SAFETY

INSTALLATION

OPERATION

MAINTENANCE

M A N U A L

Enclosed Belt Conveyor
RollerFLO and 3i RollerFLO

No. PC539883-D

Revised 2014-09-08

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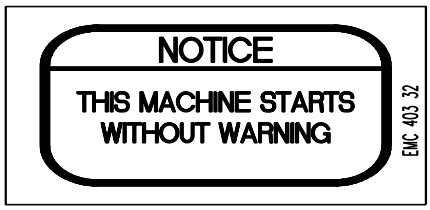
I. GENERAL SAFETY INFORMATION



STARTS W/OUT WARNING
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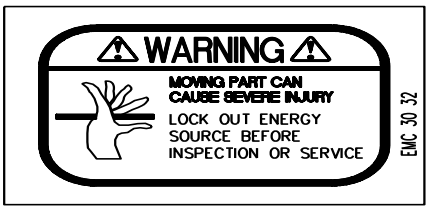


MOVING PART
EMC3032

SAFETY FIRST! The symbols shown above are examples of the safety labels and signs to be found on InterSystems equipment. They are affixed to the equipment to warn of danger to persons and of possible equipment damage. THESE SIGNS MUST NEVER BE REMOVED, TAMPERED WITH, PAINTED OVER OR OBSCURED IN ANY WAY. (See Page 3 for label locations). If labels are damaged or become unreadable, replacement labels are available from InterSystems. User must institute a continuing program to instruct all personnel in safe operating and maintenance procedures and to insure that all safety devices, guards, and covers are intact and operable and that all safety signs are legible. The user organization should institute a continuing safety program to instruct all personnel in proper, safe operating and maintenance procedures and to insure that all safety devices, guards and covers, and all safety signs are intact and legible.

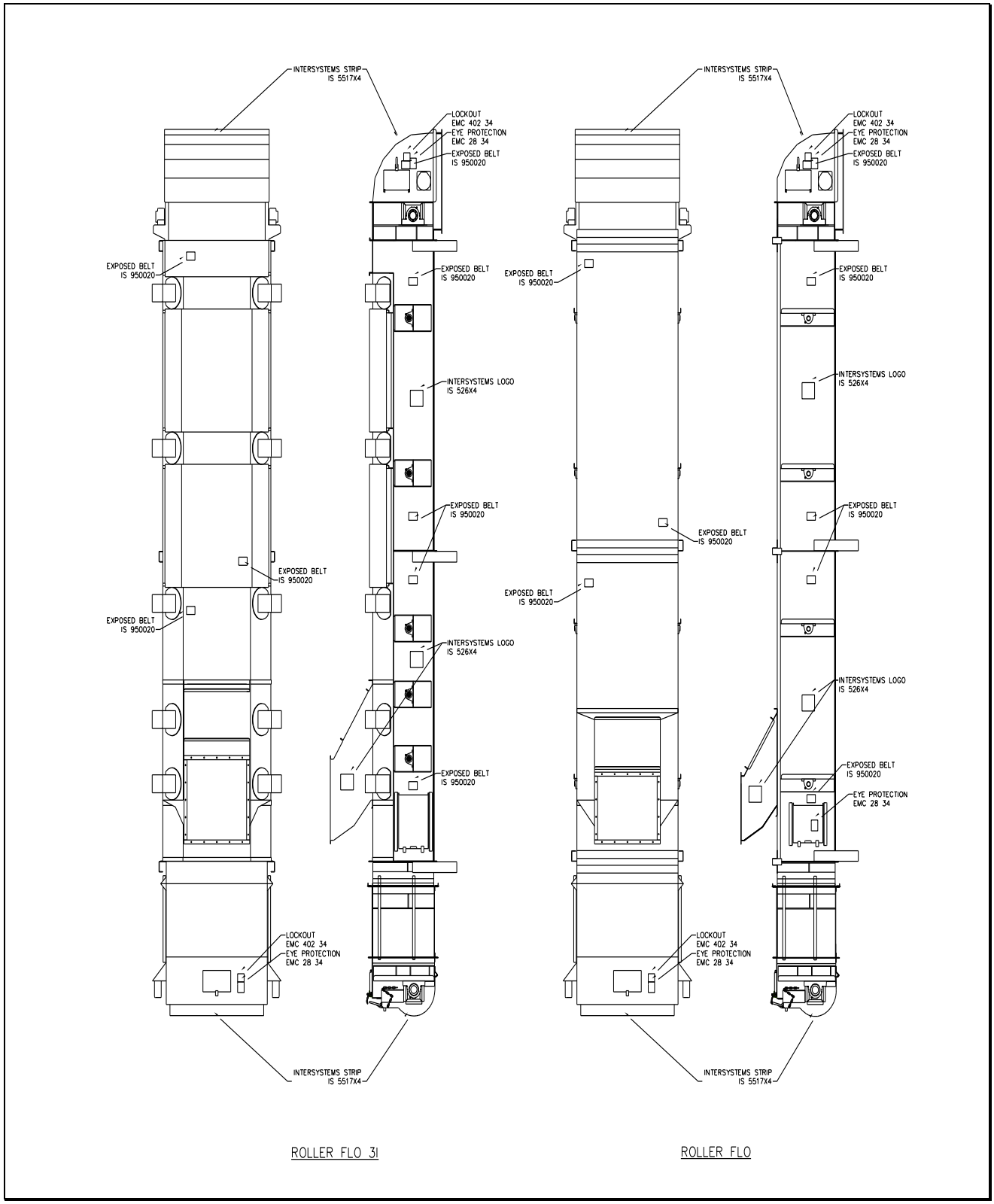
DO NOT exceed the conveyor's rated capacity. A certified drawing or drawings furnished with each conveyor lists its capacity in BPH or CFH (Bushels per Hour or Cubic Feet per Hour) and materials to be conveyed. The drawing also specifies the operating speed of the conveyor. Consult InterSystems, Inc. before making any changes to the conveyor or its operating environment, in particular, any change that necessitates increasing the speed or power of the conveyor drive. DEATH OR SERIOUS INJURY COULD RESULT AS WELL AS GREATLY REDUCED SERVICE LIFE.

NEVER PERFORM ANY SERVICE ON THIS CONVEYOR OR ANY OTHER POWERED EQUIPMENT UNTIL ALL POWER HAS BEEN SHUTOFF AND LOCKED OUT SO THAT IT CANNOT BE RESTORED WITHOUT THE CONSENT AND KNOWLEDGE OF THE PERSON WHO INTERRUPTED POWER. Power includes electrical, fluid, pneumatic, mechanical (cable, belt, chain, shaft, etc.), or gravity where the load or part of the equipment is suspended.

FAILURE TO OBSERVE ALL SAFETY PRECAUTIONS, INCLUDING THOSE DICTATED BY ORDINARY COMMON SENSE, CAN RESULT IN: DEATH OR SERIOUS INJURY, LOSS OF PRODUCT (conveyed material), AND DAMAGE OR DESTRUCTION OF THE EQUIPMENT!

1.1 Roller Flo Conveyor Safety Label Locations

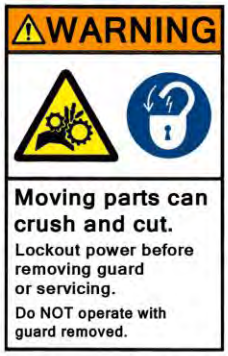
<u>NOTE:</u> These safety labels must never be removed, tampered with, painted over, or obscured in any way. If labels are damaged or become unreadable, replacement labels are available from InterSystems.



Exposed Belt IS 950020

Exposed Parts EMC 27 J3

Eye Protection EMC 28 34



Moving Parts EMC 33 34

Lockout EMC 402 34

Intersystems Logo IS 526x4

Intersystems Strip IS 5517x4

II. INSTALLATION & STARTUP

2.1 Receiving Equipment and Inspection

Carefully inspect the shipment for damage upon arrival. Verify that the quantity of parts 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.

IMPORTANT

REPORT ANY DAMAGE OR SHORTAGE TO THE DELIVERING CARRIER AS SOON AS POSSIBLE. InterSystems' responsibility for damage to the equipment ended with acceptance by the delivering carrier. Refer to the bill of lading. Save all documentation furnished with any of the conveyor components; for example, motor and reducer installation and lubrication instructions, etc.

2.2 Pre-installation Preparation

Before starting conveyor installation, study this manual, the certified drawing(s) furnished with the equipment, and other applicable documents, including but not limited to, OSHA Regulations, National Electrical Code, ASME (American Society of Mechanical Engineers), and ANSI (American National Standards Institute).

InterSystems 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.

InterSystems is the vendor of the conveyor and certain of its optional accessories only, and does not assume responsibility for the installation. 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. The MOST IMPORTANT preparations are retaining a licensed engineer to plan the installation and a qualified millwright or contractor to erect the conveyor, the accompanying equipment, and structures. Roller Flo Conveyors are not designed to be part of any truss system. **Figure 2.2** illustrates the general type of acceptable support structure. Conveyor must be supported at each section joint. Refer to the certified drawing for location and attachment of the short section.

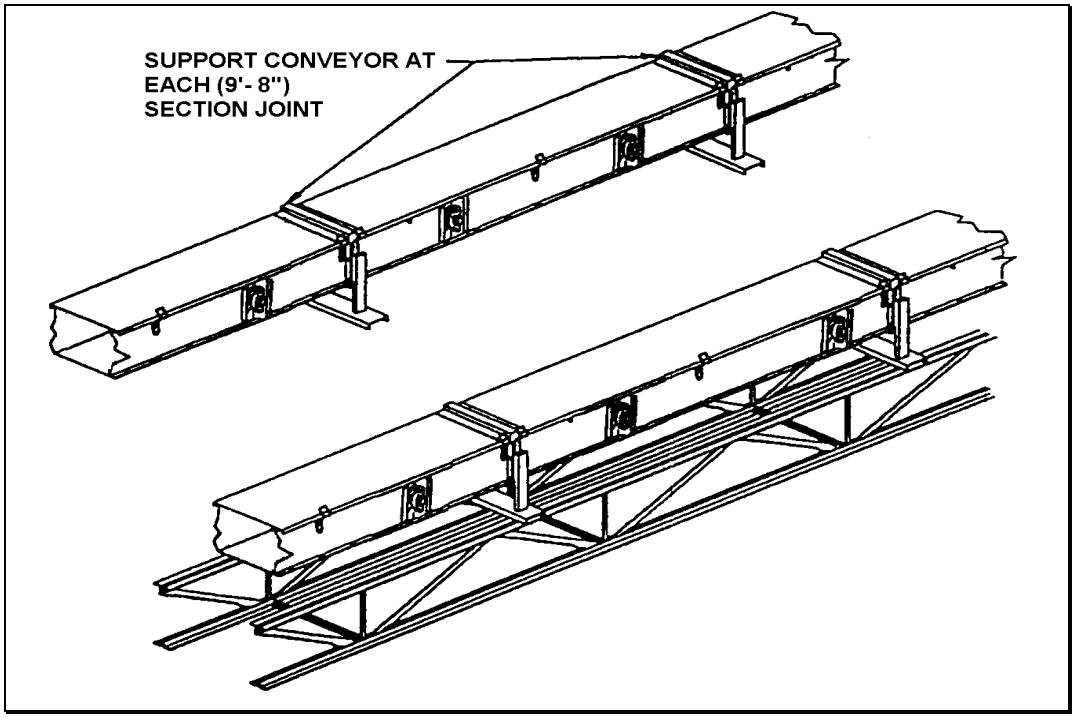


Figure 2.2 Conveyor Supporting Structures

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. ALSO 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.

2.3 Placing Conveyor Sections on the Supporting Structure

The supporting structure should be in place and completely assembled before the conveyor sections are placed for assembly. 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. The sections must be placed square and true on the supporting structure.

2.4 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 dictate that assembly be done in some other order. Refer to the certified drawing for location of short section.

A. 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.

B. Position the loader section under the discharge chute of feeding equipment.

C. There may be one or more intermediate sections in a complete Roller Flo conveyor. Refer to the certified drawing for locations of all sections. Apply silicone to the flanges along the side panels and bottom of the two 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.

D. Referring to **Figure 2.4,** notice also that the bottom flanges of each conveyor section have several 3/8" diameter holes. As each conveyor section is assembled to the preceding section, drive bull-nose alignment pins through the matching pairs of the smaller 3/8" diameter holes. This arrangement insures 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.

E. Attach a pair of the optional support legs and complete fastening the two conveyor sections together as shown in **Figure 2.4.** Support legs are optionally furnished in right-hand/left-hand sets. One set is required at each conveyor section joint to insure proper alignment and support.

F. 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.

G. Continue to assemble conveyor sections as explained in Steps C through F until all conveyor sections are assembled.

H. Install head section.

I. Install tail section. Make certain at this time that the take-up is in the full forward position to allow easy connection of belt.

J. Drive out the alignment pins. Replace them with 3/8" diameter hex head cap screws and nuts which have been furnished with the conveyor.

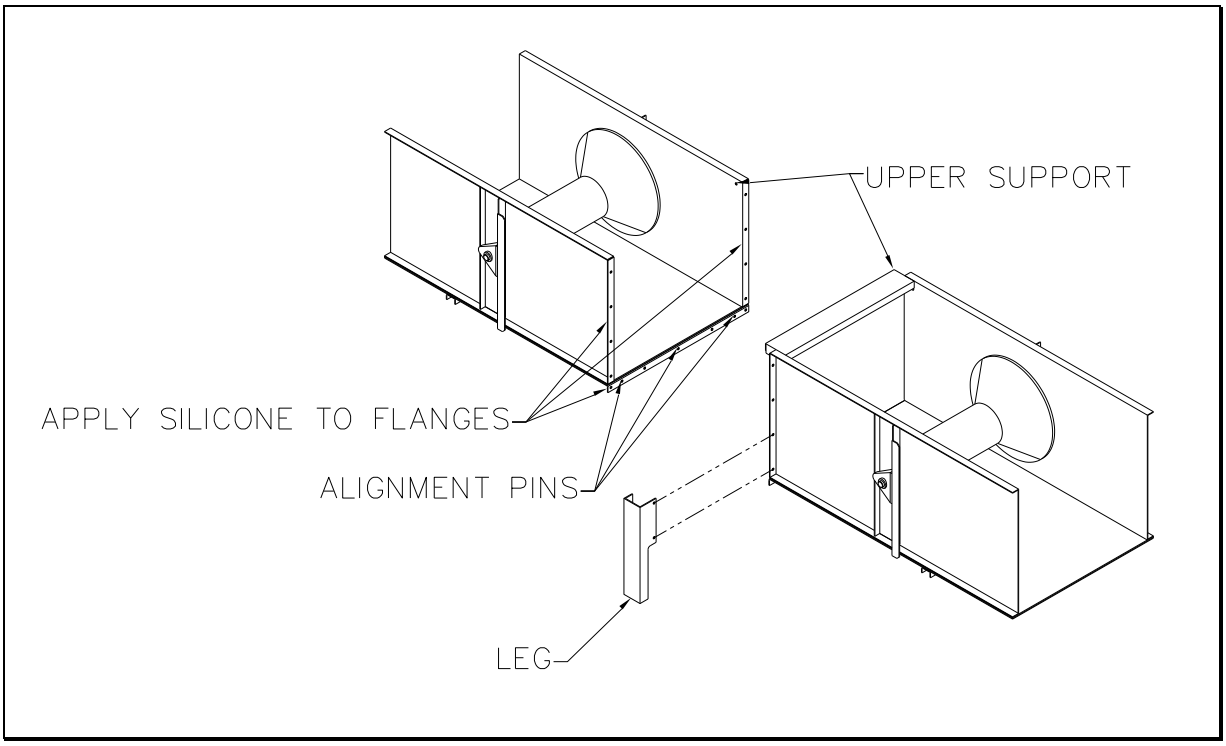


Figure 2.4 Conveyor Section Assembly

2.4.1 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 easily be installed. **Figure 2.4.1** shown below illustrates the mid loader installation procedure. Similarly, a low capacity inlet should be installed following the same steps.

A. 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.

B. Drop the loader assembly onto the top of the trunking section where the lids have been removed from. The skirting on the bottom of the loader should extend in the direction the material will be traveling down the conveyor.

C. Slide the loader assembly along the top of the trunking sections until the ideal location has been reached.

D. Drill any necessary holes into the top flange of the trunking section to match the holes provided in the loader assembly. Once holes have been drilled, bolt the loader assembly into place.

E. Trim lids to length and reinstall enclosing any open area of trunking.

F. Install provided lid seals to cover any seams between lids.

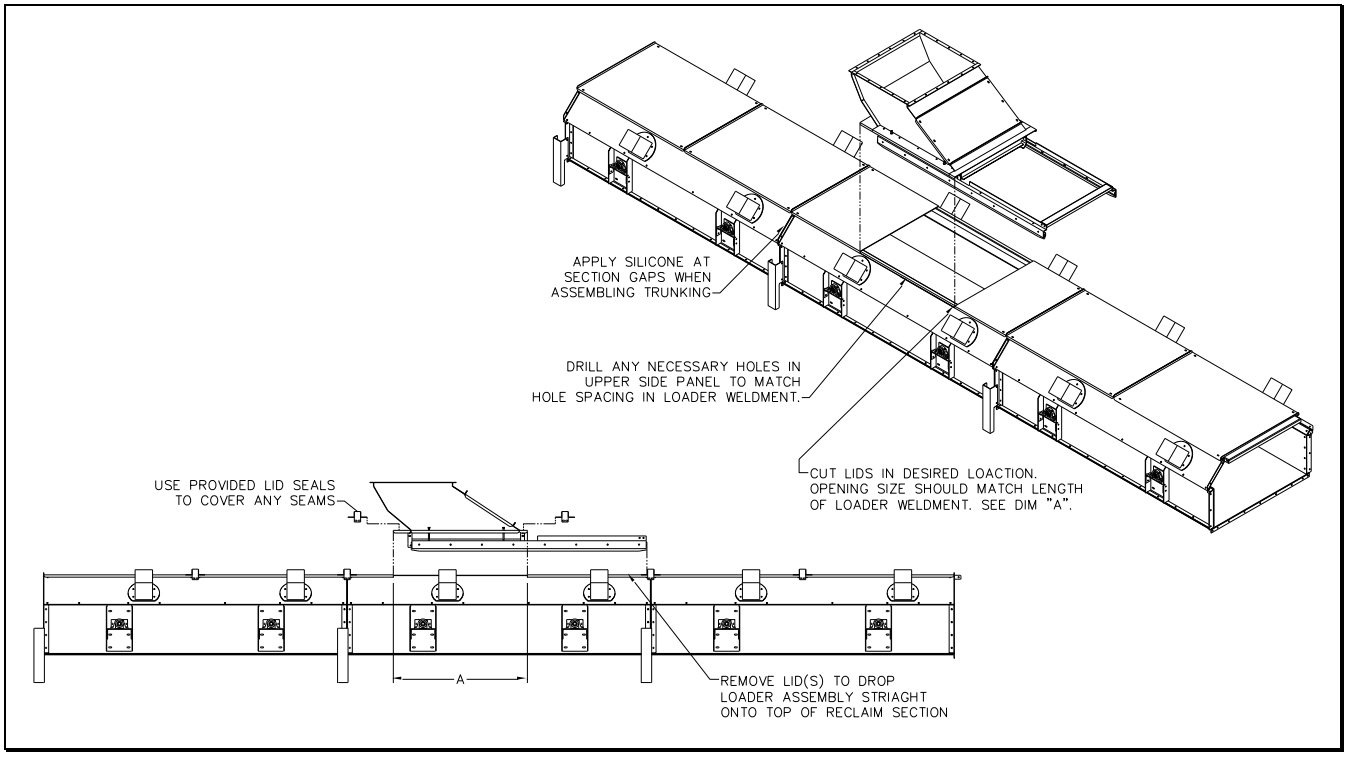


Figure 2.4.1 3I Roller Flo Mid Loader Installation

2.4.2 Belt Splice

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 all the way up 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 and **Figures 2.4.2A thru 2.4.2L** will ensure a proper belt splice.

A. Square belt ends and cut to length. Square belt by marking three 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.

B. Support belt ends with wood plank. Nail Flexco Templet in position with belt ends tight against lugs. Templet nails are in bolt bag.

C. 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.

D. 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.

E. 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.

F. Place top plate over one bolt. Insert Bolthorn Tool through the other plate hole and over the second bolt to pry it into place.

G. Assemble all top plates same way as in direction F. Start nuts down by hand far enough so that wrench will engage bolts.

H. Before tightening fasteners, cut a piece of Flexco-Loc Tape three times the width of the belt plus six inches 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 fines from deteriorating the end of the belt and increase belt life.

I. Pull tape tight and hold in position by tightening a fastener at each end of the splice. Then snug down all other plates.

J. 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.

K. Hammer plates in belt with metal or hard wood block in between bolts. Then retighten nuts.

L. Break off excess bolt ends using the two 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.

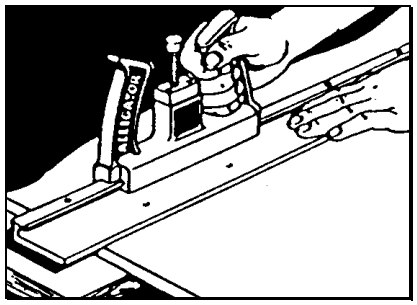


Figure 2.4.2A

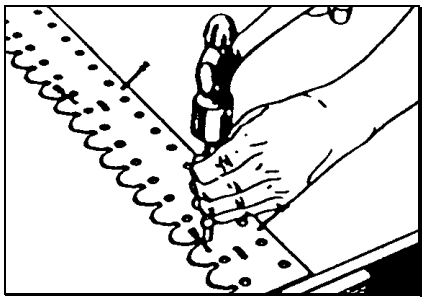


Figure 2.4.2B

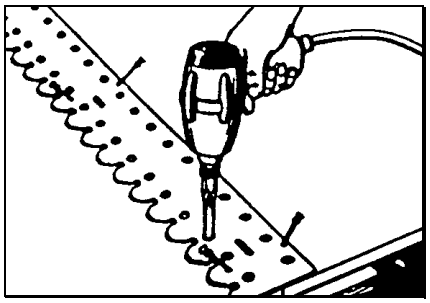


Figure 2.4.2C

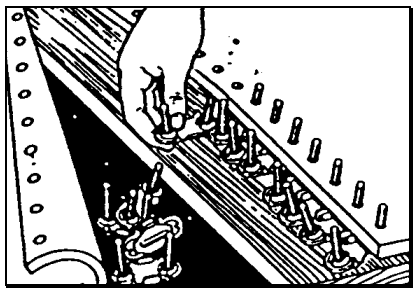


Figure 2.4.2D

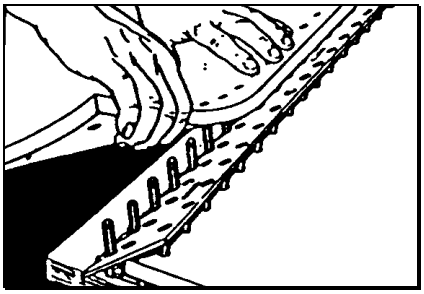


Figure 2.4.2E

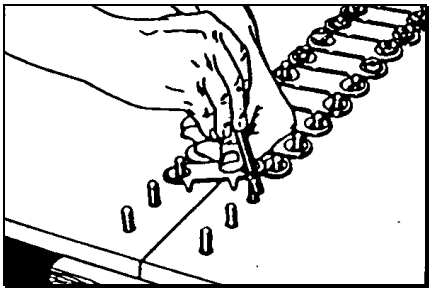


Figure 2.4.2F

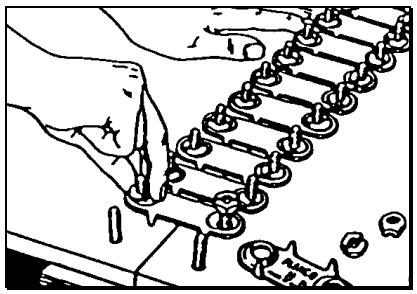


Figure 2.4.2G

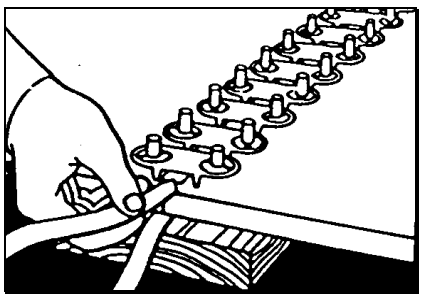


Figure 2.4.2H

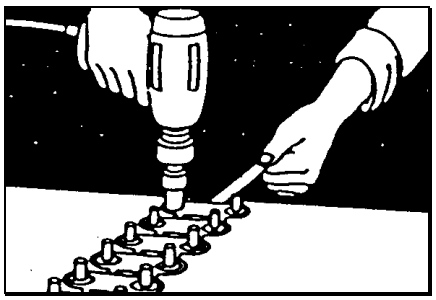


Figure 2.4.2I

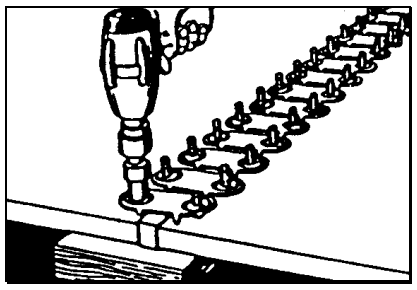


Figure 2.4.2J

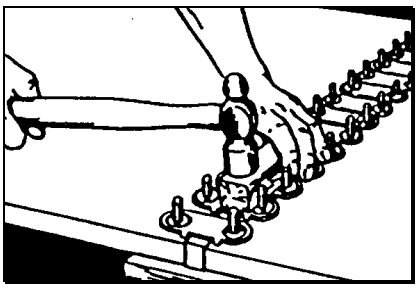


Figure 2.4.2K

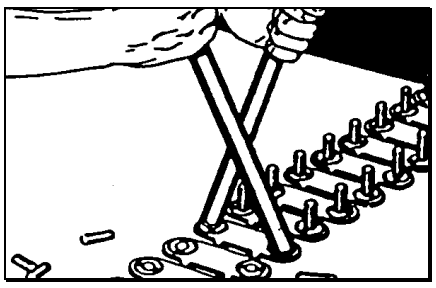


Figure 2.4.2L

2.4.3 Belt Splice Protector

Once the belt has been spliced and all nuts tightened, the belt splice protector is to be installed. The splice protector is to be placed in front of the splice going with the flow of material. Refer to **Figure 2.4.3** for proper spacing.

A. Assemble bolts in bottom plates. Snap clip over heads of bolts. Then insert bolts from under side belt along the row of holes.

B. Place splice protectors on top side of belt.

C. Place top plate over one bolt. Insert Bolthorn Tool through the other plate hole and over the second bolt to pry it into place.

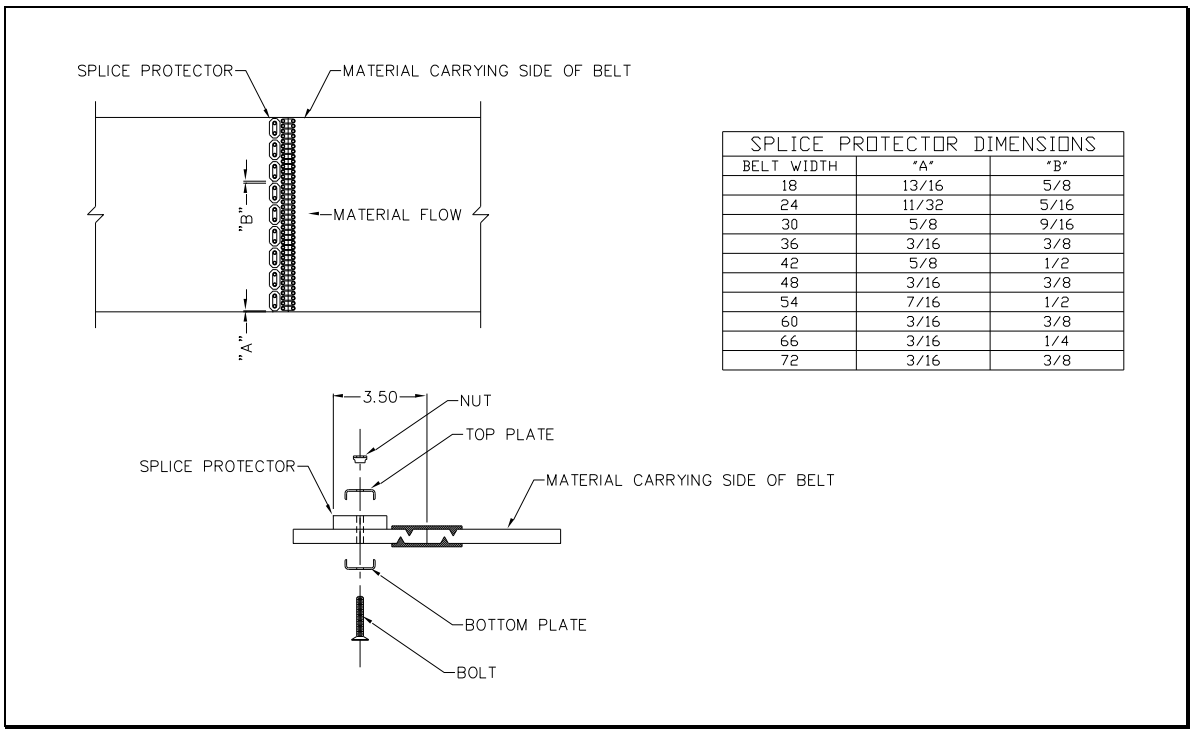
D. Assemble all top plates same way as in Direction E and F. Start nuts down by hand far enough so that wrench will engage bolts.

E. Tighten all fasteners. Tighten all nuts uniformly. The Flexco Power Tool Wrench used with an impact tool will speed this step considerably.

F. Hammer plates in belt with metal or hard wood block in between bolts. Then retighten nuts.

G. Break off excess bolt ends using two 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.

H. 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.



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

Figure 2.4.3 Belt Splice Protector Layout

2.4.4 Belt Tensioning & 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 2.4.4.1** & **Figure 2.4.4.2** can be used to assist in the following procedures.

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

B. 1. (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 boards (29" away from the board edge). See **Figure 2.4.4.1.**

   2. (For 3I Roller Flo). Place one board on top of each side panel and underneath the belt. Aling 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 boards (29" away from the board edge). See **Figure 2.4.4.2.**

C. 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.

D. 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.

E. Turn the inner nuts on the four 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 take-up screw brackets must be the same. Failure to do so will cause belt tracking problems and lead to premature belt failure.

F. Retighten 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.

(Reminder, the speed switch at the tail pulley will only notify you when the belt is slack enough to slip, not that the belt needs to be tightened to achieve the proper tension determined using the steps above.

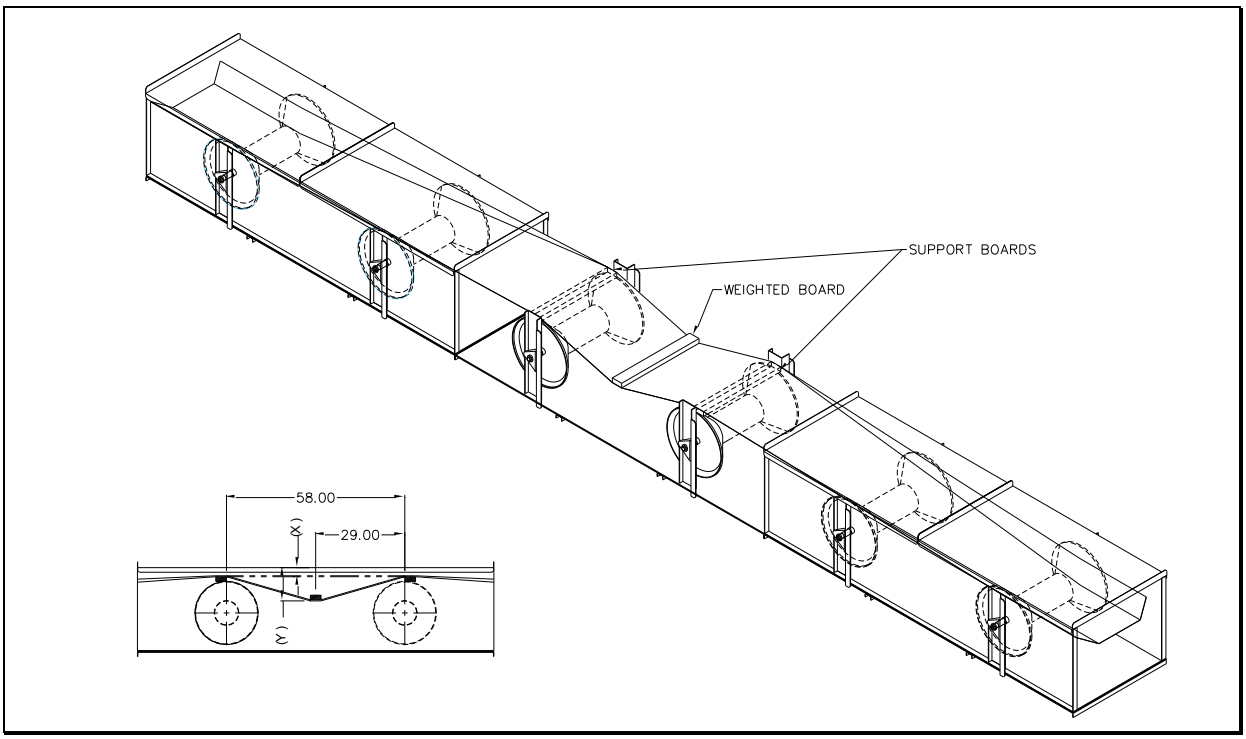


Figure 2.4.4.1 Standard Roller Flo Belt Tensioning Procedure

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.

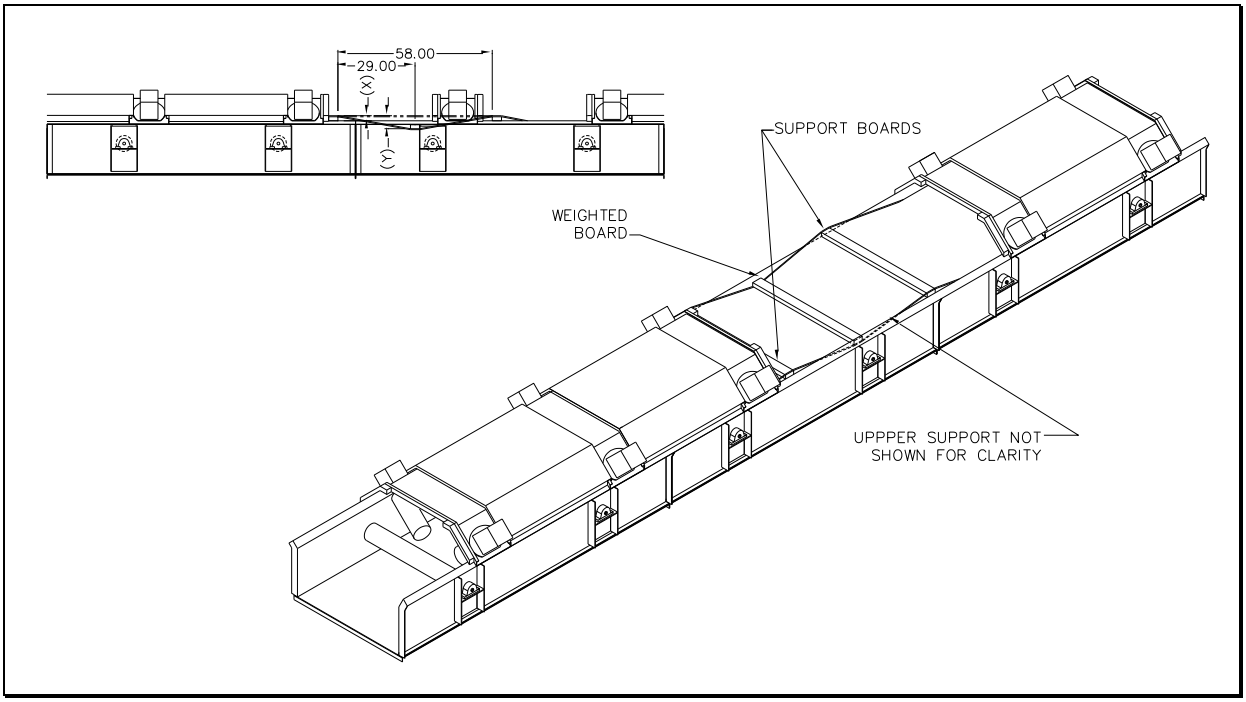


Figure 2.4.4.2 3I Roller Flo Belt Tensioning Procedure

2.4.5 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 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 2.4.5** is a typical application of a vulcanized belt splice.

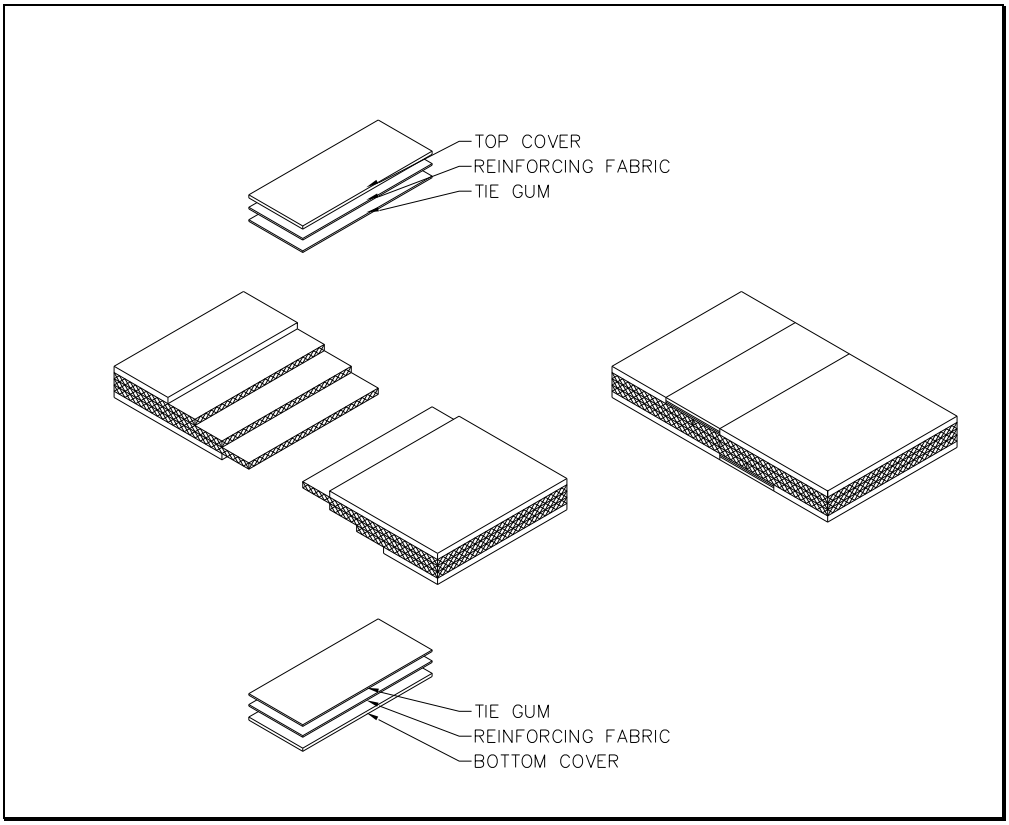


Figure 2.4.5 Stepped Vulcanized Splice

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.

2.4.6 Typical Drive Installation (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 2.4.6**. 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.

A. 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.

B. Attach the torque arm bracket to the trough bottom directly behind the head (See **Figure 2.4.6**). This should put the torque arm into the proper tension state.

C. Attach the torque arm anchor bracket to the reducer housing.

D. Rotate the torque arm turnbuckle to nearly full extension for maximum adjustment range.

E. Refer to **Figure 2.4.6**. Assemble the torque arm clevis bracket to the torque arm eye bolt.

F. 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.

G. Adjust the torque arm so that the reducer is vertical. Use the lock nut on the turnbuckle to prevent movement by vibration.

H. Attach the motor mount to the top of the head assembly through the given holes.

I. Fasten the motor to the motor mount. The fasteners used will depend on the size and origin of the motor. DO NOT tighten motor mounting screws yet.

J. Fasten the belt guard mounting brackets to the motor mount.

K. Loosely fasten the belt guard WITH THE COVER REMOVED to guard mounting bracket. 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.

L. Assemble the drive and driven sheaves on the motor and reducer input shafts. Align the sheave faces and tighten the bushing setscrews.

M. Fit the belts over the sheaves. Use the long screws in the motor bracket to take up the slack in the belt. Make sure the guard does not rub on either shaft. Then reinstall the belt guard cover.

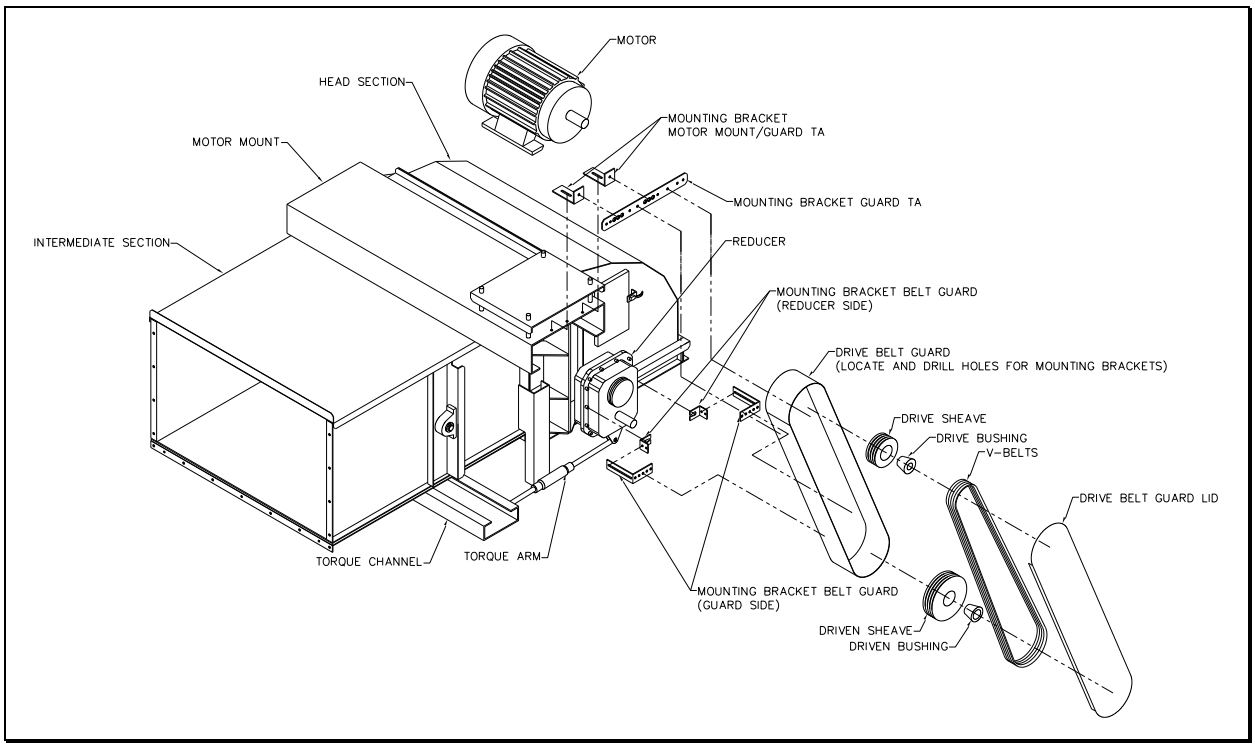


Figure 2.4.6 Typical Shaft Mount Drive Installation

2.4.6.1 Right Angle Reducer Drive Installation

In some cases, where there isn't space on top of the head for the motor and motor mount assembly, a right angle reducer can be used. A right angle reducer and motor are shown in **Figure 2.4.6.1**. 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 is mounted onto the head shaft.

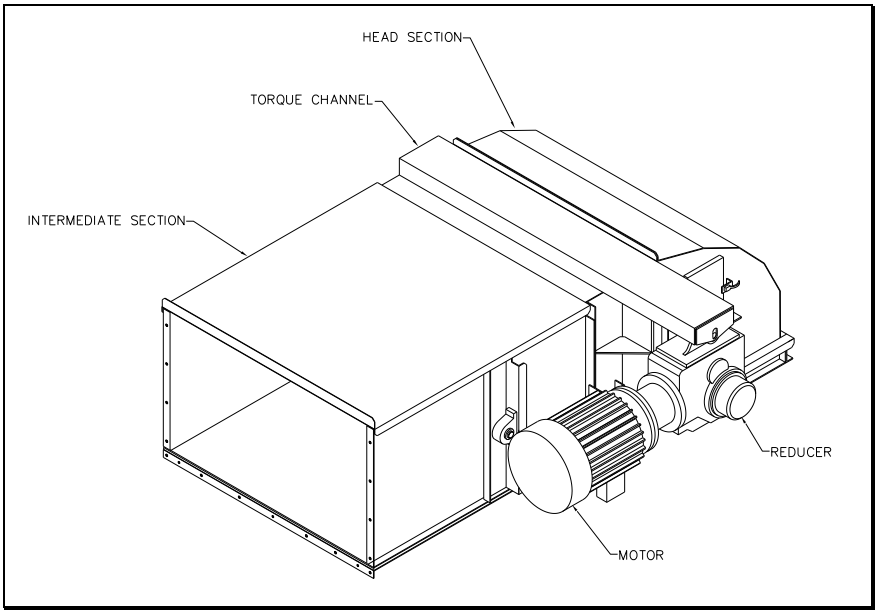


Figure 2.4.6.1 Right Angle Reducer Drive

2.4.6.2 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 2.4.6.2** for a general reference on this type of drive assembly.

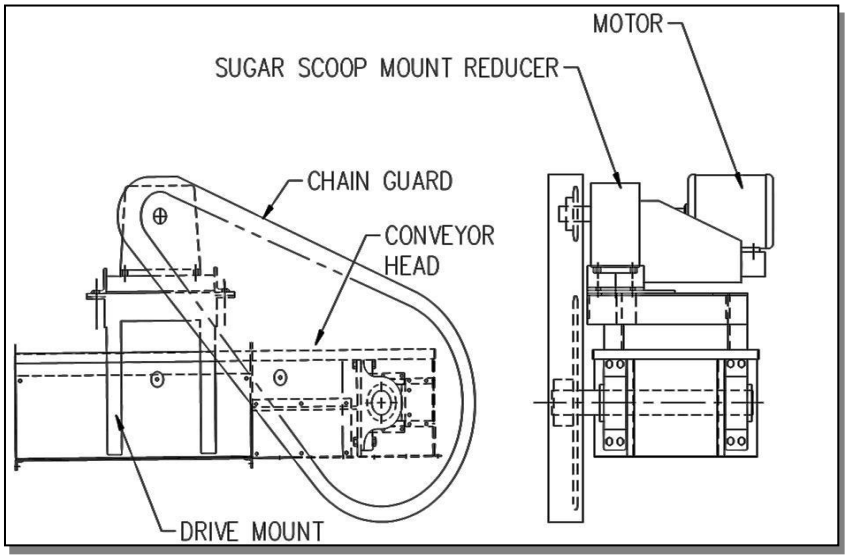


Figure 2.4.6.2 Typical Chain Drive Installation

2.4.7 Field Wiring

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.

2.4.7.1 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 buildup 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 shutdown. See **Figure 2.4.7.1** for suggested wiring diagram and Appendix A for additional details.

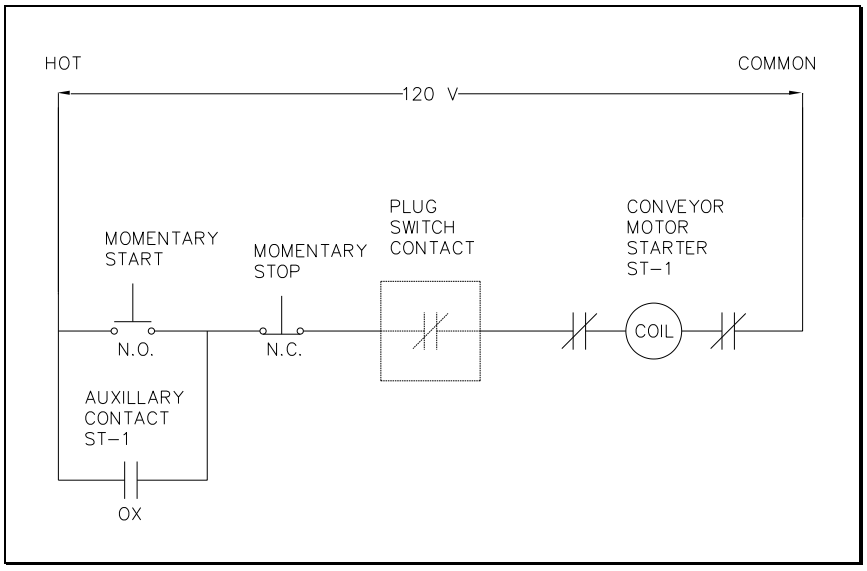


Figure 2.4.7.1 Suggested Plug Switch Wiring

2.4.7.2 Speed Switch Function

The conveyor is supplied with a speed switch located at the tail. **Figure 2.4.7.2A** shows the old Intersystems mounting bracket while **Figure 2.4.7.2B** 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 2.4.7.2C** for suggested wiring diagram.

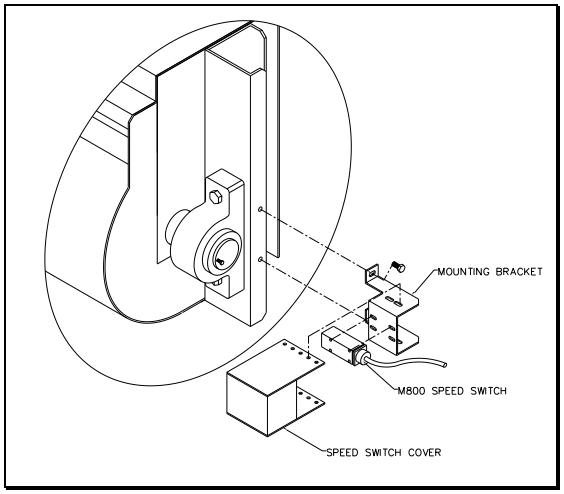


Figure 2.4.7.2A Speedswitch with Old IS Mount

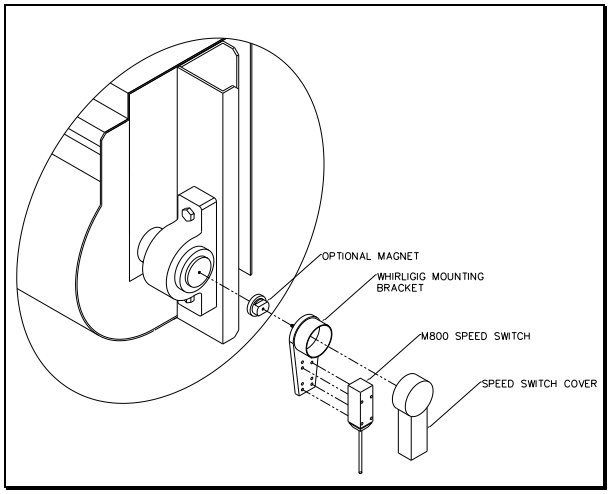


Figure 2.4.7.2B Speedswitch with Whirligig Mount

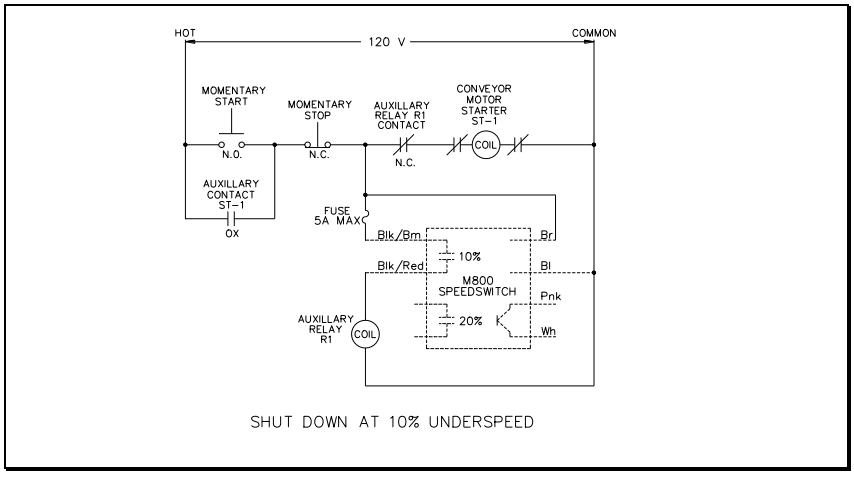


Figure 2.4.7.2C Suggested Speedswitch Wiring Diagram

2.4.8 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 rub blocks. The first two rub blocks will need to be located in the openings provided in the take up section as shown in **Figure 2.4.8.1**. The remaining two rub blocks will be inserted into the openings provided in the short section, see **Figure 2.4.8.2**. 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.

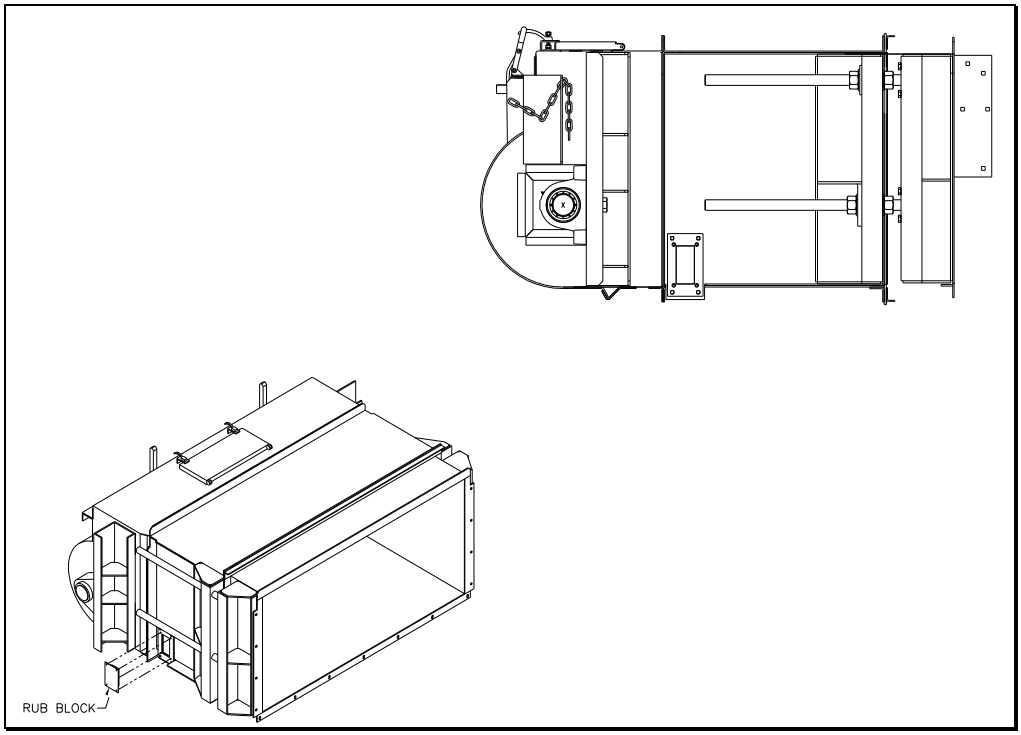


Figure 2.4.8.1 Take Up Section Rub Block Locations

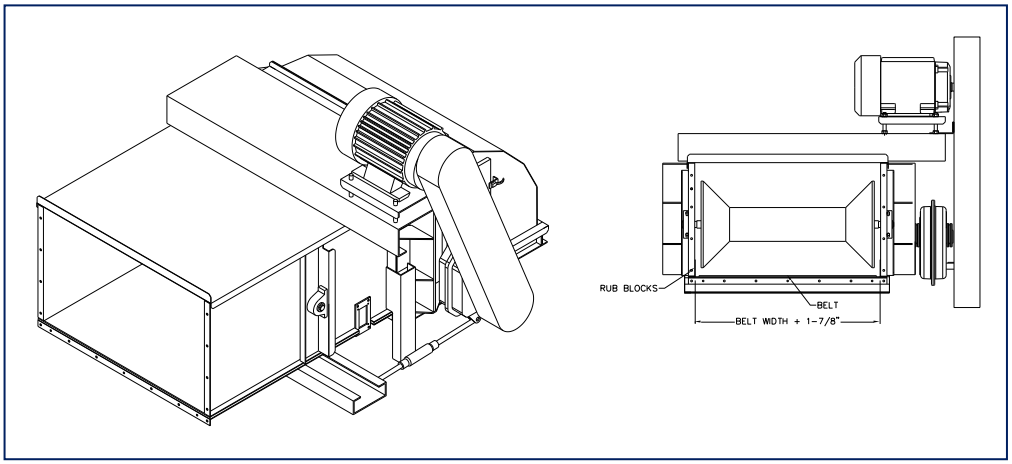


Figure 2.4.8.2 Short Section Rub Block Locations

2.4.9 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 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.

2.4.10 Sensor Locations

An example of a conveyor with sensor locations is shown in **Figure 2.4.10**. 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.

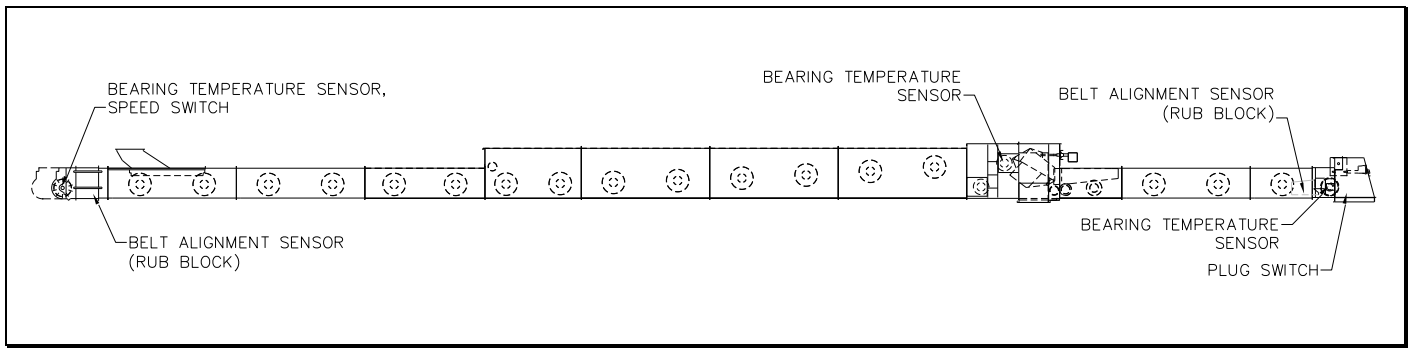


Figure 2.4.10 Sensor Locations

2.4.11 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.

2.5 Pre-Startup Procedure

DANGER

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!

2.5.1 Initial Lubrication

2.5.1.1 Filling the Reducer with Lubricant

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

2.5.1.2 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 startup time.

2.5.2 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.

2.5.3 General Safety & Housekeeping

DO THIS BEFORE POWER IS APPLIED TO THE CONVEYOR.

A. Make sure all guards are in place and all warning labels are in place and legible. Section I, GENERAL SAFETY INFORMATION, explains the purpose and intended location of the warning signs. Section I also lists the part numbers of the signs. Warning signs are an important part of any safety program; replace any missing signs IMMEDIATELY!

B. Make certain all electrical connection box covers are in place and securely fastened. Check for exposed wiring and damaged conduit.

C. Inspect the inside of the conveyor for tools, or anything else that could cause damage on startup.

2.6 Startup

A. For the initial startup, the conveyor should be empty.

B. Depending on the conveyor length and configuration, station one or more persons to listen and watch for potentially dangerous or damaging conditions.

C. 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, rearrange motor wiring for correct direction of motor rotation.

D. 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 insure 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.

E. 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 see section 2.7 for Belt Tracking suggestions.

F. 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.

G. Recheck belt tension as detailed in paragraph 2.4.4, *Belt Tensioning & Initial Tail Section (Take-up) Adjustment*.

H. Adjust the Loader skirting so that the rubber is barely above the belt. This is done with the four bolts (two each side) located on the cover part of the Loader section. Reference **Figure 2.6.2**.

I. Adjust the height of the plow in the tail section if necessary. Refer to **Figure 2.6.3** for details ensuring that the bottom of the plow is between ½" and ¾" above the belt.

J. Calibrate the tail speedswitch as instructed in the enclosed "Technical Information" sheet supplied with the speedswitch.

K. After correcting any problems detected during initial conveyor operation, replacing any guards or covers removed, and observing all safety precaution, 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.

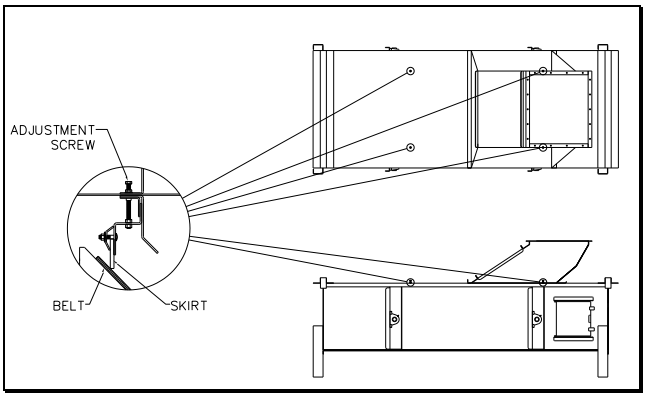


Figure 2.6.1 Roller Flo Loader Skirt Adjustment

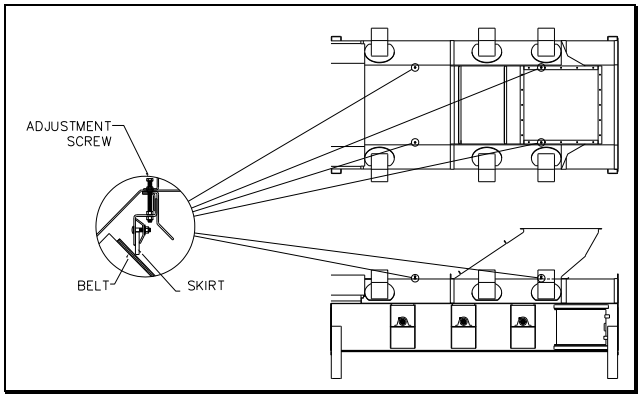


Figure 2.6.2 3I Roller Flo Loader Skirt Adjustment

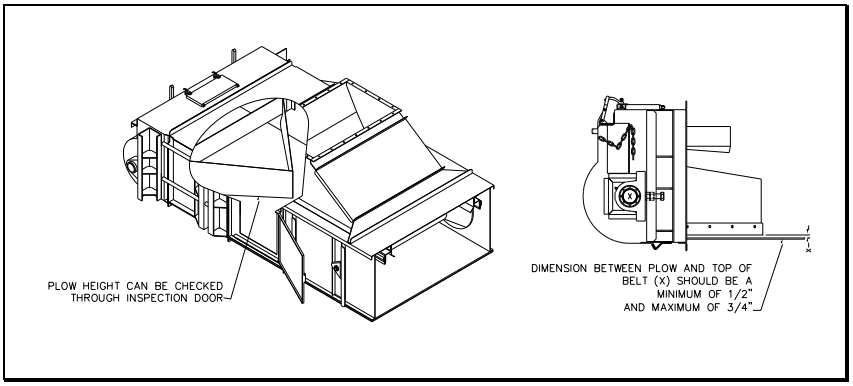


Figure 2.6.3 Tail Plow Height Adjustment

2.7 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 2.7**). 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 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 section **2.8 Loading Material on Belt** 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.

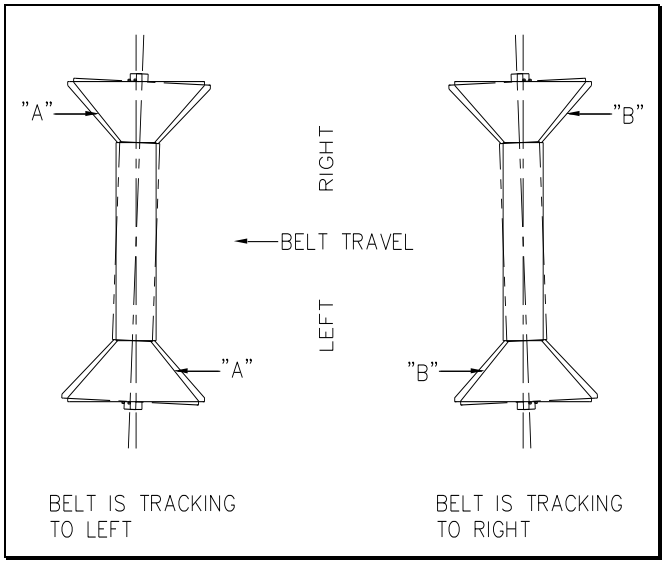


Figure 2.7.1 Standared Roller Flo Idler Adjustments

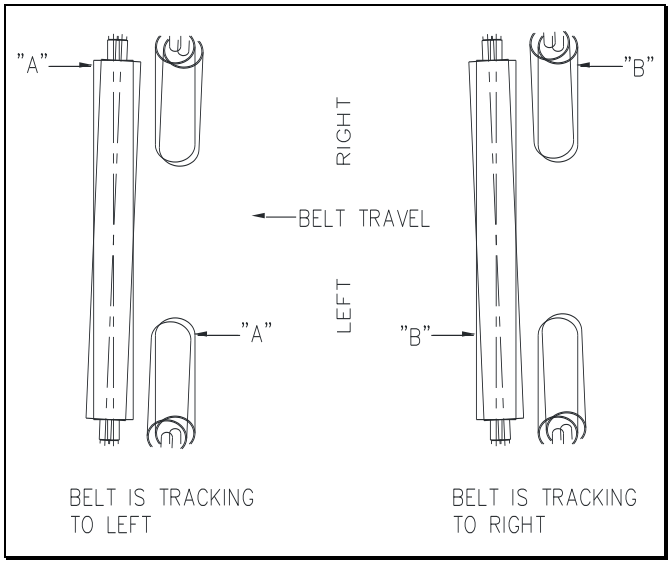


Figure 2.7.2 3I Roller Flo Idler Adjustments

2.8 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 2.8**. 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.

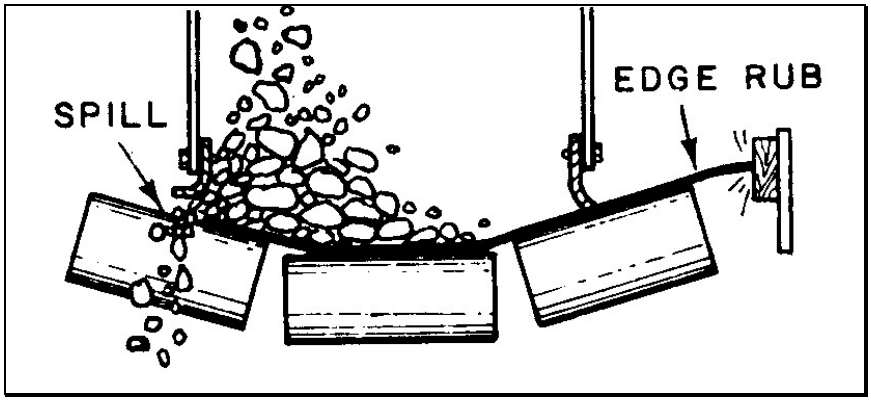


Figure 2.8 Effects of Off Center Loading

2.9 Plow Installation, Setup, & Safety

Movable discharge plows are an additional feature that allows for the discharge position to at almost any point along the conveyor. As shown in **Figure 2.9.1** 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.
Two 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 instructions found in **Section 2.4 (Conveyor Assembly**) found on page 7 of this manual.

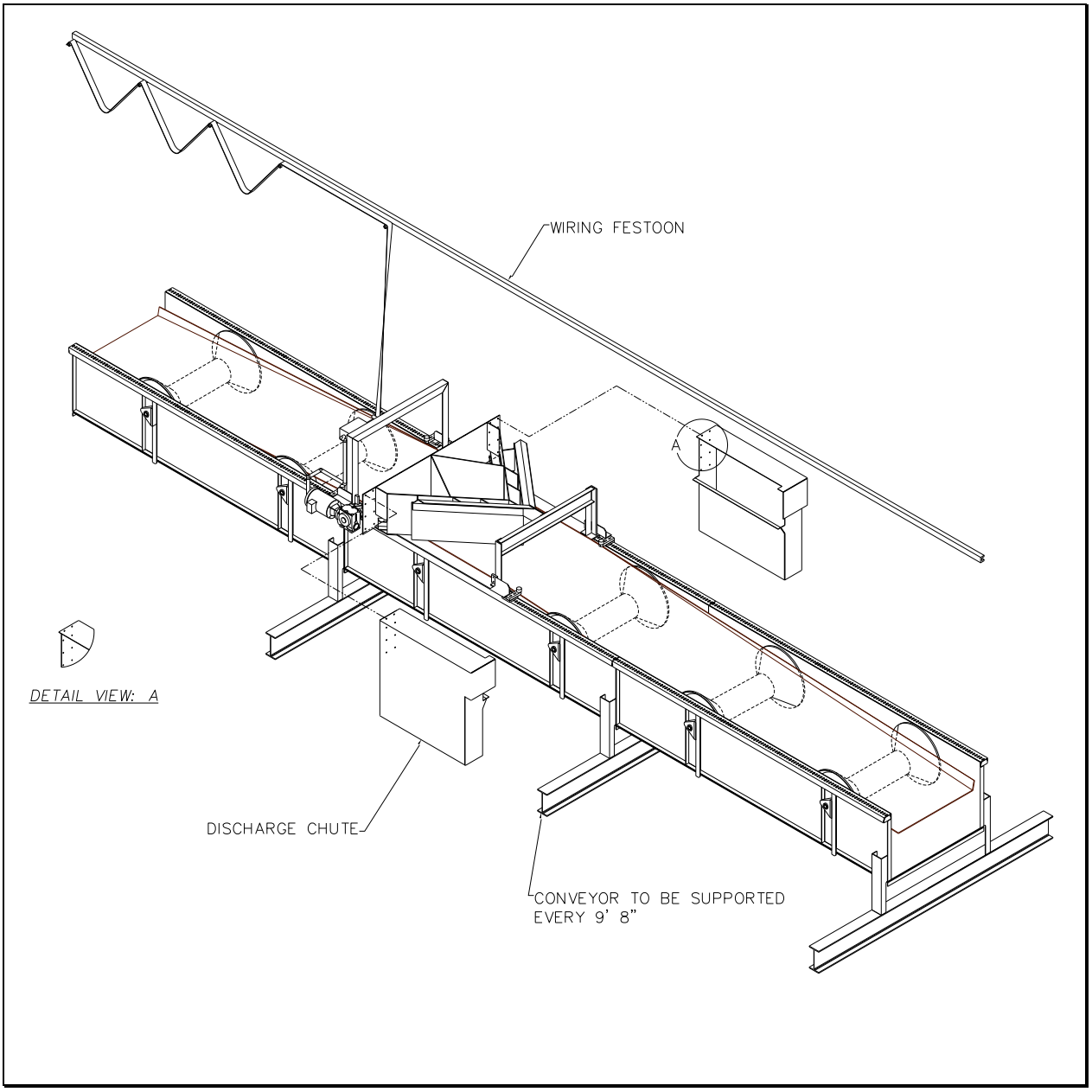


Figure 2.9.1 Plow Section Assembly

A wiring festoon 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 discharge chutes will be shipped separately from the plow assembly. They will be able to easily be attached to the plow upon shipment once the liner bolts shown in Detail View A found in **Figure 2.9.1** have been removed. After those holes have been lined up with the rear of the plow simply reattach the bolts through the liner, discharge chute, and the plow assembly to complete installation.

Two limit switches will need to be installed at the beginning and the end of the travelable plow sections. **Figure 2.9.2** 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.

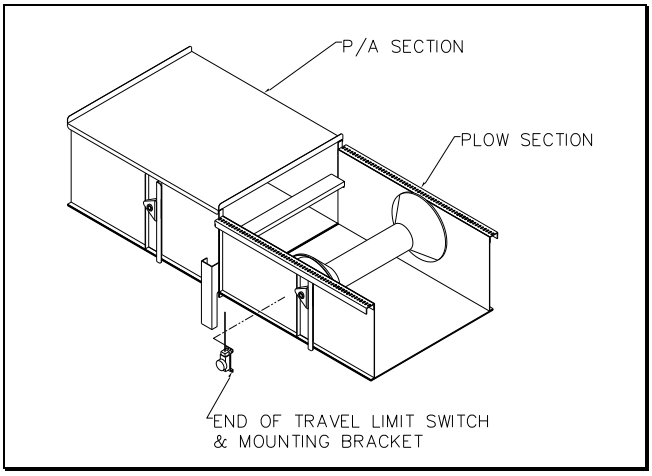


Figure 2.9.2 Limit Switch Location

InsterSystems' movable discharge plow also features a bristle brush to help sweep the belt clean as it passes through the plow assembly. **Figure 2.9.3** 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.

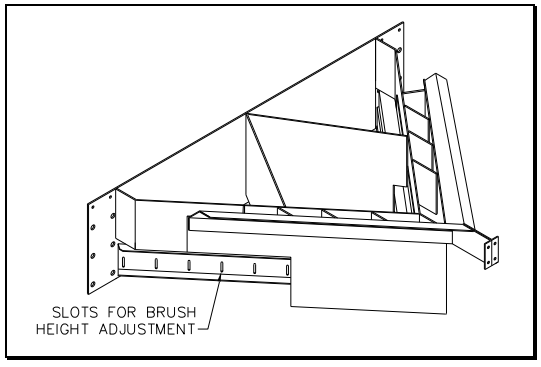


Figure 2.9.3 Brush Adjustments

2.10 Tripper Installation, Setup, & Safety

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 2.10.1** shows the material profile and belt layout for a conveyor with two 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 of the way to the end of the conveyor and the primary discharge location.

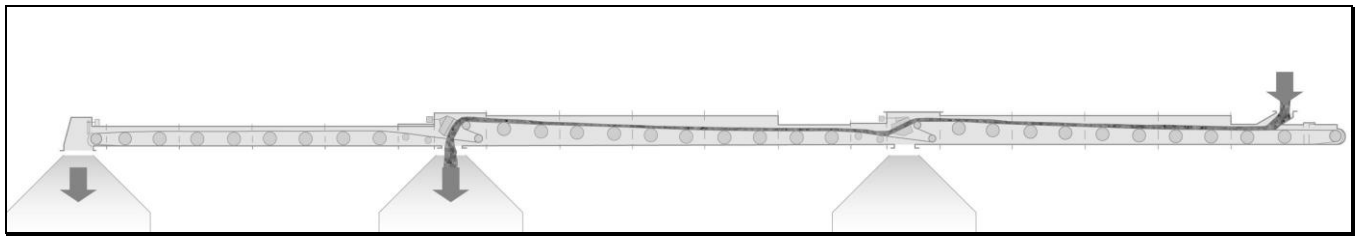


Figure 2.10.1 Tripper Layout

Each tripper consists of a total of 7 sections strategically placed in the middle of a conveyor. Installation procedures are the exact same as those found in **Section 2.4 (Conveyor Assembly)**. **Figure 2.10.2** shown below can be used for proper 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 4 sections are the “A” through “D” sections of the tripper knee. When assembled in order the knee section changes the height of the belt, raising it as it approaches the actual tripper section which follows directly behind. 48 and 54 inch 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.

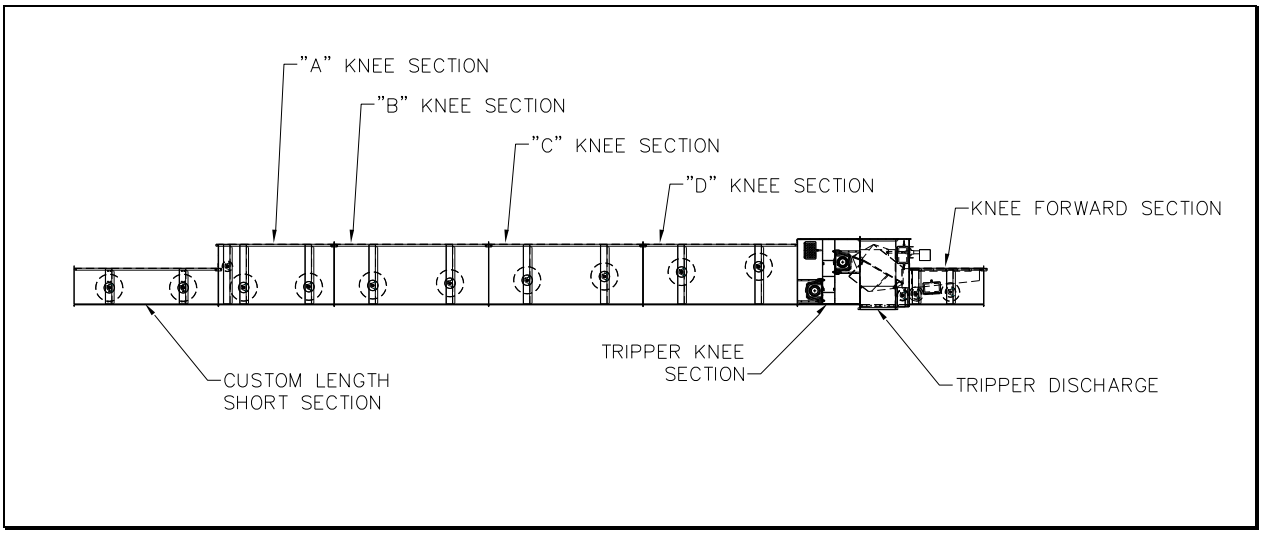


Figure 2.10.2 Tripper Assembly

The tripper has two 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 dishcarge chutes, one on each side of the conveyor as shown in **Figure 2.10.3** and **Figure 2.10.4**.

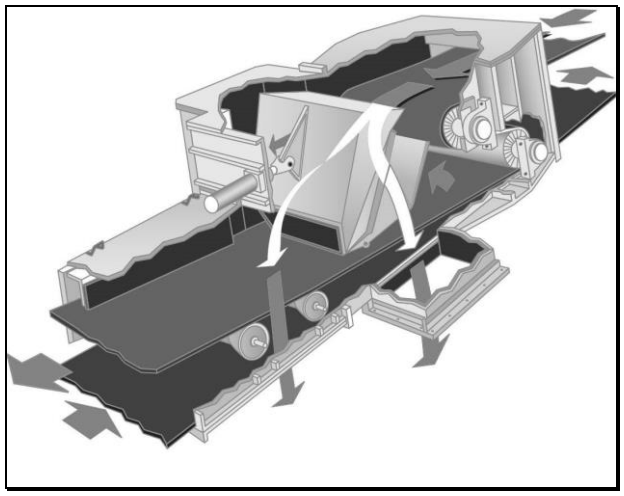


Figure 2.10.3 Tripper in Divert Position

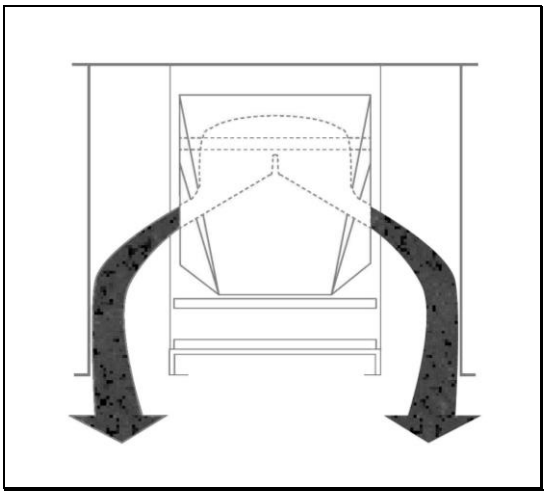


Figure 2.10.4 Tripper Side Discharge

In the flow-thru mode to skip the intermediate discharge location the tripper also helps deflect the material back onto the belt as it passes into the next conveyor section with the forward knee section. The forward knee section will bring the belt rubber back up to the standard operation height and connects to the remaing sections leading up to the discharge pulley. **Figure 2.10.5** shows the tripper when used in the flow-thru mode.

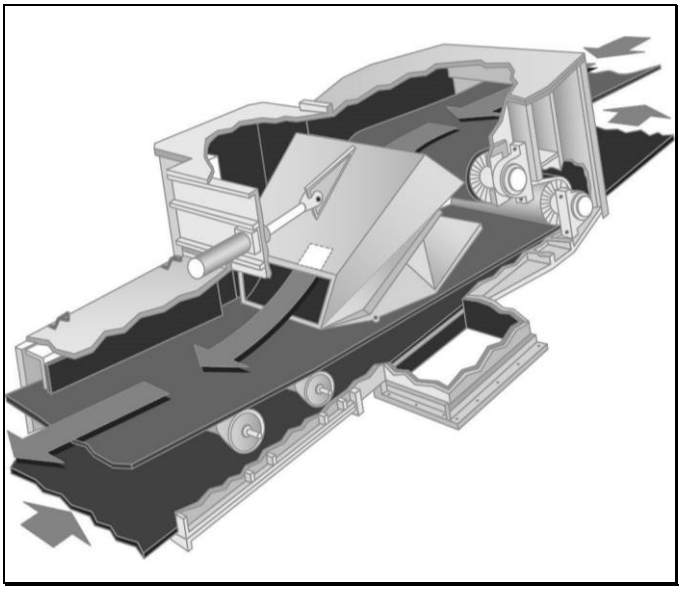


Figure 2.10.5 Tripper in Flow-Thru Position

Shrouded heads ensure that any material that hasn't 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 with the assistance of a linear actuator if the end of the conveyor is the discharge location of choice. **Figure 2.10.6** and **Figure 2.10.7** depicts the head section and demonstrates how the shroud can be used in both examples listed above.

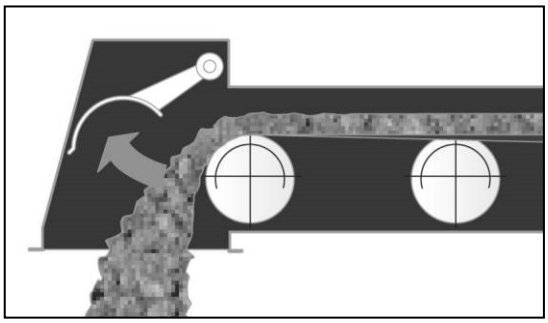


Figure 2.10.6 Open Discharge

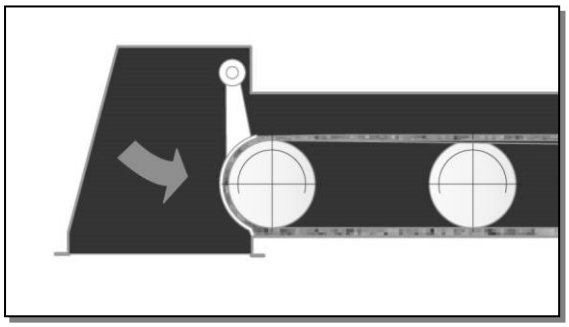


Figure 2.10.7 Closed/Carry Over Control

The section directly behind the discharge section of a conveyor that uses a tripper is the forward knee section. This section includes skirting to help contain and direct the flow of material back onto the conveyor 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 seen in **Figure 2.10.8**. 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.

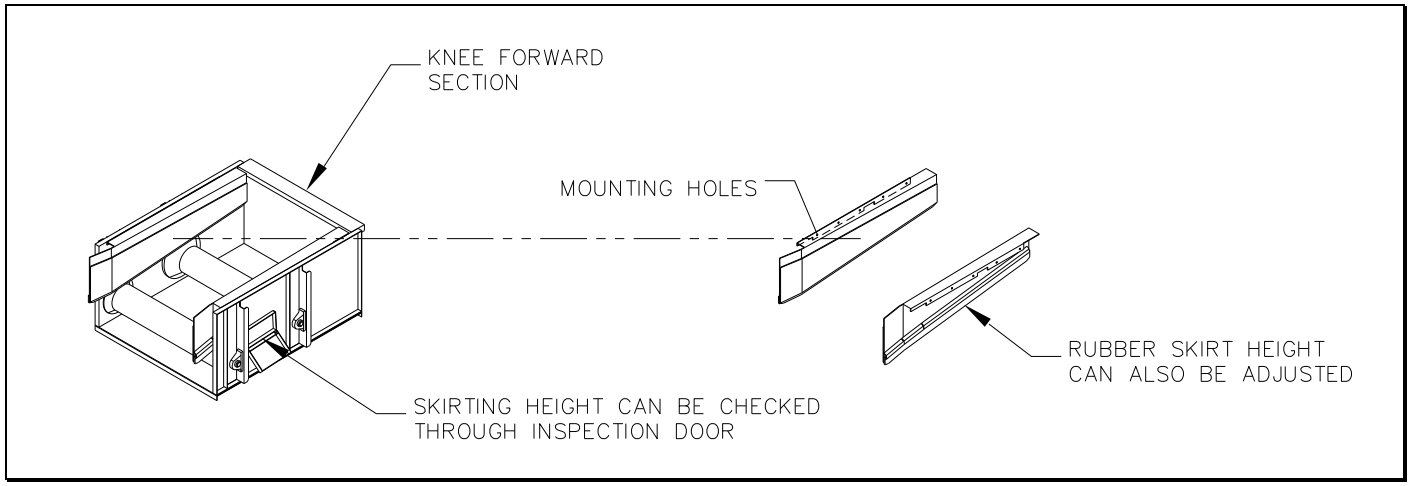


Figure 2.10.8 Forward Knee Skirting Adjustments

III. MAINTENANCE

DANGER

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!

3.1 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.

3.2 Periodic Inspection

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

A. Check belt sag to insure that it does not exceed the recommended 2% belt sag (paragraph 2.4.4, *Belt Tensioning & Initial Tail Section (Take-up) Adjustment)*.

B. Flippers on tail pulley are adjusted so they barely touch the bottom of the conveyor length.

C. Skirtboard wear and proper adjustment.

D. Bottom liner for excessive wear from belt or other foreign material.

E. Wear on head pulley lagging.

F. Loose or missing hardware.

G. Noisy bearings, motor, or reducer.

H. Overheated bearings, motor, or reducer.

I. Structural damage.

J. Rust or corrosion.

K. Damaged wiring, including exposed conductors and connections.

L. Periodically shut off and lockout all power to the conveyor. Check the plug switch and belt break/slip switch to see that they are functioning properly.

M. Check belt for damage due to foreign object caught in conveyor.

N. Make sure that all guards are in place and that all warning labels are in place and legible. Section I, GENERAL SAFETY INFORMATION, explains the purpose and intended location of the warning signs. Section I also lists the part numbers of the signs. Warning signs are an important part of any safety program; replace any missing signs IMMEDIATELY!

3.3 Lubrication Information

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.

3.3.1 Reducer

Refer to the documentation furnished with the reducer. The user must interpret the data therein in light of 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.

3.3.2 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 integral horsepower sizes. Special pressure lubricating equipment may be required. Refer to the documentation furnished with the motor.

3.3.3 Mounted Bearings

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

3.3.4 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 2.4.6.2** 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.

3.4 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.

Keep the area around the belt slip/break limit switch clear of accumulations of dirt and debris which might prevent the switch from functioning as intended.

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

3.5 Bottom Liner Replacement

REMINDER

IF ABRASION-RESISTANT LINERS WERE ORDERED, THE BOTTOM PANEL WILL BE FABRICATED FROM ABRASION-RESISTANT MATERIAL AND THEN BOTTOM PANEL IS ALSO THE BOTTOM LINER,

A. Remove and save all fasteners attaching the bottom panel and liner to the rest of the conveyor.

B. Unbolt old liner and replace with new liner. Bolt new liner to the bottom panel.

C. Lift the new bottom liner into position beneath the trough. Make sure the hole patterns match; if they do not, redrill the holes as necessary. Refasten the bottom liner to the side panels.

3.6 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 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 3.6.1**). On some pulleys, the lagging is bolted to the pulley, as shown in **Figure 3.6.2**.

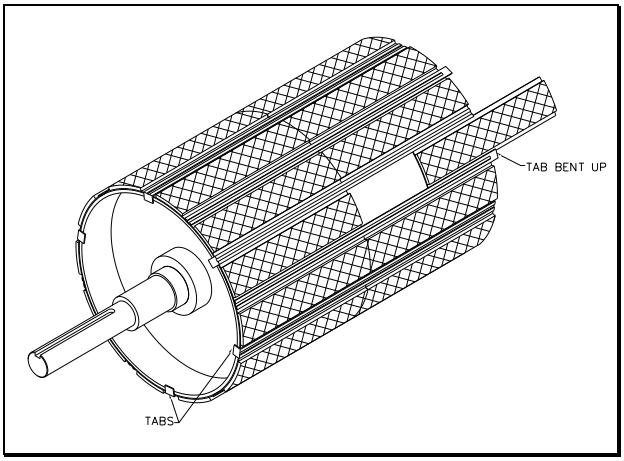


Figure 3.6.1 Head Pulley with Tabbed Retainers

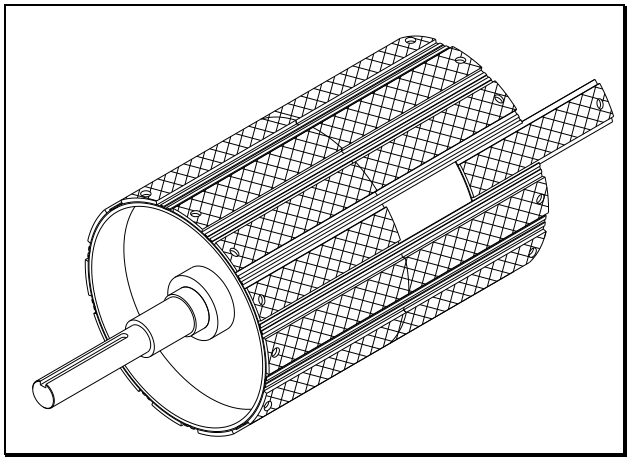


Figure 3.6.2 Head Pulley Bolted Lagging

3.7 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 3.7** is shown with the bolts removed and the hood slid back on the bottom guide rails.

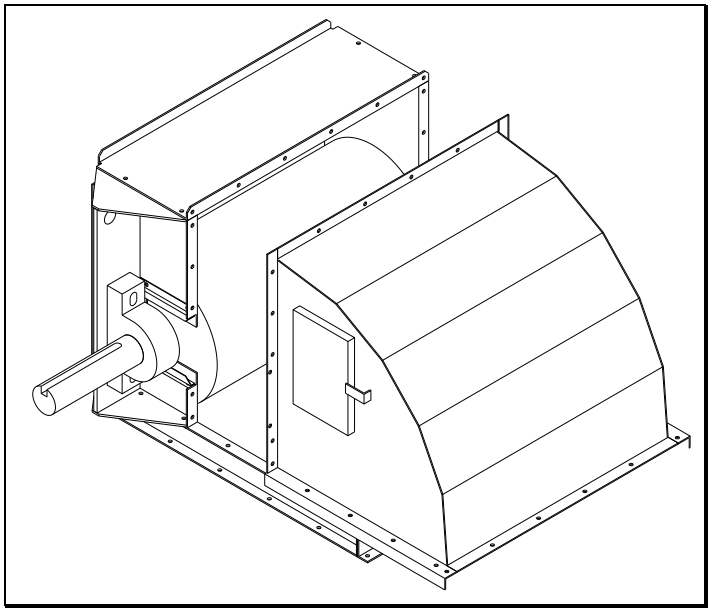


Figure 3.7 Head Hood Removal

3.8 Troubleshooting

If a problem is experienced at startup, 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:

A. Is the conveyor being used as designed in certified drawing such as inclined/declined service?

B. If the conveyor was designed for inclined service, does the degree of incline exceed the designed incline specified in the certified drawing?

C. Is the drive of different capacity or output speed than specified in the quotation?

D. Is the conveyor's capacity, either in terms of volume or weight of material being exceeded?

E. Is the conveyor being used to convey material different than that for which the conveyor was originally specified as shown on the certified drawings?

F. If there is insufficient drive belt tension, the drive belts will slip and the conveyor will operate at less than normal speed.

G. Check for obstructions at the conveyor inlet(s) or in the bins, hoppers, or chutes feeding the conveyor.

H. Look for holes in the belt carcass where a hole may be large enough to cause material spillage.

I. For belt tracking and wear problems, refer to Table 3.8.1 and Table 3.8.2 for suggested reasons for listed problems.

Table 3.8.1 Belt Troubleshooting

COMPLAINT	CAUSE (SEE TABLE 3.7.2) IN ORDER OF PROBABLE OCCURRENCE	COMPLAINT	CAUSE (SEE TABLE 3.7.2) IN ORDER OF PROBABLE OCCURRENCE
Belt runs off at tail pulley	8, 14, 13, 16, 20	Excessive wear, including rips, gouges, ruptures, and tears	11, 24, 16 20, 7
Entire belt runs off at all points of the line	25, 16, 14, 20, 4, 15	Excessive bottom cover wear	20, 13, 18, 19, 21
One belt section runs off at all points of the line	2, 10, 1	Excessive edge wear, broken edges	25, 4, 16, 7, 1, 20
Belt runs off at head pulley	14, 21, 20, 15	Cover swells in spots or streaks	7
Belt runs to one side throughout entire length at specific idlers	14, 15, 20	Belt hardens or cracks	7, 22, 21, 17
Belt slip	18, 6, 20, 15, 21	Covers become checked or brittle	7, 17
Belt slip on starting	18, 6, 21, 9	Longitudinal grooving or cracking of top cover	26, 13, 20, 11
Excessive belt stretch	12, 11, 20, 5, 8	Longitudinal grooving or cracking of bottom cover	13, 20, 21
Belt breaks at or behind fasteners; fasteners tear loose	2, 22, 12, 21, 19, 9	Fabric decay, carcass cracks, ruptures, gouges (soft spots in belt)	11, 19, 9, 7, 23
Vulcanized splice separation	12, 22, 9, 19, 2, 8	Ply separation	12, 22, 10, 7, 3

Table 3.8.2 Belt Troubleshooting Solutions

1 Belt bowed- Avoid telescoping belt rolls or storing them in damp locations. A new belt should straighten out when "broken in" or it must be replaced.	**9 Drive underbelted**- Recalculate maximum belt tensions and select correct belt. If line is overextended, 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.	**18 Insufficient traction between belt and pulley**- Increase wrap with snub pulleys. Lag drive pulley. In wet conditions, use grooved lagging. Install correct cleaning devices for safety. See item 7.
2 Belt improperly spliced or wrong fasteners- Use correct fasteners. Retighten after running for a short while. If improperly spliced, remove belt splice and make new splice. Set up regular inspection schedule.	**10-Edge worn or broken**- Repair belt edge. Remove badly worn or out-of-square section and splice in a new piece.	**19 Material between belt and pulley**- Use skirtboards properly. Remove accumulation. Improve maintenance.
3 Belt speed too fast- Reduce belt speed.	**11- Excessive impact of material on belt or fasteners**- 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.	**20 Material build-up**- Remove accumulation. Install cleaning devices and scrapers. Improve housekeeping.
4 Belt strained on one side- 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.	**12-Excessive tension**- Recalculate and adjust tension. Use vulcanized splice within recommended limits.	**21 Pulley lagging worn**- Replace worn pulley lagging. Use grooved lagging for wet conditions. Tighten loose and protruding bolts.
5 Counterweight/tension too heavy- Recalculate weight required and adjust counterweight accordingly. Reduce take-up tension to point of slip, then tighten slightly.	**13-Frozen idlers**- Free idlers. Lubricate. Improve maintenance. (Don't over lubricate)	**22 Pulleys too small**- Use large-diameter pulleys.
6 Counterweight/tension too light- Recalculate weight required and adjust counterweight or screw take-up accordingly.	**14-Idlers or pulleys out-of-square with center line of conveyor**- Realign. Install limit switches for greater safety.	**23 Radius of convex vertical curve too small**- Increase radius by vertical realignment of idlers to prevent excessive edge tension.
7 Damage by abrasives, acid, chemicals, heat, mildew, oil.- 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.	**15-Idlers improperly placed**- Relocate idlers or insert additional idlers spaced to support belt.	**24 Relative loading velocity too high or too low**- Adjust chutes or correct belt speed. Consider use of impact idlers.
8 Differential speed wrong on dual pulleys- Make necessary adjustment.	**16-Improper loading, spillage**- Feed should be in direction of belt travel and at belt speed, centered on the belt. Control flow with feeders, chutes, and skirtboards.	**25 Side loading**- Load in direction of belt travel, in center of conveyor.
	17-Improper storage or handling- Refer to the manufacturer for storage and handling tips.	**26 Skirts improperly placed**- Install skirtboards so that they do not rub against belt.

IV. REPLACEMENT PARTS

4.1 Scope

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.

4.2 Ordering Parts

Direct parts orders or requests for technical assistance to your sales representative or Customer Service Department:

Intersystems
9575 No. 109th Ave
Omaha, NE. 68142
Phone: (402) 330-1500
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 equipment is installed.

4.3 Replacement Parts

InterSystems, Inc. equipment is a quality built piece of machinery. As with any machine, parts do wear out and fail. It is InterSystems' recommendation that spare parts be kept on hand to cover any minor breakdowns. It is also necessary to check the certified drawings, which will list any special or custom components utilized on this equipment.

V. WARRANTY

InterSystems, Inc. reserves the right to make changes in design or in construction of equipment and components without obligation to incorporate such changes in equipment and components previously ordered.

WARRANTY, LIMITATION OF LIABILITY, DISCLAIMER OF IMPLIED WARRANTIES: InterSystems, Inc. manufactured equipment and components are guaranteed against defects in workmanship or materials for one year from date of shipment. The obligation of InterSystems, Inc. with respect to any goods is limited to replacement or repair of defective parts and equipment provided those parts are returned, shipping costs prepaid, to InterSystems' factory and provided the product has not been subject to misuse, negligence, or accident, or repaired or altered outside of our factory, or other than by an Authorized Service Representative. This warranty does not cover the replacement of parts inoperative because of wear occasioned by use, the cost of replacing parts by a person other than an InterSystems employee or an Authorized Service Representative, or the adjustment of a product where the product was improperly adjusted by the purchaser. In addition, this warranty does not cover components manufactured by others such as motors, drives, clutches, cylinders, valves, blowers, and the like. On those components the standard Manufacturers' warranty applies. In any event, liability is limited to the purchase price paid, and InterSystems, Inc. will, under no circumstances, be responsible for special or consequential damages, or for incidental damages.

INTERSYSTEMS, INC. NEITHER MAKES NOR AUTHORIZES ANY WARRANTY OTHER THAN AS HEREIN CONTAINED. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THOSE OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

927-0077

BINMASTER
THE LEVEL CONTROL EXPERTS

DIAPHRAGM MODELS BM65F and BM65R
Mounting and Installation Procedures

INSTALLATION

NOTE: Vertical mounting is necessary for proper operation.

Install the **BM65F** Series on the **outside** of the bin wall.The unit must be mounted vertically with the diaphragm facing to the center of the bin.

Before mounting, determine the desired location of the unit, then cut a five-inch hole in the side of the bin.

Do not warp or bow the mounting plate when screwing to the bin wall. Use washers to shim the unit if mounting to an uneven surface.

The **BM65R** Series mounts **inside** on the wall, with diaphragm facing toward the center of the bin. Secure with 4 screws.

NOTE: ***This is a delicate instrument.*** **HANDLE IT CAREFULLY.** ***Observe these special precautions.***

- ***NEVER*** *loosen the diaphragm except for replacement. Diaphragms are available from the factory at low cost.*
- ***NEVER*** *loosen the Micro Switch from its mounting as it is carefully adjusted at the factory.*

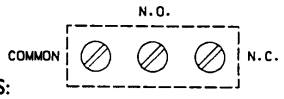
SAFETY WARNING: When removing cover from the back of the BinMaster, be very careful to avoid scratching or causing nicks on the mating surfaces. These surfaces are finished very accurately to prevent any sparks or flash from passing between them.

WIRING

The BinMaster housing has privision for connection to half-inch conduit.

Remove the back plate on this unit. This exposes the Micro Switch, which is a single pole, double throw device. (Switch ratings: 15A @ 125VAC, 10A @ 250VAC, 1/8 HP-125VAC, 1/4 HP-250VAC, 1/2A @ 125VDC.)

There are three terminals on the switch: "Common", "Normally Open", and "Normally Closed".



EXAMPLES:

A. The BinMaster switch may be used to control a motor start relay. To wire the BinMaster to stop the motor, use the "Common" and "Normally Closed" switch terminals.

B. To wire the BinMaster to turn on a light, or sound an alarm, use "Common" and "Normally Open."

SAFETY WARNING: When using in atomspheres containing combustible dust, the wiring to this unit must conform to the National Electrical Code for Class II, Hazardous Locations. Contact a qualified electrician.

BINMASTER (Division of Garner Industries)
4200 North 48th Street Lincoln, NE 68504 USA 800-278-4241 (402) 434-9102 FAX (402) 434-9133