

POWERED BY

TREW

INSTALLATION & MAINTENANCE MANUAL



FULL WIDTH BELT SORTER

TABLE OF CONTENTS

1 - OVERVIEW

| | |
|---------------------|-----|
| General Description | 1.1 |
|---------------------|-----|

2 - COMPONENTS

| | |
|--------------------------------------|-----|
| Frame Coupling | 2.1 |
| Conveyor Belt Installation | 2.2 |
| End Drive / Center Drive Overview | 2.4 |
| Under-Belt Mounting | 2.6 |
| Carrier Roller | 2.7 |
| <i>Replacement of Carrier Roller</i> | 2.7 |

3 - PREVENTIVE MAINTENANCE

| | |
|-------------------------|-----|
| Maintenance Precautions | 3.2 |
| Inspection | 3.3 |
| Belt Maintenance | 3.5 |
| Replacing Rollers | 3.8 |
| Lubrication | 3.9 |

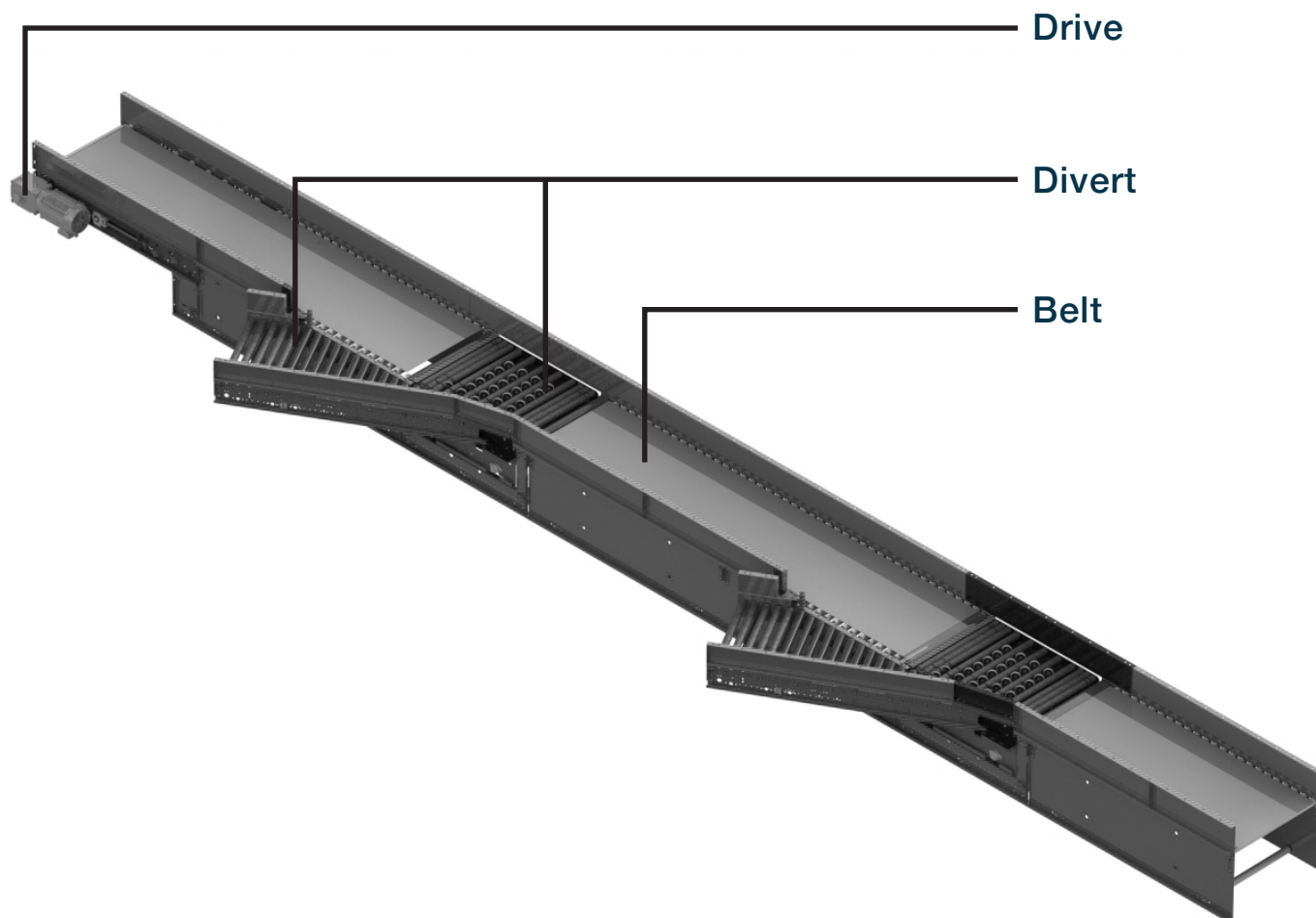
4 - SUPPORT

| | |
|-------------------------------|-----|
| Possible Problems & Solutions | 4.1 |
| Troubleshooting Help | 4.8 |

OVERVIEW

General Description

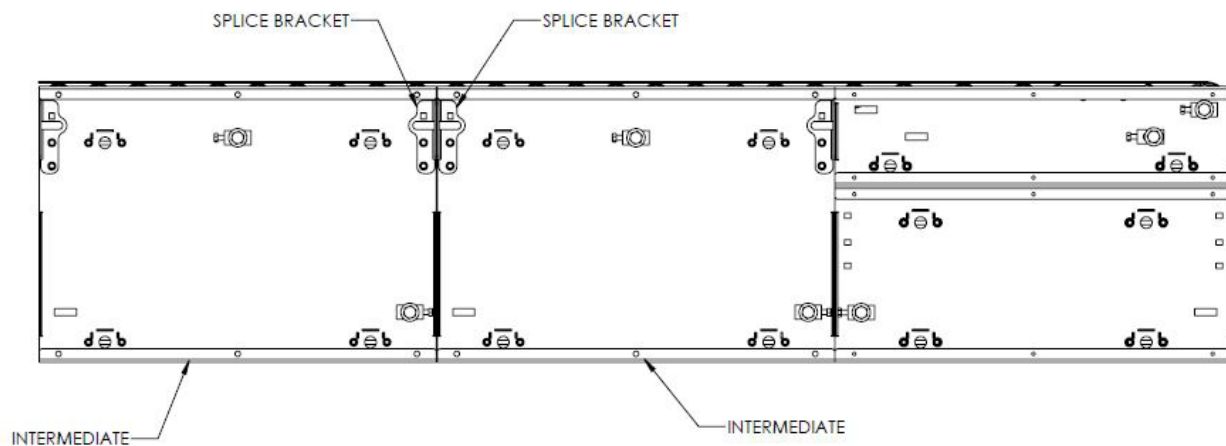
The Belt Conveyor is used for conveying product from one location to another. It is powered by a motor/reducer combination that rotates a pulley, which in turn drives the belt. The pulley and motor/reducer typically are located on the discharge end of the conveyor, or in the middle underside of the conveyor. The belt rides on rollers.



COMPONENTS

Frame Coupling

When the belt conveyor has been leveled and aligned to its final position, fasten the sections together using the couplers provided. The Splice Coupler is used between Intermediate frames and at ETI's. The Butt Couplers is used at ETT's and End Drives, as shown.



Conveyor Belt Installation

Conveyor Belt - *General*

For satisfactory conveying performance, the conveyor belt must run true and straight at all times. To accomplish this, the belt must be tracked to stay between the conveyor frames and maintain full contact with the pulleys and rollers of the unit. Typically, a new belt will require tracking adjustments during the break-in period. Tracking suggestions are listed later in this manual.

Conveyor Belt - *Tension*

Belt tension is controlled by screw type adjustments on the take-up pulleys. Be sure to adjust both sides evenly to insure proper tracking of the belt. Belt tension should be limited to the amount necessary for the drive to move the belt under full load. Too much tension on the belt may cause tracking problems, as well as considerable damage to the belt's fabric core, pulleys, bearings, and possibly the motor.

WARNING

Be sure to replace the drive guards after inspection or maintenance of the drive. Failure to follow this instruction may result in serious personal injury and/or equipment damage.

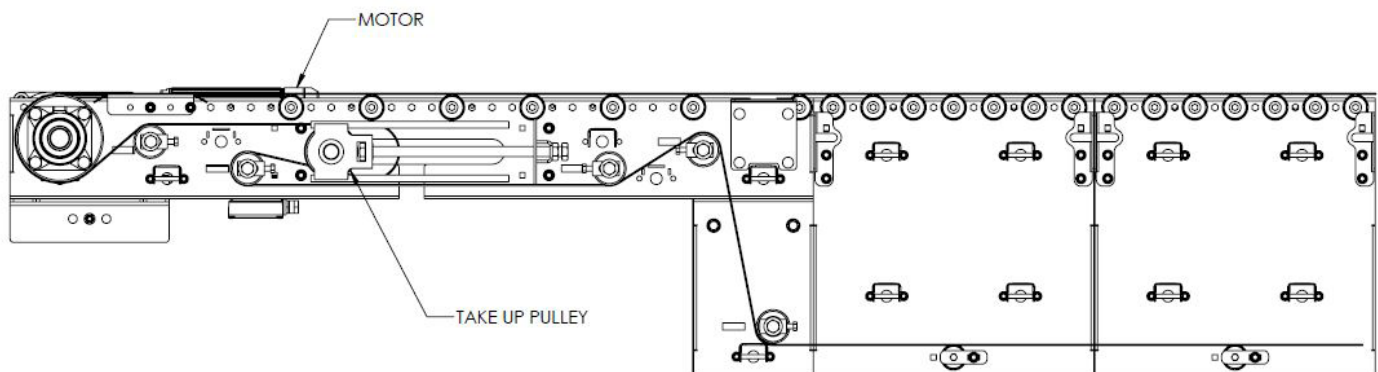
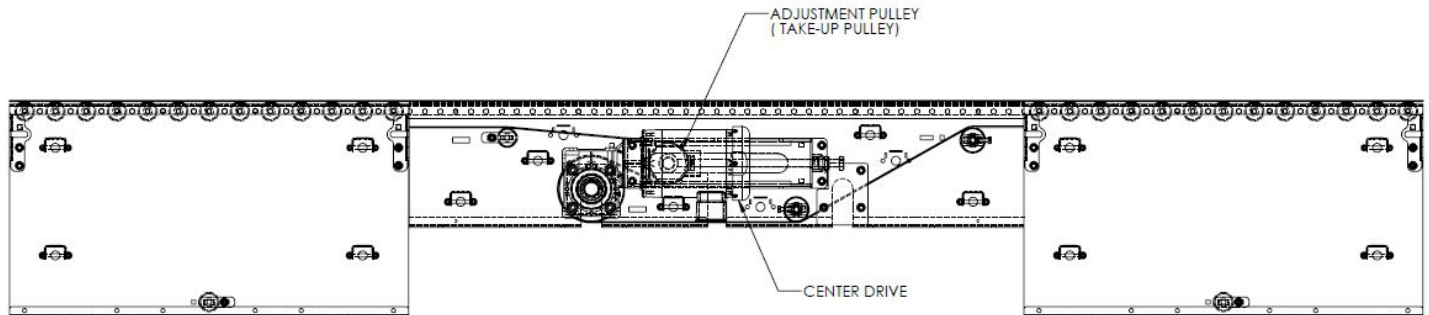
Conveyor Belt -*Tracking*

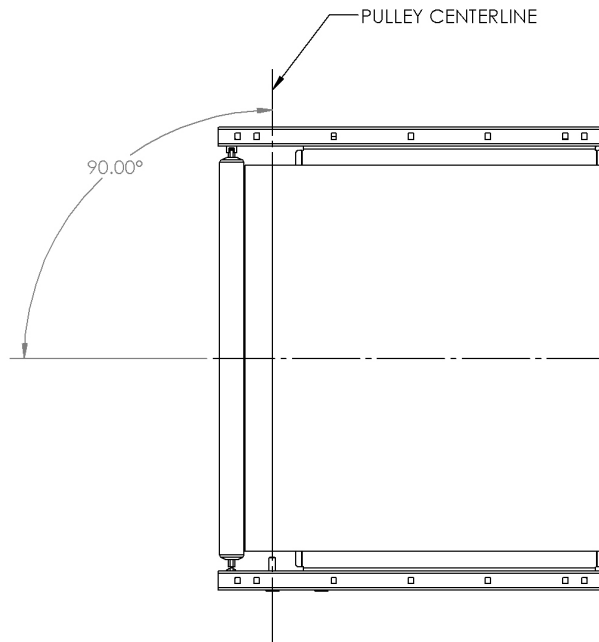
NOTE: A helpful guideline for belt tracking is that the belt always moves away from the side of the pulley where the most belt tension exists between the drive and tail pulleys (the high tension side).

All pulleys, idlers, snub, and return rollers of the conveyor can be adjusted, as necessary, to align the shafts square with the frame. If any of these items are not square, the belt may never track properly. Begin the tracking process by following the steps listed below:

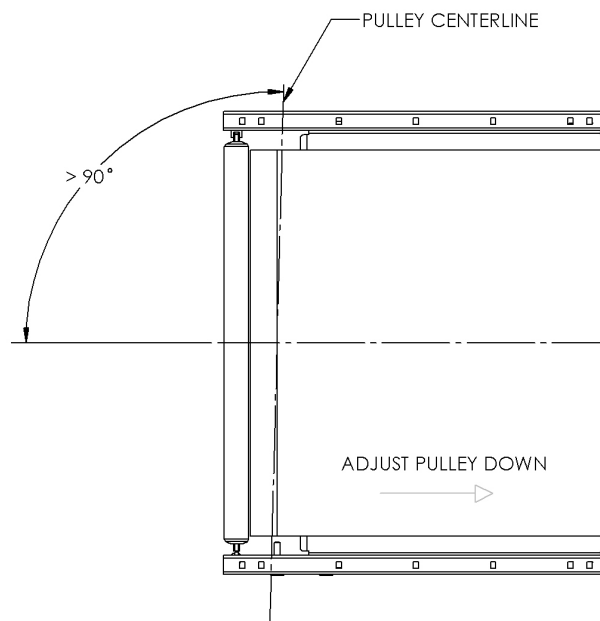
- 1 The conveyor frame must be installed square, level and plumb
- 2 All pulleys, snub rollers & return rollers should be adjusted square with the frame
- 3 Verify that the belt splice is square with the belt
- 4 Run the conveyor belt in the intended direction
- 5 Note any belt movement, especially the position of the belt as it travels around the pulleys
- 6 For end drive sections (see End Drive Illustration), adjust the return roller closest to the tail pulley. For center drive sections (see Center Drive Illustration), adjust the first roller the belt contacts. Make fractional adjustments to only one side of one pulley or roller at a time. Wait at least five belt revolutions after each adjustment to determine if the belt reacts properly. If the belt is riding to one side of a pulley or roller, adjust that side of the pulley or roller by fractionally decreasing the distance between the two pulleys (decreasing tension between belt and pulley or roller)
- 7 Repeat adjustments (step 6) until the belt is tracking on or near the center of the conveyor
- 8 Check to make sure that the belt tension is adequate (see ConveyorBelt – Tension)

End Drive / Center Drive





ALIGNED PULLEY



MISALIGNED PULLEY

Under-Belt Mounting

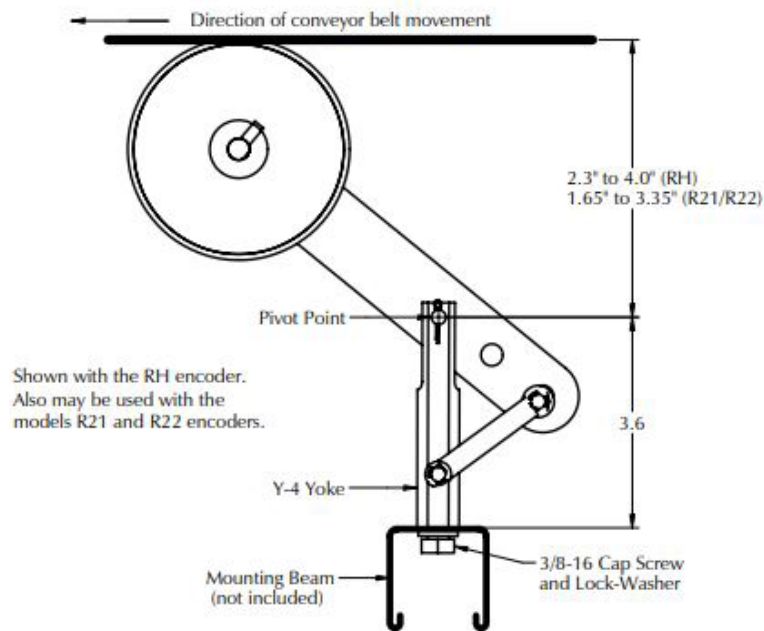
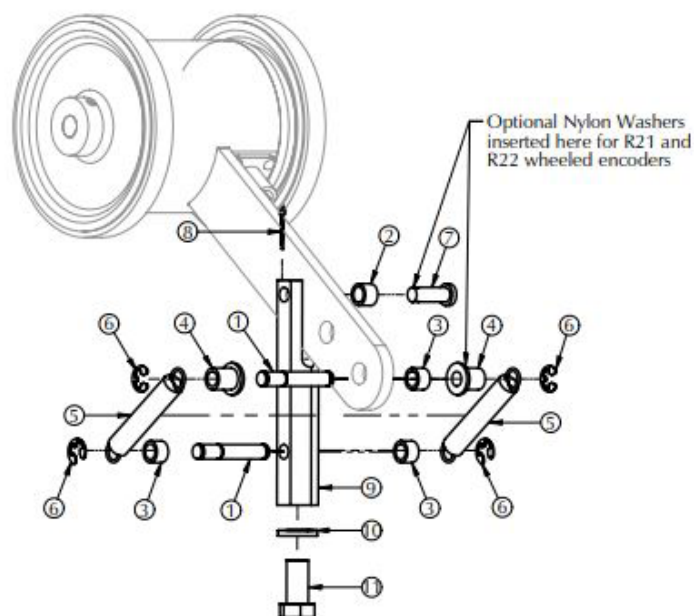


Figure 1: MB-UB4 Assembly (shown with RH wheeled encoder)



Carrier Roller

The carrier roller is used to take the weight of the product and also distributes the torque generated by the motorized drive rollers via o-belts, chain, timing belts, strip belts, or full-width belts. Generally, no more than nine carrier rollers per motorized drive roller are used in each zone.

Replacement of Carrier Roller

- 1** Turn off and Lockout / Tag-out all power to the conveyor section
- 2** Use an appropriate tool to push in the spring loaded axle on the roller and free that side of the axle from the frame of the conveyor
- 3** Carefully disengage the opposite end of the roller from the frame. Make sure the axle is not pinched on the frame causing damage during removal
- 4** Remove the disengaged roller entirely from the frame section
- 5** Carefully maneuver the roller to allow the drive belts to be removed from the grooved end of the roller. Set old roller aside
- 6** Install new roller by first maneuvering grooved end through the drive belts, ensuring the belts are aligned in the appropriate grooves
- 7** Insert the axle of the replacement roller through the conveyor frame
- 8** Use an appropriate tool to push in the spring loaded axle and lower the roller into position, aligning the axle with the hex hole in the conveyor frame
- 9** Unlock and turn on the power to the conveyor section

PREVENTATIVE MAINTENANCE

The satisfactory performance and reliability of this equipment is dependent upon a proficient preventive maintenance (PM) program with scheduled equipment inspections under normal operating conditions.

Accurate records of maintenance and repairs will help to identify problem areas and repetitive problem patterns. It is imperative that adequate records be kept in connection with the preventive maintenance program. These records should contain the date of inspection, inspection results, equipment services, repair history, part replacement history, and any other information that will help to make maintenance process more efficient and accurate. It is recommended that each conveyor have its own record. Properly kept, the conveyor record sheet will form a mechanical history of the equipment covered.

Preventive maintenance consists of regular service (lubrication, adjustments, cleaning, etc.). In addition, it consists of "keeping your eyes, ears, and nose open." Use your eyes to see potential component failure. Use your ears to listen for abnormal or louder than normal noises. Use your nose to smell a motor running abnormally warm in time to prevent its burnout. These sights, noises, and smells can be indicators of lack of lubrication, misalignment, or other potential trouble. Ignore them and you will be replacing a shaft, motor, or whatever does go out when a component is lacking proper preventive maintenance.

Only qualified maintenance specialists should maintain the mechanical, electrical and pneumatic portion of the conveyor.

⚠ WARNING

Before performing any maintenance or lubrication services, follow the lockout/tagout procedure in the Safety section to ensure that the equipment is safe to work on. Failure to follow this instruction may result in serious personal injury and/or equipment damage.

Maintenance Precautions

WARNING

You must read and understand these precautions completely before operating, setting up, running, or performing maintenance on the equipment. Failure to follow this instruction may result in serious personal injury and/or equipment damage.

- 1 When testing operating performance, do not start the equipment until all operations and maintenance personnel are notified and clear of the unit being tested
- 2 Be certain that required safety guards are never removed without authorization
- 3 Never run the equipment under production conditions without safety guards in place
- 4 Do not make any equipment repairs, while the conveyor is running
- 5 Keep hands, hair and clothing clear of any moving parts
- 6 Never attempt to clear load jams, while equipment is running
- 7 Always use appropriate tools when making repairs or adjustments
- 8 Observe all warning labels and follow plant safety rules
- 9 Make sure all connectors are secure and all wires are free from interference, obstruction, and any moving parts

Cleaning and Inspection

Generally, there are many reasons for cleaning:

- 1 To allow heat to dissipate (motors and gearboxes)
- 2 To prevent wear on moving parts
- 3 To prevent binding
- 4 For proper operation
- 5 Operating personnel will most likely treat clean equipment with more care

Any prescribed cleaning schedule should be modified as experience is gained. A thorough inspection should be performed while cleaning problem areas.

The total value of inspection procedures is determined largely by the consistency and regularity of the schedule. A definite interval of inspection must be established and obeyed. This is usually easier to accomplish if a "round robin" system of inspection is used. It is recommended that a general inspection that will ensure a thorough examination of each component and assembly contained in the system be done at least once for each thirty day period of operation. Results of these general inspections should be documented in the conveyor record of the unit inspected.

The probability of mechanical/electrical problems increase during periods of heavy usage, so an additional inspection immediately before and after a these periods is recommended.

Daily Inspection

Walk the entire length of conveyor system and observe the following:

- 1** With the conveyor running, listen for abnormal noises that could indicate:
 - Worn bearings in rollers, motors, reducers, etc.
 - O-Belt making contact due to misalignment or improper adjustment
- 2** With the conveyor shut down, look for the following:
 - Strings or other foreign material wrapped around bearings, shafts, or rollers. Remove all foreign material immediately
 - Shavings or belt dust under conveyor that would indicate misaligned or damaged components
 - Oil leakage that would indicate faulty bearings or seals in rollers, motors, reducers, etc.

Weekly Inspection

- 1 Visually inspect belts and rollers for wear, improper alignment, or buildup of foreign materials and repair/clean as required
- 2 Visually inspect all motors
- 3 Inspect O-Belts for wear or damage. Repair or replace worn or damaged O-Belts.

Inspection Every 6 Months

- 1 Check all set screws and tighten as necessary. These may work loose during normal operation
- 2 Check all bolted connections and tighten as needed. Bolted connectors may work loose during normal operation

WARNING

Before performing any maintenance or lubrication services, follow the lockout/tagout procedure in the Safety section to ensure that the equipment is safe to work on. Failure to follow this instruction may result in serious personal injury and/or equipment damage.

Belt Maintenance

Most conveyor belting will perform satisfactory if three basic rules are observed

- 1 Keep belt properly tracked
- 2 Prevent anything from dragging on belt
- 3 Keep the belt and conveyor free of foreign material build-up

All belting goes through a break-in period during which more frequent tracking adjustments are expected. To prevent damage to the belt from rubbing or roll-over, tracking adjustments must be made when the belt begins to wander from its normal track. Do not wait until it begins to rub before correcting. Tracking instructions are given later in this section.

Anything that drags on the belt will destroy it. Prevent this type of damage. If a belt should be damaged by having the edge drag, clip all loose strings and frayed edges to keep them from becoming caught or tangled in rotating parts of the conveyor.

If any part of the conveyor is damaged, make sure that edges or corners do not contact the belt. Make repairs to damaged equipment as soon as possible.

Belt Tension Requirements

Power to the drive belt is transmitted from the friction surface of the drive pulley to the friction surface of the belt. The tighter the belt grips the pulley, the tighter the tension will be. The tighter the belt tension, the greater the power transmitted. Conversely, if belt tension is low, slippage may result.

It should be remembered that the belt should not be tighter than the minimum tension required to drive the belt without slippage.

! WARNING

Before performing any maintenance or lubrication services, follow the lockout/tagout procedure in the Safety section to ensure that the equipment is safe to work on. Failure to follow this instruction may result in serious personal injury and/or equipment damage.

Note: The motor must be running in order to adjust the tension on the center drives; however, power is turned off and Locked--Out/Tagged--Out for most other maintenance/repair operations.

With the motor running, adjust the tension on the center drives using the single take--up screw on the unit. Adjust the screw until the pulley drives the belt without support.

On end drives, the take--ups should be adjusted evenly to ensure proper centering of the belt on the pulley. Following the steps for belt adjustment will help center the belt when the proper tension is obtained.

Periodically check the tension of the belt for belt support and re-adjust as necessary.

CAUTION

Excessive tension on the belt will cause tracking problems, as well as considerable damage to the belt's fabric core, pulleys, bearings, and possibly cause overload to the motor. Failure to follow this instruction may result in equipment damage.

Belt tension must be adjusted to meet operating conditions because many factors affect belt tension. Atmospheric conditions can affect belt tension. High humidity causes stretching and dry air causes shrinkage; therefore, belt tension should be checked corresponding to wet and dry seasonal changes, and daily when belts are new.

WARNING

Be sure to replace the drive guarding after inspection or maintenance. Failure to follow this instruction may result in serious personal injury and/or equipment damage

Belts always move away from the side of the pulley with the most tension (the high tension side).

If a belt suddenly leaves its established track, there is a good chance that something foreign has gotten under it or on the drive pulley. A build-up along one side will cause the belt to be curved or longer on one side than the other. A build-up on a head or drive pulley will usually cause the belt to creep toward the build-up in the same way that a belt reacts to a crowned pulley. Bear in mind that the belt could creep away from the build-up if speeds are high, tension is low, or friction on the drive pulley is low.

For that reason, both ends of the drive pulley must be inspected if a build-up is suspected. Belt tension is often changed by a build-up also. And finally, if a belt runs over a build-up for a long period, it will take a set and tend to run off the opposite way when the conveyor is finally cleaned. Changes in bed friction cause changes in belt tension, and this can cause changes in tracking. In short, keep the belts and their associated components clean.

Adjustment Intervals

There are no specific intervals between belt adjustments, but good preventive maintenance routines should be established.

Replacing Rollers

- 1 Turn off and Lockout/Tagout all power to the conveyor
- 2 Use a tool to push in the spring loaded axle on the roller to free one end of the axle from the frame of the conveyor
- 3 Carefully disengage the opposite end of the roller from the frame and remove. Make sure the axle is not pinched on the frame causing damage during removal
- 4 Insert the axle of the replacement roller through the hole on the conveyor frame
- 5 Use tool to compress the spring loaded axle on the roller and lower the roller into its proper position
- 6 Release the spring loaded axle and make sure it fully engages in the hole in the frame

WARNING

Before performing any maintenance or lubrication services, follow the lockout/tagout procedure in the Safety section to ensure that the equipment is safe to work on. Failure to follow this instruction may result in serious personal injury and/or equipment damage.

Lubrication

Speed Reducers

Standard speed reducers are sealed and maintenance free. They incorporate a pressure compensating chamber, which eliminates the lengthy preparation normally required to put a reducer into service and prevents atmospheric contamination. These reducers are properly filled at the factory with sufficient lubrication for all mounting positions. The lubricant is a synthesized hydrocarbon formulated for extremely long life. Refer to the manufacturers instructions for more information.

WARNING

Before performing any maintenance or lubrication services, follow the lockout/tagout procedure in the Safety section to ensure that the equipment is safe to work on. Failure to follow this instruction may result in serious personal injury and/or equipment damage.

Motors and Carrier Rollers

All motors and carrier rollers are equipped with sealed bearings.
No additional lubrication is required.

WARNING

Be sure to replace the drive guarding after inspection or maintenance. Failure to follow this instruction may result in serious personal injury and/or equipment damage

SUPPORT

When troubleshooting equipment problems, it is essential to completely understand how the system functions during normal operation. Thoroughly review the operational description, the circuit drawings, and the electrical diagrams sent with your equipment. Once the system operation is understood, it is usually best to start at the problem, and then work back to the source.

Procedures are discussed at length in the following pages; however, there are certain guidelines that should be followed for all troubleshooting problems.

- 1** Locate the problem
- 2** Listen and observe
- 3** Identify problem as electrical, mechanical, or pneumatic
- 4** Determine symptoms through observations
- 5** List short and long term solutions
- 6** Select a solution or possible solutions
- 7** Implement and document one solution at a time

Troubleshooting a Dead Zone on the Conveyor

Perform the following visual checks prior to any troubleshooting:

- 1 Visually check and confirm that all wires are plugged in, intact and all connectors are secure
- 2 Visually check and confirm that there are no obstructions to the rollers
- 3 Inspect the photo eye sensor and check for proper operation as described in the Preventative Maintenance section of this manual.

WARNING

These checks must be performed with the power to the conveyor section turned “**ON**”. Only qualified electricians should be allowed to perform these checks. Failure to follow this instruction may result in serious personal injury and/or equipment damage.

Controller Check

The controller typically controls 2 zones. If the 2 zones are not functional, check individual M12 cables. Unplug and plug in the MDR and PE.

Check the controller. If no voltage is detected, check the in-line fuse.

If the in-line fuse is functional, check the power supply. Unplug and plug in black cable. Replace drive card.

Power Supply Check

The power supply typically supplies voltage to multiple zones. If the power supply is defective, all zones supplied will be inoperative. If only one or two zones are inoperative, check the individual connection cables and connectors going to each card.

Check the input voltage into the power supply. Check the power supply fuse or the circuit breaker. Replace if defective.

| Symptom | Probable Cause | Corrective Action |
|--|--------------------------------|---|
| Motor will not start or it is slow to start. | No line voltage. | <p>Check emergency stops and reset.</p> <p>Check fuses and wiring for open circuit. Replace fuses or repair wiring as necessary.</p> <p>Check thermal overload protection device and reset as necessary.</p> <p>Check limit switches, starter and relays for defective contacts or mechanical fault. Replace as necessary.</p> <p>Check for supply voltage at source and correct fault as necessary.</p> <p>Check control circuit voltage and correct fault as necessary.</p> |
| | Low line voltage. | Check for proper supply voltage and proper motor wiring. Correct as necessary. |
| | Conveyor overloaded or jammed. | <p>Remove load from conveyor and reset.</p> <p>Check for foreign material in chain or sprockets and remove.</p> <p>Check chain tension and correct as necessary.</p> |
| | Defective motor. | Verify proper wiring, voltage and overload. Correct as necessary. Replace motor with spare. |

| Symptom | Probable Cause | Corrective Action |
|---|---|--|
| Motor repeatedly stalls. | Defective wiring or electrical components. | Check electrical circuits and panels for loose or defective wiring. Correct as necessary. Check for loose or defective relays, switches, etc. Correct as necessary. |
| Motor runs excessively hot (over 130 °F). | Overload. | Check for sluggish or seized bearings, or obstructions. Check all rollers for free rotation. |
| | Lack of lubrication in reducer. | Replace reducer with spare and clean motor as necessary. |
| | Ventilating holes in motor obstructed or excessive dust in motor. | Clean ventilating holes or replace motor as necessary. |
| | Defective bearing in motor or reducer. | Replace motor or reducer with spare. |
| Motor emits excessive noise, hum, or vibration. | Lack of lubrication in reducer. | Replace reducer with spare. |
| | Worn or damaged motor or reducer. | Replace motor or reducer with spare. |
| | Defective bearing. | Replace motor or reducer with spare. |
| | Loose mounting. | Check motor and reducer for loose mounting hardware. |
| Oil leakage from reducer. | Worn or damaged bearing or seals or cracked housing. | Replace reducer with spare. |

| Symptom | Probable Cause | Corrective Action |
|-----------------------------------|---|--|
| Belt slipping on drive pulley. | <p>Insufficient belt tension (new belt stretch).</p> <p>Seized pulley(s).</p> <p>Pulleys or rollers causing belt drag.</p> <p>Conveyor is overloaded.</p> | <p>Adjust take-up, while running under normally loaded condition, until slippage on pulley is overcome and return belt sag is approximately 2% of length between return rollers.</p> <p>Check pulley bearings and replace as necessary.</p> <p>Check pulleys and rollers for seized or sluggish performance and replace as necessary.</p> <p>Check conveyor capacity and correct as necessary.</p> |
| Excessive belt stretch. | Excessive belt tension. | Relieve belt tension by adjusting take-up until return belt sag is approximately 2% of return length between rollers. |
| Severe wear on underside of belt. | <p>Belt slipping on drive pulley.</p> <p>Seized or misaligned pulleys or rollers.</p> | <p>Adjust take-up, while running under normally loaded condition, until slippage on pulley is overcome and return belt sag is approximately 2% of return length between rollers.</p> <p>Check alignment, bearing condition and replace as necessary.</p> |
| Excessive edge wear. | <p>Belt tracking problem.</p> <p>Belt splice is not square.</p> | <p>See belt tracking procedure.</p> <p>Remove belt lacing, trim belt square and re-lace.</p> |

| Symptom | Probable Cause | Corrective Action |
|---|--|---|
| Belt runs off at head or tail pulley. | Belt tracking problem. Conveyor loading or load distribution problem. | See belt tracking procedure. If side loading, move loading location several feet from end of conveyor. If load is concentrated on one side, redistribute upstream to correct problem. |
| Section of belt runs to one side continually. | Belt splice is not square. Excessive belt camber. Conveyor section not square. | Remove belt lacing, trim belt square and re-lace. Replace belt. See squaring procedure in installation section. |
| Belt moves erratically. | Intermittent roller or bearing drag. Excessive belt tension. Conveyor is overloaded. | Check and replace any rollers and/or bearings that are not free rotating. Relieve belt tension by adjusting take-up to approximately 2% of return length between rollers. Check conveyor capacity and correct as necessary. |
| Belt lacing pulls out or wears out prematurely. | Wrong lacing size. Excessive belt tension. Foreign obstruction. Conveyor is overloaded. | Replace lacing with correct size. Relieve belt tension by adjusting take-up to approximately 2% of return length between rollers. Locate and clear obstruction. Check conveyor capacity and correct as necessary. |

| Symptom | Probable Cause | Corrective Action |
|---|---------------------------------------|---|
| Belt has pulsing movement. | Too much slack in drive chain. | Adjust drive chain tension per "Drive chain and sprocket" section. |
| | Excessive belt tension. | Relieve belt tension by adjusting take-up to approximately 2% of return length between rollers. |
| | Conveyor is overloaded. | Check conveyor capacity and correct as necessary. |
| Conveyor does not start or stop quickly enough. There is a delay between signal and function. | Clutch unit is not engaging properly. | Adjust clutch unit as instructed in manufacturer manual provided. |

Support

If you need further assistance:

Website:

www.poweredbyTrew.com

Email:

info@trewautomation.com

Phone:

1.800.571.8739

Monday - Friday, 8:00am - 5:00pm CT