Product Manual

E-Z Set® Live Roller Conveyor

Application Guidelines, Specifications, Installation Procedures, Maintenance, Parts Identification, and Product Index

Intelligrated®

W&D_NA - 8200 - Rev. - December 2006

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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.

The information presented in these documents are correct at the time of publication. Intelligrated has made every effort to ensure that the information presented is correct and free from error. However, some errors or misprints may occur. Please contact Intelligrated with any corrections.

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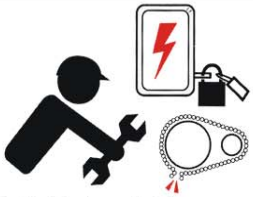
Package Conveyor Safety Signs

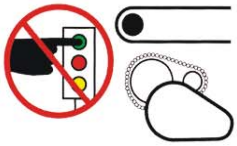
Package Conveyors

SAFETY IS IN YOUR HANDS

Do Not Climb, Sit, Stand, Walk, Ride, or Touch the Conveyor at Any Time



Do Not Perform Maintenance on Conveyor Until Electrical, Air, Hydraulic and Gravity Energy Sources Have Been Locked Out or Blocked



Operate Equipment Only WIth All Approved Covers and Guards in Place

Do Not Load a Stopped Conveyor or Overload a Running Conveyor

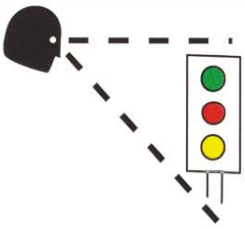
Ensure That All Personnel Are Clear of Equipment Before Starting

Allow Only Authorized Personnel To Operate or Maintain Material Handling Equipment

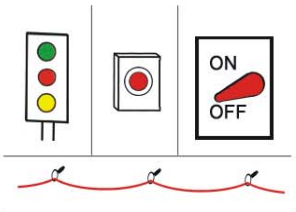
Do Not Modify or Misuse Conveyor Controls

Keep Clothing, BodyParts, and Hair Away from Conveyors

Remove Trash, Paperwork, and Other Debris Only When Power is Locked Out and Tagged Out



Ensure That ALL Controls and Pull Cords are Visible and Accessible



Know the Location and Function of All Stop and Start Controls

Report All Unsafe Conditions Jams should be cleared ONLY BY Authorized, Trained, Personnel

POST IN PROMINENT AREA

Intelligrated®

Product Manual Issue and Revision Date(s)

1st Issue	April 2005
1st Revision	December 2006

Product Manual Revision Summary

Revision Date	Manual Section(s)	Revision Summary
December 2006	Section I	Update Part Numbers

SECTION A:PRODUCT SUMMARY

CSPS Designation:	E-Z - E-Z Set Live Roller Conveyor
Applications:	Transportation - Horizontal, low pressure accumulation Speeds - 30, 45, 60, 75, 90, 120, 150, 180, 200, 250, 300, 350, and 400 fpm
Belt Widths:	8”, 10”, and 12”
Between Frame (BF) Dimension “W”	16”, 22”, 28”, 34”, and 40”
Intermediate Sections	Standard lengths - 3’, 6’, 9’ and 12’ Incremental lengths - 3’-1” through 5’-11” (actual) in 1” increments Carrier roller centers - 2”, 3”, 4” and 6” Pressure roller centers - 2X and 3X carrier roller centers; 2X carrier roller centers for incremental lengths Return roller centers - 6” (nominal)
Carrier, Pressure, and Belt Return Rollers:	G196GH - greased, commercial bearing G196GHCR - greased, commercial bearing, cold room application G196A1 - (ABEC) precision, greased, high-speed
Belts:	PVC90 - FSxFS woven (standard PVC90 - CSxCS (optional) PVC120 - TrackMate-529, FSxFS nonwoven (optional)
Intermediate Drives:	SA2000 Interemdiate Drive - 900 lbs. ESP; 8-1/4” diameter lagged pulley; manual take-up and adjustable snub roller. Under-hung power unit. SA2001 Intermediate Drive - Low Profile Drive 800 lbs. EBP; 5-7/8” diameter lagged pulley; manual take-up and adjustable snub roller. Side-mounted power unit. Field assembled to an Intermediate Section.
End Drives:	Series 600 - 473 lbs. EBP, 6-5/16” diameter pulley, 2-1/2” diameter take-up pulley Series 800 - 688 lbs. EBP, 8-5/16” diameter wpulley, 2-1/2” diameter take-up pulley All drives have grease packed pillow block bearings.
Power Units:	Motors - 1/2 through 7-1/2 HP C-Face (Baldor and Reliance) Standard and premimum efficiency motors. Reducers - C-Face (Grove and Reliance) Belt Speeds - 30 - 500 fpm Drive to Pulley - Chain or timing belt drive (depending on speed).
Accessories:	Flor supports and ceiling hangers Fixed and adjustable side guides Case deflectors Case stops Cold-room applications
Finish:	Powder-coated - Satin Gray

SECTION B:APPLICATION GUIDELINES

Introduction

The E-Z Set Live Roller Conveyor is a flat-belt-driven live roller conveyor. It provides controlled continuous-flow movement and is well suited for the following applications:

- Using flow-control devices such as carton stops or transfer devices that operate between the rollers
- Merging conveyed items from auxiliary lines onto a main line or transferring items from the main line onto auxiliary lines.
- Accumulating products in areas with varying input and output rates.
- High-speed transportation at speeds up to 500 fpm.

The remaining information in this section is intended to assist individuals involved in the application of the E-Z Set Live Roller Conveyor in material handling systems.

Conveyor Components

The E-Z Set Live Roller Conveyor consists of the following components. See Figure B - 1.

- End or Intermediate Drives
- Intermediate Sections
- End Idler Sections

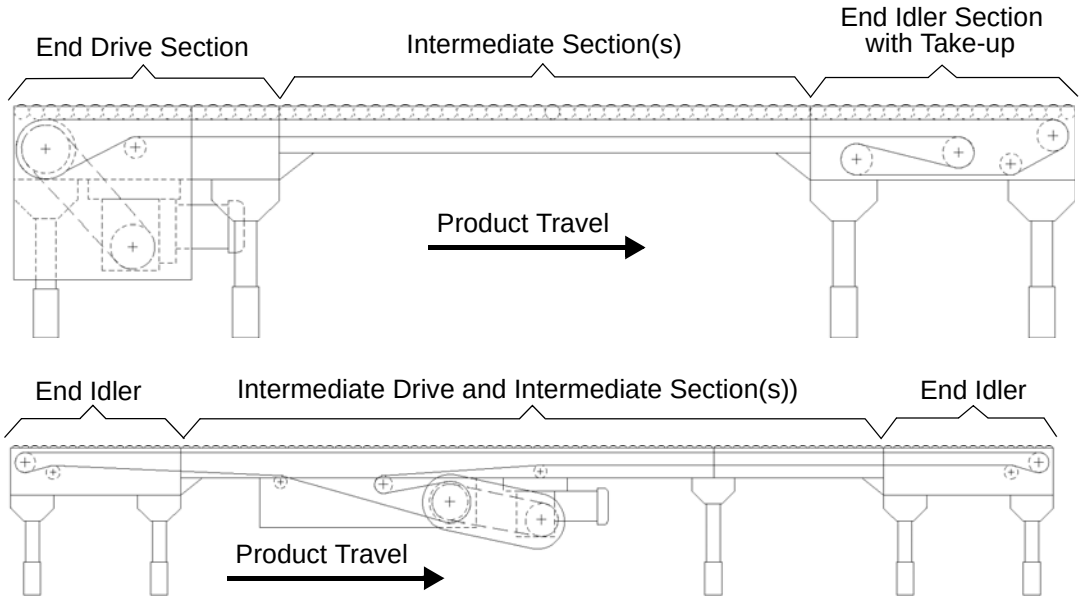


Figure B - 1 E-Z Set Live Roller Conveyor Sections

Drives

The E-Z Set Live Roller Conveyor is available with either an Intermediate or End Drive.

For one-way operation (product flows only in one direction), the drive unit should be located as close to the infeed end as possible.

For two-way operation (product flow is reversible), if the loads are equal in both directions, the drive unit should be located in the middle of the conveyor. If the loads are not equal in both directions, the drive unit should be located proportionately closer to the infeed end for the heavier loads.

Power Units

The Power Units for all drives have C-Face motors (Baldor or Reliance) and C-Face reduces (Grove or Reliance).

Series 600 and 800 - Power Units are under-hung mounted. Optional side-mounting is available.

Series SA2000 - Power Units are under-hung.

Series SA2001 - Power Units are side-mounted.

End Idlers

Style 01P conveyors, with (infeed) End Drives, require one End Idler located at the downstream discharge end. Style 02 conveyors, with Intermediate Drives, require two End Idlers (one at each end of the conveyor). End Idlers are available with an optional PTO for powering adjoining conveyors.

Take-Up Units

For Style 01P (End Drive) conveyors, a manual, screw adjusted take-up pulley is located within the conveyor's End Idler. For Style 02 (Intermediate Drive) conveyors, the take-up is built into the drive. Auxiliary take-ups are available for additional take-up capability.

Conveyable Items

The E-Z Set Live Roller Conveyor handles any self-contained item that has a firm flat-bottom surface. This includes crates, cartons, drums, cases, assemblies, tote pans, and pallets. Items with cleated bottoms may be conveyed provided the cleats are not placed parallel to the rollers.

The speed of the conveyor makes it necessary to determine that the items being conveyed are stable and capable of negotiating the various types of transfers that may be incorporated within a conveyor system.

Conveyed items must also be able to withstand impact from traffic controllers used at merge points, from sweep-off type deflectors used to divert items onto auxiliary lines, and when a package stop controls the flow at selected points along the conveyor.

Item Length

Minimum - The general rule is that there should be at least three carrier rollers under an item at all times. Therefore, the minimum item length dimension is equal to three times the roller center dimension. With the availability of standard 2”, 3”, 4”, and 6” roller centers, the minimum length items that should be conveyed are 6”, 9”, 12”, and 18”, respectively.

Maximum - The only consideration regarding maximum length is the ability of an item to be physically handled or its ability to negotiate the various possible transfers.

Item Weight

Minimum - There is no minimum weight limitation. The item must have sufficient structure and inherent strength to be conveyed properly on a powered roller conveyor.

Maximum - 100 lbs./ft. live load. Both the rollers and the frame have capacities that exceed the rating of the conveyor.

Mixed - For transportation-only applications, the weights of the conveyed items may vary between the minimum and maximum. For low-pressure applications, items should be relatively the same in weight, size, and shape.

Conveyor Length

The maximum allowable length of an E-Z Set Live Roller Conveyor is governed by the requirements of the application for which it is being considered. The conveyor length is limited by the variable factor of live load, the constant factor of drive unit pull capacity, and the horsepower and torque ratings of the power unit. If the Effective Belt Pull exceeds any of these three factors, the conveyor line will need to be divided into two or more shorter lengths in order to satisfy all application requirements completely.

Individual Pressure Roller Adjustment

The E-Z Set Live Roller Conveyor uses individually adjustable pressure rollers that allow the amount of driving force applied to the carrying rollers to increase or decrease as required at any point along the conveyor. The individual adjustment feature permits the pressure setting to be adjusted far more easily and quickly than with other designs.

This design employs a 32-notch cam on each end of the pressure roller axle. Each cam rests upon a retaining clip that restricts downward movement of the roller. As the axle of the pressure roller is turned the cams rotate causing the roller to raise or lower, depending on the rotation of the axle.

The setting of the pressure roller is easily adjusted using an ordinary hand wrench. Large numerals (0 through 7) are molded in the cam plates and are visible to provide a quick and easy check of the pressure settings.

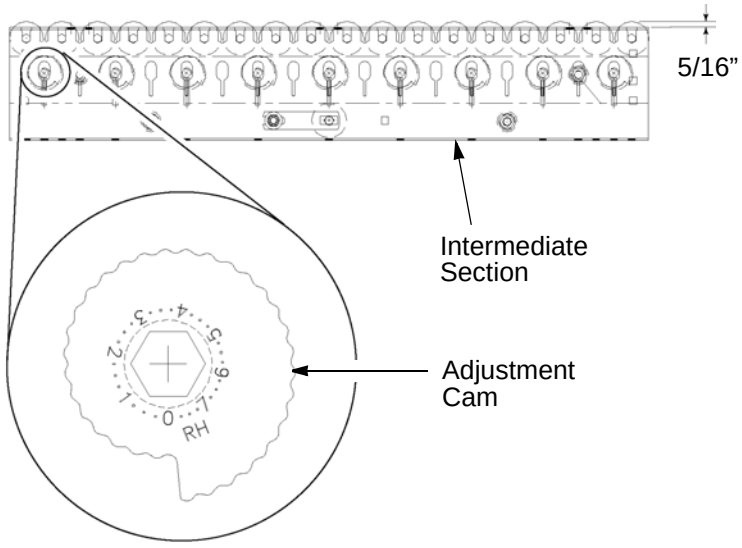


Figure B - 2 Individual Pressure Roller Adjustment

Carrier Roller Mounting

The E-Z Set Live Roller Conveyor has pop-out and/or fixed carrier roller mounting. With the fixed mounting, the 7/16” hex axles are secured in hex shaped clearance holes. The rollers extend approximately 5/16” above the frame rail. For pop-out mounting, the axles are positioned in vertical slots which extend upward through the top flange. Should an object be introduced between the rollers and belt, the open slots allow the roller axles to rise up and out of the slots.

Intermediate Sections have either fixed or pop-out carrier rollers. When the conveyor is installed overhead, use fixed roller mounting.

End Drive and End Idler sections (3’-0” long) have fixed carrier rollers ONLY.

Carrier Roller Centers

As explained under the heading, “Item Length,” there should be at least three carrier rollers under an item at all times. Therefore, roller centers should be no greater than 1/3 the length of the shortest item conveyed.

If the items being handled are long enough to allow the use of larger roller centers, determine whether the bottom surface is sufficiently strong to span the distance between the rollers and not droop. It may be necessary to use smaller carrier roller centers.

Intermediate Sections have carrier roller centers of 2”, 3”, 4”, and 6”.

End Drive and End Idler sections (3’-0” long) have carrier rollers at 2” centers ONLY.

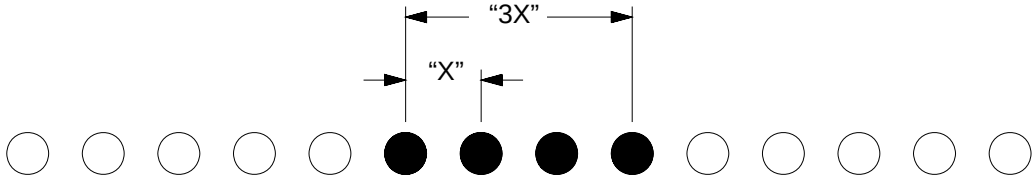


Figure B - 3 Carrier Roller Centers

Pressure Roller Centers

Intermediate Sections are available with optional pressure roller centers of either two times (2X) or three times (3X) the center dimension of the carrier rollers. End Drive and End Idler sections (3’-0” long) have pressure rollers at 4” centers ONLY.

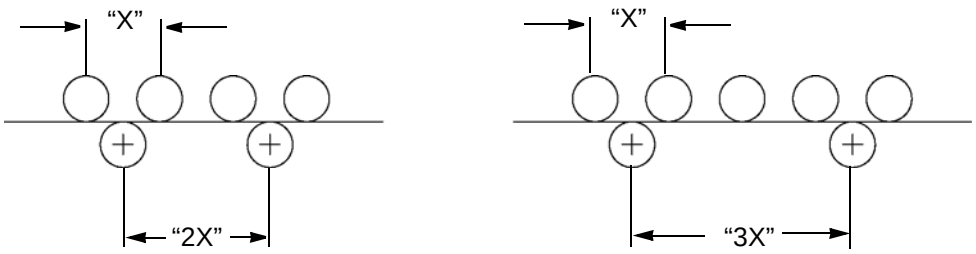


Figure B - 4 Pressure Roller Centers

Merge and Divert Operations

By adjusting the setting of the pressure rollers at points along the conveyor where the conveyed items are transferred to or from the main line, the amount of drive that is transmitted to the carrying rollers can be increased. Additional drive may be necessary to overcome the frictional drag of the items sliding across the carrying rollers and against either the sweep-type deflectors or turning posts. For merge and divert locations, use pressure roller centers twice that of carrier rollers. For example, if carrier rollers are installed at 3” centers, install pressure rollers at 6” centers.

Accumulation (Low Pressure) Operation

By lowering the setting of the pressure rollers, the amount of drive transmitted to the carrying rollers may be reduced at points along the conveyor where items are temporarily held in live storage, momentarily stopped at control points, or submitted to some type of in-process operation. The amount of drive may either be eliminated completely or adjusted to provide minimal line pressures.

Environmental Conditions

The E-Z Set Live Roller Conveyor is designed to operate within normal plant and warehouse temperature and atmospheric conditions.

Cold Room (+20°F to +40°F Dairy-Deli) and High Humidity Conditions

When ordering through CSPS, select the “COR” option in “Accessories,” which provides zinc-plated roller axles and pulley shafts.

Ovens or High Temperature Conditions

Based on the limitations stated by the component manufacturers, E-Z Set Live Roller Conveyor should not be applied in areas where the ambient temperature exceeds 150°F.

Oily Conditions

Because roller drive is based on frictional contact with the belt, applications within an oily environment are not recommended.

SECTION C:STANDARD SPECIFICATIONS

Style 01P - E-Z Set Live Roller Conveyor

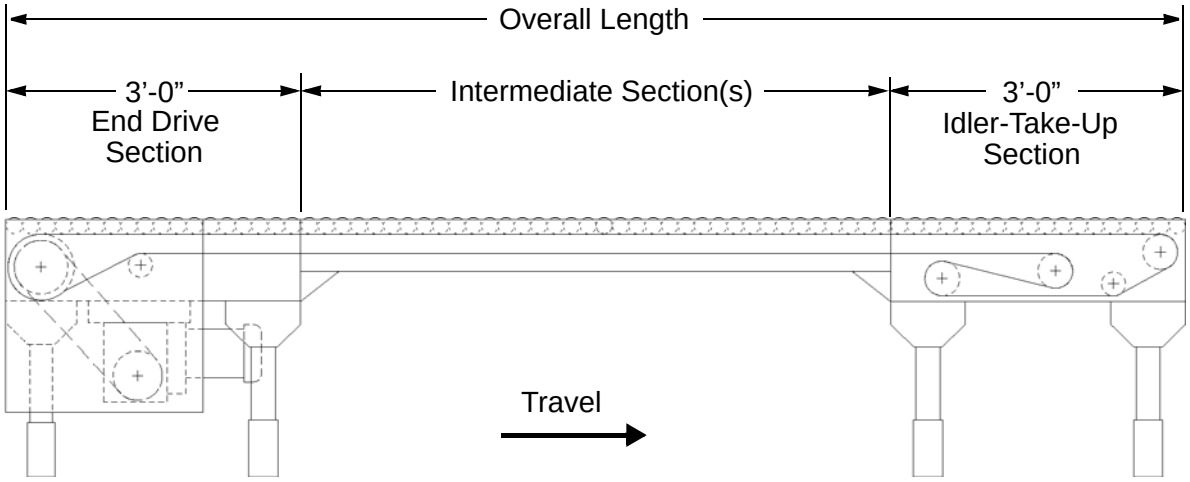


Figure C - 1 Style 01P - E-Z Set Live Roller Conveyor

Standard Features

Widths "W" (BF)

"W" (BF) = 16", 22", 28", 34", and 40".

Speeds

30, 60, 75, 90, 120, 150, 180, 200, 250, 300, 350, and 400 fpm (nominal).

Effective Belt Pull Capacities

Series 600 - 473 lbs.

Series 800 - 688 lbs.

End Drive Section

3' long × 10" deep located at the infeed end of the conveyor.

Carrier rollers (fixed) set high (5/16" above top of frame) on 2" centers, pressure rollers on 4" centers. All rollers powered and all components are guarded.

Extended drive shaft may be located on either side of unit. Available with double drive shaft extension for powering the rearward (upstream) conveyor via PTO.

Power Units

1/2 to 7-1/2 HP, totally enclosed, fan-cooled.

C-Face motor/reducer with chain drive to extended drive shaft.

Under-hung or side-mounted.

Idler - Take-Up Section

3’ long × 10” deep located at conveyor discharge end.

Carrier rollers (fixed) set high (5/16” above top of frame) on 2” centers, pressure rollers on 4” centers. All rollers powered and all components are guarded.

Manual, screw adjusted take-up.

Available with extended (PTO) drive shaft (on either side) for powering forward (downstream) conveyor.

Intermediate Sections

6-3/8” deep channel rails with bolted cross-members.

Carrier rollers (fixed or pop-out) on 2”, 3”, 4”, or 6” centers, pressure rollers on 2X or 3X carrier roller centers. Belt return rollers on nominal 6’ centers.

Carrier, Pressure, and Belt Return Rollers

Standard - G196GH rollers, six 2-groove rollers at each end driven via O-rings.

Optional - G196GHCR (cold room) and G196A1 (ABEC).

Belts

Standard - PVC90 FBS - 8” or 10” wide, woven, friction surface both sides. Recommended for general transportation and accumulation applications.

Belt width is dependent upon the drive series:

Series 600 = 8”

Series 800 = 10”

Optional - PVC90 CBS - 8” or 10” wide, woven, covered surface both sides. Recommended for high speed transportation applications (180 fpm and above) and where noise level is a concern.

Optional - PVC120 FBS - 8” or 10” wide, TrackMate-529, nonwoven, friction surface both sides. Recommended for high-speed accumulation applications (180 fpm and above).

Finish

Powder coated with epoxy polyester resins, oven baked. Standard color is medium gray.

Style 02 - E-Z Set Live Roller Conveyor

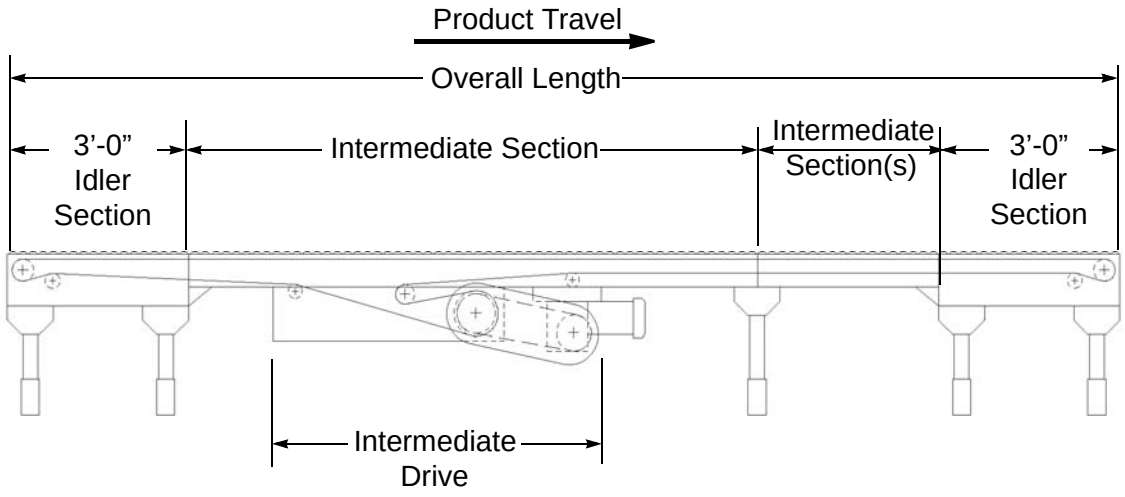


Figure C - 2 Style 02 E-Z Set Live Roller Conveyor

Standard Features

Widths "W" (BF)

"W" (BF) = 16", 22", 28", 34", and 40".

Speeds

Series 600 and 800 End Drives - 30, 60, 75, 90, 120, 150, 180, 200, 250, 300, 350, and 400 fpm (nominal).

SA2000 and SA2001 Chain Drive -30, 45, 60, 75, 90, 105, 120, 135, 150, 165, and 180 fpm.

SA2000 and SA2001 Timing Belt Drive - 30, 45, 60, 75, 90, 105, 120, 135, 150, 165, 180, 200, 225, 250, 275, 300, 325, 350, 375, 400, 425, 450, 475 and 500 fpm

Effective Belt Pull Capacities

Series 600 - 340 lbs.

Series 800 - 525 lbs.

SA2000 - 900 lbs.

SA2001 - 800 lbs.

Intermediate Drive

SA2000 - 5" deep × 48" long × 10 ga.

SA2001 - 7-1/2" deep × 48" long × 10 ga.

Bolted to 9' or 12' Intermediate Section.

Manual screw-adjusted take-up.

All components guarded.

Extended drive shaft may be located on either side of unit.

Power Units

C-Face motors (Baldor or Reliance) and C-Face reduces (Grove or Reliance).

Series SA2000 - Under-hung.

Series SA2001 - Side-mounted.

Chain or timing belt drive for speeds up to 180 fpm.

Timing belt drive for speeds above 180 fpm.

Idler Section

3’ long × 10” deep.

Carrier rollers (fixed) set high (5/16” above top of frame) on 2” centers, pressure rollers on 4” centers. All rollers powered and all components are guarded.

Available with extended (PTO) drive shaft (on either side) for powering forward (downstream) conveyor.

Intermediate Sections

6-3/8” deep channel rails with bolted cross-members.

Carrier rollers (fixed or pop-out) on 2”, 3”, 4”, or 6” centers, pressure rollers on 2X or 3X carrier roller centers. Belt return rollers on nominal 6’ centers.

Carrier, Pressure, and Belt Return Rollers

Standard - G196GH rollers, six 2-groove rollers at each end driven via O-rings.

Optional - G196GHCR (cold room) and G196A1 (ABEC).

Belts

Standard - PVC90 FBS - 8”, 10” or 12” wide, woven, friction surface both sides. Recommended for general transportation and accumulation applications.

Belt width is dependent upon the drive series.

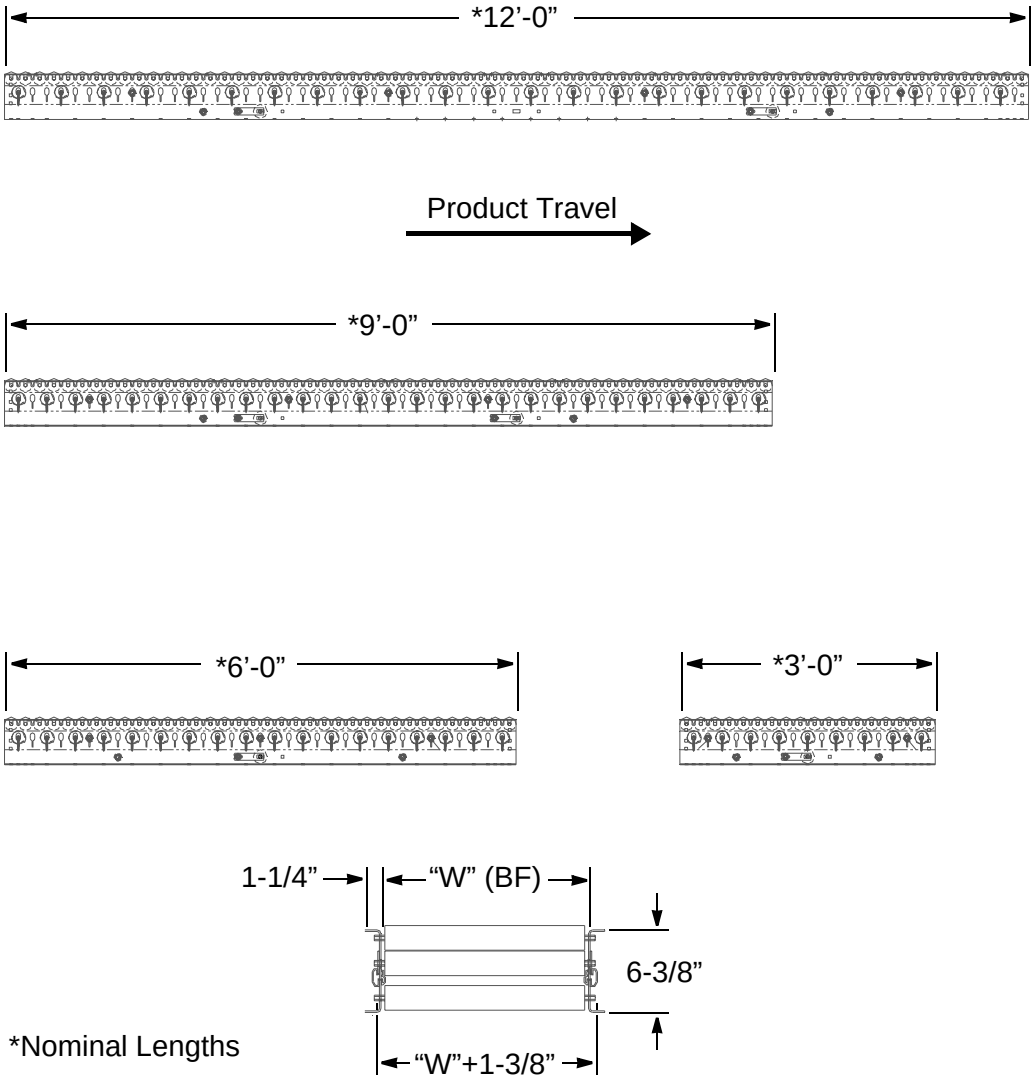
Optional - PVC90 CBS - 8”, 10” or 12” wide, woven, covered surface both sides. Recommended for high speed transportation applications (180 fpm and above) and where noise level is a concern.

Optional - PVC120 FBS - 8”, 10” or 12” wide, TrackMate-529, nonwoven, friction surface both sides. Recommended for high-speed accumulation applications (180 fpm and above).

Finish

Powder coated with epoxy polyester resins, oven baked. Standard color is Satin Gray.

Intermediate Sections



*Nominal Lengths

(Shown with Carriers Rollers, shipped without)

Figure C - 3 Intermediate Sections

Frame Rails

6-3/8” deep × 1-1/4” flange × 10 ga. formed symmetrical channel rails punched for fixed or pop-out rollers. See Table C 1 for carrier roller center hole punch increments.

Note: Intermediate sections shipped without carrier rollers.

Note: Intermediate sections with 2”, 4”, and 6” roller centers use identical rails punched to accommodate all three roller centers.

Table C 1: Intermediate Section Frame Rail Punching

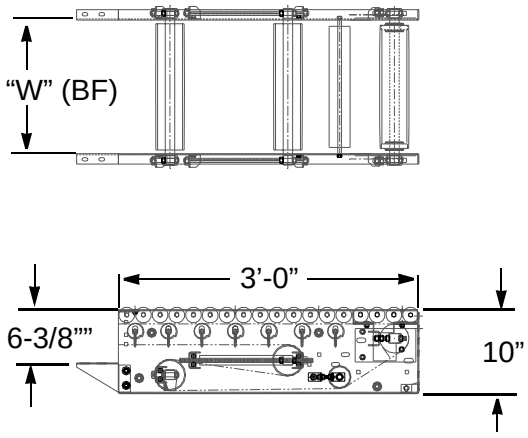
Carrier Roller Center	Axle Hole Punching Increments	
	Carrier Roller	Pressure Roller
2”	1”	2”
3”	3”	3”
4”	1”	2”
6”	1”	2”

Lengths

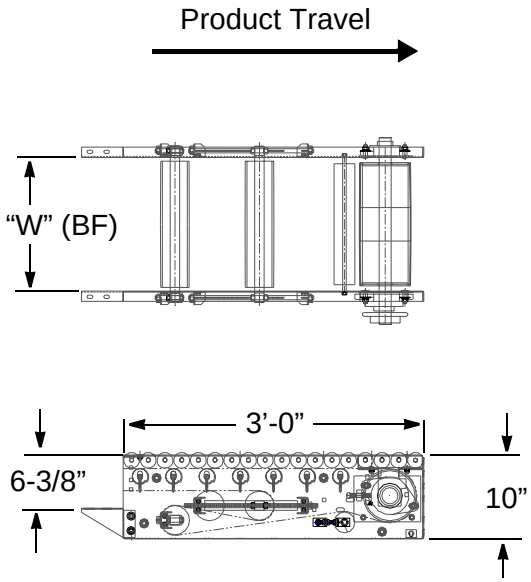
3’-0”, 6’-0”, 9’-0”, and 12’-0”. All lengths are nominal, actual lengths are nominal minus 1/8”.

1” incremental lengths available from 3’-1” to 5’-11” nominal length. 1” incremental lengths are available with 2X pressure roller centers only.

End Idler Section with Take-Up



Series 600 and 800 (3.5") Idler-Take-Up



Series 600 and 800 (6") Idler PTO-Take-Up

Figure C - 4 End Idler Sections with Take-up

Frame

10" deep × 1-1/4" flange × 10 ga. formed side plates with formed end coupling flange.

Four removable carrier roller mounting brackets for idler pulley removal.

Bolted cross-members.

Mounting gussets for attaching to adjoining intermediate section.

Length

3'-0" (actual).

Idler Pulley

3-1/2” diameter center-crowned with 1-1/8” non-rotating square shaft. Precision, removable, grease-packed sealed ball bearings. Manual adjustment for squaring.

With PTO

6-5/16” diameter center-lagged crown (spiral-wrapped lagging) with welded 1-15/16” diameter turned, ground and polished CRS shaft; (single shaft extension either side) turned down to 1-7/16” diameter. External, flange-mounted precision ball bearings (grease-packed/ relubricatable). Manual take-up adjustment for squaring. Includes RC50-17 tooth sprocket with taper lock hub and hardened teeth.

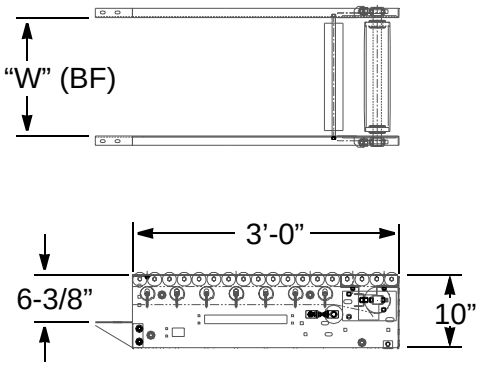
Take-Up Pulley

3-1/2” diameter flat-faced with 1-1/8” non-rotating square shaft. Precision, removable, grease-packed sealed ball bearings. Manual adjustment: 3.5” diameter idler pulley = 10” movement, 6” diameter idler pulley/PTO = 6” movement.

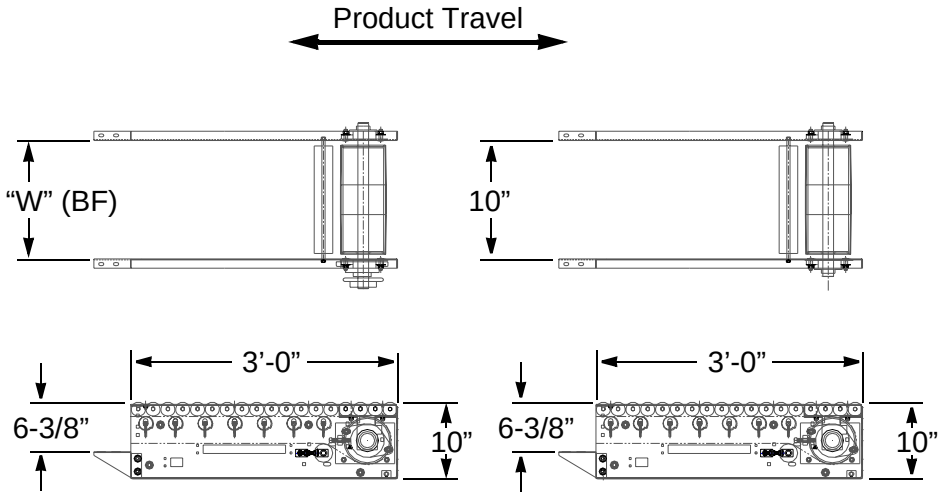
Snub Roller

G251AB - 2-1/2” diameter galvanized with retained 11/16” hex CRS shaft and ASQ6503 precision (ABEC) ball bearings.

End Idler Section



Series 600 and 800 (3.5") Idler



Series 600 and 800 (6") Idler and PTO

Figure C - 5 End Idler Sections

Frame

10" deep × 1-1/4" flange × 10 ga. formed side plates with formed end coupling flange.

Four removable carrier roller mounting brackets for idler pulley removal.

Bolted cross-members.

Mounting gussets for attaching to adjoining Intermediate Section.

Lengths

3'-0" (actual).

Idler Pulley

3-1/2” diameter center-crowned with 1-1/8” non-rotating square shaft. Precision, removable, grease-packed sealed ball bearings. Manual adjustment for squaring.

Series 600, 800, and 1000 with PTO

6-5/16” diameter center-lagged crown (spiral-wrapped lagging) with welded 1-15/16” diameter turned, ground and polished CRS shaft; (single shaft extension either side) turned down to 1-7/16” diameter. External, flange-mounted precision ball bearings (grease-packed/ relubricatable). Manual take-up adjustment for squaring. Includes RC50-17 tooth sprocket with taper lock hub and hardened teeth.

Snub Roller

G251AB - 2-1/2” diameter galvanized with retained 11/16” hex CRS shaft and ASQ6503 precision (ABEC) ball bearings.

Intermediate Drives

Intermediate Drives are available in two types; SA2000, and SA2001 Low Profile.

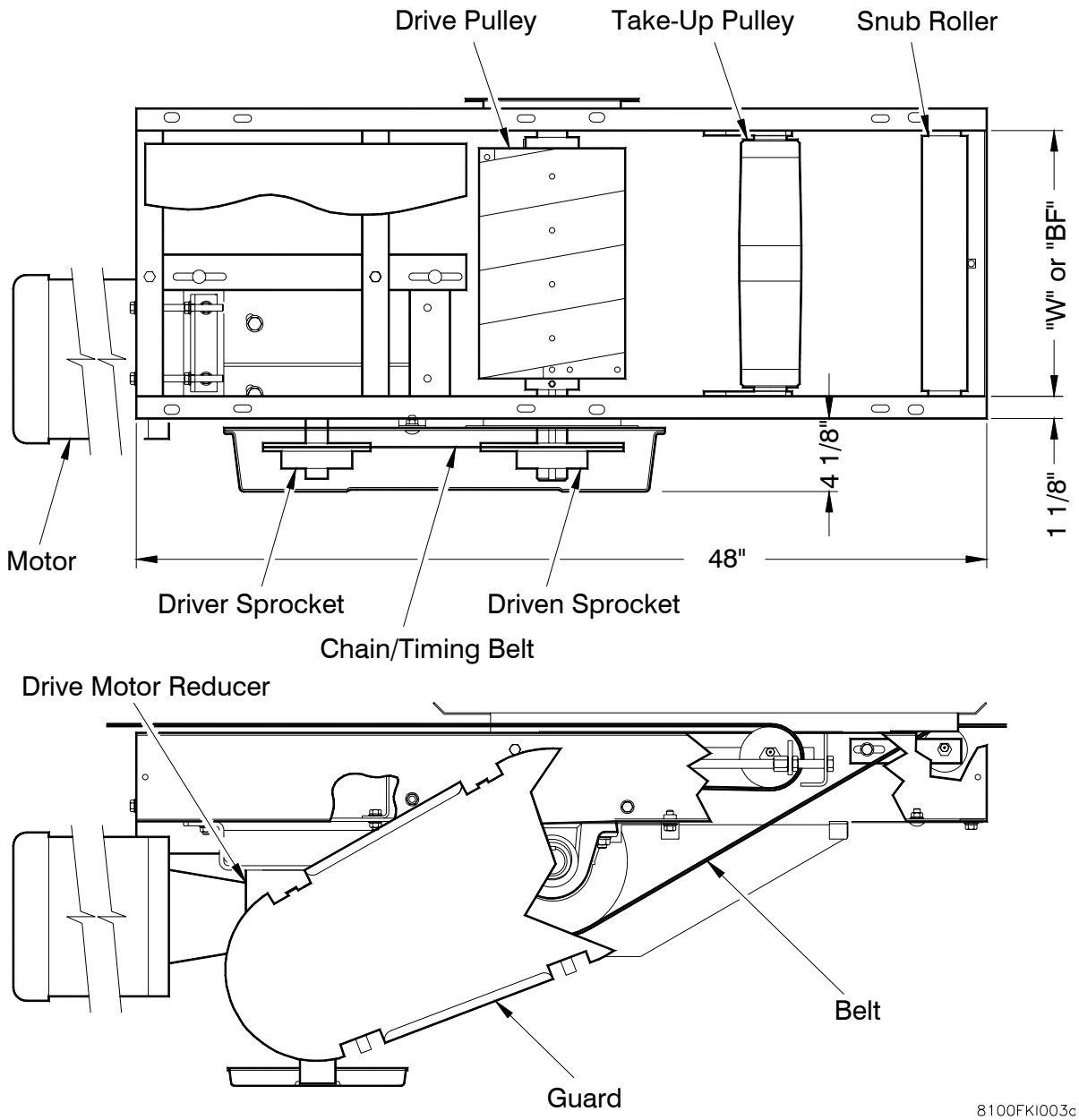


Figure C - 6 SA2000 Intermediate Drive

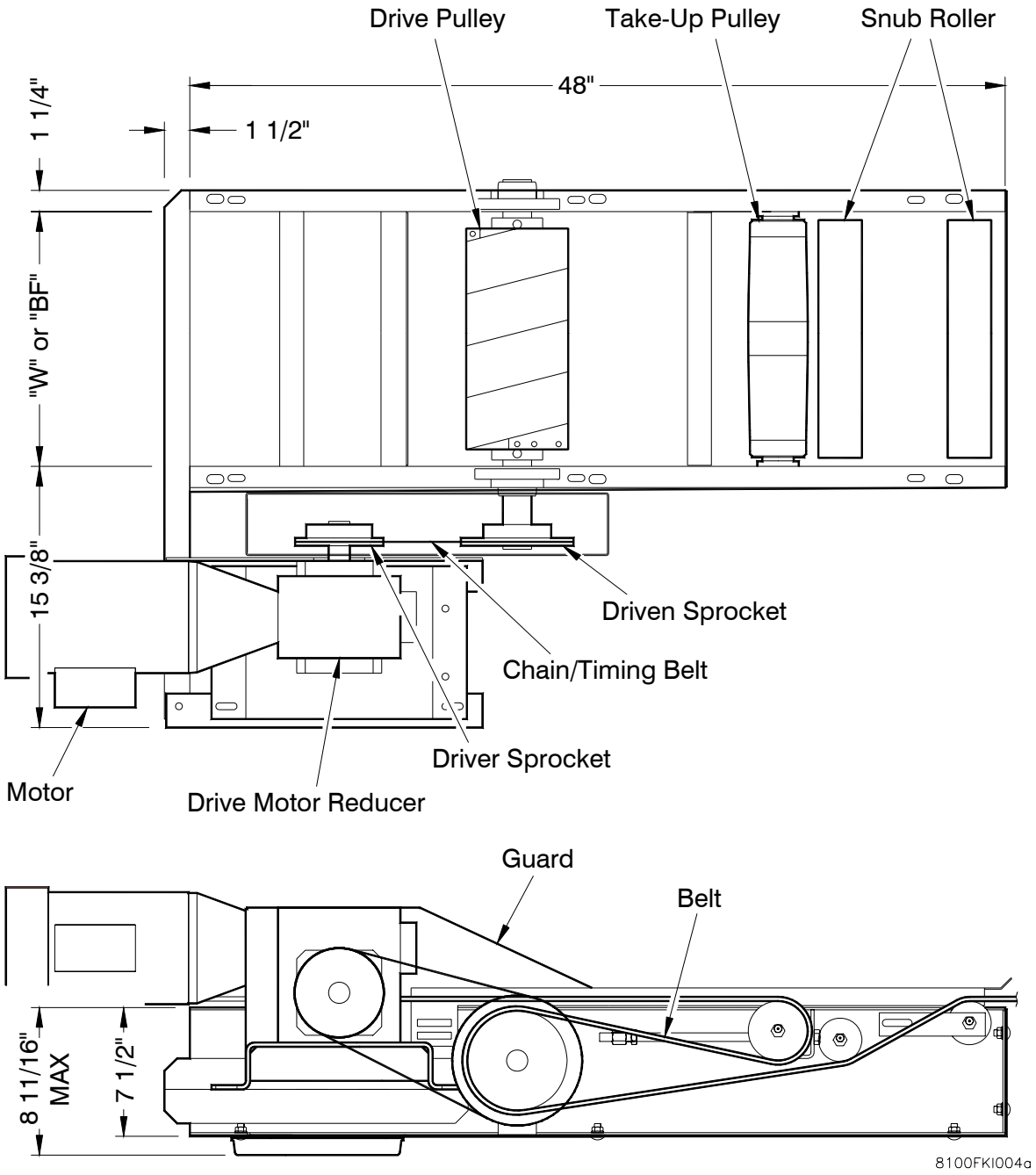


Figure C - 7 SA2001 Intermediate Drive - Low Profile

Frame

SA2000 - 5" deep × 48" long × 10 ga. Formed steel side rails with welded cross members and integral motor mounting.

SA2001 - 7-1/2" deep × 48" long × 10 ga. Formed steel side rails with welded cross members and integral motor mounting.

Drive Pulley and Shaft

SA2000 - 8-1/4” diameter straight faced lagged pulley with 1-11/16” diameter shaft and pre-lubricated pillow block bearings.

SA2001 - 5-7/8” diameter straight faced lagged pulley with 1-11/16” diameter shaft and flange bearings.

Bearings

All bearings are grease packed.

Snub Roller

2-9/16” diameter rollers with 11/16” diameter hex axle and B1150 bearings.

Take-Up Roller and Shaft

3-1/2 diameter crowned roller with 10” adjustment (20” belt), 1-1/16 hex axle and B11160 bearings.

Capacity

SA2000 - 900 lbs. effective belt pull.

SA2001 - 800 lbs. effective belt pull.

Mounting

Intermediate Drives must be bolted to the bottom flanges of an Intermediate Section.

Safety Guarding

Sprockets, chain (or timing belt), and return belt are totally enclosed for safety. Drive and Take-Up pulleys are guarded below.

Width “W” (BF)

16", 22", 28", 34" and 40".

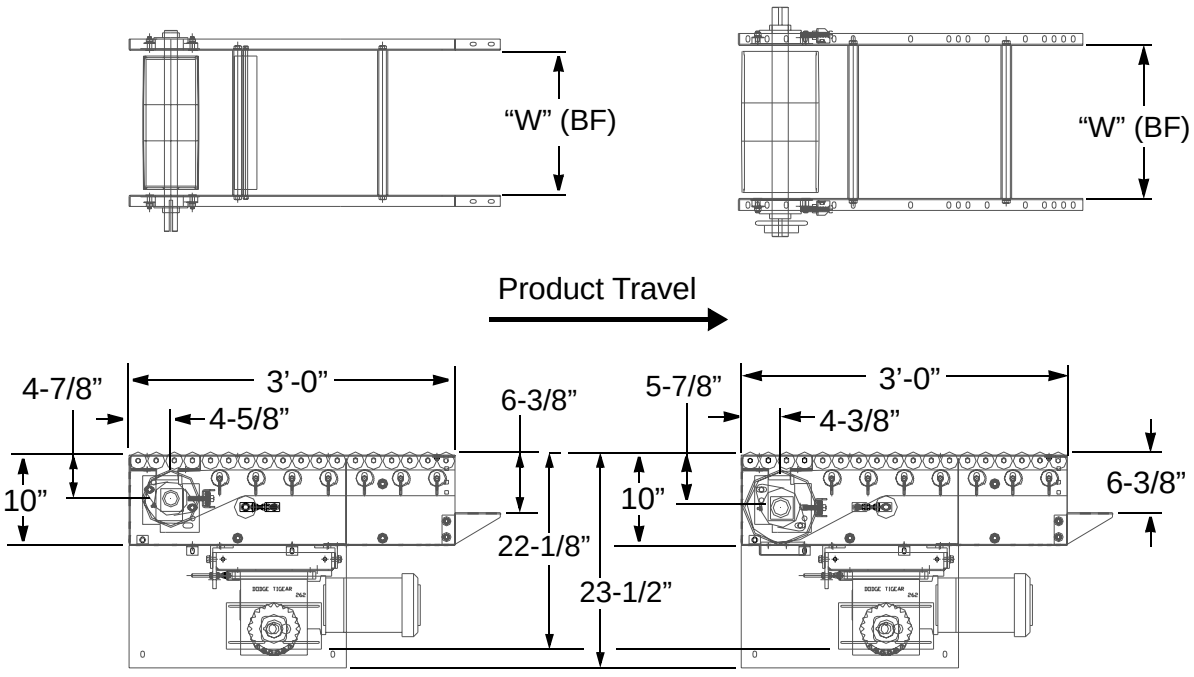
Belt Width

8", 10", and 12".

General Information

An Intermediate Drive designation (RH or LH) refers to the side of the conveyor on which the power unit is located as seen when looking in the direction of travel.

End Drive Sections



End Drive Section RH
(Series 600 Shown)

End Drive Section LH PTO RH
(Series 800 with PTO Shown)

Figure C - 8 End Drive Sections

Frame

10" deep × 1-1/4" flange × 10 ga. formed side plates with formed end coupling flange.

Removable mounting brackets for end drive pulley removal.

Bolted cross-members.

Mounting gussets for attaching to adjoining Intermediate Section.

Lengths

"L" = 3'-0" (actual).

Drive Pulley and Shaft

Center-lagged crown with spiral-wrapped lagging and welded to a drive shaft (turned, ground and polished); single or double shaft extension; flange-mounted precision ball bearings (relubricatable).

Series 600 Driven Sprocket for PTO

RC50-17 sprocket with hardened teeth for 1-7/16” diameter shaft.

Series 800 Driven Sprocket for PTO

RC50-22 sprocket with hardened teeth for 1-11/16” diameter shaft.

Pulley and Shaft Diameters:

Series 600 - Pulley 6-5/16”, Shaft 1-7/16”

Series 800 - Pulley 8-5/16”, Shaft 1-11/16”

Snub Rollers

G251AB - 2-1/2” diameter galvanized with retained 11/16” hex CRS shaft and ASQ6503 precision (ABEC) grease-packed and sealed ball bearings.

Auxiliary Take-Up Sections

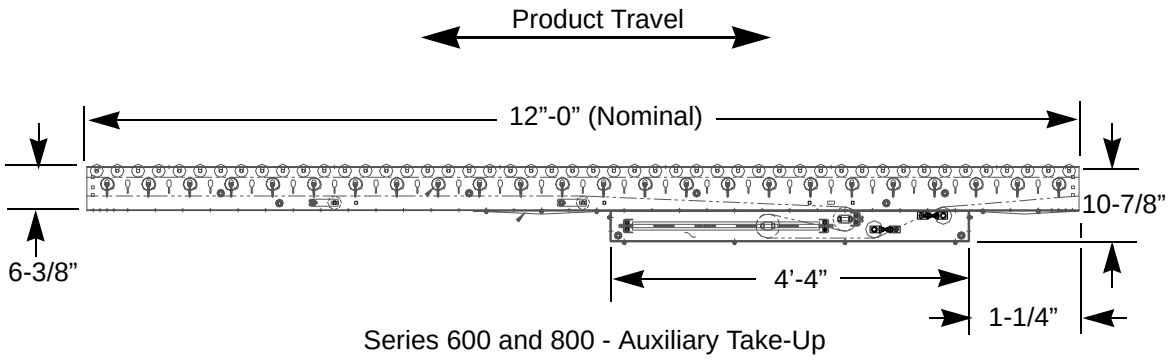


Figure C - 9 Auxiliary Take-Up Section

Lengths (Intermediate Section)

12’-0” (nominal); 11’-11-7/8” (actual).

Auxiliary Take-Up Frame

4’-4” long × 4-1/2” deep × 10 ga. enclosure. Mounted to bottom flanges of Intermediate Section.

Idler Pulley and Shaft

3-1/2” diameter flat-faced with 1-1/8” non-rotating square shaft. Internal grease-packed precision (ABEC) ball bearings.

Take-Up Pulley and Shaft

3-1/2” diameter crown-faced with 1-1/8” non-rotating square shaft. Internal grease-packed precision (ABEC) ball bearings. Manual adjustment (24” movement).

Snub Rollers

Two G251AB - 2-1/2” diameter galvanized with retained 11/16” hex CRS shaft and ASQ6503 precision (ABEC) grease-packed and sealed ball bearings.

SECTION D:ENGINEERING DATA

Use the calculations in this Section to size and select the drive components required for a belt driven live roller conveyor application.

Live Load Calculation

Live load is the weight of the material to be conveyed. It is calculated from the average item weight, the average item length, and the item rate.

- The average item weight is the total weight of a sampling of items to be conveyed divided by the number of items in the sample.
- The average item length is total length of a sampling of items divided by the total number of items in the sample.
- The item rate is the quantity of items that must be conveyed during a specified time.

Transportation Live Load

Find the transportation live load by establishing a minimum belt speed from the item rate and the average item length.

Minimum Belt Speed Calculation

$$CFPM = \frac{L_{i,A} \times CPM}{12\ (in./ft.)}$$

where:

CFPM = Case-Feet/Minute (items-ft./min.)

CPM = Rate (items/min.)

$L_{i,A}$ = Average Length of Items Being Conveyed

CFPM is the minimum belt speed that the conveyor can run with the items head-to-head. For transportation, the speed will need to be increased to create gaps between the items. The average gap length will depend on the application. Calculate the required belt speed as follows:

Required Belt Speed Calculation

$$V = \frac{[L_{i,A} + G_{i,A}] \times CPM}{12\ (in./ft.)}$$

where:

$G_{i,A}$ = Average Gap between Items being Conveyed (in.); and

V = Belt Speed (ft./min.)

Typically, the belt speed is rounded up to the next higher standard speed. Now calculate the transportation live load with the following equation:

Transportation Live Load Calculation

$$W_{m,T} = \frac{W_{i,A} \times CPM}{V}$$

where:

$W_{i,A}$ = Average Item Weight (lbs.)

$W_{m,T}$ = Transportation Live Load (lbs./ft.)

Example: Cartons of an average weight of 25 lbs. and an average length of 18" are being transported at a rate of 40 cpm. How fast does the conveyor have to run? What is the live load? If a 6" gap between items is suitable, the speed can be found by the equation above:

$$V = \frac{[L_{i,A} + G_{i,A}] \times CPM}{12\ (in./ft.)} = \frac{[18\ (in.) + 6\ (in)] \times 40\ (items/min.)}{12\ (in./ft.)} = 80\ (ft./min.)$$

$V \Rightarrow 90\ (ft./min.)$

$$W_{m,T} = \frac{W_{i,A} \times CPM}{V} = \frac{25\ (lbs.) \times 40\ (items/min.)}{90\ (ft./min.)} = 11.111\ (lbs./ft.)$$

$W_{m,T} \Rightarrow 15\ (lbs./ft.)$

Note: The conveyor speed is rounded up to the nearest standard speed, and that the live load up to the nearest 5 pound multiple.

Establishing a live load is often a matter of judgment and experience as well as the application specifications. In a particular application, if the average item weigh is 25 lbs., but the maximum item weight is 55 lbs., recalculate the live load using the maximum item weight to get a new value. Note that the higher the live load, the higher the horsepower required for the drive. Being too conservative in establishing live loads will add extra cost to the equipment.

Example: The maximum item weight in the example application above is 55 lbs. Re-calculate and find a more suitable live load:

Transportation Live Load Re-Calculation

$$W_{m,T} = \frac{W_{i,A} \times CPM}{V} = \frac{55\ (lbs.) \times 40\ (items/min.)}{90\ (ft./min.)} = 24.444\ (lbs./ft.)$$

$W_{m,T} \Rightarrow 20\ (lbs./ft.)$ (Increased from 15 (lbs./ft.) in the previous example.)

Accumulation Live Load

Accumulated items in a blocked section will have a greater live load than the same items in transportation because they are no longer spaced apart by gaps. The live load of a blocked section can be calculated from the transportation live load with the following ratio:

Blocked Section Live Load Calculation

$$W_{m,B} = W_{m,T} \times \left[\frac{L_{i,A} + G_{i,A}}{L_{i,A}} \right]$$

where:

$W_{m,B}$ = Blocked Section Live Load (lbs./ft.)

A belt driven live roller conveyor will try to discharge a slug of accumulated product upon release of the blocked section because the carrier rollers are constantly driven. The discharge rate of a blocked section can be compared to the transportation rate by the equation:

Blocked Section Discharge Rate Calculation

$$CPM_{Slug\ Discharge} = CPM_{Infeed} \times \left[\frac{L_{i,A} + G_{i,a}}{L_{i,A}} \right]$$

Example: If the transportation live load is 15 lbs./ft., average carton length is 18”, and the average gap is 6”, what are the live load and discharge rate for the blocked section?

$$W_{m,B} = 15\ (\text{lbs./ft.}) \times \left[\frac{18\ (\text{in.}) + 6\ (\text{in.})}{18\ (\text{in.})} \right] = 20\ (\text{lbs./ft.})$$

$$CPM_{Slug\ Discharge} = 15\ (\text{lbs./ft.}) \times \left[\frac{18\ (\text{in.}) + 6\ (\text{in.})}{18\ (\text{in.})} \right] = 40\ (\text{items/min.})$$

Determine the Carrier Roller Centers

Conveyed product should be supported by a minimum of 3 carrier rollers spanning the entire product length. To determine the roller centers required, divide the shortest product length by three and round down to the nearest whole number.

Carrier Roller Centers Calculation

$$\text{Carrier Roller Centers (in.)} = \frac{\text{Minimum Carton Length (in.)}}{3}$$

Example: The minimum length of the product to be conveyed is 10”.

$$\text{Carrier Roller Centers} = \frac{10\ \text{(in.)}}{3} = 3.333\ \text{(in.)}$$

Carrier Roller Centers = 3 (in.) rounded down to the nearest whole number

Additional factors to consider when determining the carrier roller centers are the condition of the product bottom, and the weight of the material to be conveyed. Product with an easily deformed bottom surface should be supported with closer roller centers. The chart below provides guidelines for maximum recommended live loads for available standard roller centers.

Carrier Roller Centers	**2”**	**3”**	**4”**	**6”**
Maximum Live Load (lbs./ft.)	100	100	75	50

Determine the Effective Belt Pull for Transportation

The effective belt pull for transportation applications is a function of the conveyor length and the weight of the material being conveyed. A transportation application is defined by constantly moving product.

Using the Live Load Pull Factor - C_{LL}

Table D 1 lists effective belt pull factors for belt driven live roller conveyors. Use the application's conveyor width, W, carrier roller centers, and live load to find the live load pull factor, C_{LL}. Multiply this value by the overall conveyor length to find the effective belt pull. Use Table D 1 and the equation below for both 2X and 3X pressure roller centers.

Effective Belt Pull using Live Load Pull Factor Calculation

$$T_E = L_C \times C_{LL}$$

where:

C_{LL} = Live Load Pull Factor (lbs./ft.). See Table D 1.

T_E = Effective Belt Pull (lbs.)

L_C = Overall Conveyor Length (ft.)

Example: A belt driven live roller conveyor, 28" wide, with carrier rollers on 3" centers, and 55'-0" long transports a live load of 40 lbs/ft. In Table D 1, the pull factor for this application is found to be 3.6 lbs./ft. Calculate the effective belt pull as follows:

$$T_E = 55 \text{ (ft.)} \times 3.6 \text{ (lbs./ft.)} = 198 \text{ (lbs.)}$$

Table D 1: Live Load Pull Factor, C_{LL} (lbs./ft.)

Carrier Roller Centers	Live Load (lbs./ft.)	Conveyor Width - W				
		16"	22"	28"	34"	40"
2"	10	1.7	2.0	2.4	2.7	3.0
	20	2.3	2.6	3.0	3.3	3.6
	30	2.9	3.2	3.5	3.9	4.2
	40	3.5	3.8	4.1	4.5	4.8
	50	4.0	4.4	4.7	5.1	5.4
	60	4.6	5.0	5.3	5.6	6.0
	70	5.2	5.6	5.9	6.2	6.6
	80	5.8	6.1	6.5	6.8	7.2
	90	6.4	6.7	7.1	7.4	7.7
	100	7.0	7.3	7.7	8.0	8.3

Table D 1: Live Load Pull Factor, C_{LL} (lbs./ft.) (Continued)

Carrier Roller Centers	Live Load (lbs./ft.)	Conveyor Width - W				
		16”	22”	28”	34”	40”
3"	10	1.4	1.6	1.8	2.0	2.3
	20	1.9	2.2	2.4	2.6	2.9
	30	2.5	2.8	3.0	3.2	3.4
	40	3.1	3.3	3.6	3.8	4.0
	50	3.7	3.9	4.2	4.4	4.6
	60	4.3	4.5	4.8	5.0	5.2
	70	4.9	5.1	5.3	5.6	5.8
	80	5.5	5.7	5.9	6.2	6.4
	90	6.1	6.3	6.5	6.7	7.0
	100	6.6	6.9	7.1	7.3	7.6
4"	10	1.2	1.4	1.5	1.7	1.9
	20	1.8	2.0	2.1	2.3	2.5
	30	2.4	2.5	2.7	2.9	3.1
	40	3.0	3.1	3.3	3.5	3.6
	50	3.5	3.7	3.9	4.1	4.2
	60	4.1	4.3	4.5	4.6	4.8
	70	4.7	4.9	5.1	5.2	5.4
	80	5.3	5.5	5.7	5.8	6.0
	90	5.9	6.1	6.2	6.4	6.6
	100	6.5	6.7	6.8	7.0	7.2
6"	10	1.0	1.1	1.3	1.4	1.5
	20	1.6	1.7	1.8	2.0	2.1
	30	2.2	2.3	2.4	2.6	2.7
	40	2.8	2.9	3.0	3.1	3.3
	50	3.4	3.5	3.6	3.7	3.8
	60	4.0	4.1	4.2	4.3	4.4
	70	4.6	4.7	4.8	4.9	5.0
	80	5.1	5.3	5.4	5.5	5.6
	90	5.7	5.8	6.0	6.1	6.2
	100	6.3	6.4	6.6	6.7	6.8

Using the Component Pull Factor - C_F

An alternate and more flexible method of calculating effective belt pull for transportation applications uses the following abbreviated formula with a component pull factor:

Effective Belt Pull using Component Pull Factor Calculation

$$T_E = L_C \times [f_L \times W_{m,T} + C_F]$$

where:

C_F = Component Pull Factor (lbs./ft.). See Table D 2.

Table D 2: Component Pull Factor, C_F (lbs./ft.)

Conveyor Width (W)	Roller Centers			
	2”	3”	4”	6”
16	1.10	0.77	0.60	0.44
22	1.44	1.00	0.77	0.55
28	1.78	1.22	0.95	0.67
34	2.12	1.45	1.12	0.79
40	2.45	1.68	1.29	0.90

where:

f_L = Live Load Pull Factor, 0.06

$W_{m,T}$ = Transportation Live Load (lbs./ft.). See “Live Load Calculation” on page D - 1.

Example: A belt driven live roller conveyor is to have an overall length of 120’-0”, a conveyor width of 28”, and 4” carrier roller centers.

The entire 120”-0” will be used for transportation and have a live load of 20 lbs./ft. In Table D 2, for a 28” wide conveyor with rollers centered on 4”, C_F equals 0.95 lbs./ft. Using this value, calculate the effective pull as follows:

$$T_E = 120 \text{ (ft.)} \times [0.06 \times 20 \text{ (lbs./ft.)} + 0.95 \text{ (lbs./ft.)}] = 258 \text{ (lbs.)}$$

Merge and Divert Applications

If items are merged onto or are diverted off of the conveyor, this will have an effect on belt pull if the cartons are heavy enough or there are a several transition points. The system rates should indicate the maximum number of divert or merge points which may be active simultaneously. We can account for this additional belt pull by adding the term $f_p W_p N_d$ to the previous pull equation:

Effective Belt Pull with Merge/Divert Factors Calculation

$$T_E = L_C \times [f_L \times W_{m,T} + C_F] + [f_P \times W_P \times N_d]$$

where:

f_P = Divert or Merge Factor = 0.420 for cartons, 0.085 for plastic totes

N_d = Number of expected simultaneous merge or divert transitions

W_P = Weight of heaviest diverting or merging product (lbs.)

Example: A belt driven live roller conveyor is to have an overall length of 120’-0”, a conveyor width of 28”, and 4” carrier roller centers.

The entire 120’-0” will be used for transportation and have a live load of 20 lbs./ft. The conveyor has 12 merger spurs. Cartons weighing as much as 40 lbs. will merge onto the main line, but we expect at most only 6 cartons to merge at the same time. Finding C_F in Table D 2 equals 0.95 lbs./ft. and using 0.42 as the merge factor, calculate the effective pull as follows:

T_E =120 (ft.) × [0.06 × 20 (lbs./ft.) + 0.95 (lbs./ft.)] + [0.42 × 40 (lbs.) × 6 (merging cartons]

T_E = 359 (lbs.)

Determine the Effective Belt Pull for Accumulation

A belt driven live roller conveyor can be used for accumulation if the application will tolerate constantly driven pressure rollers.

Accumulating - Fully Blocked

The term “fully blocked” refers to applications in which items will be blocked along the entire length of the conveyor.

Using the Live Load Pull Factor - C_{LL}

Table D 1 can be used to estimate the belt pull for a fully blocked conveyor. Use Table D 1 and the following equation for both 2X and 3X pressure roller centers.

Effective Belt Pull using Live Load Pull Factor Calculation

$$T_E = L_C \times C_{LL}$$

Example: A belt driven live roller conveyor, 22” wide, with carrier rollers on 3” centers, and 50’-0” long transports a live load of 20 lbs./ft. In Table D 1, the pull factor for this application is found to be 2.2 lbs/ft. Calculate the effective pull as follows:

$$T_E = 1.67 \times 2.2 \text{ (lbs./ft.)} \times 50 \text{ (ft.)} = 184 \text{ (lbs.)}$$

Using the Component Pull Factor - C_F

The effective belt pull for a fully blocked conveyor can also be calculated using the component pull factor and the following equation:

Effective Belt Pull using Component Pull Factor Calculation

$$T_E = L_C \times [f_B \times W_{m,B} + C_F]$$

where:

f_B = Blocked Load Pull Factor, 0.13

Example: A belt driven live roller conveyor is to have an overall length of 50’-0”, a conveyor width of 22”, and carrier rollers on 3” centers.

Product is to be accumulated over the entire length and have a live load of 20 lbs./ft. As Table D 1 shows, for 3” carrier roller centers with a live load of 20 lbs./ft., a 22” wide conveyor would have a belt pull value of 2.1 lbs./ft.

Accumulating - Partially Blocked

If a portion of the conveyor is used for accumulation and the remaining conveyor for transportation, the effective belt pulls are calculated for each section and added together. Use the equation:

Effective Belt Pull for Accumulation and Transportation Calculation

$$T_E = L_B \times [f_B \times W_{m,B} + C_F] + L_T \times [f_T \times W_{m,T} + C_F]$$

where:

L_B = Length of Blocked Section (ft.)

$L_C = L_B + L_T$, Overall Length of Conveyor (ft.)

L_T = Length of Transportation Section (ft.)

$W_{m,B}$ = Blocked Section Live Load (lbs./ft.) See “Live Load Calculation” on page D - 1.

$W_{m,T}$ = Transportation Live Load (lbs./ft.) See “Live Load Calculation” on page D - 1.

Example: A belt driven live roller conveyor is to have an overall length of 120’-0”, a conveyor width of 28”, and 4” carrier roller centers.

The first 100’-0” will be used for transportation and have a live load of 20 lbs./ft. The remaining 20’-0” will be used to accumulate product and have a live load of 30 lbs/ft. Finding in Table D 2 equals 0.95 lbs/ft., calculate the effective pull as follows:

T_E =20 (ft.) × [0.13 × 30 (lbs./ft.) + 0.95 (lbs./ft.)] + 100 (ft.) × [0.06 × 20 (lbs./ft.) + 0.95 (lbs./ft.)]

T_E = 312 (lbs.)

Select the Drive Series

Select the drive series according to the maximum effective belt pull for the conveyor style. See Table D 3.

Table D 3: Maximum Effective Pull

Conveyor Style	End Drive		Intermediate Drive	
	600	**800**	**SA2000**	**SA2001**
01P (End Drive)	472 lbs.	688 lbs.	-	-
02 (Intermediate Drive)	-	-	900 lbs.	800 lbs.

Select the Motor Horsepower

Using the same effective belt pull value used to select the drive series, determine the horsepower requirement of the power unit.

Power Unit - Horsepower Calculation

$$HP = \frac{T_E \times V}{3300 \times F_c \times F_r}$$

where:

F_c = 0.95, chain drive efficiency factor;

$F_r = \frac{\text{Reducer Output HP}}{\text{Reducer Input HP}}$, reducer efficiency factor

HP = Required Motor Horsepower (HP)

V = Conveyor Belt Speed (ft./min.)

Example: The effective belt pull, T_E, for a belt driven live roller conveyor was calculated to be 359 lbs., and the belt speed, V, is to be 180 fpm. If the reducer efficiency (F_r) is estimated to be 80%, the required motor horsepower can be calculated as follows:

$$HP = \frac{359 \text{ (lbs.)} \times 180 \text{ (ft./min.)}}{33000 \times 0.95 \times 0.80} = 2.577 \text{ (HP)}$$

$HP \Rightarrow 3.0$ (HP)

Round up to the next higher size motor. Select a reducer size with a maximum allowable input horsepower at least that of the motor. After selecting the reducer, it may be desirable to recalculate the horsepower with the new reducer efficiency. The new horsepower requirement may in turn lead us to use a different motor size.

Selecting Drive Components for Special Applications

Some applications require speeds that are not available in the standard power units. The drive components needed to produce a desired belt speed can be specified by using the following equation:

Power Unit - Speeds for Special Applications Calculation

$$V\ (\text{ft./min.}) = \frac{\text{Motor Speed (RPM)}}{\text{Reducer Ratio}} \times \frac{N_1}{N_2} \times \frac{\text{Pulley Diameter (in.)}}{\text{12 (in./ft.)}} \times \pi$$

where:

N_1 = Number of Teeth on Reducer Sprocket

N_2 = Number of Teeth on Pulley Sprocket

- The sprocket pitch diameter for the pulley should never exceed the pulley diameter or it will interfere with the chain guard.
- The pulley sprocket always has more teeth and a larger pitch diameter than the reducer sprocket.
- A good rule of thumb when choosing sprocket combinations is to try to make the sprocket ratio, as close to 0.5 as practicable.
- Maximizing the pulley sprocket will minimize the chain tension.
- Minimizing the reducer sprocket will minimize the overhung load on the reducer shaft.

Example: An application calls for a belt driven live roller conveyor to run at 105 fpm.

A Series 800 drive is required. Neither of the closest standard speeds of 90 and 120 fpm is acceptable. The motor speed is the standard 1750 RPM. After trying various combinations of reducer and sprocket ratios, we decide upon the following:

$$V = \frac{1750\ (\text{RPM})}{20} \times \frac{15}{27} \times \frac{8.313\ (\text{in.})}{\text{12 (in./ft.)}} \times \pi = 105.79\ (\text{ft./min.})$$

This will be the actual belt speed if we use a 20:1 reducer, a 27-tooth pulley sprocket, and a 15-tooth reducer sprocket. Actual belt speeds must be within 5% of nominal speeds. With the components selected in this example, we meet that requirement.

Sprocket pitch diameter can be estimated by multiplying the number of teeth on the sprocket by the chain pitch and dividing the result by π. The chain pitch equals the chain number divided by 80.

Example: What is the approximate pitch diameter of the 27-tooth sprocket used in the example above for No. 60 chain? First we divide 60 by 80 to find the chain pitch, 0.75”. Then we can estimate the pitch diameter by the following equation:

Sprocket Pitch Diameter Calculation

$$\text{Sprocket Pitch Diameter} = \frac{27 \times 0.75\ (\text{in.})}{\pi} = 6.446\ (\text{in.})$$

We can further estimate the clearance diameter of the chain around the sprocket by adding one chain pitch to the estimated pitch diameter. Since 6.447” plus 0.75” equaling 7.179” is less than the pulley diameter of 8.313”, the chain on this sprocket will not interfere with the chain guard. If we lookup these values in a sprocket catalog, we find actual pitch diameter for this sprocket is 6.461” and the actual clearance diameter is 7.173”, are very close to our estimated values.

Estimating the Line Pressure of a Blocked Section

Before specifying the use of belt driven live roller conveyor for an accumulation application, it is best to determine the line pressure that will build up in the blocked section. Excessive line pressure can cause cartons to buckle, become damaged, or skew side-by-side and jam.

Plastic totes are especially sensitive to line pressure because of their tapered sides. If a brake-meter belt is used at the discharge to block and release the accumulated product, the brake belt portion must be long enough to hold back the line pressure.

Line pressure is the force that develops between blocked items due to the constantly driven carrier rollers. The maximum line pressure will be at the discharge end of the blocked section and can be estimated by the following equation:

Blocked Section Line Pressure Calculation

$$LP = T_0 e^{f_s \theta C n} - T_0$$

where:

LP = Line Pressure of a Blocked Section (lbs.)

$$C = 1 + \frac{0.0555}{\theta^{(1.256 - 0.543 f_s)} T_0^{(0.711 - 4.444\theta)}}$$, Estimating Factor

$$\theta = \frac{1}{f_S} \ln \left[\frac{f_R[W_R + W_P] + T_0}{T_0} \right]$$, Belt Wrap Angle on Carrier Rollers (radians)

f_R = Roller Coefficient of Friction; use 0.02 to 0.03 when determining q

f_S = Sliding Coefficient of Friction between Belt and Roller, see Table D 4

Table D 4: Sliding Coefficient between Belt and Roller, f_S

	Type of Belt		
	FBS-B90	**CBS-B90**	**TM 529**
f_S	0.25	0.60*	0.25
* The manufacturer’s stated sliding coefficient of friction (f_s) is 0.80. In actual applications, however, dust on the belt reduces this value to 0.60.			

L_B = Blocked Section Length (ft.)

$$n = \frac{L_B \times 12 \text{ (in./ft.)} \times 2 \text{ (driven carrier rollers/pressure roller)}}{\text{Pressure Roller Centers (in./pressure roller)}}, \text{ Total driven carrier rollers}$$

T_E = Transportation Belt Pull (lbs.)

T_0 = Initial Belt Tension (lbs), $0.63T_E$ (manual take-up), $0.42T_E$ (automatic take-up)

W_M = Live Load over the Blocked Section (lbs./ft.)

$$W_P = \frac{W_M \text{ (lbs./ft.)} \times \text{Roller Centers (in./roller)}}{12 \text{ (in./ft.)}}, \text{ (lbs./roller)}$$

W_R = Weight of Carrier Rollers Less Axle (lbs.) See Table D 5

Note: Using T_E and T_O to estimate is not always accurate. Lower line pressures can usually be produced by reducing the belt tension and pressure roller height. Refer to the headings, “Adjusting Belt Tension”, on page G - 15, and “Adjusting Pressure Rollers”, on page G - 18, for additional information.

Example: The final 20’-0” of a 100’-0” long belt driven live roller conveyor is to be used to accumulate product.

The belt tension, T_E, over the entire length of the conveyor was calculated to be 148 lbs. for a transportation live load of 15 lbs./ft. The live load is 20 lbs./ft. over the accumulated section. The carrier rollers are on 4” centers, so the weight of the product on each roller is 6.67 lbs. The 2X pressure rollers are on 8” centers. At 28W, the weight of the carrier roller less its axle is 3.14 lbs. The application calls for a manual take-up. The standard PVC90 FBS belt will be used with a 0.25 friction factor.

$$T_0 = 0.63 \times 148 \text{ (lbs.)} = 93 \text{ (lbs.)}$$

$$\theta = \frac{1}{0.25} \ln \left[\frac{[0.02 \times [3.14 \text{ (lbs.)} + 6.67 \text{ (lbs)}]] + 93 \text{ (lbs.)}}{93 \text{ (lbs.)}} \right] = 0.00843 \text{ (radians)}$$

$$C = 1 + \frac{0.0555}{(0.00843)^{(1.256 - .543 \times 0.25)} \times (93)^{(0.711 - 4.444 \times 0.00843)}} = 1.551$$

$$n = \frac{20 \text{ (ft.)} \times 12 \text{ (in./ft.)} \times 2}{8 \text{ (in./pressure roller)}} = 60 \text{ (carrier rollers)}$$

$$LP = 93 \text{ (lbs.)} \times e^{(0.25 \times 0.00843 \times 1.551 \times 60)} - 93 \text{ (lbs.)} = 20.2 \text{ (lbs.)}$$

The actual line pressure will vary depending on belt tension and pressure roller adjustment, but a value close to 21 lbs. is achievable if the carton bottoms are in good condition.

$$\% \text{ Blocked Load} = \frac{21 \text{ (lbs.)}}{20 \text{ (lbs./ft.)} \times 20 \text{ (ft.)}} \times 100\% = 5.30\%$$

Note that the line pressure is only 5.3% of the blocked load.

The Cantenary Drop in the belt between return rollers can also be estimated. Refer to “Adjusting Belt Tension”, on page G - 15, and Table G 1 on page G - 17, for additional information. Initial belt tension is a very important factor in determining accumulation line pressure.

Example: The Cantenary Drop of a 10” wide PVC90 FBS belt between two return rollers 12’-0” apart is measured to be 1-1/4”.

Looking under the appropriate drop and belt width columns in Table G 1 on page G - 17, we find the initial belt tension to be 69 lbs. This is the value to be used in the equations above to calculate line pressure.

Effective Belt Pull Formula for Transportation

The following formula is used to calculate effective belt pull values for special applications. See Table D 1.

Effective Belt Pull Values for Special Applications Calculation

$$T_E = \frac{[L_C \times [f_R + G]] \times [W_{m,r} + [2 \times W_b] + [W_R \times C_t] + [W_R \times C_p] + [W_R \times C_i]]}{F_T}$$

where:

$C_t = \frac{12\ (in./ft.)}{(carrier\ rollers/in.)}$, (carrier rollers/ft.)

$C_p = \frac{12\ (in./ft.)}{(pressure\ rollers/in.)}$, (pressure rollers/ft.)

$C_i = \frac{12\ (in./ft.)}{(return\ rollers/in.)}$, (return rollers/ft.) for return rollers on 72” centers

f_R = Roller Coefficient of Friction, 0.05

F_T = Terminal Loss and Contingency Factor, 0.85

L_C = Overall Conveyor Length (ft.)

W_R = Weight of Carrier, Pressure, or Return Rollers Less Axle (lbs.) See Table D 5

W_b = Weight of belt (lbs./ft.) See Table D 6

W_{mT} = Transportation Live Load (lbs./ft.) See “Live Load Calculation” on page D - 1.

Table D 5: Roller Weight, Less Axle

Conveyor Width (W)	**16”**	**22”**	**28”**	**34”**	**40”**
Roller Weight (lbs.)	1.88	2.51	3.14	3.77	4.39

Table D 6: Belt Weight

Belt Width	Type of Belt		
	PVC90 FBS	PVC90 CBS	PVC120 FBS
8”	0.32	0.48	0.32
10”	0.40	0.60	0.40
12”	0.48	0.72	0.48

For applications in which the motor will stop and start frequently or the load from the weight of the material being conveyed will fluctuate sharply, consideration should be given to the effects of acceleration and deceleration. Calculate the effect on belt pull by estimating an acceleration factor G. Such applications for belt driven live roller conveyor are rare. The value of G generally will be very close to zero, and the term can be ignored.

Acceleration Factor “G” Calculation

$$G = \frac{V}{t} \times \frac{1}{60\ (\text{sec./min.})} \times \frac{1}{32.2\ (\text{ft./sec.}^2)}$$

where:

V = Conveyor Belt Speed (ft./min.)

t = Time required for motor to reach maximum speed under load (sec.)

The maximum value of G is limited by the coefficient of friction of the product on the steel rollers. Tests have shown this value to be about 0.42 for cartons. For plastic totes, the value drops to around 0.085.

Example: An application requires a line of a belt driven live roller conveyor to flush a slug of cartons upon start-up. The configuration allows only two feet for the leading edge of the product slug to accelerate from 0 to 300 fpm. We calculate G by first determining the required acceleration time, then applying the formula above:

$$t = \frac{2 \times S}{V} = \frac{2 \times 2\ (\text{ft.}) \times 60\ (\text{sec./min.})}{300\ (\text{ft./min.})} = 0.80\ (\text{sec.})$$

$$G = \frac{300\ (\text{ft./min.})}{0.80\ (\text{sec.}) \times 60\ (\text{sec./min.}) \times 32.2\ (\text{ft./sec.}^2)} = 0.194$$

Since a value of 0.194 is great enough to have a significant effect on the calculation of T_E, the effective pull, it should be included in the equation “Effective Belt Pull Values for Special Applications Calculation”, on page D - 15,.

Note that higher initial belt tensions are generally required to prevent the belt from slipping on the drive pulley when G is high.

Nomenclature Summary

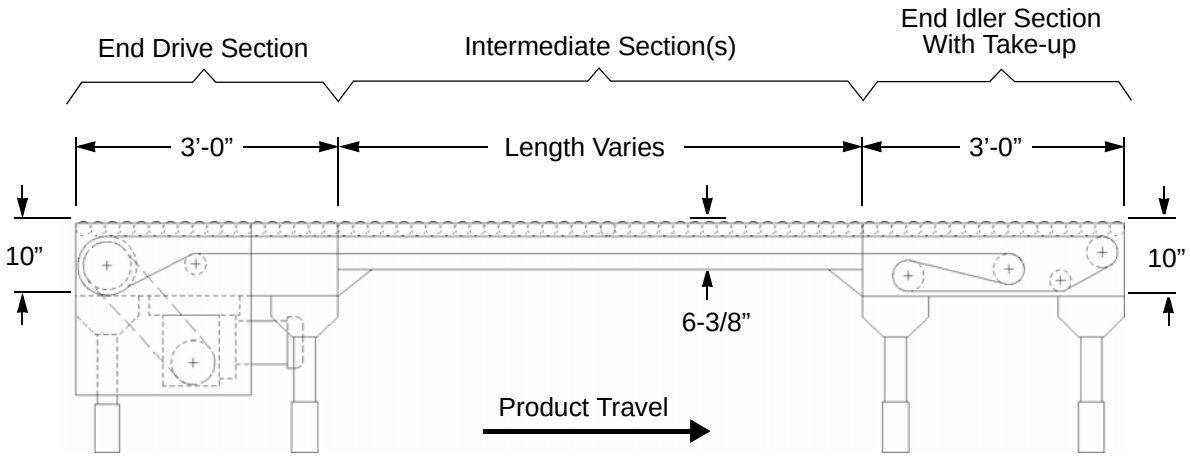
C	=	Estimating factor for determining line pressure
CF	=	Component pull factor (lbs./ft.)
Ci	=	(return rollers/ft.)
CLL	=	Live load pull factor (lbs./ ft.) (see Table D.1)
C,	=	(pressure rollers/ft.)
C,	=	(carrier rollers/ft.)
CFPM	=	Case-feet per minute (items-ft./min.)
CPM	=	Rate (items/min.)
f_P	=	Divert or merge factor = 0.420 for cartons, 0.085 for plastic totes
f_R	=	Roller Coefficient of Friction, 0.05; use 0.02 to 0.03 when determining θ
f_S	=	Sliding Coefficient of Friction between Belt and Roller
F_t	=	Terminal loss and contingency factor, 0.85
$G_{i,A}$	=	Average gap between items being conveyed (in.)
HP	=	Required motor horsepower (HP)
L_B	=	Length of blocked section (ft.)
L_C	=	Overall length of conveyor, transportation or accumulation (ft.)
$L_{i,A}$	=	Average length of item being conveyed (in.)
L_T	=	Length of transportation section (ft.)
LP	=	Line pressure of a blocked section (lbs.)
n	=	Number of driven carrier rollers
N_1	=	Number of teeth on reducer sprocket
N_2	=	Number of teeth on pulley sprocket
N_d	=	Number of expected simultaneous merge or divert transitions
t	=	Time required for motor to reach maximum speed under load (sec.)
T_E	=	Effective belt pull (lbs.)
T_0	=	Initial belt tension, $0.63T_E$ for manual take-up, $0.42T_E$ for automatic take-up (lbs.)
V	=	Conveyor belt speed (ft./min.)
W_b	=	Weight of belt (lbs./ft.)
W_i	=	Average item weight (lbs.)
W_m	=	Live load (lbs./ft.)
$W_{m,B}$	=	Blocked section live load (lbs./ft.)
$W_{m,T}$	=	Transportation live load (lbs./ft.)
W_P	=	Weight of product per roller (lbs./roller)
W_R	=	Weight of carrier, pressure, or return rollers less axle (lbs.)
θ	=	Wrap angle of belt on carrier rollers (radians)

SECTION E: LAYOUT DIMENSIONS

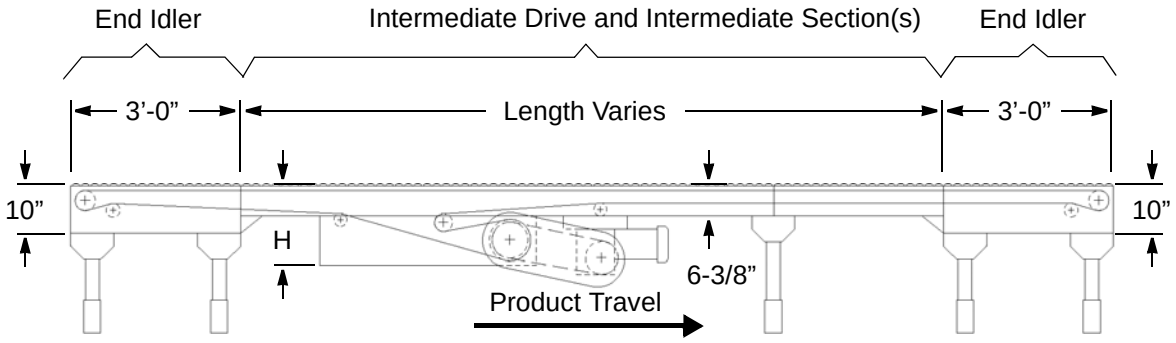
See “Standard Specifications”, on page C - 1, for layout dimensions of individual components.

E-Z Set Live Roller Conveyor

Style 01P



Style 02



Center Drive	H
SA2000	27-3/8”
SA2001	15-1/16”

Figure E - 1 E-Z Set Live Roller Conveyor Dimensions

SECTION F: ACCESSORIES

E-Z Set Live Roller Conveyor Accessories

E-Z Set Live Roller Conveyor accessories include Floor Supports, Ceiling Hangers, Side Guides, Case Deflectors, and Case Stops. Refer to the following manuals for details:

- Floor Supports and Ceiling Hangers - Manual No. 5310
- Side Guides - Manual No. 5320
- Case Deflectors - Manual No. 5330
- Case Stops - Manual No. 5340

SECTION G:INSTALLATION PROCEDURES

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 Manufacturer's Customer Service in writing within ten days after receipt of shipment.

Lost or Damaged Shipment

Report lost shipments to the Manufacturer's Shipping Department.

If shipping damage is evident upon receipt of the conveyor equipment, 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 manufacturer, 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 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 Authorization Tag" will be sent to the Purchaser (Users). 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

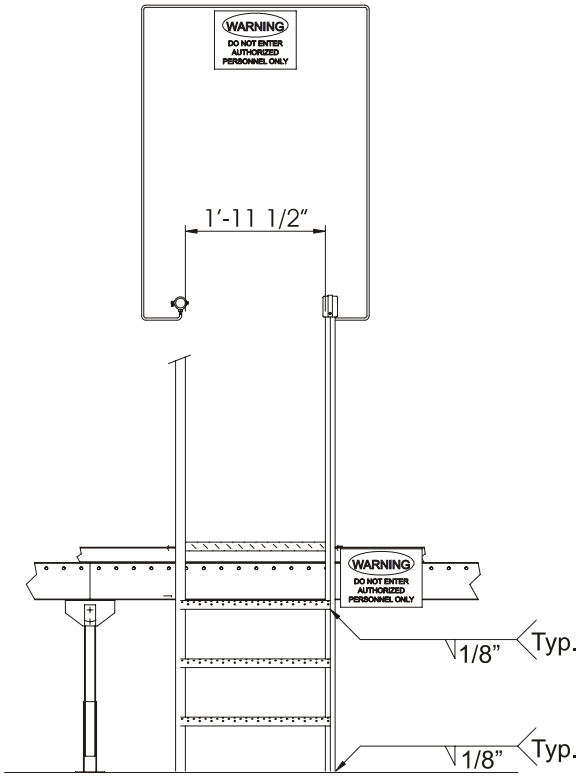
The conveyor equipment is designed and manufactured to comply with the American National Standard Institute's "Safety Standards for Conveyors and Related Equipment" (ANSI B20.1) and with the National Electrical Code (ANSI/NFPA70).

The Purchaser/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 lockout/tagout policy 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 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(s) of bill(s)-of-materials for replacement part numbers.

WARNING: For conveyors installed at floor level in an **"Authorized Personnel Access Area Only"**, fixed rollers (3" centers) may be used in conjunction with an emergency pull cord. The area must be apart from normal working areas and access must be marked with a sign, **"Warning - Do Not Enter - Authorized Personnel Only".**
Part Number for ordering Warning Sign is 957305.
The illustration below shows the location for installation of the sign.



TO ORDER LADDER SUPPORTS PER CROSSOVER:		
QNTY:	PART DESCRIPTION:	PART DESCRIPTION:
1	957173	X-OVER SIGN FRAME
2	957174	3/8" DIA NYLON LOOP CLAMP (TO ATTACH SIGN TO FRAME)
4	957175	1 1/4" DIA PIPE RING W/BOLT (TO ATTACH SIGN TO LADDERS)
4	957305	SIGN,WARN BY-WS10 SETON M2540

Safety Precautions

- TURN OFF conveyor power source(s) and affix appropriate lockout/tagout 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.
- 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 source(s) and affixing appropriate lockout/tagout device(s).

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 Field Service for installation, operation, or maintenance assistance, or Customer One Protection (COP) for replacement parts.

Pre-Installation Setup

Prior to installation, review the layout drawings to determine the proper location, orientation, and elevation of the conveyor sections. Read all instructions provided in this manual.

Identify the individual components that make up the conveyor unit, and note the orientation (right-hand or left-hand) of the various components. Motor driven components have their orientation shown by a box depicting a chain guard on one side of the conveyor.

Snap a chalk line on the floor (or other supporting structure) to establish the centerline of the conveyor. Arrange the conveyor items and mounting supports along this base line according to the layout drawing to ensure that all components are present and are compatible for proper assembly. Leave the field-installed carrier rollers, photoelectric controls, and other accessory items in the shipping containers until all conveyor items are completely installed and adjusted for proper elevation.

End Drives are for one-way travel, and must be assembled at the infeed end of the conveyor. One-way Intermediate Drives should be assembled as close as possible to the infeed end of the conveyor. Intermediate Drives for reversing operation should be located near the middle of the conveyor.

Conveyor Assembly and Installation

Use the following steps to assemble and install the conveyor:

1. Remove any shipping braces and filler blocks and check the alignment of frames, pulleys, and rollers of each section before proceeding.

   Corner-to-corner diagonal frame measurements of each conveyor section should be equal within 1/16”. Also, check that all idler rollers and pulleys rotate freely.

2. Starting at one end of the conveyor, attach two supports, A and B, to the End Drive or Idler Section. See Figures G - 1 and G - 2. Check the installed conveyor elevation (dimension H) against the required elevation.

   Note: If connecting to an adjoining conveyor, center support A under the section joint and attach to both conveyors.

   Note: There are three cases for determining the location for support B, as follows:

   - Install support B as shown in Figure G - 1 if no interference with the drive assembly will result.
   - If interference with the drive assembly would result from positioning support B as shown in Figure G - 1 and if the first Intermediate Section does not exceed 9’, support B is not required.
   - If interference with the drive assembly would result from positioning support B as shown in Figure G - 1 and if the Intermediate Section does exceed 9’, position support B about halfway between end support A and the farther end of the first Intermediate Section.

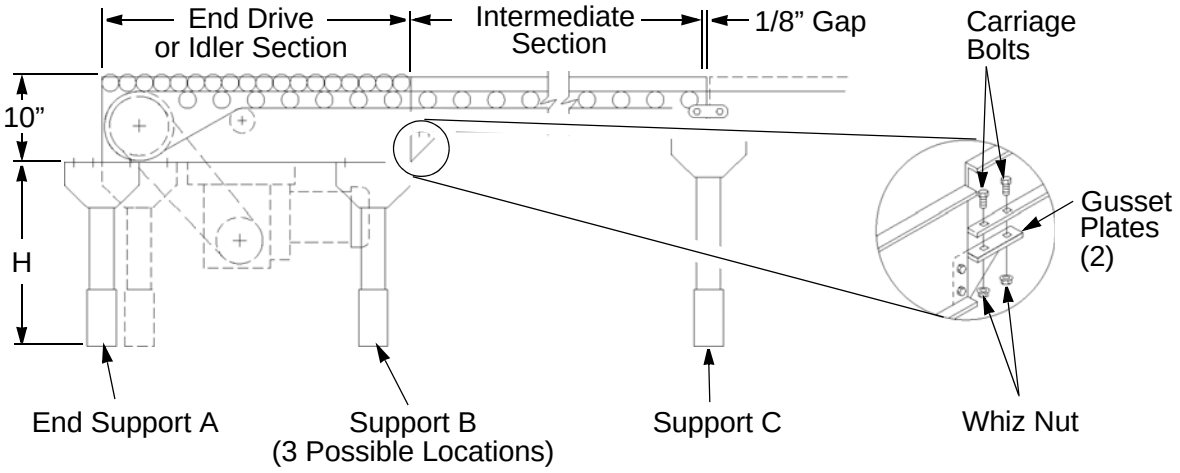


Figure G - 1 Assembling the Conveyor

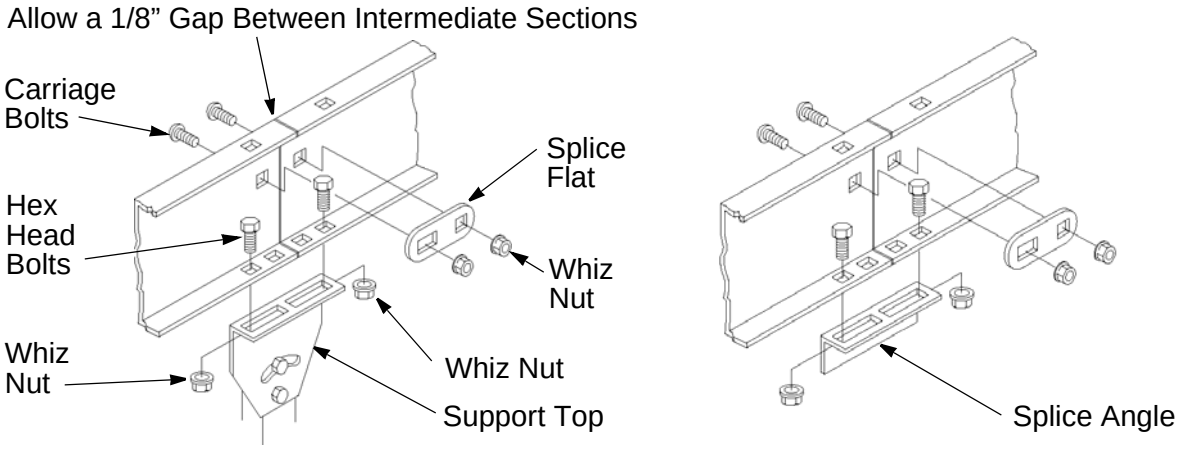


Figure G - 2 Standard Floor Support Assembly

3. Attach support C (centered) to one end of the first Intermediate Section. Assemble the other end to the gusset plates (factory-assembled to the drive or idler component). Couple sections using splice flats. See Figure G - 2.
4. Adjust the supports to the required height and level the conveyor section using a spirit level. Check the alignment of the frame, pulleys, and rollers.

   Note: Frames, pulleys, and rollers MUST be square to track the belt properly. When the corner-to-corner squaring method is impractical (as with long, narrow sections), use a steel square to check pulleys, rollers, and bolted cross members. Realign if necessary to ensure they are mounted perpendicular to the conveyor side frames.
5. Assemble support(s) to the remainder of the conveyor’s Intermediate Section(s). Leave a 1/8” gap between sections.
6. Install the last end section in the same manner as the first.
7. Check the installed conveyor elevation against the required elevation. If the joint between two sections is not located over a support, it will be necessary to assemble a splice angle

to the bottom flanges at the joint. See Figure G - 2. Do not exceed 12’-0” between supports.

Connector Channel Assembly

If the E-Z Set Live Roller Conveyor Conveyor connects to the adjoining conveyor, use a common support to support the ends of both conveyors. See Figure G - 3.

- If each conveyor has the same frame depth, bolt the two units directly to the support top plate.
- If they are not the same, use connector channels of depth “H” to compensate for the difference in depth. Connector channels are shipped with fasteners.

When connecting an E-Z Set Live Roller Conveyor to a belt conveyor, insert fill flats (1” × 4” × 3/16”) between the support top plate and the E-Z Set Live Roller Conveyor frame to compensate for the thickness of the belt.

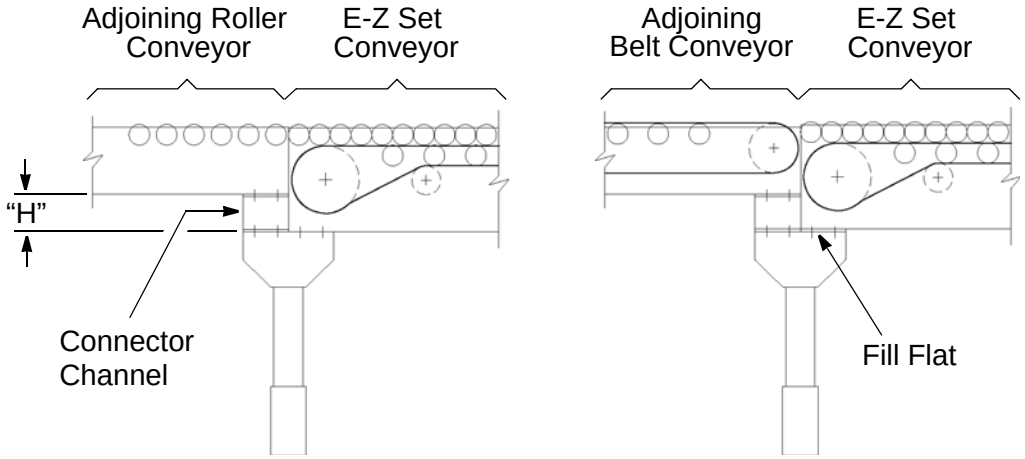


Figure G - 3 Installing a Connector Channel and Fill Flats

Installing the Belt

Before installing the belt, make certain that:

- All frame sections are aligned, level, square, and anchored
- All pulleys and rollers are perpendicular to the conveyor frame and rotate freely
- All pressure rollers are adjusted to their lowest setting

1. Adjust the take-up pulley to its retracted position.
2. Measure for the exact belt length requirement. Thread a measuring tape (or equivalent) through the conveyor following the exact path the belt will take.
3. Cut the belt square and to the required length. See “Cutting the Belt” on page G - 20.
4. Lacing the belt at this time is recommended. Lacing the belt after it has been threaded through the conveyor is also a common practice.

   Note: Both sides of the belt are the same, and belt orientation is not a concern.
5. Thread the belt through the conveyor:

   Note: It is a good idea to remove the chain from the power unit to the drive pulley. This allows the pulley to turn freely while installing the belt. Reconnect the chain after the belt is laced up.

   For Style 01P

   - Run the belt around the End Drive pulley and snub roller
   - Over the return rollers
   - Around the end take-up idler pulleys
   - Between the carrier and pressure rollers (in the 3’-0” End Drive and Idler Sections at each end of the conveyor)
   - Roll out the belt across the top of the pressure rollers in the Intermediate Sections.

   For Style 02

   - Run the belt around the Intermediate Drive and take-up pulleys and snub rollers
   - Over the return rollers
   - Around the snub rollers and idler pulleys of the two end Idler Sections
   - Between the carrier and pressure rollers (in the 3’-0” End Drive and Idler Sections at each end of the conveyor
   - Roll out the belt across the top of the pressure rollers in the Intermediate Sections.
6. If the belt was previously laced on the floor, go to step 8; if not, attach the lacing to the belt at this time.
7. Using the lacing pin supplied, join the two ends of the belt.
8. Install the carrier rollers in the Intermediate Sections. See Figure G - 4.

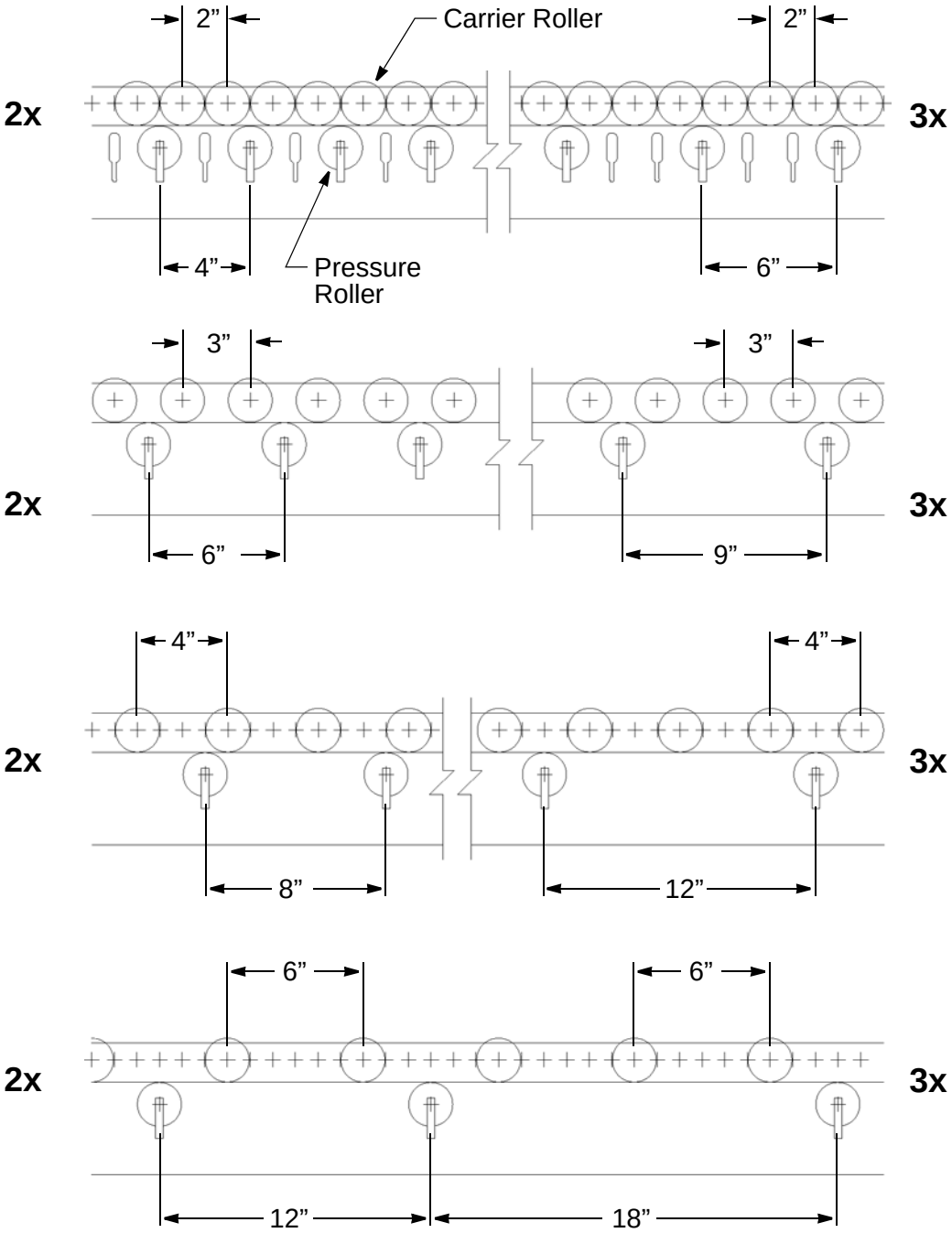


Figure G - 4 Standard Carrier Roller and Pressure Roller Spacing Combinations

Installing Electrical Wiring

Electrical wiring must be installed by a licensed electrician. The 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.

A lockable disconnect switch, rated to the service, must be mounted near and wired to each drive motor. All power to be connected to the motor must be routed through the disconnect switch. This will permit local physical lockout of the motor by persons making repairs or adjustments to the drive.

After completion of the wiring, the electrician should “bump” each drive motor, and if necessary, modify the connections to achieve proper rotation for the required direction of belt travel.

Prestart-Up Preparation

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

Pre-Operation Checklist

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 width wise) 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. Do not over tension the belt.
5. Check driver/driven sprocket alignment with a straightedge. Securely tighten all sprocket fasteners.
6. Check drive chain tension and adjust as needed. Securely tighten all mounting bolts.
7. Check motor wiring connections.
8. Check other wiring connections and test all conveyor electrical controls for proper operation.
9. Check that all conveyor safety guards removed during the installation have been replaced.
10. Check that tools and all installation materials have been removed from the conveyor.
11. Check that the reducer lubricant is up to the oil level plug. If the reducer requires additional lubricant, refer to the manufacturer’s tag attached to the reducer before adding.

    Note: Before reinstalling the oil level and fill plugs, treat the plug threads to prevent oil leakage.

12. Review Safety Precautions listed in this Section. See “Safety Precautions” on page G - 3.

Belt Tracking

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

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

Principles of Belt Tracking

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

- **Crowned Pulleys** - Belts connecting parallel shafts tend to run toward that part of the pulley which is largest in diameter. Pulleys are therefore crowned to keep the belt on center. See Figure G - 5.
- **Taut Belt** - In order for the crowned pulleys to be effective, the belt must be sufficiently tensioned to cause the belt to conform to the crown of the pulleys.
- **Parallel Shafts** - If the pulley shafts are not parallel, the belt will creep toward the side where the shaft centers are closer. See Figure G - 6.

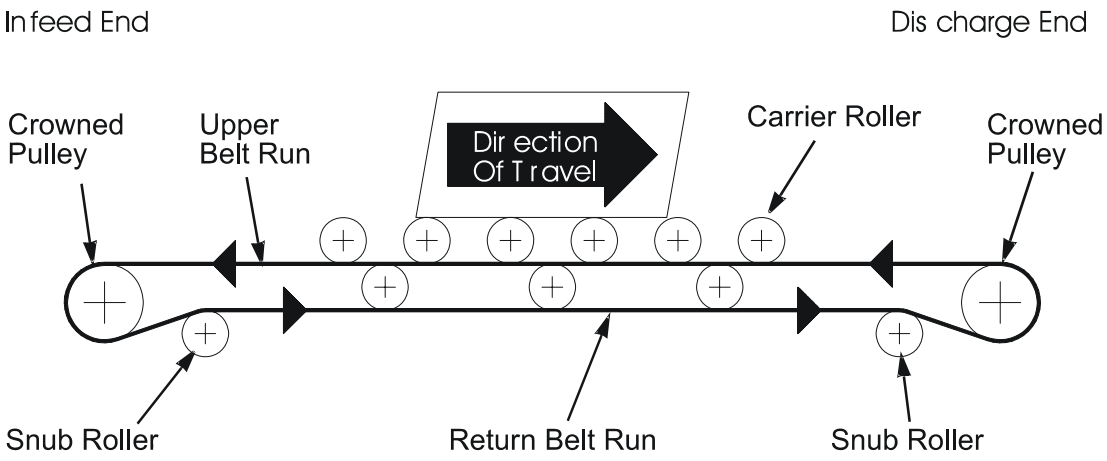


Figure G - 5 Identification of Components

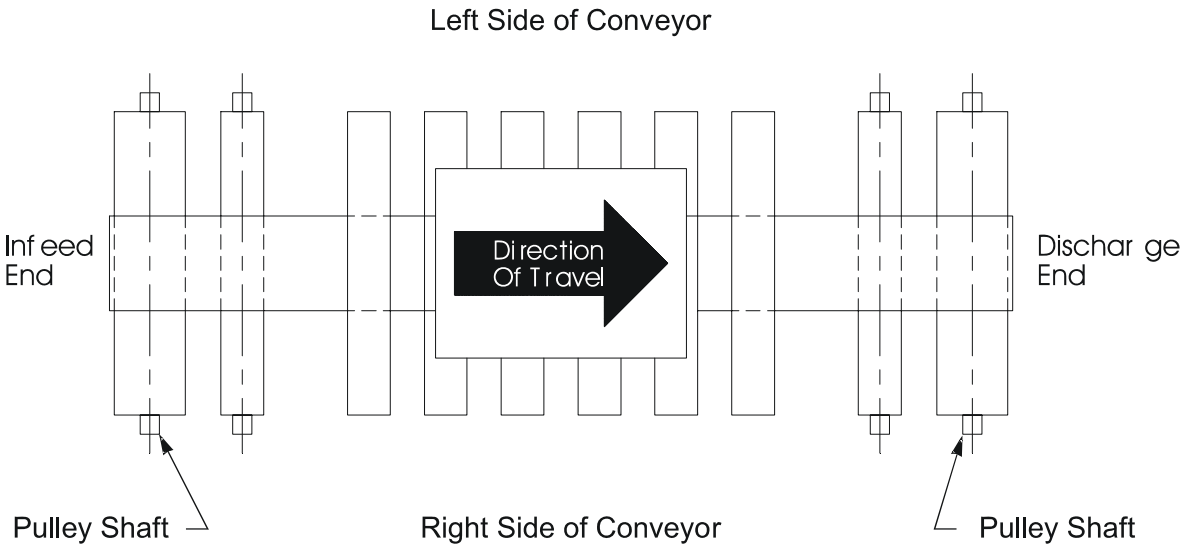


Figure G - 6 Pulley Shafts Must Be Parallel

Belt Tracking Instructions

1. When the conveyor is first turned on, check the entire length for serious tracking problems that require immediate attention.
2. Watch the conveyor's discharge-end pulley for several revolutions of the belt. The "discharge" end is the end where the belt begins its "upper" run, in which it drives the carrier rollers. See Figure G - 7.
   A If the belt wanders back and forth across the center of the pulley during a complete revolution, no adjustments are required. This condition is caused by camber in the belting and tends to straighten itself out in time.

   B. If the belt tracks to one side of the discharge-end pulley:
   - Adjust the discharge-end snub roller as indicated.
   - Check the belt's "return" run, and adjust the belt-return roller(s) as indicated.
   - If the conveyor has an Intermediate Drive or Auxiliary Take-Up unit, refer to step #4.

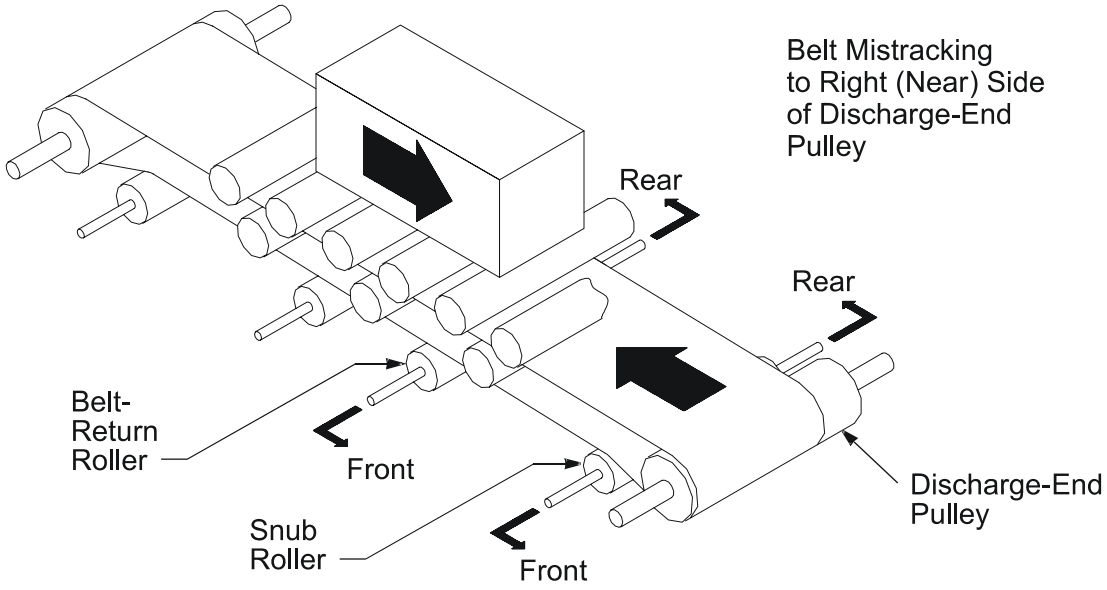


Figure G - 7 Tracking Belt at Discharge End of Conveyor

3. Next observe the conveyor's infeed-end pulley. See Figure G - 8.
   A If the belt wanders back and forth across the center of the pulley during a complete revolution, no adjustments are required. This condition is caused by camber in the belting and tends to straighten itself out in time.

   B. If the belt tracks to one side of the infeed-end pulley, check the tracking through the "upper" run, and adjust the infeed-end pulley accordingly:
   - If the "upper" run mistracks at a particular section, check that the section's rollers are square to the rails. If not, rack the frames by adjusting the 1/8" gaps located between the Intermediate Sections.
   - If the belt gradually moves to one side along the entire length, adjust the infeed-end pulley as indicated.

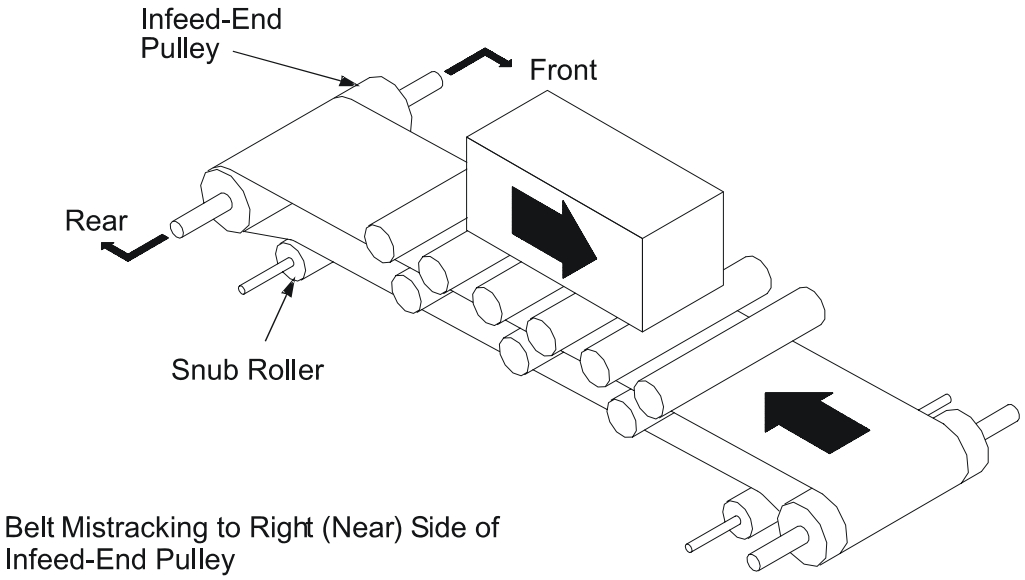


Figure G - 8 Tracking the Belt at the Infeed End of the Conveyor

3. If the belt mistracks through a Intermediate Drive or Auxiliary Take-Up, steer the belt back toward the center by adjusting snub roller “A” or snub roller “B” (adjacent to the drive and take-up pulleys). See Figures G - 9 and G - 10.
4. For conveyors with two-way travel, adjust belt tracking as follows. See Figures G - 9 and G - 10.
   - Track the belt in the direction of travel with the larger amount of product first.
   - Reverse the direction of travel, recheck the tracking of the belt, and adjust as necessary.

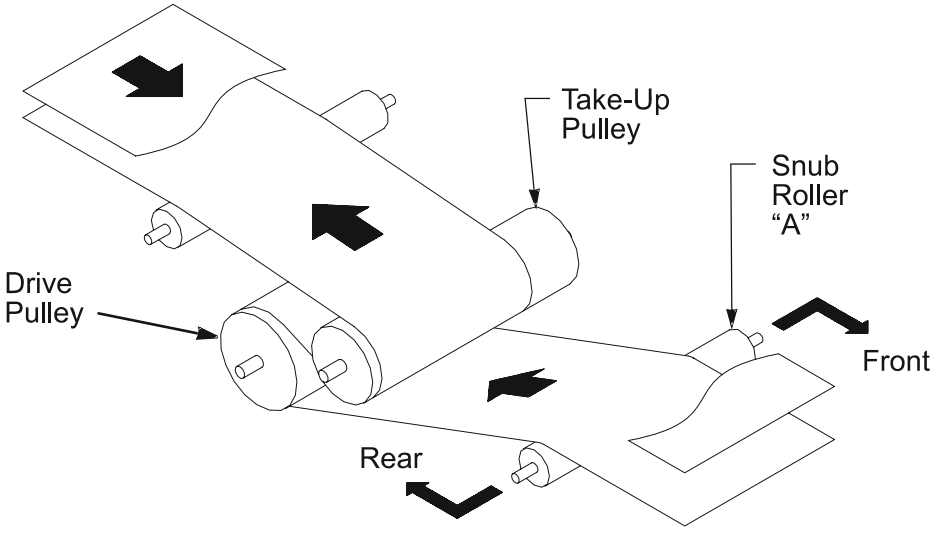


Figure G - 9 Tracking the Belt using Snub Roller “A”

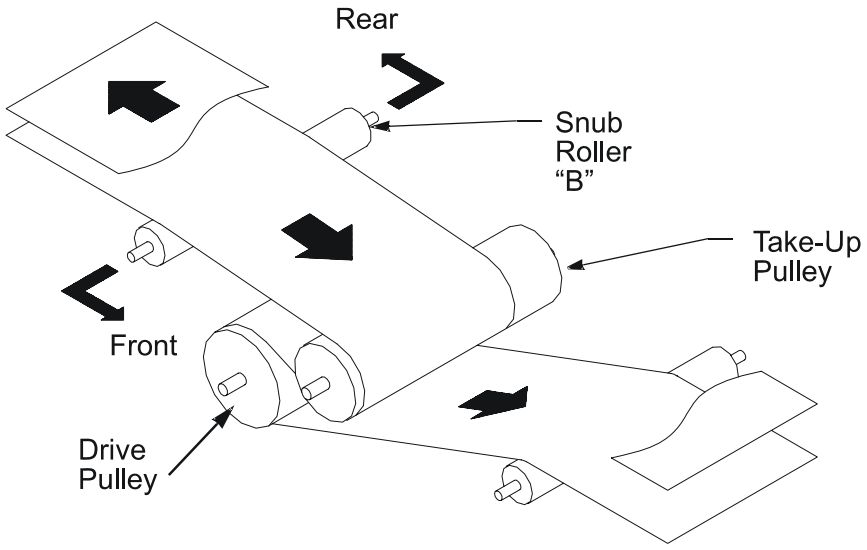


Figure G - 10 Tracking the Belt using Snub Roller “B”

Adjusting Belt Tension

After the belt has been installed and tracked, additional adjustment of the belt tension may be required. New belts stretch after they have been broken in. All belts require occasional adjustment after long periods of operation. Accumulation applications are sensitive to belt tension.

Adjust belt tension with the take-up pulley lIntermediate Driveocated either in the end idler with take-up unit, Intermediate Drive unit, or Auxiliary Take-Up unit. See Figures G - 11, G - 12 and G - 13. Adjust the tension by turning the take-up nuts against the square axle of the take-up pulley.

WARNING: If adjustment of the take-up pulley requires removing the chain guard, be careful to stay clear of the chain and drive components.

Make the adjustments in small (approximately 1/8” to 1/4”) increments on each side. Measuring the distance from the square axle of the pulley to the take-up bolt bracket helps to ensure equal adjustment on both sides. Overtensioning one side causes the belt to track away from the center of the conveyor.

Note: Use the snub rollers to track the belt - not the take-up pulley.

For general applications, adjust the take-up pulley so the belt is just tight enough to avoid slipping on the drive pulley. Too much tension will reduce the life of the belt, lacing, and pulley bearings.

When conveying heavy product, add tension to the belt to increase the driving force instead of raising the pressure rollers. See “Adjusting Pressure Rollers” on page G - 18.

Accumulation applications develop lower line pressures with a higher belt tension. Driving force is increased, requiring less belt wrap at each carrier roller to convey the product. A smaller wrap angle reduces the drive on stalled rollers in the blocked section, thus reducing line pressure.

To determine belt tension, measure the cantenary drop between return rollers over a 12’ span (see Figure G - 14) and look up the corresponding tension in Table G 1 on page G - 17. If the return rollers are on 6’ centers, remove one roller to measure the drop over a 12’ span.

WARNING: Make sure the conveyor power is OFF when measuring the catenary drop of the return belt.

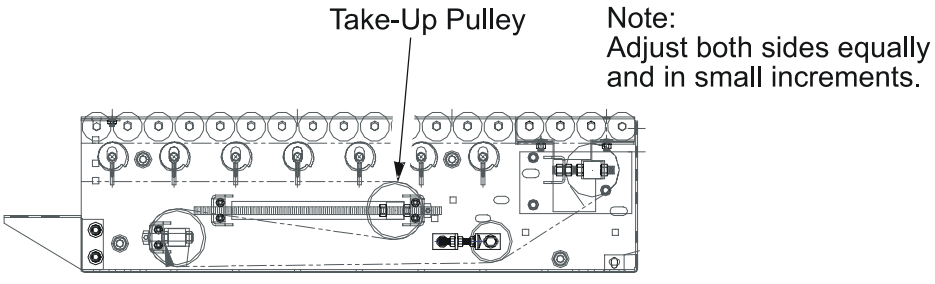


Figure G - 11 End Idler with Take-Up Pulley

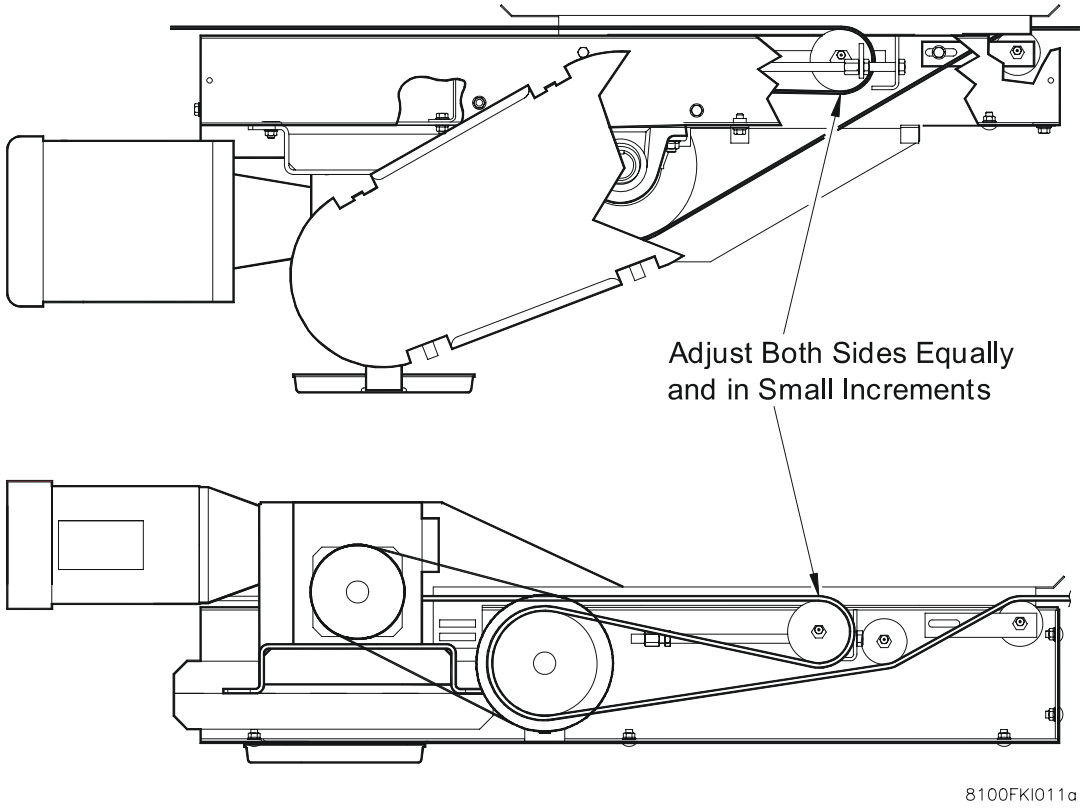


Figure G - 12 Intermediate Drive with Take-Up Pulley

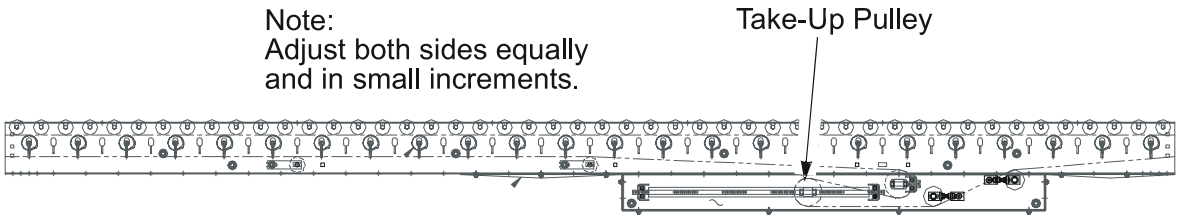


Figure G - 13 Auxiliary Take-Up

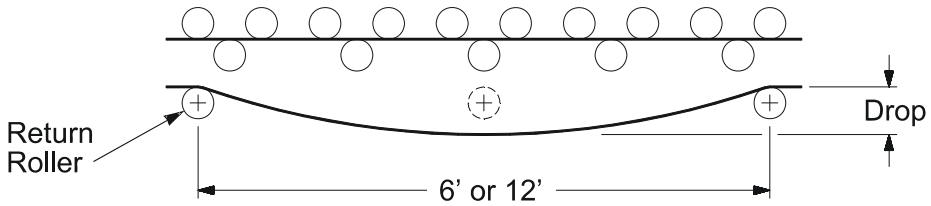


Figure G - 14 Measuring Catenary Drop

Table G 1 lists the Initial Belt Tension (T_0 lbs.) from Return Belt Catenary Drop measured between Return Rollers across 12’ span

Table G 1: Initial Belt Tension

Catenary Drop (in.)	Initial Belt Tension					
	Belt Width PVC90 CBS			Belt Width PVC90 FBS and PVC120 FBS (TM-529)		
	12”	10”	8”	12”	10”	8”
1/4	622	518	415	415	346	276
5/16	498	415	332	332	276	221
3/8	415	346	276	276	230	184
7/16	355	296	237	237	197	158
1/2	311	259	207	207	173	138
9/16	276	230	184	184	154	123
5/8	249	207	166	166	138	111
11/16	226	189	151	151	126	101
3/4	207	173	138	138	115	92
13/16	191	160	128	128	106	85
7/8	178	148	118	118	99	79
1	156	130	104	104	86	69
1 1/8	138	115	92	92	77	61
1 1/4	124	104	83	83	69	55
1 3/8	113	94	75	75	63	50
1 1/2	104	86	69	69	58	46
1 5/8	96	80	64	64	53	43
1 3/4	89	74	59	59	49	40
2	78	65	52	52	43	35
2 1/2	62	52	41	41	35	28
3	52	43	35	35	29	23

Adjusting Pressure Rollers

Pressure Roller height is set by the Adjustment Cam located on the end of each roller axle, outside of the conveyor frame. See Figure G - 15.

- Use a 7/16” wrench to make the adjustment.
- Each cam notch raises or lowers the pressure roller 0.0095".
- The notch should always rest in the saddle of the H-clip.

For Transportation and General Accumulation Applications

1. With the conveyor running, place the heaviest or most difficult to convey product on the on the conveyor at the infeed end to test the conveyor drive force.
2. If the product starts to travel without assistance, turn the cams to lower the pressure rollers by one notch until the product requires assistance to begin moving.
3. At this point, raise the pressure rollers one notch and note the setting.
4. Set all pressure rollers to this setting.
5. If the product stalls along the way, adjust the pressure roller at that point. Continue until it reaches the discharge of the conveyor (or shipping point).
6. If the line pressure is higher than desired, turn every other pressure roller down one cam notch. If the product again stalls at any point, return the pressure roller to its previous setting.
7. If the heaviest (or most difficult to convey) product travels slowly along the entire conveyor with the belt slipping on the carrier rollers, the pressure rollers have been set to their optimum operating height for minimum accumulation pressure.

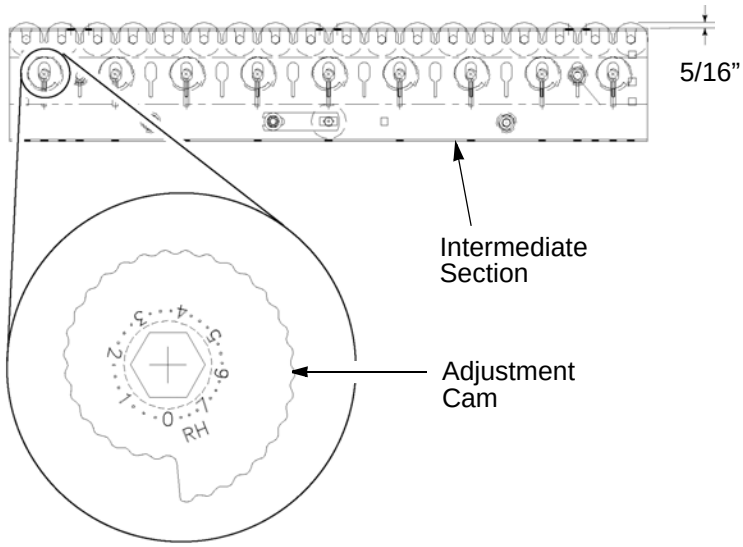


Figure G - 15 Individual Pressure Roller Adjustment

For Minimum Pressure Accumulation Applications

1. Adjust the entire conveyor as described in “For Transportation and General Accumulation Applications”, on page G - 18,.
2. Select the heaviest (or most difficult to convey) product that is to be accumulated and place it at the infeed end of the blocked section.
3. With the conveyor running, walk the item the entire length of the blocked section and adjust each pressure roller individually until the product just starts to move without assistance.
4. Place the item at the infeed end of the blocked section again and see whether it travels the full length of the section without assistance.
5. If the product stalls along the way, adjust the pressure roller at that point.
6. Repeat steps #4 and #5 until the product reaches the discharge end of the blocked section.
7. If the line pressure is too still too high, place the item at the infeed end of the blocked section again. Try turning every other pressure roller down one cam notch. If the product stalls at any point, return the pressure roller to its previous setting.
8. If the heaviest (or most difficult to convey product) travels slowly along the entire blocked section with the belt slipping on the carrier rollers, the pressure rollers have been set to their lowest operating height, which provides the minimum accumulation pressure.

For Merging and Diverting Applications

1. Adjust the entire conveyor as described under the heading “For Transportation and General Accumulation Applications”, on page G - 18,.
2. Select the heaviest (or most difficult to convey) product that is to be merged or diverted and place it at the transition point of the merge or divert.
3. Raise the pressure rollers in the immediate area where the product is being merged or diverted one notch at a time until the product moves positively on or off the conveyor.

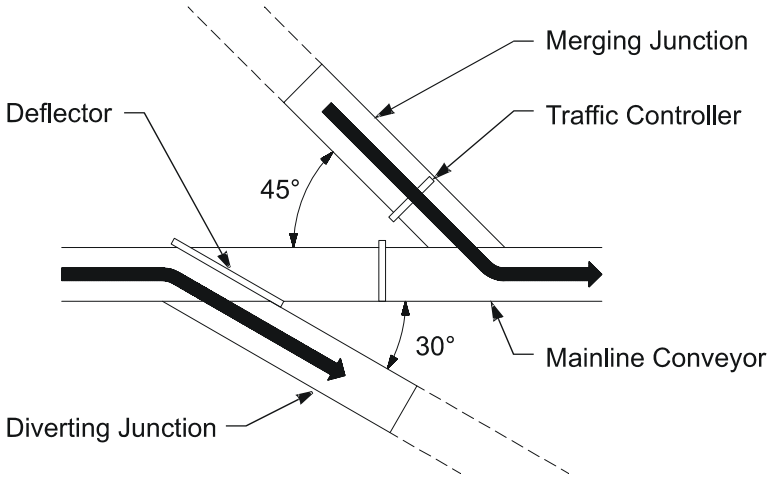


Figure G - 16 Merging and Diverting Applications

Cutting the Belt

Use the following steps to cut the belt:

1. Allowing equal amounts of excess belting on each end, mark the required cut-length on one side of the belt. Turn the belt over so that the marked surface is the bottom side. With the belt laying flat and straight on the floor, bring the two overlapping ends together so that the cut marks are in line with each other.
2. Clamp the belt so that it does not shift.
3. Mark the centerline of the belt at three places (12” intervals) on each side of the planned cut.
4. Using a straight edge, mark the centerline of the belt by passing the line through as many center marks as possible.
5. Using a steel square, mark the cut line perpendicular to the drawn centerline.
6. Carefully cut both belts with a sharp knife or belt cutting tool.

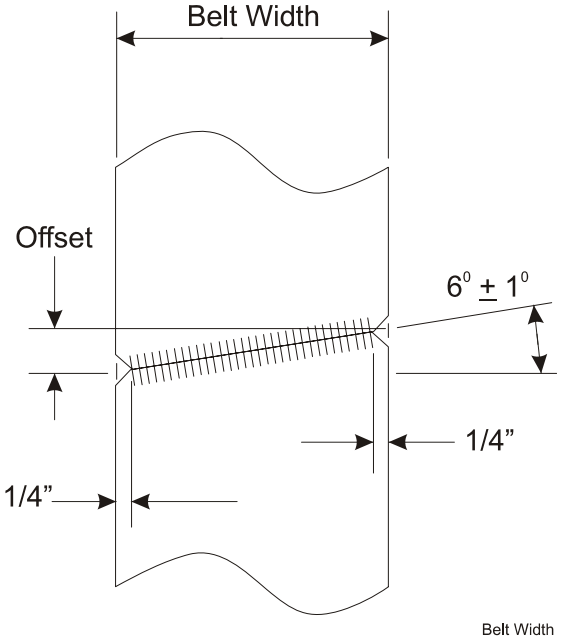
Recommended: Corners on squared cut ends of the belt should be chamfered by cutting off a triangle measuring 1/2” (along the belt width) by 1-1/2” (measured along the belt length).

Splicing the Belt

Splice the belt with the supplied lacing. Follow the lacing manufacturer’s instructions.

Replacing the Belt(s)

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
6”	5/8”
8”	13/16”
10”	1-1/16”

SECTION H:MAINTENANCE

General

The recommended inspection and maintenance functions described in this Section apply to intermittent-duty conveyor applications. Additional functions may be required for continuous-duty operation or extreme environmental conditions.

Maintenance Safety

WARNING: 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.

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 and checking chain tension, it is NOT necessary to have the conveyor turned ON to perform any of the work described in this section.

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.

New Installations

All newly installed equipment should be inspected frequently and serviced as needed during the first 40 hours of operation. See "Initial Start-up and Run-in Period" on page H - 2. Thereafter, an appropriate maintenance program should be established and followed. See Table H 1.

Maintenance Logs

Maintenance logs should be keep on all conveyor installations. Each log sheet should show:

- The date when an Inspection or Maintenance function was performed
- Details of the Inspection or Maintenance function
- Names of personnel performing the Inspection or Maintenance function

Initial Start-up and Run-in Period

Chain and Sprockets

Check the drive chain tension daily for the first week of operation, then monthly. Refer to the “Chain Maintenance” label on the inside of chain guard.

WARNING: Chain tension must be checked while the conveyor is running with the chain guard removed. When checking, be careful to stay clear of the chain and drive components.

Power Unit Reducer

Grove and Reliance reduces are supplied with “lifetime” synthetic lubricants (Mobile SHC-634) that do not need to be changed after the unit is put into service.

Note: All reducers tend to run hot when first put into operation until the maximum break-in efficiency is reached (approximately 120 hours).

Scheduled Inspections and Maintenance

Intervals indicated for performing inspections and maintenance should be considered for an 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

	Components	Item Check									
		Lubrication	Oil Level	Tension	Wear	Alignment	Fasteners	Set Screws	Proper	Physical	Operation
Weekly	Belt			X	X	X				X	
	Belt Lacing									X	
	Carrier/Pressure/Belt Return Rollers									X	X
	Electrical Devices								X	X	X
	General Structure						X			X	X
	Power Unit - Reducer		X								
	Safety Guards/Devices								X	X	X
Monthly	Bearings - External						X	X		X	
	Drive Chains and Sprockets	X		X	X	X	X	X		X	
	Timing Belts and Sprockets			X	X	X	X	X		X	X
	Take-up/Idler Pulleys									X	X
	Power Unit - Motor						X			X	
	Power Unit - Reducer						X			X	
	Pulley Lagging									X	
	Supports and Hangers						X			X	
Semi Annually 1040 hrs.	Bearings - External	X									
	Power Unit - Motor	X									
	Power Unit - Reducer	X	X								

Daily Inspections

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

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 Inspections

Belting

Check that the belt is tracking properly along the entire conveyor length. Make appropriate adjustments of snub rollers, etc. If required; check that the belt tension is sufficient to prevent the belt from slipping on the drive pulley under the maximum required load. Remove any buildup of product spillage.

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 square and re-splice. If the take-up does not permit, cut and lace in a short length of belting (1'-0" long minimum).

Carrier, Pressure, and Belt Return Rollers

Check that all rollers are in place and turning freely. Remove any buildup of dirt and/or product spillage. Take care in keeping cleaning materials from coming in contact with the ball bearings.

General Structure and Operation

Check the conveyor's physical condition, looking for lose fasteners, damaged or wearing components. Listen for unusual noises such as squeaking bearings, chains jumping sprockets, etc.

Check that the conveyed product travels along the length of the conveyor without obstruction of hesitation.

Power Unit Reducer

Check for signs of oil leakage on the floor and/or in the drip pan. If leakage persists or the amount of leakage is significant, repair or replace the unit. Until corrections are made, closely monitor the unit's oil level.

Safety Guards and Devices

Check that the safety guards, warning signs, light, 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.

Monthly Maintenance

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.

Power Unit Motor

Remove any build-up of dirt/dust around the motor vent openings. Check that all mounting bolts are securely tightened and that the motor lead wires are securely connected.

Unless specified, wick-oil sleeve bearings should be lubricated every 2000 to 4000 hours. After the first 4000 hours of operation lubricate with 3 or 4 drops of light grade mineral oil or SAE10W motor oil. Refer to the motor lubrication plate or vendors instruction tag(s).

Power Unit Reducer

Check the oil level while the unit is warm, but not running. If required, add oil through the “fill” hole until the oil begins to run out of the “oil level” hole. All standard reducers are filled by the manufacturer with a synthetic gear lubricant. When replenishing the oil, be sure to use the same brand and type. DO NOT MIX lubricants. For further information, refer to the instruction tag attached to the unit.

To prevent oil leakage, apply Teflon tape or Permatex to the threads of the fill plug and oil level plug before reinstalling. Properly install and tighten the plugs before putting the unit back into operation.

Power Unit Sprockets

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

Inspect chain sprockets for need of lubrication. If required, lubricate the chain lightly with SAE 30 oil. DO NOT use grease. Also check teeth for wear. Realign if required,

Power Unit Chains

Lubricate and check tension per instructions given on the "Chain Maintenance" label located on the inside of the chain guard. Remove any dirt or dried oil with a kerosene soaked rag.

Power Unit Timing Belts

Adjust reducer to remove any belt slack and achieve a snug belt tension.

Use the following steps to check belt tension:

1. Measure the center distance between the driver and driven sprockets to determine the belt span length. See Figure H - 1.
2. Determine the correct deflection for the span as follows: Deflection = Span Length ÷ 64.
3. Use a spring-scale tension checker (possible source Browing) to determine the force required to produce the required deflection. See Table H 2.

Table H 2: Timing Belt Deflection/Force

Belt		Deflection
Pitch	**Width**	**Force**
8mm	12mm	7 lbs.
	22mm	15 lbs.
	35mm	20 lbs.
Pitch	42mm	23 lbs.

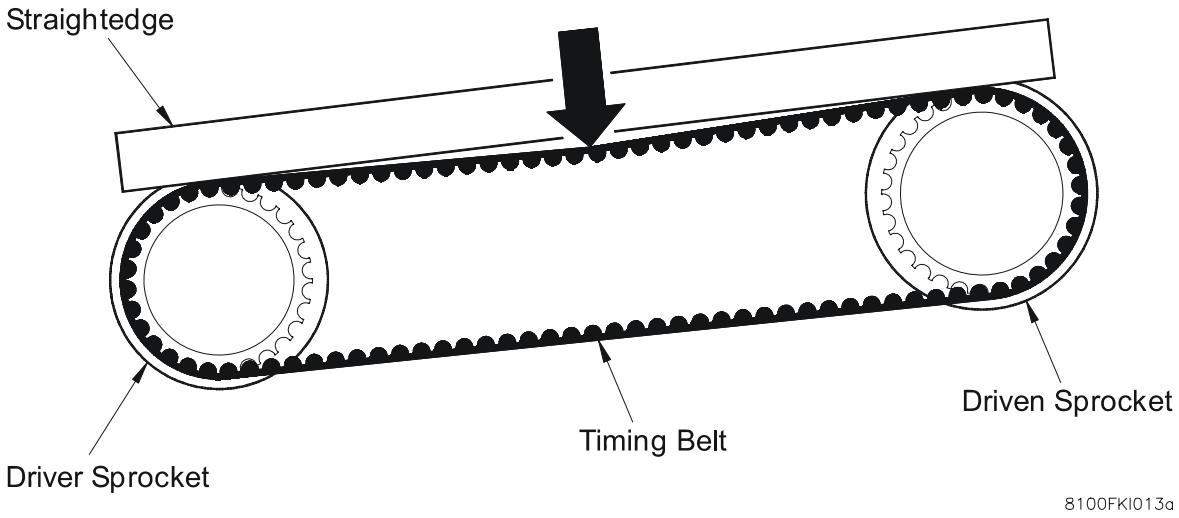


Figure H - 1 Measuring Timing Belt Deflection

Drive Sprockets

Check the alignment by placing a straight-edge across the face of both sprockets simultaneously. Also check for wear on the sprocket teeth and side bars of the chain. If loose, tighten the sprocket fasteners.

Drive Pulley and 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.

Semi-Annual Maintenance

Power Unit Motor

Units up to 5 HP are lubricated for life. For 7.5 HP motors, refer to the manufacturer's motor lubrication plate or operating instruction tag wired to the motor.

Power Unit Reducer

Check that all fasteners are secure.

Bearings - External

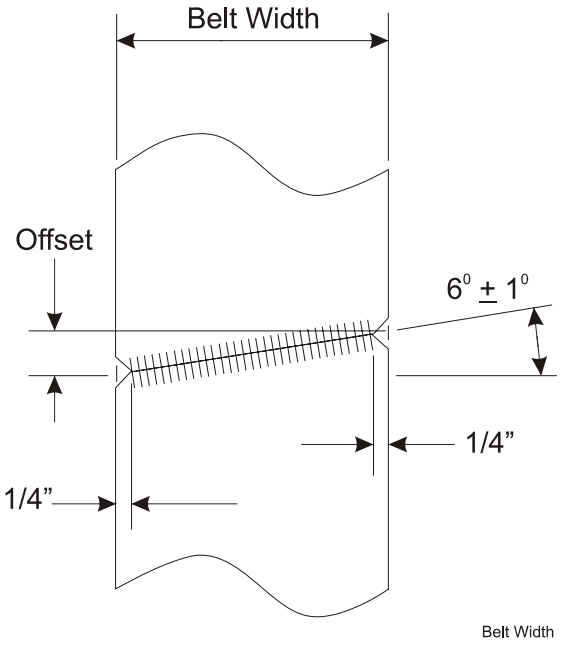
All external bearings have lubed-for-life bearing cartridges, and do not require periodic lubrication.

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.

Replacing the Belt(s)

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
6”	5/8”
8”	13/16”
10”	1-1/16”

Troubleshooting

Basic troubleshooting provisions are outlined below. For troubleshooting the specific conveyor system installed, always check the maintenance information. Basic troubleshooting is outlined in Table H 3.

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, lockout and tag the conveyor operation control(s) before attempting to correct any malfunction.

Table H 3: 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 block 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.
One part of belt creeps to one side.	Belt ends not cut square.	Cut the belt ends square.

Table H 3: Basic Troubleshooting Problems and Solutions (Continued)

Problem	Cause	Solution
Entire belt creeps to one side.	Belt shifts to low side. The base structure or conveyor frame is not level or is crooked. Alignment of pulleys; drive, tail, pulleys, or snub rollers are out of line or not perpendicular with the center line of the conveyor. Underside of the belt is dirty.	Stretch a string along the edge of the frame, check alignment of the frame and correct. Next, check the level of support structure. Square the pulleys and snub rollers. Remove foreign matter, because it creates a new crown on the pulley or roller face, adversely affecting the tracking.
Belt creeps to one side in (discharge) pulley area.	Belt is not tracked properly in return run. The belt does not track properly in the conveyor's Intermediate Drive (or auxiliary take-up) unit.	Adjust the belt-return rollers and/or snub rollers.
Belt creeps to one side in (infeed) pulley area.	The pressure and carrier rollers are not square to the frame rails. The end pulley is out of alignment (not perpendicular with the center line of the conveyor.	Square the intermediate sections. Square the end rollers.
Belt fasteners pulling out.	Fasteners are incorrect size Too much tension on belt.	Re-lace the belt with proper size fasteners. Reduce tension to the minimal amount required to prevent slipping on the drive pulley.

SECTION I: PARTS IDENTIFICATION

General Information

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.

Intermediate Sections

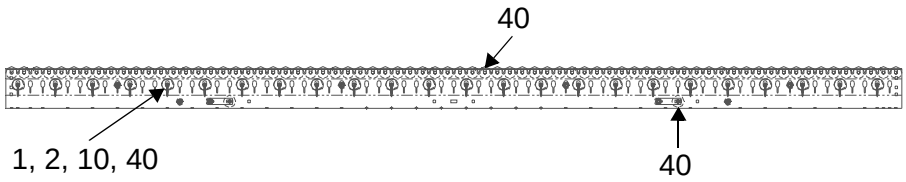
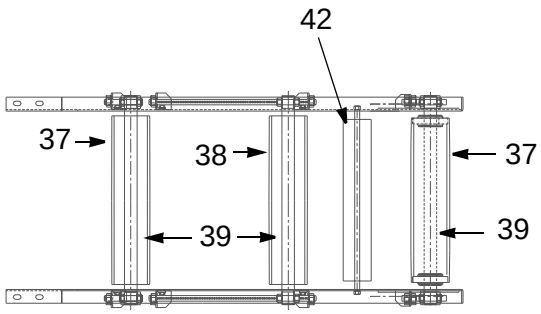
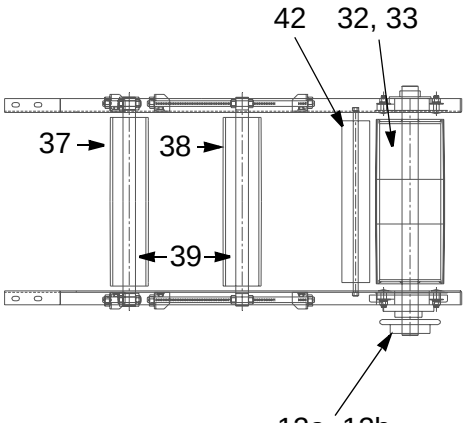
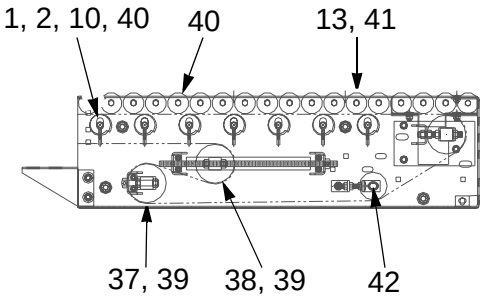


Figure I - 1 Intermediate Sections (12’-0” Shown)

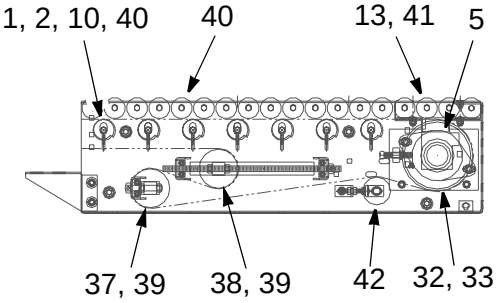
End Idler Section with Take-Up







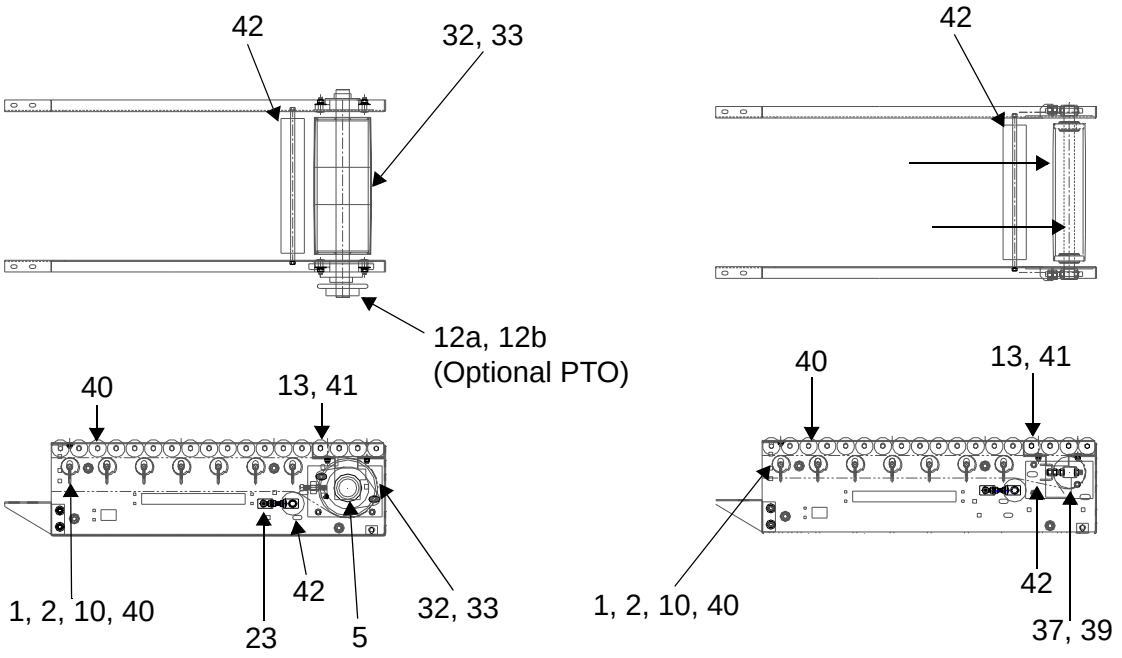
Series 600 and 800 (3.5”)
End Idler with Take-Up



Series 600 and 800 (6”)
End Idler with Take-Up
(Shown with PTO)

Figure I - 2 End Idler Sections with Take-Ups

End Idler Section



Series 1000 (6”) End Idler
(Shown with PTO)

Series 600 and 800 (3.5”) End Idler

Figure I - 3 End Idler Sections

Intermediate Drives

SA2000 - Intermediate Section

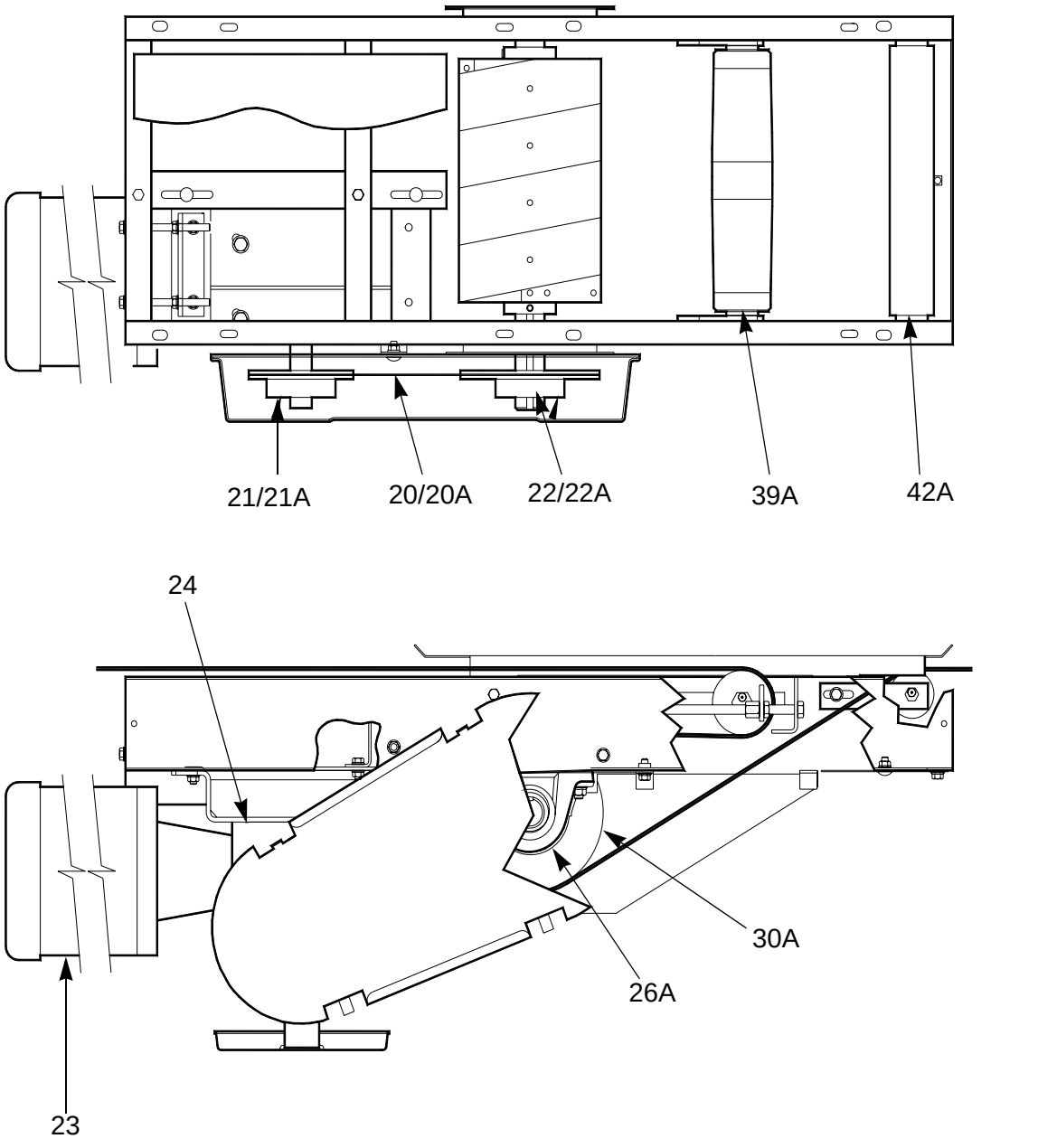
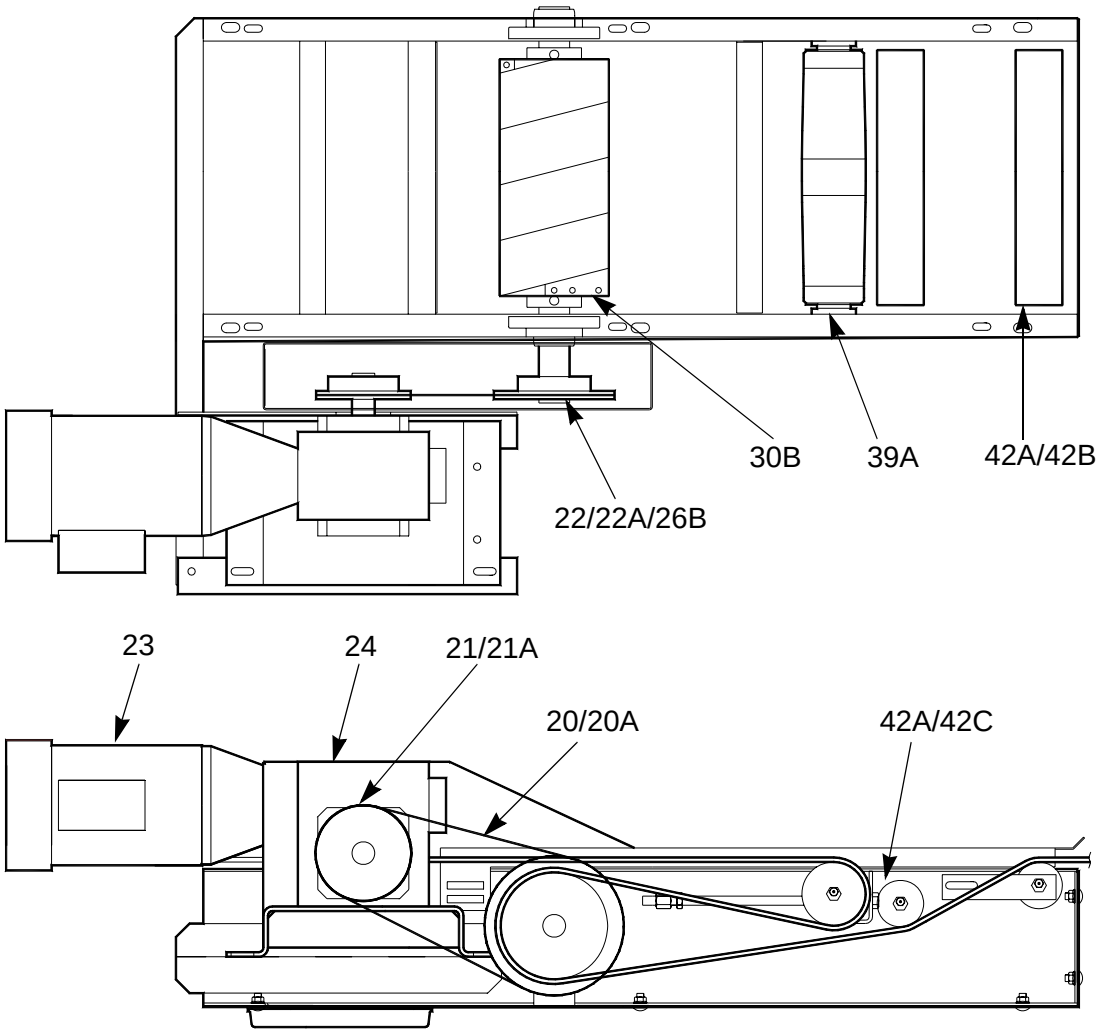


Figure I - 4 SA2000 - Intermediate Section

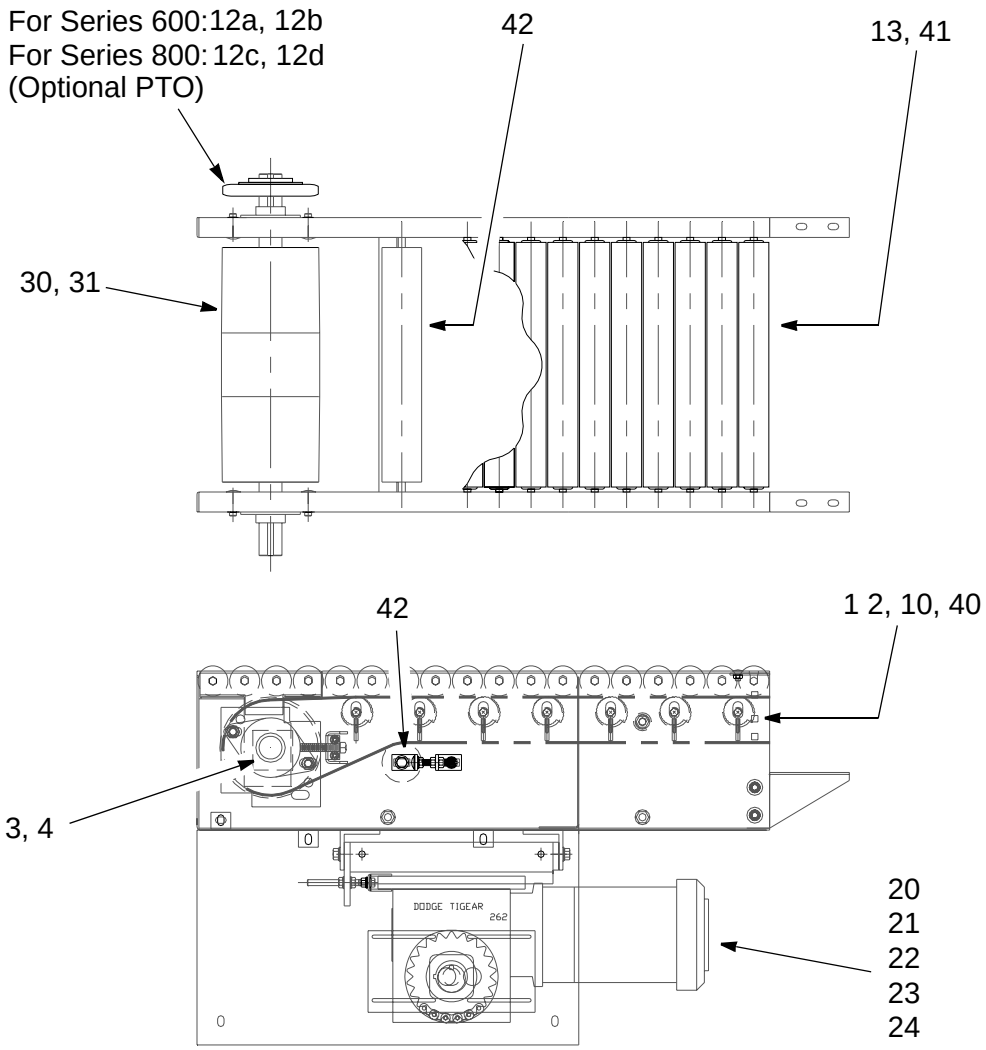
SA2001 - Intermediate Section - Low Profile



8100FKI006

Figure I - 5 SA2001 - Intermediate Section - Low Profile

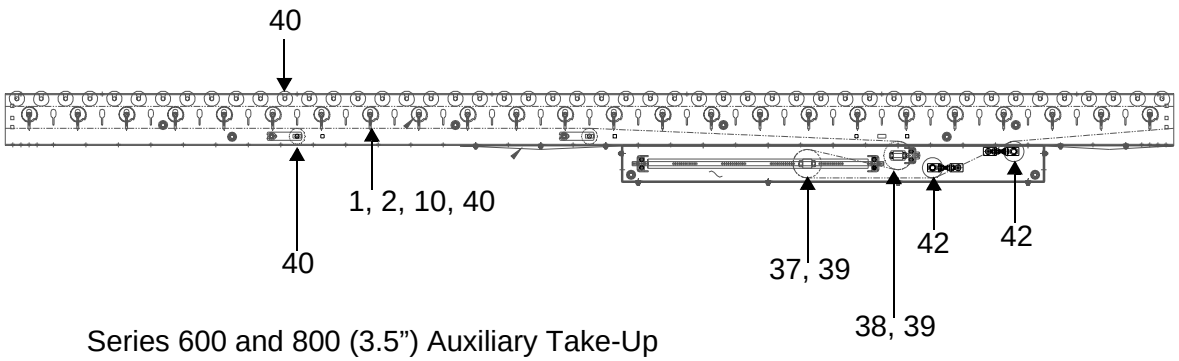
End Drive Sections



Series 600 and Series 800 End Drive
(Series 600 with PTO Shown)

Figure I - 6 End Drive Sections

Auxiliary Take-Up Sections



Series 600 and 800 (3.5”) Auxiliary Take-Up

Figure I - 7 Auxiliary Take-Up Section

Non-Width Related Parts

Key No.	Description	Part No.
1	Adjuster, EZ Cam, Right Hand	500883
2	Adjuster, EZ Cam, Left Hand	500884
3	Bearing, Flange, 2-Bolt, 1-7/16” BR - Pressure-Lubricated	400987
4	Bearing, Flange, 2-Bolt, 1-11/16” BR - Pressure-Lubricated	400990
5	Bearing, Flange, 2-Bolt, 1-15/16” BR - Pressure-Lubricated	400995
6	Bearing, Flange, 4-Bolt, 1-15/16” BR - Pressure-Lubricated	400970
7	Bearing, Take-Up, 1-15/16” BR (5/16” Wide Slot)	700145
7a	Bearing, Take-Up, 1-15/16” BR (11/16” Wide Slot)	700161
8a	Belting, PVC 90 FBS, 8” Wide (Specify Footage)	190130
	Belting, PVC 90 FBS, 10” Wide (Specify Footage)	190226
	Belting, PVC 90 FBS, 12” Wide (Specify Footage)	190355
8b	Belting, PVC 90 CBS, 8” Wide (Specify Footage)	327108
	Belting, PVC 90 CBS, 10” Wide (Specify Footage)	327110
	Belting, PVC 90 CBS, 12” Wide (Specify Footage)	327112
8c	Belting, PVC 120 FBS TrackMate-529 Nonwoven, 8” Wide (Specify Footage)	190810
	Belting, PVC 120 FBS TrackMate-529 Nonwoven, 10” Wide (Specify Footage)	190811
	Belting, PVC 120 FBS TrackMate-529 Nonwoven, 12” Wide (Specify Footage)	190812
9a	Belt Lacing with Pin - Clipper #1A (8” wide)	190711
	Belt Lacing with Pin - Clipper #1A (10” wide)	190717
	Belt Lacing with Pin - Clipper #1A (12” wide)	190712
9b	Belt Lacing with Pin - Clipper #2SP (8” wide)	190813
	Belt Lacing with Pin - Clipper #2SP (10” wide)	190814
	Belt Lacing with Pin - Clipper #2SP (12” wide)	190815
9c	Belt Lacing with Pin - Alligator #7 (8” wide)	190876
	Belt Lacing with Pin - Alligator #7 (10” wide)	190878
	Belt Lacing with Pin - Alligator #7 (12” wide)	190880
10	H-Clip, EZ Cam	640153
12a	PTO Sprocket - H50BTL21	1225021
12b	PTO Hub (#1610), 1-7/16” Bore with Key	230950
12c	PTO Sprocket - H50BTL22	1225022
12d	PTO Hub (#1610), 1-7/16” Bore with Key	230952

Key No.	Description	Part No.
13	O-Ring, 2C – 3/16” / 8”	000025
20	Chain - RC-50	20-0970
	Chain - RC-50 Connector Link	20-0040
	Chain - RC-60 (High-Speed)	20-0987
	Chain - RC-60 Connector Link	20-0986
	Chain - RC-80 (High Speed)	20-0989
	Chain - RC-80 Connector Link	20-0070
	Chain - RC-100 (High Speed)	20-1000
	Chain - RC-100 Connector Link	20-0080
20A	Timing Belt - Pitch / Width / Length	
	8mm / 21mm / 1200mm	7001504
	8mm / 21mm / 1280mm	7001506
	8mm / 36mm / 1200mm	7001512
	8mm / 36mm / 1280mm	7001514
	14mm / 37mm / 1400mm	7001519
26A	Bearing, 2-Bolt Flange, 1-11/16” BR - Pressure Lubricated (SA2000)	7522411
26B	Bearing, Pillow Block, 1-11/16” BR - Pressure Lubricated (SA2001)	7712387

Key No.	Item		Part Number					
	Chain Sprocket (Power Unit - Driver)							
	Size - Teeth - Belt Width	Sprocket Hub Type (TL Bushing No.)	Reducer Output Shaft Diameter					
			.875	1.000	1.125	1.250	1.500	1.875
21	Series 600 and 800 - End Drive							
	RC50 - 11T	Type B Hub	745505					
	RC50 - 13T	Type B Hub	745513	745512	745510			
	RC50 - 14T	Type B Hub			745514			
	RC50 - 17T	Type B Hub			745517			
	RC60 - 9T	Type B Hub	745100					
	RC60 - 10T	Type B Hub	745101		745102			
	RC60 - 11T	Type B Hub	745111	745110	745112			
		Type TL Hub	745631		745631			
	(TL Bushing)	(1008)	230701					
	RC60 - 13T	Type B Hub			745133			
		Type TL Hub	745633	745633	745633			
	(TL Bushing)	(1210)	230716	230717	230718			
	RC60 - 14T	Type B Hub			745142		745144	
		Type TL Hub	745634	745634	745634		745634	
	(TL Bushing)	(1210)	230716	230717	230718			
	RC60 - 15T	Type TL Hub	745635	745635	745635		745635	
	(TL Bushing)	(1610)	230746	230747	230748		230753	
	RC60 - 16T	Type B Hub					745165	
		Type TL Hub					745636	
	(TL Bushing)	(1610)					230753	
	RC60 - 17T	Type B Hub					745176	
		Type TL Hub			745637		745637	
	(TL Bushing)	(1610)			230748		230753	
	RC60 - 18T	Type TL Hub	745638	745638	745638		745638	
	(TL Bushing)	(1610)	230746	230747	230748		230753	
	RC60 - 19T	Type TL Hub	745639	745639	745639		745639	
	(TL Bushing)	(1610)	230746	230747	230748		230753	
	RC60 - 20T	Type TL Hub					745640	
	(TL Bushing)	(2012)					230785	
	RC60 - 21T	Type TL Hub					745641	
	(TL Bushing)	(2012)					230785	

Key No.	Item		Part Number					
	Chain Sprocket (Power Unit - Driver)							
	Size - Teeth - Belt Width	Sprocket Hub Type (TL Bushing No.)	Reducer Output Shaft Diameter					
			.875	1.000	1.125	1.250	1.500	1.875
21	RC60 - 22T	Type TL Hub		745642	745642		745642	
	(TL Bushing)	(2012)		230777	230778		230785	
	RC60 - 25T	Type TL Hub					745645	
	(TL Bushing)	(1008)????					_____	
	RC60 - 26T	Type TL Hub					745646	
	(TL Bushing)	(1210)					_____	
	RC60 - 29T	Type TL Hub					745649	
	(TL Bushing)	(1610)					230753	
	RC60 - 30T	Type TL Hub					745650	
	(TL Bushing)	(1610)					230753	
	RC80 - 11T	Type B Hub					745313	
	RC80 - 12T	Type B Hub					745322	
		Type TL Hub					745683	
	(TL Bushing)	(1615)					230766	
	RC80 - 13T	Type B Hub					745333	
		Type TL Hub					745684	
	(TL Bushing)	(1615)					230766	
	RC80 - 14T	Type B Hub					745342	
		Type TL Hub					745685	
	(TL Bushing)	(1615)					230766	
	RC80 - 16T	Type B Hub					745360	
		Type TL Hub						745687
	(TL Bushing)	(2012)						230786
	RC80 - 17T	Type B Hub						745372
		Type TL Hub						745688
	(TL Bushing)	(2012)						230786
	RC80 - 18T	Type TL Hub						745689
	(TL Bushing)	(2012)						230786
	RC80 - 19T	Type TL Hub						745690
	(TL Bushing)	(2012)						230786
	RC80 - 20T	Type TL Hub						745691
	(TL Bushing)	(2517)						230798
	RC80 - 21T	Type TL Hub						745692
	(TL Bushing)	(2517)						230798
	RC80 - 23T	Type TL Hub						745694
	(TL Bushing)	(2517)						230798

Key No.	Item		Part Number					
	Chain Sprocket (Power Unit - Driver)							
	Size - Teeth - Belt Width	Sprocket Hub Type (TL Bushing No.)	Reducer Output Shaft Diameter					
			.875	1.000	1.125	1.250	1.500	1.875
21	RC100 - 10T	Type B Hub						745500
	RC100 - 11T	Type B Hub						745432
		Type TL Hub						745718
		(SDS)						230759
	RC100 - 12T	Type B Hub						745440
		Type TL Hub						745719
		(SDS)						230759
	RC100 - 13T	Type TL Hub						745723
		(2012)						230786
	RC100 - 14T	Type TL Hub						745758
		(2517)						230798
	SA2000 / 2001 - Intermediate / Low-Profile Drive							
	RC60 - 16T	Type TL Hub		7788120	7788120	7788120	7788120	
	(TL Bushing)	(1610)		7115210	7115213	7115223	7115228	
	RC60 - 19T	Type TL Hub		7742721	7742721	7742721	7742721	
	(TL Bushing)	(1610)		7115210	7115213	7115223	7115228	
	RC60 - 20T	Type TL Hub		7743918	7743918	7743918	7743918	
	(TL Bushing)	(2012)		7115235	7115228	7115227	7721059	
	RC60 - 21T	Type TL Hub		7120512	7120512	7120512	7120512	7120512
	(TL Bushing)	(2012)		7115235	7115228	7115227	7721059	7115234
	RC60 - 22T	Type TL Hub		7000092	7000092	7000092	7000092	
	(TL Bushing)	(2012)		7115235	7115228	7115227	7721059	
	RC60 - 23T	Type TL Hub		7125294	7125294	7125294	7125294	
	(TL Bushing)	(2012)		7115235	7115228	7115227	7721059	
	RC60 - 25T	Type TL Hub		7730801	7730801	7730801	7730801	7730801
	(TL Bushing)	(2012)		7115235	7115228	7115227	7721059	7115234

Key No.	Item		Part Number					
	Chain Sprocket (Power Unit - Driver)							
	Size - Teeth - Belt Width	**Sprocket Hub Type (TL Bushing No.)**	**Reducer Output Shaft Diameter**					
			.875	**1.000**	**1.125**	**1.250**	**1.500**	**1.875**
21A	Timing-Belt Sprocket (Power Unit - Driver)							
	8mm-30T-21	Type TL Hub		7001533				
	(TL Bushing)	(1108)		7001513				
	8mm-32T-21	Type TL Hub		7001534	7001534			
	(TL Bushing)	(1210)		7200560	7115208			
	8mm-32T-36	Type TL Hub				7001551		
	(TL Bushing)	(1210)				7115207		
	8mm-34T-21	Type TL Hub		7001535	7001535	7001535		
	(TL Bushing)	(1610)		7115210	7115213	7115223		
	8mm-34T-36	Type TL Hub				7001552		
	(TL Bushing)	(1210)				7115207		
	8mm-36T-21	Type TL Hub		7001536	7001536			
	(TL Bushing)	(1610)		7115210	7115213			
	8mm-36T-36	Type TL Hub			7001553			
	(TL Bushing)	(1610)			7115213			
	8mm-38T-21	Type TL Hub		7001537	7001537	7001537		
	(TL Bushing)	(1610)		7115210	7115213	7115223		
	8mm-38T-36	Type TL Hub			7001554	7001554	7001554	
	(TL Bushing)	(1610)			7115213	7115223	7732428	
	8mm-40T-21	Type TL Hub		7001538	7001538	7001538		
	(TL Bushing)	(2012)		7115235	7115228	7115227		
	8mm-40T-36	Type TL Hub				7001555		7001555
	(TL Bushing)	(2012)				7115227		7115234
	8mm-42T-21	Type TL Hub		7001539	7001539	7001539		
	(TL Bushing)	(2012)		7115235	7115228	7115227		
	8mm-42T-36	Type TL Hub			7001556			
	(TL Bushing)	(2012)			7115228			
	8mm-45T-21	Type TL Hub		7001540	7001540	7001540		
	(TL Bushing)	(2012)		7115235	7115228	7115227		
	8mm-48T-21	Type TL Hub		7001541	7001541	7001541		
	(TL Bushing)	(2012)		7115235	7115228	7115227		
	8mm-48T-36	Type TL Hub				7001558		
	(TL Bushing)	(2012)				7115227		
	8mm-50T-21	Type TL Hub		7001542	7001542	7001542		
	(TL Bushing)	(2012)		7115235	7115228	7115227		

Key No.	Item		Part Number					
	Chain Sprocket (Power Unit - Driver)							
	Size - Teeth - Belt Width	Sprocket Hub Type (TL Bushing No.)	Reducer Output Shaft Diameter					
			.875	1.000	1.125	1.250	1.500	1.875
21A	14mm-28T-37	Type TL Hub					7001566	7001566
	(TL Bushing)	(2012)					7721059	7115234
	14mm-30T-37	Type TL Hub				7001568	7001568	7001568
	(TL Bushing)	(2517)				7001524	775668	7174980
	14mm-32T-37	Type TL Hub					7001570	7001570
	(TL Bushing)	(2517)					7756668	7174980
	14mm-34T-37	Type TL Hub					7001572	7001572
	(TL Bushing)	(2517)					7756668	7174980
	14mm-36T-37	Type TL Hub					7001574	7001574
	(TL Bushing)	(2517)					7756668	7174980
	14mm-40T-37	Type TL Hub				7001578		
	(TL Bushing)	(3020)				7001527		

Key No.	Item		Part Number		
22	Chain Sprocket (Pulley Driven)				
	Size - Teeth - Belt Width	Sprocket Hub Type (TL Bushing No.)	Reducer Output Shaft Diameter		
			1.187”	1.427”	1.675”
	Series 600 and 800 - End Drive				
	RC50 - 13T	Type B Hub	745511		
	RC60 - 21T	Type B Hub		745207	
		Type TL Hub		745641	
	(TL Bushing)	(2012)		230781	
	RC60 - 27T	Type B Hub			745270
		Type TL Hub			745647
	(TL Bushing)	(2012)			230782
	RC80 - 15T	Type B Hub		745350	
		Type TL Hub		745686	
	(TL Bushing)	(1615)		230769	
	RC80 - 19T	Type B Hub			745392
		Type TL Hub			745690
	(TL Bushing)	(2012)			230782
	RC100 - 15T	Type TL Hub			745725
	(TL Bushing)	(2517)			230793
	SA2000 / 2001 - Intermediate / Low Profile				
	RC60 - 26T	Type TL Hub			7717361
	(TL Bushing)	(2012)			7115238
	RC60 - 32T	Type TL Hub			7742328
	(TL Bushing)	(2012)			7115238

Key No.	Item		Part Number		
22A	Timing-Belt Sprocket (Pulley - Driven)				
	8mm-71T-21	Type TL Hub			7001548
	(TL Bushing)	(2517)			7115239
	8mm-71T-36	Type TL Hub			7001563
	(TL Bushing)	(2517)			7115239
	8mm-75T-21	Type TL Hub			7001549
	(TL Bushing)	(2517)			7115239
	8mm-75T-36	Type TL Hub			7001564
	(TL Bushing)	(2517)			7115239
	8mm-80T-21	Type TL Hub			7001550
	(TL Bushing)	(2517)			7115239
	8mm-80T-36	Type TL Hub			7001565
	(TL Bushing)	(3020)			7000084
	14mm-50T-37	Type TL Hub			7001582
	(TL Bushing)	(3020)			7000084
	14mm-53T-37	Type TL Hub			7001583
	(TL Bushing)	(3020)			7000084
	14mm-56T-37	Type TL Hub			7001584
	(TL Bushing)	(3525)			7000085

Note:
"B" = Sprocket with finished bore.
"TL" = Sprocket with taper-bore bushing.
"H" = Sprocket with split taper bushing.

Key No.	Part Description	Part Number			
	C-Face Motor	Baldor		Reliance	
		Motor	Brake Motor	Motor	Brake Motor
23	208-230/460V-3PH-60HZ - Standard Efficiency				
	1/2HP 56C	7155562	7742489	7001600	7001631
	3/4HP 56C	7150592	7150962	7001601	7704084
	1HP 56C	7745139	7716179	7001602	7172635
	1-1/2HP 145C	7778225	7716197	7001603	7001511
	2 HP 145TC	7274611	7325286	7001604	7704091
	3 HP 182TC	7747525	7747295	7001605	7704708
	5 HP 184TC	7747294	7817618	7001606	7001612
	7-1/2 HP 213TC	7329946	7005792	7001607	7001613
	208-230/460V-3PH-60HZ - Premium Efficiency				
	1/2HP 56C	7002040	7002030	7830000	7001621
	3/4HP 56C	7002041	7002031	7001615	7001622
	1HP 56C	7002042	7002032	7888089	7001623
	1-1/2HP 145C	7002043	7002033	7001632	7001625
	2 HP 145TC	7002044	7002034	7001617	7001626
	3 HP 182TC	7002045	7002035	7001633	7001627
	5 HP 184TC	7002046	7002036	7001618	7001628
	7-1/2 HP 213TC	7002047	7002037	7001619	7001629
	575V-3PH-60HZ - Standard Efficiency				
	1/2HP 56C	7717583	-	7002088	-
	3/4HP 56C	7717584	7152666	7002089	7002090
	1HP 56C	7717598	7717586	-	7002091
	1-1/2HP 145C	7331614	-	-	-
	2 HP 145TC	7763322	-	-	-
	3 HP 182TC	7362599	-	-	-
	5 HP 184TC	7866559	-	-	-
	7-1/2 HP 213TC	7005793	-	-	-
	575V-3PH-60HZ - Premium Efficiency				
	1/2HP 56C	7002050	7002060	7001621	7002092
	3/4HP 56C	7002051	7002061	7001622	7002093
	1HP 56C	7002052	7002062	7001623	7002094
	1-1/2HP 145C	7002053	7002063	7001625	7002095
	2 HP 145TC	7002054	7002064	7001626	7002096
	3 HP 182TC	7002055	7002065	7001627	7002097
	5 HP 184TC	7002056	7002066	7001628	7002098
	7-1/2 HP 213TC	7002057	7002067	7001629	7002099

Key No.	Item		Part Number			
	C-Face Reducer					
			Assembly			
			Series 600, 800 RU-LS		Series 600, 800 LU-RS	
			SA2000 - Shown (RH)		SA2000 - OPP (LH)	
			SA2001 - OPP (LH)		SA2001 - Shown (RH)	
	Reducer		Grove	Reliance	Grove	Reliance
	Reducer Model	Motor Frame	3	L1	2	K1
24	5:1 Ratio					
	218	56C	7005800		7005801	-
	218	145TC	7005802	-	7005803	-
	220	56C	7005804	-	7005805	-
	220	145TC	7005806	-	7005141	-
	220	184TC	7005807	-	7005808	-
	224	145TC	7005809	-	7005810	-
	224	182TC	7005035	-	7005811	-
	226	56C	7030646	-	7030645	-
	226	145TC	7030649	-	7030648	-
	226	182TC	7005021	-	7030474	-
	226	184TC	7005021	-	7030474	-
	230	184TC	7005039	-	7005812	-
	232	213TC	7005813	-	7005814	-
	175	56C	-	7005899	-	7005900
	175	145TC	-	7005901	-	7005902
	200	56	-	7005920	-	7005921
	200	145TC	-	7005922	-	7005923
	200	182TC	-	7005924	-	7005925
	262	56C	-	7005940	-	7005941
	262	145TC	-	7005942	-	7005943
	262	182TC	-	7005944	-	7005945
	262	184TC	-	7005944	-	7005945
	350	184TC	-	7005968	-	7005969

Key No.	Item		Part Number			
	C-Face Reducer					
			Assembly			
			Series 600, 800 RU-LS		Series 600, 800 LU-RS	
			SA2000 - Shown (RH)		SA2000 - OPP (LH)	
			SA2001 - OPP (LH)		SA2001 - Shown (RH)	
	Reducer		Grove	Reliance	Grove	Reliance
	Reducer Model	Motor Frame	3	L1	2	K1
24	7.5:1 Ratio					
	220	56C	7005815	-	7005025	-
	220	145TC	7005159	-	7005027	-
	224	145TC	7005816	-	7005036	-
	224	182TC	7005817	-	7005818	-
	230	184TC	7005819	-	7005820	-
	232	213TC	7005821	-	7005822	-
	242	213TC	7005823	-	7005824	-
	200	56C	-	7005926	-	7005927
	200	145TC	-	7005928	-	7005929
	262	182TC	-	7005946	-	7005947
	350	182TC	-	N/A	-	N/A
24	10:1 Ratio					
	218	56C	7005825	-	7005826	-
	220	56C	7005223	-	7005312	-
	220	145TC	7005827	-	7005828	-
	224	145TC	7005830	-	7005831	-
	226	56C	7031010	-	7031017	-
	226	145TC	7030471	-	7030470	-
	230	182TC	7005832	-	7005833	-
	232	182TC	7031008	-	7031009	-
	232	184TC	7031008	-	7031009	-
	242	184TC	7005834	-	7005835	-
	242	213TC	7005836	-	7005837	-
	175	56C	-	7005903	-	7005904
	200	56C	-	7005930	-	7005931
	200	145TC	-	7005932	-	7005933
	262	56C	-	7005948	-	7005949
	262	145TC	-	7005950	-	7005951
	350	182TC	-	7005972	-	7005973

Key No.	Item		Part Number			
	C-Face Reducer					
			Assembly			
			Series 600, 800 RU-LS		Series 600, 800 LU-RS	
			SA2000 - Shown (RH)		SA2000 - OPP (LH)	
			SA2001 - OPP (LH)		SA2001 - Shown (RH)	
	Reducer		Grove	Reliance	Grove	Reliance
	Reducer Model	Motor Frame	3	L1	2	K1
24	15:1 Ratio					
	218	56C	7005838	-	7005839	-
	220	56C	7005221	-	7005840	-
	220	145TC	7005033	-	7005841	-
	224	56C	7005037	-	7005158	-
	224	145TC	7005038	-	7005032	-
	226	56C	7031016	-	7031014	-
	226	145TC	7005086	-	7005030	-
	230	182TC	7005142	-	7005731	-
	232	145TC	7005842	-	7005843	-
	232	182TC	7005092	-	7005091	-
	242	184TC	7005844	-	7005845	-
	242	213TC	7005846	-	7005847	-
	175	56C	-	7005905	-	7005906
	200	56C	-	7005934	-	7005935
	262	56C	-	7005952	-	7005953
	262	145TC	-	7005954	-	7005955
	350	145TC	-	7005974	-	7005975
	350	182TC	-	7005976	-	7005977

Key No.	Item		Part Number			
	C-Face Reducer					
			Assembly			
			Series 600, 800 RU-LS		Series 600, 800 LU-RS	
			SA2000 - Shown (RH)		SA2000 - OPP (LH)	
			SA2001 - OPP (LH)		SA2001 - Shown (RH)	
	Reducer		Grove	Reliance	Grove	Reliance
	Reducer Model	Motor Frame	3	L1	2	K1
24	20:1 Ratio					
	218	56C	7005848	-	7005849	-
	220	56C	7005850	-	7005851	-
	224	56C	7005852	-	7005853	-
	224	145TC	7005854	-	7005333	-
	226	56C	7031012	-	7031013	-
	226	145TC	7005081	-	7005080	-
	230	182TC	7005855	-	7005320	-
	232	145TC	7030647	-	7031018	-
	232	182TC	7005090	-	7005089	-
	242	182TC	7005856	-	7005857	-
	242	184TC	7005856	-	7005857	-
	175	56C	-	7005907	-	7005908
	200	56C	-	7005936	-	7005937
	262	56C	-	7005746	-	7005956
	262	145TC	-	7005957	-	7005958
	350	145TC	-	7005978	-	7005979
	350	182TC	-	7005980	-	7005981

Key No.	Item		Part Number			
	C-Face Reducer					
			Assembly			
			Series 600, 800 RU-LS		Series 600, 800 LU-RS	
			SA2000 - Shown (RH)		SA2000 - OPP (LH)	
			SA2001 - OPP (LH)		SA2001 - Shown (RH)	
	Reducer		Grove	Reliance	Grove	Reliance
	Reducer Model	Motor Frame	3	L1	2	K1
24	**25:1 Ratio**					
	218	56C	7005858	-	7005859	-
	220	56C	7005860	-	7005861	-
	224	56C	7005862	-	7005863	-
	224	145TC	7005864	-	7005865	-
	226	56C	7031015	-	7031011	-
	230	145TC	7005866	-	7005867	-
	232	145TC	7005085	-	7005084	-
	232	182TC	7005088	-	7005087	-
	175	56C	-	7005909	-	7005910
	200	56C	-	7005744	-	7005913
	262	56C	-	7005754	-	7005742
	262	145TC	-	7005959	-	7005960
	350	145TC	-	7005982	-	7005983
	350	182TC	-	7005984	-	7005985
	30:1 Ratio					
	218	56C	7005868	-	7005869	-
	224	56C	7005870	-	7005783	-
	226	56C	7005069	-	7005068	-
	230	56C	7005871	-	7005872	-
	232	145TC	7005083	-	7005082	-
	242	145TC	7005874	-	7005875	-
	242	182TC	7005766	-	7005876	-
	175	56C		7005911		7005912
	200	56C		7005914		7005915
	262	56C		7005961		7005962
	350	145TC		7005986		7005541

Key No.	Item		Part Number			
	C-Face Reducer					
			Assembly			
			Series 600, 800 RU-LS		Series 600, 800 LU-RS	
			SA2000 - Shown (RH)		SA2000 - OPP (LH)	
			SA2001 - OPP (LH)		SA2001 - Shown (RH)	
	Reducer		Grove	Reliance	Grove	Reliance
	Reducer Model	Motor Frame	3	L1	2	K1
24	40:1 Ratio					
	220	56C	7005877	-	7005878	-
	224	56C	7005879	-	7005328	-
	226	56C	7005065	-	7005064	-
	230	56C	7005880	-	7005881	-
	232	145TC	7005075	-	7005074	-
	242	145TC	7005882	-	7005883	-
	242	182TC	7005321	-	7005884	-
	200	56C	-	7005916	-	7005917
	262	56C	-	7005752	-	7005963
	350	145TC	-	7005987	-	7005988
24	50:1 Ratio					
	224	56C	7005885	-	7005886	-
	232	56C	7005887	-	7005888	-
	232	145TC	7005073	-	7005072	-
	242	145TC	7005889	-	7005890	-
	200	56C	-	7005918	-	7005919
	262	56C	-	7005964	-	7005965
	350	56C	-	7005989	-	7005990
	350	145TC	-	7005991	-	7005992

Key No.	Item		Part Number			
	C-Face Reducer					
			Assembly			
			Series 600, 800 RU-LS		Series 600, 800 LU-RS	
			SA2000 - Shown (RH)		SA2000 - OPP (LH)	
			SA2001 - OPP (LH)		SA2001 - Shown (RH)	
	Reducer		Grove	Reliance	Grove	Reliance
	Reducer Model	Motor Frame	3	L1	2	K1
24	60:1 Ratio					
	220	56C	7005891	-	7005892	-
	224	56C	7005893	-	7005894	-
	226	56C	7005061	-	7005060	-
	230	56C	7005895	-	7005896	-
	232	56C	7005067	-	7005066	-
	232	145TC	7005071	-	7005070	-
	242	145TC	7005897	-	7005898	-
	200	56C	-	7005938	-	7005939
	262	56C	-	7005966	-	7005967
	350	56C	-	7005993	-	7005994
	350	145TC	-	7005995	-	7005996

Width Related Parts:

Key No.	Part Description	Part Number				
		16”	22”	28”	34”	40”
30	Pulley with Shaft, Drive, Lagged Crown, Single Shaft Extension (Power Unit)					
	Series 600 - 6-5/16” / 1-7/16”	684151	684152	684153	684154	684255
	Series 600/CR - 6-5/16” / 1-7/16”	684156	684157	684258	NA	NA
	Series 800 - 8-5/16 / 1-11/16”	684161	684162	684163	684164	684265
	Series 800/CR - 8-5/16 / 1-11/16”	684166	684167	684168	NA	NA
30A	Pulley w/Shaft, Drive, Crown Face, Lagged (SA2000 Intermediate Drive)					
	8-1/4” dia., 1-11/16” Shaft	7005177	7005179	7005008	7005181	7005183
30B	Pulley w/Shaft, Drive, Crown Face, Lagged (SA2001 Low Profile Intermediate Drive)					
	6-1/4” dia., 1-11/16” Shaft	7005289	7005291	7005004	7005293	7005295
31	Pulley with Shaft, Drive, Lagged Crown, Double Shaft Extension (Power Unit with PTO)					
	Series 600 - 6-5/16” / 1-7/16”	684171	684172	684173	684174	684175
	Series 600/CR - 6-5/16” / 1-7/16”	684176	684177	684178	NA	NA
	Series 800 - 8-5/16 / 1-11/16”	684181	684182	684183	684184	684185
	Series 800/CR - 8-5/16 / 1-11/16”	684186	684187	684188	NA	NA
33	Pulley with Shaft, Idler, Lagged Crown, Single Shaft Extension (Series 600 / 800 Idle with PTO)					
	6” / 1-15/16” / 1-7/16”	684271	684272	684273	684274	684275
	6” / 1-15/16” / 1-7/16” (CR)	684276	684277	684278	NA	NA
34	Pulley with Shaft, Take-Up, Flat-Face, No Shaft Extension (Series 1000 Take-Up)					
	6” / 1-15/16”	684286	684287	684288	684289	684290
	6” / 1-15/16” (CR)	684291	684292	684293	NA	NA
35	Pulley with Shaft, Take-Up, Flat-Face, No Shaft Extension (Auxiliary Take-Up)					
	6” / 1-15/16”	4852916	4852922	4852928	4852934	4852940
	6” / 1-15/16” (CR)	684281	684282	684283	NA	NA
36	Pulley with Shaft, Take-Up, Crown-Face, No Shaft Extension (Auxiliary Take-Up)					
	6” / 1-15/16”	684251	684252	684253	684254	684255
	6” / 1-15/16” (CR)	684256	684257	684258	NA	NA
37	Pulley without Axle, Idler, Crown-Face (Series 600 and 800 Idler with Take-Up)					
	3-1/2” Diameter / 1-1/8” Square Bore	501238	501239	501240	501241	501247
38	Pulley w/o Axle, Idler, Flat-Face (Series 600 and 800 Idler and Take-Up)					
	3-1/2” Diameter / 1-1/8” Square Bore	64005916	64005922	64005928	64005934	64005940

Key No.	Part Description	Part Number				
		16”	22”	28”	34”	40”
39	Axle (3.5” Idler, Take-Up Pulley)					
	Axle - 1-1/8” Square	690909	690910	690919	690920	690970
	Axle/CR - 1-1/8” Square (Plated)	690954	690955	69-0956	NA	NA
39A	Pulley & Axle, Take-Up, Crown Face, (SA2000 / 2001 Intermediate / Low Profile)					
	3-1/2” × 1-1/16” HX BR	7005184	7005188	7005009	7005186	7005187
	Axle - 1-1/16” CRS Hex	7005188	7005189	7005010	7005190	7005191
40*	1.9” Diameter Roller with Axle - Carrier, Pressure and Belt Return					
	RLR G198 GH P 01 __.__ NC	7017540	7017541	7017542	7017543	7017544
	RLR G196 GH Z 01 __.__ NC	7040112	7040113	7040114	NA	NA
	RLR G196 A1 P 01 __.__ NC	7015687	7015688	7015689	7015690	7015691
	1.9” Dia. Roller w/Axle - Pop-Out (w/Clips) Carrier Roller					
	RLR G196 GH P 02 __.__ NC	7005488	7005489	7005490	7005491	7005492
	RLR G196 GH Z 02 __.__ NC	7040321	7040322	7040323	NA	NA
	RLR G196 A1 P 02 __.__ NC	7005501	7005502	7005503	7005504	7005505
41*	1.9” Diameter Roller with Axle - Carrier with 2 Grooves					
	RLR G196 GH P 11 __.__ NC G2	7017545	7017546	7017547	7017548	7017549
	RLR G196 GH Z 11 __.__ NC G2	7040086	7040087	7040088	NA	NA
	RLR G196 A1 P 11 __.__ NC G2	7026848	7026849	7026850	7026851	7026852
42	2.5” Diameter Roller with Axle - Snub					
	No.G251AB	501056	501057	501058	501059	501060
	No.G251ABCR	501066	501067	501068	NA	NA
42A	Roller - Adjustable / Fixed Snub SA2000 and SA2001					
	2-9/16” × 11/16 HX BR	7005192	7005193	7005011	7005194	7005195
42B	Shaft - Adjustable Snub SA2001					
	11/16’ CRS Hex	7005196	7005197	7005012	7005198	7005199
42C	Shaft - Fixed Snub SA2001					
	11/16’ CRS Hex	7005296	7005297	7005045	7005298	7005299

*Roller Description Explanation on page I-27.

(Example) RLR G196 GH P 01 16.00 NC G2

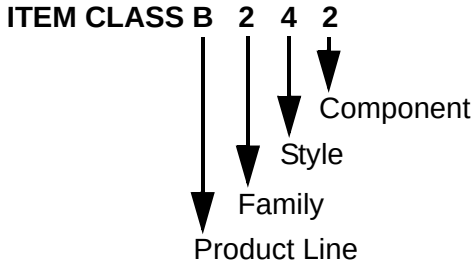
- G2 = Two (2) Grooves (A=3". B=2") - If Applicable
- NC = No Cover
- 16.00 = Conveyor Width "W"
- 01 = Spring-Loaded Axle; Fixed Roller w/o Grooves
- 02 = Non Spring Loaded Axle; Pop-out Roller w/o Grooves
- 11 = Spring-Loaded Axle; Roller w/2 Grooves
- P = Plain Steel Axle
- S = Stud Axle (With C1 Bearings ONLY)
- Z = Zinc-Plated Steel Axle (Cold Room)
- A1 = (Bearing Type) ABEC precision Bearing
- C1 = (Bearing Type) ABEC Cartridge Tapered Hex
- GH = (Bearing Type) Greased, Commercial Bearing
- 196 = (Roller Tube) 1.90" dia x 16 gage (.065" wall)
- G = (Roller Tube Material/Finish) Galvanized Steel
- RLR = Roller

Lubricants and Paints

Part Description	Part Number
Reducer Lubricant	
Grove, Above +20° F (1 Gallon)	Consult Factory
Grove, -20° F to +20° F (1 Gallon)	Consult Factory
Reliance, Above +20° F (1 Gallon)	Consult Factory
Reliance, -20° F to +20° F (1 Gallon)	Consult Factory
Paint	
Medium Gray - Spray Can	959002
Intelligrated Satin Gray - Spray Can	7900005

SECTION J: PRODUCT INDEX

Idler Units



(F1) EZ IDLER ASSY
(F2) EZ IU PRESSURE ROLLERS
(F3) BED ROLLERS
(F4) SNUB ROLLER

Description	Dwg. No.	16" W	22" W	28" W	34" W	40" W
EZ IU 2"CTR 3-0/__	19721 D	827591	827592	827593	827594	827595

Intermediate Sections

ITEM CLASS B 2 4 3

(F1) EZ IS CHAN RAIL
(F2) EZ IS PRESSURE ROLLERS
(F3) RETURN ROLLERS

Description	Dwg. No.	16" W	22" W	28" W	34" W	40" W
EZ IS 2"CTR 3-0/__	19713 D	827501	827502	827503	827504	827505
EZ IS 3"CTR 3-0/__	19713 D	827506	827507	827508	827509	827510
EZ IS 4"CTR 3-0/__	19713 D	827511	827512	827513	827514	827515
EZ IS 6"CTR 3-0/__	19713 D	827516	827517	827518	827519	827520
EZ IS 2"CTR 6-0/__	19713 D	827521	827522	827523	827524	827525
EZ IS 3"CTR 6-0/__	19713 D	827526	827527	827528	827529	827530
EZ IS 4"CTR 6-0/__	19713 D	827531	827532	827533	827534	827535
EZ IS 6"CTR 6-0/__	19713 D	827536	827537	827538	827539	827540
EZ IS 2"CTR 9-0/__	19713 D	827541	827542	827543	827544	827545
EZ IS 3"CTR 9-0/__	19713 D	827546	827547	827548	827549	827550
EZ IS 4"CTR 9-0/__	19713 D	827551	827552	827553	827554	827555
EZ IS 6"CTR 9-0/__	19713 D	827556	827557	827558	827559	827560
EZ IS 2"CTR 12-0/__	19713 D	827561	827562	827563	827564	827565
EZ IS 3"CTR 12-0/__	19713 D	827566	827567	827568	827569	827570
EZ IS 4"CTR 12-0/__	19713 D	827571	827572	827573	827574	827575
EZ IS 6"CTR 12-0/__	19713 D	827576	827577	827578	827579	827580

Incremental Intermediate Sections

ITEM CLASS B 2 4 3

(F1) EZ IS CHAN RAIL
(F2) EZ IS PRESSURE ROLLERS
(F3) RETURN ROLLERS

Description	Dwg. No.	16” W	22” W	28” W	34” W	40” W
EZ IS 2”CTR 3’-2” TO 5’-10”/__	19714 D	827756	827757	827758	827759	827760
EZ IS 3”CTR 3’-1” TO 5’-11”/__	19715 D	827761	827762	827763	827764	827765
EZ IS 4”CTR 3’-1” TO 5’-11”/__	19716 D	827766	827767	827768	827769	827770
EZ IS 6”CTR 3’-1” TO 5’-11”/__	19717 D	827771	827772	827773	827774	827775

Part numbers listed below are for Intermediate Section rollers that are shipped loose.

Description	Dwg. No.	16” W	22” W	28” W	34” W	40” W
ROLR G196GH__.00 FY-	23000 D	496331	496431	496523	496602	496656
ROLR G196AB__.00 BU-	23000 D	504906	504858	504915	504586	504587
ROLR G196GH__.00 FY-CR	23000 D	496334	496434	496526	NA	NA

Example below is for calculating roller quantities for Intermediate Section rollers shipped loose.

Centers	Qty./Ft.
2”	6
3”	4
4”	3
6”	2

Example: E-Z Set - 144’-0” Long at 4” centers.

Infeed Drive or Idler 3’-0” Long + Discharge Idler 3’-0” Long = 6’-0”
Total Conveyor Length Calculation [144’ - 6’] = 138’
Roller Calculation at 3 rollers per ft. [3 × 138 + 1] = 415

End Drive Units

ITEM CLASS B 2 4 1

(F1) EZ END DRIVE ASSY
(F2) EZ ED PRESSURE ROLLER
(F3) BED ROLLERS
(F4) SNUB ROLLER
(F5) POWER UNIT RH
(F6) POWER UNIT LH
(F7) POWER UNIT MOTOR
(F8) EZ EDRV CHAIN GUARD & SUPT

Description	Dwg. No.	16” W	22” W	28” W	34” W	40” W
EZ ED 06 2”CTR 3-0/__	19718 D	827581	827582	827583	827584	827585
EZ ED 08 2”CTR 3-0/__	19718 D	827586	827587	827588	827589	827590

SA2000 - Intermediate Drive

ITEM CLASS B 3 1 1

How To Order

An SA2000 Intermediate Drive is ordered by entering a Call-Up line which includes the “Required Fields” to define the drive and “Options Fields” to define the options to be supplied.

Call-Up Line Format - State the Call-Up in the order shown below and in Table J 1 and Table J 2.

SA2000 - W - SPEED - HP - REDUCER/MOTOR - VOLTAGE - OPTIONS

Example - SA2000 Intermediate Drive Application

SA2000 Intermediate Drive - 22” “W” - Nominal Belt Speed of 60 fpm - 1 HP - Grove Reducer and Baldor Motor - 230-460VAC, 3 PH, 60HZ - Timing Belt Drive.

Example Call-Up Line - SA2000-22-60-1-GB-V1-TB

Call-Up Required Fields - Table J 1 lists the Required Fields in the order to be stated in the Call-Up.

Table J 1: Required Call-Up Fields

Field	Description	Call-Up Entry
“W” (Select 1 Only)	Between Frame	16, 22, 28, 34, or 40
SPEED (Select 1 Only)	Speed (fpm) for Chain Drive	30, 45, 60, 75, 90, 105, 120, 135, 150, 165, or 180
	Speed (fpm) for Timing Belt Drive	30, 45, 60, 75, 90, 105, 120, 135, 150, 165, 180, 200, 225, 250, 275, 300, 325, 350, 375, 400, 425, 450, 475, or 500
HP (Select 1 Only)	Horsepower for Chain Drive	.5, .7, 1, 1.5, 2, or 3
	Horsepower for Timing Belt Drive	.5, .7, 1, 1.5, 2, 3, 5, or 7.5
REDUCER/ MOTOR (Select 1 Only)	Grove/Baldor	GB
	Grove/Reliance	GR
	Dodge (TiGear)/Reliance	DR
	Dodge (TiGear)/Baldor	DB
VOLTAGE (Select 1 Only)	208-230/460 VAC, 3 PH, 60 HZ	V1
	575 VAC, 3 PH, 60 HZ	V2
	115 VAC, 1 PH, 60 HZ	V3

Call-Up Option Fields - Table J 2 lists the Option Fields in the order to be stated in the Call-Up.

Table J 2: Option Call-Up Fields

Option Description	Call-Up Entry
For Opposite Hand Unit	OPP
Brake Motor with Brake Coil Wired into Motor	B1
Brake Motor with 115 Volt Brake Coil Wired Seperate from Motor (with ”PE” option only)	B2
Timing Belt Drive	TB
Premium Efficient Motor	PE
Pulley Guard	PG
Clutch - Brake (56 Double C-Face with 90 Volt Coil	CB
Clutch - Brake Power Supply (Required on all standard orders with “CB” option)	PS

SA2001 - Intermediate Drive - Low Profile

ITEM CLASS B 3 1 1

How To Order

An SA2001 Intermediate Drive is ordered by entering a Call-Up line which includes the “Required Fields” to define the drive and “Options Fields” to define the options to be supplied.

Call-Up Line Format - State the Call-Up in the order shown below and in Table J 3 and Table J 4.

SA2001 - W - SPEED - HP - REDUCER/MOTOR - VOLTAGE - OPTIONS

Example - SA2001 Intermediate Drive Application

SA2001 Intermediate Drive - Low Profile - 22” “W” - Nominal Belt Speed of 60 fpm - 1 HP - Grove Reducer and Baldor Motor - 230-460VAC, 3 PH, 60HZ - Timing Belt Drive.

Example Call-Up Line - SA2001-22-60-1-GB-V1-TB

Call-Up Required Fields - Table J 3 lists the Required Fields in the order to be stated in the Call-Up.

Table J 3: Required Call-Up Fields

Field	Description	Call-Up Entry
“W” (Select 1 Only)	Between Frame	16, 22, 28, 34, or 40
SPEED (Select 1 Only)	Speed (fpm) for Chain Drive	30, 45, 60, 75, 90, 105, 120, 135, 150, 165, or 180
	Speed (fpm) for Timing Belt Drive	30, 45, 60, 75, 90, 105, 120, 135, 150, 165, 180, 200, 225, 250, 275, 300, 325, 350, 375, 400, 425, 450, 475, or 500
HP (Select 1 Only)	Horsepower for Chain Drive	.5, .7, 1, 1.5, 2, or 3
	Horsepower for Timing Belt Drive	.5, .7, 1, 1.5, 2, 3, 5, or 7.5
REDUCER/ MOTOR (Select 1 Only)	Grove/Baldor	GB
	Grove/Reliance	GR
	Dodge (TiGear)/Reliance	DR
	Dodge (TiGear)/Baldor	DB
VOLTAGE (Select 1 Only)	208-230/460 VAC, 3 PH, 60 HZ	V1
	575 VAC, 3 PH, 60 HZ	V2
	115 VAC, 1 PH, 60 HZ	V3

Call-Up Option Fields - Table J 4 lists the Option Fields in the order to be stated in the Call-Up.

Table J 4: Option Call-Up Fields

Option Description	Call-Up Entry
For Opposite Hand Unit	OPP
Brake Motor with Brake Coil Wired into Motor	B1
Brake Motor with 115 Volt Brake Coil Wired Seperate from Motor (with ”PE” option only)	B2
Timing Belt Drive	TB
Premium Efficient Motor	PE
Pulley Guard	PG
Clutch - Brake (56 Double C-Face with 90 Volt Coil	CB
Clutch - Brake Power Supply (Required on all standard orders with “CB” option)	PS

Center Take-Up Units

ITEM CLASS B 2 4 4

(F1) EZ IS CHAN RAIL 12-0
(F2) EZ IS PRESSURE ROLLERS
(F3) RETURN ROLLERS
(F4) SNUB ROLLER
(F5) EZ CENTER TAKE-UP UNIT

Description	Dwg. No.	16” W	22” W	28” W	34” W	40” W
EZ CT 2”CTR 3.5” LOPRO 12-0/__	19730 D	827716	827717	827718	827719	827720
EZ CT 3”CTR 3.5” LOPRO 12-0/__	19730 D	827721	827722	827723	827724	827725
EZ CT 4”CTR 3.5” LOPRO 12-0/__	19730 D	827726	827727	827728	827729	827730
EZ CT 6”CTR 3.5” LOPRO 12-0/__	19730 D	827731	827732	827733	827734	827735
EZ CT 2”CTR 6” SCREW 12-0/__	19731 D	827736	827737	827738	827739	827740
EZ CT 3”CTR 6” SCREW 12-0/__	19731 D	827741	827742	827743	827744	827745
EZ CT 4”CTR 6” SCREW 12-0/__	19731 D	827746	827747	827748	827749	827750
EZ CT 6”CTR 6” SCREW 12-0/__	19731 D	827751	827752	827753	827754	827755

Miscellaneous

Belting

ITEM CLASS B 2 4 9

Note: Use with E-Z Set Transportation.

Description	600 Series 8” Belt	800 Series 10” Belt	1000 Series 12” Belt
BELT __” PVC-90 CBS BLACK	0327108	0327110	0327112
LACING CLIPPER 1A __”	190711	190717	190712
LACING BELT ALLIG #7 __”	190876	190878	190880

Note: Use with E-Z Set Accumulation, Speeds < 180 FPM.

Description	600 Series 8” Belt	800 Series 10” Belt	1000 Series 12” Belt
BELT __” PVC-90 FBS BLACK	190130	190226	190355
LACING CLIPPER 1A __”	190711	190717	190712
LACING BELT ALLIG #7 __”	190876	190878	190880

Note: Use with E-Z Set Accumulation, Speeds > 179 FPM.

Description	600 Series 8” Belt	800 Series 10” Belt	1000 Series 12” Belt
BELT __” PVC-120 TM-529 BLACK	190810	190811	190812
LACING CLIPPER #2SP	190813	190814	190815
LACING BELT ALLIG #7 __”	190876	190878	190880

Belt Length Calculations

Total Belt Length =

Intermediate Length + Drive and Idler Length + Auxiliary Take-Up Length (If Required)

where:

$$\text{Intermediate Length} = \left[\frac{(\text{CSPS Length* “Feet”} \times 12) + \text{CSPS Length “Inches”}}{12} - 6 \right] \times 2$$

Drive and Idler Length = See Table J 5

Auxiliary Take-Up Length = See Table J 6

Table J 5: Drive and Idler Belt Length

Style	600	800	1000
01P	14’	15’	-
02_	18’	19’	20’

Table J 6: Auxiliary Take-Up Belt Length (CSPS Accessories)

Accessory Code	Series	Length
AT3	600 and 800	3’
AT6	1000	6’

*CSPS Length” is displayed in CSPS Field #8 (“Length”) in feet and inches. The “Intermediate Length” calculation converts the length from “feet and inches” to “feet,” and doubles the result.

Belt Personnel Guards

ITEM CLASS B 2 4 9

Description	Dwg No.	16” W	22” W	28” W	34” W	40” W
BC BPG INTER SECTION 12-0 W__	No Dwg	823946	823947	823948	823949	823950
BC BPG INTER SECTION 9-0 W__	No Dwg	823951	823952	823953	823954	823955
BC BPG INTER SECTION 6-0 W__	No Dwg	823956	823957	823958	823959	823960
BC BPG INTER SECTION 3-0 W__	No Dwg	823961	823962	823963	823964	823965

Note: To be used on Intermediate Sections only.