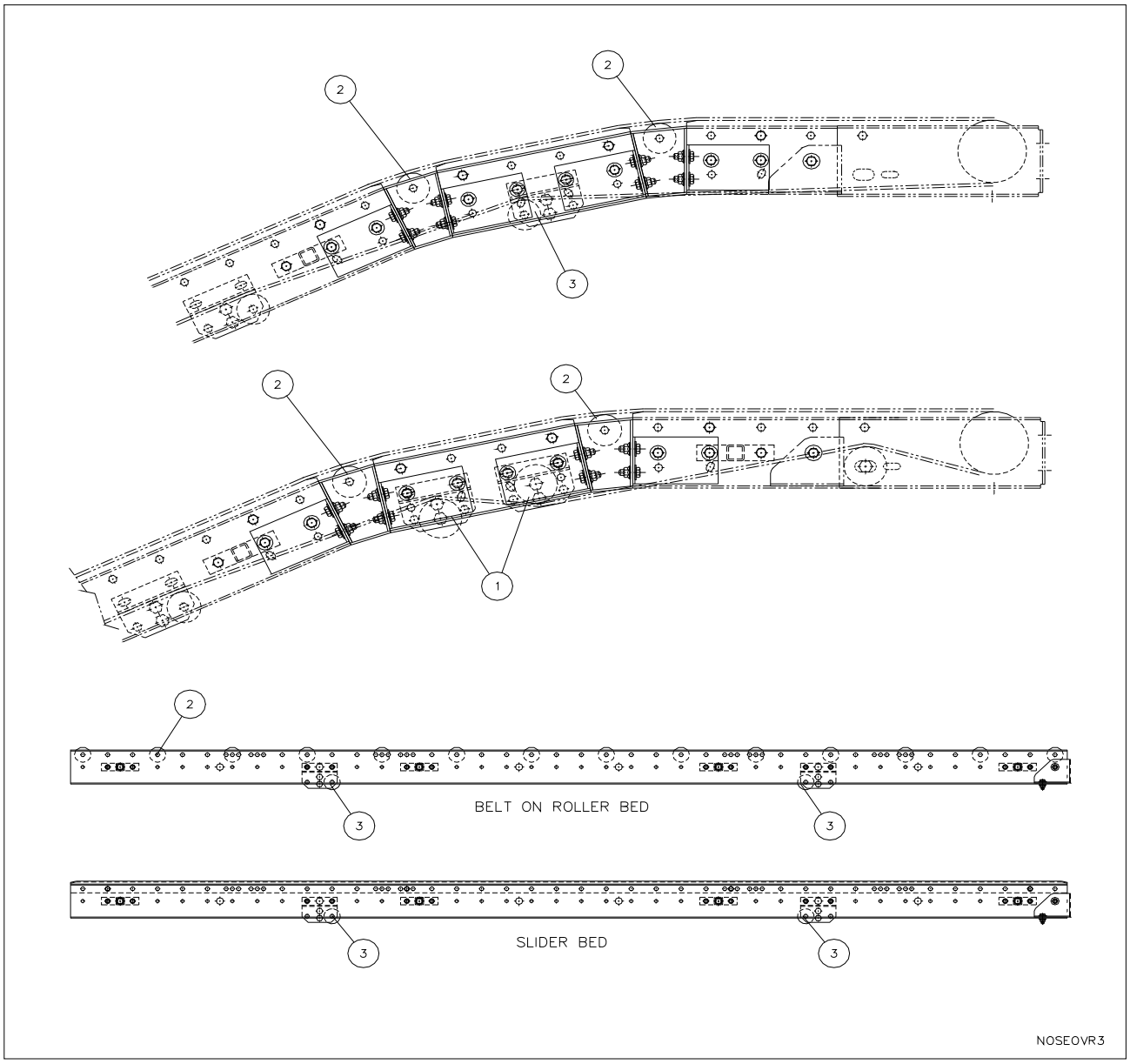
4” FIXED END PULLEY WITHOUT SNUBBER



Item No.	Description	Part Number by Width					
		15-1/2	18-1/2	24-1/2	30-1/2	36-1/2	42-1/2
1A	Pulley 4" dia.	25400155	25400185	25400245	25400305	25400365	25400425
1B	Shaft, 4" end pulley	25710215	25710218	25710224	25710230	25710236	25710242
1C	Collar, eccentric lock	90140052 - (2) Required per pulley assembly					
2	Gap, Roller 1-3/8 dia.	14214018	14217018	14223018	14229018	14235018	14241018

PARTS IDENTIFICATION

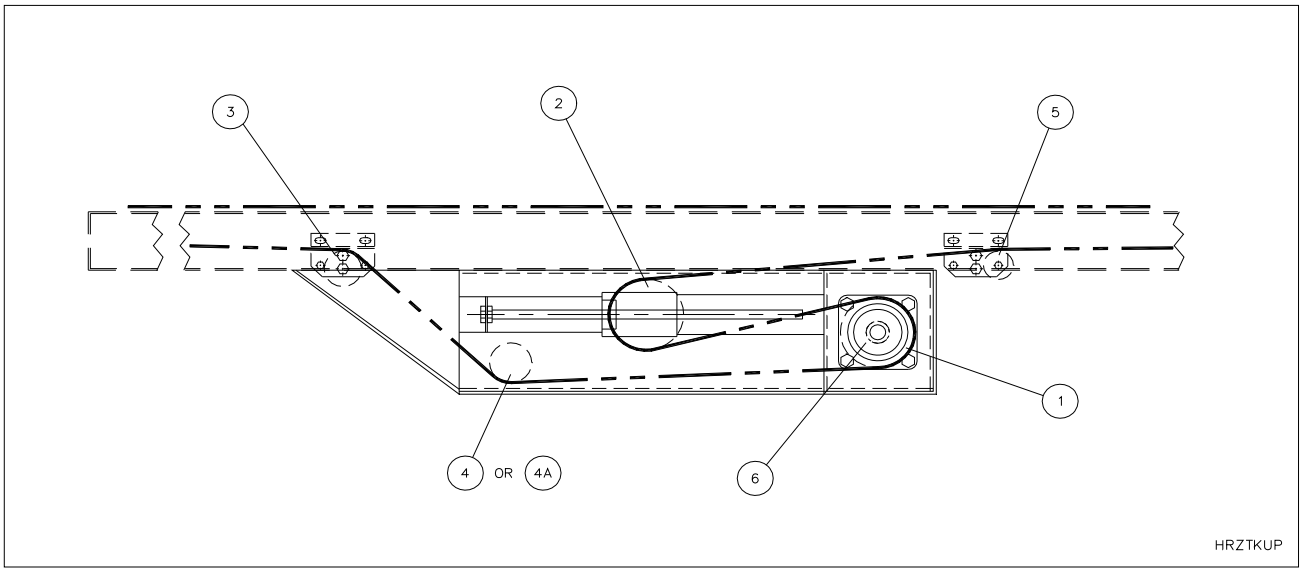
NOSE-OVER AND BEDS



Item No.	Description	Part Number by Width					
		15-1/2	18-1/2	24-1/2	30-1/2	36-1/2	42-1/2
1	Snubber 2-1/2" Dia. x 11/16" Hex	18214001	18217001	18223001	18229001	18235001	18241001
2	Idler Roller 2" Dia. (In Bracket)	25211501	25214501	25220501	25226501	25232501	25238501
3	Idler Roller 2" Dia. (In Frame)	25213001	25216001	25222001	25228001	25234001	25240001

PARTS IDENTIFICATION

HORIZONTAL TAKE-UP



Item No.	Description	Part Number by Width					
		15-1/2	18-1/2	24-1/2	30-1/2	36-1/2	42-1/2
1	Pulley, 4" Assembly	25615010	25618010	25624010	25630010	25636010	25642010
2	Pulley, 4" Take-up Assembly	25740215	25740218	25740224	25740230	25740236	25740242
3	Snubber 2-1/2" Dia. x 11/16" Hex	18214001	18217001	18223001	18229001	18235001	18241001
4 4A	Snubber 2-1/2" Dia. x 11/16" Hex Snubber 2-1/4" Dia. x 1/2" Rnd	25210015 25200015	25210018 25200018	25210024 25200024	25210030 25200030	25210036 25200036	25210042 25200042
5	Roller, Idler 2" Diameter	25211501	25214501	25220501	25226501	25232501	25238501
6	Bearing, 4-Bolt Flg 1-3/16" Bore	90050204					

MISSION

To meet or exceed all customer expectations by providing the highest quality products and services, on time, at exceptional value, in an environment which promotes safety and personal development.

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