

**Field Manual**  
**Swivel Roller Sorter**  
Installation Procedures, Maintenance, and  
Spare Parts



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Read these documents thoroughly before attempting to perform maintenance or repairs to the applicable Intelligrated conveyor system components or devices. Exercise extreme caution when working around moving and rotating conveyor equipment. Wear the proper clothing and safety equipment. DO NOT attempt to perform any maintenance until the equipment is de-energized, locked out and tagged out in accordance with established company procedures.

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## ***SECTION G:INSTALLATION PROCEDURES***

### **Introduction**

#### **Accepting Shipment**

Immediately upon delivery, check that all equipment received agrees with the bill of lading or carrier's freight bill.

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**Note:** Do not sign the freight bill before checking the equipment for completeness and for damage.

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#### *Lost Shipments*

Report lost shipments to the Manufacturer's Customer Service Department.

#### *Shortages or Errors*

Before signing the freight bill, note any shortages or errors clearly on the freight bill. Report any shortages or errors to the Manufacturer's Customer Service Department in writing within ten (10) days after receipt of shipment.

#### *Damaged Shipments*

If shipping damage is evident upon receipt of the shipment, proceed as follows:

- Before signing the freight bill, note the extent of the damage clearly on the freight bill.
- Immediately contact the transportation carrier to request an inspection.
- Do not destroy the crating or packing materials until the carrier's agent has inspected them.
- If possible, take photographs of the damage in order to document negligence on the part of the carrier.

Unless otherwise agreed by the Manufacturer, the Purchaser (User) shall be responsible for filing claims with the transportation carrier. A copy of the inspection report and a copy of the freight bill should be sent to the Manufacturer's Traffic Department.

#### *Claims and Returns*

All equipment furnished in accordance with the Manufacturer's Agreement is not returnable for any reason except where authorized in writing by the Manufacturer. Notification of return must be made to the Manufacturer's Customer Service Department, and if approved, a Return Goods Authorization will be sent to the Purchaser (User). If the product to be returned is boxed, affix the authorization (sealed in the Return Authorization Envelope) to the exterior surface on any side of the shipping carton (not top or bottom). If the product is not boxed, affix the authorization to any smooth, flat surface on the equipment.

Send authorized return shipment(s) transportation charges prepaid to the address indicated on the Return Goods Authorization. If initial shipment is refused, the Purchaser (User) shall be liable for all freight charges, extra cost of handling, and other incidental expenses.

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## Codes and Standards

The conveyor equipment is designed and manufactured to comply with the American National Standard Institute's Safety Standards for Conveyors and Related Equipment (ANSI B20.1) and with the National Electrical Code (ANSI/NFPA70). The Purchaser/Operator shall be familiar with, and responsible for, compliance with all codes and regulations having jurisdiction regarding the installation, use, and maintenance of this equipment. Appropriate lock-out and tag-out policies and procedures shall comply with the minimum safety requirements outlined in the American National Standard Institute's current publication (ANSI Z244.1).

## Warning Signs

Warning signs and labels are to be posted on or near the conveyor equipment and shall not be removed, painted over, or altered at any time. All safety devices, warning lights, and alarms associated with the conveyor system should be regularly tested for proper operation and serviced as needed. If the original safety item(s) become defective or damaged, refer to the conveyor parts list(s) of bill(s)-of-materials for replacement part numbers.

## Safety Instructions

- Turn off conveyor power source(s) and affix appropriate lock-out and tag-out device(s) to operating controls before servicing the equipment. Only trained and qualified personnel who are aware of the safety hazards should perform equipment adjustments or required maintenance while the conveyor is in operation.
- Observe all warning signs, lights, and alarms associated with the conveyor operation and maintenance, and be alert at all times to automatic operation(s) of adjacent equipment.
- Use extreme caution near moving conveyor parts to avoid the hazard of hands, hair, or clothing being caught.
- Do not sit on, stand on, walk on, ride, or cross (over or under) the conveyor at any time except where suitable catwalks, gate, or bridges are provided for personnel travel.
- Do not attempt to repair any equipment while the conveyor is running, replace any conveyor component without appropriate replacement parts, or modify the conveyor system without prior approval by the manufacturer.
- Do not operate the conveyor until all safety guards are securely in place, all tools and non-product materials are removed from or near the conveying surfaces, and all personnel are in safe positions.
- Do not remove or modify any safety devices provided on or with the conveyor.
- Do not clear jams or reach into any unit before first turning off the equipment power source(s) and affixing appropriate lock-out and tag-out device(s).

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**CAUTION:** There is a risk of injury with the roller conveyors with trapped rollers. Turn off conveyors before handling product or servicing. Limit access to maintenance personnel.

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## Parts Replacement

To minimize production downtime, selected conveyor spare parts should be stocked for replacement of defective components when required. Refer to the equipment bill(s)-of-materials where quantity requirements or code numbers are not indicated on the conveyor parts list. For added convenience, a list of selected spare parts for standard products is included in this manual (see Section I).

## Factory Assistance

Contact Customer Service for installation, operation, or maintenance assistance, or replacement parts.

## Pre-Installation Check

Review your conveyor layout drawing to verify the location of the conveyor sections and the sorter tubs (see Figure G - 1). Read all instructions provided in this manual. Locate the conveyor in accordance with the layout drawing for your system. Arrange the conveyor sections and the diverter tubs per the layout drawings to make certain all module and related mounting hardware is present.

Power for the sortation system is provided by the main drive for the belt conveyor. The sorter tubs receive their power from the belt, which passes through the tubs. See Figure G - 1 for reference. Note the manner in which the belt is tracked through the belt conveyor and sorter sections. Refer to your specific layout drawings to make certain the location of the modules aligns with the design of the system.

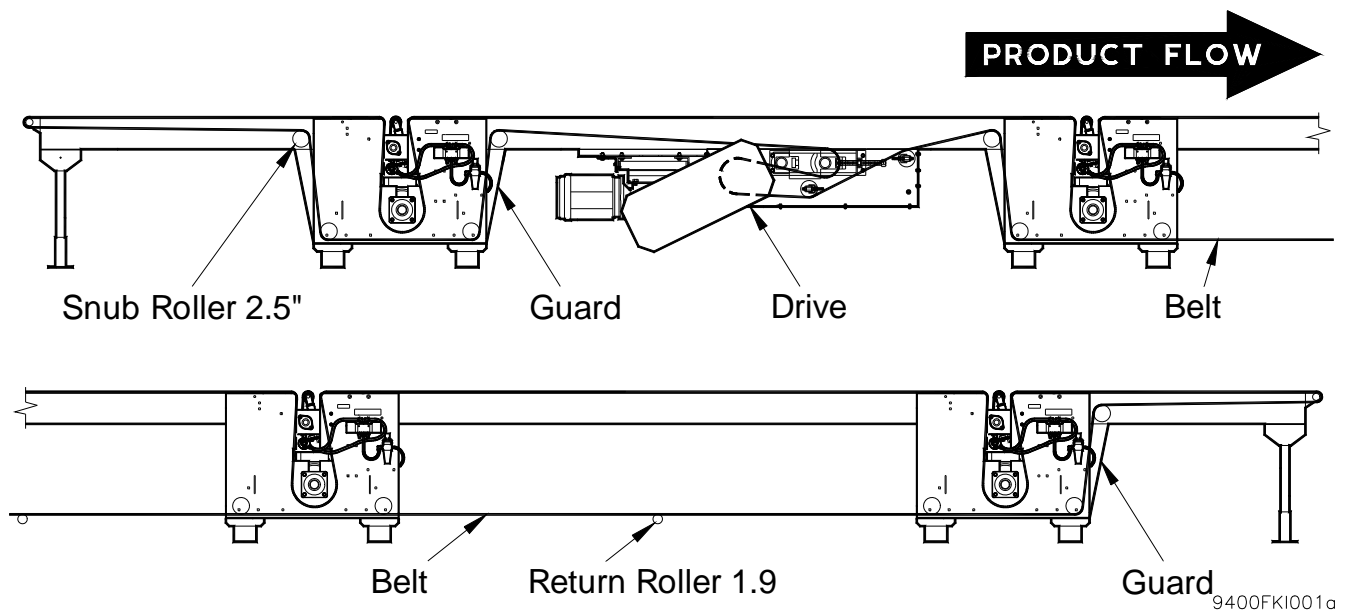


Figure G - 1 Typical Layout and Assembly Drawing(s) Showing Belt Tracking



## Assembling the Conveyor

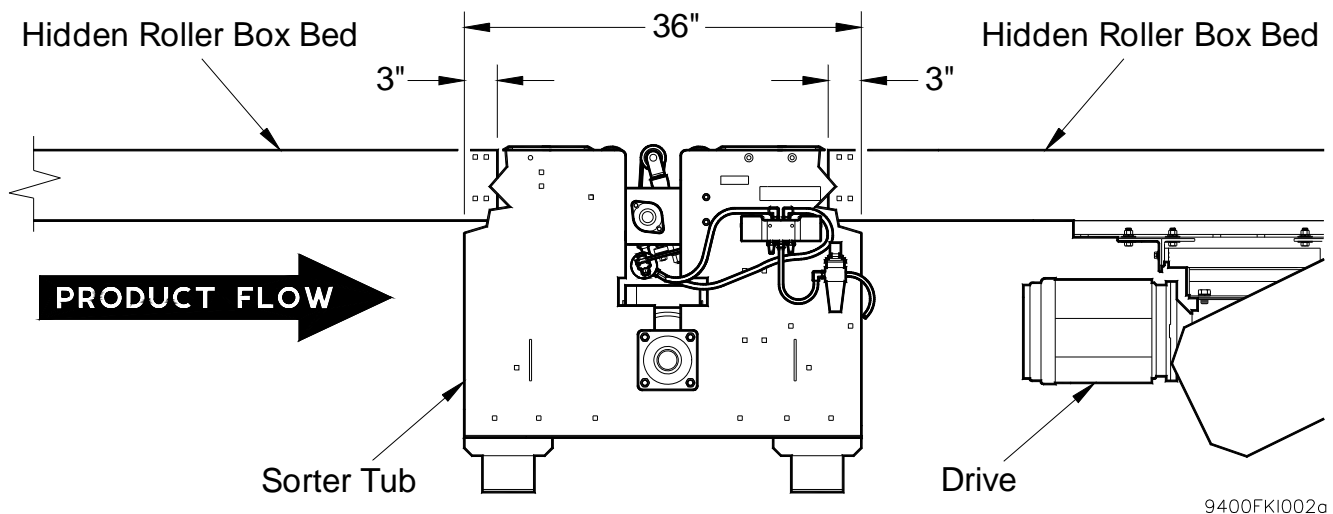
Use the following steps to assemble the conveyor.

1. Remove the shipping braces and check alignment of frames, pulleys, and rollers before assembling the conveyor. Corner-to-corner, diagonal frame measurements of each conveyor section should be equal plus or minus 1/16 of an inch. (See the NOTE in Step 4 for squaring out-of-square frames.) Also, check to make certain that all idler pulleys and rollers rotate freely and are square with the frames.
2. Refer to the component mark numbers on the layout/assembly drawing(s) and assemble the conveyor and diverter sections using appropriate supports and mounting hardware, refer to Product Manual 5310 *Floor Supports & Ceiling Hangers*.
3. Center each conveyor and diverter section with the layout chalk line, and adjust all supports for the required elevation.
4. Be sure to level the conveyor and diverter sections with a transit to within 1/16" tolerance. Recheck alignment of frames, pulleys, and rollers. Add appropriate shims as needed. Tighten all mounting bolts and securely anchor all supports.
5. Install the return roller(s) as specified on the layout/assembly drawing(s). If not otherwise noted, the return belt should be supported at 6' centers (maximum).

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**Note:** Frames, pulleys, and rollers **MUST** be square to properly track the belt. When the corner-to-corner squaring method is impractical as with long narrow conveyor sections, use a steel square to check (and realign if needed) pulleys, rollers, and bolted cross members to ensure that they are mounted perpendicular (90°) to the conveyor side frames.

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Figure G - 2 2 Belt Conveyor Section to Diverter Section

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## Installing Side Guides

Install side guides per layout drawing. Refer to typical assemblies of standard components. Refer to the *Product Manual 5320 Side Guides* for information on installing side guides.

## Sorter Specifics

Swivel rollers to be flush with T.O.B. to 1/32" below when in the down position at divert side. Far side is not critical, but should be flush or above.

1. Swivel rollers in the down position to be perpendicular to centerline of sorter with +/- 1/32".
2. Sorter to present a level plane (T.O.B.) within +/- 1/16" along its entire length and width.
3. Belt to be straight within: +/- 1/8" over any 10-0" length; +/- 1/2" over the total length.
4. Lacings must be perpendicular to center line of belt within +/- 1/32".
5. Belt to be tracked on center line +/- 3/4" of sorter and allowed to walk no more than +/- 1/2".
6. Spur elevation to be 3/8" above T.O.B. and level with this plane.

## Installing the Belt

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**Note:** Based on your layout, refer to *Product Manual 8100 Power Belt Conveyor*.

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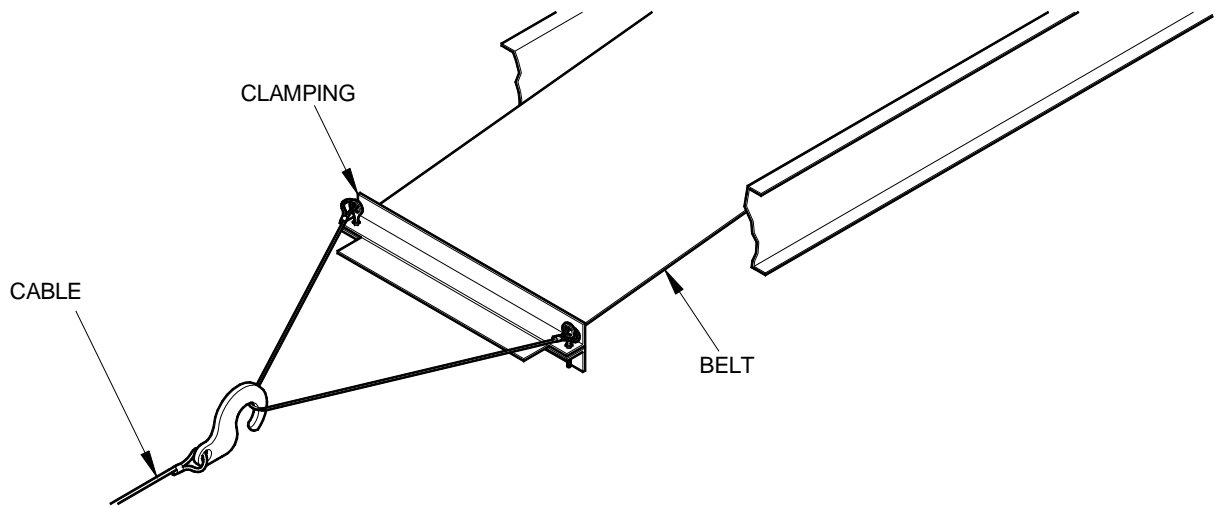
Use the following steps to install the belt.

1. BEFORE STARTING to install the belt, make certain that:
  - Power to the gearmotor is shut off, locked out, and tagged.
  - All frame sections are square, properly aligned, and securely anchored.
  - All pulley and roller shafts are perpendicular (90°) to the conveyor frame.
  - All idler pulleys and rollers rotate freely.
  - No dips or humps exist along the conveyor bed surface.
  - All sections are level.
2. Adjust all take-ups to their minimum take-up position.
3. Measure the required belt length.

For a short conveyor, thread a tape or rope through the conveyor following the path th belt will take and measure. Cut the belt to this length.
4. Orient the belt properly on the unit. For minimum friction (less belt drag), particularly on slider bed units, the brushed, non-glossy side of the belt must be face-down on the top side of the conveyor.
5. Thread the belt through the conveyor and diverter sections (as shown in Figure G - 1). Thread the belt through the bottom of the conveyor first. Position the belt near one end of the conveyor such that the brushed side of the belt is up and the first pulley to be encountered by the belt is the drive pulley. Large rolls of belting should be mounted on a shaft for ease of unrolling.

An alternative is to unroll the belt and lay it on the floor in large loops, taking care to avoid kinking the belt. The belt may then be pulled from the pile in the same manner it is pulled from a coil. Attach a suitable pulling clamp and cable to the lead end of the belt (see Figure G - 3). the clamp should distribute the pull evenly across the width of the belt. Then, with the assistance of a puller on the cable or rope, the lead end of the belt can be

guided through the final path, around drive and take-up pulleys, over return rollers, around end pulleys, and finally, up to the top of the conveyor where it can be joined with the other end.

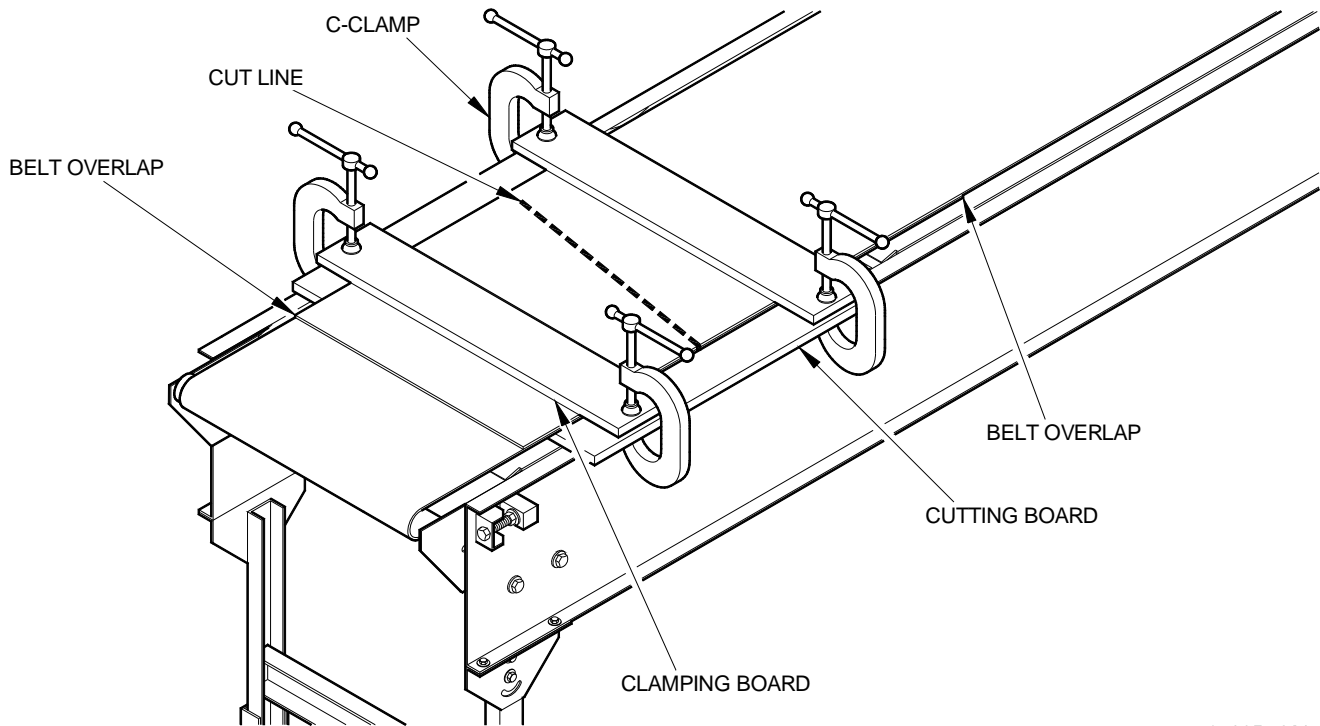


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Figure G - 3 Belt Pulley Device

## Cutting the Belt Ends

1. Pull the ends together and secure with appropriate clamps (see Figure G - 4). If excessive belt length remains, overlap the belt ends and pull the belt until the belt sag between the return rollers is about 1" (with conveyor take-up at minimum take-up position); then mark the cut line with chalk or pencil.



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Figure G - 4 Clamping Belt Ends

2. Belt ends must be precisely square to ensure proper belt tracking and even distribution of the tension load through the belt splice.
  - Using chalk or pencil, mark the center of the belt at a number of points about 1 ft. apart in the vicinity of the planned cut.
  - Using a straightedge, mark the centerline of the belt by passing the line through as many center marks as possible.
  - Using a steel square, mark the cut line perpendicular to the drawn centerline.
  - Carefully cut the belt with a sharp knife or belt cutting tool.
3. Recommended: Corners on squared but ends of the belt should be chamfered by cutting off a triangle measuring 1/2" (along the belt width) by 1 1/2" (measured along the belt length).
4. Recommended: Rough tops, ribs, chevrons, etc. should be skived back about 1" from the belt ends before lacing.

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**Note:** Skiving is assumed by belting and lacing manufacturers when sizing belt fasteners for these types of belts.

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## Splicing the Belt with Clipper® Lacing

Clipper® lacing consists of parallel, staggered-grip hooks on removable carding paper. Number 1 Clipper® lacing is to be used with Polymate 120 FS x FS belting. A Clipper® lacing machine, manual or electrical-hydraulic, is required. The following general instructions are applicable to all Clipper® lacers; refer to the vendor's manual for detailed information.

1. Before lacing the belt, check to ensure:
  - belt ends are squared.
  - lacing hooks and hinge pin are the proper size.
2. Trailing end of belt should have one less hook than the leading end. To calculate the number of hooks needed:
  - determine belt width.
  - subtract total unlaced portion (at least 1/4" on each belt edge should be unlaced; add corner notch if belt ends are chamfered).
  - divide by hook pitch.

### Example: 40" Belt Laced with #1 Lacing

$A (40") - b (1/2" \text{ min.}) = 39-1/2" \quad 39-1/2" / c (0.125) = 316 \text{ hooks (Leading end) and } 315 \text{ hooks (Trailing end).}$

3. Turn adjusting lever to open lacer jaws. Remove lacer pin, insert hooks (with carding paper reading upside down), re-insert lacer pin, and close lacer jaws just enough to hold hooks in position. Uncurl and pull carding paper off the hook points.
4. Position belt perpendicular to the lacer, not at an angle, and insert belt end between the hooks. Hold belt down flush on the hook retainer and close the lacer jaws by turning the closing lever or operating the foot pedal. Open jaw, remove lacer pin and remove the belt. Examine hook clinch by running fingernail along top of hook loops. *Hooks should not wiggle*, hook legs should be nearly flush with belt surface and hooks should be slightly visible.

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**Note:** When lacing belts less than 3/4 capacity of the lacer, a scrap piece of belting the same thickness as belt being laced should be used as a filler strip.

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5. When lacing a wide belt, always have the left side of the belt first, so the two already laced hooks can be placed in the extra deep slots for continuous lacing).
    - Determine total number of hooks (cards) needed to complete the lacing for each belt end. Remember to use one less hook on the trailing end.
    - Lace short section(s) first to ensure there will always be belting between the full width of the lacer jaws.

**Example:** LW #95 manual lacer is used to lace an 18" belt (5-1/2" long cards are standard with this lacer). The 1 1/2" short section should be laced first, leaving 16 1/2" for three full cards.

- *Complete each laced section with the adjusting lever in the same position to ensure that all hooks are cinched exactly the same.* Use the positions of a clock to remember position of the adjusting lever after completing each lacing operation.
6. After lacing both ends, bring the ends together using appropriate belt clamps and insert the lacing pin to complete the belt splice. Chamfer corners as needed to prevent end hooks from being torn out should side(s) of belt come in contact with any stationary structure.

## Tensioning the Belt

Tension the belt by adjusting the take-up pulley (see Figure G - 5). The adjustments must be made equally on both side and in small increments.

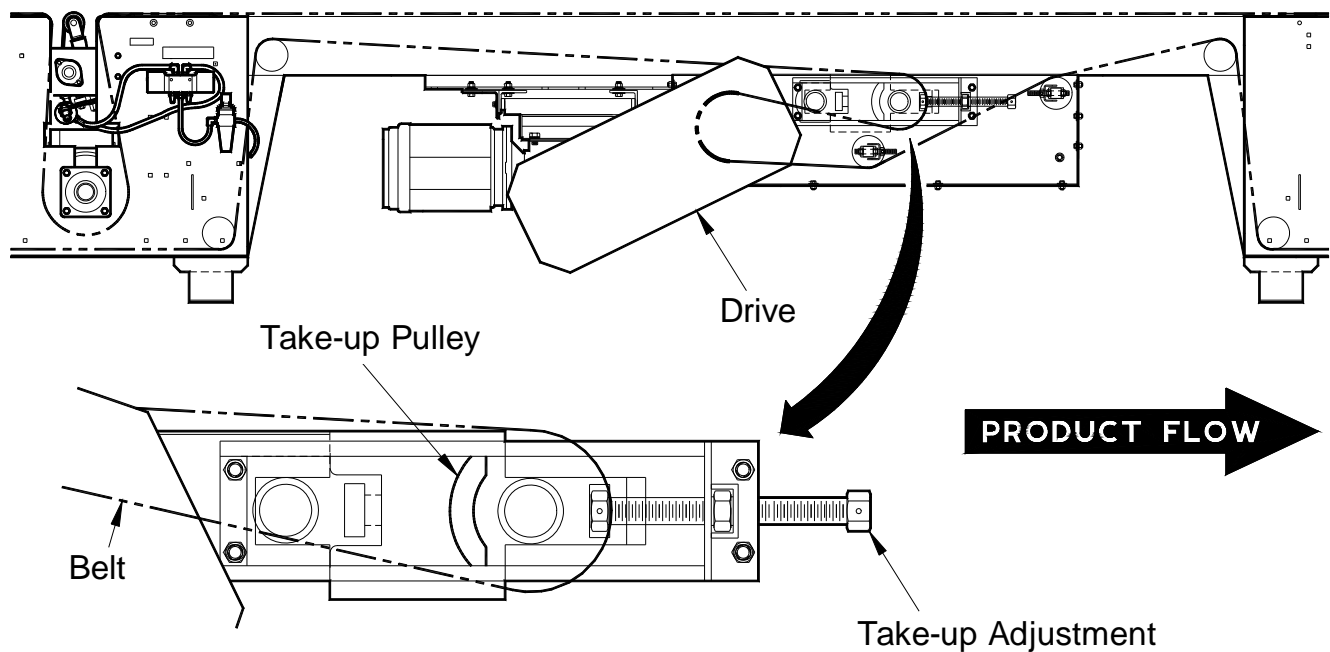
Adjust the take-up pulley so that the belt tension is just tight enough to prevent the belt from slipping on the drive pulley. Excess tension will reduce the life of the belt, snub rollers, and pulley bearings.

Refer to your specific layout to determine which style drive your system is equipped with.

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**Note:** When adjusting, be careful to stay clear of the chain and drive components.

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Figure G - 5 Center Drive/Take-Up

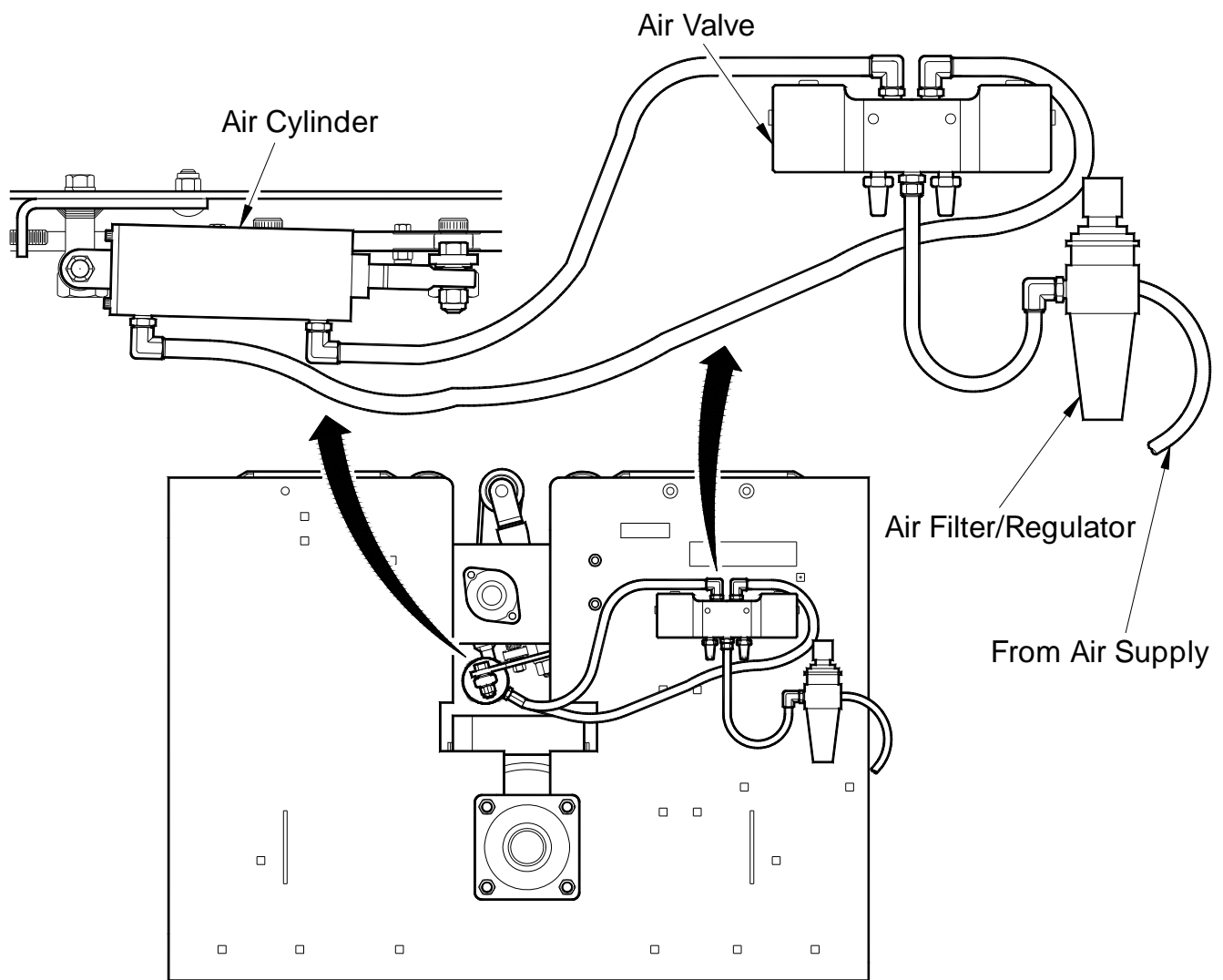
## Air and Electrical Provisions

The location of pneumatic components is shown in Figure G - 6. Refer to the conveyor layout drawing(s), pertaining to the particular conveyor being installed, for the location of fieldinstalled air and electrical equipment required (see conveyor bills-of-materials for factory provided components). For a complete understanding of the electrical control system it is necessary to become familiar with the electrical drawings and description of operation that have been prepared specially for this project.

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**CAUTION:** Turn off power circuit(s) and lockout/tagout the operating control(s) before making electrical connections.

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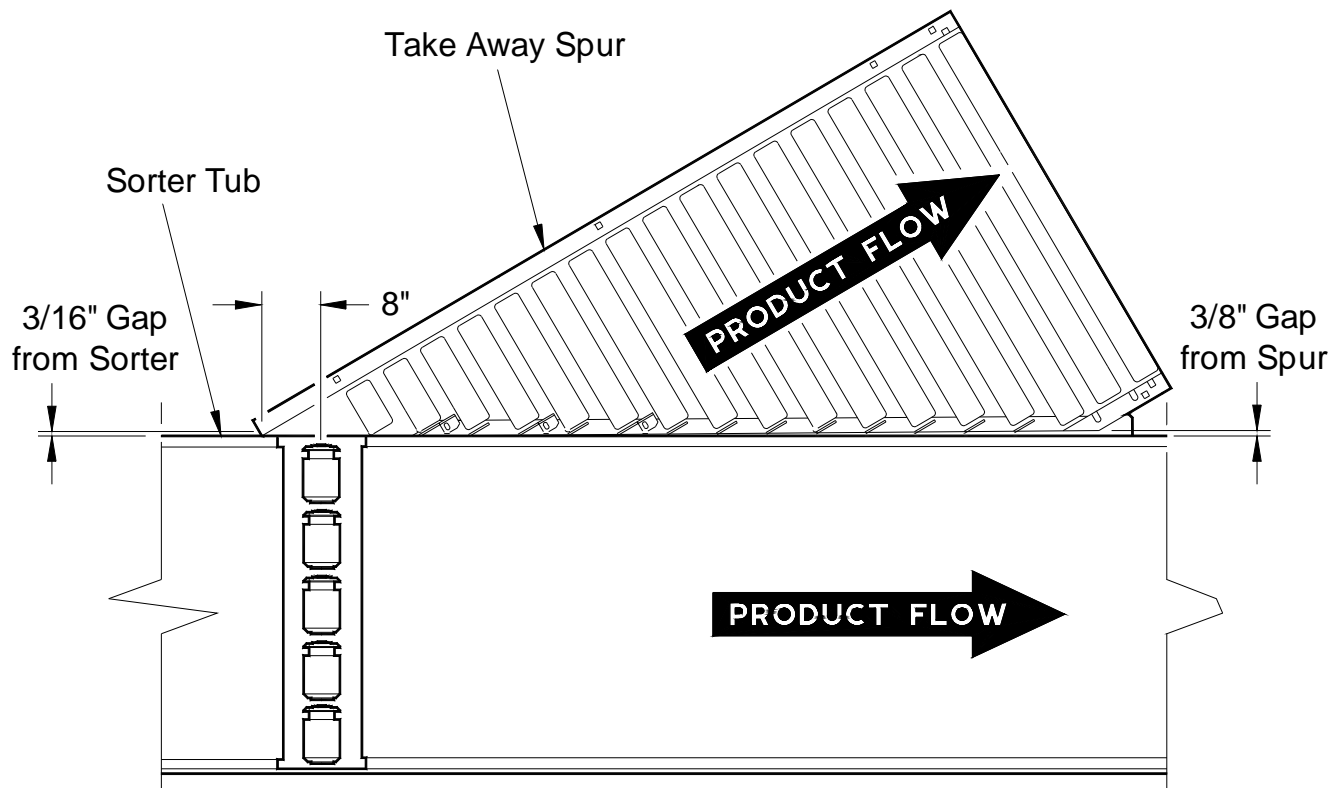
Figure G - 6 Typical Air Piping Detail



## Swivel Sorter Spur Installation

The 30° V-Belt roller take away spur nests directly against the side frame of the sorter tub (see Figure G - 7). Use the following procedure to install the take-away spurs to the sorter sections.

1. Position the spur against the sorter tub side frame. The spur must be placed so the end of the long rail is located 8" upstream from the centerline of the swivel rollers. The location of the spur is critical for proper operation of the sorter system.
2. Properly mount and support the spur to the sorter tub with the supplied mounting hardware and supports. The spur should be mounted 3/16" to 3/8" off the main line conveyor.
3. Adjust the top of the spur rollers such that they are 3/8" above the top of the main line sorter belt. This ensures proper drive of packages as they approach the spur conveyor.
4. Adjust all related supports and mounting hardware to confirm proper location of the spur. Once alignment is verified, tighten all connections to make certain the spur is locked into position.



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Figure G - 7 Spur to Sorter Attachment

## Installing the Transfer Drive V-Belt to Spur

Use the following steps to install the V-belt drive between the sorter and the take-away spur.

1. Verify the location of the take-away spur. The end of the long rail of the take-away spur should be located 8" upstream from the centerline of the swivel rollers.
2. Install the V-belt over the drive pulley, which is located on the belt pulley drive shaft of the sorter tub. Verify the location of the drive pulley does not interfere with the flat belt drive used to power the swivel rollers.
3. Feed the belt over the driven pulley, which is located at the end of the take-away spur. The two pulleys should be aligned such that the belt follows a relatively straight path coming off of the driven pulley (from the spur) and onto the drive pulley (on the sorter).
4. Mount the idler assembly onto the spur conveyor as shown in Figure G - 8.
5. Position the idler pulley in such a manner that there is adequate thread remaining on the adjustment to properly tension the belt.
6. Adjust the tensioner so the belt remains tight around all pulleys. The belt will loosen over time and become flexible after 10 to 24 hours of use. After this break-in period, the belt needs to be re-tensioned. The position of the idler is set with the threaded bracket attached to the idler pulley. Make certain all fasteners for the idler are secure before starting the conveyor system.
7. Verify the belt is tracking properly and doesn't show tendencies to want to walk off of the pulleys. Monitor the belts and pulleys on all sorter beds for proper operation and alignment.

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**Note:** Minor V-belt shavings will accumulate below and around the V-belt during this break-in period as the V-belt is "de-burred". This is normal.

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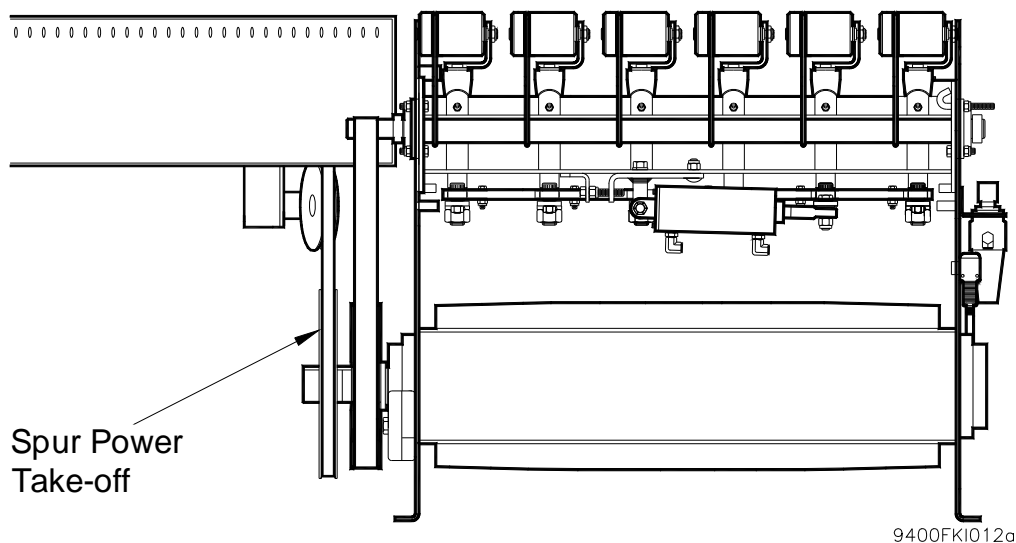
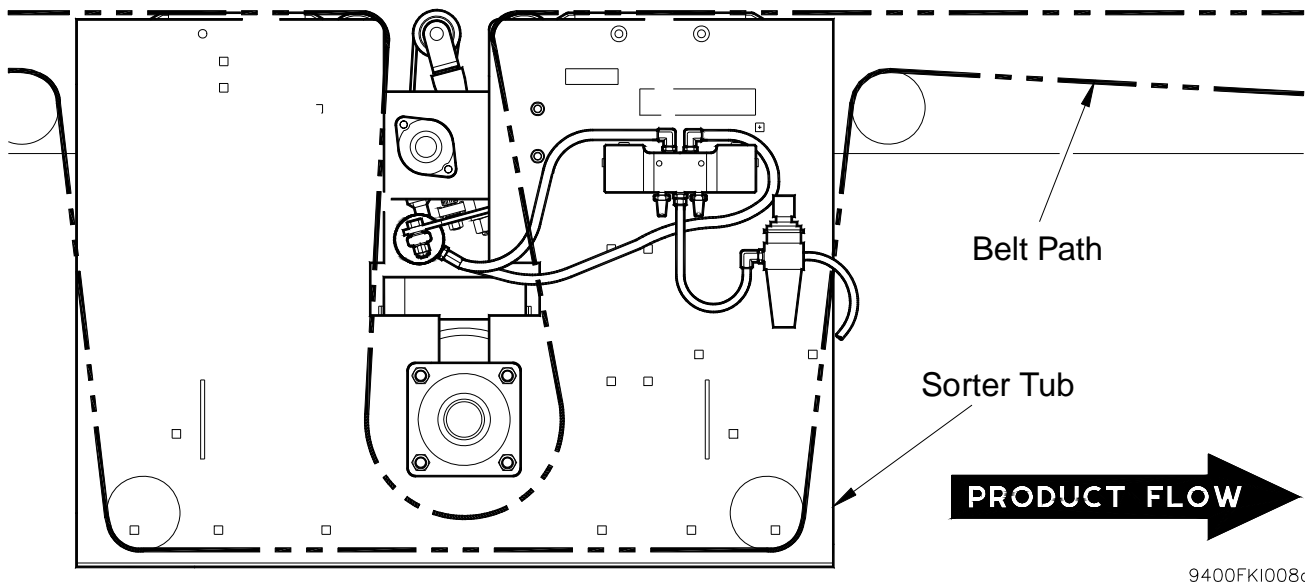


Figure G - 8 Mounting the V-belt Drive Between the Sorter and the Take-Away Spur

## Initial Operation

Make certain that all conveyor safety guards are in place, and that all personnel are in safe positions before conveyor starts up.

1. Jog the motor to verify correct rotation of the system. If the direction is not proper, rewire the motor to achieve proper direction.
2. Start the conveyor and observe belt for tracking.
3. Carefully monitor belt tracking through each diverter section, belt conveyor bed sections and belt drive sections. Check for proper drive through each sorter section.
4. Verify all swivel rollers are operating as designed.
5. Check flat belt drives on each swivel roller sorter section for proper belt drive and alignment. Flat belts are tensioned with rotary tensioners located near the drive pulley for the flat belt.
6. Ideally the belt should run centered along the entire conveyor section. If the belt is not tracking properly, refer to the belt tracking section of this manual.



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Figure G - 9 Belt Path Through Sorter Module

## Belt Tracking

Prior to making any belt tracking adjustments, make certain that the belt is properly installed and that the head, tail and drive pulleys are properly aligned and square with the conveyor frames. The belt must be properly tensioned before attempting to track the belt. Attempting to track the belt without properly aligning the head, tail and drive pulleys will yield poor results (see Figure G - 10).

1. Start the conveyor system and observe the belt tracking through each belt conveyor module.
2. If the belt is not tracking properly, adjust one side of the snub idler pulley to track the belt down the centerline of the system. The snub roller that will yield the greatest effect will be upstream most snub idler roller. Snub rollers are located on the undersides of the belt conveyor sections. There are also snub rollers located at the bottom of the diverter tubs. These should only be adjusted as a secondary measure, after the snub rollers on the conveyor frames are adjusted with insufficient results.
  - Loosen (do not remove) the nut holding the snub idler in place.
  - Slowly adjust the snub idler in the desired direction to make the belt rack to the center of the system. This is best done by leaving slight tension in the bolted joint and using a wide screwdriver to “tweak” the roller into the desired location.
  - Observe the tracking of the belt.
  - Repeat this process along the length of the entire sorter/belt system. Only make adjustments where absolutely necessary.
3. Observe the entire system, and watch the belt for signs of misalignment.
4. For additional belt tracking procedures, see the Product Manual 8100 *Powered Belt Conveyor*.

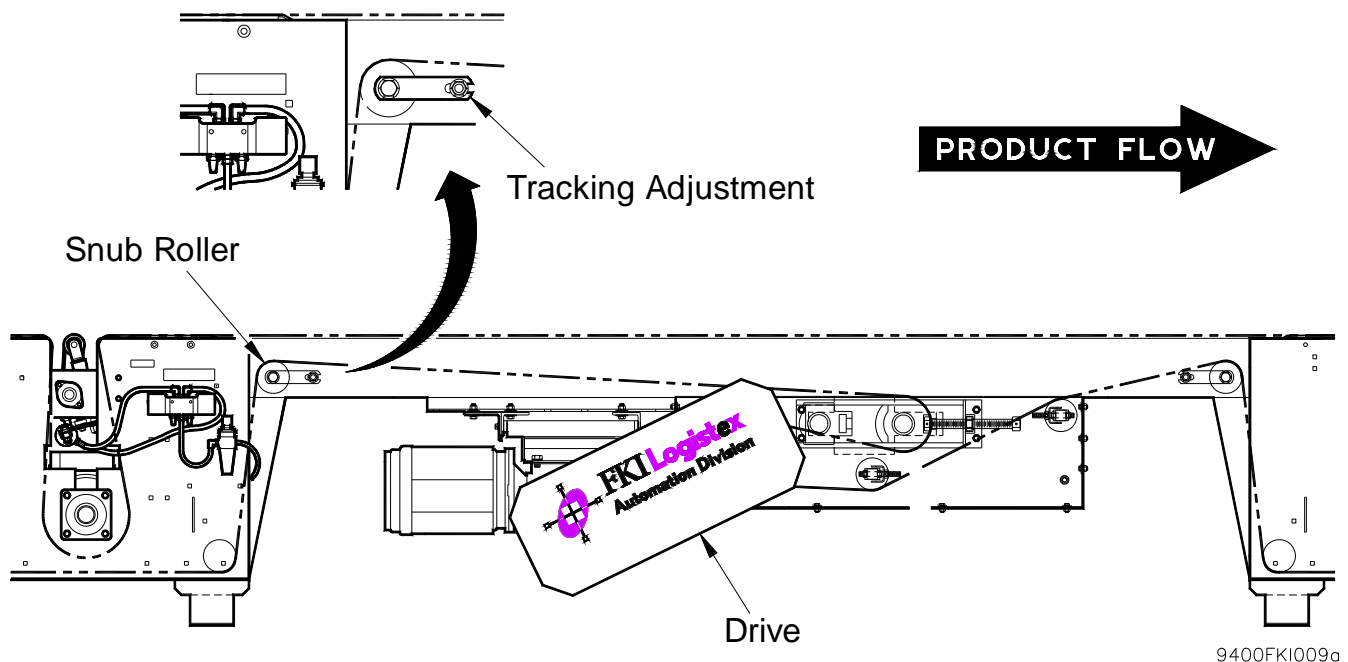


Figure G - 10 Adjusting Belt Tracking

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## SECTION H: MAINTENANCE PROCEDURES

### Introduction

Recommended service checks and equipment maintenance are outlined in this section for typical and intermittent-duty conveyor applications. Additional maintenance and servicing schedule adjustments may be required for continuous-duty operation or extreme environmental conditions.

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**CAUTION:** Before performing maintenance on a conveyor, make certain that the conveyor's power disconnect is locked in the "Open" position and tagged to prevent the accidental or unexpected application of power.

Do not perform maintenance while the conveyor is running unless specifically instructed to do so in this manual.

Maintenance must be performed only by qualified personnel who are trained in normal and emergency operations of the conveyor, and who are knowledgeable about all safety devices, their locations and functions.

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Before restarting a conveyor:

- Remove all foreign objects from the conveyor;
- Be sure that all guards and safety devices are properly installed and working.
- Make sure that all persons are clear of the conveyor and are aware that the conveyor is about to be restarted.

### Safety Instructions

- • Turn off conveyor power sources and affix appropriate lock-out and tag-out devices to operating controls before servicing the equipment. Only trained and qualified personnel who are aware of the safety hazards should perform equipment adjustments or required maintenance while the conveyor is in operation.
- • Observe all warning signs, lights, and alarms associated with the conveyor operation and maintenance, and be alert at all times to automatic operations of adjacent equipment.
- • Exercise extreme caution near moving conveyor parts to avoid the hazard of hands, hair, and clothing being caught.
- • Do not sit on, stand on, walk, ride, or cross (over or under) the conveyor at any time except where suitable catwalks, gates, or bridges are provided for personnel travel.
- • Do not attempt to repair any equipment while the conveyor is running, replace any conveyor component without appropriate replacement parts, or modify the conveyor system without prior approval by the manufacturer.
- • Do not operate the conveyor until all safety guards are securely in place, all tools and non-product materials are removed from or near the conveying surfaces, and all personnel are in safe positions.
- • Do not remove or modify any safety devices provided on or with the conveyor.
- • Do not clear jams or reach into any unit before first turning off the equipment power sources and affixing appropriate lock-out and tag-out devices.

## Parts Replacement

To minimize production downtime, selected conveyor spare parts should be stocked for replacement of defective components when required. Refer to the equipment bill(s)-of-materials where quantity requirements or code numbers are not indicated on the conveyor parts lists. For added convenience, a list of selected spare parts for standard products is included in this manual (see Section I).

## Factory Assistance

Contact Customer Service for installation, operation, or maintenance assistance, or replacement parts.

## Preventive Maintenance

Table H - 1 Scheduled Maintenance Summary

Interval	Components	Unusual Noises	Lubrication	Oil Level	Tension	Wear	Alignment	Fasteners	Set Screw	Proper Position	Physical Condition	Operation
<b>Weekly (40 Hours)</b>	Belt Return Sheaves										X	X
	Electrical Devices									X	X	X
	General Structure							X			X	
	Power Unit - Reducer			X								X
	Safety Guards and Devices						X	X		X	X	X
	Belts (Divert Roller & Drive)	X			X	X	X				X	X
<b>Monthly (160 Hours)</b>	Bearings - External							X	X		X	
	Drive Belts/Chains and Sprockets	X	X		X	X	X	X	X		X	
	Power Unit - Motor	X						X			X	X
	Power Unit - Reducer	X						X			X	X
	Supports and Hangers						X	X			X	
	Take-Up/Idler Sheaves										X	X
	Divert Roller Pivot Shafts		X								X	X
	Pneumatic Cylinder	X				X	X			X	X	X
	V-Belt Spur Drive				X	X						X
<b>Semiannually (1040 Hours)</b>	Bearings - External		X									
	Power Unit - Motor											X
	Power Unit - Reducer		X	X								

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## Scheduled Maintenance

All newly installed equipment should be frequently inspected and serviced as needed during the first 40 hours of operation. An application may subject the equipment to conditions that would necessitate more frequent maintenance. This may be determined by performing maintenance more frequently when the conveyor is first put into operation, and then lengthening the intervals based on experience.

## Initial Start-Up and Run-In Period

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**Note:** To prevent accidental start-up, make certain that electrical power to the gearmotor is turned off and locked out.

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1. Check conveyor elevation and adjust supports as needed.
2. Check conveyor alignment (lengthwise and width wise) with a spirit level, and adjust supports or add shims as required; securely tighten all mounting bolts.
3. Check that all pulleys and rollers are mounted perpendicular (90°) to the direction of travel.
4. Check belt sag, and adjust take-up pulley or roller as needed.
5. Check drive/driven sprocket alignment with a spirit level and straightedge (remove chain guard); securely tighten all sprocket set screws.
6. Check drive chain tension (remove chain guard) and adjust gearmotor platform as required; securely tighten all mounting bolts.
7. Check motor wiring connections refer to the vendor's manual for additional information.
8. Check that all conveyor safety guards removed during the installation have been replaced.
9. Check that all piping connections are in accordance with the layout drawings. Set the pressure regulators on each sorter section to 60 psi.
10. Check each sorter section for the following:
  - The divert roller assembly should be adjusted to be level with the top of the belt (see Figure H - 1).
  - The divert rollers should be aligned in the straight, un-actuated position. Thread the cylinder rod end bearings in or out as required. The divert rollers should be skewed at approximately 30° to the conveyor belt travel when actuated and should rise by approximately 3/8". Manual operation of the air valve(s) is required for making these checks.
  - Shim idler sheaves position on shafts as needed to line up with drive pulley. Guard removal is required.
11. Check that tools and all installation materials have been removed from the conveyor and installation site.
12. Review safety instructions located in the front of this section. Check that all conveyor safety guards removing during installation have been replaced.



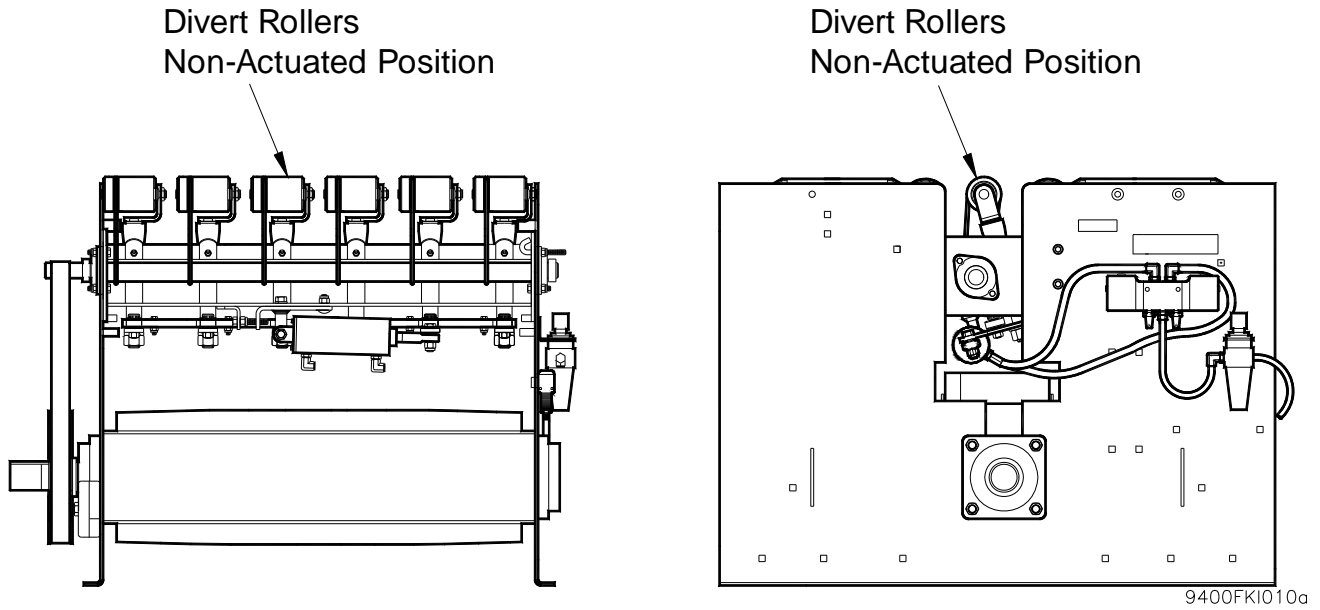


Figure H - 1 Divert Rollers in Non-Actuated Position

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## Daily Inspections

1. General walk-through inspections of the conveyor equipment (listening for unusual noises and carefully observing the system) during daily plant operation is recommended. For continuous-duty applications, conduct conveyor inspections once each shift.
2. Frequently check equipment safety guards, warning signs, lights, and alarms associated with the operation of the conveyor system and keep them in good condition to ensure the safety of all plant personnel. Any unusual conveyor noise, oil leaks, and operational problems should be immediately reported and promptly corrected.
3. Check operation of all electrical controls, including dust build-up on photo eyes and reflectors.
4. Inspect roller and pulleys for debris build-up.
5. Inspect divert air cylinder and rollers for smooth operation and alignment.

## Weekly Inspections (Every 40 hours of operation)

1. 1. Inspect bearings, gear reducers and motors for excessive noise or heat. A motor may be 175°F, (hot to touch) as normal. One-half horsepower motors may be slightly hotter.
2. Inspect round urethane divert roller belts for signs of wear.
3. Clean breather cap on reducer (if used).
4. Inspect drive belt for proper tracking.

## Monthly Inspections (Every 160 hours of operation)

1. 1. Inspect drive pulley and belt for wear and proper tensioning.
2. Inspect drive unit for leaking seals (and oil level in gearcase if applicable), and the condition of the drive belts.
3. Inspect flat belt (Divert Roller) drive for proper alignment, tracking, and tensioning.
4. Inspect belts for signs of wear.
5. Inspect pulleys and sheaves for alignment.
6. Inspect fasteners and set screws for signs of loosening, fatigue or movement.
7. Inspect pneumatic cylinder for secure mounting and alignment of divert rollers.
8. Lubricate divert roller pivot shafts through Zerk fitting.

## Semi-Yearly (1040 hours)

Lubricate: Drain and flush gearcase after each 2,500 hours of normal operation or at least every six (6) months (if applicable).

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## Selected Procedures

### Speed Reducer - Lubrication and Maintenance

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**Note:** See vendor literature for specific information.

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#### *Oil Levels*

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**Note:** Excessive oil temperatures may be the result of one or more of the following factors: overloads, overfilling or underfilling, inadequate cooling.

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Speed reducers are filled to the proper level for the standard mounting position with the appropriate grade of oil for operation in a 51°F to 110°F temperature environment. The oil level should be checked and adjusted (if necessary) prior to operation, using the oil level plug provided and while the unit is oriented in its operating position.

If a speed reducer is overfilled with oil, the energy used in churning the excessive oil can result in overheating. If this occurs, shut down the drive, remove the oil level plug and allow oil to drain until oil ceases to drain from the level hole, reinstall the oil level plug, and restart the drive. If the speed reducer is underfilled, the resultant friction can cause overheating and possible damage. If this occurs, fill the speed reducer to the oil level plug hole and check the gearing for excessive wear.

#### *Temperature*

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**Note:** To dissipate internally generated heat, the speed reducer must be installed in such a way that air can circulate freely. Tightly confined areas (inside cabinets, etc.) should be avoided. If this is not possible, forced air cooling by means of a separate blower should be used.

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If the operating ambient temperature is outside the range specified above, then refer to the Vendor Lubrication Chart and refill the unit with the correct grade based on actual ambient temperatures.

Speed reducers in normal operation can generate temperatures up to 200°F depending on the type of reducer and the severity of the application (loading, duration of service, ambient temperatures).

#### *Changing the Oil*

When changing oil for any reason, remember that oil of various types may not be compatible. therefore, when changing to a different oil, it is recommended that the housing be completely drained and thoroughly flushed with a light flushing oil before refilling with the appropriate lubricant. The oil level should be checked after a short period of operation and adjusted, if necessary. When changing double reduction models, each housing should be drained and filled independently, even though there may be a common level.

Synthetic lubricants can be advantageous over mineral oils in that they generally are more stable, have a longer life, and operate over a wider temperature range. these oils are

appropriate for any application but are especially useful when units are subjected to low startup temperatures or high operating temperatures. However, continuous operation above 225°F may cause damage to the seals or other components.

It is recommended that the initial oil be changed or filtered after the first 1500 hours of operation to remove metal particles that accumulate during break-in. Under normal conditions, after the initial oil change, the oil should be changed after every 2,500 hours of operation, or every six months, whichever occurs first. For synthetic oils, subsequent oil changes should be made after 5000 hours of operation if units are operating in a clean environment. Under severe conditions (rapid temperature changes, moist, dirty, or corrosive environment) it may be necessary to change oil at intervals of one to three months. Periodic examination of oil samples taken from the unit will help establish the appropriate interval.

### *Overloads*

Overloads may be due to an increase in speed, or product/component weight exceeding the original design values, an increase in drag caused by a bad bearing, excessive belt snubbing, component interface, etc.

Always check the speed reducer rating when increasing driven loads or increasing the horsepower rating of the motor or other prime move.

### *Seals*

Although high quality seals and precision ground shafts are used to provide a superior seal contact surface, it is possible that circumstances beyond control can cause oil seal leakage (defective seal, damage during the shipment or installation, etc.). When replacing a shaft oil seal, using the following suggestions will help to insure leak-free operation and long seal life.

When installing a new seal, cover the keyway and any other surface discontinuity with smooth tape to protect the seal lip from being damaged. A sealant should be used between the O.D. of the seal and the I.D. of the bore into which the seal is installed. The seal bore should also be free of any burrs, nicks, or scratches.

## Electrical Devices

Periodically inspect photo-eyes and adjust as required. Lenses and reflectors on photoelectric devices should be wiped clean on a daily basis. Refer to appropriate vendor's instructions for additional maintenance.

## Pneumatics

The divert air cylinder and rollers should be observed daily for smooth operation, and alignment.

The alignment of the divert rollers should be observed when in the straight ahead, nonactuated position. Misaligned (skewed) rollers will require readjustment of the cylinder rod ends to get them back in line. These rod ends must be tightened securely and should be checked periodically.

If the divert air cylinder and/or valve show signs of sluggish movement, remove the air supply line nearest the cylinder or valve and add 3 to 5 drops of air tool oil into the line.

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**Note:** The short cylinder stroke and confined space make the use of an automatic oiler impractical.

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## Bearings

All precision bearings in the Swivel roller Sorter units are considered sealed for life (based on the application) and do not require lubrication. If a defective divert roller bearing is found, replace the roller.

The divert roller pivot shafts should be periodically lubricated with Aluminum Complex #0, medium thickness grease at the grease Zerks provided at each pivot shaft housing. Wipe off excess grease to prevent propagation to other areas.

## Round Urethane Belts

The round urethane belts on the Swivel Roller Sorter sections should be inspected on a weekly basis for cracking and powdering due to excessive wear and abrasion. Tension of the round urethane belts is non-adjustable. It is recommended that all the round urethane belts for one sorter section be replaced at the same time. How often this needs to be done will be determined in part by the amount of operational time and the environmental conditions.

Replacement procedure for round urethane belts is as follows:

1. Loosen the setscrews on the 2-bolt flange bearing opposite the flat belt drive side.
2. Remove the two bolts that hold the 2-bolt flange bearing.
3. Remove this bearing from the plate to which it was bolted.
4. Slip the replacement round urethane belt over the shaft end and through the mount plate hole.
5. The urethane belt can now be looped over the appropriate divert roller. Be sure that the belt is seated in the bottom of the groove in the roller.
6. Bolt the bearing back in place and tighten the setscrews. Check the alignment of the driven sheave, and the tracking of the flat belt drive.

The flat belt should also be inspected occasionally for wear. Cracked or frayed belts should be replaced. Pulley alignment and belt tension should be checked regularly. Additional urethane belts are stored over the shaft for quick replacement. These are supplied from the factory.

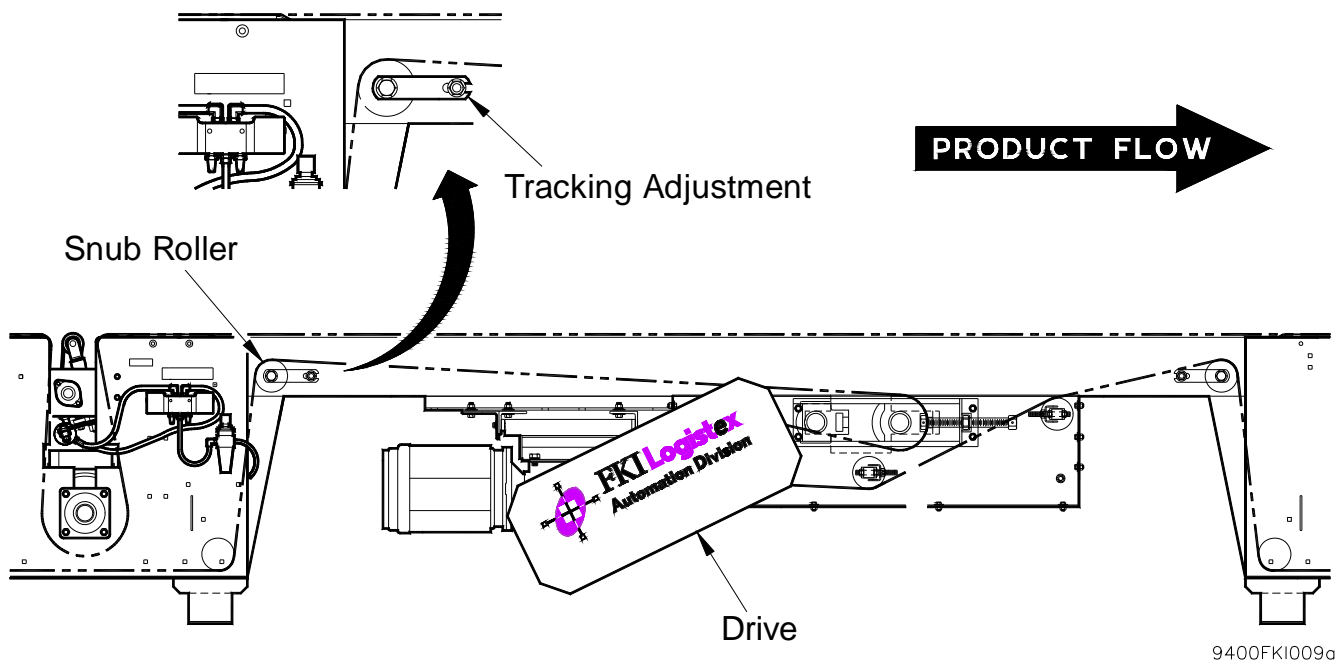
## Fasteners

Periodically check all fasteners for signs of loosening. Tighten the fasteners to standard recommended torque (unless otherwise specified) and replace locking device. "Perma-Lok" #HL126 (FKI Logistex #2904059) wicking adhesive sealant may be applied to pre-torqued fasteners to prevent loosening.

## Adjusting the Belt

Start the conveyor system and observe the belt tracking through each belt conveyor module (see Figure H - 2). If the belt is not tracking properly:

1. 1. Adjust one side of the snub idler pulley to track the belt down the centerline of the of the system. The snub roller that will yield the greatest effect will be upstream most snub idler roller. Snub rollers are located on the undersides of the belt conveyor sections. There are also snub rollers located at the bottom of the diverter tubs. these should only be adjusted as a secondary measure, after the snub rollers on the conveyor frames are adjusted with insufficient results.
  - Loosen (do not remove) the nut holding the snub idler in place.
  - Slowly adjust the snub idler in the desired direction to make the belt track to the center of the system. This is best done by leaving slight tension in the bolted joint and using a wide screwdriver to “tweak” the roller into the desired location.
  - Observe the tracking of the belt.
  - Repeat the process along the length of the entire sorter/belt system. Only make adjustments where absolutely necessary.
2. Observe belt travel and watch the belt for signs of misalignment.
3. For additional belt tracking procedures, see the Product Manual #8100 *Powered Belt Conveyor*.



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Figure H - 2 Adjusting Belt Tracking

## Troubleshooting

Basic troubleshooting provisions are outlined in below. For troubleshooting the specific conveyor system installed, always check the maintenance information.

**CAUTION:** Do not clear jams or reach into any unit before first turning off the equipment power source(s) and making certain that all moving parts are fully stopped. To avoid personal injury equipment damage, lock-out and tag-out the conveyor operation control(s) before attempting to correct any malfunction.

Table H - 2 Basic Troubleshooting Problems and Solutions

Problem	Cause	Solution
Conveyor does not start.	Electrical power shut off or control circuit(s) not energized.	Check that the system control panels are energized.
	System control devices (photocells, limit switches, etc.) out of adjustment or defective.	Adjust or replace.
	Emergency stop devices activated.	Reset the emergency stop devices.
	Motor overload block open.	Check the conveyor drive system and overload size before resetting.
Conveyor shuts off.	Accumulation photocell or other control device(s) actuated or defective.	Check conveyor accumulation or obstruction of control device; replace control device if defective.
	Power or component failure at system control center.	Consult vendor manuals.
	Motor overloaded.	Check for cause; also check motor and overload sizes.
Belt runs to one side of conveyor only at given points.	Idler roller(s) immediately preceding trouble point(s) misaligned, dirty, sluggish or frozen.	Align, clean, lubricate or replace.
	Conveyor out of square	Align, frame(s), pulley(s) or roller(s).
	Conveyor or structure not level (belt shifts to low side).	Adjust supports.
Belt runs to one side on conveyor for a long distance.	End pulley not parallel or square.	Align pulley shafts and frames.
	Conveyor bed not straight or level.	Align frames and adjust supports.

Problem	Cause	Solution
Particular belt section runs to one side of conveyor.	Belt splice poorly laced or damaged.	Remove lacing and re-splice.
	Belt is not square.	Remove lacing, square belt ends and re-splice.
	Bowed or worn belt.	Replace belt.
<b>CAUTION: Using excessive belt tension to improve belt tracking may result in motor overload and damage to lacing, or pulley/roller bearings.</b>		
Excessive belt slip.	Insufficient belt tension.	Tighten take-up or shorten belt if belt length exceeds take-up capacity DO NOT OVER TENSION BELT.
	Material spillage on belt or pulley(s)	Clean and correct cause(s) for material spillage.
Excessive belt stretch.	Overtightened take-up or snub unit.	Adjust for proper belt tension. DO NOT OVER TENSION BELT.
	Wrong belt for application.	Replace with appropriate belting.
Excessive belt wear.	Pulleys, idlers, or conveyor frame not square.	Correct alignment and inspect belt.
	Belt not tracking properly.	Re-align the belt.
	Foreign material on conveyor bed, pulley or rollers.	Clean and correct cause(s) for material buildup.
Lacing pullout.	Hook failure (Occurs when belt tension exceeds lacing strength).	Check for proper hook clinch and correct belt tracking.
	Belt failure (occurs when lacing is stronger than belt and hooks pull through the belt carcass).	Check belt tension.
Gearmotor unusually noisy.	Mounting bolts loose.	Re-tighten.
	Unit misaligned or defective.	Re-align or replace.
	Insufficient lubrication.	Fill to proper level.
Gearmotor runs hot or overheats	Normal break-in period.	Daily inspection only.
	Overload.	Reduce load or use larger gearmotor.
	Insufficient lubrication or inadequate ventilation.	Service the unit.



Problem	Cause	Solution
Excessive chain noise or chain/sprocket wear.	Sprocket misalignment.	Check the drive/driven shafts are parallel and align sprockets.
	Chain too loose or too tight.	Adjust chain tension.
	Insufficient lubrication.	Lubricate
	Worn/defective chain or sprocket(s).	Replace.
Sluggish or frozen roller(s)	Dirty or worn bearings.	Replace bearings or roller assembly and check roller alignment.
Belt conveyor roller(s) sluggish or frozen.	Bent roller shaft.	Replace roller assembly.
Belt conveyor pulley(s) sluggish or frozen.	Insufficient lubrication	Lubricate.
	Dirty or worn bearings.	Clean or replace bearings; check belt tension.
	Bent pulley shaft.	Replace pulley assembly.
Divert roller mechanism sluggish or frozen.	Obstruction.	Check for interference and/or hang-ups.
	Insufficient air pressure	Check pressure regulator gauge (should read 60 psi).
	Insufficient lubrication of pivot shaft.	Lubricate pivot shaft grease Zerks with Aluminum Complex #0, medium thickness grease.
	Insufficient lubrication of valve or air cylinder.	Disconnect from mechanism and test, replace if necessary.
	Rod-end bearings defective or worn out.	Check for freedom of movement and replace if necessary.
	Air cylinder misaligned, push rod bent or worn out.	Check alignment and replace rod if necessary.
Divert rollers sluggish or frozen.	Insufficient tension on double flat belt drive.	Adjust tension, DONOT OVERTIGHTEN, Belts should only be tight enough to provide adequate drive.
	Round urethane belt worn.	Replace belt.
	Sealed bearing defective.	Replace divert roller.

<b>Problem</b>	<b>Cause</b>	<b>Solution</b>
Excessive wear or breakage of round urethane belts.	Belt rubbing against obstruction.	Check for obstructions or interference and eliminate.
	Belt wearing on divert roller which is not free to rotate.	Check to see that all divert rollers turn freely, and that cases never come to rest on top of divert rollers.

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***SECTION I: SPARE PARTS*****General Information**

The purpose of this section is to identify the critical replacement parts required for a solid preventive maintenance program and to minimize the chances for extended down time.

The following pages illustrate the location of these recommended spare parts as they apply to each particular unit. Keep in mind that these illustrations only apply to the standard product line.

## Miscellaneous Spare Parts

Key	Description	Part Number
1	O-Ring	8700440
2	Bearing w/Coll 1 7/16 BR FHR207-23	0110240
3	Bearing Rod End 7/16 B w/Zerk	0200053
4	Bearing Flange 1 11/16 B 4-Bolt	0200228
5	Bearing Flg 1 B 2-Bolt Eccn Lock	0202116
6	SHV FLFC Idler 1.88 OD 0.51 B	2302200
7	Connector 1/4 MPT x 3/8T	271496
8	Tube 3/8" OD Flexible Hipress	271731
9	Silencer 1/4 MPT (54011 OR =)	271771
10	SRSTR Accs Rot Tnsnr	2900330
11	Bearing 6203-ZZ 5/8 Shielded 40MMOD	350920
12	SRSTR Flat Belt Drive Pulley	4802037MA
13	Cyl. Air 2 B x 2 1/4 Strk Cshn	8092115
14	A33-82 Bracket Master Pneumatic	8500083
15	Filter Reg 1/4 0-100 psi CFR55-2	8500109
16	Gauge Air 1/8 0-160 psi 1 1/2 D	8500224
17	SRSTR Pivo Roller Sleeve	922509
18	SRSTR Div Roller Assembly	922510
19	Prox Sensor 42EF-S1RCA-A2	970521

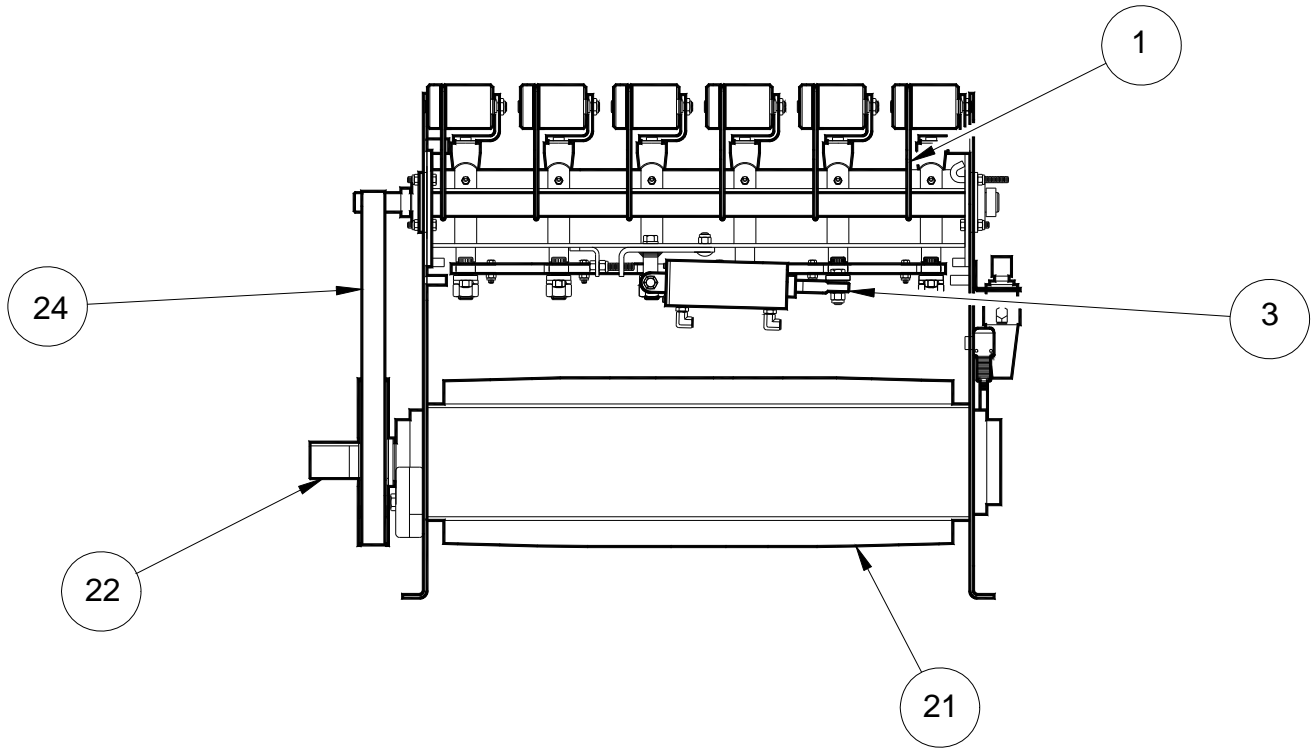
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**Spare Parts Related by Width**

<b>Key</b>	<b>Description</b>	<b>Part Number</b>
20	Roller G251AB 40.000 BX	501060
21	SRSTR Pulley DR 8l.625 x W40	922511
22	SRSTR Shaft Pulley W40	4700049MB
23	SRSTR Idler Pulley W40	64005440

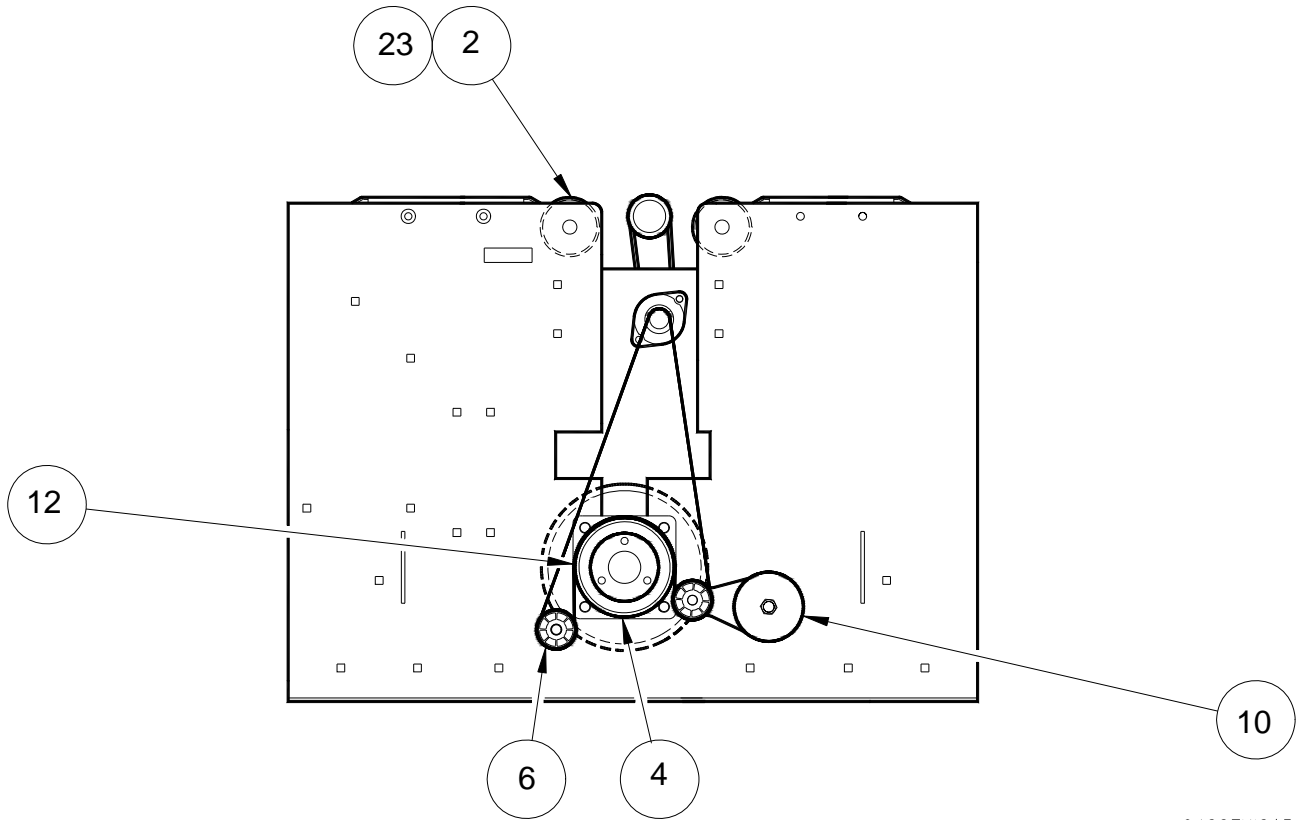
**Spare Parts Related by Hubs, Sprockets, Belts**

<b>Key</b>	<b>Description</b>	<b>Part Number</b>
24	Belt 1 3/16 x 53 1/4 Endless	2408134MA
25	V-Belt, Spur Drive	970960



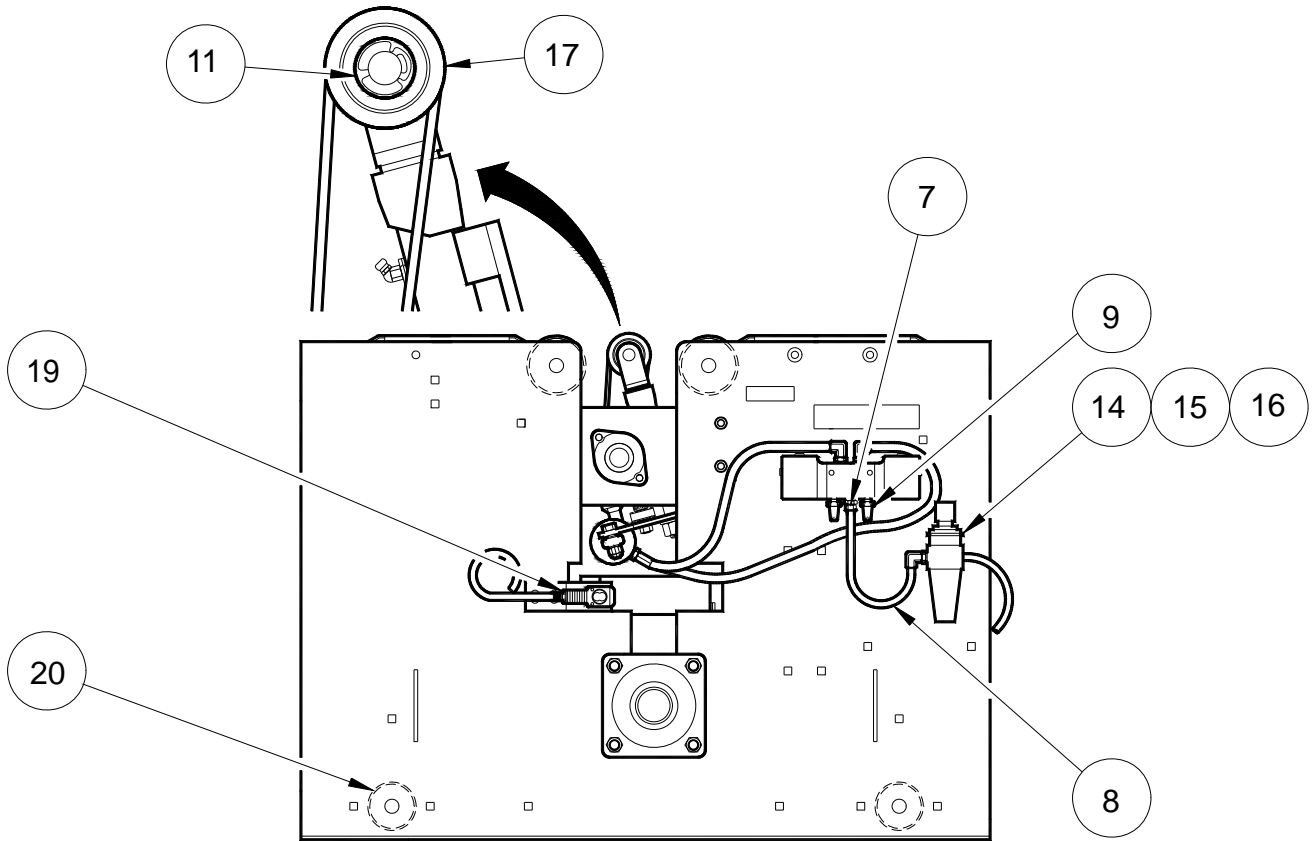
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Figure I - 1 (LH) Swivel Roller Sorter Drive - Divert Module - End View (Looking in the Direction of Travel)



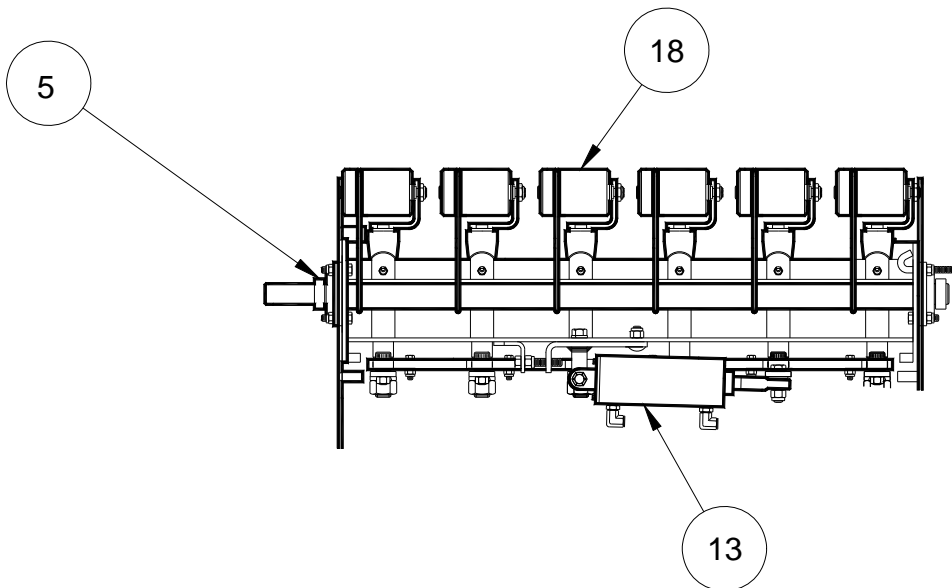
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Figure I - 2 (LH) Swivel Roller Sorter - Drive Side



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Figure I - 3 (LH) Swivel Roller Sorter - Drive Side



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Figure I - 4 (LH) Swivel Roller Sorter - Cartridge Assembly



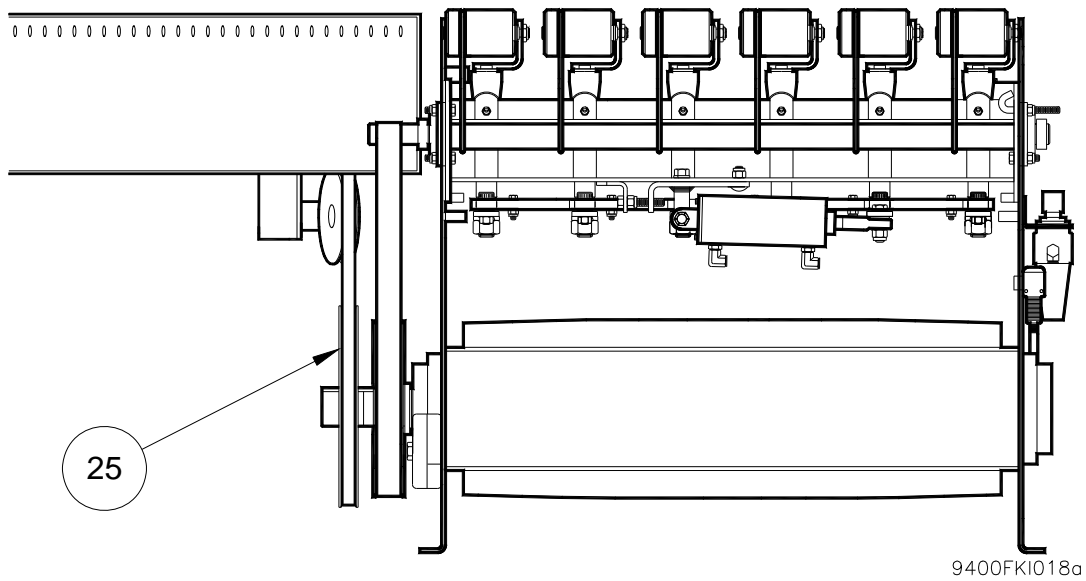


Figure I - 5 V-Belt Drive for Take-Away Spur

