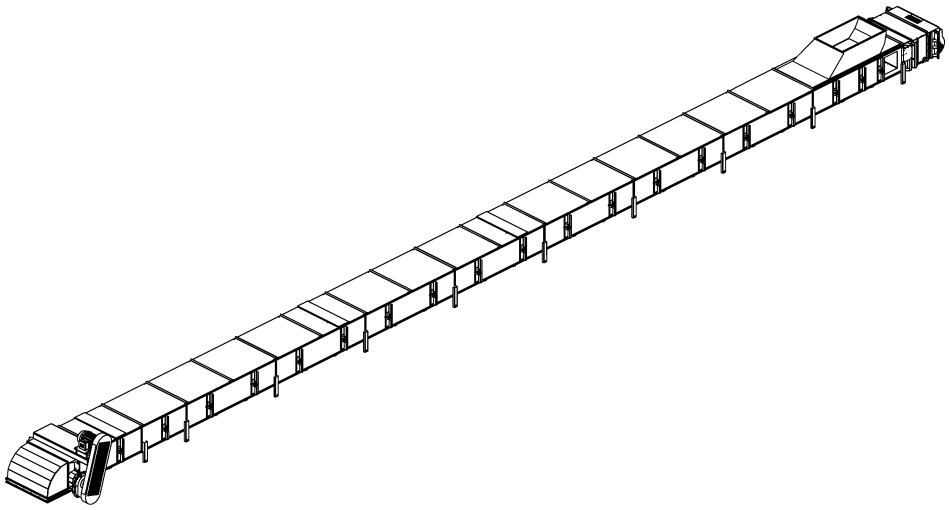


Enclosed Belt Conveyor

Roller Flo and 3i Roller Flo

Installation and Operation Manual

PNEG-2114

Version: 1.1

Date: 04-11-17

PNEG-2114

All information, illustrations, photos, and specifications in this manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.

Contents

General Information

InterSystems reserves the right to improve its product whenever possible and practical to do so. We reserve the right to change, improve and modify products at any time without obligation to make changes, improvements and modifications on equipment sold previously.

This manual covers the installation and operation for the Enclosed Belt Conveyor. This manual provides guidelines for installing the product. You must retain a qualified contractor to provide on-site expertise. INTERSYSTEMS IS NOT RESPONSIBLE FOR THE INSTALLATION OF THIS PRODUCT.

General Safety Statements

1. The conveyor is designed and manufactured with operator safety in mind. However, residual risk remains due to the nature of material handling, and specific material hazards. Use extreme caution at all times.
2. Modifications to equipment may cause extremely dangerous situations that could result in damage to the equipment as well as serious injury or death. Never modify the equipment.
3. InterSystems recommends that you contact the local power company to have a representative survey the installation to ensure wiring is compatible with their system and adequate power is supplied to the unit.

Replacement Parts

The InterSystems, Inc. conveyor is a quality built piece of machinery. As with any machine, parts do wear out and fail. It is InterSystems recommendation that a small supply of spare parts be kept on hand to cover any minor breakdowns. A separate Spare Parts/Price List will be sent identifying the suggested spare parts. It is also necessary to check the certified drawings, which will list any special or custom components utilized on this equipment.

The certified drawings furnished with the conveyor list the components which are likely to require replacement. Replacements for any other components, including structural members, can be supplied upon request.

For direct parts orders or requests for technical assistance, contact your sales representative directly or the InterSystems office:

InterSystems
9575 No. 109TH AVE
Omaha, NE. 68142
Phone: (800) 228-1483
FAX: (402) 330-3350

Please have available the MODEL NUMBER, SERIAL NUMBER and CUSTOMER ORDER NUMBER of the equipment in question as well as the LOCATION where the conveyor is installed.

Safety Guidelines

Safety guidelines are general-to-specific safety rules that must be followed at all times. This manual is written to help you understand safe operating procedures and problems that can be encountered by the operator and other personnel when using this equipment. Save these safety guidelines for future reference.

As owner or operator, you are responsible for understanding the requirements, hazards, and precautions that exist and to inform others as required. Unqualified persons must stay out of the work area at all times.

Alterations must not be made to the equipment. Alterations can produce dangerous situations resulting in SERIOUS INJURY or DEATH.

This equipment must be installed in accordance with the current installation codes and applicable regulations, which must be carefully followed in all cases. Authorities having jurisdiction must be consulted before installations are made.

When necessary, you must consider the installation location relative to electrical, fuel and water utilities.

Personnel operating or working around equipment must read this manual. This manual must be delivered with equipment to its owner. Failure to read this manual and its safety instructions is a misuse of the equipment.

ST-0001-3

Cautionary Symbols Definitions

Cautionary symbols appear in this manual and on product decals. The symbols alert the user of potential safety hazards, prohibited activities and mandatory actions. To help you recognize this information, we use the symbols that are defined below.

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

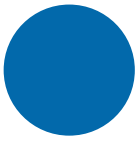
WARNING This symbol indicates a potentially hazardous situation which, if not avoided, **can result in serious injury or death.**

CAUTION This symbol indicates a potentially hazardous situation which, if not avoided, **can result in minor or moderate injury.**

NOTICE This symbol is used to address practices not related to personal injury.

This symbol indicates a general hazard.

This symbol indicates a prohibited activity.



This symbol indicates a mandatory action.

ST-0005-2

Safety Cautions

Use Personal Protective Equipment

- Use appropriate personal protective equipment:

Eye Protection

Respiratory Protection

Foot Protection

Hearing Protection

Head Protection

Fall Protection

Hand Protection

- Wear clothing appropriate to the job.
- Remove all jewelry.
- Tie long hair up and back.

ST-0004-1

Follow Safety Instructions

- Carefully read all safety messages in this manual and safety signs on your machine. Keep signs in good condition. Replace missing or damaged safety signs. Be sure new equipment components and repair parts include the current safety signs. Replacement safety signs are available from the manufacturer.
- Learn how to operate the machine and how to use controls properly. Do not let anyone operate without instruction.
- If you do not understand any part of this manual or need assistance, contact your dealer.

ST-0002-1

Maintain Equipment and Work Area

- Understand service procedures before doing work. Keep area clean and dry.
- Never service equipment while it is operating. Keep hands, feet, and clothing away from moving parts.
- Keep your equipment in proper working condition. Replace worn or broken parts immediately.

ST-0003-1

Install and Operate Electrical Equipment Properly

- Electrical controls must be installed by a qualified electrician and must meet the standards set by applicable local codes (National Electrical Code for the US, Canadian Electric Code, or EN60204 along with applicable European Directives for Europe).
- Lock-out power source before making adjustments, cleaning, or maintaining equipment.
- Make sure all equipment and bins are properly grounded.

ST-0075-1

Stay Clear of Hoisted Equipment

- Always use proper lifting or hoisting equipment when assembling or disassembling equipment.
- Do not walk or stand under hoisted equipment.
- Always use sturdy and stable supports when needed for installation. Not following these safety precautions creates the risk of falling equipment, which could crush personnel and cause serious injury or death.

ST-0047-1

Operate Motor Properly

- All electrical connections must be made in accordance with applicable local codes (National Electrical Code for the US, Canadian Electric Code, or EN60204 along with applicable European Directives for Europe). Make sure equipment and bins are properly grounded.
- Lock-out power before resetting motor overloads.
- Do not repetitively stop and start the drive in order to free a plugged condition. Jogging the drive in this manner can damage the equipment and drive components.

ST-0009-3

Stay Clear of Moving Parts

- Entanglement in rotating sprocket or moving chain will cause serious injury or death.
- Keep all guards and covers in place at all times.
- Lock-out power source before making adjustments, cleaning, or maintaining equipment.

ST-0017-1

Toxic Fume and Dust Hazard

- Do all work outside or in a well-ventilated area. Dispose of paint and solvent properly.
- Remove paint before welding or heating:
  - — Avoid potentially toxic fumes and dust. Hazardous fumes can be generated when paint is heated by welding, soldering, or using a torch.
  - — If you sand or grind paint, avoid breathing the dust. Wear an approved respirator.
  - — If you use solvent or paint-stripper, remove stripper with soap and water before welding.
  - — Remove solvent or stripper containers and other flammable material from area. Allow fumes to disperse at least 15 minutes before welding or heating.

ST-0043-2

Sharp Edge Hazard

- This product has sharp edges, which can cause serious injury.
- To avoid injury, handle sharp edges with caution and always use proper protective clothing and equipment.

ST-0036-2

Stay Clear of Slide Gate

- Keep hands away from slide gate opening. Slide gates can crush and dismember. Motor can start at any time.
- Lock-out power source before making adjustments, cleaning, or maintaining equipment.

ST-0049-1

Fall Hazard

- Ladders, stairways and platforms are for use by competent and trained personnel only. Do not allow children or other unauthorized persons to have access to the equipment.
- Access to the equipment must be restricted by the use of security fencing and lockable gates.
- Lower sections of ladders must be fitted with a lockable safety gate to prevent unauthorized access.
- Make sure that hot surfaces have had adequate time to cool before working on or in the equipment.
- Lock out and tag out power supplies and fuel supplies to all equipment.
- Do not attach lifting equipment to ladders or platforms.
- Do not go outside of the safety rails provided on elevated platforms.
- Do not work at heights during high winds, rain, snow, or ice storms.

ST-0056-1

Flying Material Hazard

- Flying material can cause severe eye injury or blindness.
- Wear safety glasses around operating equipment.

ST-0074-1

Safety Sign-Off Sheet

Below is a sign-off sheet that can be used to verify that all personnel have read and understood the safety instructions. This sign-off sheet is provided for your convenience and personal record keeping.

Date	*Employee Name*	*Supervisor Name*

ST-0007

3. Decals

The safety decals on your equipment are safety indicators which must be carefully read and understood by all personnel involved in the installation, operation, service and maintenance of the equipment.
To replace a damaged or missing decal, contact us to receive a free replacement.

InterSystems
9575 N. 109th Ave.
Omaha, Nebraska 68142
Toll Free: (800) 228-1483

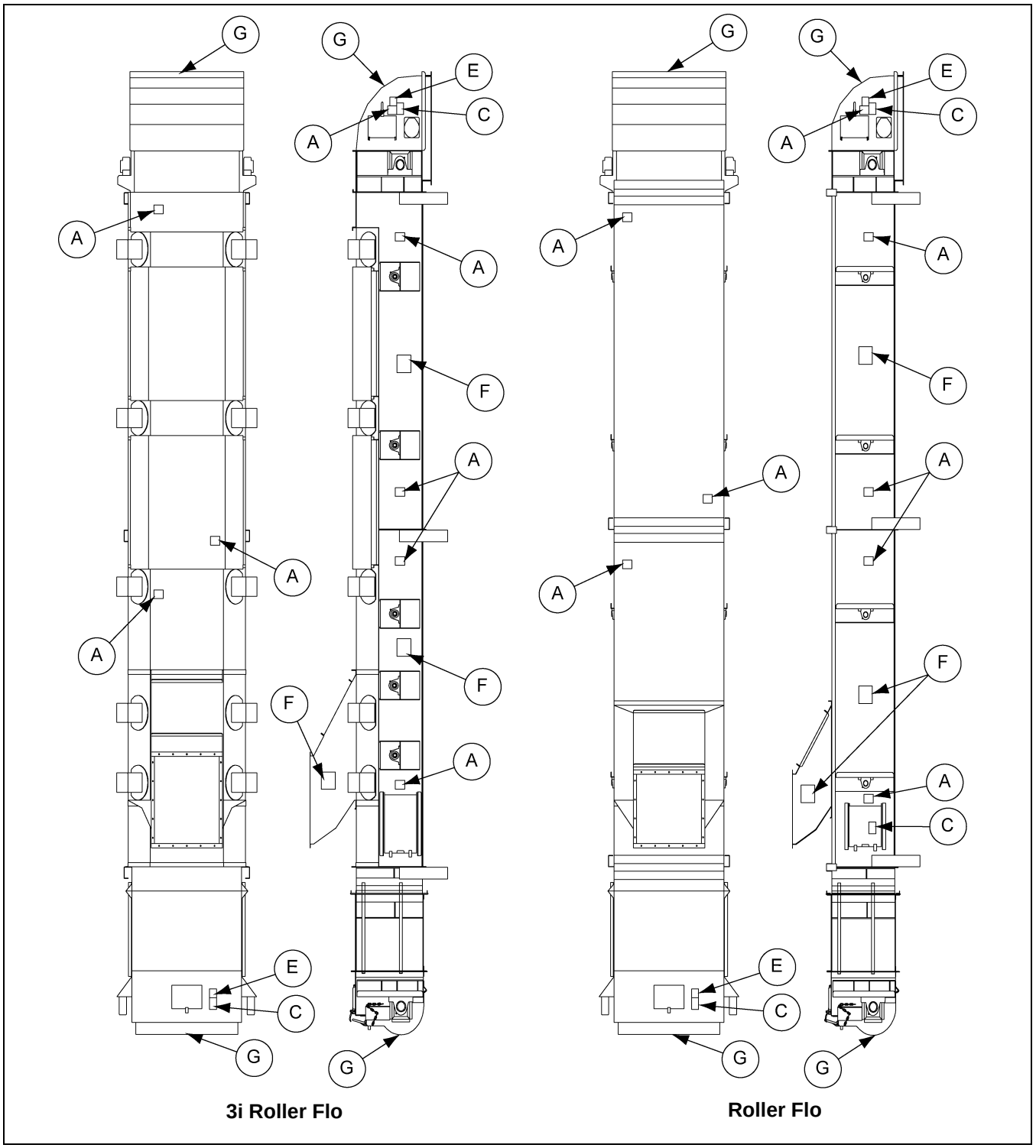
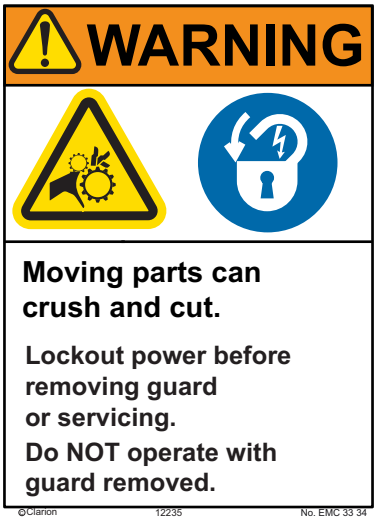


Figure 3A *Roller Flo Conveyor Safety Decal Locations*

Ref #	Decal #	Decals	Description
A	IS 950020		Exposed Belt
B	EMC 27 J3		Exposed Parts
C	EMC 28 34		Eye Protection

Ref #	Decal #	Decals	Description
D	EMC 33 34		Moving Parts and Exposed Gears
E	EMC 402 34		Lock Out Machine
F	IS 526X4		Intersystems Logo
G	IS 5517X4		Intersystems Strip

Receiving Inspection

1. Carefully inspect the shipment for damage as soon as it is received. Verify that the quantity of parts or packages actually received corresponds to the quantity shown on the packing slip. One or more cartons containing the fasteners required for assembly are included with the shipment. Report any damage or shortage to the delivering carrier as soon as possible.
2. InterSystems responsibility for damage to the equipment ended with acceptance by the delivering carrier. Refer to the bill of lading for more detailed information.
3. Save all paperwork and documentation furnished with any of the conveyor components; for example, motor and reducer installation and lubrication instructions, etc.

Pre-Installation Preparation

1. The MOST IMPORTANT preparations are retaining a licensed engineer to plan the installation and a qualified millwright or contractor to install the enclosed belt conveyor and the accompanying equipment and structures. Before starting the conveyor assembly installation, review this manual, the drawing(s) furnished with the equipment and other applicable documents, including but not limited to, O.S.H.A. Regulations and the National Electrical Code, ASME (American Society of Mechanical Engineers), and ANSI (American National Standards Institute).
2. InterSystems is the vendor and certain of the conveyor and its optional accessories only, and does not assume responsibility for the installation.
3. The installation recommendations contained within this manual are for consideration only. The user or installer should consult a civil or structural engineer regarding the design, construction, and supervision of the entire installation.
4. Enclosed belt conveyors are not designed to be self-supporting when erected. The conveyor does require a structure for horizontal and vertical support. The conveyor has not been designed to support other equipment such as cleaners, distributors, spouting, etc. Separate structures must be provided for any accessory equipment.
5. Roller Flo conveyors are not designed to be part of any truss system.

Supporting Structure

1. *Figure 4A* illustrates the general type of acceptable support structure.
2. Conveyor must be supported at each section joint (A). Refer to the certified drawing for location and attachment of the short section.

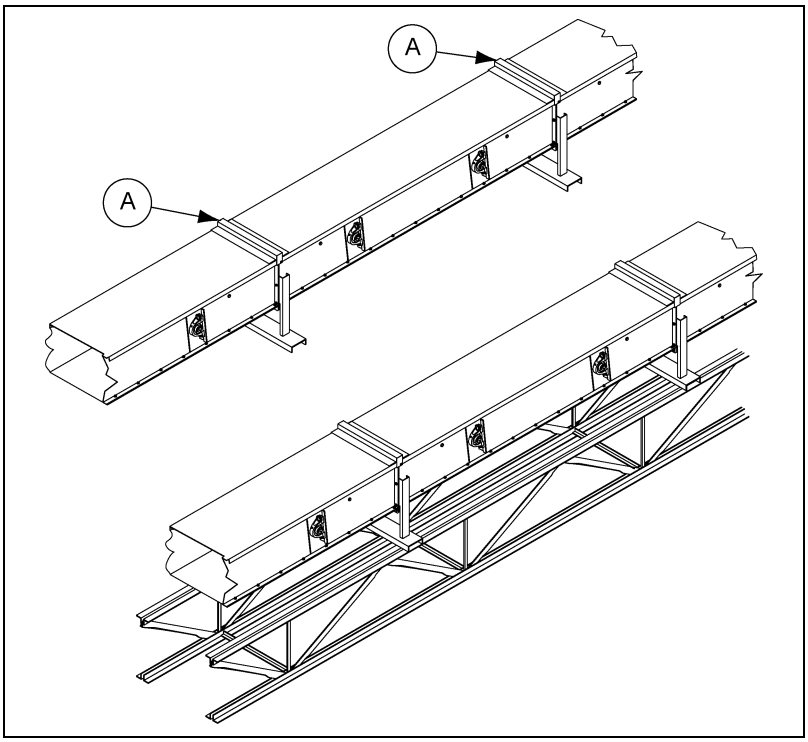


Figure 4A *Conveyor Supporting Structures*

Ref #	Description
A	Support conveyor at each (9'-8") section joint

DANGER

Do not attempt to hoist a completely assembled conveyor into position onto its supporting structure. Death or serious injury could result.

Before lifting any of the conveyor sections, make sure hoisting machinery capacity exceeds the weight of the heaviest section.

Make certain that the chains, cables, or slings used are rated for overhead hoisting duty and of sufficient lifting capacity for the heaviest conveyor section to be lifted.

Placing Conveyor Sections on the Supporting Structure

1. The supporting structure should be in place and completely assembled before the conveyor sections are placed for assembly.
2. Place one section of the conveyor at a time in order to reduce the chance of damage to the equipment by lifting more than one section at a time.
3. The sections must be placed square and true on the supporting structure.

Conveyor Assembly

Since the loading of the material on the conveyor belt is the most important part of the conveyor working correctly, conveyor installation should begin by positioning the loader section under the discharge chute of the feeding equipment. After the loader section is securely fastened into place, assembly works forwards through the intermediate sections, ending with the placement of the head section. Also the tail may be attached to the end of the loader at any time after the loader is in its proper location. This is the generally accepted practice of conveyor installation. Your situation may require that assembly be done in some other order. Refer to the certified drawing for location of short section.

1. A chalk line or other instruments should be used to ensure that the conveyor is being assembled in a straight manner and each section should be squared with the previous one. The cross section of the conveyor should be level.
2. Position the loader section under the discharge chute of feeding equipment.
3. There may be one or more intermediate sections in a complete Roller Flo conveyor. Refer to the certified drawing for locations of all sections.
4. Apply silicone to the flanges (D) along the side panels and bottom of the two (2) sections to be joined. Mate the first intermediate section with the loader section. Fasten sections with supplied grade 5-3/8" diameter hex head cap screws and nuts. Sections may be assembled in any order unless otherwise specified on the certified drawing.
5. The bottom flanges of each conveyor section have several 3/8" diameter holes. *(See Figure 4B.)* As each conveyor section is assembled to the preceding section, drive bull-nose alignment pins (C) through the matching pairs of the smaller 3/8" diameter holes. This arrangement ensures that liners of adjoining conveyor sections form a smooth, even surface with no lip or ledge in which the belt might otherwise catch. Use a straightedge to verify that the liner surfaces of adjoining conveyor sections are even. If they are not, find and correct the problem.

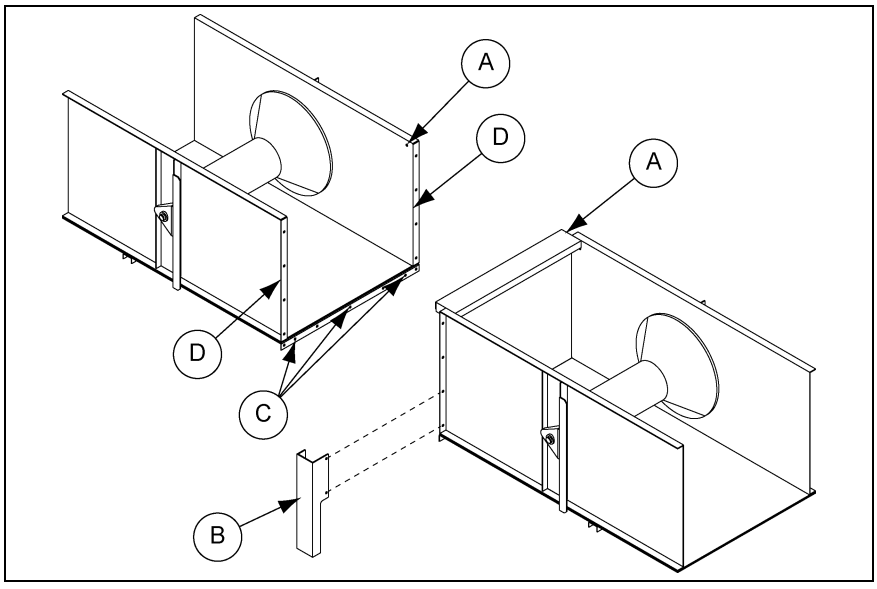


Figure 4B *Conveyor Section Assembly*

Ref #	Description	Ref #	Description
A	Upper Support	C	Alignment Pins
B	Leg	D	Apply Silicone to Flanges

6. Attach a pair of the optional support legs (B) and complete fastening the two (2) conveyor sections together as shown in *Figure 4B on Page 17.* Support legs (B) are optionally furnished in right hand/ left hand sets. One set is required at each conveyor section joint to ensure proper alignment and support.
7. As each conveyor section is mated with the preceding section. Remove the lids and loosen the upper support channel and rotate it so that it connects to the next section of the conveyor. Align the holes of the channel and the matching holes in the next section and bolt.
8. Continue to assemble conveyor sections as explained in *Steps 3 - 7* until all conveyor sections are assembled.
9. Install head section.
10. Install tail section. Make certain at this time that the take-up is in its fully retracted position to allow for easiest connection of belt ends for splicing.
11. Drive out the alignment pins (C). Replace them with 3/8" diameter hex head cap screws and nuts which have been furnished with the conveyor.

Mid Loader Installation

Belt conveyors often require the use of multiple inlets to assist in unloading bins or silos. The procedure outlined below describes the steps in which a mid loader assembly can be installed. *Figure 4C on Page 19* illustrates the mid loader installation procedure. Similarly, a low capacity inlet should be installed following the same steps.

1. Remove any lids near the location of where the loader assembly is to be installed. Also remove any upper supports that may interfere with the skirting below the loader.
2. Locate the loader assembly onto the top of the trunking section where the lids have been removed. The skirting on the bottom of the loader should extend in the direction the material will be traveling down the conveyor.
3. Slide the loader assembly along the top of the trunking sections until the ideal location has been reached.
4. Drill any necessary holes into the top flange of the trunking section to match the holes provided in the loader assembly (B). Once holes have been drilled, bolt the loader assembly into place.
5. Trim lids to length and re-install enclosing any open area of trunking.
6. Install provided lid seals to cover any seams between lids (D).

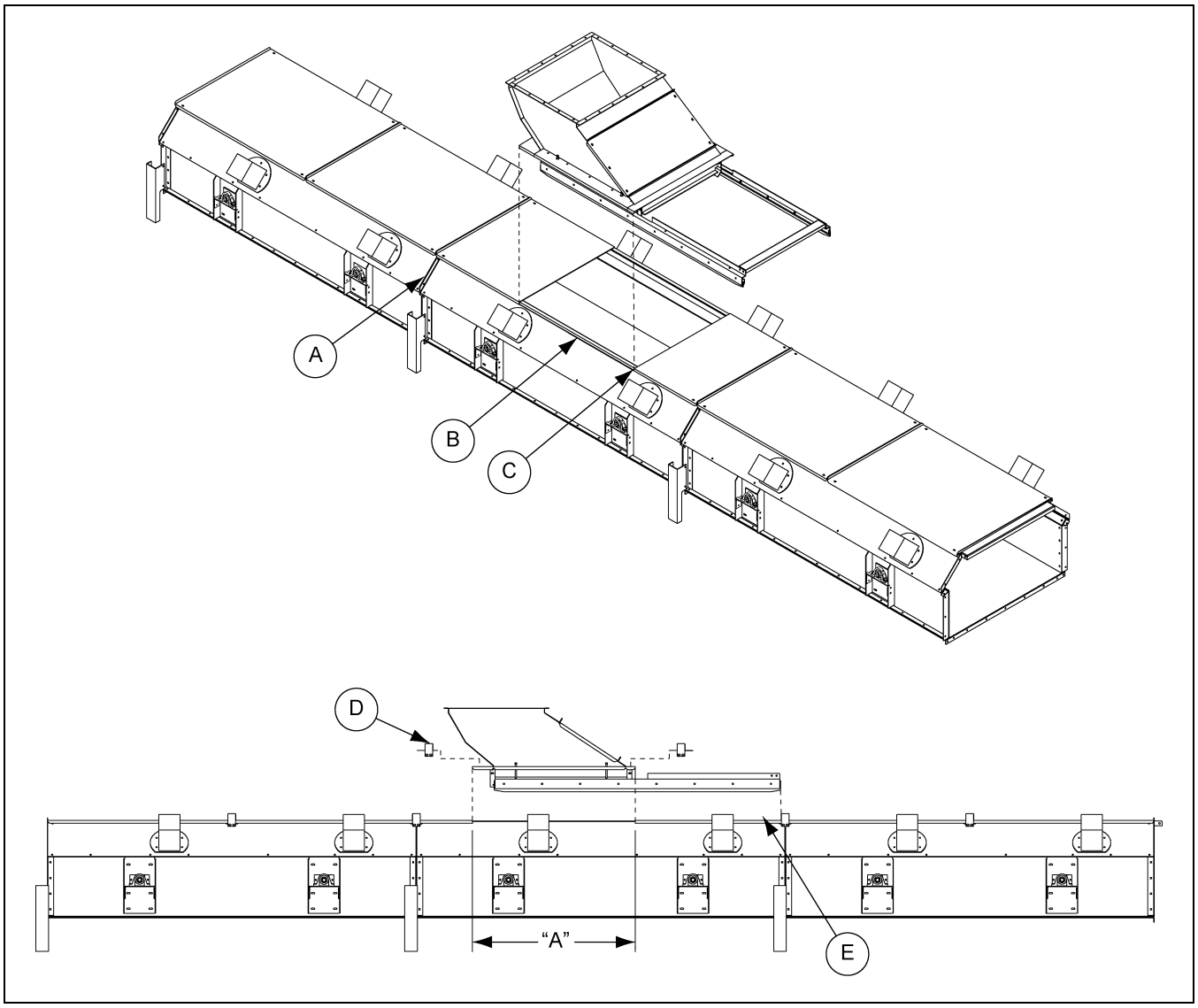


Figure 4C *3i Roller Flo Mid Loader Installation*

Ref #	Description
A	Apply silicone at section gaps when assembling trunking.
B	Drill any necessary holes in upper side panel to match hole spacing in loader weldment.
C	Cut lids in desired location. (Opening size should match length of loader weldment.)
D	Use provided lid seals to cover any seams.
E	Remove lid(s) to locate loader assembly onto top of reclaim section.

Splicing the Belt

Upon initial installation of the belt, the tension should be checked within a couple hours of belt operation as the belt will tend to rapidly “break-in” upon initial start-up. Pre-stretching the belt prior to splicing will help to minimize the duration of the "break-in" period.

Pre-stretching the belt is recommended for long conveyors or for shorter take-up adjustment lengths. If the operating tension of the belt is known before-hand, pre-stretching should be done with that tension. Using come-alongs is a good way to stretch the belt. If time allows, pre-stretching for a couple days or even a week is a good way to reduce the “break-in” period. In addition, during the “break-in” period, the belt can “walk” along the tail pulley, that is, it can move from side to side. This is a normal occurrence and pre-stretching can help to reduce the effects.

Once the conveyor has been fully assembled and all bolts tightened, the belt may now be fed through the conveyor. Check to make sure the take up is fully retracted for later tensioning of belt. Some may prefer to place a small amount of general purpose flour or grain dust on the bottom of the conveyor to help prevent the belt from sticking to the bottom liner during installation and start-up. Make sure the top side of the belt is facing up on the top of the idlers and facing down toward the linear on the bottom of the conveyor. The following procedure will ensure a proper belt splice.

1. Square belt ends and cut to length. Square both belt ends by marking three (3) center points along belt at 1' to 3' intervals. Draw an average center line using these center points as a guide. Place one leg of a large steel square along the marked center line and position the other leg of the square at the point where the square cut is to be made. Draw a line along the square’s leg which is perpendicular to the center line and extend it entirely across the belt. Make sure the cut is clean, square and straight. A cut made along this line will be properly squared with the belt. *(See Figure 4D.)*

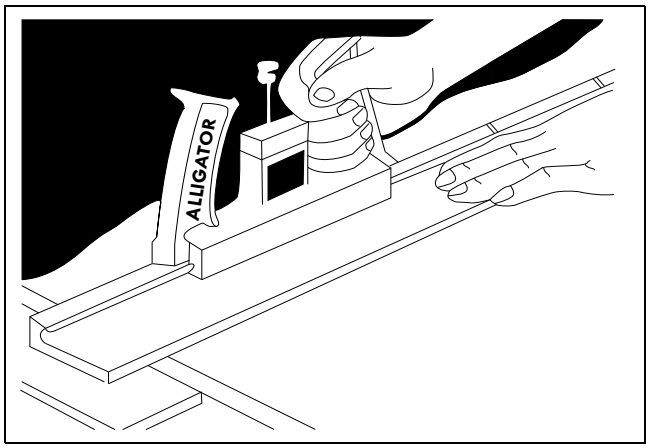


Figure 4D

2. Support belt ends with wood plank. Nail Flexco Templet in position with belt ends tight against lugs. Templet nails are in bolt bag. *(See Figure 4E on Page 21.)*

3. Punch or bore bolt holes using an impact tool with Flexco Power Punch or Flexco Power Boring Bit speeds hole boring operation. Remove templet. Leave plank under belt ends for a work surface. All work can be done from the top of the belt. *(See Figure 4F on Page 21.)*

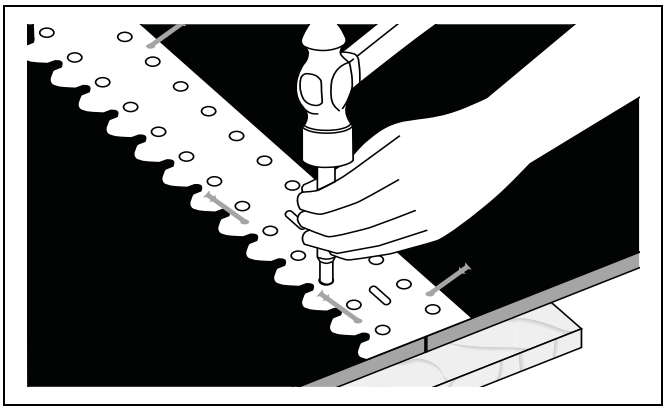


Figure 4E

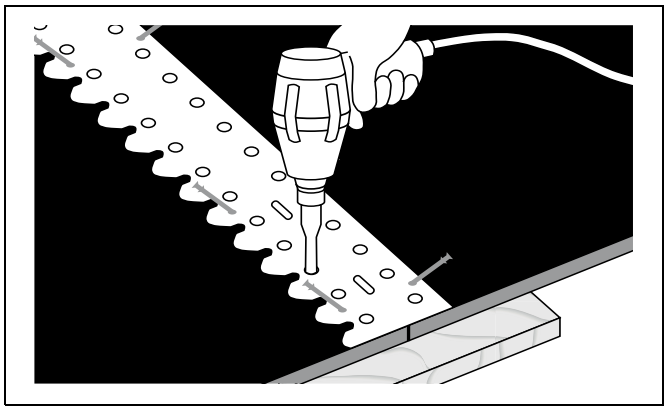


Figure 4F

4. Assemble bolts in bottom plates. Snap clip over heads of bolts. Fold one end of belt back out of the way. Then insert bolts from under side along one row of holes. *(See Figure 4G.)*

5. Using the notches in the templet to align the opposite row of bolts, place the end of the belt over the bolts. Press belt onto bolts with hands. Remove templet. Continue to press belt until it is in place. *(See Figure 4H.)*

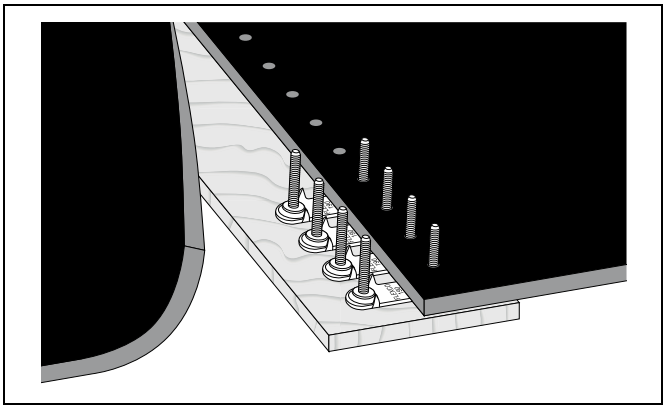


Figure 4G

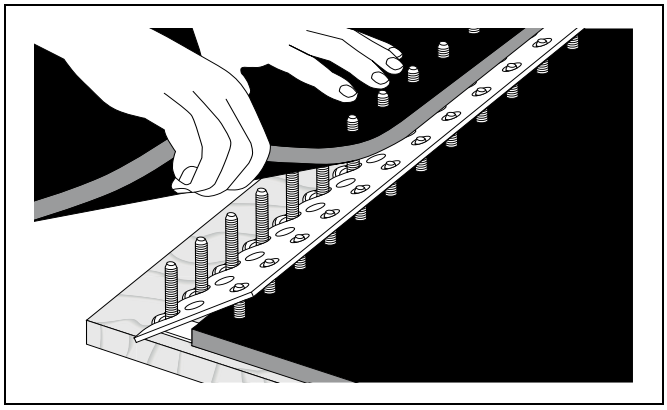


Figure 4H

6. Place top plate over one bolt. Insert Bolthorn Tool through the other plate hole and over the second bolt to pry it into place. *(See Figure 4I.)*

7. Assemble all top plates the same way as in direction 6. Start nuts down by hand far enough so that wrench will engage bolts. *(See Figure 4J.)*

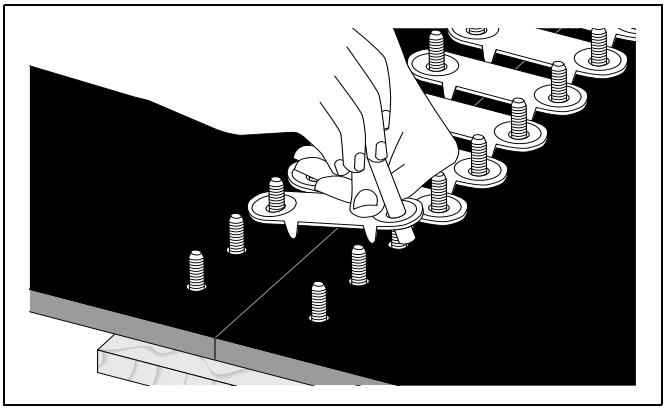


Figure 4I

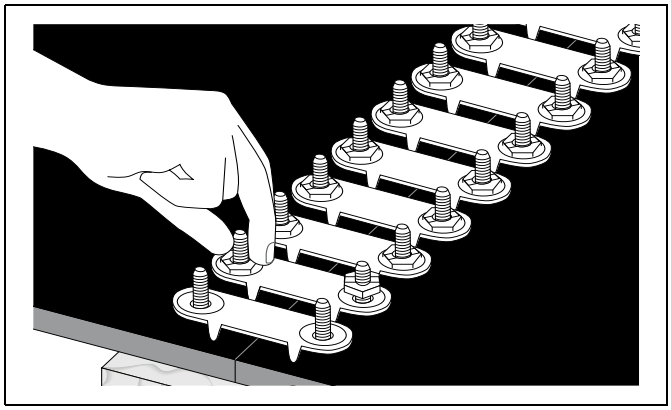


Figure 4J

8. Before tightening fasteners, cut a piece of Flexco-Loc Tape three (3) times the width of the belt plus 6" and cut a point on one end. Thread pointed tape between fastener teeth and top of belt, back through the bottom plates, and across the top again. This will help eliminate belt ripple and keep moisture and fine particles from deteriorating the end of the belt and increase belt life. *(See Figure 4K.)*
9. Pull tape tight and hold in position by tightening a fastener at each end of the splice. Then snug down all other plates. *(See Figure 4L.)*

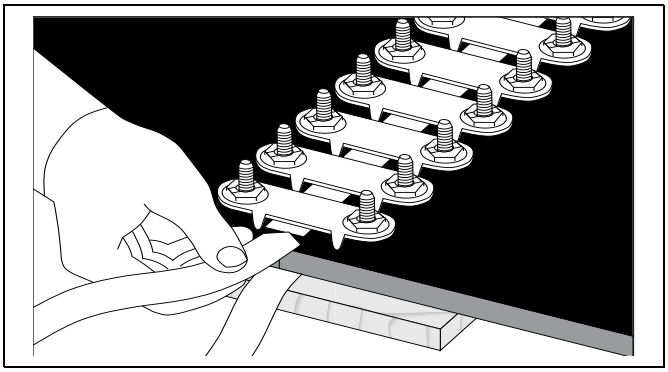


Figure 4K

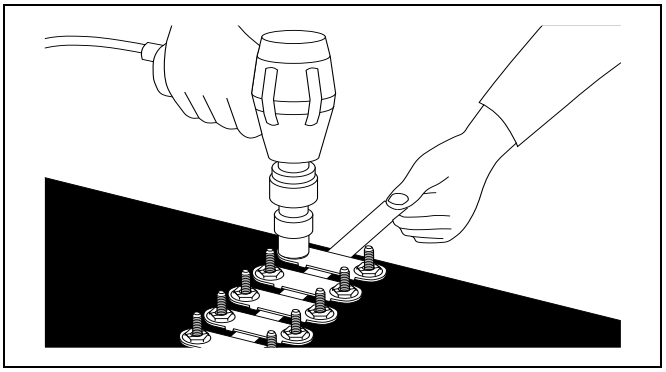


Figure 4L

10. Tighten all fasteners from **EDGES to CENTER**. Tighten all nuts uniformly. The Flexco Power Tool Wrench used with an impact tool will speed this step considerably. *(See Figure 4M.)*
11. Hammer plates in belt with metal or hard wood block in between bolts. Then retighten nuts. *(See Figure 4N.)*

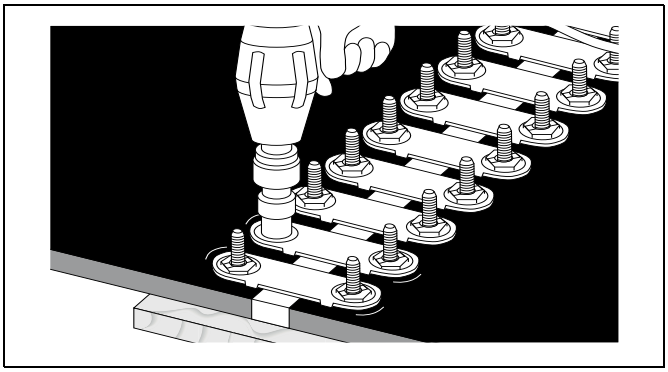


Figure 4M

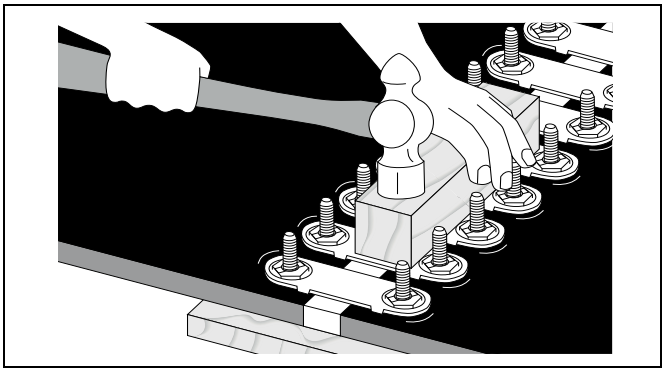


Figure 4N

12. Break off excess bolt ends using the two (2) bolt breakers. On belts thicker than 3/8” rubber covers, retighten all nuts after a few hours of running. Grind sharp edges of broken bolt ends until they are smooth and do not protrude.*(See Figure 4O.)*

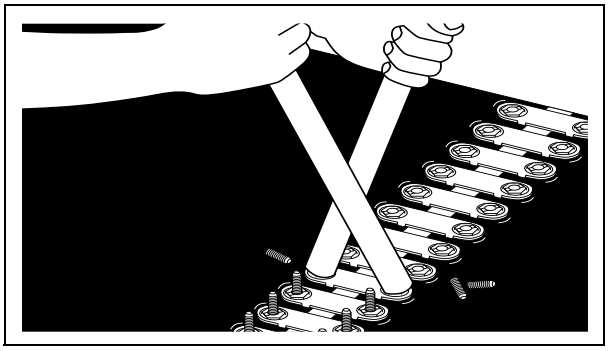


Figure 4O

Belt Splice Protector

Once the belt has been spliced and all nuts tightened, the belt splice protector is to be installed. The splice protector (A) is to be placed in front of the splice going with the flow of material (C). *See Figure 4P* for proper spacing.

1. Assemble bolts (F) in bottom plates (E). Snap clip over heads of bolts (F). Then insert bolts (F) from under side belt along the row of holes.
2. Place splice protectors (A) on top side of belt.
3. Place top plate (D) over one bolt. Insert Bolthorn Tool through the other plate hole and over the second bolt to pry it into place.
4. Assemble all top plates (D) the same way as in direction 3. Start nuts down by hand far enough so that wrench will engage bolts.
5. Tighten all fasteners. Tighten all nuts (G) uniformly. The Flexco Power Tool Wrench used with an impact tool will speed this step considerably.
6. Hammer plates in belt with metal or hard wood block in between bolts (F). Then retighten nuts (G).
7. Break off excess bolt ends using two (2) bolt breakers. On belts with thicker than 3/8" rubber covers, retighten all nuts after a few hours of running. Grind sharp edges of broken bolt ends until they are smooth and do not protrude.
8. Belts longer than 150' will be provided with additional splice protector kits (one kit for every 150' addition). The additional splice protectors should be located every 150' of belt length. This provides for additional clean out of the bottom sections and tail.

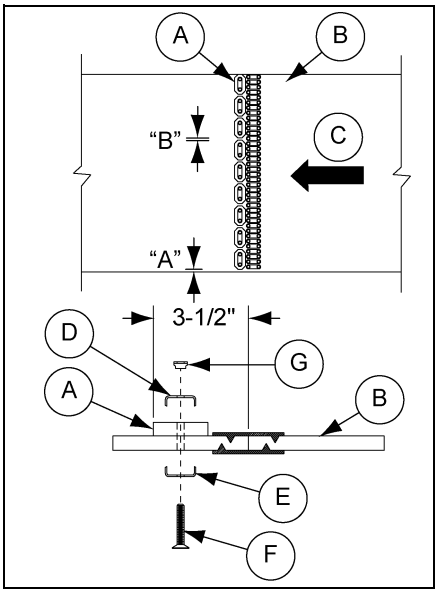


Figure 4P *Belt Splice Protector Layout*

Splice Protector Dimensions		
Belt Width	**"A"**	**"B"**
18	13/16"	5/8"
24	11/32"	5/16"
30	5/8"	9/16"
36	3/16"	3/8"
42	5/8"	1/2"
48	3/16"	3/8"
54	7/16"	1/2"
60	3/16"	3/8"
66	3/16"	1/4"
72	3/16"	3/8"

Ref #	Description
A	Splice Protector
B	Material Carrying Side of the Belt
C	Material Flow
D	Top Plate

Ref #	Description
E	Bottom Plate
F	Bolt
G	Nut

Belt Tensioning and Tail Section (Take-Up) Adjustment

The following steps will assist in properly adjusting the take up to ensure proper tension in the belt during normal operation. *Figure 4Q below* and *Figure 4R on Page 25* can be used to assist in the following procedures.

1. Remove lids from conveyor sections where belt tension is to be checked (tension can be between any two (2) idlers that are 58" apart, but should be at least three (3) idlers away from head and tail pulleys). Also remove the first unobstructed cover from the intermediate section nearest the tail section.

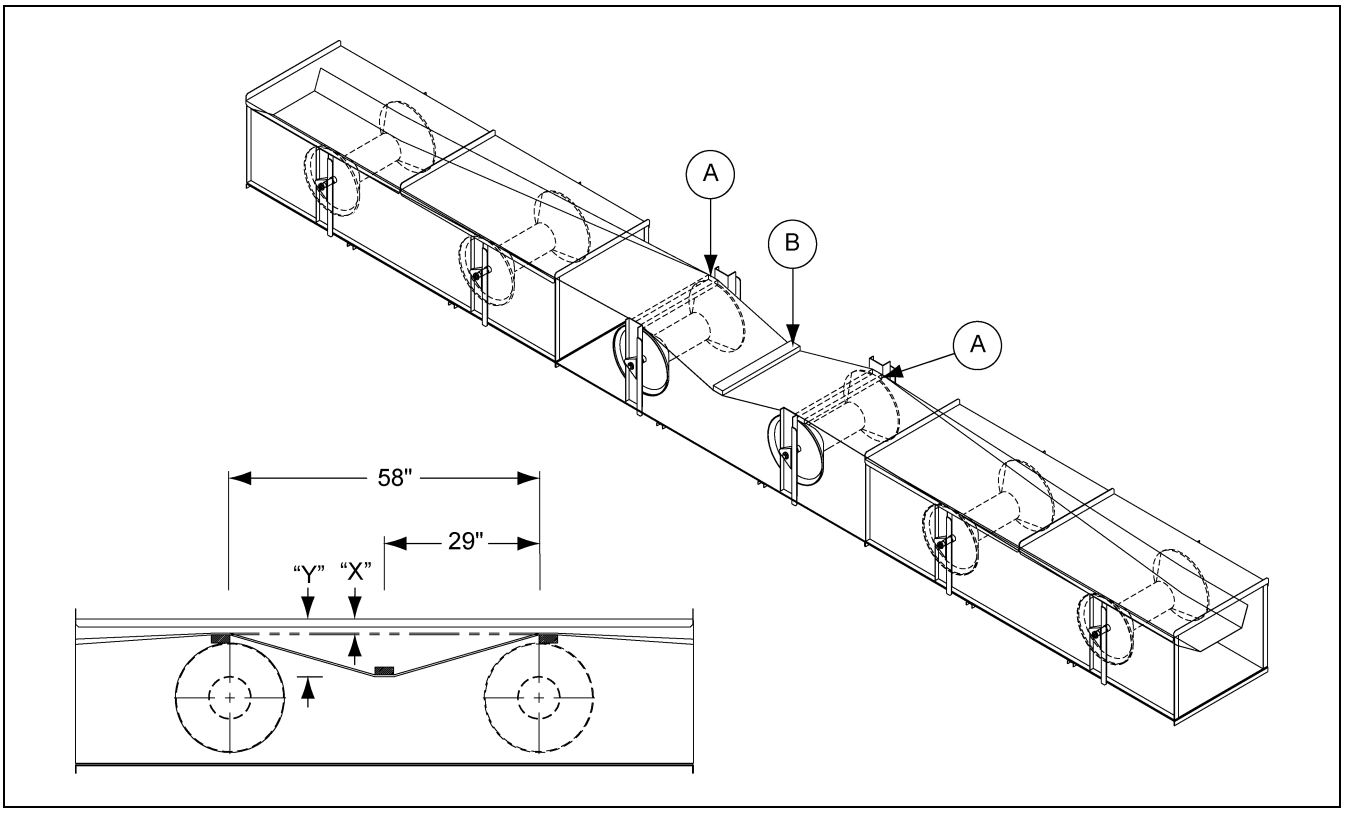


Figure 4Q *Standard Roller Flo Belt Tensioning Procedure*

Ref #	Description
A	Support Boards
B	Weighted Board

2. **For Standard Roller Flo:** Place one board on top of each idler and underneath the belt. Center the inside edges of the boards over the shafts so the belt span is a full 58". Measure the distance (X) from the top of the side panel down to the top of the belt at the midpoint between the two (2) boards (29" away from the board edge). *(See Figure 4Q.)*

3. **For 3i Roller Flo:** Place one board on top of each side panel and underneath the belt. Align outer edge of the first board with one of the upper suppots on the intermediate section to be checked. Place the second board on top of the side panel so that the inside edges of the boards span a full 58". Measure the distance (X) from the top of the side panel down to the top of the belt at the midpoint between the two (2) boards (29" away from the board edge). *(See Figure 4R on Page 25.)*

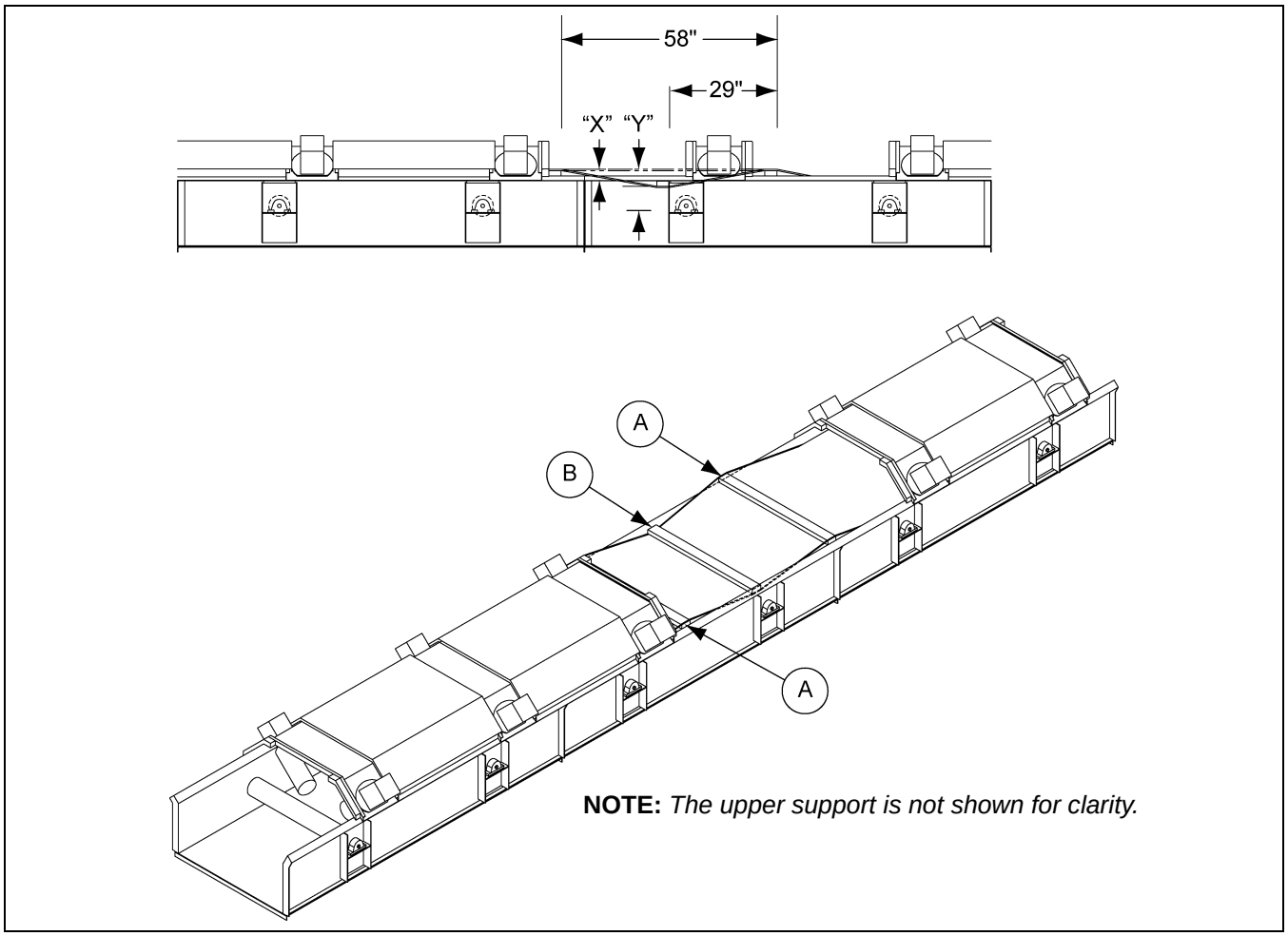


Figure 4R *3I Roller Flo Belt Tensioning Procedure*

Ref #	Description
A	Support Boards
B	Weighted Board

4. Place the weighted board in the same location that was just measured (29" away from the end boards). Place 200 lbs. of weight on the center board. Measure the distance (Y) to the top of the belt at the same location as noted *above*.

5. Compute the belt deflection (X-Y). Adjust the belt tension equally on both sides of the take-up until the belt deflection is within the range listed on the certified drawing. The minimum amount of tension will allow for proper operation of the belt.

6. Turn the inner nuts on the four (4) take-up screws to apply the necessary tension to the belt.
   NOTE: *When adjusting tail pulley, make sure the pulley stays square with the rest of the belt. To ensure the tail pulley is square, the distance between the two (2) take-up screw brackets must be the same. Failure to do so will cause belt tracking problems and lead to premature belt failure.*

7. Re-tighten the take-up screw locking nuts. Reattach lids to complete belt tensioning and take-up adjustment.

Continue to check the tension daily for the first several days of operation and then weekly until the belt stabilizes and does not need adjustments when checked. The amount of time this process will take varies greatly with the overall belt length and the operating conditions of the conveyor. After 200 hours of break-in has been achieved the belt should be checked on regular intervals.

IMPORTANT: *The speed switch at the tail pulley will only notify you when the belt is slack enough to slip, not if the belt needs to be tightened to achieve the proper tension determined using the steps previously listed.*

NOTE: *Improper belt tension will lead to premature failure of the belt conveyor. Under tensioning a belt can result in drive pulley slippage, idler failure, low capacity, material spillage and other serious problems. Over tensioning a belt will lead to premature failure of bearings, shafts, and pulleys. Please follow the above instructions carefully; always install a low speed switch, and tension belt to lowest tension that puts belt deflection in proper range.*

Vulcanized Belt Splices

For some applications, such as when a plow assembly or multiple tripper assemblies are incorporated into a conveyor belt, a vulcanized belt splice is required. This type of splicing joins the two (2) ends of the belt rubber together with the adhesive power of a cement compound without the use of mechanical fasteners. Once the plies of the belt have been glued together, the seam is placed in a portable electric vulcanizing press, which applies even heat and pressure to the joint as the cement compound hardens. A stepped splice like the one shown in *Figure 4S* is a typical application of a vulcanized belt splice.

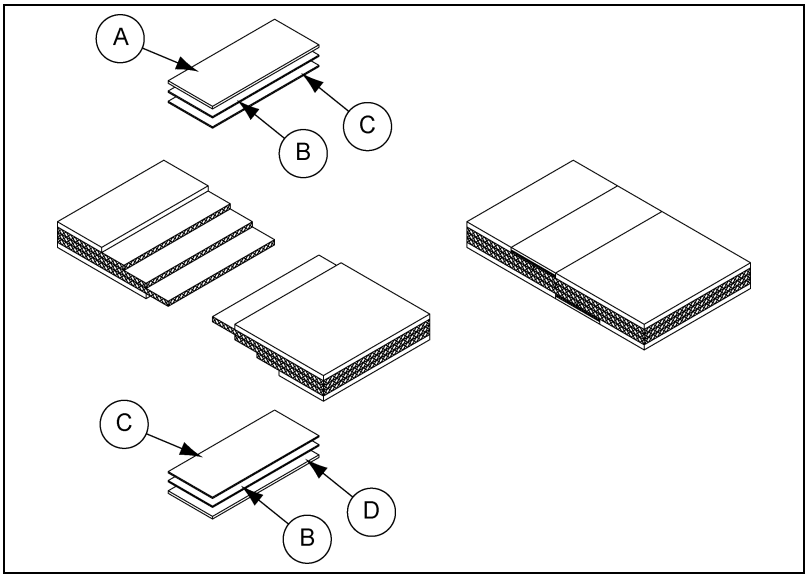


Figure 4S *Stepped Vulcanized Splice*

Ref #	Description	Ref #	Description
A	Top Cover	C	Tie Gum
B	Reinforcing Fabric	D	Bottom Cover

Vulcanized splices can be used on any conveyor belt assembly, but it is best to wait until the belt has been fully broken in and has been stretched to the proper working tension. The disadvantage of a vulcanized splice is that it is much more costly than the typical mechanical fastener style of belt splicing. However, vulcanized splicing requires less maintenance and lasts much longer than more conventional splicing methods.

Installing the Drive (Shaft Mount Only)

Refer to the certified drawing and the equipment quotation for details of the drive components, if supplied. Drive components furnished can vary from simply providing an extended and keyed head shaft, to a complete drive. For purposes of explanation, the installation of a Dodge Shaft Mount Torque Arm reducer will be discussed. Installation of other reducer brands is very similar, differing only in minor details. Refer to *Figure 4T on Page 28.* Save and refer to the manufacturer's data supplied with the reducer. The reducer has a hollow output shaft. Tapered bushings in the output shaft seat the reducer on the conveyor head shaft. The input shaft faces away from the conveyor. The reducer should be positioned close to the head shaft bearing while leaving between 1.50"-2.44" depending on drive model for clearance to tighten and loosen the screws that draw the tapered bushings tight on the head shaft.

1. Slide the gearbox's hollow shaft onto the conveyors extended shaft with proper clearance on back side of the gearbox and tighten the taper-lock bushings to proper torque settings. *(See Figure 4T on Page 28.)*
2. Attach the torque arm bracket to the trough bottom directly behind the head. This should put the torque arm (J) into the proper tension state.
3. Attach the torque arm anchor bracket to the reducer housing (G).
4. Rotate the torque arm turnbuckle to nearly full extension for maximum adjustment range.
5. Refer to *Figure 4T on Page 28.* Assemble the torque arm clevis bracket to the torque arm eye bolt.
6. Fasten the clevis bracket to the torque arm bracket. Use existing holes if possible or drill new holes to fasten the clevis bracket to the torque arm bracket.
7. Adjust the torque arm (J) so that the reducer (G) is vertical. Use the lock nut on the turnbuckle to prevent movement by vibration.
8. Attach the motor mount (B) to the top of the head assembly (A) through the given holes.
9. Fasten the motor (D) to the motor mount (B). The fasteners used will depend on the size and origin of the motor. DO NOT tighten motor mounting screws yet.
10. Fasten the belt guard mounting brackets (H) to the reducer (G), and brackets (E) to the motor mount (B). After installing the brackets (E), attach the mounting bracket guard TA (F) to the brackets (E).
11. Loosely fasten the belt guard WITH THE COVER REMOVED to guard mounting bracket (F). Hole locations for the mounting brackets will need to be found and drilled into the belt guard. Shift the guard so that the elongated hole for the reducer input shaft is vertically aligned and so the full range of adjustment is available. Tighten the guard mounting fasteners.
12. Assemble the drive (M) and driven sheaves (O) on the motor (D) and reducer (G) input shafts. Align the sheave faces and tighten the bushing set screws.
13. Fit the belts (Q) over the sheaves. Use the long screws in the motor bracket to take up the slack in the belt (Q). Make sure the guard does not rub on either shaft. Then re-install the belt guard cover (R).

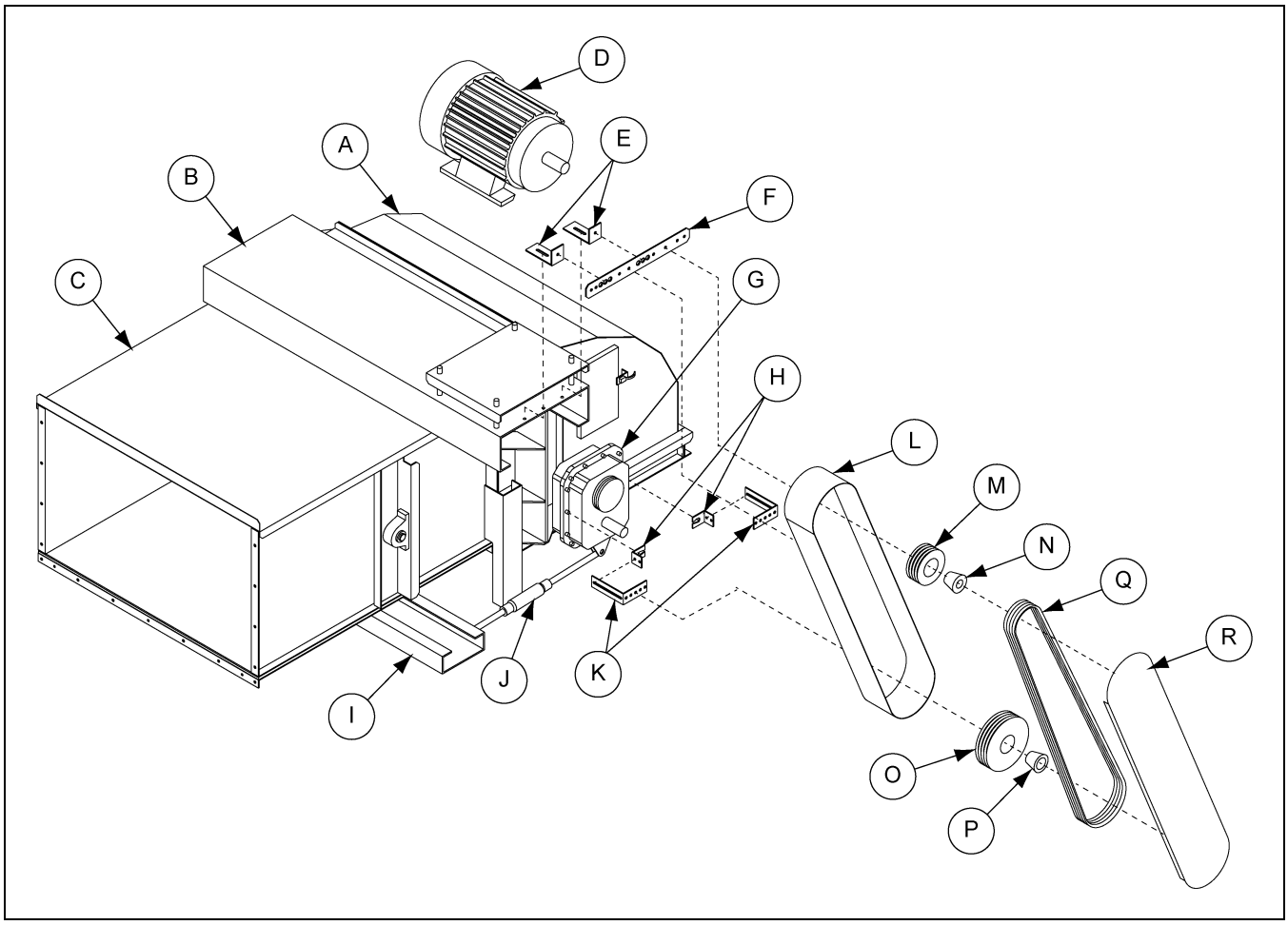


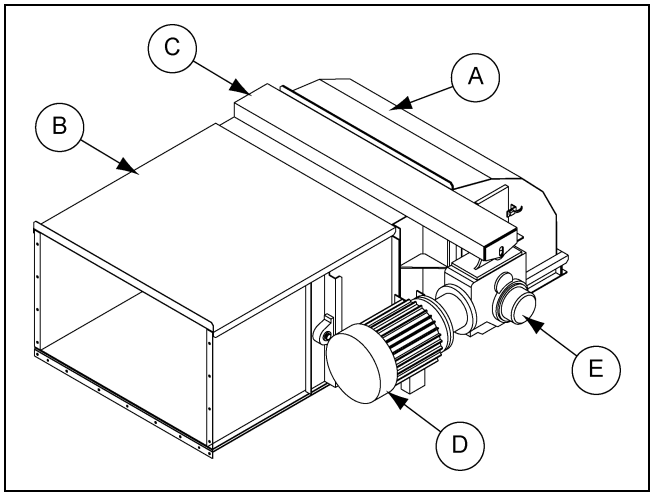
Figure 4T *Typical Shaft Mount Drive Installation*

Ref #	Description
A	Head Section
B	Motor Mount
C	Intermediate Section
D	Motor
E	Mounting Bracket (Motor Mount/Guard TA)
F	Mounting Bracket Guard TA
G	Reducer
H	Mounting Bracket Belt Guard (Reducer Side)
I	Torque Channel

Ref #	Description
J	Torque Arm
K	Mounting Bracket Belt Guard (Guard Side)
L	Drive Belt Guard
M	Drive Sheave
N	Drive Bushing
O	Driven Sheave
P	Driven Bushing
Q	V-Belt
R	Drive Belt Guard Lid

Right Angle Reducer Drive Installation

In some cases, where there is not space on top of the head for the motor and motor mount assembly, a right angle reducer can be used. A right angle reducer (E) and motor (D) are shown in *Figure 4U*. When a right angle reducer is used, there is also no need for a belt drive package because the motor output is in a direct line with the reducer input. To install a right angle reducer drive, the reducer (E) is mounted onto the head shaft.



Ref #	Description
A	Head Section
B	Intermediate Section
C	Torque Channel
D	Motor
E	Reducer

Figure 4U *Right Angle Reducer Drive*

Chain Drive Installation

A chain drive can be provided at the customer's request. There is such variety, that specific details cannot be given in advance. Refer to the conveyor quotation and the certified drawing for further detail if a chain drive is supplied. *See Figure 4V* for a general reference on this type of drive assembly.

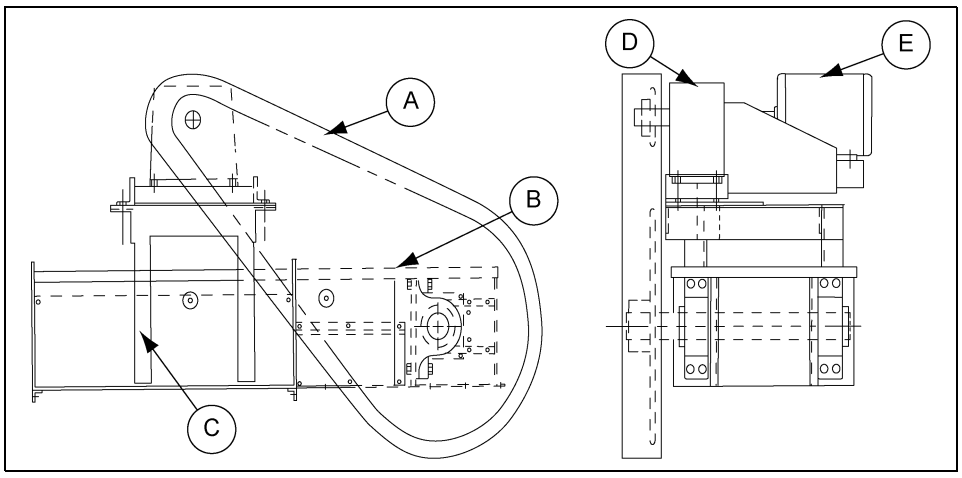


Figure 4V *Typical Chain Drive Installation*

Ref #	Description
A	Chain Guard
B	Conveyor Head
C	Drive Mount

Ref #	Description
D	Sugar Scoop Mount Reducer
E	Motor

Plow Installation

Movable discharge plows are an additional feature that allows for the discharge position to be at almost any point along the conveyor. The plow sits on top of interconnected sections that have rails running along the top of the sections that help support and guide the plow as it traverses the conveyor. *(See Figure 4W.)* Two (2) P/A sections are sent that will make the transition from a standard conveyor section to a plow section all-in-one. Installation procedures will again follow the conveyor assembly instructions *on Page 17*.

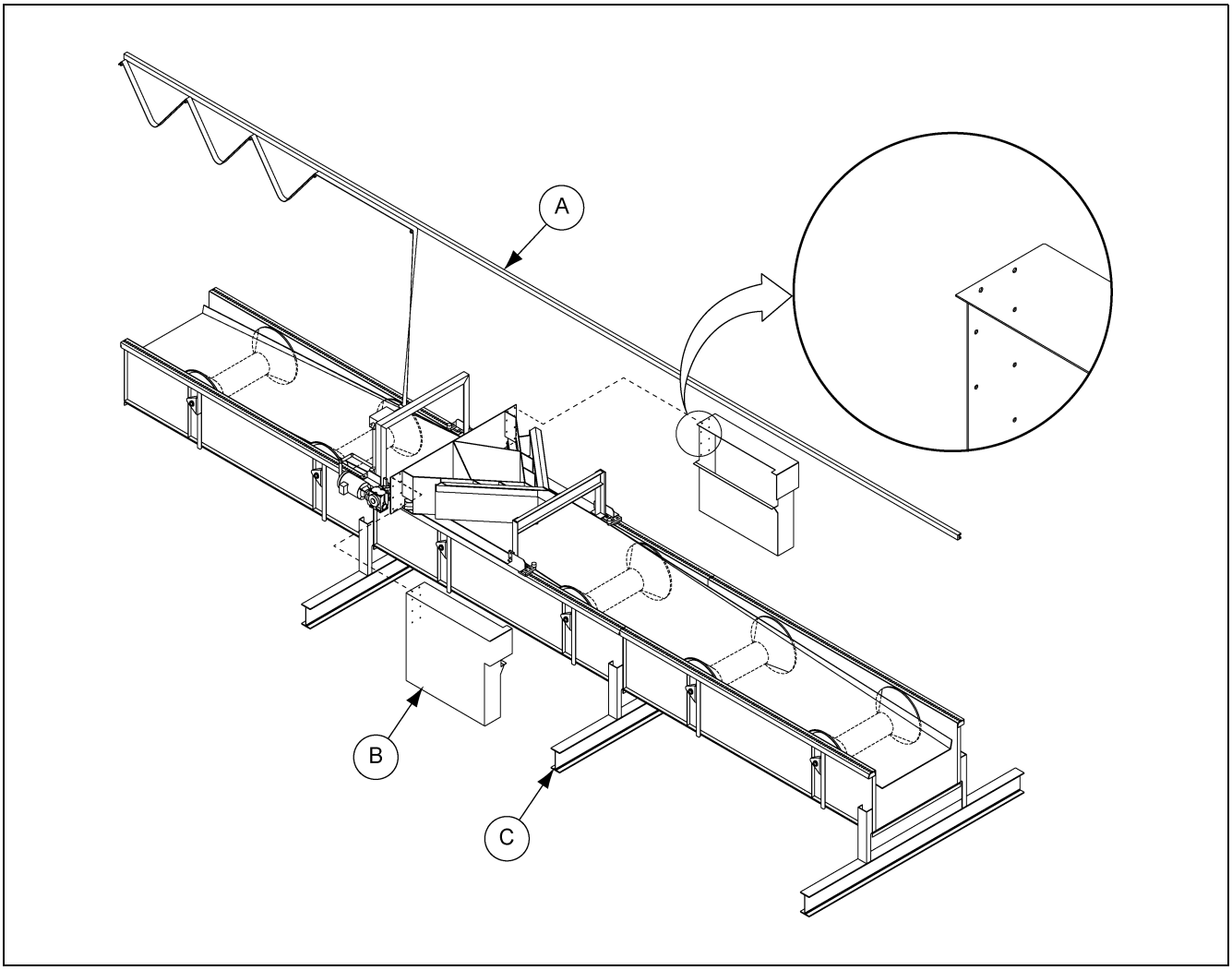


Figure 4W *Plow Section Assembly*

Ref #	Description
A	Wiring Festoon
B	Discharge Chute
C	Conveyor to be Supported Every 9'-8"

A wiring festoon (A) is necessary to supply power to the motor found on the plow assembly. The festoon is to be supplied by others, but the wiring support provided at the rear of the plow makes for an ideal location to mount and secure conduit for the electric motor.

Two (2) discharge chutes (B) will be shipped separately from the plow assembly. They are easily attached to the plow upon shipment once the liner bolts shown in detail view of *Figure 4W* have been removed. After those holes have been lined up with the rear of the plow simply re-attach the bolts through the liner, discharge chute, and the plow assembly to complete installation.

Two (2) limit switches will need to be installed at the beginning and end of the travelable plow sections (E). *Figure 4X* demonstrates how the limit switch and supplied mounting bracket need to be field located and attached to the side of the conveyor. Typical mounting locations include either the side panel or the bearing bracket.

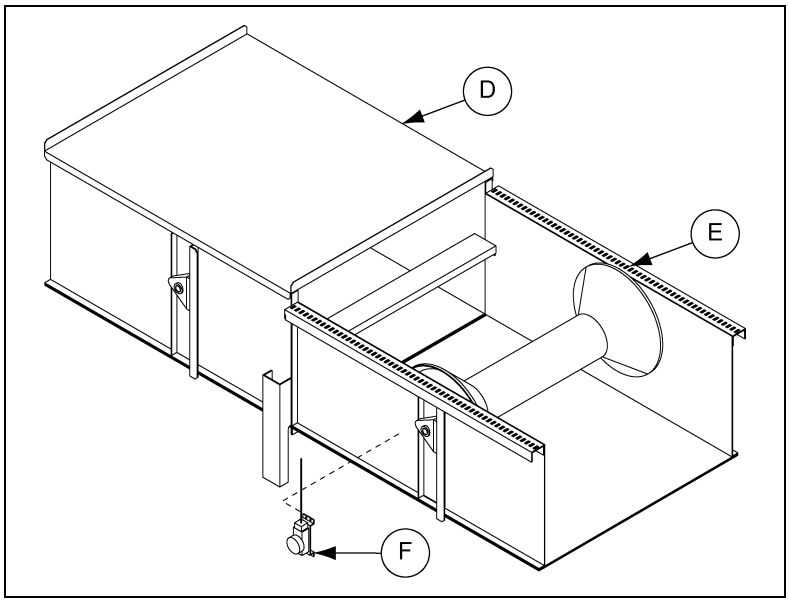


Figure 4X *Limit Switch Location*

Ref #	Description
D	P/A Section
E	Plow Section
F	End of Travel Limit Switch and Mounting Bracket

InterSystems movable discharge plow also features a bristle brush to help sweep the belt clean as it passes through the plow assembly. *Figure 4Y* shows where the brush is located and highlights a few of the incorporated slots to adjust the height of the bristles to increase or decrease the amount of contact with the belt.

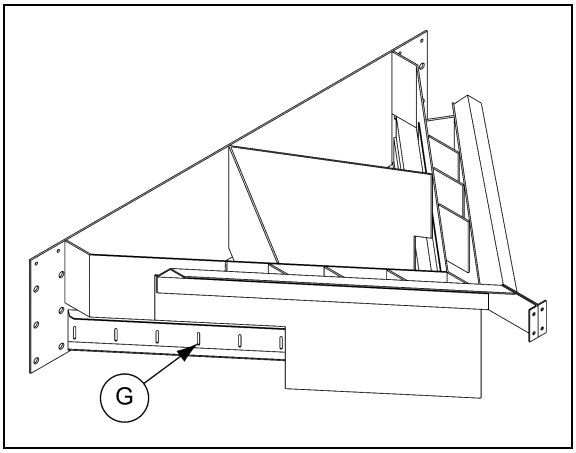


Figure 4Y *Brush Adjustments*

Ref #	Description
G	Slots for Brush Height Adjustment

Tripper Installation

Another form of intermediate discharge Intersystems offers is a tripper. The tripper is designed to allow for material offload at a given point along the conveyor. *Figure 4Z* shows the material profile and belt layout for a conveyor with two (2) trippers. In this example, the first tripper is set so the material bypasses the first intermediate discharge location. The material then exits the belt at the second intermediate discharge location. If desired, the second tripper setup could be set to the flow-thru mode as the first tripper is, and the material would then travel all the way to the end of the conveyor, discharging at the head.

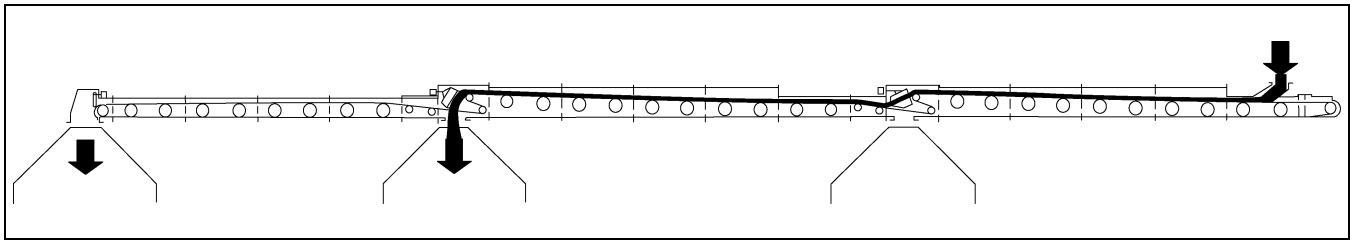


Figure 4Z *Tripper Layout*

Each tripper consists of a total of seven (7) sections strategically placed in the middle of a conveyor. Installation procedures are the exact same as conveyor assembly *on Page 17*. *Figure 4AA* shows the layout of the sections. The special short section before the tripper helps to ensure proper spacing of the tripper and the intermediate discharge. The next four (4) sections are the “A” through “D” sections of the tripper knee. When assembled in order, the knee sections change the height of the belt, raising it as it approaches the actual tripper section which follows directly behind. 48" and 54" wide conveyor assemblies also include an “E” knee section which pushes the total number of sections to 8 for those sizes. Similar to the smaller conveyor widths the “E” section will follow directly behind the “D” section and just ahead of the tripper section.

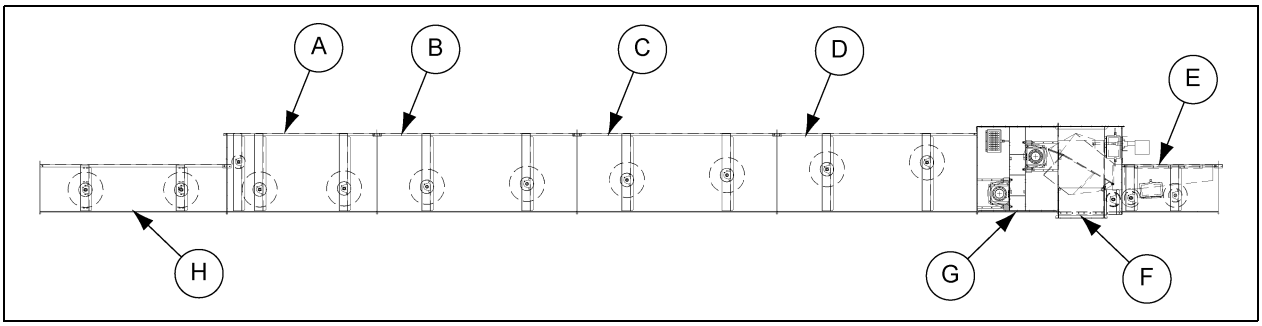


Figure 4AA *Tripper Assembly*

Ref #	Description
A	“A” Knee Section
B	“B” Knee Section
C	“C” Knee Section
D	“D” Knee Section

Ref #	Description
E	Knee Forward Section
F	Tripper Discharge
G	Tripper Knee Section
H	Custom Length Short Section

The tripper has two (2) functions. It can be used for its primary purpose of offloading the material at the intermediate discharge location. When the material is offloaded at the intermediate discharge point, the tripper acts similarly to a plow, pushing the material to both sides of the conveyor. The material then falls through two (2) dishcarge chutes, one on each side of the conveyor as shown in *Figure 4AB* and *Figure 4AC*.

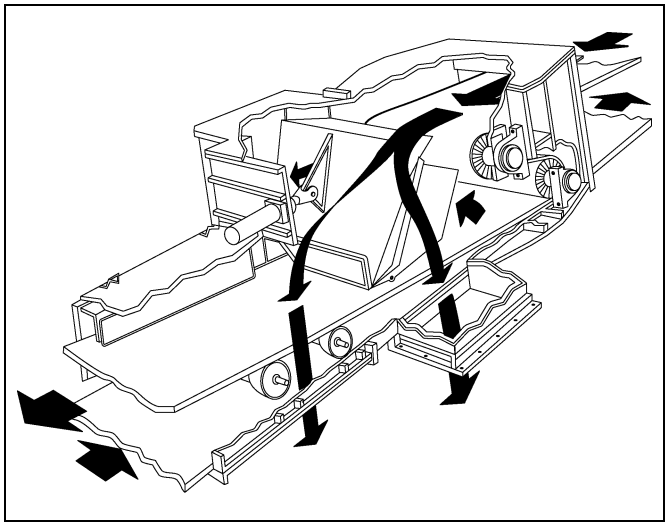


Figure 4AB *Tripper in Divert Position*

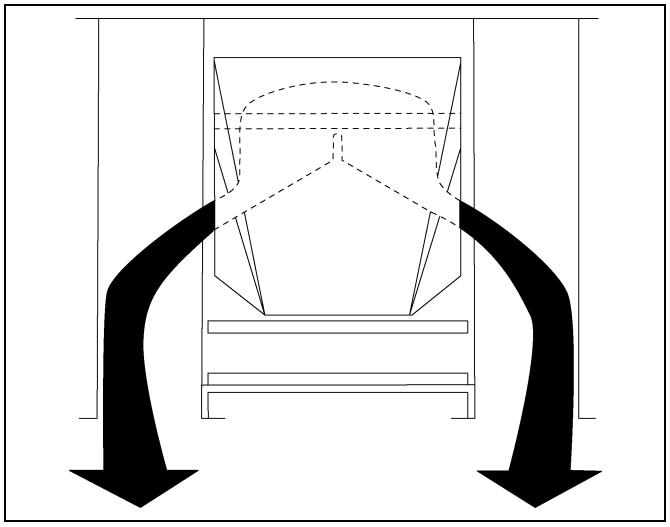


Figure 4AC *Tripper Side Discharge*

The tripper can be set to flow-thru position to bypass the intermediate discharge location. In this mode, the internal weldment funnels the conveyed material back onto the belt at the forward knee section, as opposed to diverting it outward to the side of the section housing into the discharge chutes. The forward knee section then brings the belt back up to standard operation height in addition to transitioning the belt back to standard trough shape. The material is then conveyed in typical fashion through the remaining sections to either an additional intermediate discharge or the head pulley discharge. *Figure 4AD* shows the tripper when used in the flow-thru mode.

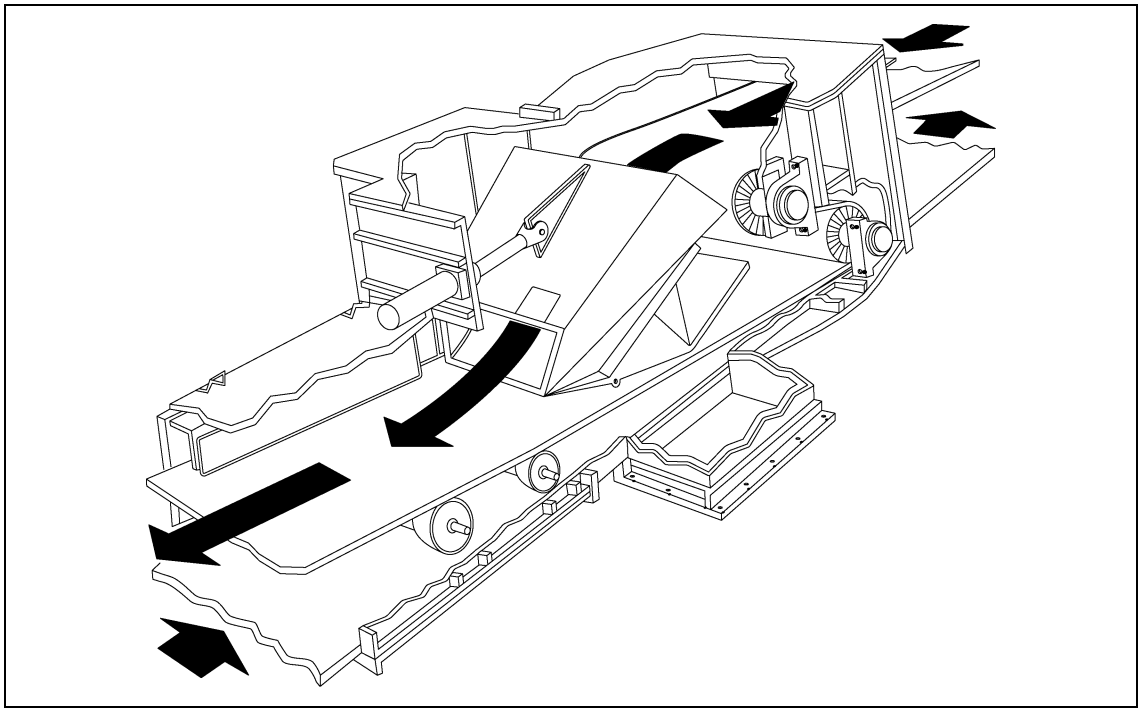


Figure 4AD *Tripper in Flow-Thru Position*

Shrouded heads ensure that any material that has not exited the conveyor at one of the previous discharge locations is carried back to the tail along the bottom of the conveyor. Once that remaining material has reached the tail pulley, it will be flipped back onto the belt for a return trip to the desired discharge location. The shroud can also be retracted by a linear actuator if the end of the conveyor is the discharge location of choice. *Figure 4AE* and *Figure 4AF* depicts the head section and demonstrates how the shroud can be used in both examples listed.

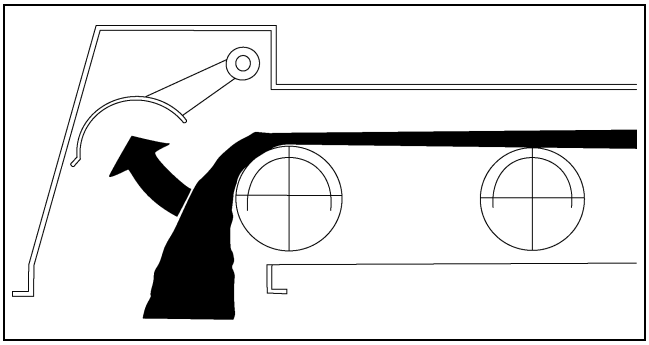


Figure 4AE *Open Discharge*

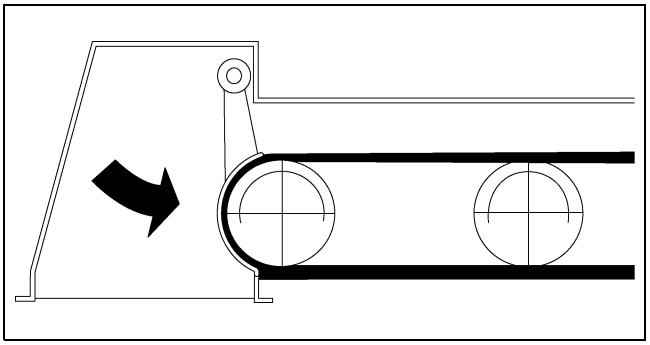


Figure 4AF *Closed/Carry Over Control*

The section directly behind the discharge section of a conveyor that uses a tripper is the forward knee section (I). *(See Figure 4AG.)* This section includes skirting to help contain and direct the flow of material back onto the belt should the tripper discharge be bypassed. There is an inspection door on each side of the section that allows for an operator to check the height of the rubber skirting with respect to the idlers and the belt. Slots in the side panels allow for the mounting brackets to be raised and lowered as needed to ensure the rubber skirting is barely touching the belt rubber as it passes underneath as shown in *Figure 4AG*. By loosening the retainer on the back of the rubber skirting the rubber can be slid down prior to the retainer being retightened to help adjust the height of the skirting as needed.

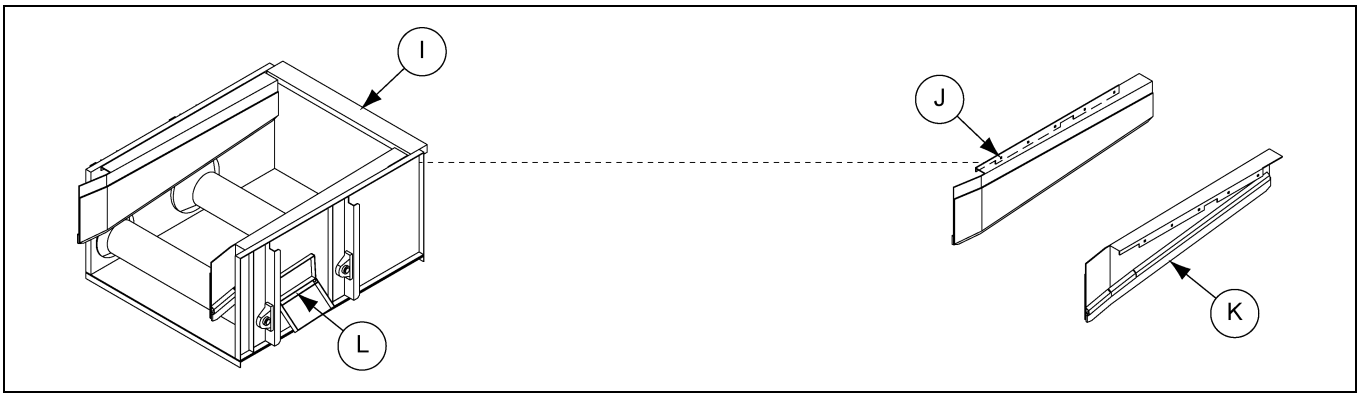


Figure 4AG *Forward Knee Skirting Adjustments*

Ref #	Description
I	Forward Knee Section
J	Mounting Holes
K	Rubber skirt height can also be adjusted.
L	Skirting height can be checked through inspection door.

Field Wiring

NOTICE ***Standard electrical safety procedures should be used. A qualified electrician should make all electrical wiring installations. Follow all local or national electrical safety standards and ordinances when installing the equipment.***

Regardless of the source of the conveyor's drive and controls, all power and control wiring must conform to the National Electrical Code and to all applicable federal, state, and local codes and regulations. Usually, a magnetic motor starter/circuit breaker is used to control the conveyor drive motor. The starter is typically located in an electrical panel located some distance from and out of sight of the conveyor. The National Electrical Code (NEC) requires that a fused, lockable disconnect switch be located near and in sight of the conveyor drive so that maintenance and repair personnel can see and discourage anyone who attempts to restore power without authorization.

Plug Switch Function

The conveyor is supplied with a plug switch that is located in the discharge hood. If the head section of the conveyor becomes choked or clogged with conveyed material, this switch is allowed to return to its normally open unactuated condition when the build-up of material forces out the diaphragm of the switch. The switch contacts must be interlocked with momentary start/stop push button switches and the motor starter. When this condition occurs, the motor circuit will be interrupted, causing the conveyor and any other interlocked equipment to shut down. *See Figure 4AH* for suggested wiring diagram and Appendix A *on Page 50* for additional details.

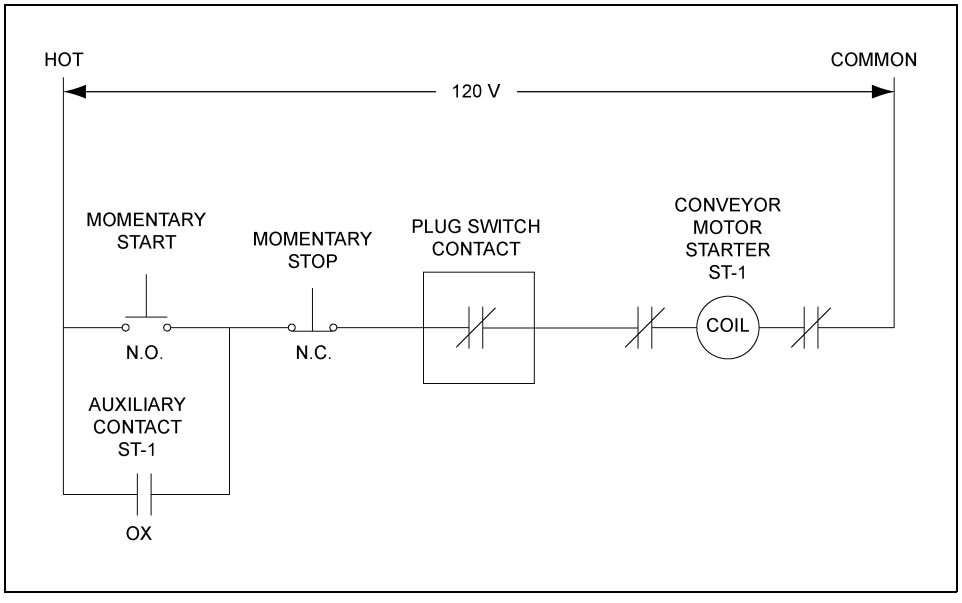
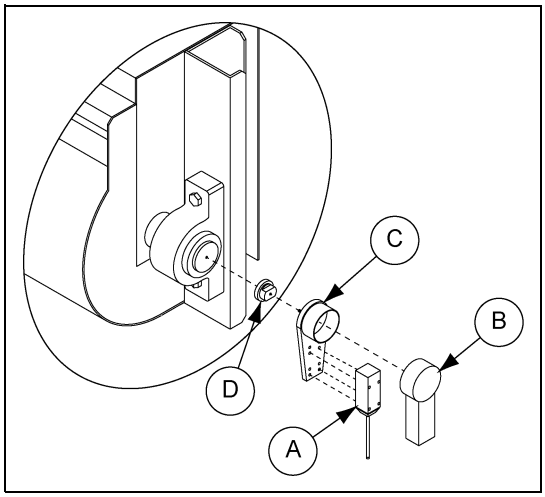


Figure 4AH *Suggested Plug Switch Wiring*

Speed Switch Function

The conveyor is supplied with a speed switch located at the tail. *See Figure 4AI* shows the standard "whirligig" mounting type. The whirligig mounting option allows for a bracket to be bolted directly to the tail shaft rather than mounting a bracket to the side of the tail section. The purpose of the speed switch is to stop the conveyor if there is a 10% drop in RPM of the tail shaft. This sensing will act as a belt break and belt slip monitor. Should a speed decrease be detected, the switch is allowed to return to its normally open unactuated condition.

The switch contacts must be interlocked with momentary start/stop push button switches and the motor starter. When this condition occurs, the motor circuit will be interrupted, causing the conveyor and any other interlocked equipment to shutdown. Since each conveyor is unique, **the switch MUST be calibrated**. Refer to documentation enclosed with speed switch for proper installation and settings. *See Figure 4AJ* for suggested wiring diagram.



Ref #	Description
A	M800 Speed Switch
B	Speed Switch Cover
C	Whirligig Mounting Bracket
D	Optional Magnet

Figure 4AI *Speed Switch with Whirligig Mount*

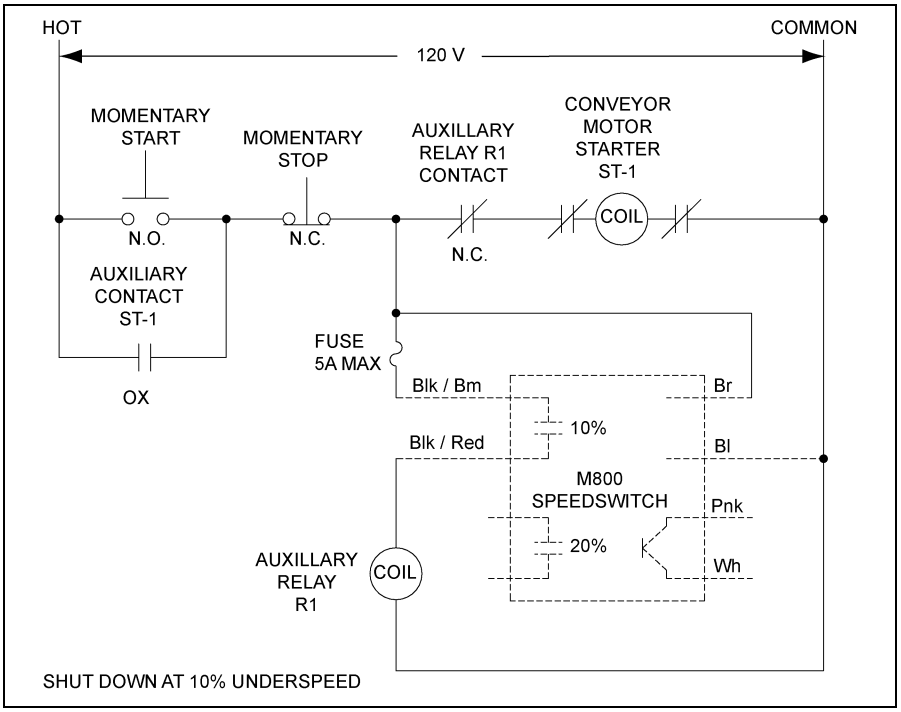


Figure 4AJ *Suggested Speed Switch Wiring Diagram*

Belt Alignment Monitoring System

If your Roller Flo conveyor is equipped with a belt alignment monitoring system, refer to certified drawing for proper location of rub blocks. A typical belt alignment monitoring system will consist of four (4) rub blocks. The first two (2) rub blocks will need to be located in the openings provided in the take up section as shown in *Figure 4AK*. The remaining two (2) rub blocks will be inserted into the openings provided in the short section as shown in *Figure 4AL*. The rub blocks are only to be installed after the initial tail take-up has been performed. See the supplemental information for the remaining information on the installation of the belt alignment monitoring system.

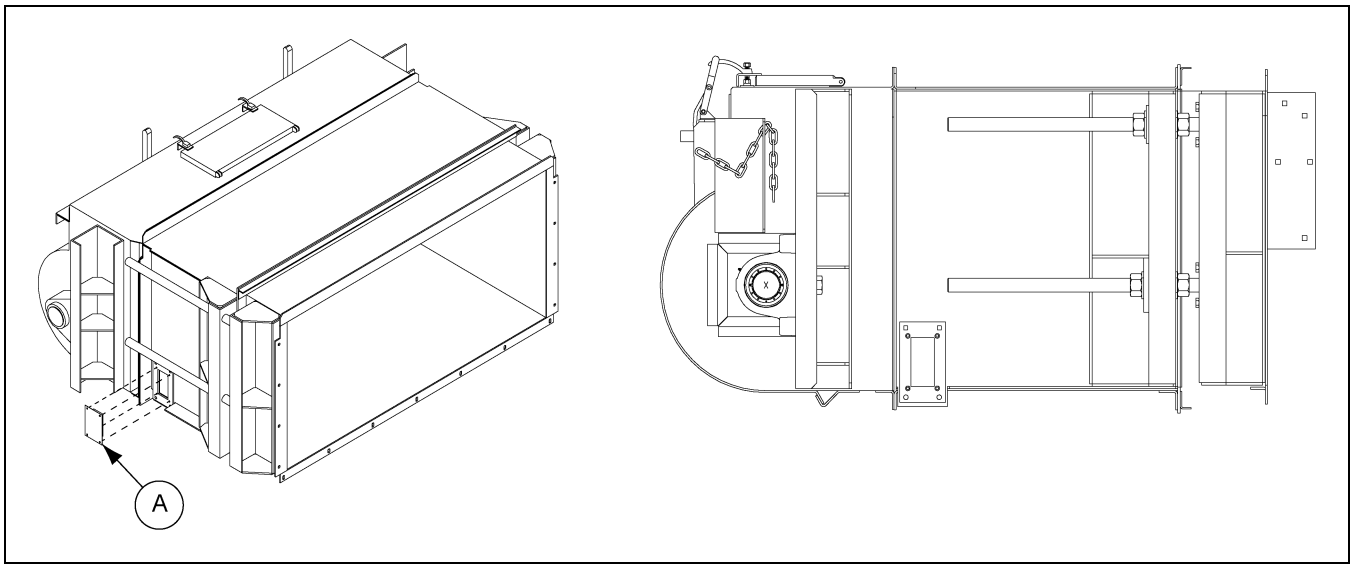


Figure 4AK *Take-Up Section Rub Block Locations*

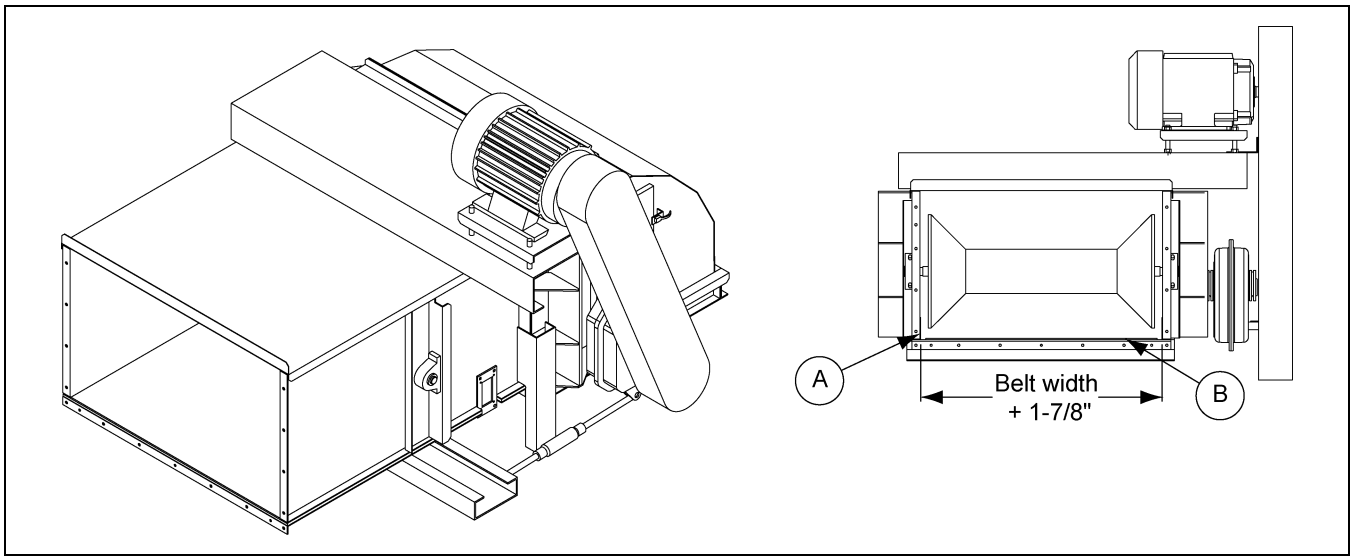


Figure 4AL *Short Section Rub Block Locations*

Ref #	Description
A	Rub Block
B	Belt

Bearing Temperature Monitoring System

If your conveyor is equipped with a bearing temperature monitoring system, refer to certified drawing for proper location of sensors. A typical bearing temperature monitoring system contains four (4) bearing temperature sensors. These sensors are located on the bearings of the tail pulley and the bearings of the head pulley. If the conveyor is equipped with a tripper intermediate discharge, bearing temperature sensors may also be used in the bearings of the tripper section. See the supplemental information on the installation of the belt alignment monitoring system.

Sensor Locations

An example of a conveyor with sensor locations is shown in *Figure 4AM*. Your conveyor may or may not have all the shown sensors and conveyor features. For more specific information regarding sensor locations for an individual conveyor, refer to the certified drawing.

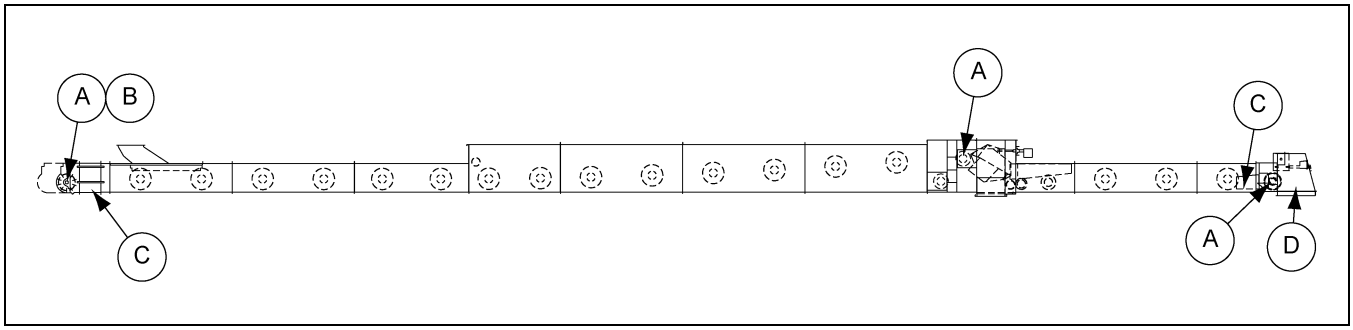


Figure 4AM *Sensor Locations*

Ref #	Description
A	Bearing Temperature Sensor
B	Speed Switch
C	Belt Alignment Sensor (Rub Block)
D	Plug Switch

Ventilation

Grain dust can be hazardous to one’s health, so ventilation is strongly recommended. Grain dust is also very flammable so it is critical that the end user takes necessary precautions.

Pre-Startup Procedure

Do this before power is applied to the conveyor:

1. Make sure all guards are in place and all warning labels are in place and legible. GENERAL SAFETY INFORMATION, explains the purpose and intended location of the warning signs. Safety Section also lists the part numbers of the signs. Warning signs are an important part of any safety program; replace any missing signs IMMEDIATELY.
2. Make certain all electrical connection box covers are in place and securely fastened. Check for exposed wiring and damaged conduit.
3. Inspect the inside of the conveyor for tools, or anything else that could cause damage on startup.

All power to the conveyor must be shut off and locked out before performing any pre-startup procedure. Death or serious injury can result if the conveyor starts while any service is being performed.

Initial Lubrication

Filling the Reducer with Lubricant

The conveyor's drive reducer is shipped without lubricant (dry). Refer to the documentation furnished with the optional reducer, fill the reducer gearcase with the recommended lubricant to the specified level. All lubricants to be supplied by others.

Mounted Bearings

The mounted bearings in the head, tail, and intermediate sections were filled with lubricant from the manufacturer and do not require relubrication at initial start-up time.

Head Shaft Alignment

Verify that the head shaft is truly perpendicular to the conveyor axis and that the pulley is centered on the shaft. A misaligned shaft or incorrectly positioned pulley may cause premature belt failure.

Start-Up

1. For the initial start-up, the conveyor should be empty.
2. Depending on the conveyor length and configuration, station one or more persons to listen and watch for potentially dangerous or damaging conditions.
3. Remove the cover closest to the head. Turn the conveyor ON. If there is provision for JOGGING the conveyor, do so rather than operate it continually. Verify correct direction of motor rotation. If necessary, change motor wiring for correct direction of motor rotation.
4. Once the belt is operating in correct direction, watch the head pulley to see if the belt slips on the head pulley when power is applied. If the pulley slips, tighten the take up until it does not slip. Recheck when material is loaded on the belt. Also watch the head pulley to see if it is tracking center. If the belt is tracking off center, check to ensure the tail pulley is square and tight. Check the head pulley to ensure it is square. If needed shim the head pulley to make it square with the path of the conveyor.
5. With the belt running and all covers off, inspect the belt travel on the idlers and return path. If the belt is tracking to one side in any location, refer to *Page 41* for belt tracking suggestions.

6. **NOTE:** *Not all idlers will turn with an empty belt.* The weight of the belt is not enough to turn the mass of the idler. However, if the idler does not turn when material is applied, check the bearing of that idler for seizure.
7. Recheck belt tension as detailed in belt tensioning and initial tail section (take-up) adjustment *on Page 24*.
8. Adjust the loader skirting (B) so that the rubber is barely above the belt (A). This is done with the four (4) bolts (two (2) each side) located on the cover part of the Loader section. *(See Figure 5A and Figure 5B.)*
9. Adjust the height of the plow in the tail section if necessary. Refer to *Figure 5C* for details ensuring that the bottom of the plow is between 1/2" and 3/4" above the belt.
10. Calibrate the tail speed switch as instructed in the enclosed “Technical Information” sheet supplied with the speed switch.
11. After correcting any problems detected during initial conveyor operation, replacing any guards or covers removed, and observing all safety precautions, proceed to test the conveyor with the product or material to be conveyed in normal operation. Since InterSystems, Inc. is not responsible for system integration or controls, a system test procedure is beyond the scope of this manual.

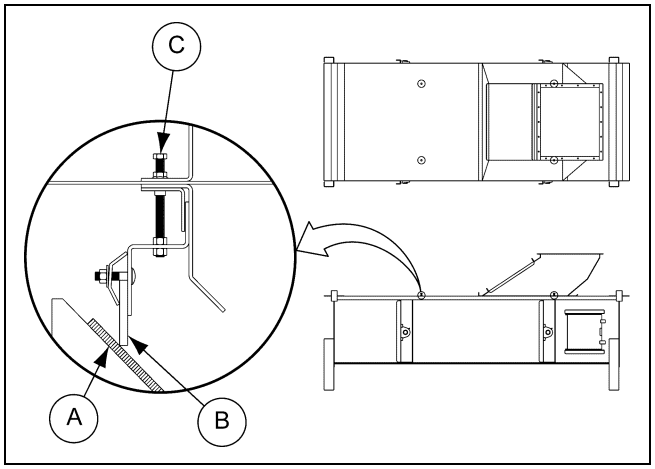


Figure 5A *Roller Flo Loader Skirt Adjustment*

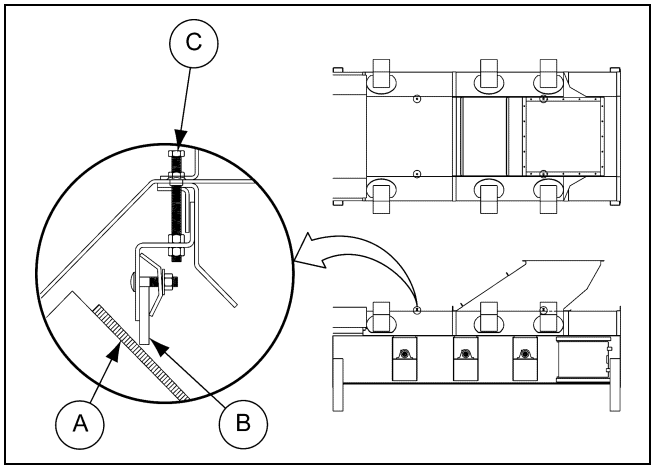


Figure 5B *3i Roller Flo Loader Skirt Adjustment*

Ref #	Description
A	Belt
B	Skirt

Ref #	Description
C	Adjustment Screw

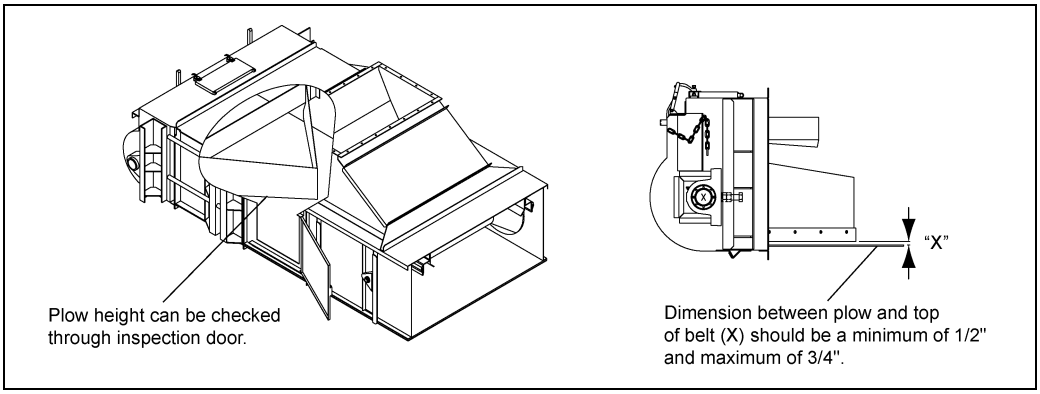


Figure 5C *Tail Plow Height Adjustment*

Belt Tracking

If the belt is tracking to one side in one location, adjust the idler at that section. Adjust the side of the idler that the belt is riding high on toward the direction of travel until the belt becomes center. *(See Figure 5D and Figure 5E.)* If the belt is rubbing the side of the conveyor on the return path, check to see if that section is squared and level with the two (2) sections before and after. If one or more portions of the belt run off at all points along the conveyor, the cause is more likely in the belt itself, in the joints of the belt, or in the loading of the belt. See loading material on the belt *on Page 42* for belt loading corrections. If the belt runs off center at or near the splice then returns to center, the splice is not correct. Resplice the belt according to the direction stated in this manual. If the belt runs off center away from the splice and then returns to center, check that area of belt for cuts, burns, or other localized damage.

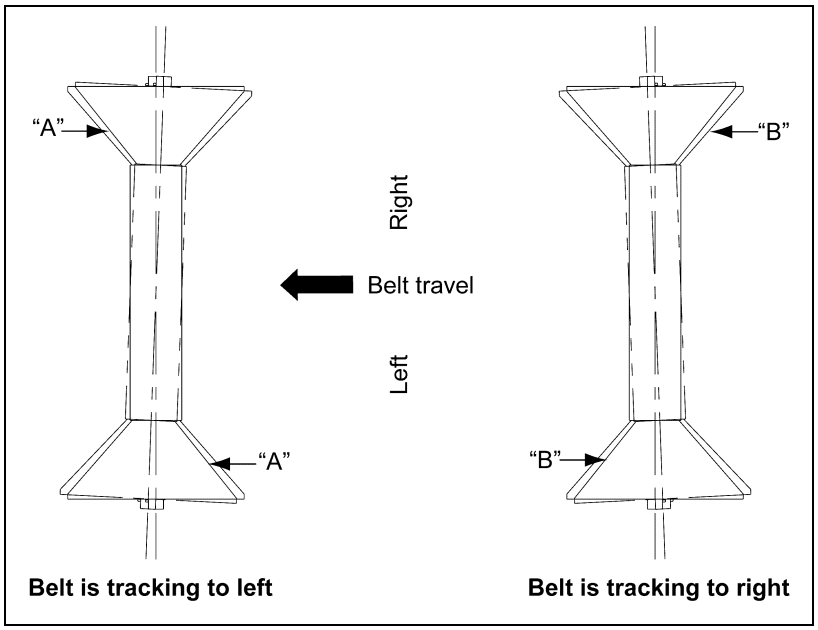


Figure 5D *Standared Roller Flo Idler Adjustments*

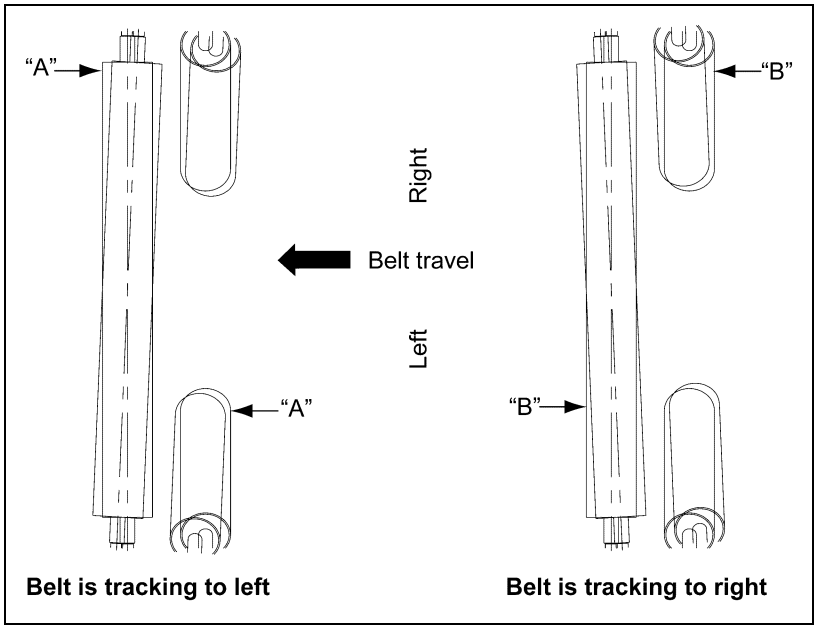


Figure 5E *3i Roller Flo Idler Adjustments*

Loading Material on the Belt

Start with a light load and gradually work up to the load that the conveyor was designed to handle. Check skirting to see that the material is being directed onto the **CENTER OF THE BELT**. Off-center loading is harmful to the belt, idlers, and shafting. An off-center load will affect belt alignment in that the belt will run off center. *(See Figure 5F.)* A central load will maintain belt alignment. **If the material is not loading center on the belt, install baffles in the chute from the feeding equipment BEFORE it gets to the belt loader in order to center the material**.

The loading point of a belt conveyor is the critical point. Here, the conveyor receives its major abrasion and practically all of its impact. The ideal condition is to have the material pass from chute to belt at the same speed and direction of travel as the belt, with a minimum amount of impact, and to load the belt on center. If the material is not delivered onto the belt at the belt speed, there will be turbulence in the mass of the material at the loading point. A build-up in volume may form at this point. This material turbulence is a function of the velocity difference between the belt and the material.

The skirts must be adjusted to prevent side spillage of material and to keep the load central on the belt. The maximum distance between skirtboards customarily is two thirds the width of a troughed belt. The skirt length is designed to stop side spillage. The material should also be at rest on the belt before it reaches the end of the skirt. If the material is still tumbling as it passes the skirt end, the skirts may need to be lengthened.

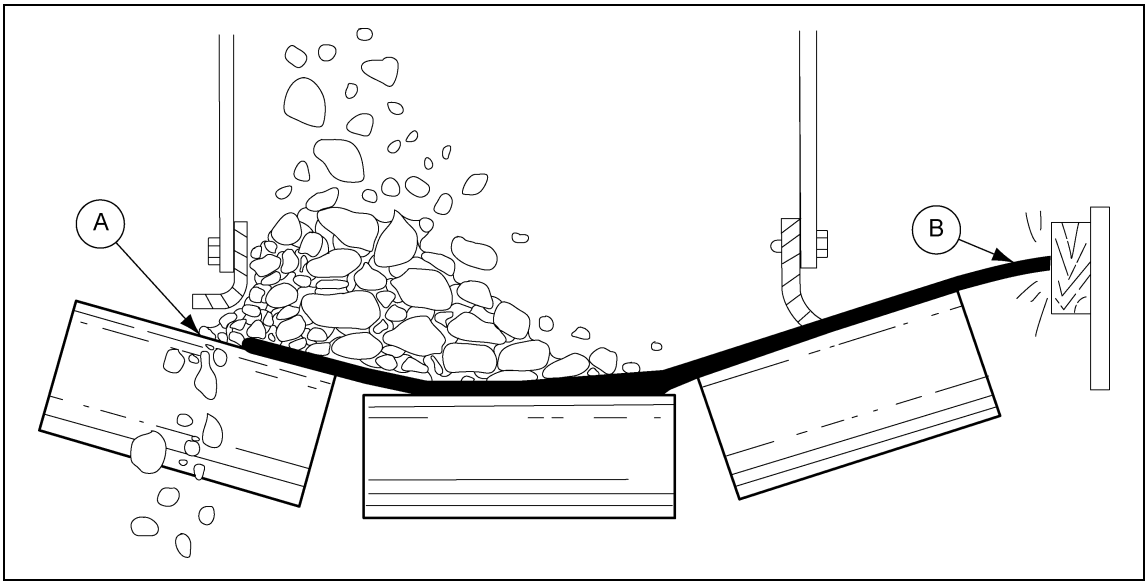


Figure 5F *Effects of Off Center Loading*

Ref #	Description
A	Spill
B	Edge Rub

Before any maintenance is performed on the conveyor, power must be shut OFF and locked out to prevent accidental start-up.
Failure to observe all safety rules, written, implied, and those suggested by obvious common sense, can result in death, serious injury, and/or equipment damage.

General Maintenance

A good maintenance program involves thorough general housekeeping, adequate periodic re-lubrication, and timely adjustment of take-ups to maintain proper belt tension.

Periodic Inspection

At regularly scheduled intervals, while observing all safety precautions, observe the conveyor as it operates. Inspect for:

1. Check belt sag to ensure that it does not exceed the recommended 2% of idler spacing while loaded. (Refer to belt tensioning and initial tail section (take-up) adjustment *on Page 24*.)
2. Flippers on tail pulley are adjusted so they barely touch the bottom of the conveyor length.
3. Skirtboard wear and proper adjustment.
4. Bottom liner for excessive wear from belt or other foreign material.
5. Wear on head pulley lagging.
6. Loose or missing hardware.
7. Noisy bearings, motor, or reducer.
8. Overheated bearings, motor, or reducer.
9. Structural damage.
10. Rust or corrosion.
11. Damaged wiring, including exposed conductors and connections.
12. Periodically shut off and lock out all power to the conveyor. Check the plug switch and belt break/slip switch to see that they are functioning properly.
13. Check belt for damage due to foreign object caught in conveyor.
14. Make sure that all guards and warning labels are in place and legible. GENERAL SAFETY INFORMATION from *Pages 5-14*, explains the purpose and intended location of the warning signs. Safety section also lists the part numbers of the signs. Warning signs are an important part of any safety program; replace any missing signs IMMEDIATELY.

Lubrication

In all cases, the manufacturers of the individual components have precise recommendations for periodic lubrication of their products. Strict adherence to these procedures will result in a minimum of down time and maximum component life.

Reducer

Refer to the documentation furnished with the reducer. The user must interpret the data therein with respect to the severity of duty in each application. If there is any doubt, contact the manufacturer or a local supplier of the reducer for specific recommendations.

Motor

Many motors have sealed and permanently lubricated bearings; with these, no re-lubrication is possible or desirable. If bearings of this type become noisy or overheat, they must be replaced.

Motors having bearings which can be re-lubricated are usually larger horsepower sizes. Special pressure lubricating equipment may be required. Refer to the documentation furnished with the motor.

Mounted Bearings

Mounted bearings require periodic re-lubrication at appropriate intervals. The amount and frequency depends on the severity of the operating environment and the duty cycle. Refer to manufacturers recommendations for frequency, type and amount of lubrication.

Roller Chain Drive

For conveyors which include InterSystems, Inc. supplied chain drives, the lubricant level in the chain case/cover should be maintained at a high enough level to immerse the lower sprocket teeth and roller chain. It must not be so high as to leak from the joints in the chain case. *Figure 4V on Page 29* shows a typical chain drive.

Chain lubricant should be examined at appropriate intervals and changed whenever it is dirty or yearly, whichever occurs first. Use heavyweight 140 Wt. gearlube.

General Housekeeping

At frequent and regular intervals, remove the accumulated dirt from the motor and reducer to prevent overheating. Fan cooled motors depend upon unobstructed air flow over the housing for effective cooling.

Reducer gear cases must also be free of dirt for effective radiation of heat. Most reducers have a pressure vent which allows escape of vapors which may build up internally. If dirt blocks a vent, internal pressure can rupture seals. Leaking lubricant can contaminate product and will result in reducer failure and equipment downtime. Some manufacturers have refused to honor warranties in such cases.

DANGER

If despite the prohibition stated in the installation section of this manual, the conveyor has been employed as a stressed or tensioned support member, positively do not remove any side or bottom panels until shoring, staging, or other substantial support has been provided. Without adequate support, the conveyor can buckle or collapse entirely. Death or serious injury is possible.

If the conveyor was not emptied before beginning liner replacement, the product remaining in the trough could have considerable weight. Injury could result from falling material.

Bottom Liner Replacement

1. Remove and save all fasteners attaching the bottom panel and liner to the rest of the conveyor.
2. Unbolt old liner and replace with new liner. Bolt new liner to the bottom panel.
3. Lift the new bottom liner into position beneath the trough. Make sure the hole patterns match; if they do not, re-drill the holes as necessary. Re-fasten the bottom liner to the side panels.

Head Pulley Lagging Replacement

The lagging acts as a barrier between the belt and the pulley to soften the interaction and extend belt life. It is possible to remove the lagging from the head pulley, and should be replaced before it wears down to the top of the retainer or the bottom of the grooves. Replacement can be done in two (2) ways. The first way is to remove the pulley from the conveyor assembly. On certain models, there are side doors on the head assembly to allow access to the pulley. To remove the lagging, bend the tabs on the side of the pulley up and then slide the lagging out from under the retainers. *(See Figure 6A.)* On some pulleys, the lagging is bolted to the pulley. *(See Figure 6B.)*

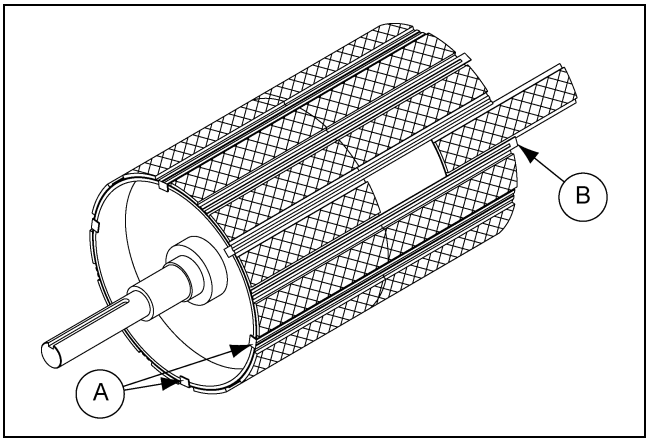


Figure 6A *Head Pulley with Tabbed Retainers*

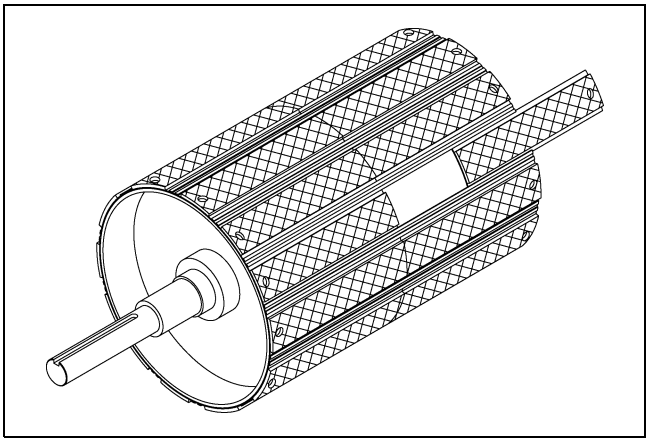


Figure 6B *Head Pulley Bolted Lagging*

Ref #	Description
A	Tabs
B	Tab Bent Up

Head Hood Removal

To access the inside of the head assembly, the hood can be easily removed. Access may be required to change the lagging of the pulley or to perform other routine maintenance and inspection. The hood is removed by unbolting it from the rest of the head assembly and sliding it back along the guide rails. This allows access to the head without having to take anything apart. The head in *Figure 6C* is shown with the bolts removed and the hood slid back on the bottom guide rails.

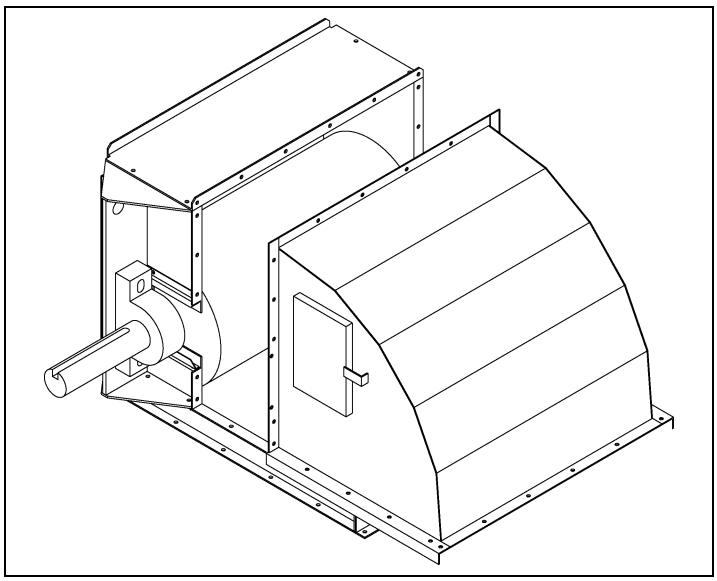


Figure 6C *Head Hood Removal*

If a problem is experienced at start-up, verify that the conveyor has been installed and is being operated within the parameters set forth when the conveyor was ordered and as stated in the quotation confirmation and shown on the certified drawing furnished with the conveyor. Among the factors to be considered are these:

What you should know:

1. Is the conveyor being used as designed in certified drawing such as inclined/declined service?
2. If the conveyor was designed for inclined service, does the degree of incline exceed the designed incline specified in the certified drawing?
3. Is the drive of different capacity or output speed than specified in the quotation?
4. Is the conveyor's capacity, either in terms of volume or weight of material being exceeded?
5. Is the conveyor being used to convey material different than that for which the conveyor was originally specified as shown on the certified drawings?
6. If there is insufficient drive belt tension, the drive belts will slip and the conveyor will operate at less than normal speed.
7. Check for obstructions at the conveyor inlet(s) or in the bins, hoppers, or chutes feeding the conveyor.
8. Look for holes in the belt carcass where a hole may be large enough to cause material spillage.
9. For belt tracking and wear problems, refer to table *below* for suggested reasons for listed problems.

Belt Troubleshooting

Complaint	Cause *(See Page 48 and Page 49.)* (In order of probable occurrence)
Belt runs off at tail pulley	8, 14, 13, 16, 20
Entire belt runs off at all points of the line	25, 16, 14, 20, 4, 15
One belt section runs off at all points of the line	2, 10, 1
Belt runs off at head pulley	14, 21, 20, 15
Belt runs to one side throughout entire length at specific idlers	14, 15, 20
Belt slip	18, 6, 20, 15, 21
Belt slip on starting	18, 6, 21, 9
Excessive belt stretch	12, 11, 20, 5, 8
Belt breaks at or behind fasteners; fasteners tear loose	2, 22, 12, 21, 19, 9
Vulcanized splice separation	12, 22, 9, 19, 2, 8
Excessive wear, including rips, gouges, ruptures, and tears	11, 24, 16, 20, 7
Excessive bottom cover wear	20, 13, 18, 19, 21
Excessive edge wear, broken edges	25, 4, 16, 7, 1, 20
Cover swells in spots or streaks	7
Belt hardens or cracks	7, 22, 21, 17
Covers become checked or brittle	7, 17
Longitudinal grooving or cracking of top cover	26, 13, 20, 11
Longitudinal grooving or cracking of bottom cover	13, 20, 21
Fabric decay, carcass cracks, ruptures, gouges (soft spots in belt)	11, 19, 9, 7, 23
Ply separation	12, 22, 10, 7, 3

Belt Troubleshooting Solutions

Symptoms	Solutions
1. Belt bowed	1. Avoid telescoping belt rolls or storing them in damp locations. A new belt should straighten out when “broken in” or it must be replaced.
2. Belt improperly spliced or wrong fasteners	2. Use correct fasteners. Re-tighten after running for a short while. If improperly spliced, remove belt splice and make new splice. Set up regular inspection schedule.
3. Belt speed too fast	3. Reduce belt speed.
4. Belt strained on one side	4. Allow time for new belt to “break in”. If belt does not break in properly or is not new, remove strained section and splice in a new piece.
5. Counterweight/tension too heavy	5. Re-calculate weight required and adjust counterweight accordingly. Reduce take-up tension to point of slip, then tighten slightly.
6. Counterweight/tension too light	6. Recalculate weight required and adjust counterweight or screw take-up accordingly.
7. Damage by abrasives, acid, chemicals, heat, mildew, oil	7. Use belt designed for specific conditions. For abrasive materials working into cuts and between plies, make spot repairs with cold patch or with permanent repair patch. Seal metal fasteners or replace with vulcanized step splice. Enclose belt line for protection against rain, snow, or sun.
8. Differential speed wrong on dual pulleys	8. Make necessary adjustment.
9. Drive underbelted	9. Re-calculate maximum belt tensions and select correct belt. If line is over extended, consider using two-flight system with transfer point. If carcass is not rigid enough for load, install belt with proper flexibility when service is lost.
10. Edge worn or broken	10. Repair belt edge. Remove badly worn or out-of-square section and splice in a new piece.
11. Excessive impact of material on belt or fasteners	11. Use correctly designed chutes and baffles. Make vulcanized splices. Install impact idlers. Where possible, load fines first. Where material is trapped under skirts, adjust skirtboards to minimum clearance or install cushioning idlers to hold belt against skirts.
12. Excessive tension	12. Re-calculate and adjust tension. Use vulcanized splice within recommended limits.
13. Frozen idlers	13. Free idlers. Lubricate. Improve maintenance. (Do not over lubricate)
14. Idlers or pulleys out-of-square with center line of conveyor	14. Re-align. Install limit switches for greater safety.
15. Idlers improperly placed	15. Relocate idlers or insert additional idlers spaced to support belt.

Symptoms	Solutions
16. Improper loading, spillage	16. Feed should be in direction of belt travel and at belt speed, centered on the belt. Control flow with feeders, chutes, and skirtboards.
17. Improper storage or handling	17. Refer to the manufacturer for storage and handling tips.
18. Insufficient traction between belt and pulley	18. Increase wrap with snub pulleys. Lag drive pulley. In wet conditions, use grooved lagging. Install correct cleaning devices for safety. *(See Step 7 on Page 48.)*
19. Material between belt and pulley	19. Use skirtboards properly. Remove accumulation. Improve maintenance.
20. Material build-up	20. Remove accumulation. Install cleaning devices and scrapers. Improve housekeeping.
21. Pulley lagging worn	21. Replace worn pulley lagging. Use grooved lagging for wet conditions. Tighten loose and protruding bolts.
22. Pulleys too small	22. Use large-diameter pulleys.
23. Radius of convex vertical curve too small	23. Increase radius by vertical realignment of idlers to prevent excessive edge tension.
24. Relative loading velocity too high or too low	24. Adjust chutes or correct belt speed. Consider use of impact idlers.
25. Side loading	25. Load in direction of belt travel, in center of conveyor.
26. Skirts improperly placed	26. Install skirtboards so that they do not rub against belt.

8. Appendix A - Reference Information

Information regarding the installation procedures of BM 65 Series Diaphragm switches can be downloaded from the BinMaster website.

Go to www.binmaster.com/resources/dyn/files/1068329zeb9efe1d/_fn 9270077_RevA_BM65_Series.pdf

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This equipment shall be installed in accordance with the current installation codes and applicable regulations, which should be carefully followed in all cases. Authorities having jurisdiction should be consulted before installations are made.

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InterSystems is a part of GSI, a worldwide brand of AGCO Corporation.

Printed in the USA

CN-328951