Product Manual

Servo/Vector Powered Belt Conveyor

Product Summary, Application Guidelines, Specifications, Engineering Data, Layout Dimensions, Accessories, Installation Procedures, Maintenance Procedures, Spare Parts, and Product Index

Intelligrated®

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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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Package Conveyor Safety Signs

Manual Release and Revision Dates

1st Release Date: May 2005

Revision Date(s): June 2008

Revision Summary

Revision Date	Manual Section	Revision Summary
June 2008	B	Updated Figure B-6
	E	Updated Figure E-3
	I	Updated Figure I-7 and Parts
	J	Added Feature 3 Encoder to Servo Belt

SECTION A: PRODUCT SUMMARY

Overview

Table A.1 Servo Powered Belt Conveyor Options

Conveyor	Conveyor Options (any combination)			
	Length	**Width**	**Speed Ratio**	**Motor Location**
Servo Meter Belt	17’-6” 22’-6”	16” 22” 28” 34” 40”	1.27:1 1.33:1 1.40:1 1.67:1 1.78:1 2.00:1	Left Hand Right Hand
Servo Belt	4’-0”	16” 22” 28” 34”	NA	Left Hand Right Hand
Servo Staging Belt	36’-6”	22: 28” 34”	NA	Left Hand Right Hand

Terminology

The term “Servo Powered Belt Conveyors” refers to conveyors that are driven by servo motors, the Servo Meter Belt, the Servo Belt, and the Servo Staging Belt (see Table A.1). These products are sometimes referred to by other names, especially the Servo Meter Belt, because it serves different functions when used in different parts of a conveyor system.

The Servo Meter Belt is sometimes called a “Gap Optimizer” when used in a gap optimizing application. It is sometimes called an “Infeed” when used as part of the infeed to a combiner.

The Servo Belt is sometimes called a Velocity Transition Belt.

SECTION B: APPLICATION GUIDELINES

The purpose of this section is to explain the purpose and behavior of servo powered belt conveyors, and the applications in which they are used, from both a mechanical and a system point of view.

The descriptions in this section apply only to systems using Intelligrated controls and software.

Introduction

The servo powered belt conveyor family consists of three specific conveyors, the Servo Meter Belt, the Servo Belt, and the Servo Staging Belt. Each is powered by a servo motor. The velocity of the servo motor is controlled by a computer.

Normally the Servo Meter Belt, Servo Belt, or the Servo Staging Belt, is purchased as a package with a combiner (and/or other conveyors) and the computer (with Intelligrated software) that controls them.

The Servo Meter Belt performs different functions when placed in different parts of a conveyor system. The computer controls the behavior of the Servo Meter Belt and coordinates its activities with those of the conveyors connected to it.

The Servo Belt, and Servo Staging Belt while also computer controlled, have only one function.

Servo Meter Belts - Configurations

Servo Meter Belt conveyors can be used in different places in a conveyor system with the Servo Meter Belt behaving slightly differently in each place. There are five Servo Meter Belt applications that fall into two categories.

Table B.1 - Servo Meter Belt Application Configurations

Category	Configuration
Gap Optimizer	Gap Optimizer
Merges	High-Speed Merge
	High-Speed Merge with Gap Optimizer
	Very High-Speed Merge
	Very High-Speed Merge with Gap Optimizer

Servo Meter Belts - Overview

A Servo Meter Belt consists of two sections of belt conveyor – a brake belt and a meter belt – mechanically coupled by a power takeoff. The power takeoff provides a fixed speed ratio between the brake belt and the meter belt. The brake belt, which receives product from an upstream conveyor, moves the product at one speed, and passes product to the meter belt, which moves at a faster speed than the brake belt. The Servo Meter Belt is powered by a servomotor and controlled by a computer.

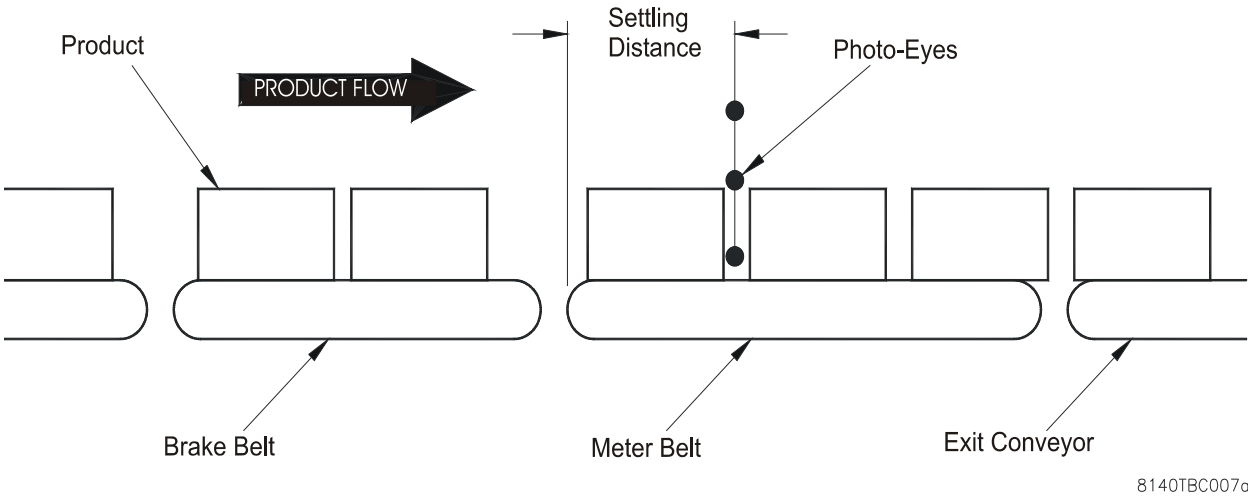


Figure B - 1 Servo Meter Belt

As product is received by the brake belt, its speed and preexisting gap are reduced. Then as product is passed to the meter belt, it accelerates and gap is increased. A set of photo-eyes is located along the meter belt at a point at the "settling distance" away from the infeed end of the meter belt.

- The settling distance is that distance from the infeed end of the meter belt where enough of the length of the largest package to be handled is supported by the meter belt for the meter belt to assume full control of the movement of the package. Normally the settling distance is equal to the length of the longest package to be handled.

The photo eyes detect the leading and trailing edges of packages, and corresponding signals are sent to the computer.

The computer adjusts the speed of the Servo Meter Belt conveyor to deliver product to the exit conveyor at the desired speed and with at least the desired gap. The brake and meter belts slow down and accelerate in unison, with the meter belt always faster than the brake belt by a fixed ratio.

Servo Meter Belts - Gap Optimizer Applications

Operation

A Servo Meter Belt may be used to optimize gaps that were established somewhere upstream. In this application it is referred to as a gap optimizer.

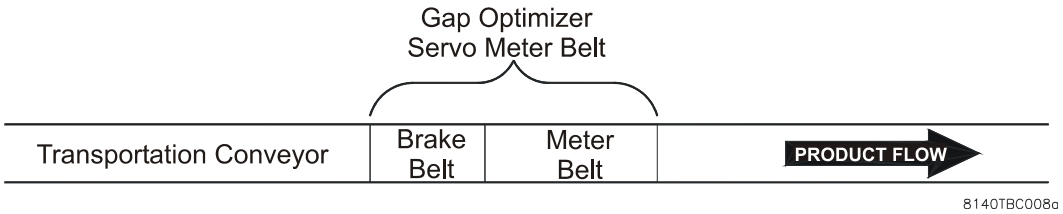


Figure B - 2 Gap Optimizer

When the belt that is downstream from the gap optimizer is up to speed and ready to accept cartons, the gap optimizer begins to run at a lower speed than normal for a full length of the meter belt. Then, it accelerates to full speed and signals that it is ready to receive cartons from the upstream conveyor.

The brake belt serves two purposes. It holds back (acts as a brake for) cartons entering from the upstream belt, and with the speed difference between itself and the meter belt it causes a gap to be created between cartons exiting onto the meter belt.

Each Servo Meter Belt is equipped with photo eyes. There are two product detection eyes (low and high) and a wide-carton detection eye, and optionally a tote lip product detection eye. The low, high, wide, and tote lip (if applicable) eyes are mounted to a frame that forms a vertical plane perpendicular to the belt and to the direction of travel. As the carton passes through the plane, the product eyes detect the carton, measure its length, detect if it is a wide carton, and measure the amount of gap. An encoder is used to measure motion. After the cartons are detected and measured, the controlling computer determines how to deliver the cartons so that they have the appropriate gap once they are on the downstream conveyor.

Gap optimization as such occurs as product is transferred from the meter belt to the exit conveyor. The meter belt adjusts the gap for each carton by slowing down from the reference speed as necessary to adjust the gap, and then speeding up to deliver the carton to the exit conveyor at the reference speed. A graph of speed versus time would show linear changes from the reference speed to a lower point, and from the point back up to the reference speed, producing a "V" profile. There is "V" profile for each gap adjusted.

The speed of the exit conveyor is a constant, which serves as a reference speed for the meter belt. Ideally the meter belt will deliver product to the exit belt at the exit-conveyor speed, but this is not always feasible due to variations in carton size and in the length of gaps as product is received by the Servo Meter Belt conveyor.

Drop Out Zone

When accumulation conveyor feeds a Servo Meter Belt it is possible for the accumulation conveyor to deliver cartons to the brake belt faster than it can receive them. This might happen when a stream of very short cartons is inducted, causing cartons to be pushed across the brake belt with no gaps at the eyes. To prevent this, the computer starts and stops the drop out zone in short bursts to match the net accumulation conveyor speed with the brake belt speed.

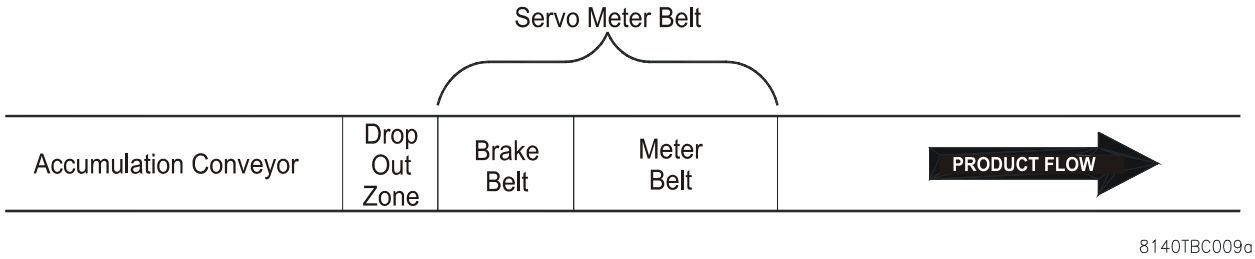


Figure B - 3 Gap Optimizer Application

Sorters

A common use of gap optimizers is to present equally spaced product to a sorter, insuring a correct divert.

When the sorter diverts a carton, the carton rotates toward the exit, pivoting on the outside rear corner, which causes the inside rear corner of the carton to consume some of the carton's trailing gap as set by the gap optimizer. The amount of gap consumed by this rotation is a function of the divert angle and the carton width. Wider cartons need more trailing gap. The computer ‘sees’ wider cartons with the width detect eye and places extra gap behind them.

Servo Meter Belts - Merge Applications

Operation

A high-speed merge combines cartons from several lanes into one stream of cartons. It has a Servo Meter Belt in each infeed lane. Merges may or may not have a Servo Meter Belt functioning as a gap optimizer following the merge. If a gap optimizer does follow the merge, it fine-tunes the gap between the cartons.

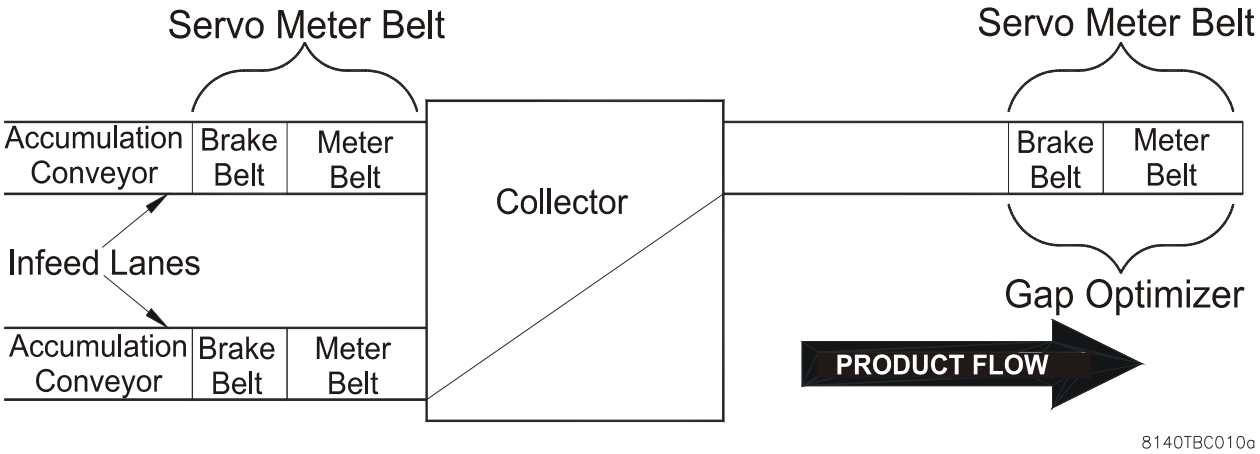


Figure B - 4 High-Speed Merge

Infeed Lanes

The high speed merge computer supports up to five infeed lanes, depending upon the application. Each infeed lane consists of a Servo Meter Belt conveyor. A single computer controls and synchronizes the activities of the Servo Meter Belts, the collector, and the gap optimizer (if there is one) following the collector.

The computer causes the meter belt to deliver cartons to the collector at the collector velocity but does not always succeed. When it cannot succeed in matching velocities, it plans extra trailing gap to prevent collisions on the collector.

Gap Optimizer (Following)

After the cartons are funneled together by the collector, they may travel through a stretch of conveyor and lose the gapping established by the high speed merge. A gap optimizer is then used to ensure that the cartons have the proper gap before they are read by a scanner or reach a sorter.

Batching

In some systems, the infeed lanes employ a batching system where end-of-batch (EOB) totes are placed behind the cartons from a batch on the infeed lanes. The EOB totes have a reflector mounted at the center of both sides of the tote. Each infeed lane that uses batching is equipped with an EOB tote detect eye. When an EOB tote arrives at the Servo Meter Belt, the EOB eye will "see" the reflector, and the High Speed Merge will then know that an EOB tote is present. The computer holds the EOB tote until the appropriate conditions are met and then releases it.

Wide Belt Merge

This style of collector uses multiple belts (up to 10 belts) to form a giant merge. The design uses a vertically mounted belt (powered face deflector or PFD) to guide the cartons into a single stream. There can be both a right and a left PFD in a merge.

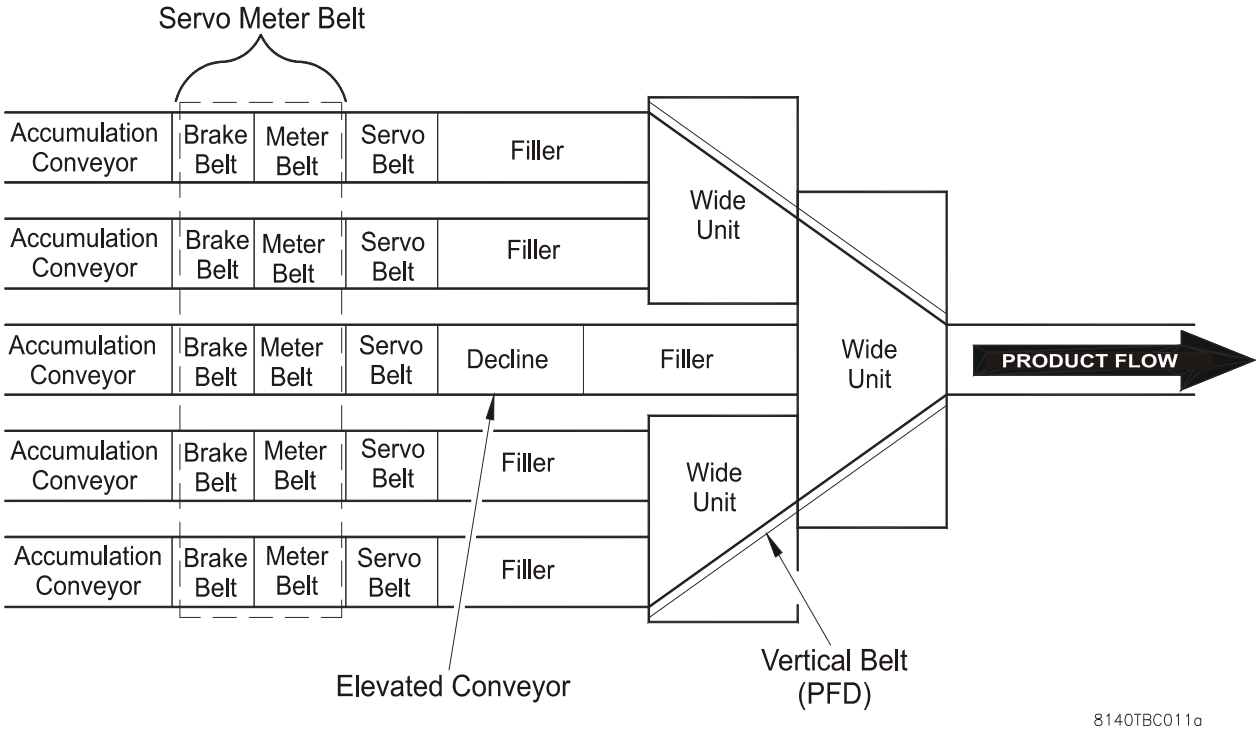


Figure B - 5 Very High-Speed Merge - 5-to-1

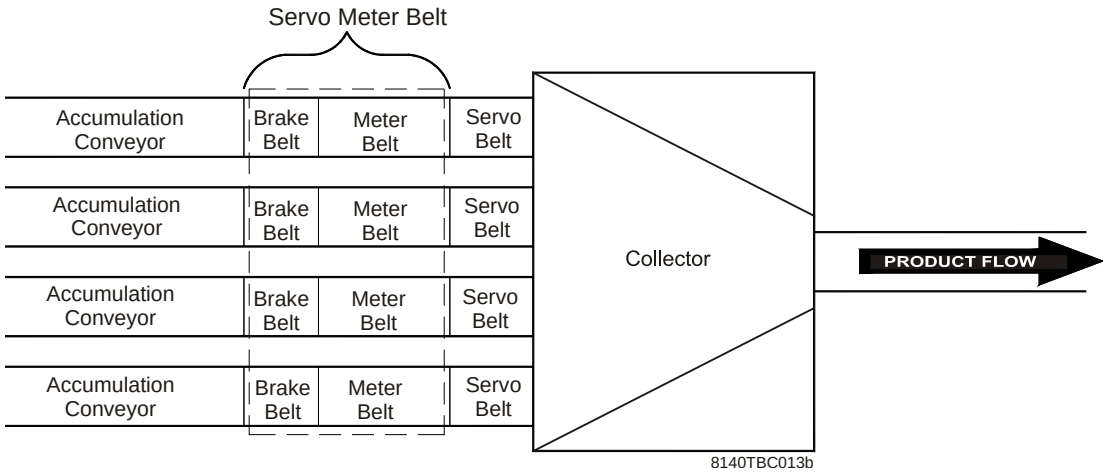
The merge always has a main bed, and may have both a right bed and a left bed. When five lanes are used in an application, it is sometimes necessary to mount the middle lane above the outside four lanes. Because of this configuration, there are filler (or intermediate) belts that transport cartons from the Servo Belts to the merge beds.

All belts start and stop together and accelerate at the same rate. The main bed always has an encoder, but the other belts may or may not have an encoder.

Servo Belts

In some higher speed systems, there is an additional servo controlled belt after the Servo Meter Belt. This additional belt is known as the Servo Belt. The computer controls this belt so that it provides a smooth transition for each carton from the release velocity of the Servo Meter Belt to the fixed velocity of the collector.

The Servo Belt is required at higher speeds. Contact Intelligrated for details.



The servo belt requires a 3” or 5” discharge knife edge depending on the collector type. If the collector is a sliding shoe combiner, use the 5” discharge knife edge. If the collector is a wide belt merge, use the 3” discharge knife edge.

Figure B - 6 Very High-Speed Merge - 4-to-1

SECTION C: SPECIFICATIONS

Servo Meter Belt

MODEL
SVM - Servo Meter Belt

OPERATION
The speed of Metering Belt “B” is faster than Brake Belt “A”. This speed differential generates a gap between items that can be detected by a photo eye.

WIDTHS
16”, 22”, 28”, 34”, 40”

FRAME
10 ga. side frame with bolted slider pan inserts. 10” deep at the drive, 6-3/8” deep in the intermediate sections. Bolted pipe spreaders.

SERVO MOTOR
Three-phase synchronous AC servo motor. 420 in-lbs continuous torque. Brushless resolver. Thermal overload protection switch.

DRIVE PULLEYS
5-7/8” diameter lagged and edge crowned pulley, 1-5/16” diameter shaft. The brake belt pulley is driven from metering belt pulley by enclosed PTO belt drive. 4-Bolt flange bearings.

TAKE-UP ROLLERS
3 1/2” flat faced rollers with 1-1/8” square axles.

IDLER PULLEYS
2 5/8” edge crowned pulleys.

TRACKING ROLLERS
2-1/2” rollers with 1 1/8” square axles.

KNIFE EDGE ROLLERS
2 1/4” crowned face knife edge rollers. Internal roller bearing, mounted on 3/4” diameter shaft, milled one end to lock in “D” hole.

KNIFE EDGE ROLLER FRAMES
5-1/4” deep side plates attached to conveyor frame, adjustable.

UNDERSIDE PERSONAL GUARD
Attached to bottom flanges. Removable.

SNUB ROLLERS
No. G251AB, 2-1/2” diameter galvanized rollers with retained 11/16” hex shafts and No. ASQ6503 (precision ABEC, grease-packed and sealed) ball bearings.

BELTING
Two ply polyester with low friction-low noise bottomside, rough-top carrying surface, brushed friction surface bed side, non-metallic lacing, gray.

Servo Belt

MODEL
SVB - Servo Belt

WIDTHS
16”, 22”, 28”, and 34”

FRAME
10” deep x 10 ga. side frame with bolted slider pan inserts. Bolted pipe spreaders.

SERVO MOTOR
Three-phase synchronous AC servo motor. 420 in-lbs continuous torque. Brushless resolver. Thermal overload protection switch.

DRIVE PULLEY
5-7/8” diameter lagged and edge crowned pulley, 1-5/16” diameter shaft mounted in grease-packed precision flange-type bearings. 4-Bolt flange bearings.

TAKE-UP ROLLERS
3 1/2” flat faced rollers with 1 1/8” square axles.

IDLER PULLEYS
2 5/8” edge crowned pulleys.

UNDERSIDE PERSONAL GUARD
Attached to bottom flanges. Removable.

BELTING
Two ply polyester with low friction-low noise bottomside, rough-top carrying surface, brushed friction surface bed side, longitudinally ribbed, non-metalic lacing, black.

Servo Staging Belt

MODEL
SVS - Servo Staging Belt

WIDTHS
22”, 28”, and 34”

FRAME
10 ga. side frame with bolted slider pan inserts. 10” deep at the drive, 6-3/8” deep in the intermediate sections. Bolted pipe spreaders.

SERVO MOTOR
Three-phase synchronous AC servo motor. 420 in-lbs continuous torque. Brushless resolver. Thermal overload protection switch.

DRIVE PULLEY
5-7/8” diameter lagged and edge crowned pulley, 1-5/16” diameter shaft mounted in grease-packed precision flange-type bearings. 4-Bolt flange bearings.

TAKE-UP ROLLERS
3 1/2” flat faced rollers with 1 1/8” square axles.

IDLER PULLEYS
2 5/8” edge crowned pulleys.

TRACKING ROLLERS
2-1/2” Rollers with 1-1/8” square axles.

UNDERSIDE PERSONAL GUARD
Attached to bottom flanges. Removable.

BELTING
Two ply polyester with low friction-low noise bottomside, rough-top carrying surface, brushed friction surface bed side, longitudinally ribbed, non-metalic lacing, black.

SECTION D: ENGINEERING DATA

The formulas and guidelines in this section apply only to applications using Intelligrated control systems and software.

Stopping Distance

Servo Meter Belt stopping distance can be determined by the following formula:

$$\text{Stop Dist} = \frac{\left(\frac{\text{Speed}}{5}\right)^2}{2 \times \text{Accel}}$$

where:

Stop Dist = stopping distance (inches)
Accel = acceleration (inches/sec^2)
Speed = speed (feet per minute)

Note: If the Servo Meter Belt is being used before a merge, then "Speed" is the lesser of 350 FPM or the actual merging speed. If the Servo Meter Belt is being used as a gap optimizer, then "Speed" is the actual speed of the conveyor onto which the gap optimizer discharges

Typical acceleration values are between 154 inches/sec^2 (0.4 g) and 174 inches/sec^2 (0.45 g). Higher values can cause cartons with a high center of gravity to fall over.

Selecting Servo Meter Belt Lengths

The Servo Meter Belt is available in two lengths, 17'-6" and 22'-6". The 22'-6" model handles the widest variety of carton lengths. The 17'-6" model requires less floor space but is restricted to shorter cartons.

The Servo Meter Belt consists of a brake belt (upstream) portion and a meter belt (downstream) portion. The brake belt portion comes in 5'-3" and 10'-3" lengths. The meter belt portion is 12'-3" long.

Brake Belt Length (Merge Applications)

The brake belt is the upstream portion of the Servo Meter Belt. Use the 5'-3" length if it is fed by singulation release accumulator or less than 50' of autoslug release accumulator; otherwise use the 10'-3" length.

Brake Belt Length (Gap Optimizer Applications)

The brake belt is the upstream portion of the Servo Meter Belt. Use the 5'-3" length if it is fed by a high speed merge, singulation release accumulator, or less than 50' autoslug release accumulator; otherwise use the 10'-3" length.

Meter Belt Length (Merge Applications)

The meter belt is the downstream portion of the Servo Meter Belt. Use the following formula to determine the minimum length:

$$\text{Meter Belt} = (2 \times \text{Max Length}) + (3 \times \text{Stop Dist})$$

where:

Meter Belt = length of meter belt (inches)
Max Length = maximum carton length (inches)
Stop Dist = stopping distance (inches)

Note: To obtain “Stop Dist”, see “Stopping Distance” on page 1 of this section. Use 154 inches/sec^2 (0.4g) (typically) as “Accel” and the lesser of 350 FPM or the actual merging speed for “Speed”.

If the result is greater than 87 but less than or equal to 147, the standard 12’-3” (147”) meter belt will work. If the result is less than 87 or greater than 147, contact Intelligrated for a non-standard meter belt length.

Meter Belt Length (Gap Optimizer Applications)

The meter belt is the downstream portion of the Servo Meter Belt. Use the following formula to determine the minimum length:

$$\text{Meter Belt} = (2 \times \text{Max Length}) + \text{Stop Dist}$$

where:

Meter Belt = length of meter belt (inches)
Max Length = maximum carton length (inches)
Stop Dist = stopping distance (inches)

Note: To obtain “Stop Dist”, see “Stopping Distance” on page 1 of this section. Use 154 inches/sec^2 (0.4g) (typically) as “Accel” and the actual speed of the conveyor onto which the gap optimizer discharges for “Speed”.

If the result is greater than 87 but less than or equal to 147, the standard 12’-3” (147”) meter belt will work.

Servo Meter Belt Speed Ratio Selection

Gap Optimizer Applications

The servo belt is available in seven speed ratios. Use the following formula to determine the best ratio for an application:

$$\text{speed ratio} = \frac{\text{longest carton + consistent gap}}{\text{longest carton}}$$

Available speed ratios include 1.27:1, 1.33:1, 1.40:1, 1.67:1, 1.78:1, 2.00:1. If the value obtained using the formula is between the available ratios, round up to the next higher ratio.

Merge Applications

Determining speed ratios in merge applications depends on several dynamic factors and must be calculated by the Intelligrated engineering department. The 1.67:1 ratio is typical, although specific applications may vary.

SECTION E: LAYOUT DIMENSIONS

Servo Meter Belt - 17’-6”

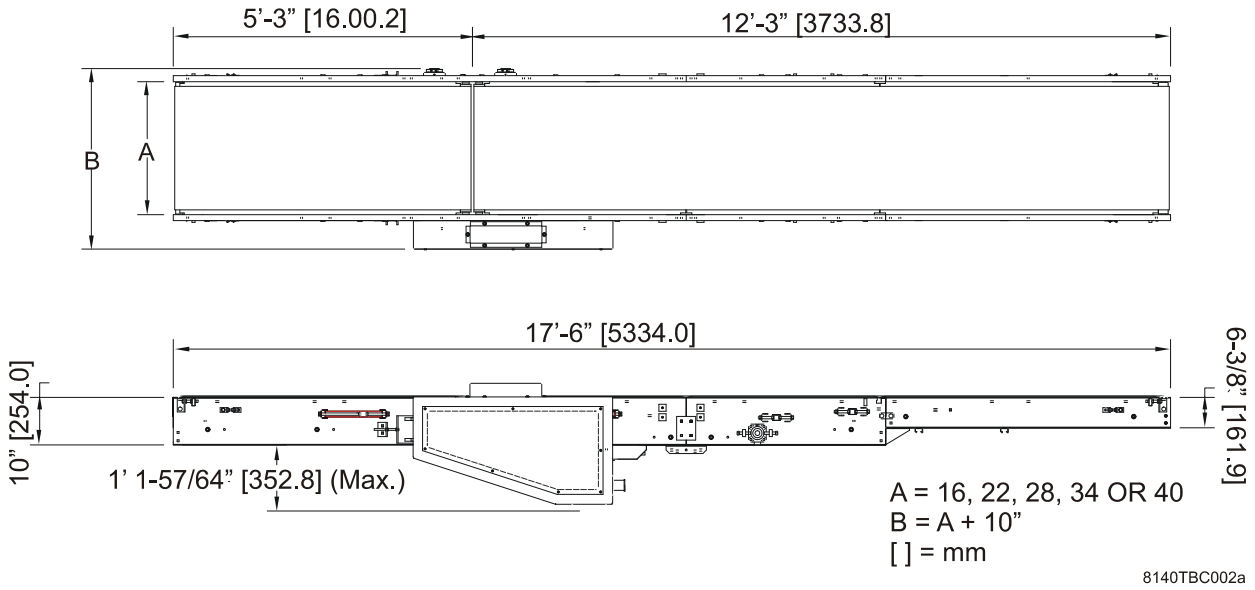


Figure E - 1 Servo Meter Belt - 17’-6”

Servo Meter Belt - 22’-6”

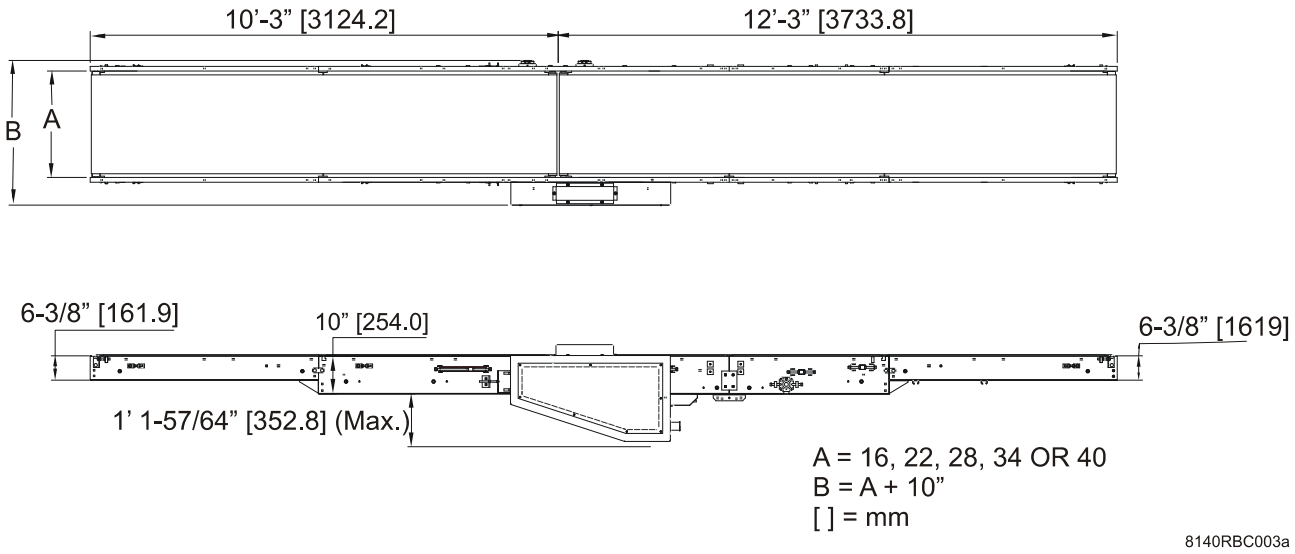


Figure E - 2 Servo Meter Belt - 22’-6”

Servo Belt

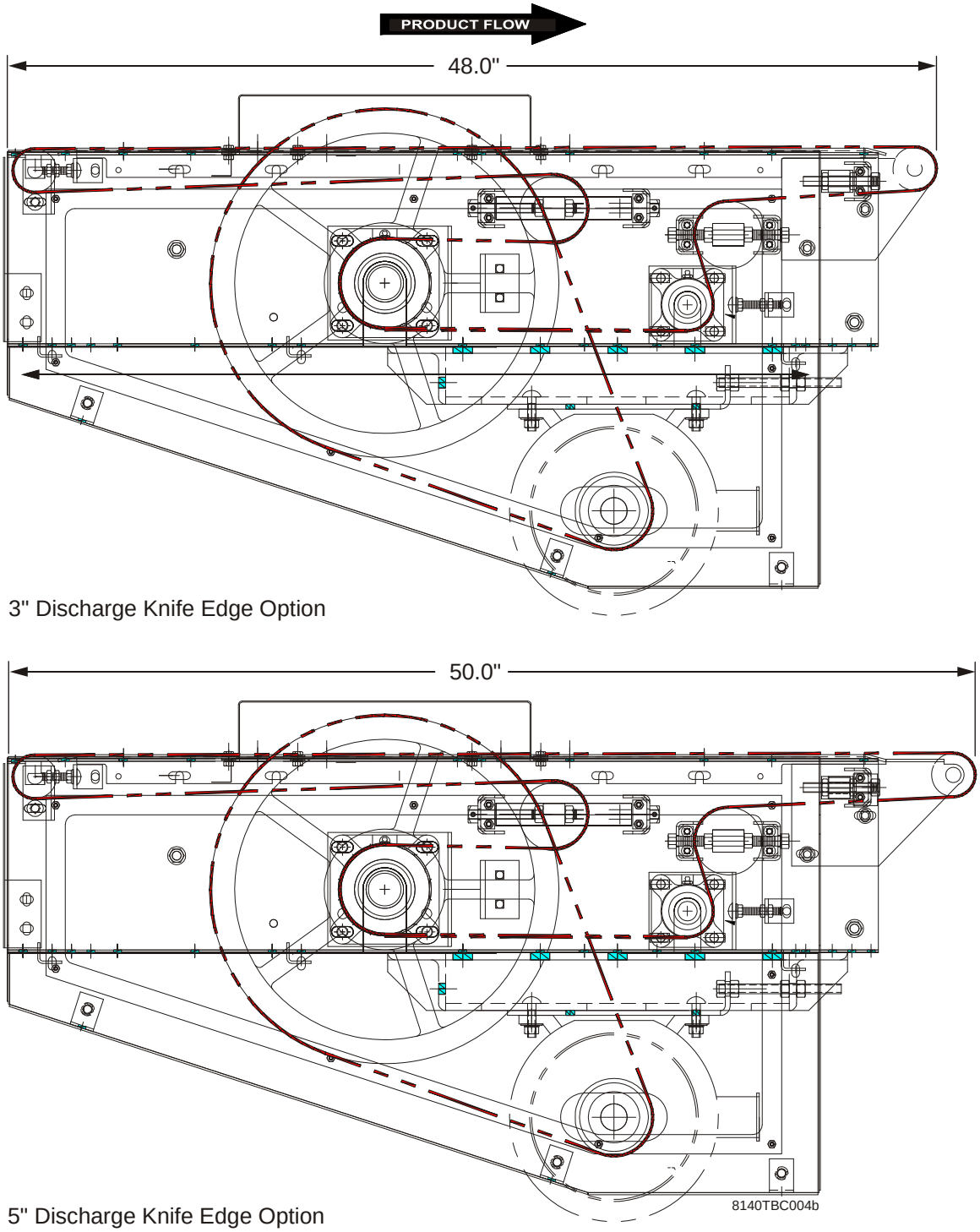


Figure E - 3 Servo Belt

Servo Staging Belt

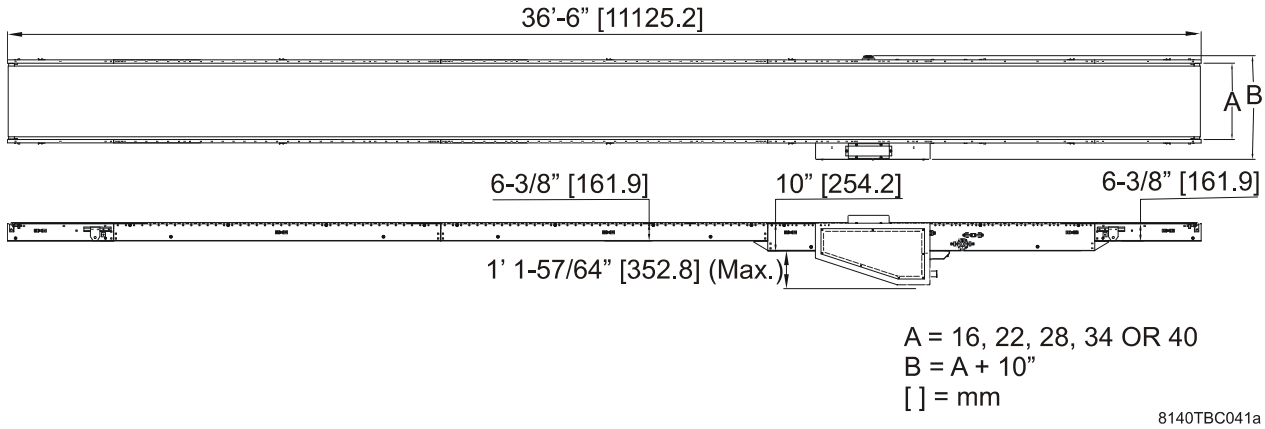


Figure E - 4 Servo Staging Belt

SECTION F: ACCESSORIES

There are no servobelt accessories.

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. Any shipping discrepancy or equipment damage should be clearly noted on the freight bill before signing.

Shortages or Errors

Report any shortages or errors to the Customer Service in writing within ten (10) days after receipt of shipment.

Note: It is very important that you compare the Order Acknowledgment against the actual material received when you receive the shipment so you have enough lead time to order any missing parts. If you find that a part is missing during assembly, you may have to discontinue assembly while you wait for the part to arrive.

Lost or Damaged Shipment

Report lost shipments to our Shipping Department.

If shipping damage is evident upon receipt of the conveyor, note the extent of the damage on the freight bill and immediately contact the transportation carrier to request an inspection. Do not destroy the equipment crating and packing materials until the carrier's agent has examined them. Unless otherwise agreed by the seller, the Purchaser (user) shall be responsible for filing claims with the transportation carrier. A copy of the inspection report along with a copy of the freight bill should be sent to our Traffic Department.

Claims and Returns

All equipment furnished in accordance with the Manufacturer's Agreement is not returnable for any reason except when authorized in writing by the Seller. Notification of return must be made to the Customer Service Department, and if approved, a "Return Authorization Tag" will be sent to the Purchaser (user). The return tag, sealed in the "Return Authorization Envelope" should be securely affixed to the exterior surface on any side of the shipping carton (not Top or Bottom), or affixed to any smooth flat surface on the equipment, if not boxed.

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

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/User shall be familiar with, and responsible for, compliance with all codes and regulations having jurisdiction regarding the installation, use, and maintenance of this equipment.

Warning Signs

Warning signs and labels posted on or near the conveyor equipment 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 or bills-of-materials for replacement part numbers.

Safety Precautions

Accidents causing personal injury can usually be traced to unsafe work practices by either operating or maintenance personnel. Many accidents occur because the personnel concerned do not realize the danger of improper practices; or the proper practice is known, but ignored because the employee is in a hurry or is careless.

Safety Precautions for Personnel Operating the Conveyor

- Make sure only authorized, trained personnel operate the conveyor.
- Stop the conveyor before clearing jams or removing foreign objects.
- Make sure all personnel are clear of moving parts before starting the conveyor.
- Avoid distractions when operating the conveyor.
- The conveyor is designed and manufactured to comply with the American National Standard Institute's "Safety Standards for Conveyors and Related Equipment" (ANSI B20.1).
- Keep conveyor fully-retracted (and belt turned off) when not in use.

Maintenance personnel can contribute greatly to the success of a safety program. They are familiar with the equipment and know the dangers inherent in such equipment. In addition, they realize the hazards resulting from incorrect use of the equipment.

Maintenance personnel should be trained to recognize and to promptly report unsafe practices in the operation of this conveyor, as well as any dangerous condition in the conveyor itself.

Safety Precautions for Maintenance Personnel

The following precautions must be observed:

- Do Not perform maintenance while the conveyor is operating. Lock-out the circuit breaker disconnect switch with padlocks before performing maintenance.

Note: Single-key locks must be used by qualified electricians or maintenance mechanics. When possible, an additional power lock-out at the power source is recommended.

- Before restarting the conveyor, make sure all personnel are clear of moving parts.
- Maintain good housekeeping in the vicinity of the conveyor at all time. Clean up spilled materials or lubricants promptly.
- Always replace the protective devices before putting the conveyor back into service.
- Maintenance personnel should be alert for hazardous conditions at all times. Remove sharp edges and protruding objects, and replace broken or worn parts promptly.
- Use the proper tool for each job. Carry tools in a pouch or a tool box. never carry tools in a pocket.
- Report all accidents resulting in personal injury or damage to equipment, and all irregularities in equipment operation promptly to the proper authority.

Parts Replacement

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

Factory Assistance

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

Mechanical Installation

Bed Section Assembly

1. Remove any shipping braces and filler blocks then check the alignment of frames, pulleys, and rollers before proceeding. Corner-to-corner diagonal frame measurements of each conveyor should be equal within 1/16”.

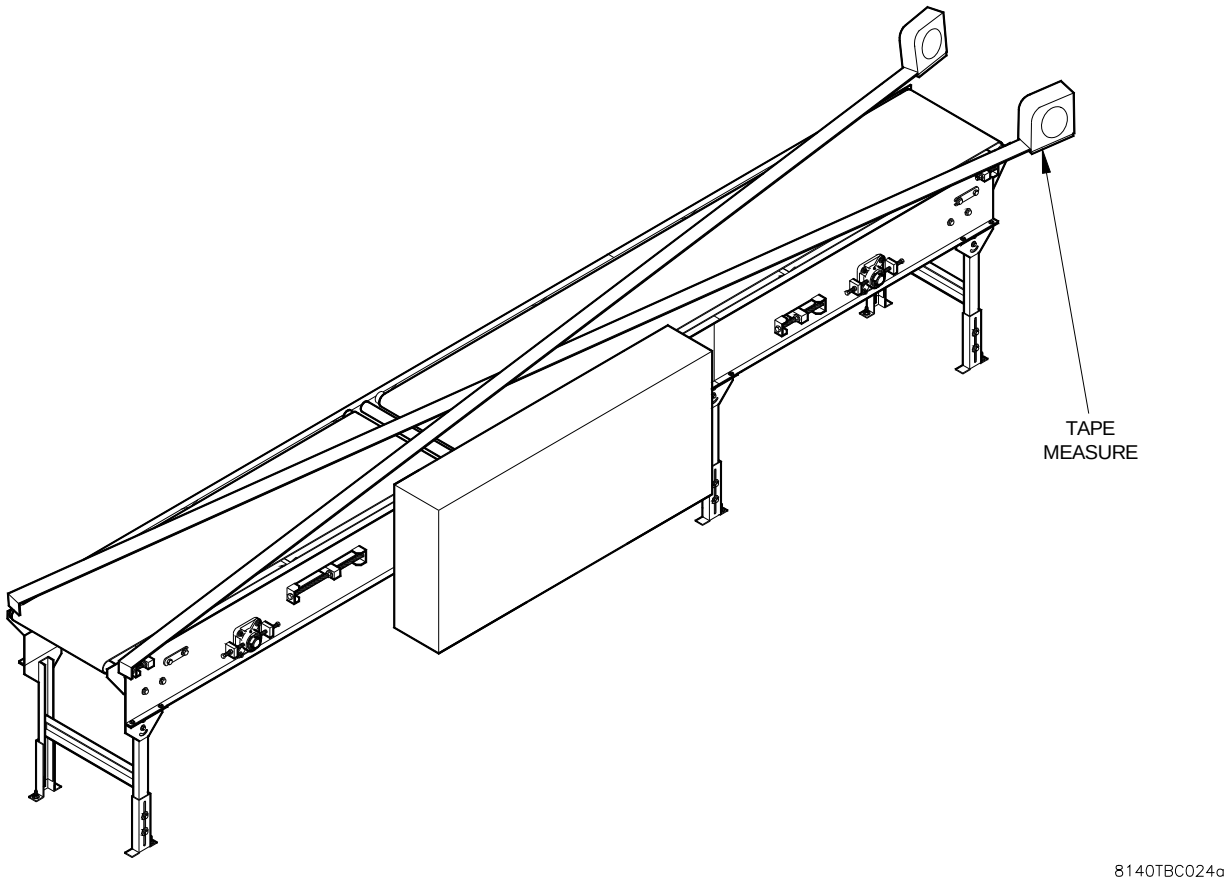


Figure G - 1 Checking Frame with Diagonal Measurements

2. Attach the supports to the conveyor, (3 for 17’-6” units, 4 for 22’-6” units). Refer to the *“Floor Supports & Ceiling Hangers”* manual.
3. Adjust the supports to the required height and level the conveyor using a spirit level. Check the alignment of the frame, pulleys, and rollers.

   Note: Frames, pulleys, and rollers MUST be square to properly track the belt. Check (and realign if necessary) pulleys, rollers, and bolted cross members to ensure they are mounted perpendicular to the conveyor side frames.

Drive Sprocket Alignment

Check the drive sprocket alignment with a straight edge (see figure below). The shafts must be parallel and the faces of the sprockets must be in line with each other.

CAUTION: Before working on a PTO unit, make certain the conveyor's power disconnect is locked in the open position and tagged to prevent accidental or unexpected application of power.

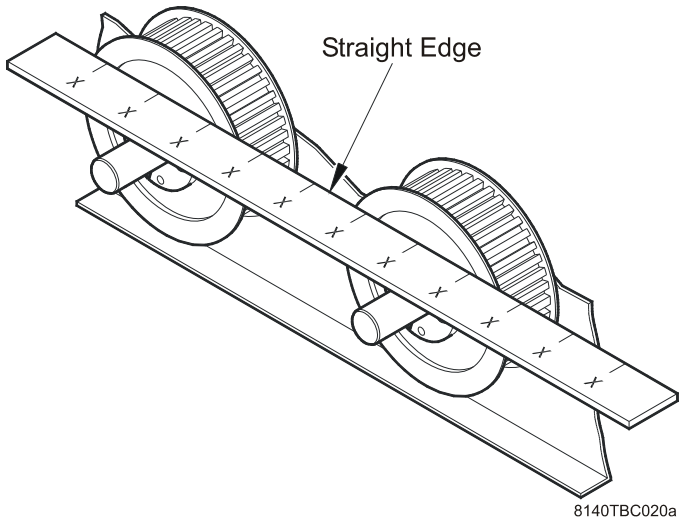


Figure G - 2 Check Drive Sprocket Alignment

Taper Lock Buschings

Check the tightness of all taper lock bushing hardware in the drive unit.

CAUTION: Before working on a PTO unit, make certain the conveyor's power disconnect is locked in the open position and tagged to prevent accidental or unexpected application of power.

Conveyor Transitions

It is important that the transitions from one conveyor to another are smooth. The conveyors need to be level with one another, aligned, and close together (no big gaps).

Side Guide Offset Requirement

The side guide feeding into the brake belts should be offset about one inch towards the center of the brake belt (away from the skewed side) on the Gap Optimizer (required) and infeed lanes (optional). This keeps the cartons on the belt, so that they do not drag against the sideguide or pan under the belt. This is a gradual offset (longer than four feet); usually made with roller skate sideguide.

Electrical Installation

Electrical Wiring

Electrical wiring must be installed by a competent licensed electrician. The licensed electrician must be familiar with the operation and adjustment requirements of the conveyor so that the conduit and apparatus do not interfere with required access.

Photo Eye Mounting

The strut has been provided to mount the photo eyes. The strut is mounted in a horizontal position for shipping. The strut must be positioned vertically for the photo eye mounting, see Figure G - 3. Proper placement and height of the photo eyes will be based on the controls requirements.

The low and high detect eyes should be mounted on both sides of the frame. The width detect eye(s) should be mounted ONLY on the non-skew side of the conveyor. In some applications a tote LIP eye and a batch eye will be used. For further eye mounting detals, contact Intelligrated Engineering.

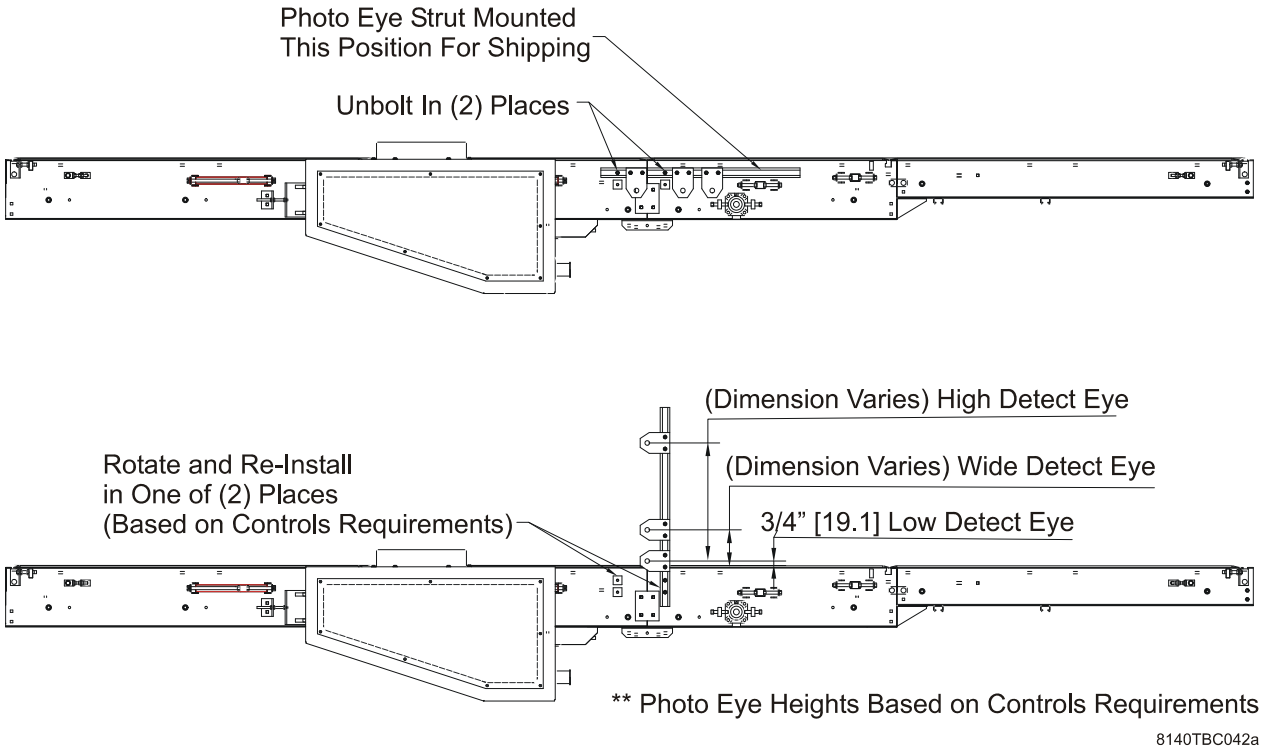


Figure G - 3 Strut Mounting

Encoder Mounting

Do **not** use the encoder set screws. Mount the encoder using a 1/4”-20 shoulder bolt that is 2 inches long. Position two flat washers and two lock washers exactly as shown below. The flat washer positioned against the roller shaft should be large enough so that it does **not** drop into the countersunk area of the shaft.

The electrical wire from the encoder should be tie wrapped to the conveyor so that the encoder is not free to rotate, but not so tight as to put side torque on the encoder bearing.

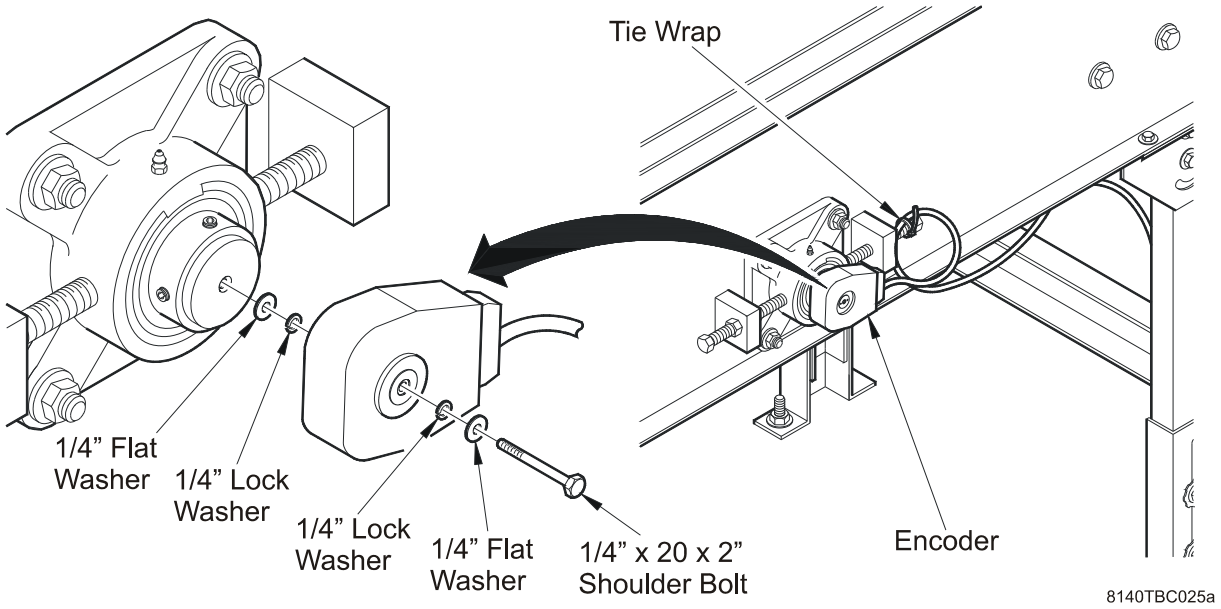


Figure G - 4 Mounting the Encoder

Belt Preparation

Belt Tension

Tension the belt by adjusting the take-up pulley. The adjustments must be made equally on both sides 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, lacing, snub rollers, and pulley bearings.

See Figures G-7, G-8, G-9 and G-10 for take-up pulley locations.

.

CAUTION: Adjustment of the take-up pulley may require the guard to be removed. When adjusting, be careful to stay clear of the drive components.

Belt Tracking

At this point, the conveyor is properly installed, all sections are aligned, and all carrier rollers and insert pans are level and square with the frame. The belt is installed with all pulleys, snub, and return rollers at right angles to the conveyor frame, and all start-up precautions observed. Now you are ready to track the belt.

CAUTION: Belt tracking is performed while the conveyor is running and is dangerous. Only trained and qualified personnel must perform the belt tracking function. The personnel must be instructed to always be alert for any unsafe condition and to use extreme care when tracking the belt.

Belt Tracking Principles

You must understand the principles of belt tracking in order to properly track the belt:

1. Crowned Pulleys - Crowned pulleys are used because they tend to keep belts centered.
2. Taut Belt - The belt must be sufficiently tensioned to not slip on the drive pulley. DO NOT overtighten.
3. Parallel Shafts - If the pulley shafts are not parallel, the belt will creep toward the side where the shaft centers are closest.

Belt Tracking Guidelines

1. When first tracking the belt, station qualified personnel at each end of the conveyor to observe possible belt tracking problems.
2. It is seldom possible to make pulley shafts perfectly parallel. Corrective adjustments must be made by adjusting rollers.
3. Watch the belt's position at a given point for at least one complete rotation. If the belt does wander off center and then returns back to the center position, there is no need to make any adjustments. When the belt wanders off center, it is caused by camber in the belt length which will tend to straighten out in time.
4. A common mistake is to adjust the end pulleys for any belt tracking problem. It is proper to adjust the end pulleys only for mistracking on the pulley at the discharge end of the conveyor.
5. Note that the belt creeps toward the side of the pulley or snub roller that it touches first. Adjustments should be made accordingly.

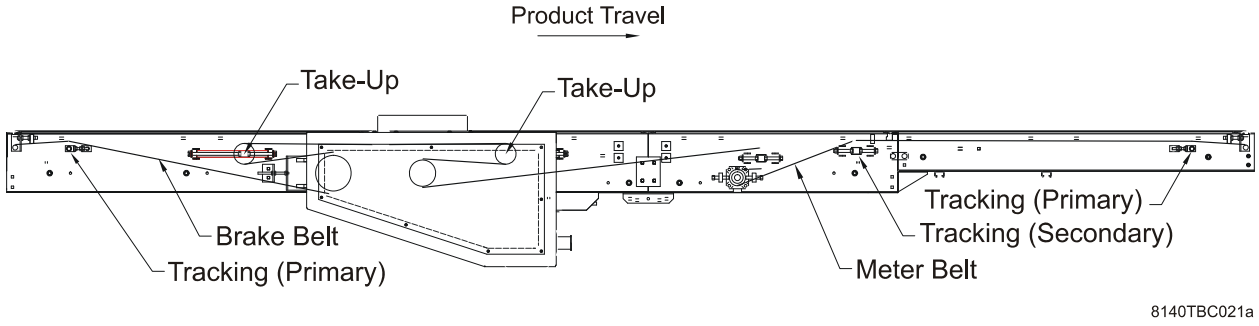


Figure G - 5 Servo Meter Belt - Belt Tracking - 17'-6"

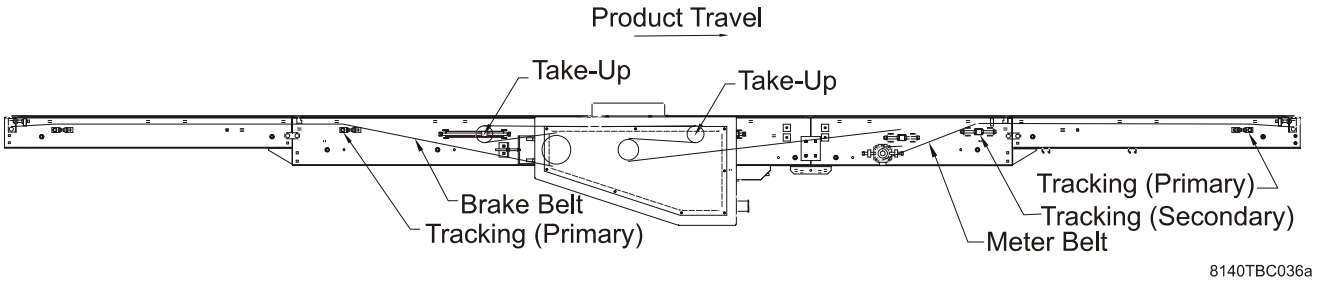


Figure G - 6 Servo Meter Belt - Belt Tracking - 22'-6"

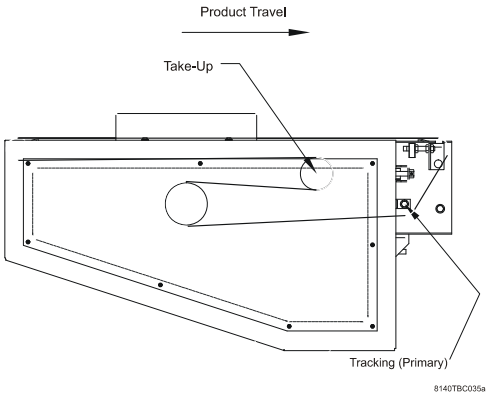


Figure G - 7 Servo Belt - Belt Tracking

6. Observe the belt's return run and its position on each return roller. Adjust any roller that causes the belt to move off center.
7. All adjustments should be slight and you must allow sufficient time for the belt to react to the adjustment, (especially if the conveyor operates at slow speeds). Multiple revolutions of the belt are required for the belt to reach equilibrium.

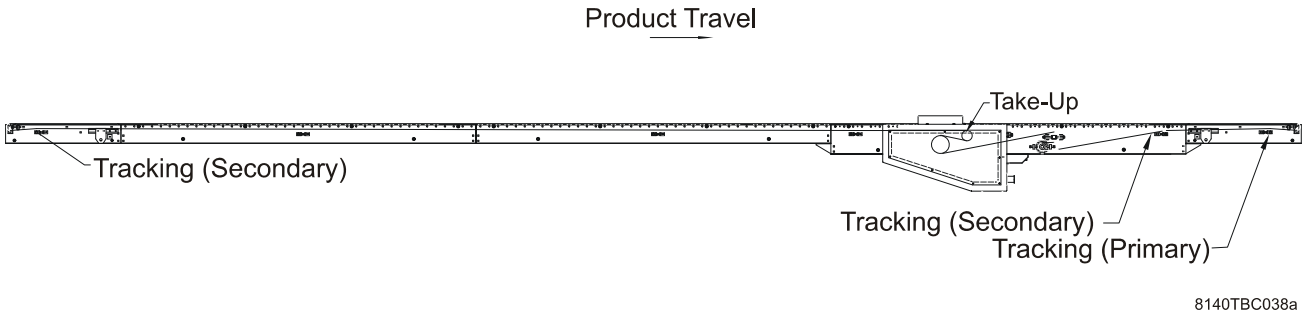


Figure G - 8 Servo Staging - Belt Tracking

Start-Up Preparation

CAUTION: *T*o prevent accidental start-up, make certain electrical power to the power unit is turned off and locked out.

The following describes the check list prior to equipment start-up:

1. Check conveyor elevation and adjust supports as needed.
2. Check conveyor alignment (lengthwise and widthwise) with a spirit level. Adjust supports or add shims as needed and securely tighten all mounting bolts.
3. Check that all pulleys and rollers are mounted perpendicular (90°) to the direction of belt travel.
4. Check belt sag and adjust take-up pulley as needed.
5. Check driver/driven sprocket alignment with a straightedge. Securely tighten all sprocket fasteners.
6. Check motor wiring connections.
7. Check other wiring connections and test all conveyor electrical controls for proper operation.
8. Check that all conveyor safety guards removed during the installation have been replaced.
9. Check that tools and all installation materials have been removed from the conveyor.

SECTION H: MAINTENANCE

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

All newly installed equipment should be frequently inspected and serviced as needed during the first 40 hours of operation; thereafter, an appropriate maintenance program should be established and followed (see Table H-1).

Maintaining separate service log sheets on each type of conveyor is recommended for plants operating more than one shift. Each log sheet should show dates, detailed inspection service information, and name or initials of person(s) performing the equipment inspection or service for future reference.

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 accidental or unexpected application of power.

Do not perform maintenance while the conveyor is running unless specifically instructed to do so in this manual. Note: Other than belt tracking, it is NOT necessary to have the conveyor turned ON in order to perform any of the work described in this section.

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

Note: The placement of the photoeyes is very critical. The merge program must be calibrated to their placement. If the eyes are displaced, they must be repositioned and the program may need to be recalibrated.

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.

Scheduled Maintenance

Intervals indicated for performing maintenance should be considered for 8 hour per day operation. An application may subject the equipment to conditions that would necessitate more frequent maintenance. This may best be determined by performing maintenance more frequently when the conveyor is first put into operation, and then lengthening the intervals based on experience.

Table H-1 Scheduled Maintenance Summary

	Components	Item Check										
		Clean	Lubrication	Oil Level	Tension	Wear	Alignment	Fasteners	Set Screws	Proper Position	Physical Condition	Operation
Weekly	Conveyor Belt				X	X	X				X	
	Belt Lacing										X	
	Belt Return Rollers										X	X
	General Structure							X			X	X
	Safety Guards/Devices									X	X	X
	Electrical Devices									X	X	X
Monthly	Drive Belts										X	X
	Drive and PTO Sprockets				X	X	X				X	
	Conveyor Belt	X			X	X	X					X
	Bearings - External							X	X		X	
	Bearing - Internal		X								X	
	Servo Motor							X			X	
	Drive Pulley Lagging										X	
	Take-up/Idler Pulleys										X	X
	Supports and Hangers							X			X	
	Encoder											X
Semi Annually 1040 hrs.	Bearings - External		X									
	Bearing - Internal		X								X	
	Photoeyes	X										

Initial Start-up/Run-in Period

Drive Belts

Check the tension of the timing belt and the PTO belt daily for the first week of operation, then monthly.

Sprockets

Check the alignment of the drive sprockets and PTO sprockets daily for the first week of operation, then monthly. Check the alignment by placing a straight-edge across the face of both sprockets simultaneously.

Conveyor Belt

Check the tension and tracking of the conveyor belt daily for the first week of operation, then monthly.

Drive Bushings

Check the drive sprocket and PTO sprocket bushings daily for the first week of operation.

Daily Maintenance

General walk-through inspections of the conveyor equipment during daily plant operation is recommended. Listen for unusual noises and carefully observe the system. For continuous duty applications, conduct conveyor inspections once each shift.

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.

Weekly Maintenance

Conveyor Belt

Check that the belt is tracking properly along the entire conveyor length. Check that the belt tension is sufficient to prevent the belt from slipping on the drive pulley under the maximum required load. Remove product spillage.

The servo belts need to maintain good contact with the cartons. Since the cartons are skewed to one side of the servo, track the belts to that side so the cartons do not drag on the bed under the belt.

Belt Lacing

Check the lacing for damage or protrusions which might cause damage to the conveyor or product. If the lacing needs to be replaced and the take-up permits, cut both ends of the belt and resplice. If the take-up does not permit, cut and lace in a short length of belting (1’-0” long minimum).

Belt Return Rollers

Check that all rollers are in place and turning freely. Remove any buildup of dirt and/or product spillage. Do not allow cleaning materials to come in contact with ball bearings.

General Structure/Operation

Check the conveyor's physical condition, looking for lose fasteners, and damaged or wearing components. Listen for unusual noises.

Safety Guards/Devices

Check that the safety guards, warning signs, lights, and alarms are in place and in proper working condition. Check that all emergency-stop pull-cords and/or push buttons are functioning properly.

Electrical Devices

Photocells, proximity sensors, limit switches, etc. should be periodically inspected and adjusted as needed. Lenses and reflectors on photoelectric devices should be wiped clean on a daily basis. For additional maintenance provisions, refer to the appropriate vendors instructions provided.

Note: The placement of the photoeyes is very critical. The merge program must be calibrated to their placement. If the eyes are displaced, they must be repositioned and the program may need to be recalibrated.

Monthly Maintenance

Drive Belts

Check the tension of the timing belt and the PTO belt.

Drive Sprockets and PTO Sprockets

Check the alignment by placing a straight-edge across the face of both sprockets simultaneously.

Conveyor Belt

Servo Powered Belt conveyors are computer-controlled variable-speed belts which require a specific level of friction. They should be cleaned frequently, with the frequency of cleaning depending on the product being shipped. After initial system installation, clean more frequently because cartons will carry original surface oils from the rollers to the belts. After the system has been "broken in", cleaning times can be less frequent but should still be done on a regular schedule. Successful cleaning can be performed with shop rags and a general-purpose spray cleaner such as Fantastic or Simple Green.

Check the tension and tracking of the conveyor belt. Also check for dry rot.

If a belt is worn, replace it with the belt specified as the replacement belt. Do not use common conveyor belt. The recommended belts have a specific level of friction which is required for the computer, photo eyes, and encoder to track the speed and position of the cartons.

External Bearings

Check that all mounting bolts, set screws, etc, are securely tightened, and that no lubricant is coming out of the seals. Listen for any unusual noises.

Internal Bearings

Check that the bearings are fully-pressed into the roller tube, and that the lubricant is not coming out of the seals. Listen for any unusual noises.

Servo Motor

Remove any build-up of dirt, dust, grease, or oil on the motor. Check that all mounting bolts are securely tightened and that the motor lead wires are securely connected.

Drive Pulley/Lagging

Check the pulley alignment and make certain that all mounting bolts are securely tightened. Check for worn or damaged lagging on the drive pulley. Repair or replace as required.

Supports and Hangers

Check that all floor supports and/or ceiling hangers are in good physical condition and have not been damaged. Check that all fasteners are securely tightened and that none are missing.

Encoder

Be sure the encoder operates freely and the signal wires are attached.

Semi Annual Maintenance

External Pulley Bearings

All external bearings have lubed-for-life bearing cartridges, and do not require periodic lubrication.

If desired, the bearings may be re-lubricated using the grease-fitting that is provided in all bearing housings. Once grease is added, the bearing must be re-lubricated every 6 months with a lithium based ball bearing grease or compatible grease conforming to NLG1 Grade 2 consistency.

Add the grease slowly and sparingly while the pulley is rotating until a slight showing of grease forms around the seals. DO NOT OVER LUBRICATE. Too much grease may damage the seals. If a bearing is over greased; remove the fitting to allow the excess grease to escape. Replace the fitting and wipe clean before putting the conveyor back into operation.

Internal Bearings

Check that the bearings are fully-pressed into the roller tube, and that the lubricant is not coming out of the seals. Listen for any unusual noises.

Note: For 2-1/4” dia. knife edge pulleys lubricate with Valvoline #633 every 1000 hours.

Photoeyes

The lenses of the photoeyes should be kept clean.

Note: The placement of the photoeyes is very critical. The merge program must be calibrated to their placement. If the eyes are displaced, they must be repositioned and the program may need to be recalibrated.

Maintenance Procedures

Replacing the Belt

Use the following steps to replace the belt.

1. Before starting to replace the belt, make certain that:
   - all frame sections are level, properly aligned, and securely anchored.
   - all pulley and roller shafts are perpendicular 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. Orient the belt properly on the unit. The brushed, non-glossy side of the belt must be face-down on the top side of the conveyor.
4. Thread the belt through the conveyor. 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.

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 the figure below). 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.

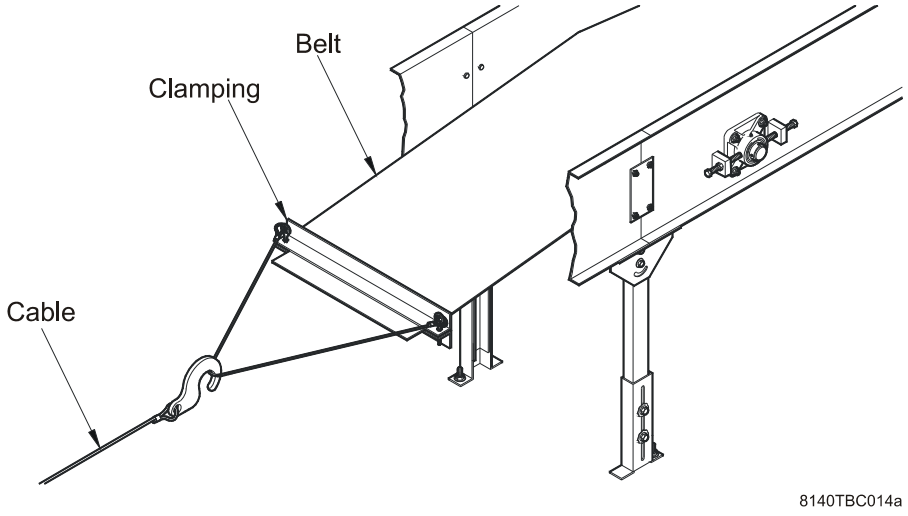
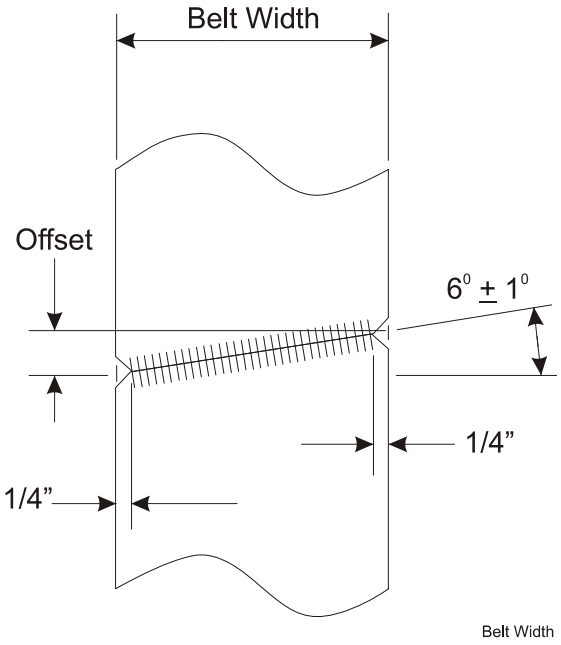


Figure H - 1 Belt Pulling Device

5. Join the ends and adjust the tension and tracking of the belt as described in “Section G - Installation Procedures”.

When replacing the belt(s), it may be beneficial in certain applications to splice the belt on a bias to reduce noise. When the belt is spliced on a bias, Intelligrated engineering requires the angle of the splice to be less than 7 degrees. Use the table below as a guide for common belt widths and dimensions. Each end of the belt must be cut at the exact same angle to ensure proper belt tracking. Be sure to take the offset measurement before trimming 1/4” from the corners, so as not to exceed the maximum bias angle.



Common Belt Widths	Offset Dimension for 6 Degree Bias
12”	1-1/4”
18”	1-7/8”
24”	2-1/2”
30”	3-1/8”
36”	3-13/16”

Troubleshooting

Basic troubleshooting instructions are outlined in the table below.

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 or equipment damage, lock out and tag 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 NOT energized.	Check that system control panel(s) are energized. Be certain emergency stop devices are not activated.
	System control devices (photocells, limit switches, etc.) out of adjustment or defective.	Adjust or replace.
	Motor overload open.	Check conveyor drive system and overload sizing 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.
	Emergency stop activated.	Correct condition and reset according to control logic.
	Power or component failure at system control center.	Refer to vendor manuals.
	Motor overload.	Check conveyor drive system and overload sizing before restarting.

Problem	*Cause*	*Solution*
Entire belt creeps to one side.	Improper loading of belt.	Center the product on the belt. Load in direction of travel.
	Belt shifts to low side. The base structure or conveyor frame is not level or is crooked.	Stretch a string along the edge of the frame, check alignment of the frame and correct. Next, check the level of support structure.
	Alignment of pulleys; drive, tail, pulleys, or snub rollers are out of line or not perpendicular with the center line of the conveyor.	Use a T-square against the edge of the conveyor to recheck and square the pulleys.
	Underside of the belt is dirty.	Remove foreign matter, because it creates a new crown on the pulley/roller face adversely affecting the tracking.
Belt creeps to one side in head (discharge) pulley area.	Head pulley is out of alignment (not perpendicular with the center line of the conveyor).	Realign the head pulley, then readjust the tracking rollers.
Belt creeps to one side in tail (infeed) pulley area.	Tail pulley is out of alignment (not perpendicular with the center line of the conveyor.	Realign the tail pulley, then readjust the tracking rollers.
Belt wanders irregularly.	Incorrect belt.	Install proper belt.
	Off center or improper loading.	Correct loading procedure.
Edge wear is excessive.	Belt edges fold up on conveyor guards and frame.	Remove the rough areas on the conveyor guards or frame.
	Belt shifts to opposite side and rubs excessively due to side loading.	Loading in direction of belt travel will improve this condition.
Belt fasteners pulling out.	Fasteners are incorrect size	Relace the belt with proper size fasteners.
	Too much tension on belt.	Relieve tension until belt will run without slipping on the drive pulley.

SECTION I: PARTS IDENTIFICATION

Introduction

The purpose of this section is to identify the critical replacement parts required for a solid preventative 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 apply to the STANDARD product line ONLY.

Servo Meter Belt - Parts Related by Width and Length

Table I-1 Servo Meter Belt - Parts Related by Width and Length

Key	Description	Length	Spare	Width				
				16”	22”	28”	34”	40”
1	Belt, Non-metallic, Laced, Black (Standard Belt)	17’-6” 22’-6”	Yes Yes	191135 191120	191136 191106	191137 191107	191138 191108	191139 191109
2	Belt, Non-metallic, Laced, Black (Standard Belt)	17’-6” 22’-6”	Yes Yes	191115 191125	191116 191116	191117 191117	191118 191118	191119 191119

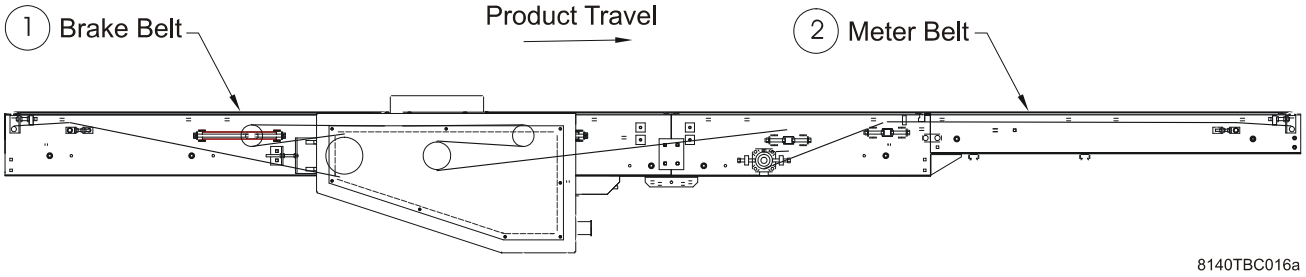


Figure I - 1 Servo Meter Belt - Parts Related by Width and Length - 17’-6”

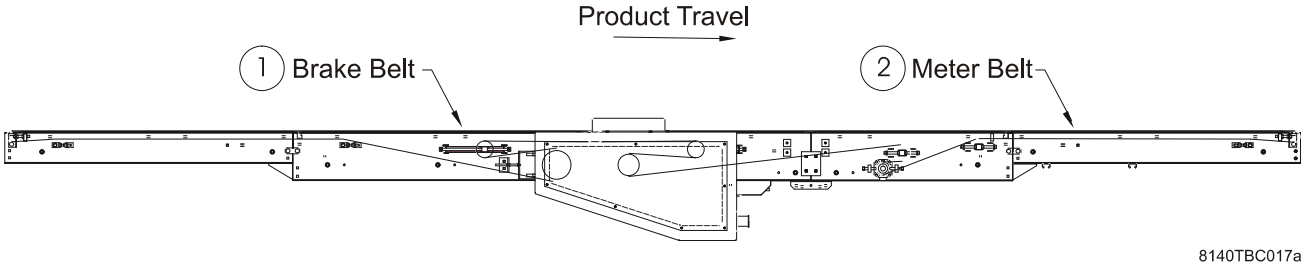


Figure I - 2 Servo Meter Belt - Parts Related by Width and Length - 22’-6”

Servo Meter Belt - Parts Related by Width Only

Table I-2 Servo Meter Belt - Parts Related by Width Only

Key	Description	Width				
		16”	22”	28”	34”	40”
3	Drive Pulley, 5-7/8”	682055	682056	682057	682058	682059
4	Idler Roller, 3-1/2” Flat Face	501238	501239	501240	501241	501247
5	Axle, 1-1/8” Square	690909	690910	690919	690920	690970
6	Idler Pulley, 2-5/8” Crowned Face	680115	680116	680117	680118	680119
7	Roller, 2-1/2”	501056	501057	501058	501059	501060
8	End Roller, 2-1/4” Crowned Face, No Knife Edge	510610	510611	510612	510613	510614
9	End Roller, 2-1/4” Crowned Face, Knife Edge	510001	510002	510003	510004	510005

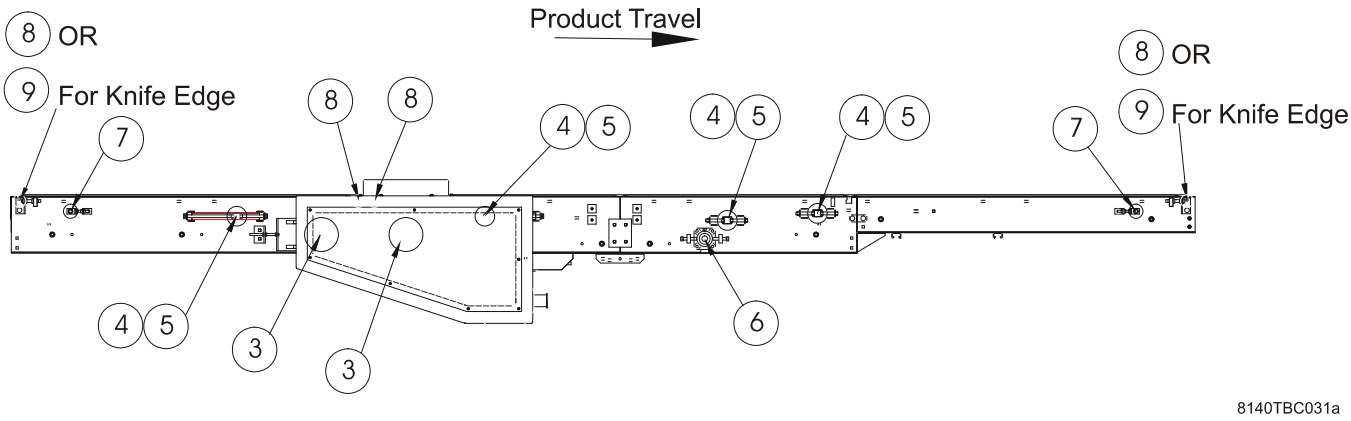


Figure I - 3 Servo Meter Belt - Parts Related by Width Only - 17’-6”

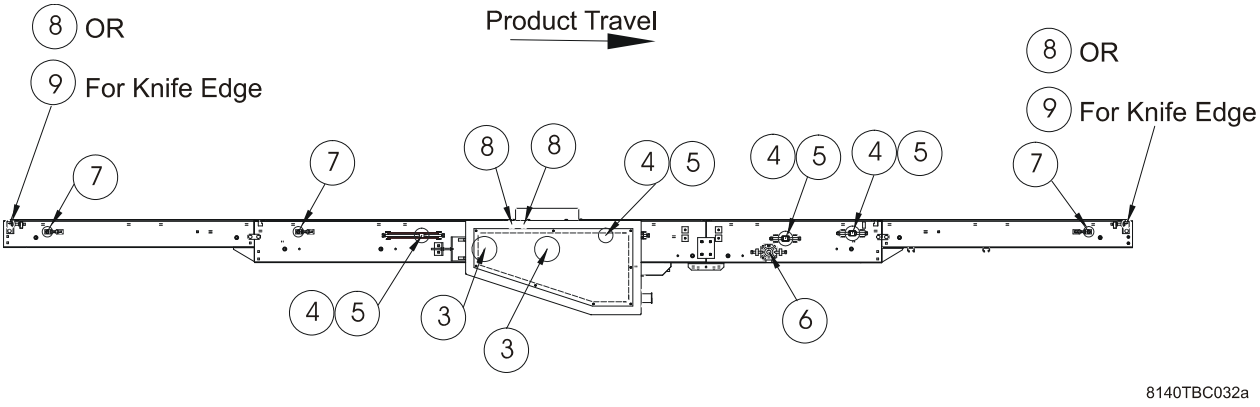


Figure I - 4 Servo Meter Belt - Parts Related by Width Only - 22’-6”

Servo Meter Belt - Parts Related by Speed Ratio

Table I-3 Servo Meter Belt - Parts Related by Speed Ratio

Key	Description	Ratio					
		1.27:1	1.33:1	1.40:	1.67:1	1.78:1	2.00:1
10	Sprocket, Timing (driver - downstream)	7001544	7001540	7001538	7001541	7001540	7001538
11	Hub, 1-11/16" (driver - downstream)	230782	230782	230782	230782	230782	230782
12	Sprocket, Timing (driven - upstream)	70001548	7001545	7001544	7001550	7001550	7001550
13	Hub, 1-11/16" (driven - upstream)	230793	230782	230782	230793	230793	230793
14	Timing Belt	7001506	7001504	7001503	7001506	7001506	7001506

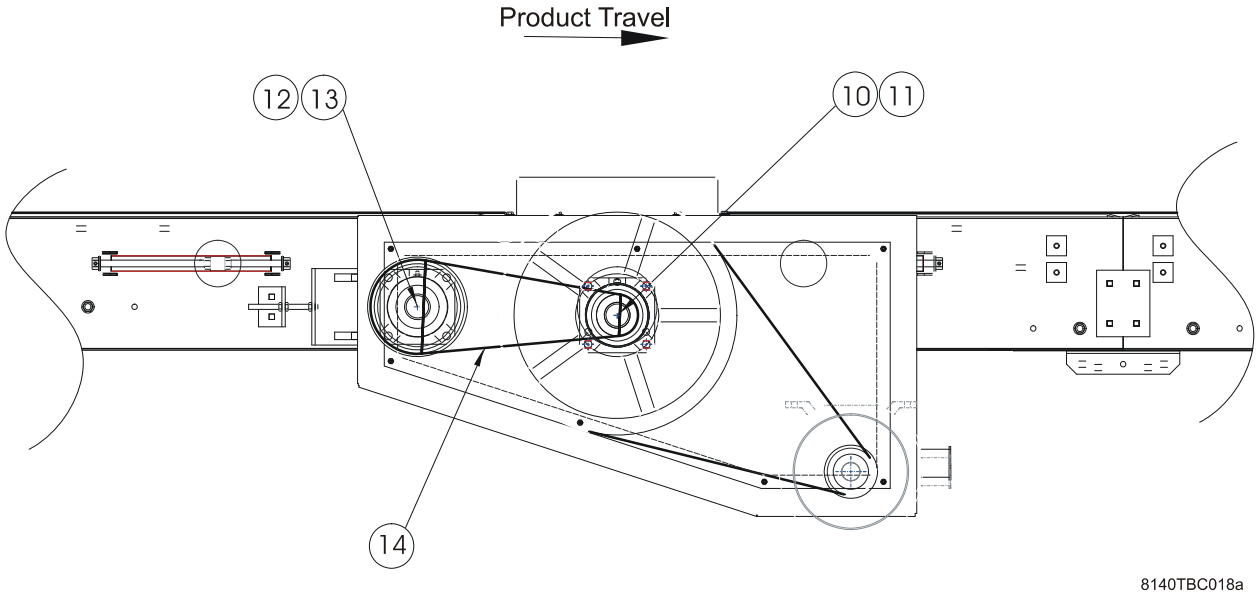


Figure I - 5 Servo Meter Belt - Parts Related by Speed Ratio

Servo Meter Belt - Parts Non-Related

Table I-4 Servo Meter Belt - Parts Non-Related

Key	Description	Part Number
17	Flange Bearing, 4 bolt, 1-15/16”	400954
18	Flange Bearing, 4 bolt, 1”	400942
19	Sprocket, Timing (driver	7001536
20	Sprocket, Timing (driven)	7035250
21‘	Hub, 1-15/16” (driven	230809
22	Timing Belt	7035251
25	Bearing, 3.5”, 1-1/8” Square Bore	350360

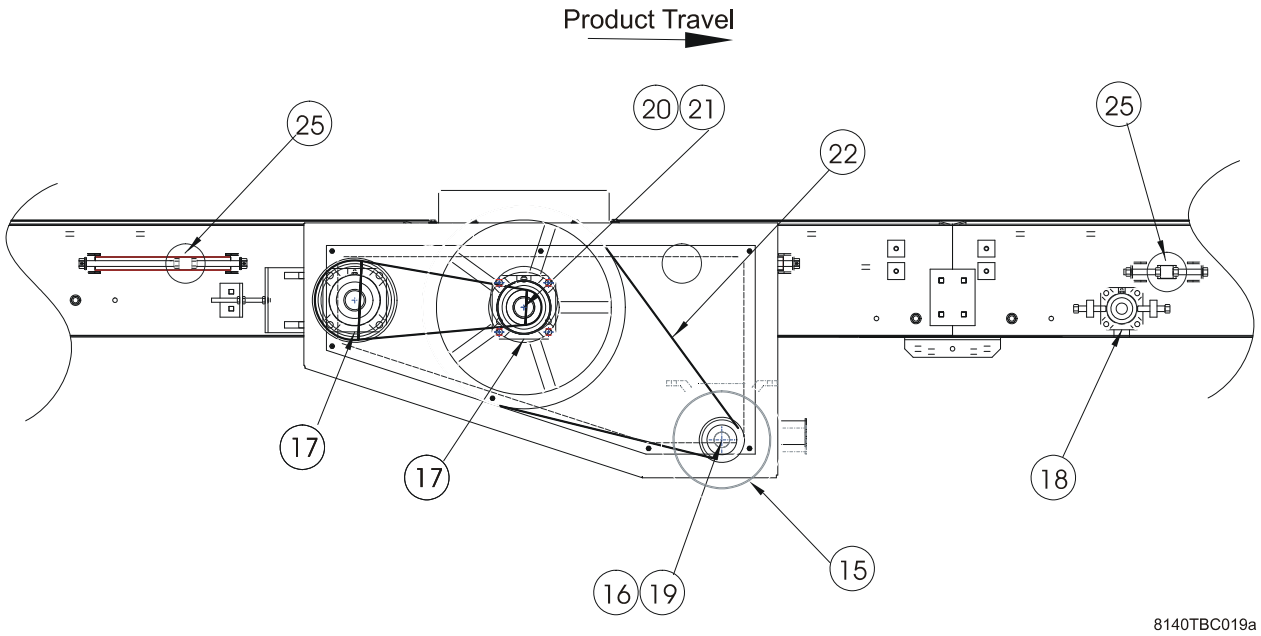


Figure I - 6 Servo Meter Belt - Parts Non-Related

Motor - Related Parts

Table I-5 Motor Related Parts

Key	Description	Motor	
		Rockwell	Black Max
15	Servo Motor	330800	330802
16	Hub, Motor Shaft	230953	2155220

Servo Belt - Parts Related by Width and Length

Table I-6 Servo Belt - Parts Related by Width and Length

Key	Description	Spare	Width			
			16”	22”	**28”**	**34”**
23	Belt, Non-metallic, Laced Black, 3” Knife Edge	Yes	191160	191162	191163	191164
23	Belt, Non-metallic, Laced Black, 5” Knife Edge	Yes	191164	191163	191166	191167

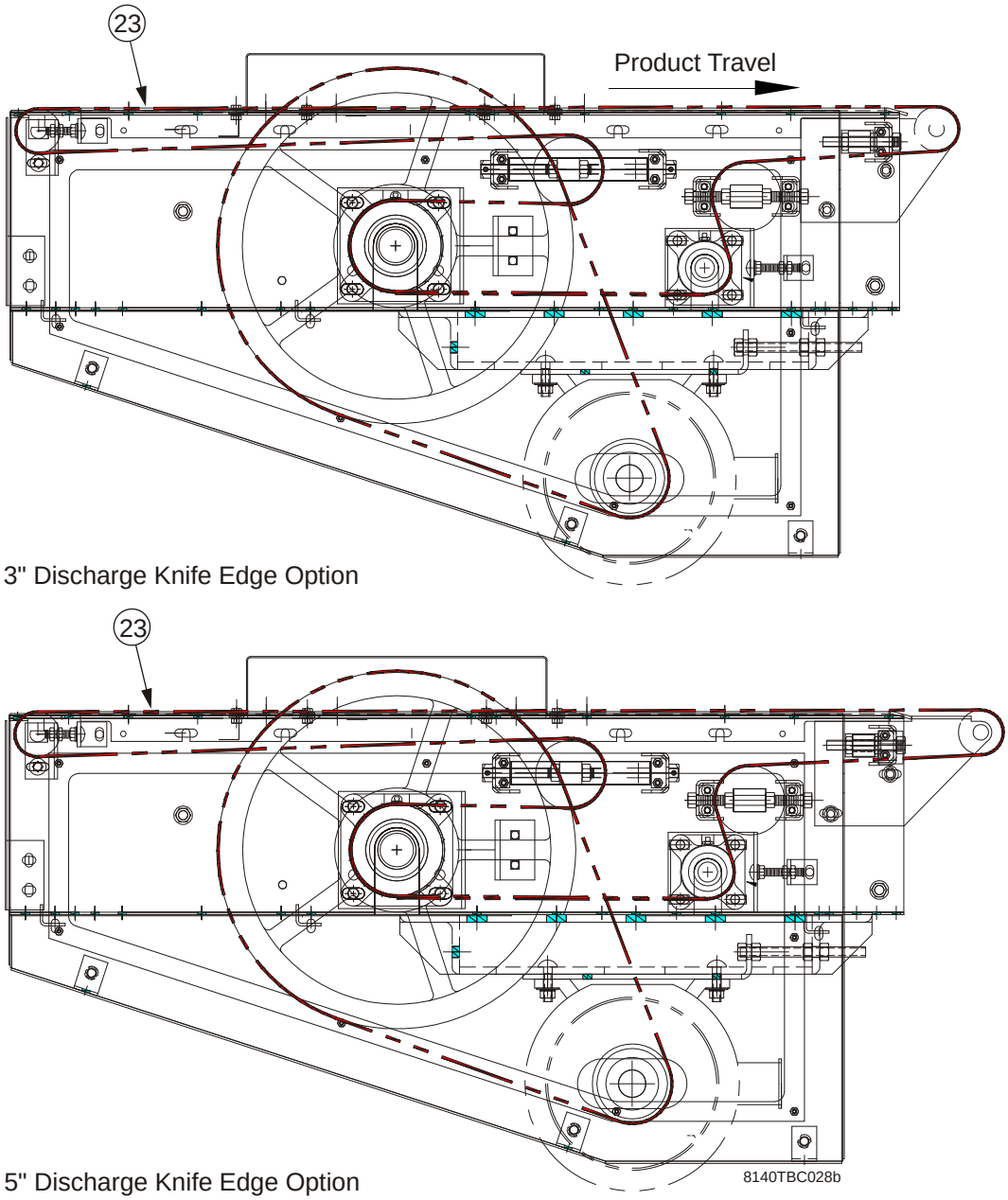


Figure I - 7 Servo Belt - Parts Related by Width Length

Servo Belt - Parts Non-Related

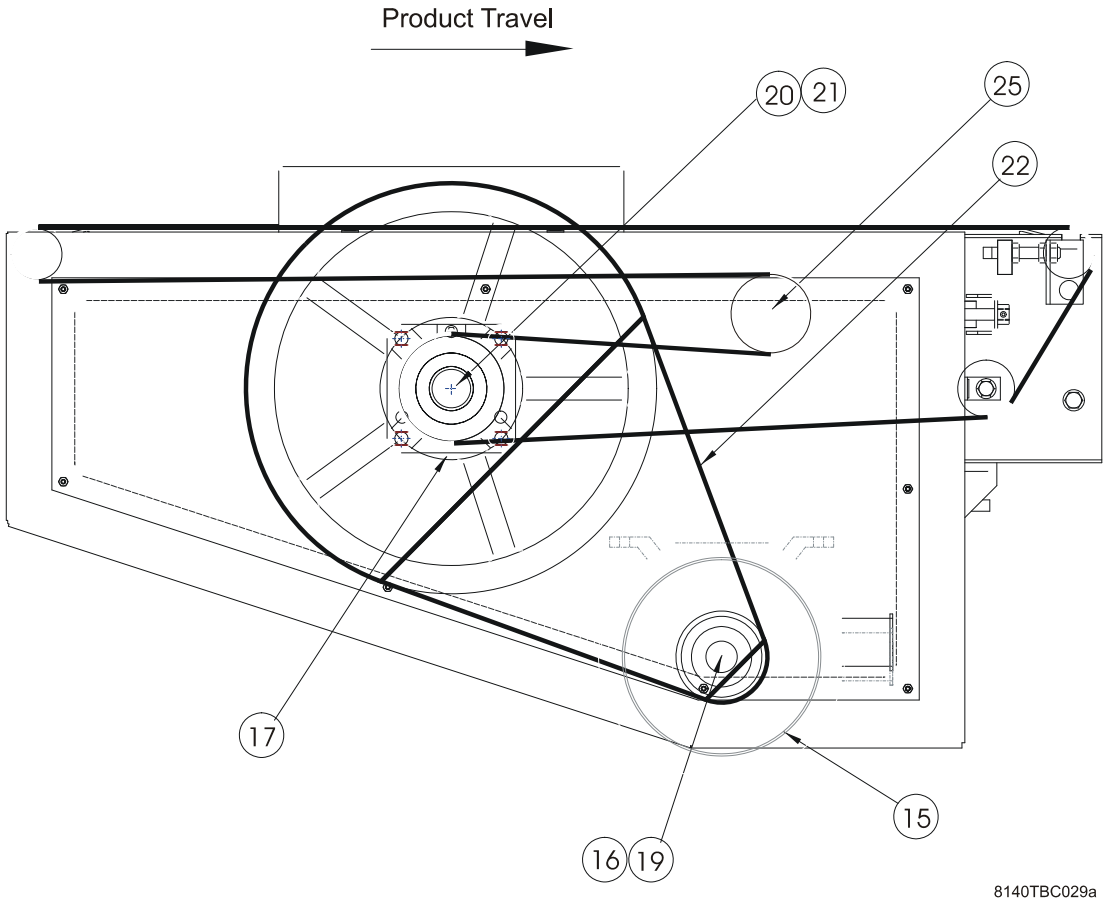


Figure I - 8 Servo Belt - Parts Non-Related

Note: See Table I-4 and I-5 for Spare Parts 15-25

Servo Staging Belt - Parts Related by Width Only

Table I-7 Servo Belt - Parts Width Related

Key	Description	Spare	Width		
			22”	**28”**	**34”**
24	Belt, Non-metallic, Laced Black	Yes	191145	191146	191147

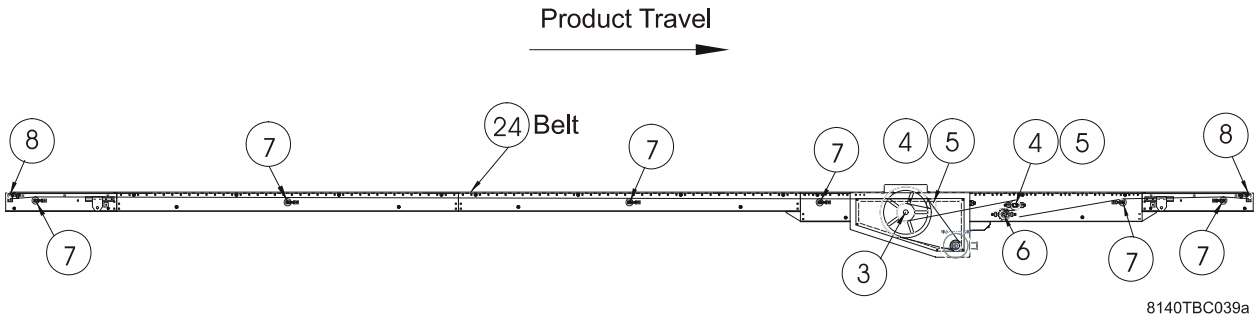


Figure I - 9 Servo Staging Belt - Parts Related by Width Only

Note: See Table I-2 for Spare Parts 3-8.

Servo Staging Belt - Parts Non-Related

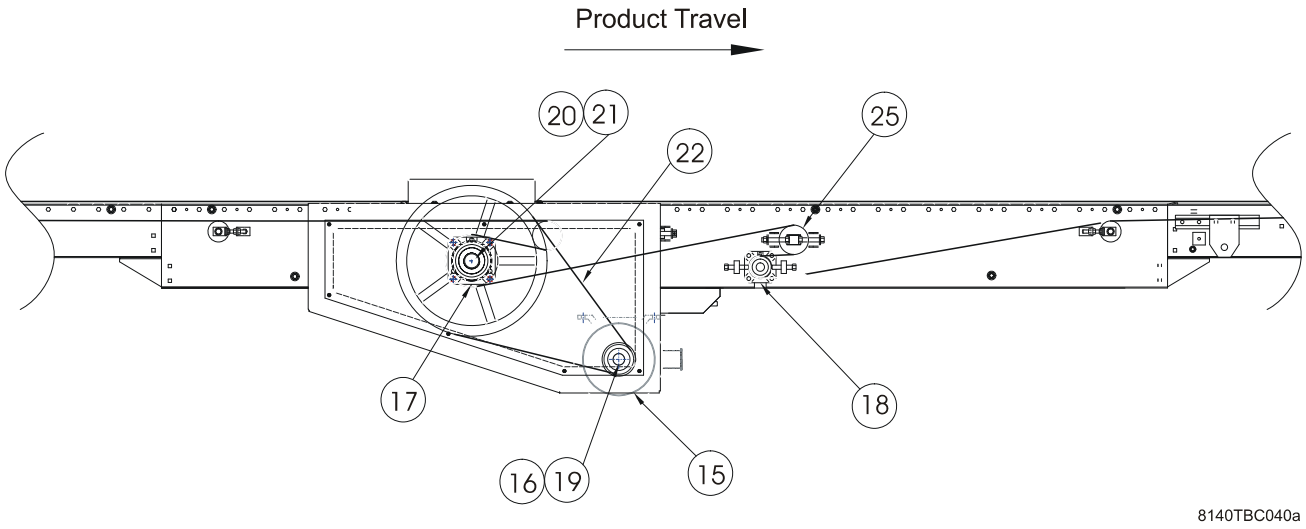


Figure I - 10 Servo Staging Belt - Parts Non-Related

Note: See Table I-4 and I-5 for Spare Parts 15-25.

SECTION J: PRODUCT INDEX

Servo Meter Belt

ITEM CLASS C 2 1 2

(F1) Feature 1 RAILS AND PANS
(F2) Feature 2 BELTING
(F3) Feature 3 MOTOR
(F4) Feature 4 PTO SPROCKETS
(F5) Feature 5 OPEN NON-REQIRED FEATURE

DESCRIPTION	DWG. NO.	W16	W22	W28	W34	W40
SVM METER BELT 22-6 W_ RH	27301 D	828950	828952	828954	828956	828958
SVM METER BELT 22-6 W_ LH	27301 D	828951	828953	828955	828957	828959
SVM METER BELT 17-6 W_ RH	27308 D	828960	828962	828964	828966	828968
SVM METER BELT 17-6 W_ LH	27308 D	828961	828963	828965	828967	828969

Servo Belt

(F1) Feature 1 RAILS AND PANS
(F2) Feature 2 MOTOR
(F3) Feature 3 ENCODER

DESCRIPTION	DWG. NO.	16” W	22” W	28” W	34” W	40” W
SVB SERVO 4-0 W_ RH	27391 D	829317	829319	829321	829323	NA
SVB SERVO 4-0 W_ LH	27391 D	829318	829320	829322	829324	NA

Servo Staging Belt

(F1) Feature 1 MOTOR
(F2) Feature 2 OPEN NON-REQUIRED FEATURE

DESCRIPTION	DWG. NO.	16” W	22” W	28” W	34” W	40” W
SVS DRV RB 3C 10-0/__ RH	27124 D	NA	827956	827952	827954	NA
SVS DRV RB 3C 10-0/__ LH	27124 D	NA	827957	827953	827955	NA

Components Below Have Not Features/Options

DESCRIPTION	DWG. NO.	16” W	22” W	28” W	34” W	40” W
SVS IS RB 3C 6.375 10-0/__	27309 D	NA	828970	8289718	828972	NA
SVS ID 3-3 6.375 EXT W__ NOKE	27310 D	NA	828973	828974	828975	NA
BELT 2X0412A32__X930 LACED +	NO DWG	NA	191145	191146	191147	NA