

INSTALLATION, OPERATION, MAINTENANCE MANUAL



AccuROL®

AccuROL

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PURPOSE

It is the intent of MHS Conveyor Corp. formally know as Ermanco Inc., through this manual to provide information that acts as a guide in the installation, operation and maintenance of MHS Conveyor Corp. AccuROL® conveyors.

This manual describes basic installation practices, assembly arrangements, preventive maintenance and assists in replacement parts identification.

This service manual is intended to be used by personnel who are knowledgeable of installation and safe working practices on conveyor systems.

Not all applications and conditions can be covered; therefore, this manual is to be used as a guide only.

If additional copies of this manual are needed or if you have any question concerning the conveyor, please contact your distributor or MHS Conveyor Corp. Distributor Services Department at 231-798-4547 or Fax 231-798-4146.



EQUIPMENT WARRANTY

MHS Conveyor formally known as ERMANCO warrants that the material and workmanship entering into its equipment is merchantable and will be furnished in accordance with the specifications stated.

MHS Conveyor agrees to furnish the purchaser without charge any part proved defective within 2 YEARS from date of shipment or before the equipment has forty-one hundred (4100) hours of running use, whichever period is shorter, provided the purchaser gives MHS Conveyor immediate notice in writing and examination proves the claim that such materials or parts were defective when furnished. For drive components specific to XenoROL®, this warranty shall be extended to five years or ten thousand (10,000) hours of running use, whichever period is shorter, provided the conveyors are applied, installed and maintained in accordance with MHS Conveyor published standards. Other than the above, there are no warranties which extend beyond the description on the face hereof. Consequential damages of any sort are wholly excluded.

The liability of MHS Conveyor will be limited to the replacement cost of any defective part. All freight and installation costs relative to any warranted part will be at the expense of the purchaser. Any liability of MHS Conveyor under the warranties specified above is conditioned upon the equipment being handled, operated, and maintained in accordance with the written instructions provided or approved in writing by MHS Conveyor.

The warranties specified above do not cover, and MHS Conveyor makes no warranties which extend to, damage to the equipment due to deterioration or wear occasioned by chemicals, abrasion, corrosion or erosion; Purchaser's misapplication, abuse, alteration, operation or maintenance; abnormal conditions of temperature or dirt; or operation of the equipment above rated capacities or in an otherwise improper manner.

All equipment and components not manufactured by MHS Conveyor carries only such warranty as given by the manufacturer thereof, which warranty MHS Conveyor will assign or otherwise make available to Purchaser without recourse to MHS Conveyor, provided that such warranty is assignable or may be made available.

IMPORTANT

For service on motors, reduction units, electrical components, controls, air or hydraulic cylinders, contact the local authorized sales and service representative of respective manufacturer. If none is available in your locality, contact the MHS Conveyor representative. MHS Conveyor will not be responsible for units that have been tampered with or disassembled by anyone other than the authorized representative of the respective manufacturer.

Rev. January 31, 2003

THERE ARE NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, EXTENDING BEYOND THOSE SET FORTH IN THIS AGREEMENT.

WARNINGS & SAFETY INSTRUCTIONS

Failure to follow the instructions, warnings, cautions (throughout this booklet) and warning labels (on the conveyor) may result in injury to personnel or damage to the equipment.

Your AccuROL® zero pressure live roller conveyor is powered by a motor and can be stopped only by turning off electrical power to the motor. As with all powered machinery, the drive and driven sprockets, chains, and pneumatically actuated devices present a danger. We have installed or provided guards to prevent inadvertent contact with these components along with warning labels to identify the hazards. **After maintenance, REPLACE guards immediately. Keep ALL warning labels clean and clear of any obstructions.**

Be sure to read and heed all Warnings. Warnings and Cautions are included throughout this manual and are defined as follows:

Warning - A notice which, if not followed, could result in serious injury to personnel.

Caution - A notice which, if not followed, could result in damage to equipment.

A thorough understanding and compliance with these Warnings and Cautions will greatly reduce the possibility of personnel injury or equipment damage.

Never remove, deface or paint over any labels. Any damaged label will be replaced by Manufacturer at no cost by contacting the Distributor Services Department.

Do not perform maintenance on the conveyor until the startup controls are locked out and cannot be turned on by any person other than the one performing the maintenance. If more than one member of a crew is working on the conveyor, EACH CREW MEMBER MUST HAVE A LOCK ON THE POWER LOCK OUT. The air pressure must be turned off to the work area. All pneumatic devices must be de-energized to prevent accidental cycling of the device.

Make sure personnel are clear of all conveyor equipment before restarting the system.

It is very important to instruct personnel in proper conveyor use including the location and function of all controls. It is important to establish work procedures and access areas which do not require any part of a person to be under the conveyor. It should be required that long hair be covered by caps or hair nets and the wearing of loose clothing or jewelry when working at or near the conveyor be prohibited.

Maintain enough clearance on each side of the unit for safe adjustment and maintenance of components. Provide crossovers or gates at sufficient intervals to eliminate the temptation to climb over or under any conveyor. Prohibit riding or walking on conveyor by anyone.

WARNING

Before servicing or performing any work in the motor control panel, disconnect and lockout the main incoming service. If only the panel disconnect is off, the incoming side will still be hot.



Warning examples on each conveyor frame.

INTRODUCTION TO AccuROL®

CONCEPT

AccuROL zero pressure accumulation conveyor transports and accumulates product in many varying applications.

The major advantage of AccuROL is that it allows the accumulation of mixed-size and weight products, with a choice of sensor options, and discharge rates to suit the application.

AccuROL eliminates line pressure completely. As product accumulates, zones of non-powered rollers are created. This allows product(s) to coast into a zone, allowing accumulation with minimal impact and gaps.



AccuROL accumulates mixed product.

AccuROL is offered with two pneumatic releases. One release uses valving which provides *singulation*. This method is most common. Product or groups of products are released by zone progressively. Whenever product clears a sensor, the next zone upstream then releases. *Slug* release is offered to maximize the discharge rate at minimum conveyor speed. Either of these two releases may use single roller sensors or dual roller sensors.

AccuLIGHT™ (photosensors) is offered in basic or progressive accumulation. Both singulation and slug releases are available with basic accumulation. Only slug release may be used with progressive accumulation. This is explained further on pg. 57-18.

SINGLE ROLLER SENSOR (STANDARD)

This sensor is the most common for accumulating cartons only and may be used with either singulation or slug release. The force required to actuate this sensor is 10 oz. This requires product to have good conveyability and load distribution and weigh 20 oz. over 12", or 2 lbs. over 20".

DUAL ROLLER SENSOR (OPTION)

These sensors have dual actuation rollers. This feature allows the conveying of items with handles, tapered ends, or bottoms that have gaps. The dual actuation rollers help prevent products from missing a sensor when accumulating. The force required to actuate the sensor is 8 oz. Product must have good conveyability and load distribution, and weigh at least 1 lb. Product more than 12" in length may require some additional weight.



Dual roller sensors assure tapered totes will properly actuate the zone.

OPERATION

The product-carrying rollers are driven by a 4" wide belt which has a center guide on the underside for reliable belt tracking. This belt is held in contact with the underside of the carrying rollers by pressure roller assemblies on 12" centers.

Accumulation begins when an external signal "arms" the first sensor (discharge end). The first product stops over the discharge sensor which arms the next sensor while lowering the belt in that zone.

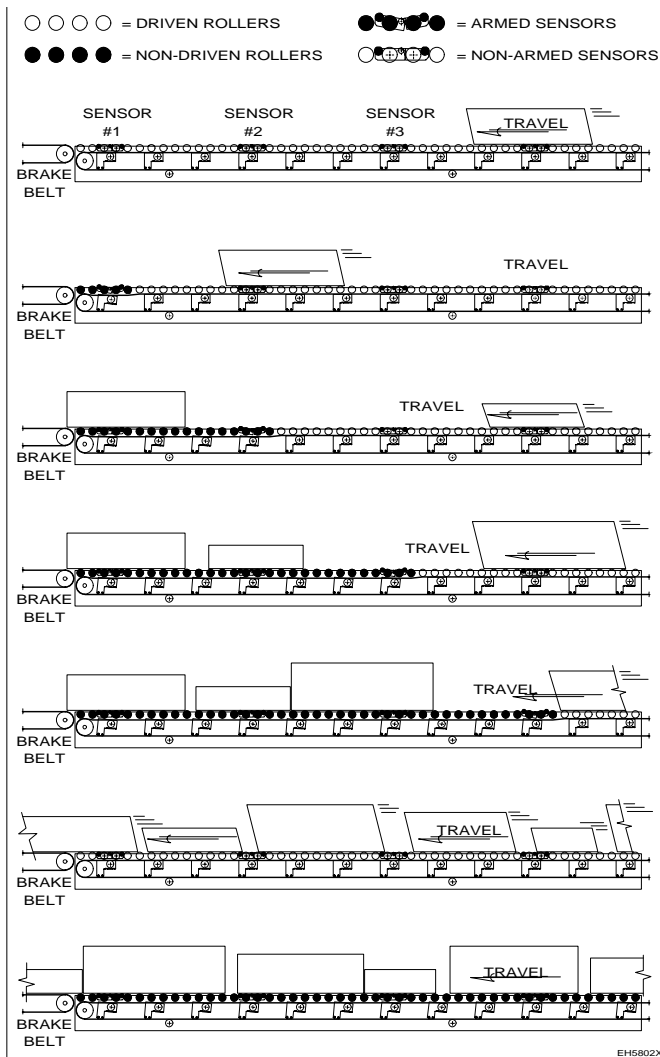
When a zone accumulates, each pressure roller assembly in that zone lowers by the use of an air diaphragm. The belt is lowered away from the carrying rollers causing them to become non-powered. Products are conveyed to the zone, then coast as they enter the non-powered area. As accumulation takes place from zone to zone. Accumulated products are under zero pressure.



Drive belt is 4" wide with V-guide for reliable belt tracking.

OPERATION

SINGULATION RELEASE



1. **Transportation mode**, both conveyor at discharge end and AccuROL are running.
2. **Accumulation begins**, when signal is given to stop further release. The discharge sensor is armed and belt pressure assemblies lower in the first zone.
3. **First product arrives** at discharge end and actuates discharge sensor. Pressure assemblies in next zone drop and sensor #2 is armed.
4. **Accumulation continues** as each sensor is actuated, dropping the next zone's pressure assemblies and arming the next sensor.
5. **Gaps** may occur with certain combinations of product weight and zone length.
6. **Release** occurs when a signal is given at the discharge zone. Air is applied to the pressure assemblies zone-to-zone as gaps are sensed between products. A zone length gap is created between each zone of product.
7. **Reaccumulation** after a partial release will cause most gaps to close, due to product momentum.

DISCHARGE ZONE BRAKE

Optional discharge zone brakes can be provided which will engage and stop the rollers in the discharge bed when a signal is given to accumulate. The braked rollers will provide additional resistance to prevent "push over" onto the downstream conveyor. Pushover on the discharge end is greatest during reaccumulation after a partial slug release. The overall operation and type of conveyor at the discharge end will determine if an optional discharge zone brake module(s) is required.

APPLICATION

DEFINITION OF TERMS

Accumulation - Act of queuing, holding or backing up products on a conveyor.

Zero Pressure Accumulation - The lack of force between products after accumulation.

Singulation Release - A method of release that senses gaps between products or groups of products and then releases the next upstream zone.

Zone - A portion of conveyor activated by a sensor to stop and hold product in queue.

Zone Length - The distance between sensing devices.

Dual Roller Sensors - Two sensing rollers per assembly. Actuation of either or both results in accumulation.

Dynamic Sensors™ - Sensor rollers remain down until accumulation is required in that zone.

Zone Actuation Force - The force required to depress a sensing roller sufficiently to deactivate the zone.

Pressure Roller Assembly - The roller and pivoting bracket which supports the drive belt and causes the rollers to be driven or non-driven.

Pneumatic Diaphragm Assembly - Pushes the pressure roller assembly and belt against the carrier rollers.

Actuation Valve Assembly - Pneumatic valving which allows accumulation or transportation.

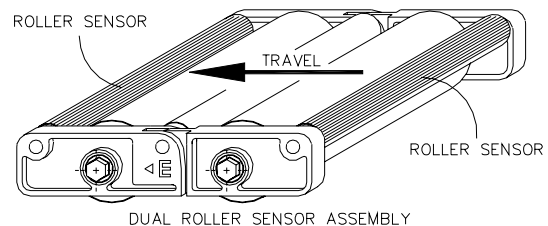
Coastability - Characteristics of a product which affect its coast on non-powered rollers (speed, weight and bottom firmness).

Release Efficiency - The ratio (%) between conveyor speed and product release rate (case feet/minute).

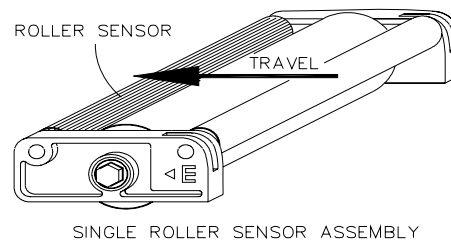
Product Density - The relationship of product to gaps during accumulation. Product coastability determines how tight the product will pack. High product density increases release efficiency.

FEATURES

Feature	Sensor		
	ACL	Single Roller	Dual Roller
Zero Pressure	X	X	X
Single roller sensor with 10 oz. zone actuation force		X	
Dual roller sensor with 8 oz. zone actuation force			X
Photosensor with zero zone actuation force	X		
Pop-out 1.9" Dia. Rollers	X	X	X
Mixed Size & Weight Product	X	X	X
Accumulate totes	X		X
Accumulation initiated at any zone	X	X	X
Low Air Pressure	X	X	X
Slug Release (rate over 90%)	X	X	X
24" Zone Length	X	X	X
75 lbs. Max. Load Per Ft.	X	X	X
200 lbs. Max. Unit Load	X	X	X
ACL = AccuLIGHT™ Photosensors			

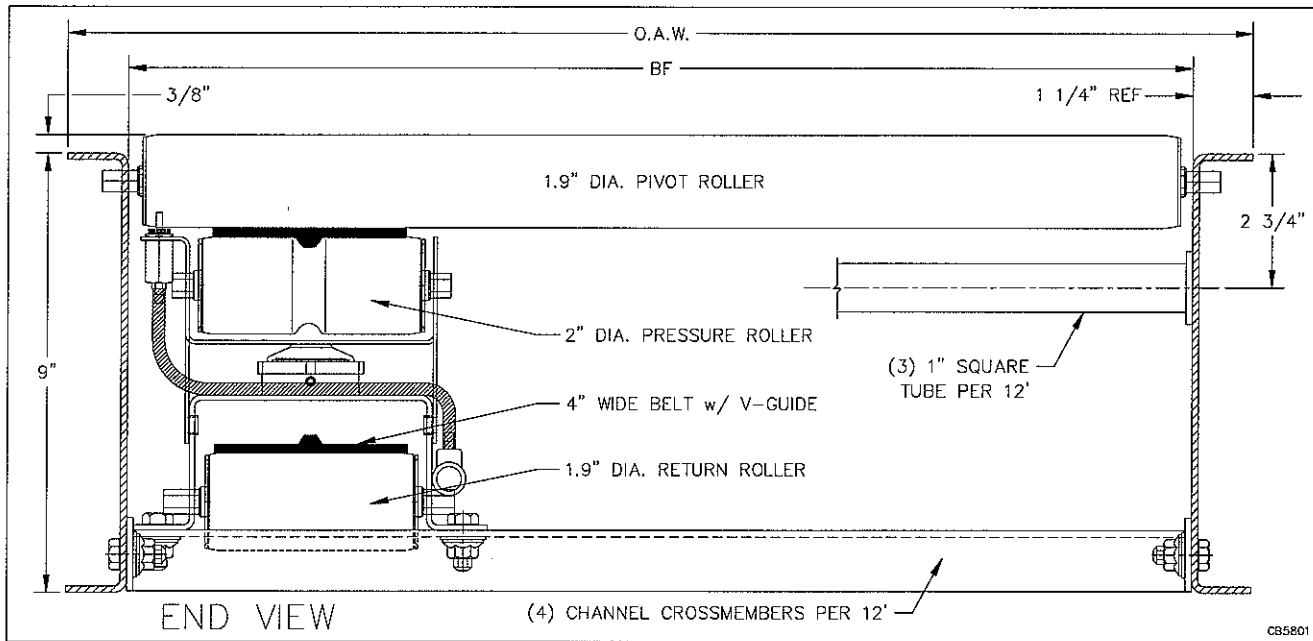


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EH5703A

APPLICATION



RELEASE RATES

Product delivery (release) following accumulation is always an important application consideration. The product release rate depends on the release valving, conveyor speed, length of zones, gaps between products, product length and sensor used.

Release efficiency is the ratio between conveyor speed (feet per minute) and the product footage delivered (case feet per minute). One variable is the amount of gaps between products before release. These gaps are due to product coast when accumulating. (See Coastability.) Additional gaps occur at release based on the valving.

When product is discharged over several releases, gaps from coast are eliminated. However, the release efficiency calculation to meet required gaps must consider both gaps from coast and valving.

SINGULATION VALVING

When product clears the discharge zone sensor, drive is applied to the carrying rollers in the next zone upstream. Whenever a sensor clears, the next zone upstream releases. This singulation release sequence progresses throughout the conveyor until a new accumulation signal is given to the discharge zone. The release efficiency is 45-50% with the single roller sensor. The dual roller sensor adds 6" to the gap which reduces release efficiency to 40-45%. These rates are for speeds less than 100 FPM. Higher speeds reduce efficiency by increasing the gap size.

SLUG VALVING

With slug valving, all zones are released simultaneously. Depending on gaps from coast, the release efficiency is 90-98% for both single and dual roller sensors.

ACCULIGHT PHOTOSENSORS

AccuLIGHT in *basic accumulation* can provide singulation during input, and can release either singulation or slug, depending on how it is wired. Or, AccuLIGHT may be ordered in *progressive accumulation* which allows slugs of product to be received and slug only upon release. The resulting release rate will be the same as described for Singulation (with single roller sensor) or Slug Valving. (See pg. 57-18).

Notes: Required case feet per minute ÷ release efficiency = required conveyor FPM.

COASTABILITY

Product coast is determined by many factors involving the product and conveyor. When one product does not coast up to the previous product, a gap occurs. Some gaps are likely within a zone. This is not a problem if considered when determining the conveyor speed.

Factors determining coast are:

1. Product bottom - smooth, firm, straight
2. Product weight
3. Product length relative to zone length
4. Conveyor speed
5. Roller bearing friction
6. Rollers still turning from previous product movement or rollers which have stopped

APPLICATION

USE AccuROL WHEN:

- Accumulation is required
- Product-to-product contact is allowed
- Single product release not required
- Product weight: 1-75 lbs./ft.
- Product may be same size and weight, or mixed
- Ambient temperature is +35° to 100°F
- Air supply is dry

APPLICATION NOTES

1. Conveyor operations before and after AccuROL are vital to proper application decisions.
2. The conveyor downstream from AccuROL must run at a speed which allows it to receive products as fast as they are released from the AccuROL conveyor.
3. The release rate increases over one or two partial releases or until all gaps are gone.
4. There will not be a gap or means of detecting a specific product, directly on the end of AccuROL.
5. When feeding sortation from AccuROL, use a split metering belt to singulate individual products with specific minimum gap as required.
6. AccuROL cannot be fed at a rate exceeding the AccuROL rate, especially from a curve.
7. AccuLIGHT (photosensors) with progressive accumulation can receive product back to back, providing the AccuROL conveyor is running at least equal to the speed of the conveyor feeding it.
8. Convey all products along one side of AccuROL unless products are nearly the same width and closely match the conveyor width.
9. Maximum slope on tapered totes may not exceed 2" per end.
10. When conveyor length is between 120' and 200', a belt takeout section 18" long should be considered or the belt will need to be spliced in the future.
11. During accumulation, product density (packing) increases with product weight and speed.

AccuROL SELECTION GUIDELINES

45 to 100 FPM using cartons

Singulation or slug release will provide the best dense product packing at low speeds and is user friendly. Sensor noise is minimal due to the low speed. Release efficiencies are dependent on the case size and mix, but normally are 50% for the standard singulation and 95+% for the slug release. Only 60-70% product packing may be expected at 45 FPM.

45 to 100 FPM using totes or tote and carton mix

Dual roller sensors with singulation or slug release work well for totes. The release efficiency is slightly lower for dual roller sensors (singulation 45%, slug 90%) and the conveyor does not pack quite as tight as with single sensors.

Over 100 to 150 FPM using cartons

Slug release has tremendous throughput rate at these speeds and can discharge up to 100 cases per minute from a single line.

Singulation release functions very well in this speed range, but the release efficiency drops as the speed increases. At 150 FPM the release efficiency is 30- 35%. Product packing while accumulating at speeds over 100 FPM may be expected to be 95-100%.

Over 150 FPM using totes or tote and carton mix

Operating AccuROL at these speeds requires an M ve engineering review.

GENERAL CAUTIONS

1. Steel or aluminum pallets with sharp edges do not work well with the dual roller sensor.
2. Singulating product one by one out of AccuROL is effective. However, it requires a fairly consistent product and requires M ve application review.
3. Do not pitch AccuROL either up or down. When product accumulates, the conveyor turns to gravity and can create line pressure problems.
4. Do not overfeed downstream conveyor with either singulation or slug release. This will create line pressure.

RECEIVING & SITE PREPARATION

GENERAL

AccuROL® zero pressure conveyors are shipped in subassemblies. These subassemblies are packaged to guard against damage in shipment when handled properly.

Examination immediately following unloading will show if any damage was caused during shipment. If damage is evident, claims for recovery of expenses to repair damage or replace components must be made against the carrier immediately. While unloading, a check must be made against the Bill of Lading, or other packing lists provided, to confirm full receipt of listed items.

CAUTION

TAKE CARE DURING THE REMOVAL OF EQUIPMENT FROM THE CARRIER. Remove small items and boxes first. Pull and lift only on the skid, not on the frame, crossmember or any part of the equipment. Be sure the skid is free of other materials which may be on top of or against the side of the skid to be removed.



PREPARATION OF SITE

After the conveyor is received, move it to the installation site or designated dry storage area as soon as possible. Clean up all packing material immediately before parts get lost in it. Loose parts should remain in the shipping boxes until needed.

Prior to starting assembly of the conveyor, carefully check the installation path to be sure there are no obstructions that will cause interference. Check for access along the path needed to bring in bed sections and components closest to the point where they are needed. It is often necessary to give the area along the system path a general cleanup to improve installation efficiency, access and accuracy.

PARTS INVENTORY & IDENTIFICATION

Each subassembly is shipped completely assembled except typical loose parts which are listed on page 9. Drive assemblies are shipped mounted to the drive bed frame. Segregate the conveyor subassemblies by types for inventory and ease of locating during installation.

An identification label is attached to the inside of one side channel or on a crossmember, close to one end of each conveyor bed and on all drive packages. This label contains: job number, part number, order number, tag number (if specified), assembler's initials and date of manufacture. On supports, the tag is located on the bottom side of the foot. On special devices it is located on a convenient flat surface that is not offensive to the appearance of the equipment but is still accessible for viewing. These numbers can be cross-referenced against the packing list. The illustrations in this manual and the part number stickers will assist you with your inventory.



Identification Label

Loose parts are boxed and shipped separately. You should have all conveyor sections and supports for a particular conveyor prior to installation. It is cost-effective to identify and procure any missing parts before they are needed for assembly. Small items like nuts and bolts are weigh-counted and packaged by size and type.

TYPICAL AccuROL® LOOSE PARTS

Part Number	Item	Use	Illustration
Varies by Size	Floor Support	Support Conveyor Frames	See Page 14
80400002	KBA Knee Brace	Brace Frame to Support Leg	See Page 14
80400003	KBB Knee Brace	Brace Frame to Support Leg	See Page 14
80400004	KBC Knee Brace	Brace Frame to Support Leg	See Page 14
80700010	Adjustable Channel	Guard Rail, 10' lengths	
80700001	Guard Rail Arm	Support Adjustable Channel G.R.	See Page 29
80700006	Guard Rail Upper Bracket	Fasten Adjustable Channel G.R. to Arm	See Page 29
80700007	Guard Rail Lower Bracket	Fasten Arm to Frame	See Page 29
80700011	Guard Rail Splice Angle	Support Rail-to-Rail Joint	See Page 29
95000027	1/4-20 Bolt x 2" Hex Head	Upper Bracket to Channel G.R.	See Page 29
95000075	3/8-16 x 1" Hex Head Bolt	Lower Bracket to Frame and Brackets to Arm	See Page 29
95000020	1/4-20 x 3/4" Hex Head Bolt	Splice Angle to Channel Guard Rail	See Page 29
95200050	1/4-20 Nuts	Adjustable Channel Guard Rail	See Page 29
80700013	V-Bracket	Ceiling Hanger	See Page 15
Varies by Length	Cross Pipe	Ceiling Hanger	See Page 15
40700051	Connector Plate	Bed Joints	See Page 16
40700057	Butt Bolt Connector	For Ceiling Hung Applications	See Page 16
40700051	Electrical Components	Per Application	
95000072	3/8-16 x 3/4 Hex HD Bolts	Butt Bolts, Braces, Supports	
95000074	3/8-16 x 3/4 Truss HD Bolts	Angle Guard Rail	
95200061	3/8-16 Nuts	Angle Guard Rail	
90530005	O-ring Slave Belts	Roller-to-roller belts at charge and discharge end	
80701002	2" Angle Guard Rail	Straight conveyor	
Varies by Width	Rollers	Carrying rollers mounted in frame	
Varies by Length	Belt, 4" Wide, V-Guided	Drive Carrier Rollers Conveying Length x 2 + 5'-3"	
98900016	Kit, Filter/Regulator	Maintain Filtered Air at 20 PSI	

GENERAL PROCEDURES

The following procedures are to be used as guidelines only. Specific installation methods will vary somewhat depending on available equipment on site and each installer's preferences based on past experience.

WARNING

The Installation Supervisor must be experienced with conveyor and qualified in the mechanics of the equipment and enforce safe working procedures for the protection of the crew, customer, and customer's property.

DIMENSIONAL REFERENCE POINTS

The path of each conveyor in the system is determined by establishing a reference point at each end. The center line of the conveyor is established and a chalk line is snapped between these points.

Conveyors should be installed with the center line of the bed matching the center line of the conveyor path. Locate and mark the center of the crossmembers at each end of the conveyor. Use a plumb line or other acceptable means to ensure accuracy to the chalk line.

Always carry out a thorough check for any obstructions such as building columns, manholes, etc. It may be necessary to reroute the conveyor to avoid the obstruction. In this case it would be advisable to begin installation at this point, using the obstruction as a reference point (Datum), and install the sections in either direction as required.

All conveyor sections must be checked for squareness prior to installation as "racking" or being knocked out of square may have occurred during shipping and handling.

ELEVATIONS

All conveyors should be installed in accordance with the elevations shown on the drawings. In addition, all conveyors must be level across the frame width and length (if horizontal). Leveling of the frames is best done using a rotating laser level or a builder's level.

After the first elevation is established at a critical point, the elevation of all other points shall be relative to this first point. Normal practice is to dimension the layout and measure elevations from the floor at each point of support.

As the conveyor system proceeds onto another floor or into another building or room, a new elevation will be measured from the floor at that point. This new elevation will then become the reference for subsequent elevations.

When installing an overhead system, the first elevation is measured from the floor and becomes the reference elevation point until a change in elevation is shown on the layout. Any new elevation is also measured from the floor and becomes the new reference point. The process is repeated each time an elevation change occurs.

CAUTION

Consult the building architect or a structural engineer regarding ceiling loading or structural limitations of the building if any conveyor is ceiling hung.

COMPONENT ORIENTATION

Using your conveyor system layout drawing and the numbers on the I.D. tags on each component, position and orient the conveyor sections. You must know:

- The direction of product flow
- The elevation height
- How the drive is positioned
- Charge and discharge end beds

IMPORTANT! Do not make alterations to the equipment without consulting with user's representative and Maintenance. Unauthorized modifications to the equipment may impair its function, create a hazardous condition, affect its useful life and/or void the warranty.



Discharge end bed with product flow direction.

SUPPORTING ARRANGEMENTS

FLOOR SUPPORTS

Install bolts used to attach the standhead to the frame so the nut is on the bottom. Standhead bolts should be left finger tight while the conveyor is being assembled and aligned.

Floor supports are ordered by nominal height range, which is the dimension from the floor to top of the support. Conveyor elevations are shown on the layout by top-of-roller elevations. This difference must be recognized when setting the support elevations. AccuROL® conveyor is 9-3/8" from top-of-support to top-of-rollers with a 9" deep frame channel.

It is important that conveyor frames be installed level. Floor supports will accommodate normal irregularities in the floor surface. Adjustment for elevation in floor supports is accomplished with metal-on-metal bolt clamping force. To achieve the support's stated load rating, it is necessary to tighten the elevation adjustment bolts (3/8" diameter) to 23 ft./lbs. of torque.

Supports should always be installed in the vertical position, and any variations due to conveyor pitch or floor slope will be compensated for in the pivoting standhead of the support.

ANCHORING

Anchoring in concrete floors is accomplished by drilling into the floor and inserting the suitable anchor bolt. The hole diameter and depth must be in accordance with the anchor bolt manufacturer's instructions.

Anchor intermediate floor supports with two anchor bolts, one through each support foot plate using minimum 3/8" diameter anchor bolts. For floor supports over 5' high or when supporting drives, use 1/2" diameter anchor bolts.

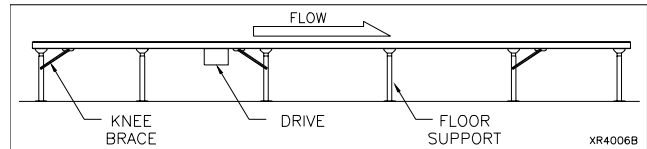
Stagger anchors from front hole on one side of the support, to rear hole on opposite side. Anchor bolts for equipment subject to impact loads should be a minimum of 1/2" diameter.

WARNING

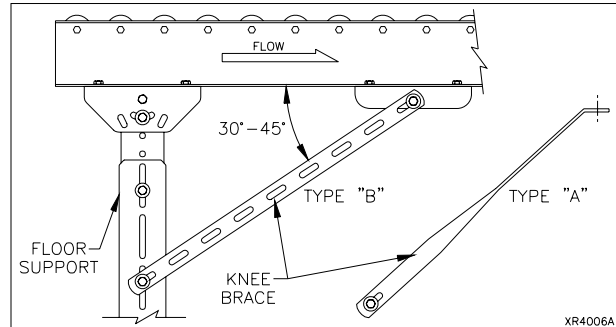
Place a bolt through the frame and support immediately with finger tight nut. This will prevent the frame from falling off the support, if bumped, and causing injury.

KNEE BRACES

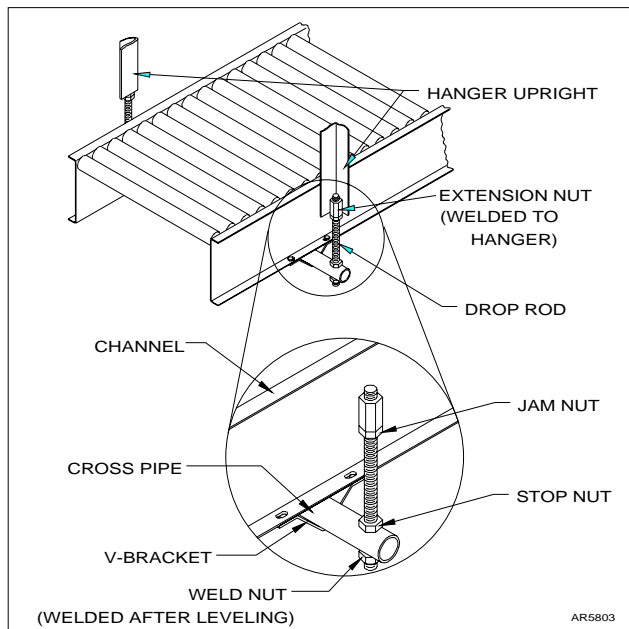
Stability along the conveyor length is achieved with knee braces. Braces resist stresses caused by direction of product flow, drives, stops and starts. Every support does not require bracing. Braces are used at the ends of straight runs and approximately every 30' in between. Braces should be located toward the discharge end (DOWNSTREAM) side putting them in tension. Starting the conveyor puts opposite stresses on the supports, which is resisted by installing a brace near the drive toward the receiving end (UPSTREAM).



For best results the angle between the knee brace and frame should not exceed 45 degrees, or be less than 30 degrees. On short supports where a small angle results, the knee brace may need to be shortened.



CEILING HANGERS



Drop rods and nuts are optional. The extension nut is welded into the angle hanger upright during installation.

WARNING

Consult the building architect or a structural engineer regarding ceiling loading or structural limitations of the building for sizing header steel.

Cross pipes, V-brackets and flat strap connectors are provided with ceiling hangers. Threaded 3/4" rod and attaching nuts are available as an option. Bed connectors are recommended with all ceiling hanger applications.

If hanger uprights are field fabricated, they should be a minimum of 1-1/2" x 1-1/2" x 3/16" angle.

WARNING

Consult your distributor or a structural engineer to determine what size hangers should be used to support your maximum anticipated load.

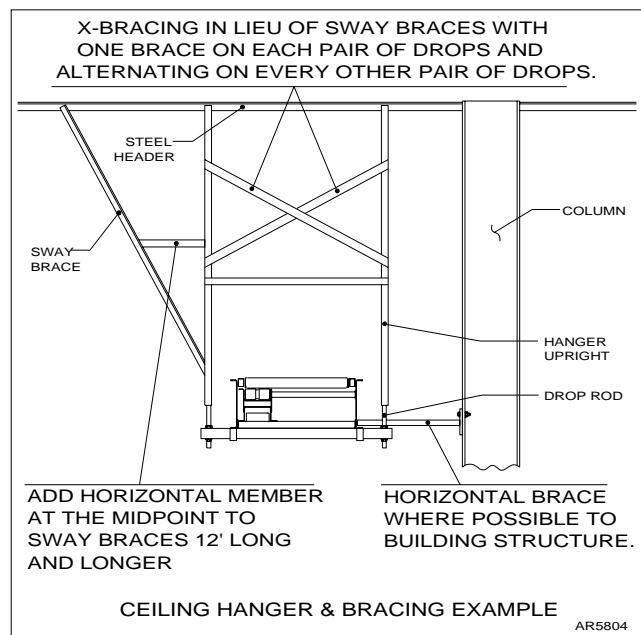
After hanger uprights are installed and the heavy extension nuts welded to angle hangers, thread the drop rods into the extension nuts. Thread the jam nuts and stop nuts on the drop rods far enough up the rods to allow installation and adjustment of the cross pipe.

While still on the floor, loosely attach cross pipe, V-brackets, flat strap connectors and bed connector to one end of a bed section. Hoist the bed section between the drop rods guiding the rods through the mounting holes in the cross pipe. Thread the weld nuts on the drop rods to support the bed. Weld the weld nuts to the drop

rods to prevent loosening. Hoist the next bed section into place and connect it using the flat strap connectors and V-brackets. Level the bed lengthwise and side to side by threading the drop rods up or down by using a wrench on the weld nuts. Tighten the jam nuts against the extension nuts and the stop nuts against the cross pipe. Continue for the length of the conveyor.

SWAY BRACING (CEILING HANGER)

1. Sway bracing should be a minimum of 1-1/2" x 1-1/2" x 3/16" angle.
2. Sway bracing is secured to the hanger upright near the conveyor support and extended upward at an angle of approximately 30 degrees from the hanger upright. The sway brace angle should not be over 45 degrees to the upright. When hangers are installed adjacent to building columns, a horizontal brace may be installed securely to the column.
3. Hanger uprights over 12'-0" in length must have horizontal bridging angles connected between the upright and the sway brace at approximately the half way point.
4. Sway bracing should be installed on every third hanger (maximum of 30'-0" centers).
5. If sway bracing cannot be placed on the outside of the uprights, alternate X-bracing between every other pair of uprights.
6. Additional bracing should be used:
 - Before and after curves
 - At drives
 - At product diverting points



ANCHORING CEILING HANGERS

Open Building Steel

The following references are from the American Institute for Steel Construction manual (AISC).

Welding of auxiliary steel (stringers or headers) to building steel is prohibited.

Drilling and bolting to building steel is not recommended and will be done only with the customer's written permission.

Clamping of stringers or headers to building trusses will normally be done only at panel points. Specific customer permission and load calculations by a qualified engineer are necessary to safely clamp between panel points.

Headers when used for short spans, such as between roof purlins, will be securely clamped to building steel. Stringers, when used between headers, may be welded or bolted to the headers directly or with suitable angle clips.

Concrete Ceilings

Accomplish anchoring by drilling into the concrete ceiling and inserting suitable anchor bolts. The hole diameter and depth must be in accordance with the lag bolt manufacturer's instructions.

Anchor each hanger with four bolts (two per upright) minimum size 1/2" diameter. Consult your distributor or structural engineer to determine your needs.

WARNING

Do not use explosive type anchors.

For heavier concentrated loads like drives or points where movement or vibration can occur, use 5/8" diameter through bolts with backup plates. If this is not permissible or possible, then header steel must be installed using several anchor bolts to spread the load.

Wood Joists/Beams

Hangers may be attached directly to the joists providing the load rating of the building will permit. Attach hangers to the vertical side of the joist in two places, one above the other, on each hanger upright. Anchoring is accomplished by drilling through the joist in the upper position and using a 1/2" diameter through bolt with a backup plate or heavy washer. A 1/2" diameter lag screw may be used in the lower position.

When a header is required to support the load, it must bridge across two or more joists. This header will be attached to each joist in the manner specified in paragraph above. Hanger uprights should then be bolted or welded securely to the headers. **Consult a structural engineer to determine which method should be used for your load requirements.**

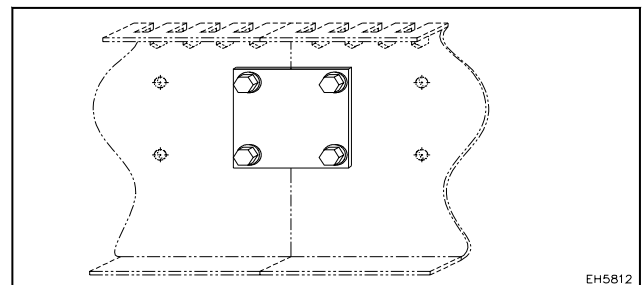
Concrete/Masonry Walls

Equipment may be supported from concrete walls through use of suitable bolts and anchors or by bolting through the wall if the condition of the wall or load dictates it. A 1/2" diameter through bolt should be used with a backing plate.

Ceiling-hung conveyor header steel should be installed well ahead of the conveyor frame installation to minimize congestion.

CONNECTORS

Adjoining beds are connected using flat plate connectors. When used with ceiling hangers and the hanger is not centered on the frame joint, the hanger should be within 1' of the joint while maintaining 12' maximum centers. The beds should be temporarily supported while the support and connectors are installed.



BELT INSTALLATION

PRE-INSTALLATION

Belts, as shipped from Manufacturer, are cut to length with lacing installed. Belts should be stored on a pallet. Never leave a belt where it may absorb moisture. Re-move any tight shipping banding immediately upon arrival.

The conveyor should be completely installed and aligned less belt and carrying rollers. The belt pressure pans must be checked for alignment.

Remove the springs from the take-up pulley located at the drive and move the take-up pulley as near as possible to the drive pulley. Check the three snubber rollers in the drive that they are square to the frame. The axles of these snubbers are located in a hole on one side and a slot on the opposite side. The starting position must be with the axle centered in the slot.

Remove the bottom pan from the drive frame along with the access panel in the top of the hat shaped structure supporting the pressure roller assemblies. The belt may now be installed.

BELT TRACKING

With the belt tensioned, bump the motor over to be sure everything is running smoothly and stays in position. Most AccuROL conveyors do not require belt tracking. However, each conveyor should be checked at the drive to be sure the V-groove is floating in a neutral position with light contact on the sides of the V-grooved snubbers. If the V-section is out of the groove or riding hard to one side, adjustment can be made on the driven pulley jackscrew, to realign it.

Reinstall the bottom pan on the drive and access covers at this point. The carrying rollers can now be installed.

BELT THREADING

To thread the belt, it will be most efficient to have two people working together.

Start at the charge end (closest to the drive) and unroll the belt the full length of the conveyor with the belt laying on the pressure roller assemblies. At the discharge end, one person will feed belt as required to the other working the belt through the conveyor to the drive location.

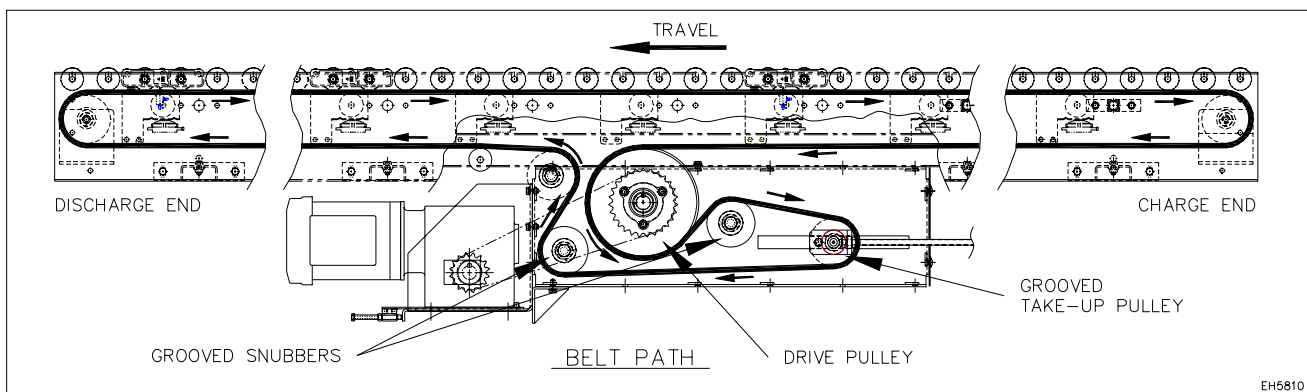
Pull all the remaining belt slack to the drive. With one person feeding the belt into the drive the other will thread it through from underneath. After working all the belt slack through the drive, the threading is completed through the charge end bed around the end pulley to the starting point on top of the charge end bed.

Join the ends of the belt together so the sides of the belt are even. Mesh the loops of the lacing on one end of the belt with the loops on the other and install the lacing pin. If the ends will not readily join together, use a belt tensioning device which distributes load over the width of the belt.

BELT SPECIFICATIONS AND LACING

AccuROL belting is PVC 150, 4" wide, .170" thickness (+/- .015), covered on one side with brushed back. "O" section V-guide is secured full length down the center of the back side.

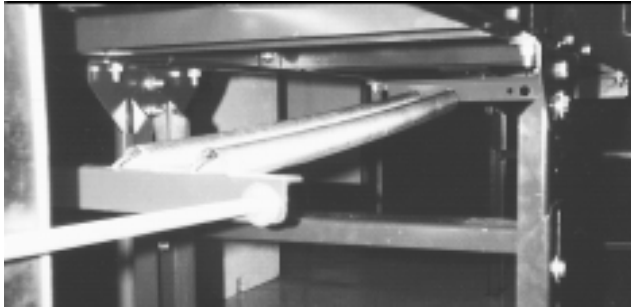
Use Clipper #1 long leg, standard point lacing. Strip V-guide back 3/4" on each end. Peel back and remove cover in lacing area across the belt width. Notch back the belt corners. Check that lacing is laying flat with full point penetration.



BELT TENSION

The belt can now be pretensioned by installing the take-up springs. Make sure the V-guide is properly laying in all grooves and double check the path through the drive. In addition, the return belt must be inside of the pressure pan on top of the return rollers.

The drive assembly must be mounted to the bed with a product travel in the correct direction. The belt direction must travel from the drive pulley to the take-up pulley. This



Two springs shown between take-up and anchor.

will automatically be correct if the drive was assembled correctly at the factory and the charge bed was installed per the product flow label on the end of this AccuROL conveyor.

Pull back on the take-up pulley until most slack is removed from the belt. Mount the spring anchor to the underside of the conveyor frame 6" to 9" past the spring's relaxed length. The take-up springs can then be installed between the anchor and attachment which is attached to the take-up pulley. Normally two springs will be adequate. For some applications the total belt pull will require three springs.

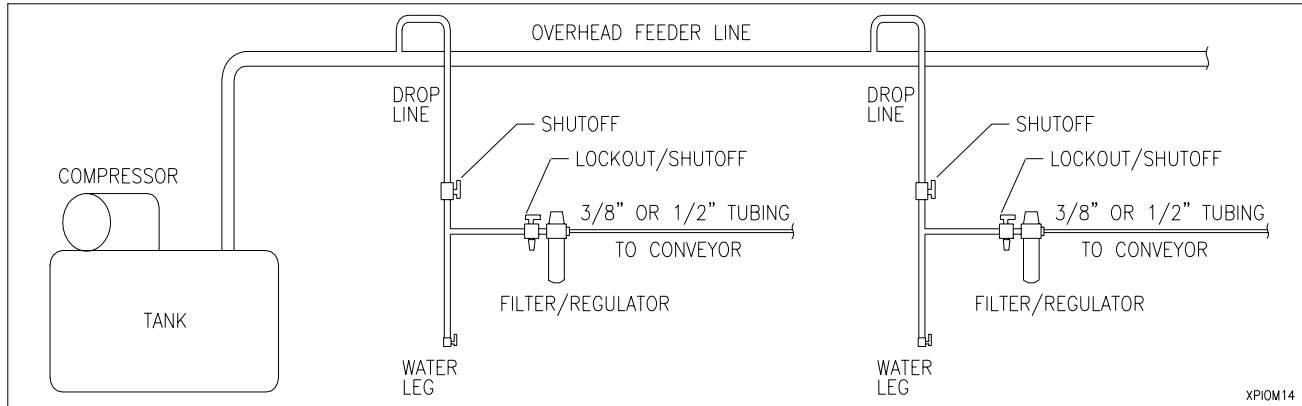
Each take-up spring increases in tension by 5 lbs./in. plus 22 lbs. beyond its relaxed length. Therefore, with two springs, the pull on the belt increases or decreases 10 lbs. with each inch of coil-to-coil dimension change.

The following is a guide to properly position the spring anchor. The relaxed spring length is 22" coil-to-coil. The dimensions given in the chart below are total spring length required to apply proper tension to the belt at various horsepower and speed combinations.

ACCUROL TAKE-UP SPRING COIL-TO-COIL DIMENSION (INCHES) UPPER GRAY AREAS INDICATES RECOMMENDED USE OF HIGH STRENGTH BELT

<u>HORSEPOWER</u>	<u>1/2</u>	<u>3/4</u>	<u>1</u>	<u>1 1/2</u>	<u>2</u>	<u>3</u>
SPEED						
FPM						
30	34	---	---	---	---	---
35	32	---	---	---	---	---
40	30	---	---	---	---	---
45	29	34	---	---	---	---
50	28	33	---	---	---	---
60	28	30	34	---	---	---
75	28	28	31	---	---	---
90	28	28	29	34	---	---
100	28	28	28	32	---	---
120	28	28	28	30	34	---
150	28	28	28	28	31	---
180	28	28	28	28	29	34
210	28	28	28	28	28	32

AIR SUPPLY REQUIREMENTS



XPIOM14

GENERAL

Every conveyor system is unique, with its own specific requirements. Therefore, the following is a general guide.

MAIN FEEDER: Air velocity through the main feeder piping can be kept smooth with lower losses using large diameter pipe with minimum bends and restrictions. Standard weight black pipe or copper is suitable for plumbing the compressed air overhead to all points of use.

AIR DROPS: Mve recommends using 3/4" pipe on air drops for high flow and low pressure loss. The drop is terminated with a drain at the bottom. A tee located prior to the drain branches off to the conveyor. This branch line must contain a lockout/shutoff. A shutoff must also be located in the drop before the branch tee. OSHA Rule 29, CFR1910.147 requires energy sources (air drops) be turned off and capable of being locked or labeled with a warning tag.

Note: The pneumatic system of AccuROL does not require lubrication. Lubrication may affect the valving operation and cause sluggish or erratic operation.

Important: If your air compressor uses a synthetic oil, a coalescing filter plus a regular filter of 5 micron is required. Synthetic oils will shrink the seals in pneumatic devices and valving.

CAUTION

All air lines must be thoroughly blown out (of all debris) and the regulator must be set at 18-20 PSI before connecting air to AccuROL.

LOW PRESSURE SWITCH

An air pressure switch is recommended to be installed into the pneumatic circuit to detect a drop in air pressure below required levels. If pressure drops below approximately 12 PSI, the conveyor system will shut off.

PNEUMATIC REQUIREMENTS

1. Regulator pressure set at 18 PSI
2. Maximum conveyor length each way from regulator is 100'. Locate regulator in center of conveyor for maximum length.
3. Regulator must limit pressure to 20 PSI maximum
4. Low pressure switch to be set at 12 PSI
5. In high humidity or low temperature, use air dryer
6. Use 5 micron filter
7. Lockout/shutoff valve to be provided by air system installer

Other:

1. Compressor HP = total CFM ÷ 3.55
2. Air tank size = approx. 1 gallon per CFM

Formulas to determine cubic feet per minute (CFM) air consumption (at 20 PSI) follows:

1. Sequential release valving (Dynamic Sensing™) = .0014 x accumulated conveyor length (ft.) x releases per minute
2. Singulation release valving = rate (products per minute) x conveyor length (ft.) x .0014

CAUTION

A solenoid air shutoff is required for conveyors running 100 FPM or more. The solenoid must energize the air supply 5 seconds AFTER the motor starts.

A high pressure condition can occur between products when an emergency stop has been actuated to cause the conveyor to stop in the middle of a release.

AIR LINE CONNECTIONS

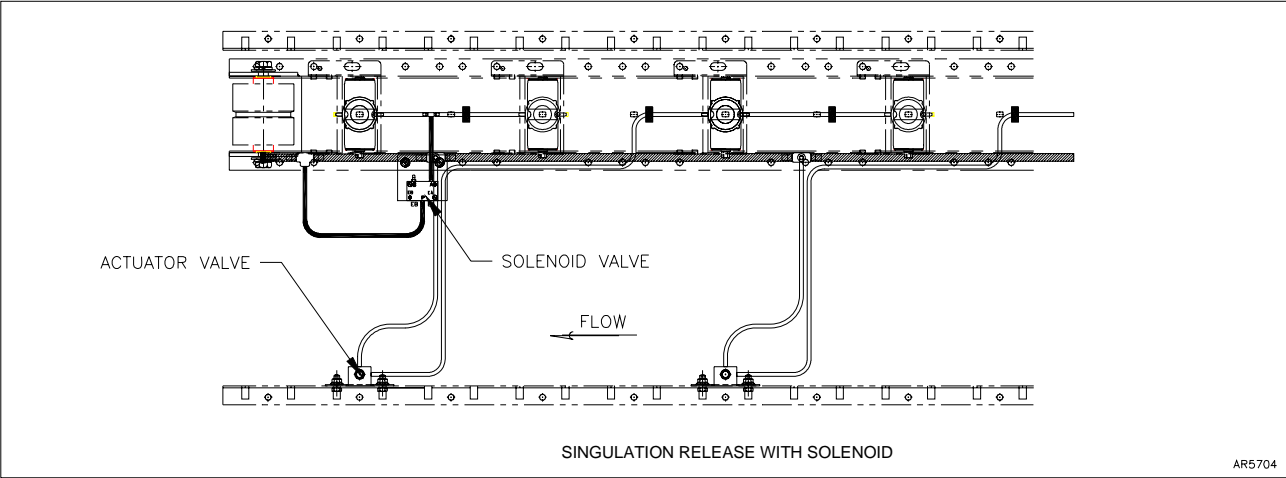
GENERAL

After all beds are installed, the pneumatic connections can be made from one bed to the next. The air lines are connected between zones within the same bed, at the factory.

Connect the supply and control air lines between beds using the straight connectors supplied. The air supply line on the first zone of the charge end bed is capped at the factory.

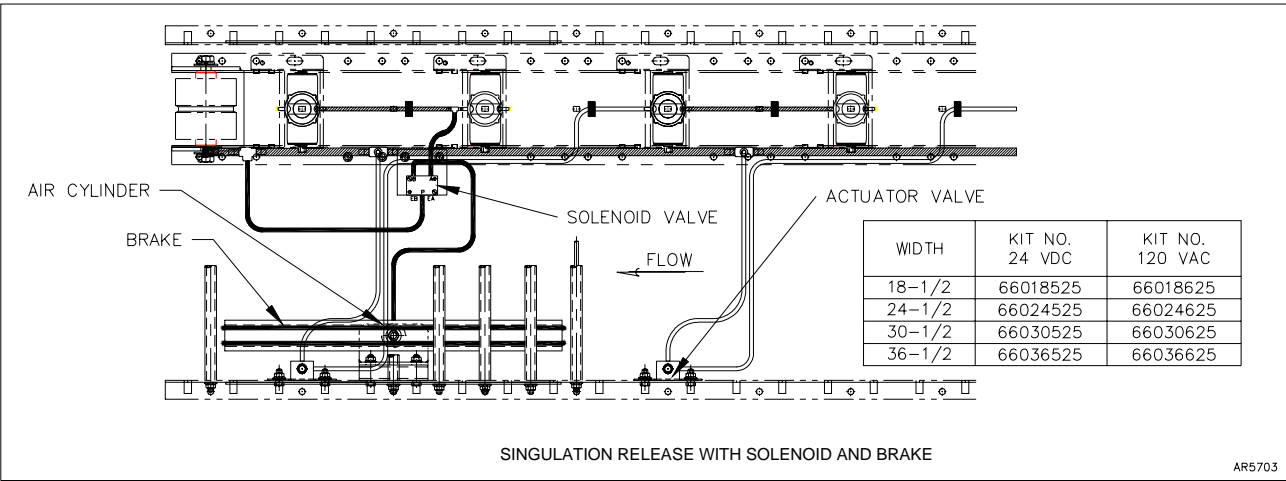
For conveyors over 100' in length, connect the source air at the center of the conveyor into the supply line.

SINGULATION RELEASE WITH SOLENOID



AR5704

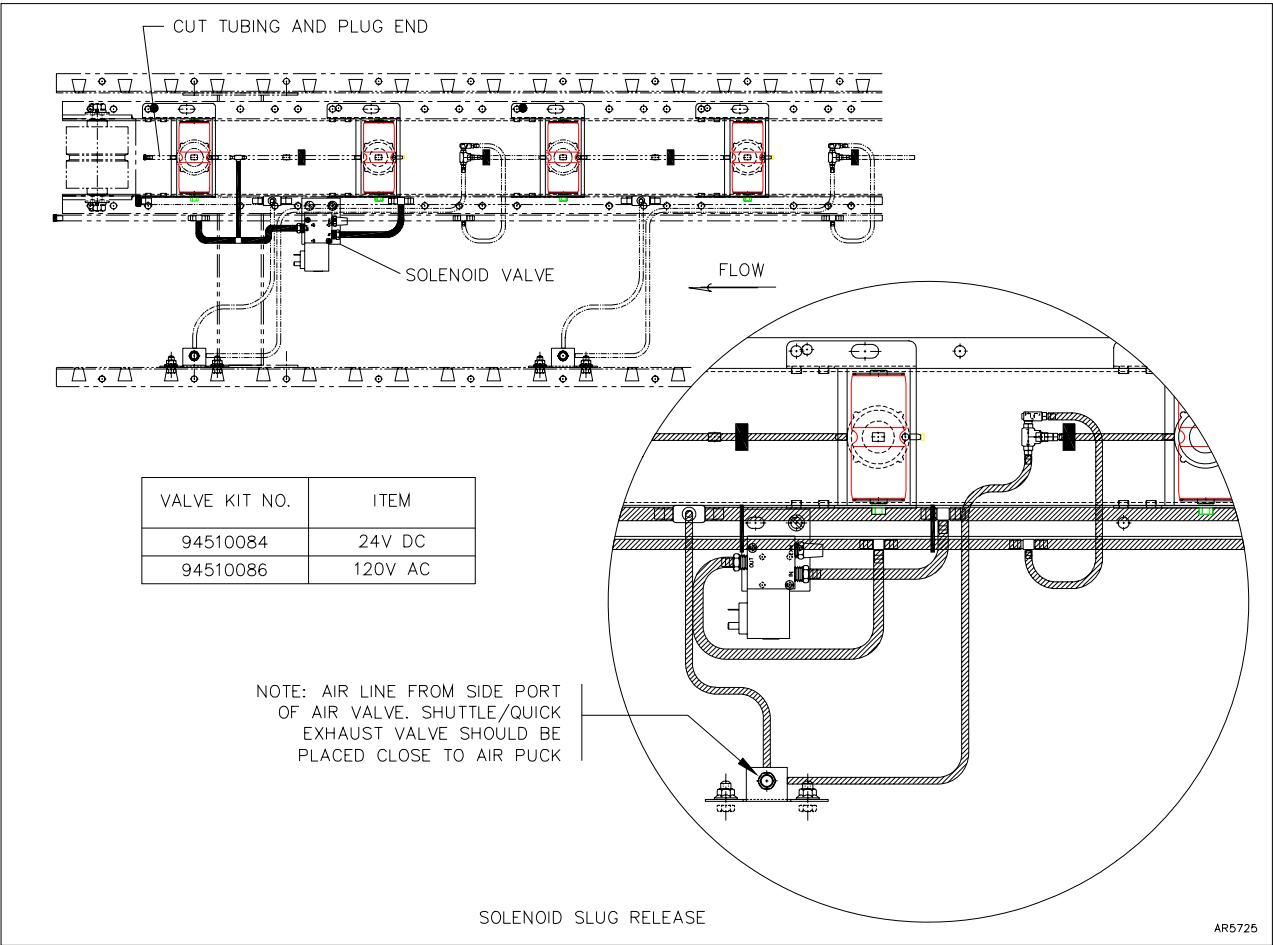
SINGULATION RELEASE W/SOLENOID AND BRAKE



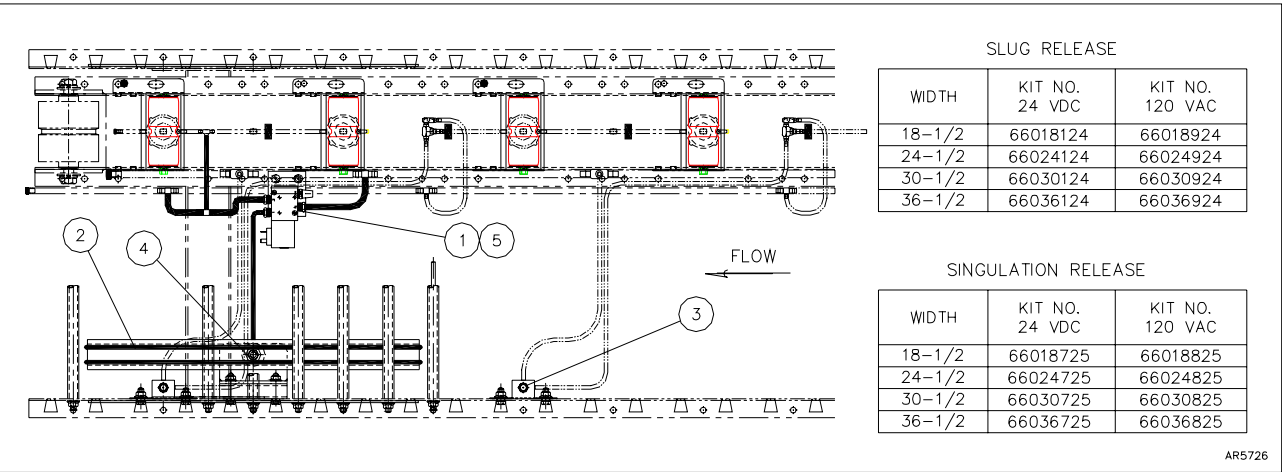
AR5703

AIR LINE CONNECTIONS

SLUG RELEASE W/SOLENOID

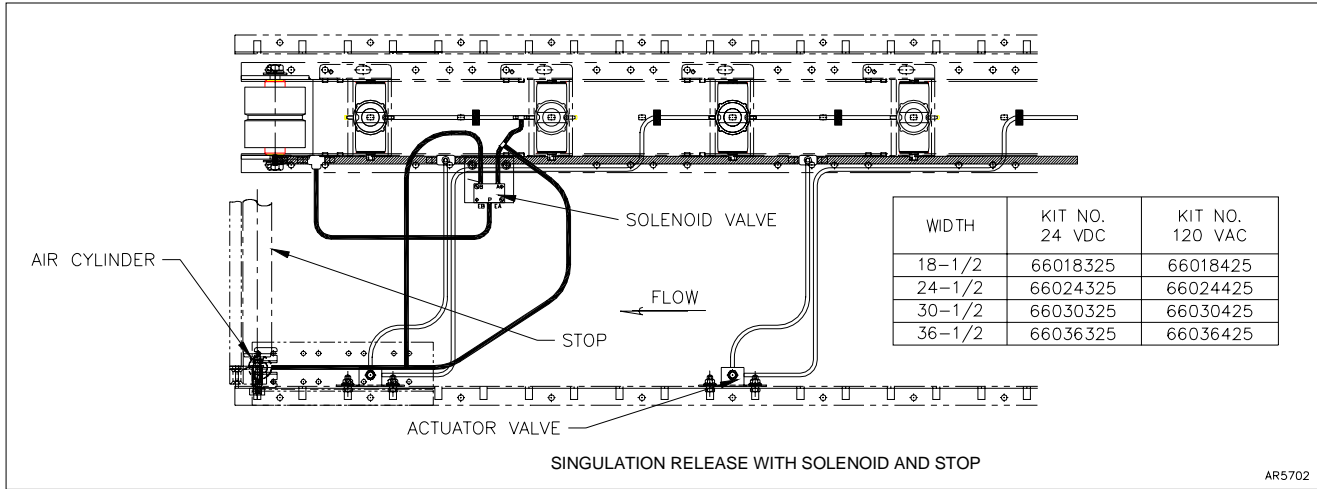


SLUG RELEASE W/SOLENOID AND BRAKE

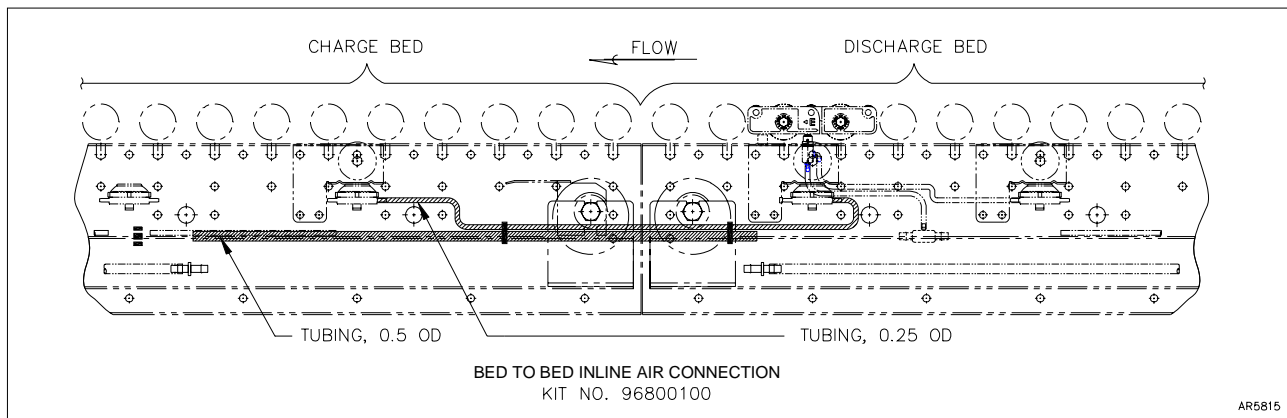


AIR LINE CONNECTIONS

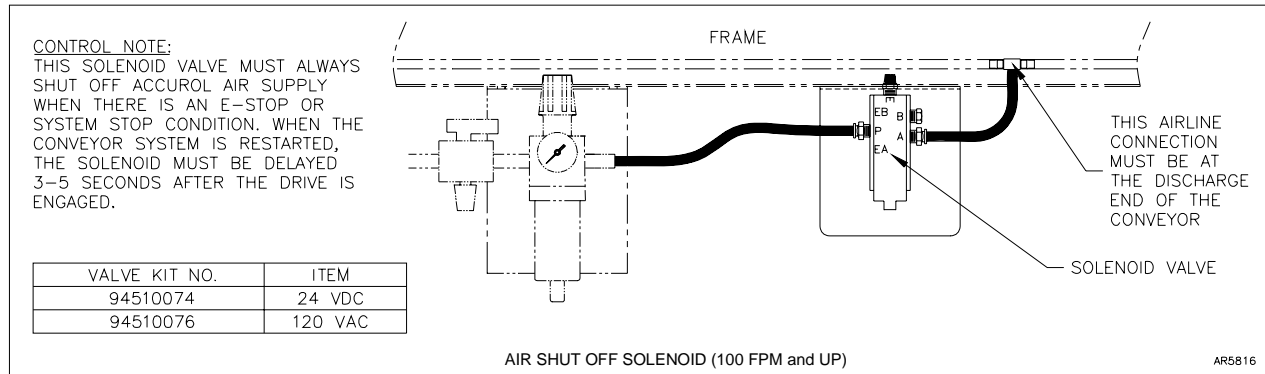
SINGULATION RELEASE W/SOLENOID AND STOP



BED TO BED INLINE AIR CONNECTION

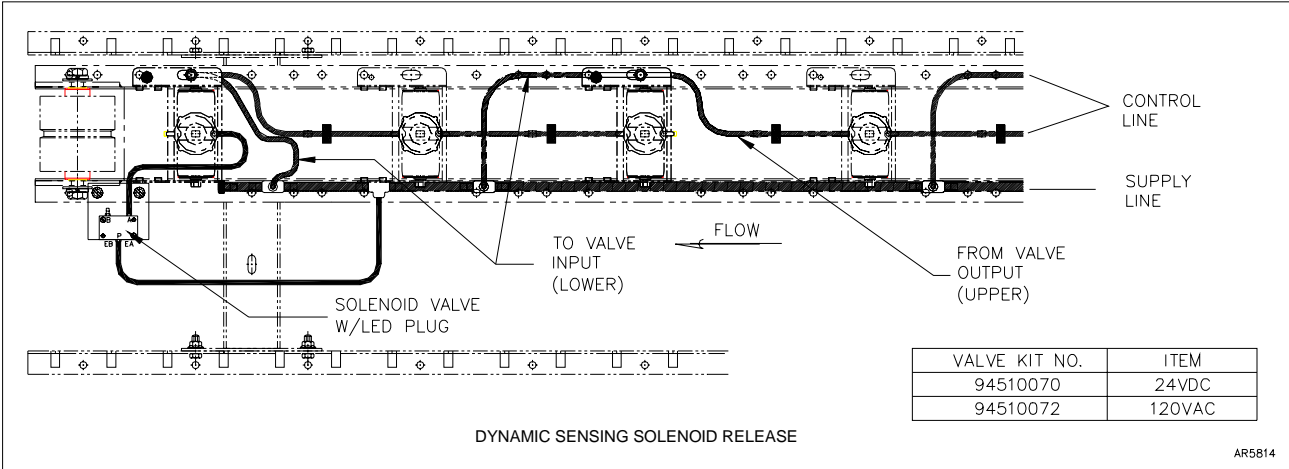


AIR SHUTOFF SOLENOID

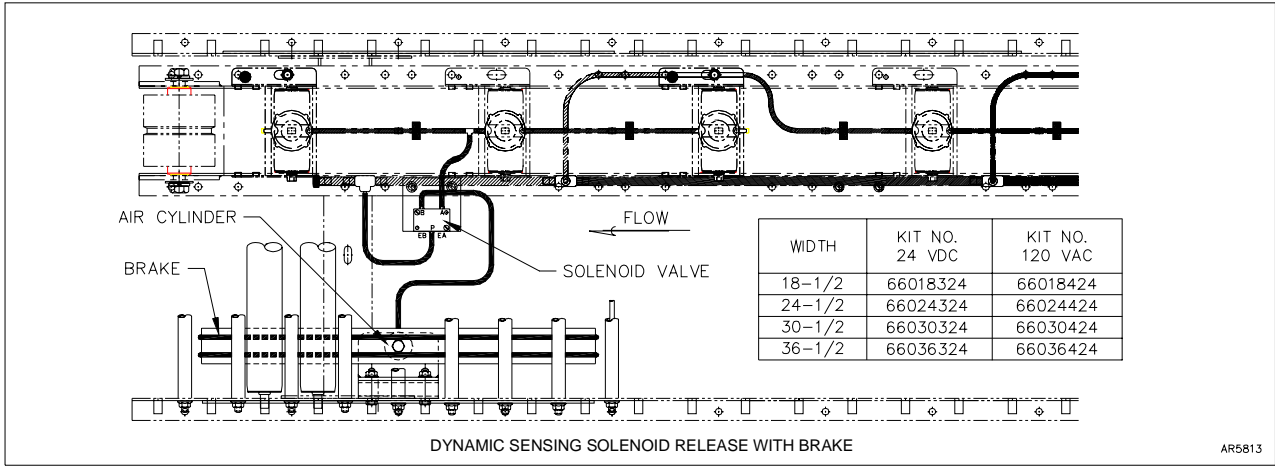


AIR LINE CONNECTIONS

DYNAMIC SENSING SOLENOID RELEASE

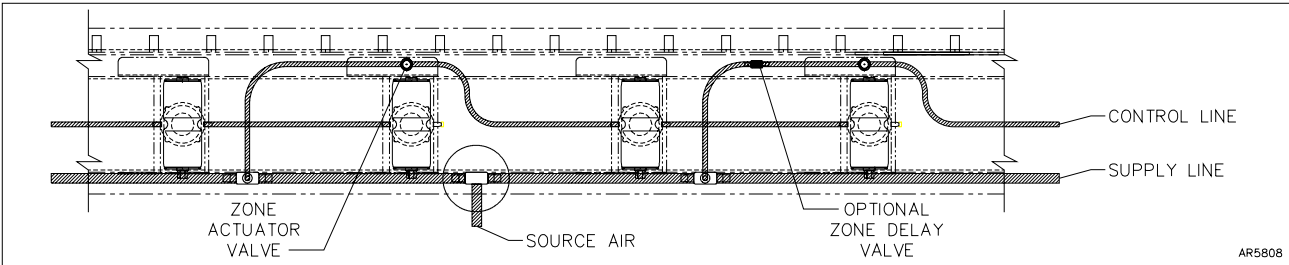


DYNAMIC SENSING SOLENOID RELEASE W/BRAKE



INTERMEDIATE BED

For conveyors over 100' in length, connect the source air at the center of the conveyor into the supply line.



AIR LINE CONNECTIONS

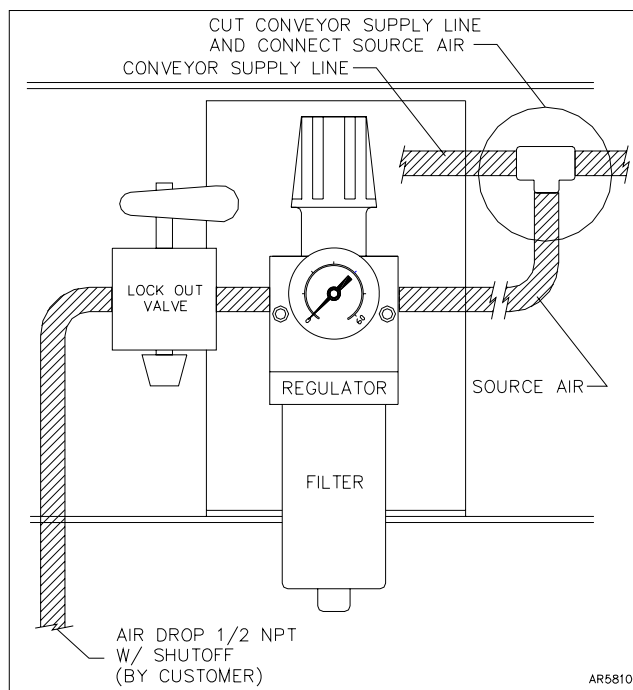
SOURCE AIR CONNECTION

Select the best position along the conveyor to connect the source air from a drop line. This should not be more than 100' from either end of the conveyor. Attach the filter/regulator assembly to the bottom flange using the mounting bracket supplied with the kit.

Cut the supply line in the conveyor bed and install the source air line tee fitting. Connect the source air line between this fitting and the filter/regulator output.

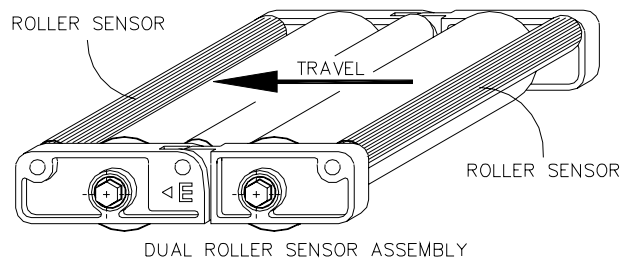
CAUTION

Do not use a lubricator. When replacing filter/regulator bowl, lightly lubricate seal with mineral oil. Do not use synthetic oils such as esters or silicones. DO NOT get oil inside filter/regulator bowl.

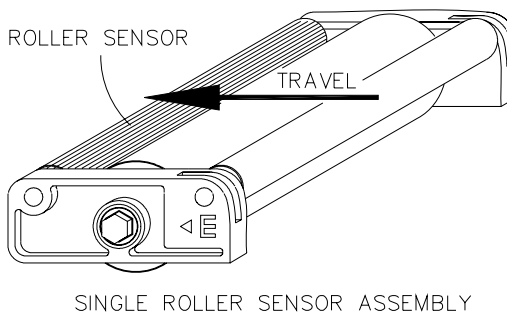


SENSOR INSTALLATION

Sensor assemblies are shipped in a roller box. Since AccuROL has pop-out rollers, the sensor assembly simply drops into place over the actuator valve. It is important to have the 3/4" diameter sensor rollers up and in the proper location relative to product travel. On the double roller sensor assembly, there is a directional arrow molded into the black pivot blocks indicating the product travel direction.

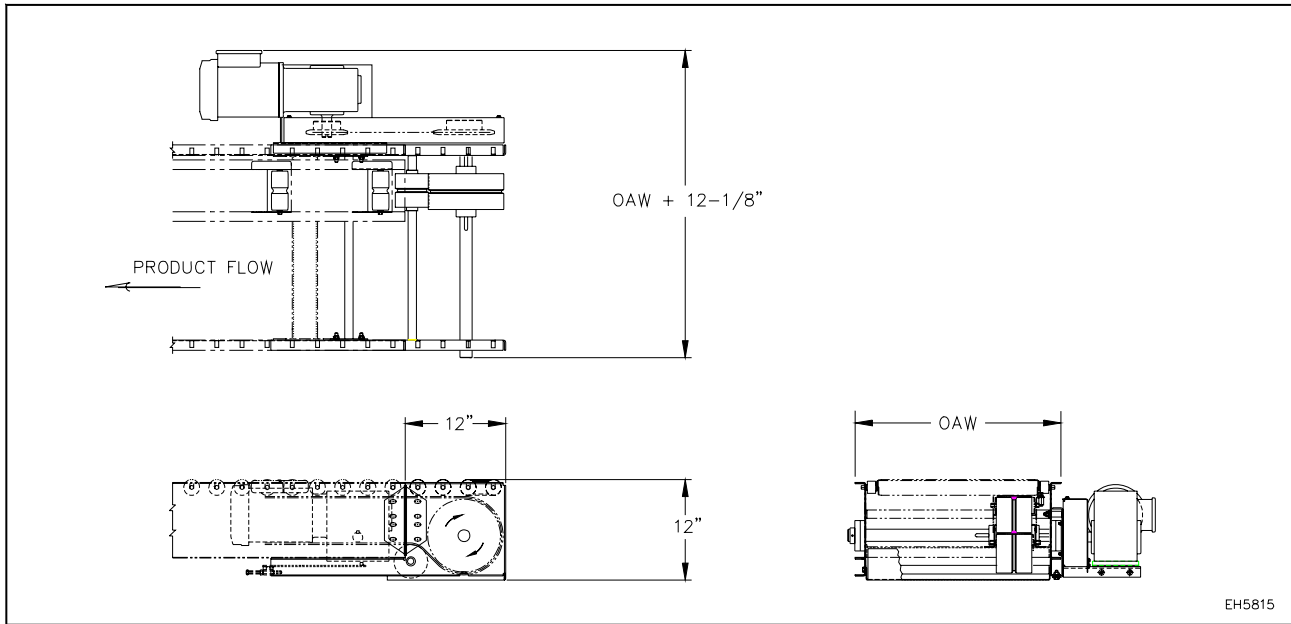


EH5703B



EH5703A

SIDE MOUNTED DRIVE AUXILIARY TAKE-UP (OPTIONAL)



Belt take-up has automatic spring operation and maintains low profile.

The AccuROL side mounted, low profile, end drive is used in applications requiring minimum profile (or depths) from top of roller to underside of the drive and take-up. This minimum profile may be required for a low elevation to the floor, for use with multi-levels or to provide maximum overhead clearance.

The 8" diameter drive pulley allows the same maximum load capacity as the standard center drive. An auxiliary belt take-up is required with this end drive. The auxiliary take-up has the same travel and take-up capacity as the standard belt take-up built into the center drive.



Side mounted drive is located at the charge end.

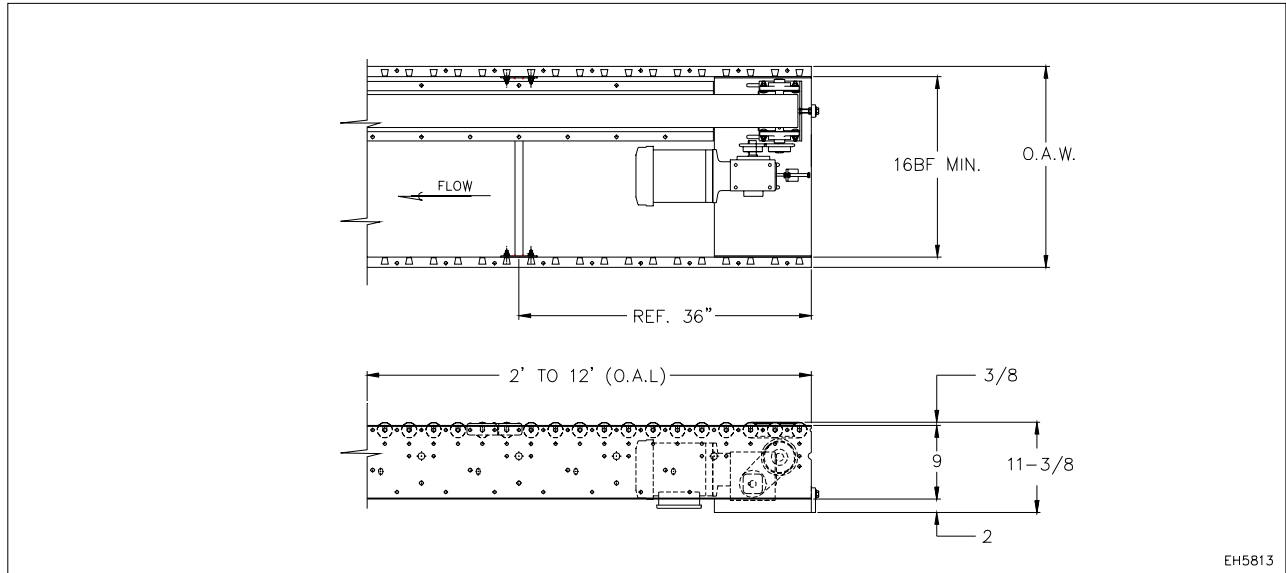
FEATURES

- 12" top of roller for low profile drive and take-up.
- 11-1/2" side projection.
- Take-up is spring operated.

BELT LENGTH

Double the overall conveyor length and add 2'-10". (Includes auxiliary take-up.)

COMPACT DRIVE (OPTIONAL)



EH5813

APPLICATION

AccuROL Compact Drives reduce the cost of AccuROL conveyor in 60'-0" lengths or less. This compact drive completely contains all its components within the frame width, at a low profile depth of 12". The take-up is built into the reducer/drive pulley mounting plate, eliminating the need for an auxiliary take-up normally associated with end drives. The 4" diameter lagged drive pulley will handle up to 1,000 lbs. of product at one time.

Note: A V-belt Driven Curve (pg. 57-15) or Power Connection to XenoROL (pg. 57-16) can only be slaved from the discharge end.

BELT LENGTH

Double the overall conveyor length and subtract 4". When using the Compact Drive over 45'-0" in length, belt stretch becomes critical due to the 4-1/2" belt take-up built into the drive. At some point relacing may be required. This can be avoided by using an auxiliary belt take-up. This take-up maintains the same low profile.

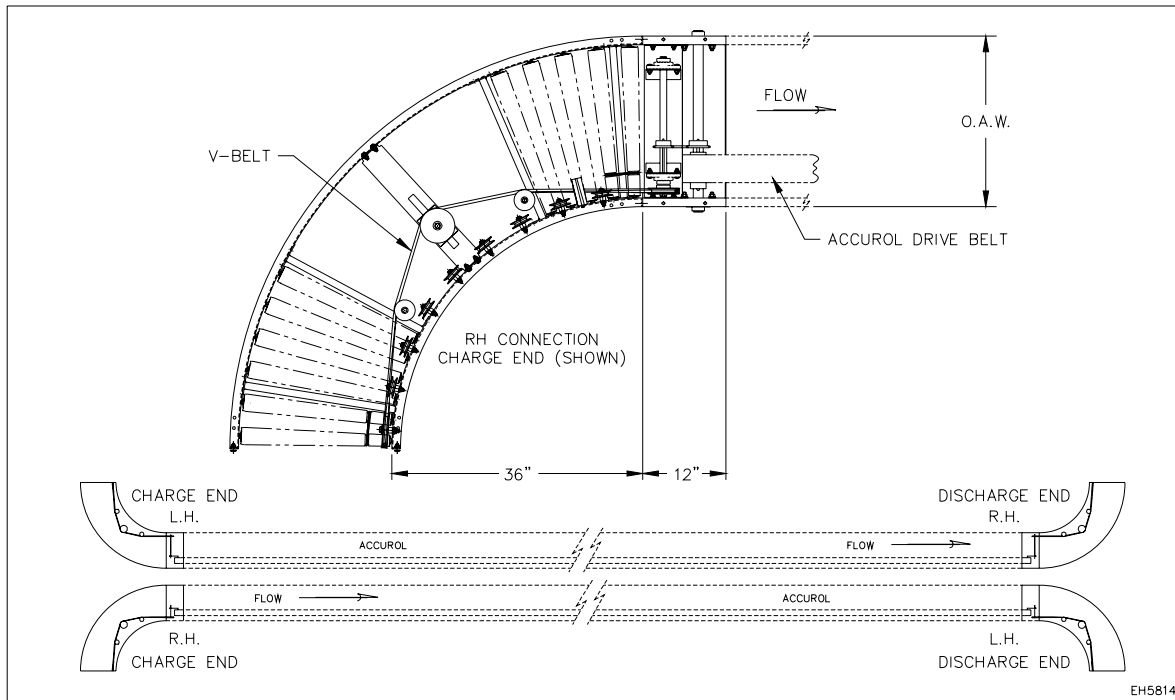


Compact end drive saves space and cost.

FEATURES

- Low cost
- 60'-0" length
- 18-1/2", 24-1/2", 30-1/2", 36-1/2" wide
- Totally contained within frame
- 12" deep profile
- 1,000 lbs. of product conveyed
- Service from top

V-BELT DRIVEN CURVE W/POWER CONNECTION (OPTIONAL)



APPLICATION

The AccuROL V-belt driven curve provides a low cost, efficient means of adding a curve to either end of AccuROL. This curve can only be added to the discharge end of AccuROL if an optional end drive is used.

A short 12" long "power takeoff" (PTO) bed is used to make the slave connections to the curve and become a part of the AccuROL conveyor. This PTO includes the end pulley for the AccuROL drive belt, replacing the standard end pulley.

The V-belt driven curve has a 9" deep x 10 ga. frame to match the AccuROL frame. It completely contains the V-belt within this frame. It uses the tapered rollers to maintain product orientation throughout the curve. The inside of the curve runs approximately 18% faster than the adjoining AccuROL to provide product separation in the curve and is necessary for maintaining orientation.

Consistent tension is maintained on the "B" section V-belt by the automatic spring loaded take-up.

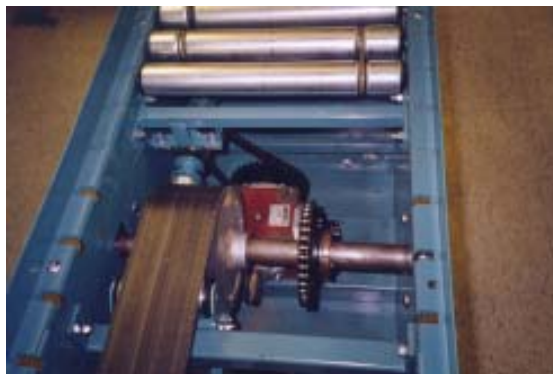
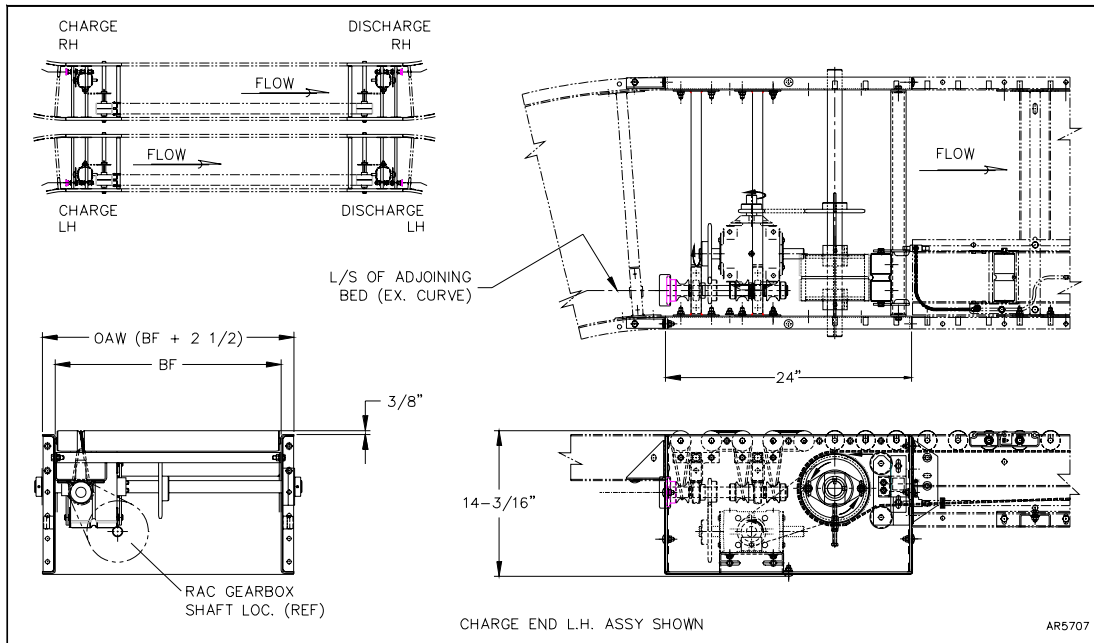


AccuROL end pulley shaft provides direct transfer of power to curve.

FEATURES

- Low cost
- 9" deep frame
- True tapered rollers
- 18-1/2", 24-1/2", 30-1/2" and 36-1/2" widths
- Automatic spring take-up
- B-section V-belt
- Curve speedup for product spacing and higher rates

POWER CONNECTION TO XenoROL (OPTIONAL)



Large lagged end pulley transfers power through right angle gear box to line-shaft-driven live roller conveyor.



AccuROL shown connected to line-shaft-driven curve.

APPLICATION

Sometimes AccuROL accumulation conveyor needs to be offset with an "S" curve, angled in a new direction, or needs to include a gate, transfer, merge, etc. These requirements are best handled with the flexibility of XenoROL® line-shaft-driven live roller conveyor.

Using the power connection to XenoROL, the AccuROL drive may be used to drive both the AccuROL and XenoROL or XenoPRESSURE conveyors.

The AccuROL drive must be capable of handling the additional requirements of the line-shaft conveyor. Therefore, the combined horsepower cannot exceed the drive of the horsepower shown in Chart 3, pg. 57-7 for the maximum effective belt pull allowed at the speed of the AccuROL.

FEATURES

- Allows interface to line-shaft-driven conveyors.
- Eliminates drive motor on line-shaft conveyor.
- Allows AccuROL conveyor to be offset or change directions by using the flexibility of line-shaft-driven conveyor between two AccuROL conveyors.

Note: Since the XenoROL is driven from one end, the normal allowed horsepower is reduced 50%, as shown in Chart 4.

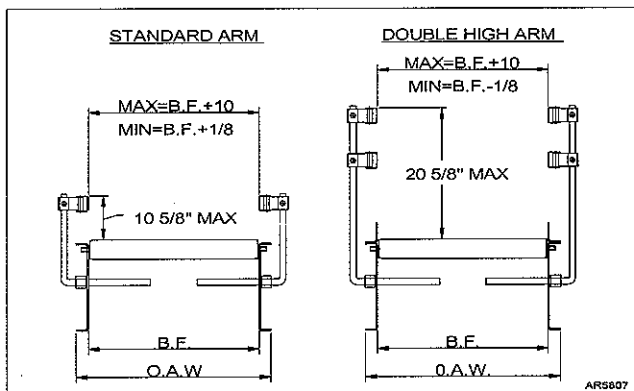
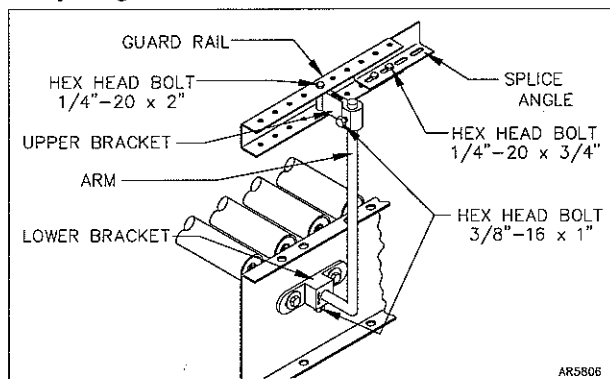
CHART 4	
Line-shaft Speed	Maximum HP
30	1/2
45	3/4
60	1

GUARD RAILS

ADJUSTABLE CHANNEL

Adjustable channel guard rail is used to match the width between guard rails to the conveyed product. It may also be adjusted vertically to better contain product and resist tipping.

Each 10'-0" section of guard rail channel must be supported in two places. It is preferable to locate the arms 5'-0" to 6'-0" apart. The extra holes between crossmembers may be used to bolt the lower bracket to the frame. Splice angles are used when joining rails end-to-end.



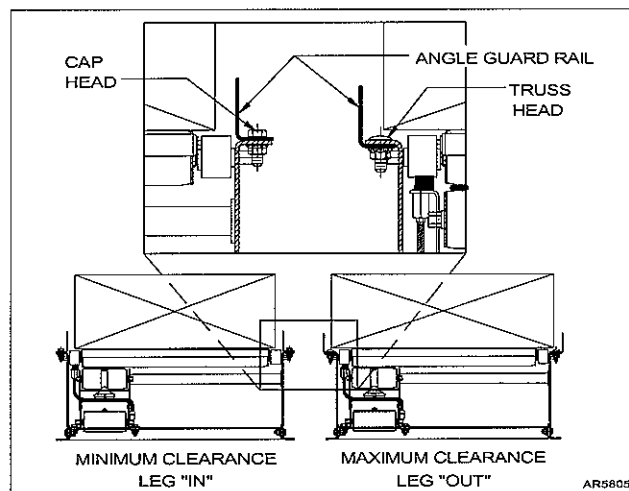
Adjustable channel guard rail may be used in conjunction with angle guard rail as illustrated on the optional double high channel. The angle rail guides the product while the channels prevent tipping or spillage.

Offset arms may be used to allow the channel rail to overlap the rollers more. This may be desirable for small product or to assist in forcing product toward the center of the conveyor.

ANGLE

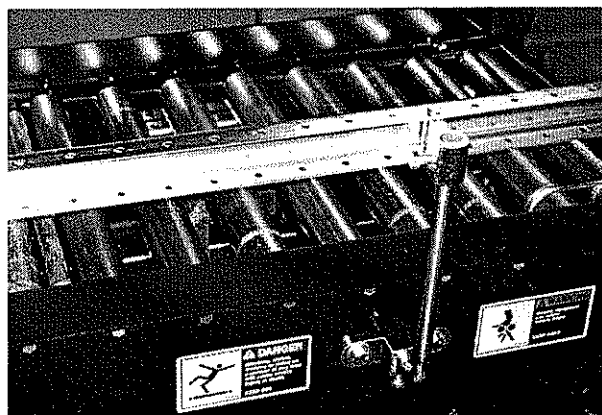
Angle guard rails are bolted to the conveyor frame's top flange. They are either bolted with the vertical leg "out" for maximum clearance or leg "in" for minimum clearance (for overhead use only). Use a maximum of 4 bolts per 10'-0" long rail per side.

For minimum clearance, the horizontal leg is placed on top of the frame and attached with cap head or truss head bolts. For maximum clearance, the horizontal leg is placed under the top flange of the frame and must be attached with truss head bolts.



Minimum clearance mounting can only be used on overhead conveyor, since the rollers cannot lift out, which is a requirement for floor supported AccuROL.

Scalloped (notched) angle guard rail, mounted for maximum clearance, is required if the AccuROL conveyor is floor supported below 7'-0". This allows the rollers to lift out of the frame for safety. The notches in the guard rail must be carefully matched to the notches in the frame to allow the roller axles to slide out easily without catching.



Adjustable Channel Guard Rail with 2" high angle guard .

SKEWING ROLLERS ON ACCUROL

Rollers may be skewed on AccuROL to edge align the product provided the following rules are STRICTLY followed:

1. Do not skew a roller directly over a pressure roller as it will mistrack the belt.
2. Never skew more than two rollers in a zone, and do not exceed two rollers every 6'-0" or 3 zones. Additional skewing will put excessive pressure on the V-guide.
3. If possible, skew rollers on XenoROL conveyor against a low friction guard rail, before entering AccuROL.

CONTROLS FUNCTIONS

DISCHARGE ZONE SOLENOIDS

The following description applies to an operation where cartons are accumulated over a period of time, and then released as a slug.

A single solenoid controlled air valve is located at the discharge end of the conveyor. The last (downstream) 24 inch accumulation zone is called the discharge zone

Energizing the solenoid enables the discharge zone of the conveyor and also puts the conveyor into the slug discharge mode. The conveyor then functions as a transportation conveyor, with no accumulation features.

De-energizing the solenoid disables the discharge zone of the conveyor and also puts the conveyor into the accumulation mode. The conveyor then functions as an accumulating conveyor, with new product flowing in and accumulating, but with no product being released from the conveyor.

Zone enabled means that the rollers in the 24 inch zone are driven. Zone disabled means that the drive belt is lowered away from the rollers in the zone, making the rollers in the zone non-driven or gravity.

In accumulation mode, depressing a sensor roller disables the second zone upstream of the sensor roller, or 24 inches upstream of the activated (depressed) sensor roller. (Upstream is opposite of the direction of product flow on the conveyor.)

In slug discharge mode, all zones are enabled regardless of sensor roller activation.

FUNCTIONAL DESCRIPTION

The following functional description describes an operation which is meant to maximize the number of cartons accumulated on the conveyor. The actual performance of the conveyor is a function of conveyor speed and length as well as product size and weight. The location of photoeyes and the time settings as described are to be adjusted as required to optimize the performance of the conveyor.

A discharge photoeye is to be located four feet from the discharge end of the conveyor. A line full photoeye is to be located ten feet from the charge end of the conveyor. Both photoeyes are to be provided with two way time delays (in PLC logic) such that the photoeye is only considered blocked by carton accumulation after 2 uninterrupted seconds of the light being blocked, and is only considered cleared of accumulated cartons after 4 uninterrupted seconds of seeing light.

Whenever the meter belt conveyor downstream of the AccuROL® conveyor is running, the conveyor is put into release mode (solenoid energized).

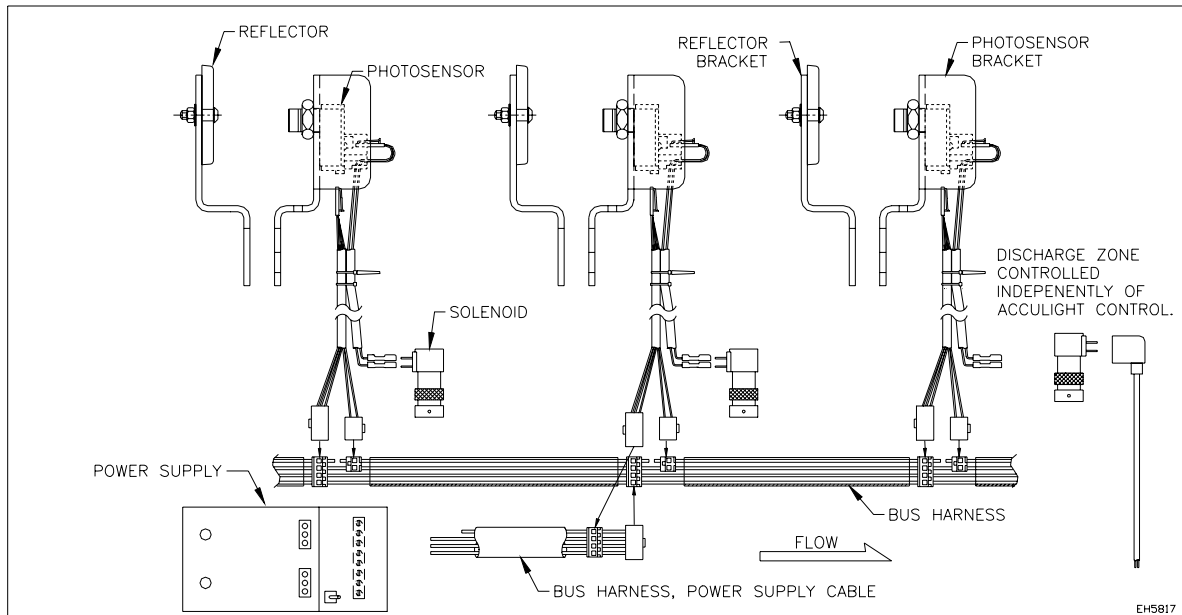
If the meter belt conveyor is off and the discharge photoeye is blocked, the conveyor is put into accumulation mode (solenoid de-energized).

Option - When in the accumulation mode, the solenoid may be energized for one second every five to ten seconds. This is called the pulse mode. This will close the gaps between cartons, but it will also momentarily increase the line pressure. The time delays must be adjusted as required. If no additional cartons are received by the conveyor for a short time period (10 seconds) as sensed by the line full photoeye, the pulse mode should not be used, since it should not be required at that point.

When the line full photoeye is blocked, indicating possible full accumulation, the solenoid should again be energized once for one second to see if that would allow the carton blocking the photoeye to clear the photoeye. If it does not, assume that full accumulation has been reached and do not energize the solenoid again until it is time to discharge from the conveyor.

AccuLIGHT™

PHOTO-ELECTRONIC ZONE CONTROL



APPLICATION: The compact self-contained photosensor provides extraordinary reliability, versatility and “no touch” sensing at low cost. The control logic contained within the photosensor eliminates the need for pneumatic logic.

Photosensors are ideally suited to sensing the presence of products which weigh less than the reliable range of a mechanical sensor. Also, the configuration of the product bottom sometimes requires photosensing. *Anything that can be conveyed, can be sensed.*

ADDITIONAL FEATURES AND BENEFITS:

- No sensor noise.
- Instantaneous response.
- Photosensors and solenoid valves operate on low 24VDC for safe operation.
- AccuLIGHT is rated for Nema 1 installations.
- Standard photosensor mount included.
- Built-in protection against dead shorts.
- Solenoid valves pre-mounted at the factory.
- Uses continuous cabling and “plug in” connections for ease of installation.
- Singulation or slug release to suit for application.
- AccuLIGHT is available for zero-pressure zones in all AccuROL conveyors.
- Basic or progressive accumulation.
- Up to 110 zones with center mounted power supply. 55 zones with end mounted power supply.

STANDARD DEFINITIONS

BASIC ACCUMULATION: Products will travel through a zone except if the current and downstream zone is full (photosensor blocked). The downstream zone does not necessarily have to be the discharge zone. Products accumulate one zone at a time. Upon discharge, products are released one zone at a time. Offers choice of singulation or slug release.

PROGRESSIVE ACCUMULATION: Products will travel through a zone except if the current and all the downstream zones are full (photosensors blocked). Products accumulate one zone at a time beginning with the discharge end. All products are released together as soon as the release signal is given to the discharge zone. This offers slug release only.

SINGULATION RELEASE: Accumulated products start moving forward one zone at a time.

SLUG RELEASE: Accumulated products start moving forward at the same time as each (downstream) zone clears in turn.

POLARIZED RETROREFLECTIVE PHOTOSENSOR is standard and may be used on reflective surfaces such as shrink wrap or glass.

Note: This product functions to replace sensor rollers only. Secondary methods to determine product presence at the lead zone, a line full condition, and to initiate accumulation are required.

ELECTRICAL

GENERAL

WARNING

All electrical controls must be installed, wired and connected by a licensed electrician only.

All motor controls and wiring must conform to the National Electrical Code as published by the National Fire Protection Association and approved by the American National Standards Institute, Inc. In addition, since specific electrical codes vary from one area to another, be sure to check with the proper authorities before starting the electrical wiring.

The electrical voltage of the motor will be stamped on the metal name plate. This voltage should be checked to see that it matches your available voltage. Many motors, both single phase and three phase, are dual voltage. Consult the wiring diagram on the motor for the proper connections. If a three-phase motor on a single direction conveyor runs the wrong direction, the leads must be switched to reverse rotation.

WARNING

Do not connect the motor to any other voltage than stamped on its metal name plate.

Consult the wiring diagram on the inside cover of the starter and pushbutton station for the proper electrical connections.

Three-phase drives require transformers to reduce the pushbutton and control circuit to 115 volts. If primary voltage is changed, the transformer must be changed according to the wiring diagram found on the transformer.

Note:

All control equipment is covered by the original manufacturer's equipment warranty.

NEMA type enclosure ratings are as follows:

NEMA 1 - Indoor use, provides protection against contact with internal components. Suitable for use in warehouse and distribution environments.

Gasketed NEMA 1 - Same use as NEMA 1, but with additional protection against dust and dirt.

NEMA 3 - Outdoor use, designed to keep out rain and dust.

NEMA 4 - Indoor and outdoor use, designed to keep out rain and dust.

NEMA 12 - Indoor use, provides protection against dust, dirt and oil seepage and dripping of noncorrosive liquids. Suitable for use in industrial environments.

NEMA 13 - Indoor use, provides protection against dust, dirt, sprayed oil and noncorrosive liquids.

SAFETY GUIDELINES

The following are basic conveyor control safety guidelines for common controls equipment.

WARNING

All safety devices, including wiring of electrical safety devices, shall be arranged to operate in a "fail safe" manner. That is, if power failure or failure of the device itself would occur, a hazardous condition must not result.

STARTUP WARNING HORN - Ideally, all conveyors should be within sight of the conveyor start pushbutton. This allows the operator to verify that no one is on the conveyor or would be in danger if the conveyor were to start up.

If all conveyors being started cannot be seen from the start pushbutton location, then an audible warning device is required. It could be a horn, buzzer or bell unique to that conveyor for that location. It must be loud enough to be heard at any point on the conveyor being started. It should sound for a duration of five seconds after the start pushbutton is pushed, prior to the conveyor starting. Any auxiliary equipment such as vertical lifts, turntables, etc. must be included in the warning circuitry.

All conveyor sections that stop and restart automatically should be marked with appropriate signs or labels. Order CEMA label CHR930002.

START PUSHBUTTONS - Start pushbutton must be the flush type or guarded such that inadvertently leaning against them will not actuate them. They should be provided with a legend plate clearly defining which conveyors will be started.

STOP PUSHBUTTONS - Stop pushbutton should be the extended type such that any contact with it is sufficient to stop the conveyor. They should have a legend plate defining which conveyors will be stopped.

OPERATOR CONTROLS - Additional operator controls should be designed into the system with the same guidelines that go into start and stop pushbutton, depending upon their function. Devices which are repeated on multiple control stations, such as emergency stops, should be located at the same relative location on each station. All operator controls shall be clearly marked or labeled to indicate the function controlled.

EMERGENCY STOPS - All locations where an operator must work directly at the conveyor or areas of high pedestrian traffic must be protected by an emergency stop. Operators should not have to leave their position to actuate the emergency stop.

For protection of equipment or product, emergency stops may be located throughout a system such that it is possible to shut down the system. The location will depend on likely observation points and areas with special devices and interfaces between equipment.

Emergency stops can be of the pushbutton or cable operated switch type. The pushbutton type should be a red, mushroom head, maintained pushbutton which requires resetting after it is actuated. Cable operated switches should trip by pulling the cable and require resetting at the switch.

An emergency stop normally stops all conveyors in the system. Very large systems may involve dividing a system into zones of control based on proximity of personnel, safety hazards, walls, obstacles, etc.

WARNING

Before restarting a conveyor which has been stopped because of an emergency, an inspection of the conveyor must be made and the cause of the stoppage determined. The starting device must be locked out before any attempt is made to correct the cause of stoppage.

CONTROLS LOGIC - Solid state controls logic devices, such as programmable controllers, are used extensively for conveyor control. They are very reliable, but a hardware failure or software bug could cause the device to function erratically. For this reason, start circuits, warning horn circuits and emergency stops should usually be configured using conventional relay logic.

SAFETY SWITCHES - All conveyor control cabinets and motors must be provided with safety (or disconnect) switches. These switches must have provisions for padlocking. As required for maintenance, equipment should be locked in the off position.

SPECIAL DEVICES - Special devices and equipment such as vertical lifts, turntables, high speed conveyors, etc. all have unique design and safety requirements. These must be examined in each case to determine what the requirements might be.

CONTROL MODULES (ECM)

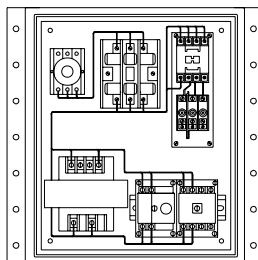
Smaller systems requiring only basic controls located at or near each conveyor drive can utilize Motor Control Modules. The Motor Control Module (ECM) and accessory components fulfill the need for basic control devices in a compact, standard package. This provides substantial savings over individual components.

Example of ECM-2:

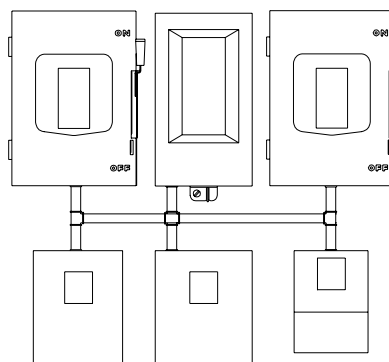
Includes Prewired:

- Lockable 30AMP disconnect
- 3 Pole fuseblock
- 3 Phase starter

Provides additional space to mount:
Transformer, relay and timer, on a provided din rail



THIS



REPLACES THIS

BC22A

Separately enclosed, mounted and field wired:

- Fused disconnect switch
- Motor starter
- Transformer
- Relay
- Timer

Controls engineering quotation is available upon request. Please contact Motor Control Module Distributor Services Department.

COMMISSIONING OF EQUIPMENT

GENERAL

Commissioning of the equipment can best be defined as the final adjustments and test of the installed equipment required for its proper operation. The need for commissioning is inherent, since the individual components of equipment are brought together at the installation site to operate as a system.

Mechanical and electrical commissioning are most often carried out simultaneously. Commissioning must simulate the actual operation of the system as closely as possible to demonstrate the ability to perform reliably at the specified rate in the prescribed operational sequence.

During the Commissioning Phase, it is necessary to load the equipment with product to be conveyed, which provides the means of detecting those areas requiring adjustment. Personnel will be required to support operational functions. This may serve as part of operator training and familiarity with the system. During the commissioning activity, special attention should be directed toward personnel safety. No unnecessary risks should be taken that would endanger the safety of any personnel. All personnel must familiarize themselves with all safety features of the system such as emergency stops and motor disconnects.

MECHANICAL STATIC CHECKOUT (NO POWER TO THE CONVEYOR.)

1. Check the sensor assemblies for correction orientation. The clevis end of a pivot must be on the downstream side of the conveyor.
2. The air pressure must be set at 18-20 PSI. Air pressure higher than can cause component failure.
3. Listen for air leaks after the air pressure is turned on.
4. Check the plumbing of the solenoid or discharge kit to the drawing.
5. Follow the belt path through the entire conveyor. The belt must be threaded through the drive per the diagram on the drive, all of the belt must be in the V-groove of the pulleys, and no belt should be threaded under a crossmember.
6. Visually inspect the installation. Is the conveyor straight? Is the spring take-up tensioned? Is the conveyor reasonably level from side to side? From end to end?

7. Check guard rail clearance to product.
8. Eliminate all catch points.
9. Check conveyor elevations.
10. All bolts and set screws tight.
11. Check product clearance to overhead structures.
12. Simulate all operational functions with actual product.
13. All guards in place with proper clearance.
14. All OSHA required guards in place on walkways, catwalks, ladder-ways, floor openings, etc.
15. All labels and warning signs in proper place unobstructed.
16. Any spare parts shipped with conveyors turned over to appropriate personnel.
17. Proper roller-to-roller height at bed joints and interfaces.
18. Check pneumatic connections for leaks.

MECHANICAL DYNAMIC CHECKOUT (POWER TO THE CONVEYOR, BUT NO PRODUCT ON IT.)

1. Turn the motor on. With the belt moving and air turned off, no rollers should be turning. If some are turning, then check the following items:
 - Make sure the pivot bracket is in position.
 - Loose the crossmember bolts at the problem area and let the bolts settle to the bottom of the hole clearance. Retighten.
2. Turn the air on. All of the rollers should be turning. If not, check the dead areas for:
 - Is the plug in the back of the air diaphragm?
 - Is the air plumbed correctly at the valve?
 - Is there a plugged air line feeding the valve?
 - Is the valve working correctly?
 - Is the pivot bracket in the pivot holes?
3. Actuate the discharge solenoid (or foot valve) with the manual override button. Does the first air diaphragm deflate?
4. Complete a sensor-to-sensor checkout of the entire line. As you remove each sensor, make sure the upstream air diaphragm deflates. Do the rollers stop turning? If any zone does not stop or accumulate correctly, check out the plumbing of the valve and diaphragm.
5. Check the belt tracking. The belt in the drive area must have the "V" groove in the pulleys. If not, adjust the drive pulley with the drag plate.

ELECTRICAL CHECKOUT

- Adjust timing functions
 - Adjust limit switches
 - Verify circuitry
 - Verify proper line voltage
 - Verify function of all safety shutoff devices
 - Verify sequence of operation
 - Verify each motor has lockable disconnect switch
 - Check audible system startup warning signals
 - Verify all national, state and local codes are met
 - Control stations marked/labeled to indicate the function or motor controlled
 - Verify all devices are labeled and numbered to match documentation (Ex. PE 12, for photoeye No. 12 or SOL43 for solenoid valve No. 43)
-
- Adjust photoeye types as follows:
 1. Determine what size product the photoeye must sense.
 2. Adjust for the worst case, usually smallest item, by loosening photoeye mounting nut and aligning while making sure photoeye has unobstructed view of reflector.
 3. Move the product in and out of the field of detection to ensure that the photoeye energizes and de-energizes.
 4. Readjust as required to achieve maximum performance and tighten mounting nut. If the photoeye cannot be adjusted, replace and adjust as required. When replacing the photoeye, be sure that the correct type is installed.
 - Adjust proximity switches as follows:
 1. Loosen proximity switch mounting bolt and adjust sensing switch so that the product passes directly in front of the switch face at a distance of approximately 1/2".
 2. Check that the proximity switch energizes and de-energizes as the product passes in front of the switch face.
 3. Tighten the mounting bolt.

After commissioning, conduct operator training on all safety and operational aspects of the system. This must include system startup, location of emergency stops and familiarity with all operator controls.

OPERATIONAL CHECKOUT

The system operating under normal conditions with product.)

The following operational items could cause AccuROL to operate incorrectly.

1. Boxes under 1 lb. or with uneven weight distribution. This could cause a surging of the line if the sensor is not depressed.
2. Very bad bottoms on the product. The dual sensor is very forgiving of poor product, but excessive tapers or crushed corners could be a problem.
3. Carefully observe the solenoid actuation during operation. What downstream operation is triggering the engagement? Does this control logic make sense? Is the solenoid triggering too late? Is it pulsating (momentary engagement) during accumulation?
4. Are the edges of the boxes aligned enough so they do not "shingle"?
5. Is the AccuROL overfeeding the teak-away line? This could cause excessive line pressure on the end zones.

PREVENTIVE MAINTENANCE

GENERAL

The key to ensuring the expected return on investment is to protect against premature failure with a well-planned program of preventive maintenance.

Preventive maintenance programs examine what may fail and then formulate action plans which will prevent failure or downtime. This kind of maintenance includes lubrication and replacement or repair of parts before failure but after expected life has been attained.

Preventive maintenance will save expensive downtime and wasted energy. It will increase the life of components. Along with preventive maintenance, there should be a record-keeping system. You must know what problems you have had in the past and when different components were serviced.

A visual and audible inspection should be taken every day. You can see if a chain is loose, oil leaking, sprocket worn; or you can hear a faulty bearing, noisy chain or any other noise that might indicate a problem. When something major goes wrong with some component, records should be kept to see if a pattern to the problem occurs.

All personnel working in close proximity to the conveyor should inform maintenance or their supervisor of any unusual noise.

WARNING

Do not perform maintenance on the conveyor until the startup controls are locked out and cannot be turned on by any person other than the one performing the maintenance. If more than one member of a crew is working on the conveyor, EACH CREW MEMBER MUST HAVE A LOCK ON THE POWER LOCK OUT. The air pressure must be turned off to the work area. All pneumatic devices must be de-energized to prevent accidental cycling of the device.

Make sure personnel are clear of all conveyor equipment before restarting the system.

MOTOR AND GEAR CASE

The drive unit should be checked monthly. Check the motor gearcase for leaking seals. If reducer is other than Reliance Relialube, check the gearcase for proper oil level and add the approved oil for your particular unit. Check for overheating, vibrations and dirt buildup.

With Reliance Relialube reducers, change oil only when performing maintenance that requires gearbox disassembly using Mobil SHC-634. When replacing the motor, relubricate using Fel-Pro C5A Anti-Seize or Mobiltemp 78 grease in the reducer bore and on the motor shaft.

CHAINS AND SPROCKETS

Chains and sprockets should be checked monthly. Look for correct alignment. In time, set screws may loosen and allow the sprockets to become misaligned. Use a straight edge held parallel to both sprockets to check alignment. Shift one of the sprockets if the straight edge shows it is necessary.

WARNING

REPLACE ANY CHAIN GUARD REMOVED in order to adjust, check or lubricate chain and sprockets. Guards are furnished and installed to prevent personal injury during operation; maintain them on the unit.

Keep the chain clean and lubricated. Chains may be cleaned by wiping with a rag soaked in nonflammable cleaning solvent.

Lubrication of roller chains is essential to effectively minimize metal-to-metal bearing contact of pin-bushing joints of the chain. Oil should be applied to outside plate and inside plate edges, since access to pin-bushing area is possible only through clearances between the outside plates and the inside plates. Oil applied on the center line of the rollers cannot reach pin-bushing joints.

A good grade of non-detergent petroleum base oil is recommended. Heavy oils and greases are generally too stiff to enter and fill the chain joints. The Lubrication Guide on page 28 indicates the proper lubricant viscosity for various surrounding temperatures.

WARNING

Do not use gasoline or kerosene for cleaning. Use nonflammable solvent only.

During the monthly check, look for damaged or worn links in the chain and wear spots on sprockets. If either the chain or sprockets are worn, then both must be replaced and the cause of wear corrected.

If chains have stretched so that above adjustments cannot be made, remove a link and reconnect. If removal of one link makes the chain too short, add an offset half link and reconnect. Chains should be tightened until there is 1/2" total movement at center of span (1/4" each way of center).

New chains should be installed under slight tension as they will elongate a small amount due to seating of pins and bushings during the first 250 hours of operation. Chains on drives having near vertical centers should be kept reasonably tight with idler sprockets.

ROLLERS

For severe or dirty conditions, the rollers may require periodic (approx. 6 months) lubrication if they sound dry. If the rollers have unsealed bearings, lubricate them by removing them from the bed and placing several drops of a good grade machine oil in the small opening around the inner race hub and spinning the axle. Repeat for each end of the roller. Standard rollers are greased for life and normally do not require maintenance. However, if the conveyor operates over 120 FPM more than a single shift, it is under severe duty conditions. Periodically removing the rollers has an added benefit of distributing the wear on the bearing inner race by rotating the axle to a new position. If a defective roller bearing is found, replace the roller.

WARNING

Use a blunt object to remove rollers from frame. A screwdriver or similar pointed object could slip and cause injury.

Do not allow tape, banding, shrinkwrap, etc. to build up on roller or pulleys. This can cause rollers to jam and the belt to mistrack. If this is a common occurrence due to the product packaging, clean up on a regular schedule.

MOTOR CONTROLS

WARNING

Before servicing or performing any work in the motor control panel, disconnect and lockout the main incoming service. If only the panel disconnect is off, the incoming side will still be hot.

Excessive overheating is indicated by discoloration of components. Most often, these symptoms are a sign of loose connections. If left uncorrected this can eventually cause arcing between components, leading to destruction of the controls. It is normal to find the interior of the control cabinet very warm when it is first opened.

The condition of contacts must be checked on all contactors and starters that show signs of overheating. Make sure that they are free of dust and are not excessively pitted or burned. When badly burned or worn, the contacts must be replaced.

In the course of inspecting contact condition, spring pressure should be checked. As contact surface wears down, spring pressure can be lost because of the overheating. Contact spring resiliency can usually be detected by fingertip pressure.

Check for faulty door gaskets especially when there are excessive deposits of foreign materials. Particular attention should be given to conductive deposits because they can cause flashovers and premature component failure when allowed to collect to any great extent. Either reposition or replace defective gaskets and clean the control cabinet.

CAUTION

Avoid touching components until they have had time to cool. Some may still be hot.

Check all overload settings on motor controls. Check for loose wiring and tighten as required.

CLEANING

When cleaning a control cabinet, it is best to use a vacuum cleaner rather than compressed air. A vacuum cleaner removes rather than redistributes dust and dirt. Compressed air can damage and displace relay contacts and springs.

SUPPORTS/Framework

Preventive maintenance for supports and framework should include the following periodic checks:

- Check for plumb and level. Shims have been known to vibrate out from under supports in isolated incidents.
- Check and retighten any bolts that may have come loose.
- Touch up paint that has been chipped. Unpainted surfaces will rust.
- Check for stress cracks or fatigue.

AIR SYSTEM

The best preventive maintenance for any air operated device is clean air. Always be alert for air leaks anywhere in the system and correct promptly. Check all air line filter bowls for accumulated water and drain if necessary. Check for proper PSI settings on air regulators.

Monitor bowl drain every week. To manually drain the bowl, first remove the hose. Carefully turn knurled drain valve counterclockwise until you hear air escaping. Let all accumulated liquid drain and close by turning clockwise. Reconnect hose.

Remove and replace clogged filter elements as required by filter condition indicator. Indicator is mounted on top of the filter housing.

LUBRICATION

Normally a lubricated air system is not required; however, if lubrication is used due to very dry air, it should be a non-detergent, lightweight oil without an ester or ketone base. It must also be anti-foaming, compatible with Buna N rubber and have high film strength.

Note: See Lubrication Guide on page 40 for recommended oils which perform well.

MAINTENANCE SCHEDULE CAUTION

- Check to confirm tools and foreign objects have not been left on or inside the conveyor.
- Check to confirm all loosened parts have been retightened.
- Check to confirm all guards have been installed.

WARNING

- Prohibit riding on conveyor by anyone.
- Think before making any adjustments. It may prevent an injury. Remember, all moving components are potentially dangerous.
- Protect yourself from unexpected starts when working on a stopped unit by locking and tagging the control panel or disconnect switch that supplies power to the unit.

CAUTION

If an internal (light oil) lubricator is to be used, **EXTREME CARE** must be taken to avoid over lubrication.

Periodic maintenance intervals may vary with load, speed, hours of daily operation, ambient temperature, humidity, etc. Intervals can be established by fairly frequent maintenance at first, then lengthen the intervals as justified by observation of need based on history. The following is based on 5 days per week, 8 hours per day under normal conditions.

MAINTENANCE SCHEDULE

Periodic maintenance intervals shown may vary with load, speed, hours of daily operation, ambient temperature, humidity, etc. Intervals can be established by fairly frequent maintenance at first, then lengthen the intervals as justified by observation of need based on history. The following is based on 5 days per week, 8 hours per day under normal conditions.

Daily

- Listen to everything for unusual noises or vibration.
- Visually inspect to see that conveyor sections are clear and free of debris.
- Check to see that all safety guards are in place.
- Check any oil leakage.
- Check any unusual noises or vibration.
- Check for loose bolts or parts.
- Check air filter bowls for accumulated water.
- Listen for air leaks.

Weekly

- Inspect bearings, gear reducers and motors for excessive noise or heat.
- Clean breather cap on gear motor (if used).
- Check operation of all electrical controls.
- Inspect motor mounting bolts.
- Check for proper PSI on air regulators.

WARNING

- **Prohibit riding on conveyor by anyone.**
- **Think before making any adjustments. It may prevent an injury. Remember, all moving components are potentially dangerous.**
- **Protect yourself from unexpected starts when working on a stopped unit by locking and tagging the control panel or disconnect switch that supplies power to the unit.**

Monthly

- Check air filters for cleanliness.
- Clean chains and sprockets and lubricate with SAE 30 weight oil or equivalent. (Check chain tension and tightness of all adjusting screws.)
- Check drive unit for leaking seals and oil level in gearcase (if applicable), unusual noises, vibration and stress cracks.

Semi-Yearly

- If dry sounding, lubricate unsealed bearings in rollers with light oil. Check free spin of rollers.
- Drain and flush gearcase after each 2,500 hours of normal operation or at least every 6 months (if applicable).
- Grease motor shaft bearings.
- Inspect and clean motor control centers.
- Grease regreasable bearings.

Yearly

- Change oil in gearboxes.
- Inspect tightness of all nuts and bolts on units. Re-adjust and, if necessary, retighten.
- Check for plumb and level. Shims have been known to vibrate out from under supports in isolated incidents.
- Touch up paint that has been chipped. Unpainted surfaces will rust.
- Inspect for stress/fatigue cracks in frame and supports.

CAUTION

- **Check to confirm tools and foreign objects have not been left on or inside the conveyor.**
- **Check to confirm all loosened parts have been retightened.**
- **Check to confirm all guards have been installed.**

LUBRICATION GUIDE

Item	Use	Procedure	Recommended Lube	
Chain Drives	Drives	See Page 36 & 41	Mineral Oil SAE 30	
C-Face Speed Reducers	Drive packages using Reliance Relialube reducers	See Page 42	Mobil SHC-634 for gearbox. For input bore and motor shaft use Fel-Pro C5A Anti Seize or Mobil Temp 78 Grease	
Rollers	Product support and driving rollers	See Page 37	Light Machine Oil	
Air System	Actuate Pneumatic Devices		American Oil Co. Gulf Oil Co. Mobil Oil Co. Non Fluid Oil Corp. Shell Oil Co. Sinclair Oil Co. Sun Oil Co. Texas Oil Co.	Rykon No. 11 American Oil No. 15 Harmony No. 43AW Harmony No. 44 D.T.E. Light Air Lube 10w/NR Tellus No. 27 Dura No. 150 Sunvis No. 701 Sunvis No. 706 Regal "A" R&O
Note: See "Maintenance Schedule" for frequency of lubrication. (Page 39)				

REPAIR PROCEDURES

WARNING

Do not perform maintenance on the conveyor until the startup controls are locked out and cannot be turned on by any person other than the one performing the maintenance. If more than one member of a crew is working on the conveyor, EACH CREW MEMBER MUST HAVE A LOCK ON THE POWER LOCK OUT. The air pressure must be turned off to the work areas. Make sure personnel are clear of all conveyor equipment before restarting the system.

Do not use gasoline or kerosene for cleaning. Use nonflammable solvent only.

CHAIN & SPROCKETS

Lubrication of roller chains is essential to effectively minimize metal-to-metal bearing contact of pin-bushing joints in the chain. Oil should be applied to outside and inside plate edges, since access to the pin-bushing area is possible only through clearances between the outside plates and the inside plates. Oil applied on the center line of the rollers cannot reach pin-bushing joints.

Chain drives should be protected against dirt and moisture. Oil supply should be kept free of contamination. A good grade of non-detergent petroleum base oil is recommended. Heavy oils and greases are generally too stiff to enter and fill the chain joints. The following table indicates the proper lubricant viscosity for various surrounding temperatures.

Temperature Degree F	Recommended Lubricant
20 to 40	SAE 20
40 to 100	SAE 30
100 to 120	SAE 40
120 to 140	SAE 50

Inspection includes:

1. Lubrication check for dirt, grit, or chips and clean if necessary by soaking chain in nonflammable cleaning solvent
2. Sprocket alignment (see following text)
3. Wear on the inner surfaces of the roller chain link plates
4. Sprocket tooth wear
5. Chain tension (see following text)
6. Set screw tightness (5/16-18 at 13 ft./lbs. and 1/4-20 at 6 ft./lbs.)

SPROCKET ALIGNMENT

1. Loosen sprocket.
2. Align loose sprocket to the other by laying a straight edge across their faces or along the chain.
3. Retighten the loose sprocket.

CHAIN TENSION

Chain should be checked for excessive slack, if the chain is running close to the tips of the sprocket teeth.

This can be checked by lifting the chain away from the large sprocket, making sure the chain is in mesh with the sprocket teeth. Excess clearance is conclusive evidence that the chain has elongated in pitch and no amount of tension adjustment will keep it properly meshed with the sprocket teeth. Continued operation will quickly destroy the sprocket teeth which otherwise may be good. If the sprocket is still serviceable, replace the chain.

TENSION ADJUSTMENT

1. Loosen mounting bolts of tension.
2. Increase tension up to 1/2" of total slack (1/4" each way of center).
3. Turn adjusting bolts on gearbox plate or move gearbox in mounting slots until there is 1/2" total chain slack.
4. Retighten all bolts after checking alignment.

If chains have stretched so that above adjustments cannot be made, remove a link and reconnect. (If removal of one link makes the chain too short, add offset link and reconnect.)

If a chain should break or fail due to overload, neglect or accident, those portions of the chain which appear to remain intact are, in all probability, damaged and subject to early failure if continued in service. Replace the entire chain and sprockets.

REDUCERS/GEARMOTORS

Units are properly filled at the factory with sufficient lubrication for desired mounting position. With "Relialube", the break-in period and subsequent oil change ordinarily experienced with conventional reducers has been eliminated.

With Reliance Relialube reducers, change oil only when performing maintenance that requires gearbox disassembly. In this case, use only Mobil SHC-634. If possible return to Reliance service center for repairs.

Disassembly/assembly procedure as follows:

1. To provide access to maintenance area, remove necessary rollers.
2. Disconnect drive chain from line-shaft drive sprockets using roller chain extractor tool.
3. Disconnect any electrical connection.
4. Remove reducer or gearmotor.
5. Perform required maintenance.
6. Reverse procedures for assembly.
7. After all fasteners are tight, double check chain tension and sprocket alignment.
8. Replace all guards.

Regularly inspect all gearbox reducers (ref. Lubrication Chart) to guarantee maximum performance.

1. Tightness of bolts and screws
2. Correct alignment of shaft and couplings
3. No major oil leaks
4. No excessive heating
5. No unusual vibration or noise

Enclosed gear drives (except those tagged as prelubricated) require filling to the proper oil level before operating as indicated. Equivalent lubricants should conform to AGMA Standard Specification No. 250.03 applying to the AGMA Lubricant Number indicated for the required ambient range. Service life and efficiency of gears and bearings will be affected by oxidation or contamination of oil used. Improved performance will be obtained by periodic lubrication at regular intervals of approximately 2,500 hours of operation or six months, whichever comes first. See Lubrication Guide page 40.

WARNING

Do not perform maintenance on the conveyor until the startup controls are locked out and cannot be turned on by any person other than the one performing the maintenance. If more than one member of a crew is working on the conveyor, EACH CREW MEMBER MUST HAVE A LOCK ON THE POWER LOCK OUT. The air pressure must be turned off to the work area. All pneumatic devices must be de-energized to prevent accidental cycling of the device.

Make sure all personnel are clear of all conveyor equipment before restarting the system.

SOLENOID VALVES

In order to minimize downtime, it is normally not feasible to repair malfunctioning electrical or valve components while leaving the conveyor unusable. Spare components should be kept in stock for emergency replacement. If feasible, the part may be repaired later to replace maintenance stock. Items which cannot be readily repaired or are questionable should be replaced. Components under warranty should not be repaired except in an emergency.

WARNING

Before removing a valve or other pneumatic component, shut off and exhaust the entire pneumatic circuit and shut off and lockout electrical supply.

Valve Removal and Replacement

- Open the wire cover for the manifold on which defective valve is mounted.
- Remove solenoid wires from their terminals.
- Loosen and remove two Allen head screws on top of valve body.
- Remove valve and gasket from subbase.
- Install replacement valve and existing gasket in reverse order.

Coil Replacement

- Loosen straight-slot screws on capsule assembly.
- Remove defective solenoid coil, pulling wires through the valve. Be careful not to damage paper gasket positioned between coil and valve body.
- Route wires of new coil assembly through valve body and paper gasket, and trim to proper length.
- Attach new coil using straight-slot screws.

Valve Body Overhaul

- Remove coils as described above.
- Carefully remove detent body, spool and spring, noting their orientation. (For double solenoid, remove detent assembly and spool.)
- Use a blunt plastic probe (pen) to push spring retainer through valve body. This will remove both spring retainer and sleeve assembly. (For dual solenoid, push bumper to remove sleeve.)
Note: Sleeves are not interchangeable.
- Clean and lubricate spool and sleeve per accompanying repair kit instructions, and replace all seals.
- Install spring retainer in valve body.
- Assemble detent body to cleaned spool/sleeve assembly and install spring in end of spool (single solenoid only).
- Push cleaned spool/sleeve assembly into valve body until detent body is sealed.
- Replace coil(s) as described in paragraph above.

MOTOR CONTROLS

WARNING

Before servicing or performing any work in the motor control panel, disconnect and lock-out the main incoming service. If only the panel disconnect is off, the incoming side will still be hot.

INSPECTION

Excessive overheating is indicated by discoloration of components. Most often, these symptoms are a sign of loose connections. If left uncorrected this can eventually cause arcing between components, leading to destruction of controls. It is, however, not unusual to find the interior to the MCC quite warm when it is first opened.

The condition of contacts must be checked on all contactors and starters that show signs of overheating to ensure that they are free of dust and dirt and are not excessively pitted or burned. When badly burned or worn, the contacts must be replaced.

In the course of inspecting contact condition, spring pressure should be checked. As contact surface wears down, spring pressure can be lost because of the overheating. Contact spring resiliency can usually be detected by fingertip pressure.

Check for faulty gaskets especially when there are excessive deposits of foreign materials. Particular attention should be given to conductive deposits because they can cause flashovers and premature component failure when allowed to collect to any great extent. Either reposition or replace defective gaskets and clean the control cabinet.

WARNING

Avoid touching components until they have had time to cool. Some still may be hot.

Check overload settings on motor controls. Check for loose wiring and tighten as required.

CLEANING

When cleaning a control cabinet, it is best to use a vacuum cleaner rather than compressed air. A vacuum cleaner removes rather than redistributing dust and dirt. Compressed air can damage and displace relay contacts and springs.

SENSING SWITCHES

The sensing switches are of two types: retroreflective photoeye and proximity switch.

Adjust the retroreflective type as follows:

1. Determine what sizes of target the photoeye must sense.
2. Adjust for the worst case, usually smallest item, by loosening photoeye mounting nut and aligning while making sure photoeye has unobstructed view of reflector.
3. Move the target in and out of the field of detection to ensure that the photoeye energizes and de-energizes.

Adjust the proximity type as follows:

1. Loosen proximity switch mounting bolt and adjust sensing switch so that the product passes directly in front of the switch face, as close to the switch face as possible without making contact.
2. Check that the proximity switch energizes and de-energizes as the product passes in front of the switch face.
3. Tighten the mounting bolt.

TROUBLESHOOTING GUIDE

Troubleshooting is the process of looking at trouble symptoms and then relating these to the most likely cause. By carefully analyzing the problem, the experienced troubleshooter can take appropriate corrective steps.

WARNING

Do not perform maintenance on the conveyor until the startup controls are locked off and cannot be turned on by any person other than the one performing the maintenance.

WARNING

Before disassembling a valve or other pneumatic component or removing it from the installation, shut off and exhaust the entire pneumatic circuit and lock it off.

Note: The disassembly or repair of equipment under Warranty may void such Warranty (motor and reducer, for example). Check to be sure the Warranty has expired or will not be voided before performing disassembly or repair.

The following Operating / Product Troubleshooting Guide lists certain conveyor problems, possible causes and corrections. These procedures will help in identifying and correcting these problems. Problems may have several possible causes each with their associated corrections. Read all causes and corrections before attempting repair procedures.

TROUBLESHOOTING GUIDE

OPERATIONAL

A dead zone appears when conveyor is running in transportation mode.

- An air leak is the normal cause of this problem. It could be a hose off or the plug missing in the back of the air puck.
- Check the air pressure to be sure you have 18-20 PSI. Even if you have this pressure at the regulator, a major air leak downstream could cause an overall pressure drop.
- The Clippard CS - 784 valve could be malfunctioning. At times the barb fitting is forced too far into the side of the valve and the plunger hangs up. If air is coming out of the exhaust hole all of the time, replace the valve.
- Check the pivot bracket to be sure it is in the pressure pan holes and moves up and down freely. There can be situations where the pivot bracket legs are either too loose or too tight as they fit over the pressure pan.

The product will not accumulate at all, even when the accumulation solenoid is energized.

- Check the plumbing of the discharge solenoid kit to be sure it is correctly routed.
- There may be too much air pressure. At pressures over 30 PSI the CS-784 valve ceases to function correctly.
- A replacement belt could have been installed at a thickness greater than the standard .171 +/- .015"

Line pressure upon or after accumulation.

- Normally this is caused by a sensor that has been bridged by the product. Check the height of all of the sensors in the "up" position. There should be a minimum of .075" of set up height above the adjacent rollers. If one is below this height, add a lock washer or two under the CS-784 valve. This will cause greater sensor set up height.
- This could be caused by a valve that is malfunctioning – check the valve on the zone where the line pressure is starting. Replace the valve if necessary.
- Check the product footprint. If it is badly damaged or distorted, it could be bridging a sensor, especially when pushed from behind by the next product.

- There may be too light of product on the conveyor that is not depressing the sensor. The sensor will depress at 8 oz., but a tote or box with all of the weight in one end may not present 8 oz. to the sensor.
- A long slug of product entering the conveyor may cause a few seconds of line pressure when this slug accumulates. The solution is to either address whatever action is causing the slug (normally people pushing product on to the conveyor) or to install a couple of guardian sensors at the charge end. The guardians will break up the slug as it moves on to the conveyor.
- Check the pivot brackets to see if they all move up and down freely. A pivot bracket may have a bent leg that will prevent it from dropping out, causing line pressure from that point on. In addition, an air puck out of position on the pressure pan can also prevent the pivot bracket from dropping.

4" V-bottom belt is mis-tracking.

- Look for skewed rollers. AccuROL can have skewed rollers, but there can be no more than two skewed per zone and they cannot be skewed over a pressure roller. Straighten out any rollers that are skewed beyond these guidelines.
- If the belt is mis-tracked at the drive, check to see if the drive pulley is straight within the frame. There is an adjustment plate on one side of the pulley to straighten it if required.
- There could be a damaged section of belt where the V-guide is torn off. This is not common, but could happen if the belt has been mis-tracked for some time. New belt sections can be spliced in.

Conveyor simply does not seem to have adequate drive - heavy cases stall out.

- This is almost always caused by low air pressure or a major air leak. Check the regulator to be sure you have at 18 to 20 PSI. Listen and look for air leaks and correct them.
- Raise the crossmembers in the low drive area to the extent allowed by the bolt in the frame and crossmember holes.
- Check belt tension. Take-up may be fully extended. If so, the belt must be shortened and relaced.

A product will stall behind a sensor when it is supposed to release.

- This could be bad product. Determine if it is always one type of product with which you are having trouble. Some product, when damaged, will have a "front lip" that noses down and "bumps" over every roller. These products will snag under a sensor and need to be removed from the system.
- The sensor can occasionally set up too high if the valve bracket is bent. Loosen the valve bracket, apply upward pressure and re-tighten at the top of the mounting hole clearance. If this is not adequate, bend the valve bracket up a bit.
- A sharp edge steel or aluminum pallet will make a lot of noise or stall on the dual sensor. Remove and go to a single sensor.

Product does not tight pack upon accumulation.

- If the conveyor is running at low speeds with light product, it will not tight pack. A solution is to group 4 to 8 products in a slug prior to entering the conveyor and release this slug onto the conveyor. This slug will have more inertia and will tight pack. This slug is normally built on upstream XenoROL using a brake and a couple of photo eyes.
- The conveyor speed can be increased if the application will allow it. Several cautions need to be taken when doing this:

The speed on a light case will have to be dramatically increased to have any effect. With heavy cases, increasing the speed is much more effective.

Be sure the speed increase does not cause overfeed on the downstream conveyor. This will cause line pressure.

- The single sensor will always pack tighter than the double sensor. Be sure to check your product before going to a single sensor. Totes always require a dual roller sensor.

Very light product fails to convey.

- Product under 2 lbs. will hang up at the slightest resistance. Sensors must be adjusted for minimum projections above the carrier rollers and still actuate the valve. This will be between .065 and .100 for the dual roller sensor. Products cannot have a lip or overlapping cardboard to catch on the sensor. Larger boxes will convey better (less skewing) than small ones. The weight cannot be in the rear and still place at least 8 oz. on the sensor.

Conveyor will "surge" when started after an E-stop condition. (Dynamic Release only.)

- This condition can happen on relatively long lines (over 75'). When an E-stop is triggered, the conveyor may be in the process of releasing product which would cause an open sensor. The pneumatics continue to sequentially release even though the power has been taken off the drive motor. When the conveyor is restarted, the pneumatics have prematurely sequenced out and the entire conveyor is in the transport mode until the open sensor is depressed. This can cause significant line pressure for up to 5 seconds.

The solution can be one of two options:

- Do not use the E-stop except for true emergencies. By regulating the product discharge of the AccuROL through the discharge solenoid as it was designed to function, there will never be this problem.
- If the customer insists upon using the E-stop on a casual basis, then an extra air dump solenoid needs to be supplied (drawing #58842) This solenoid should be installed at the discharge end of the conveyor and must be energized 3 to 5 seconds after the drive has restarted.
- This condition will never happen with guardian sensors.

Conveyor with dual sensor rollers is discharging with extra-large gaps.

- Is the product accumulating tight? If there are large gaps when product accumulates these gaps will only get larger when the product is released.
- Check for a sensor that is not laying totally flat as the product discharges. If one of these sensors triggers as the product discharges, it will momentarily initiate accumulation and slow down the rate of release. The solution is to remove one of the washers from the CS-784 valve to allow it to push the sensor flatter when it raises. By running the conveyor in the discharge mode and laying a straight edge across the top of the rollers, it is easy to see if any of the sensors are not laying flat.

TROUBLESHOOTING GUIDE - MECHANICAL

MECHANICAL PROBLEM		POSSIBLE CAUSE	REMEDY
1.	Insufficient drive	Poor bottom on product	Improve product conveyability. Remove bad product
		Overloading of product	Remove overload condition
		Low air pressure	Increase regulated air to 20 PSI
2.	Rollers not turning/turning slowly	Low air pressure	Increase regulated air to 20 PSI
		Missing plug in the back of the air diaphragm	Replace plug
		Loose or incorrectly piped air line in one or more zones	Reconnect as required
3.	Excessive sprocket wear	Loose chain	Tighten chain (Ref. p. 41)
		Misalignment	Check alignment with straight edge along side of chain
		Dry chain	Lubricate on proper intervals (Ref. p. 39)
4.	Nonsymmetrical wear on sprockets or rollers	Connected shafts not parallel	Realign shafts
5.	Wear on inside of roller plates or side of sprocket teeth	Sprockets offset on shaft (misaligned) or out of parallel	Realign sprockets (Ref. p. 41)
6.	Wear on tips of sprocket teeth	Chain elongated excessively	Replace chain (Ref. p. 41)
		Loose chain	Tighten chain (Ref. p. 41)
7.	Broken chain parts, sprocket teeth	Drive overloaded	Avoid overloading
		Excessive slack causing chain to jump teeth	Periodically adjust tension (Ref. p. 41)
		Foreign object caught in chain	Remove object and prevent entry
		Inadequate lubrication	Maintain proper lubrication intervals (Ref. p. 39)
8.	Excessive chain noise	Chain contacting stationary parts	Remove interference
		Worn sprockets or chain	Replace both
		Inadequate lubrication	Maintain proper lubrication intervals (Ref. p. 39)
		Broken or missing chain rollers	Repair or replace chain (Ref. p. 41)
		Sprockets misaligned	Align and tighten all fasteners
		Check shaft and sprocket alignments	Realign (Ref. p. 41)
		Insufficient chain tension	Adjust tension (Ref. p. 41)
		Chain jumping sprocket teeth	Adjust chain tension; check for wear (Ref. p. 41)

TROUBLESHOOTING GUIDE - MECHANICAL

MECHANICAL PROBLEM		POSSIBLE CAUSE	REMEDY
9.	Excessive vibration	Broken or missing chain roller	Replace chain and sprockets
		Broken sprocket teeth	Replace chain and sprockets
10.	Pulsing chain	Insufficient chain tension	Reposition drive sprocket shaft
		Misalignment of chain guard	Align sprockets and chain guard
		Overload	Adjust guard as appropriate Inspect for obstruction to or drag on conveyor
11.	Broken chain	Drive overload	Avoid overloading Reduce unit length
		Frozen bearing on sprocket shaft	Inspect for damaged bearings and replace as necessary
		Worn or damaged chain	Replace chain as required
		Obstruction or jam	Remove obstruction to clear jam
		Very dry chain	Use lubrication schedule (Ref. p. 39)
		Rusty chain	Remove source of corrosion or use non corrosive chain; increase lubrication schedule
12.	Sprocket loose on shaft	Loose set screws	Realign sprockets & tighten set screws
		Worn or damaged keyway	Replace with new key
13.	Excessive slack	Normal wear	Expect rapid chain growth in first two weeks of operation Ñ reposition sprocket shaft; align sprockets and tighten down drive.
14.	Chain climbs on sprocket	Improper chain/sprocket alignment	Realign sprockets (Ref. p. 41)
		Material build-up in sprocket teeth	Clean sprocket and readjust chain (Ref. p. 36)
15.	Excessive drive after accumulation signal	Solenoid not energized	Verify circuitry, see Solenoid Valves (pg. 42)
		Solenoid piped incorrectly	Check Connections pgs. 20, 21, 22, 23, 24
		Diaphragm in one or more zones not seated on the pressure pan correctly	Push diaphragm firmly into mounting hole
		Faulty sensor valve in or more zones	Replace
16.	Belt mistracking	Roller is skewed over a pressure roller	Straighten it
		More than two rollers are skewed every 6'	Straighten excess skewed roller
		Drive pulley is not square	Square using jack screw

TROUBLESHOOTING GUIDE - MOTOR/REDUCER

MOTOR/REDUCER PROBLEM		POSSIBLE CAUSE	REMEDY
17.	Reducer running excessively hot	Low reducer oil level	Check oil level in gearcase and be sure breather plug is open (non Relialube reducers)
		Drag on conveyor	Check and inspect all bearings on conveyor
			Check for excessive product load
			Check all rollers for free rotation
18.	Reducer or motor noisy	Insufficient reducer lubricant on motor shaft bearing	Add recommended oil to gearcase (Ref. p. 40)
		Damaged gears	Replace unit
		Output shaft or chain rubbing chain guard	Adjust guard
		Bent fan housing	Repair or replace part
		Worn brushes	Repair or replace part
		Worn bearing	Repair or replace part
19.	Repeated motor stalling	Electrical	Check circuits and panel
		Motor wiring	Check heater size and amp draw
			Check motor wiring
		Drag on conveyor	Check all bearings
20.	Drive slow to start	Electrical	Check circuits and panel
			Take ampere reading
21.	Motor will not start	No line voltage	Check fuses and wiring for open circuit; check overload protection device and reset; check limit switches, starter and relays for faulty contacts or mechanical fault; check for voltage at source
		Low line voltage	Check control circuit voltage
			Check for low resistance short on line
		Conveyor jammed	Check for foreign material in chain and sprockets
		Burned out or shorted stator windings	Replace motor with spare and send defective motor to authorized repair station
		Failure of photo electric control	Check photo electric control
22.	Motor will run but reducer output shaft does not turn	Worn worm gear in reducer	Replace reducer with spare and send defective reducer to authorized repair station
		Input shaft key missing or defective	Replace key

TROUBLESHOOTING GUIDE - MOTOR/REDUCER

MOTOR/REDUCER PROBLEM		POSSIBLE CAUSE	REMEDY
23.	Reducer oil leakage (non Reliance Relialube)	Overfilling	Drain lubricant to proper level
		Vent in wrong location	Place vent in uppermost position
			Extend vent with pipe nipple
		Defective oil seals on output shaft	Tighten all bolts and fittings
			Install new oil seals
24.	Motor overload protectors kicking out	Incorrect size	Check overload size and replace if necessary
		Short in motor	Replace motor
25.	Motor runs, conveyor rollers do not turn	Drive chain broken or disconnected	Replace chain (Ref. p. 41)
		Sprocket loose in drive	Install key, tighten set screws and check line-shaft for wear
26.	Starter overloads kicking out	Wrong size overloads	Check proper size and replace
		Excessive amps being pulled	Reset starter and check amp draw
		Motor too small	Replace motor within size limits for conveyor speed
		Defective motor	Repair or replace motor
		Overloaded conveyor	Check for excessive product

TROUBLESHOOTING GUIDE - ELECTRICAL

ELECTRICAL/SOLENOID VALVE PROBLEM		POSSIBLE CAUSE	REMEDY
27.	Electrical shorts	Loose connection	Check all wire connections
		Improper voltage	Consider adding additional transformer
			Check fuses
28.	Photoeye or proximity switches do not energize solenoid	Retroreflective photoeye not properly aligned with target	Realign photoeye with retroreflective target so indicator light comes on
		Defective switch	Replace
29.	Solenoid valve blows to exhaust	Inlet poppet not sealed	See "Solenoid Valves" (Ref. p. 42)
		Faulty valve-to-base gasket	
		Faulty seals	
		Damaged spool	
		Cylinder leaks	
		Inadequate air supply	
		Water or oil contamination	
30.	Solenoid fails to actuate valve	Loose pilot cover or faulty solenoid	
		Inadequate voltage at solenoid	
31.	Air flow is normal only in actuated position	Broken return spring	
32.	Solenoid buzzes	Faulty solenoid	
		Inadequate voltage at solenoid	
		Varnish in direct operated spool valve	
33.	Solenoid burned out	Varnish in direct operated spool valve	
		Incorrect voltage at solenoid	
34.	Valve is sluggish	Faulty seals on spool valve	
		Varnish in spool valve	
		Inadequate air supply	
		Inadequate pilot or signal pressure	
		Faulty silencer	
		Water or oil contamination	

PARTS IDENTIFICATION

This section is used to identify parts that may require replacement during the life of the conveyor.

Parts which specifically pertain to AccuROL™ are included with illustrations. Drive components are identified for standard speed and horsepower combinations.

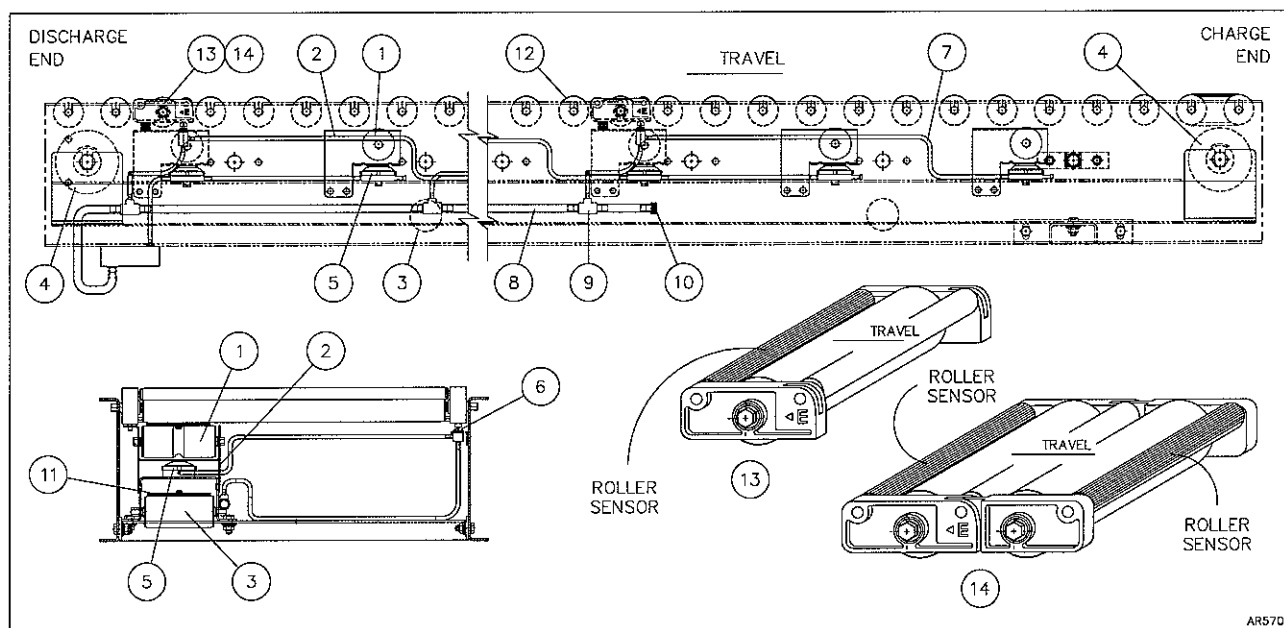
A "**Recommended Spare Parts List**" is published for all conveyor orders of \$10,000 or more. This spare parts list is sent to the purchaser approximately (2) weeks after the order is received. It includes part numbers, description, pricing and recommended quantities to be kept for maintenance.

If you are unable to locate this document (order under \$5,000 and not sent) another may be obtained by contacting the Major Distributor Services Department at 231-798-4547 or Fax 231-798-4146.

To identify a part and its part number, refer to the assemblies and devices on the following pages. Determine the balloon number for the required part and reference the parts list. The parts listed may then refer to one of the data charts for more detail.

PARTS IDENTIFICATION

DISCHARGE, INTERMEDIATE & CHARGE BEDS (SINGULATION RELEASE)

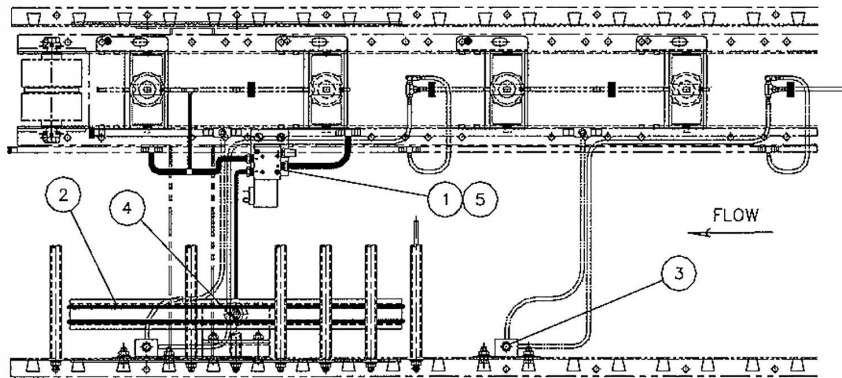


Balloon Number	Description	Part Number
1	Roller, Pressure	60204001
2	Bracket, Pressure Roller	60700543
3	Roller, Return	60204000
4	Pulley, 4" Dia. Terminal	60000014
5	Air Diaphragm	60700000
6	Valve, Sensor	89000350
7	Hose, Urethane 1/4" dia.	89000580
8	Hose, Urethane 1/2" dia.	89000595
9	Tee, Union Barbed 1/2" x 1/2" x 1/4"	89000653
10	Plug, Terminal Barbed	89000426
11	Drive Belt, 4" Wide	Conveyor Length x 2, then add 5'-3"

Balloon Number	Description	18-1/2"	24-1/2"	30-1/2"	36-1/2"
12	Roller, Carrier	60218001	60224001	60230001	60236001
13	Single Roller, Sensor Assembly	60218701	60224701	60230701	60236701
14	Dual Roller, Sensor Assembly	60218900	60224900	60230900	60236900

PARTS IDENTIFICATION

SINGULATION OR SLUG RELEASE W/BRAKE



SLUG RELEASE

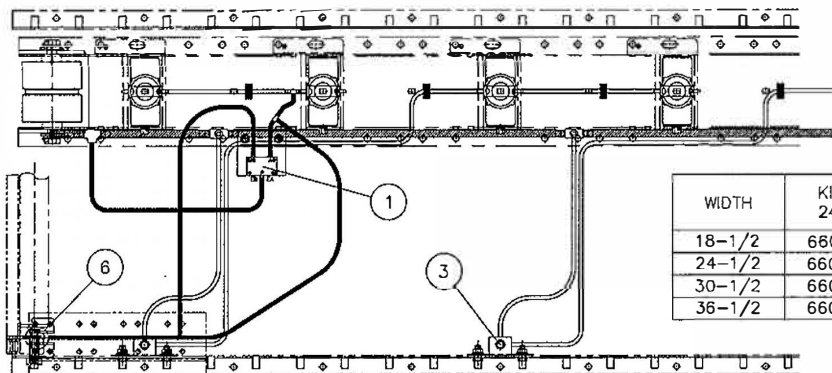
WIDTH	KIT NO. 24 VDC	KIT NO. 120 VAC
18-1/2	66018124	66018924
24-1/2	66024124	66024924
30-1/2	66030124	66030924
36-1/2	66036124	66036924

SINGULATION RELEASE

WIDTH	KIT NO. 24 VDC	KIT NO. 120 VAC
18-1/2	66018725	66018825
24-1/2	66024725	66024825
30-1/2	66030725	66030825
36-1/2	66036725	66036825

AR5726

Balloon Number	Description	Part Number
1	Solenoid Valve Singulation	89000177
2	Brake Tubing	89000580
3	Actuator Valve	89000350
4	Brake Air Cylinder	89000020
5	Solenoid Valve Slug	89000182
6	Stop Air Cylinder	P1000352001C

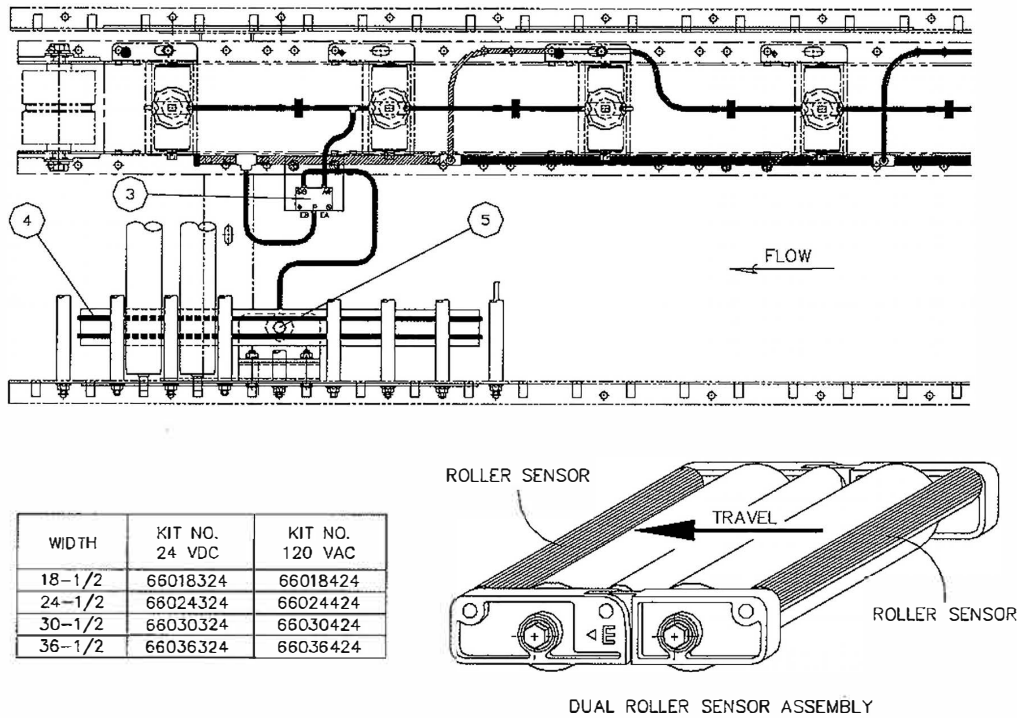


WIDTH	KIT NO. 24 VDC	KIT NO. 120 VAC
18-1/2	66018325	66018425
24-1/2	66024325	66024425
30-1/2	66030325	66030425
36-1/2	66036325	66036425

AR5705

PARTS IDENTIFICATION

DYNAMIC RELEASE W/BRAKE (OPTIONAL)

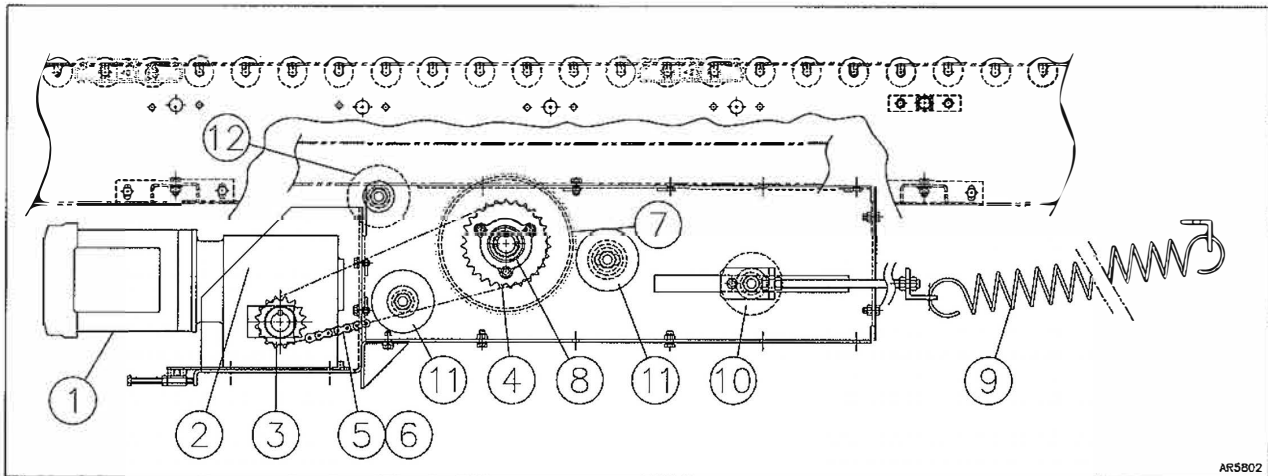


AR5021

Balloon Number	Description	Part Number
1	Pilot, Valve	89000340
2	Valve	89000008
3	Solenoid Valve	89000177
4	Brake Tubing	89000580
5	Brake Cylinder	89000020

PARTS IDENTIFICATION

CENTER DRIVE W/SPRING TAKE-UP

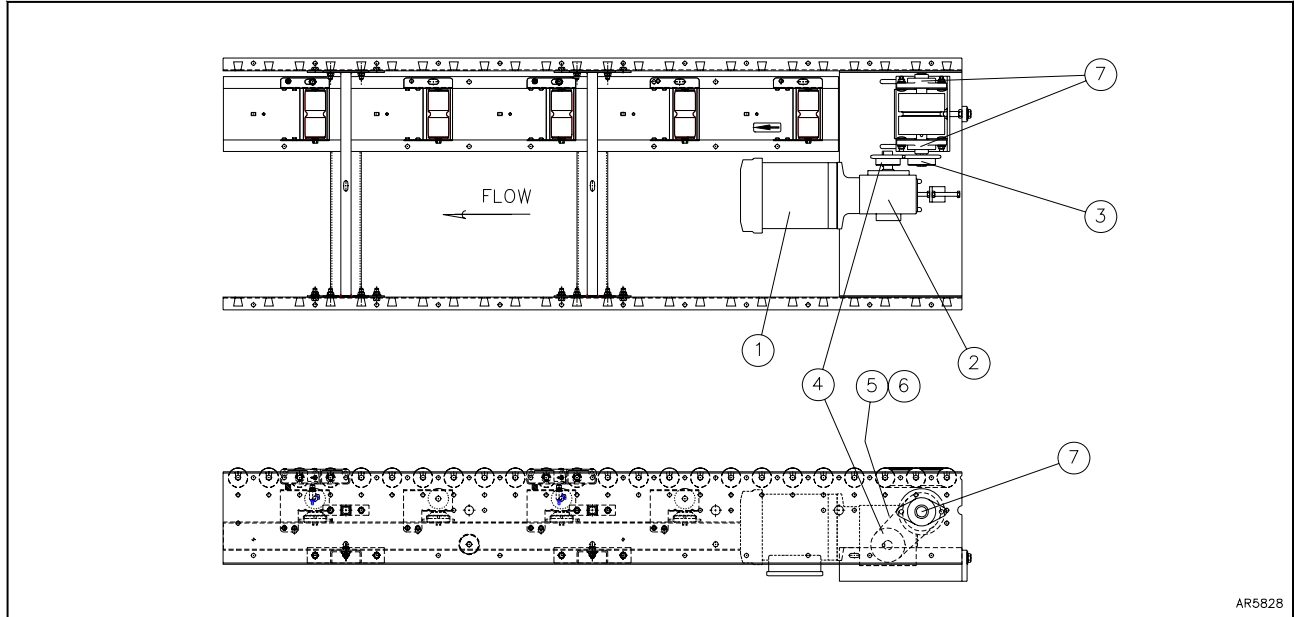


AR5802

Balloon Number	Description	Part Number
1	Motor	Refer to Drive Components Chart
2	Reducer	
3	Drive Sprocket	
4	Driven Sprocket	
5 and 6	Chain, RC50 and Master Link	
7	Snubber Roller, Grooved Face	60000014
8	Pulley, 8-1/2" Dia.	60000050
9	Bearing, 1-3/16 3-Belt	90050210
10	Pulley, Take-up	60000024
11	Extension, Spring .177 x 2'-0"	60000001
12	Snubber Roller, Smooth Face	

PARTS IDENTIFICATION

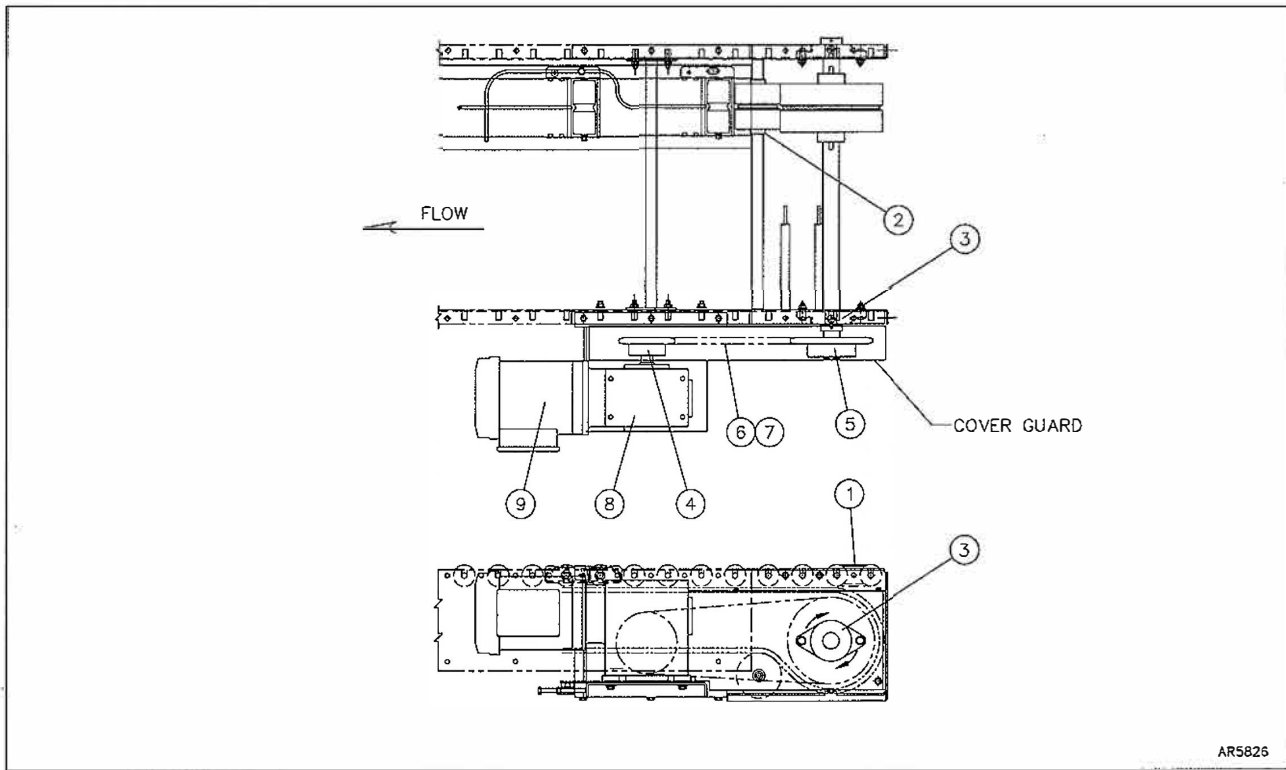
COMPACT DRIVE (OPTIONAL)



Balloon Number	Description	Part Number
1	Motor, 230 VAC	Per Application
2	Reducer	
3	Sprocket, Drive	
4	Sprocket, Driven	
5	Chain, RC50	90140029
6	Link, RC50 Connection	90440106
7	Bearing Bolt 1" Bore	P06988001B

PARTS IDENTIFICATION

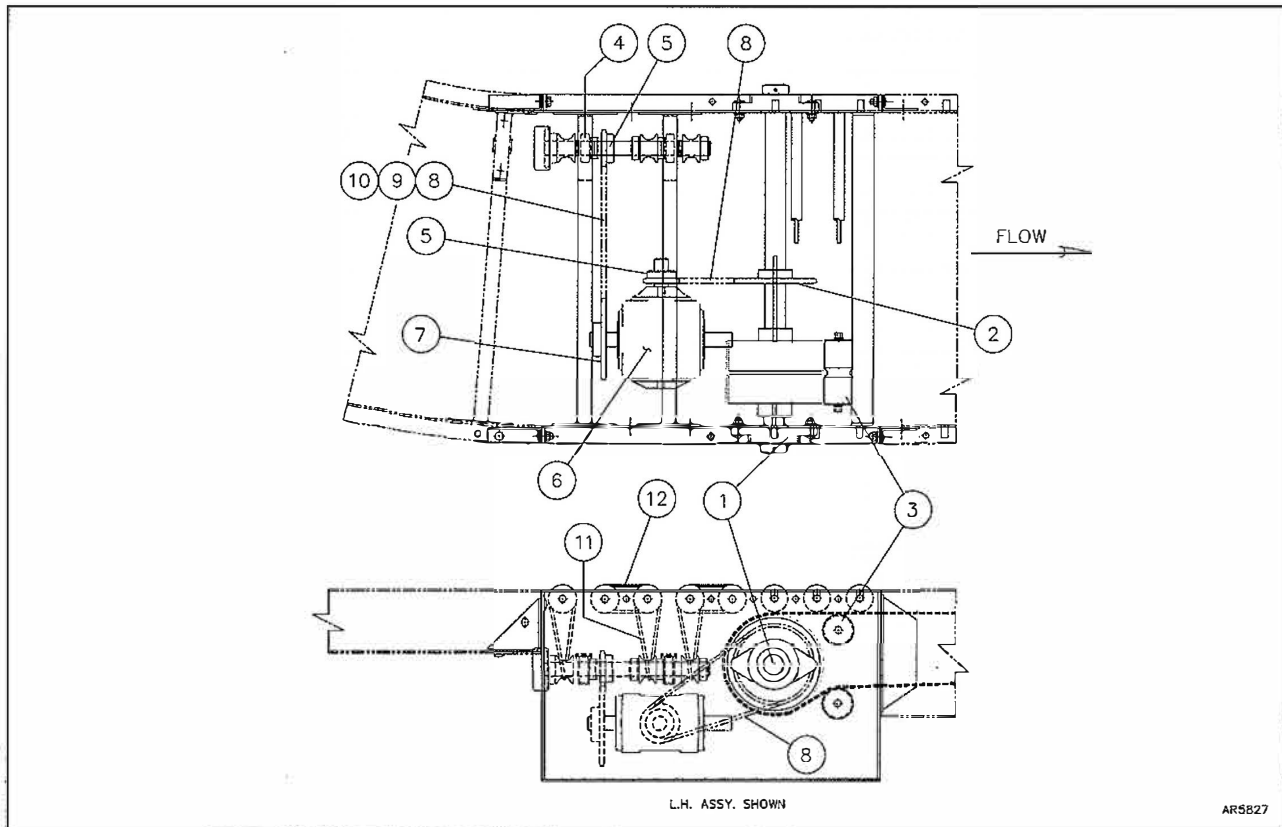
SIDE MOUNTED LOW PROFILE DRIVE



Balloon Number	Description	Part Number
1	O-ring 3/16 x 9-15/16	9053005
2	Bearing, Snubber	90050028
3	Bearing, 1-7/16 Bore	90050212
4	Sprocket, H60 12T, 1-1/8" Bore	90800564
5	Sprocket, H60 27T, 1-7/16 Bore	90800600
6	Chain, RC60	90140032
7	Link, RC60 Connector	90140107
8	Reducer, 15:1	90655038
9	Motor, 1.5 HP 230 VDC	90480120

PARTS IDENTIFICATION

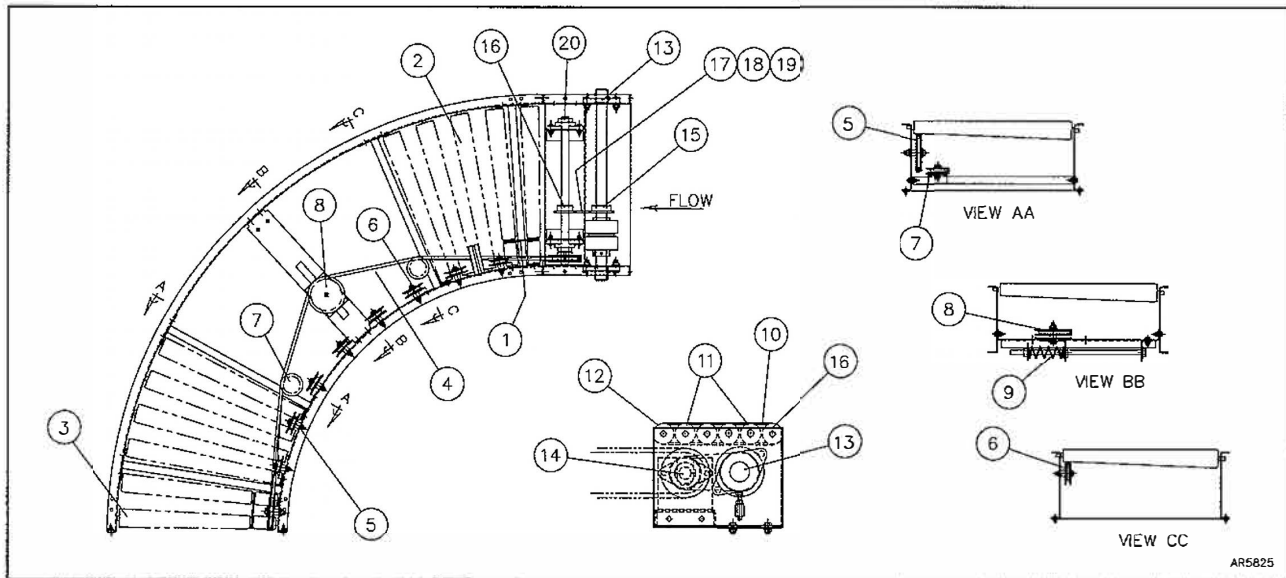
ACCUROL POWER CONNECTION TO XENOROL



Balloon Number	Description	Part Number
1	Bearing, 2-Bolt 1-7/16" Bore	90050212
2	Sprocket, 1-7/16" Bore	90800907
3	Roller, Pressure	60204018
4	Bearing, 1" Bore Line-shaft Assembly	90050103
5	Sprocket, 1" Bore	90800592
6	Reducer, 1:1 Type D	90655000
7	Sprocket, 1" Bore	90800909
8	Chain, RC40	90140027
9	Link, RC40, Connector	90440105
10	Link, RC40, Offset	90440110
11	O-ring, 3/16 x 13-1/2"	90530009
12	O-ring, 3/16 x 9-15/16"	90530005

PARTS IDENTIFICATION

V-BELT DRIVEN CURVE W/POWER CONNECTION (OPTIONAL)



Balloon Number	Description	Part Number
1	O-ring, 3/16" x 9"	9053003
2	Roller, True Taper Gravity	D9905146
3	Roller, True Taper	D9905147
4	V-Belt	D9903441
5	Sheave, Assembly V-Belt	P05764002B
6	Sheave, Assembly V-Belt	P05764002D
7	Sheave, Assembly V-Belt	P05764002E
8	Sheave, Assembly V-Belt	P05764003A
9	Spring	P05764003B
10	O-ring, 3/16" x 7-7/8"	90530012
11	Roller, Double Groove	D9905139
12	Roller, Grooved	60224109
13	Bearing, 1-7/16" Bore	90050212
14	Bearing, 1" Bore	90050223
15	Sprocket, 1-7/16" Bore	90800497
16	Sprocket, 1" Bore	90800489
17	Chain, RC40	90140027
18	Link, Chain Connector	90440105
19	Link, RC40 Offset	90440110
20	Sheave, V-Belt	P05764003D

PARTS IDENTIFICATION

CENTER DRIVE COMPONENTS

H.P.	FPM	Reducer	Drive Sprocket	Bore	Driven Sprocket	Bore	Chain Size
1/2	30	56/262-60LH	H6012T	1-1/8	H6027T	1-3/16	60
3/4	30	56/262-60LH	H8010T	1-1/8	H8021T	1-3/16	80
1/2	45	56/175-40LH	H5015T	7/8	H5034T	1-3/16	50
3/4	45	56/262-40LH	H6Q11T	1-1/8	H6025T	1-3/16	60
1	45	56/262-40LH	H6011T	1-1/8	H6025T	1-3/16	60
1/2	60	56/175-30LH	H5015T	7/8	H5034T	1-3/16	50
3/4	60	56/262-30LH	H5015T	1-1/8	H5034T	1-3/16	50
1	60	56/262-30LH	H6012T	1-1/8	H6027T	1-3/16	60
1-1/2	60	56/350-30LH	H8012T	1-1/2	H8021T	1-3/16	80
1/2	75	56/175-30LH	H5018T	7/8	H5033T	1-3/16	50
3/4	75	56/262-30LH	H6015T	1-1/8	H6027T	1-3/16	60
1	75	56/262-30LH	H6015T	1-1/8	H6027T	1-3/16	60
1-1/2	75	56/350-30LH	H8011T	1-1/2	H8020T	1-3/16	80
1/2	90	56/175-30LH	H5023T	7/8	H5035T	1-3/16	50
3/4	90	56/262-30LH	H5023T	1-1/8	H5035T	1-3/16	50
1	90	56/262-30LH	H6018T	1-1/8	H6027T	1-3/16	60
1-1/2	90	56/350-30LH	H8014T	1-1/2	H8021T	1-3/16	80
2	90	56/350-30LH	H8014T	1-1/2	H8021T	1-3/16	80
1/2	120	56/175-20LH	H4024T	7/8	H4041T	1-3/16	40
3/4	120	56/175-20LH	H5020T	7/8	H5034T	1-3/16	50
1	120	56/175-20LH	H5020T	7/8	H5034T	1-3/16	50
1-1/2	120	56/262-15LH	H6012T	1-1/8	H6027T	1-3/16	60
2	120	56/262-15LH	H6012T	1-1/8	H6027T	1-3/16	60
1/2	150	56/175-15LH	H4013T	1	H4024T	1-3/16	40
3/4	150	56/175-15LH	H5013T	1	H5024T	1-3/16	50
1	150	56/175-15LH	H6014T	7/8	H6026T	1-3/16	60
1-1/2	150	56/262-15LH	H6014T	1-1/8	H6026T	1-3/16	60
2	150	56/262-15LH	H6014T	1-1/8	H6026T	1-3/16	60
3	150	56/350-15LH	H8011T	1-1/2	H8020T	1-3/16	80
1/2	180	56/175-15LH	H4015T	1	H4023T	1-3/16	40
3/4	180	56/175-15LH	H5015T	7/8	H5023T	1-3/16	50
1	180	56/175-15LH	H6015T	7/8	H6023T	1-3/16	60
1-1/2	180	56/262-15LH	H6015T	1-1/8	H6023T	1-3/16	60
2	180	56/262-15LH	H8014T	1-1/8	H8021T	1-3/16	80
3	180	56/350-15LH	H8014T	1-1/8	H8021T	1-3/16	80
1/2	210	56/175-10LH	H4015T	7/8	H4029T	1-3/16	40
3/4	210	56/175-10LH	H5015T	7/8	H5029T	1-3/16	50
1	210	56/175-10LH	H5015T	7/8	H5029T	1-3/16	50
1-1/2	210	56/262-10LH	H5015T	1-1/8	H5029T	1-3/16	50
2	210	56/262-10LH	H6015T	1-1/8	H6029T	1-3/16	60
3	210	56/262-10LH	H6015T	1-1/8	H6029T	1-3/16	60

Note: For other speeds use the following formula: $FPM = 2.356 \times \text{Reducer Output} \times \frac{\text{Drive Sprocket}}{\text{Driven Sprocket}}$

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