

# OWNER'S MANUAL



## Z-Turn 180 DEGREE BELT POWER CURVE CONVEYOR

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Conveyor Location: \_\_\_\_\_  
Model Number: \_\_\_\_\_  
Serial Number: \_\_\_\_\_

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**A. Tool Requirements for Z-Turn Installation, Maintenance, and Belt Replacement**

<b>Tool</b>	<b>Used For</b>
10 mm, 15 mm, 17mm or 9/16" Wrench	Bearing Tensioners
15 mm or 9/16" Wrench or Socket	Bearing Housing to Frame 1-3/16" (30 mm) dia shaft & smaller
18 mm or 3/4" Wrench or Socket	Bearing Housing to Frame 1-7/16" (35 mm) dia shaft & larger
13 mm or 1/2" Wrench or Socket	Chain Cover – Sideguards – End Caps
13 mm or 1/2" Wrench or Socket	Return Guide Extrusion to Frame
Socket Wrench Set with 3/8" drive and imperial and/or metric sockets	Standard Drive Arrangements
Small Electric or Air Drill with 1/8" (3.2 mm) and 7/64" (2.8 mm) Drill Bits & Hand Rivet Gun with 1/8" Steel Rivets	Upper Guide Extrusion to Frame and Chain Guide Strips
5/32" Allen Wrench	End Rolls
3/16" Allen Wrench	Sprocket Set Screws
5/32" Allen Wrench	Bearing to Shaft 1-7/16" (35 mm) dia. shaft & larger
1/8" Allen Wrench	Bearing to Shaft 1-3/16" (30 mm) dia. shaft & smaller
3/32" Allen Wrench	Return Wheels
Electricians Nut Driver Set Or Adjustable Wrench	Electrical Motor Connections
Flat Blade (standard) Screw Driver	Guide Material
Pliers and Side Cutters	Mechanical Lace Belt Splice
Rubber Mallet or Small Pry Bar	Belt Tension Adjustment

**NOTE:** Only trained personnel should perform all required work on the curve to prevent any danger to operators or other persons, and to prevent damage to the curve.

**WARNING:** Disconnect and lock-out power before performing any installation or maintenance procedures. All guards must be in place before startup of curve.

## B. Safety precautions

Portec Flomaster does not install conveyors, therefore, it is the responsibility of the contractor, installer, owner and user to install, maintain and operate the conveyor, components and conveyor assemblies in such a manner as to comply with all national, state and local laws and ordinances, including the Occupational Safety and Health Act, and the American National Standards Institute (ANSI) B20.1 Safety Code and Z244 Lockout/Tagout.

In order to avoid an unsafe or hazardous condition, the conveyors or parts must be installed and operated in accordance with the following minimum provisions.

1. Conveyors shall not be operated unless all covers and/or guards for the conveyor and drive unit are in place. If the conveyor is to be opened for inspection cleaning, maintenance or observation, the electric power to the motor driving the conveyor must be LOCKED OUT/TAGGED OUT in such a manner that the conveyor cannot be restarted by anyone; however remote from the area, until conveyor cover or guards and drive guards have been properly replaced.
2. If the conveyor must have an open housing as a condition of its use and application, the entire conveyor is then to be guarded by a railing or fence in accordance with the current revision ANSI standard B20.1.
3. Do not attempt any maintenance or repairs of the conveyor until power has been LOCKED OUT/TAGGED OUT.
4. Always operate conveyor in accordance with these instructions and those contained on the caution labels affixed to the equipment.
5. Do not place hands, feet, or any part of your body, in the conveyor.
6. Never walk on conveyor covers or guards. Never climb, sit, stand, or work from a conveyor.
7. Do not use conveyor for any purpose other than that for which it was intended.
8. Do not poke or prod material into the conveyor with a bar or stick inserted through the openings.
9. Keep the area around conveyor drive and control station free of debris and obstacles.
10. Eliminate all sources of stored energy (materials or devices that could cause conveyor components to move without power applied) before opening the conveyor
11. Do not attempt to clear a jammed conveyor until power has been LOCKED OUT/TAGGED OUT.
12. Do not attempt field modification of conveyor or components without prior approval of Portec Flomaster.
13. Conveyors are not normally manufactured or designed to handle materials that are hazardous to personnel. These hazardous materials include those that are explosive, flammable, toxic or otherwise dangerous to personnel. Conveyors may be designed to handle these materials. If hazardous materials are to be conveyed, Portec Flomaster should be consulted prior to any modifications.
14. When two or more conveyors are interfaced or joined together, make sure there is adequate guarding, pinch point protection and safety devices.
15. Only trained operators should be permitted to operate and maintain conveyors. Training needs to include instruction in operation under normal conditions and emergency conditions.
16. All starting and stopping devices should be clearly marked and the immediate area kept clear of obstructions to permit ready access.
17. The areas around loading and unloading points should be kept clear of any obstructions.
18. A person should NOT BE PERMITTED TO RIDE on any conveyor not specifically designed and approved to convey people.
19. Workers working around or operating conveyors should be shown the location of the starting and stopping devices and instructed how to use them to stop the conveyor in an emergency.
20. Do not use a conveyor for any purpose other than that for which it was intended. A conveyor should only be used to transport material it is capable of handling safely.
21. Under no circumstances should safety guarding or labels attached to the conveyor be altered or removed without written permission from the owner/manufacturer. If the labels attached to the equipment become illegible, order replacement warning labels from Portec Flomaster or Conveyor Equipment Manufacturer's Association (CEMA) at [www.cemanet.org](http://www.cemanet.org).
22. Routine inspections and Preventive and Corrective maintenance programs should be conducted to ensure that all safety features and devices are in place and functioning properly.

23. Employees should be alerted to the potential hazard of entanglement in conveyors caused by items such as long hair, loose clothing, and jewelry.
24. As a general rule, conveyors should not be cleaned while in operation. Where proper cleaning requires the conveyor to be in motion and a hazard exists, personnel should be made aware of all associated hazards as indicted above and take proper precautions.

**Additional Safety Notes:**

Disconnecting and locking out the power to the motor driving the unit provides the only real protection against injury. Secondary safety devices are available; however, the decision as to their need and the type required must be made by the owner-assembler as Portec Flomaster has no information regarding plant wiring, plant environment, the interlocking of the conveyor with other equipment, extent of plant automation, etc. Other devices should not be used as a substitute for locking out the power prior to removing guards or covers. We caution that use of the secondary devices may cause employees to develop a false sense of security and fail to lock out power before removing covers or guards. This could result in a serious injury should the secondary device fail or malfunction.

Electrical controls, machinery guards, railings, walkways, arrangement of installation, training of personnel, etc., are necessary ingredients for a safe working place. It is the responsibility of the contractor, installer, owner and user to supplement the materials and services provided by Portec Flomaster to make the conveyor installation comply with the law and accepted standards.

**Examples of Safety Labels used on conveyors:**



## C. Installation Instructions

Power conveyors are normally shipped partially disassembled. The drive unit, floor supports and sideguards will have to be attached to the conveyor unit. Larger-sized conveyors are sometimes shipped in sections and will have to be assembled in the field.

### C1. Assembly & setup

Portec power curve conveyors are fully assembled, adjusted and shop tested before being shipped. Only minor checking is required to insure that no parts may have shifted during shipment. The floor supports, side guards and drive unit are normally removed for shipment. After uncrating the conveyor and moving it to the site, the assembly process may begin.

- a) Raise the conveyor and attach the floor supports and braces using the bolts provided. Be sure to observe all safety precautions when working under hoisted equipment.  
**Note: Never lift a conveyor using the drive shaft extension or shaft deflection can result.**
- b) Position the conveyor in relation to the adjoining conveyors. Level and securely attach the conveyor to the floor. It may be necessary to shim the legs if the floor is uneven. This may not be necessary if your supports have adjustable feet.
- c) Mount the drive unit on the center drive shaft extension. The drive unit is not normally supplied with a motor starter or other controls.
- d) Before startup, check to be sure that the belt is not rubbing against any other part such as a conveyor side guard, chain cover or an adjoining conveyor.
- e) During the initial run-in period listen for any unusual noises that may indicate that something is out of alignment. Some small adjustments may be necessary and are described in further detail in this manual.

**WARNING: Do not adjust the end rolls to minimize the transfer distance to an adjoining conveyor. Either move the entire conveyor or use a transfer roll to minimize the transfer distance.**

- f) Inspect the chain tension after setup. Attempt to maintain the initial chain tension when making future adjustments. The first semi-annual check should be made after the first 40 hours of operation. (See the Preventative Maintenance Schedule )

**Note:** *Future adjustments to allow for chain stretch must be done, taking care not to bring the belt tight against the roll.*

**WARNING: A CONVEYOR THAT IS ADJUSTED WITH THE BELT TIGHT AGAINST THE ROLL MAY DAMAGE THE EQUIPMENT AND BECOME HAZARDOUS.**

**C2. Run-in inspection:** The run-in procedures are to be followed after the initial setup and after all maintenance is performed on the conveyor.

- a) Check that all guards and safety devices are in place.
- b) Check that there is slack between the end roll and the belt as described on the belt tension sticker on the inside radius frame of the conveyor. Make adjustment as necessary.
- c) Turn on the conveyor and visually check that the chain that is attached to the belt makes a smooth transition from the chain guides to the sprocket. Listen for excessive chain chatter, such as popping or snapping. Make adjustments as necessary. A well-adjusted chain should make a gentle hissing sound when operating. Refer to section D2.
- d) Watch the conveyor operate for a period of time and observe whether the belt moves smoothly over the slider bed and over the return rolls. If the belt drags on the return roll shaft, it may indicate that the belt tension may need to be tightened.

## D. Service and Maintenance

**Warning:** Disconnect the power and perform the appropriate lock-out/tag-out procedures prior to inspection.

**D1. Visual Inspection:** Check for any changes, rub marks, abrasion, noises, excessive dust build up or damage to the conveyor belt. Inspect the conveyor belt for any apparent damage. The belt must be relatively clean and free of any gouges, scuffs, or abrasions. The belt seams and edges should be in good condition with no evidence of damage or excessive wear. The belt lacing and lacing pin should be securely fastened and that there are no loose hooks. The belt should never be tight against the end roll or damage to the conveyor may result.

**Fasteners:** Inspect all fasteners to be sure they are tight.

**Drive Sprocket Idlers:** Inspect the drive sprocket idlers for damage and excessive wear. The chain impregnation depth should not be more than 3/32" (2.4 mm). Inspection can be accomplished by looking through the expanded metal viewing window in the drive sprocket guard, which is located on the underside of the conveyor.

**End Roll Idlers:** Inspect the end roll idlers for damage and excessive wear. The chain impregnation depth should not be more than 3/32" (2.4 mm). Inspection can be accomplished from underneath the conveyor near the end of outside radius frame at each end.

**Note:** Drive sprocket or end roll idler wear in excess of 3/32" (2.4 mm) will cause excessive chain guide material wear.

**Chain Guide Material:** Inspect the lower chain guide material for damage and excessive wear, particularly on the ends near the drive sprocket. Check that the chain guide material is securely fastened. The chain wear depth should not exceed 3/32" (2.4 mm). Inspection can be accomplished by looking through the expanded metal viewing window in the drive sprocket guard, which is located on the underside of the conveyor.

**Drive Sprocket:** Inspect the drive sprocket for alignment, damage and excessive wear. The drive sprocket should be centered in the chain path. **A Sprocket that is out of alignment can cause premature wearing of the drive chain, drive sprocket, chain guide material and possibly cause the chain to jump off the sprocket teeth.** Any chain noise that is heard such as rattling, ticking or rumbling, as the drive chain passes over the drive sprocket, could indicate that the sprocket is out of alignment.

Also check that the drive sprocket is securely fastened to the drive shaft. Inspection can be accomplished by looking through the expanded metal viewing window in the drive sprocket guard, which is located on the underside of the conveyor.

### D2. Drive Sprocket Alignment

When the sprocket alignment needs to be adjusted:

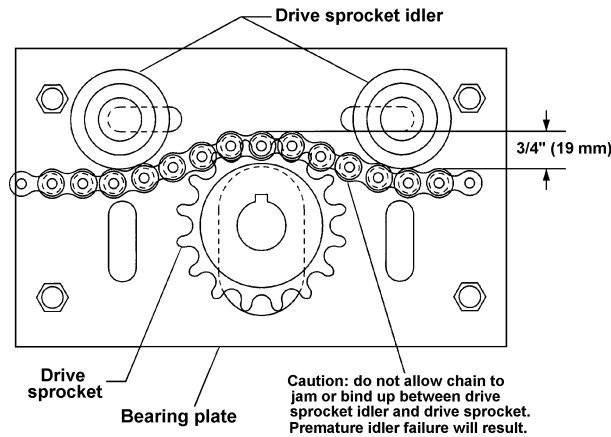
- a) Remove the drive sprocket guard
- b) Loosen the set screws, which are located on the drive sprocket hub.
- c) Align the drive sprocket back into the center of the drive
- d) chain path.
- e) Securely retighten the set screws.
- f) Reinstall the drive sprocket guard.

### D3. Drive Chain & Idlers

**Chain Tension:** Excessive drive chain noise is an indication that the chain is incorrectly tensioned. The chain tension will possibly decrease in a new Portec Power Curve during the run-in period. This is due to the seating of the chain into the chain guide material, drive sprocket idlers, and end roll idlers as well as normal elongation of the chain. Chain elongation most often appears after extended operation. The Chain tension may be adjusted as follows:

- a) Remove the chain cover to reveal the drive chain and end roll idlers. Be careful not to bend or distort the chain cover when removing it.  
**Note:** With the chain cover removed inspect the upper chain guide material. Insure it is securely fastened, undamaged and not grooved more than 3/32".
- b) Loosen the hex nuts on the end roll eye bolt and adjustment bolt.
- c) Adjust the chain tension by moving both end roll assemblies inequal amounts, using the adjustment nuts, until the chain deflection is 1/32 – 1/16" (.8-1.6 mm). Equal amounts of adjustment will keep the belt centered on the conveyor, maintain equal transfer distance between the mating conveyors, and leave an equal take-up distance on both ends for adjustments in the future.

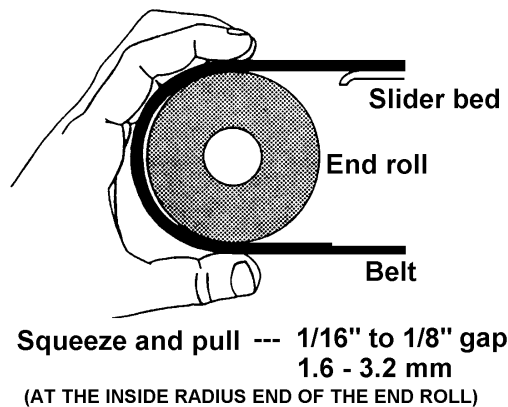
**Note:** The center drive design allows for a small amount of chain tensioning by moving the drive shaft up further into the take-up slot. This method can be used but it is not recommended, unless the chain is slipping on the sprocket. The drive sprocket height has been preset at the factory. If this method is used to tension the chain, extreme care needs to be taken to insure there is no undo stress placed on the drive sprocket idler shafts or drive chain. If the drive sprocket is moved too high in the take-up slot, in relation to the drive sprocket idlers, it will lead to premature drive sprocket idler failure. To insure the longevity of drive sprocket idlers, drive sprocket and the drive chain, the drive chain should not be moved any more than 3/4" (19 mm) up between the drive sprocket idlers.



**Typical drive sprocket arrangement**

- d) After the chain has been adjusted to the proper tension, check the belt tension along the length of the end roll. Squeeze the belt on the end roll and pull slightly to ensure that the belt is not snug against the end roll. There should be a gap of 1/16 – 1/8" (1.6-3.2 mm) between the belt and the end roll. A balance of this adjustment must be maintained that will allow the end roll roller, at the inside, to be turned by the belt. This procedure will insure that a flat spot will not develop on end roll roller.

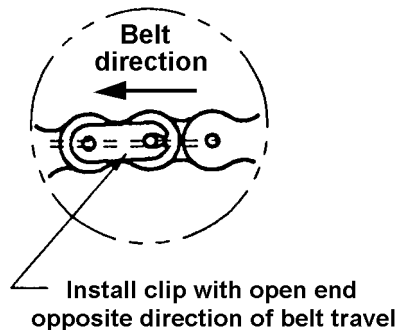
**Note:** When the chain is properly seated into the sprocket, it will not "pop" or jump on the drive sprocket teeth.



**Note:** Over tensioning may damage the belt and attachment components. A balance of this adjustment must be maintained that will allow the end roll roller, at the inside, to be turned by the belt. This procedure will insure that a flat spot will not develop on end roll roller.

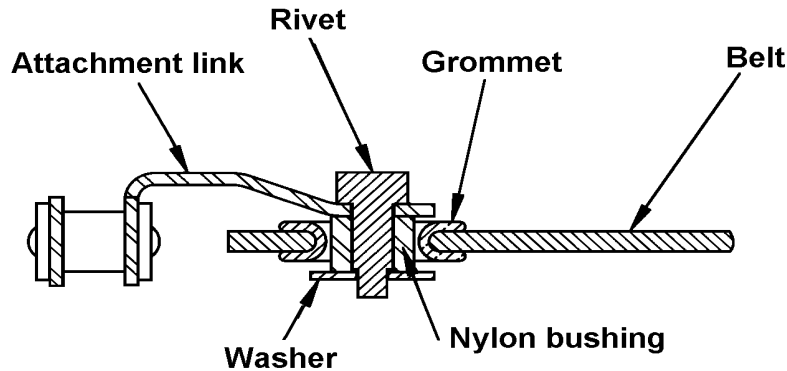
- e) Retighten all end roll hex nuts, making sure that the adjustment bolts remain in the same position, while tightening.  
f) Reinstall the chain cover.

**D4. Chain connecting link:** The chain attachment link, on a Portec Power Curve, is designed to be used with sidebow chain. The chain is allowed to flex in order to bend around the curve. When installing the connecting link, ensure that the open end of the clip is opposite the direction of belt travel (except for reversing conveyors).



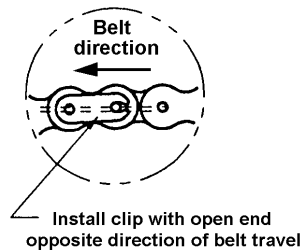
**D5. Attachment links:** An attachment link is used to attach the sidebow chain to the outside edge of the curved belt. If the attachment link is damaged, it may be replaced as follows:

- a) Remove the chain cover.
- b) Move the belt assembly until the damaged attachment link is on the top the conveyor.



**Cross section of belt w/hardware**

- c) At the outside radius, loosen the chain tension by moving the end roll back in the slot (towards the center of conveyor). Loosen the end roll adjustment bolts, on one end of the conveyor to accomplish this.
- d) Lift up the drive chain out of the chain guide track and use a chain break tool to remove the chain links, on both sides of the damaged attachment link.
- e) Bend the edge of the belt over and grind off the rivet that holds the attachment link to the belt and remove the damaged attachment link. **Be careful not to contaminate the grease in the wear guide track with metal particles.**
- f) Install a new attachment link into the chain using two connecting links. Insure that the connecting link clip is in the proper direction in relation to the belt direction.



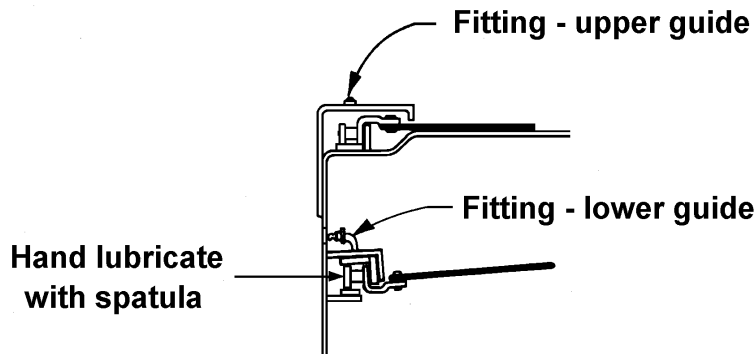
- g) Inspect the condition of the grommet in the belt. Replace if it is worn or damaged.
- h) Connect the new attachment link to the belt using a new rivet, washer and nylon bushing. Place a heavy piece of metal under the rivet when peening the washer unto the bottom of the rivet. The rivet end should be peened enough to securely attach the washer while allowing the washer to rotate on the bottom of the rivet. **Care should be used during the peening process to prevent damage to the belt or the top the conveyor slider bed. (If using a threaded rivet PN/900808, the peening process is not required.)**
- i) Lay the chain back into the chain guide track.
- j) Adjust the chain tension and tighten the outside radius adjustment bolts.
- k) Replace the chain cover.

**D6. Drive Chain Lubrication:** The upper and lower chain guides should be periodically lubricated. A mixture of dried grease and dust can greatly reduce the life of the chain and guides. This is especially true if the conveyor operates in dusty conditions. The conveyor is equipped with grease fittings located in the frame and chain cover along the length of the chain. We recommend using Lubriplate Molith #2 grease. The frequency of lubrication and amount required will depend upon the load, speed, and environmental conditions. Some general guidelines are as follows:

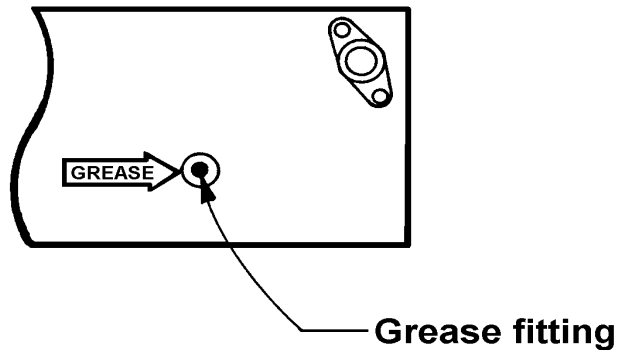
- Clean conditions @ 8 hours per day** - Lube every 3-4 months
- Clean conditions @ 18 hours per day** - Lube every 6-8 weeks
- Dusty conditions @ 8 hours per day** - Lube every 4-6 weeks  
Clean chain every 4-6 months
- High humidity** - Lube enough to stop rust and every 4-5 weeks

**WARNING: Running a conveyor that does not have adequate lubrication will damage the conveyor and substantially shorten the life of the chain.**

Periodic chain cleaning with a solvent soaked cloth is highly recommended when operating in dusty conditions. After cleaning, apply new grease to the entire length of the chain and work it well into the moving parts. A spatula or putty knife may be helpful in applying grease to the lower chain guides.



All power turns have grease fittings in the chain cover. Some models also have grease fittings in the side of the frame on the outside perimeter. The number of grease fittings on your particular turn will depend upon size and arc. Each grease fitting is clearly marked.



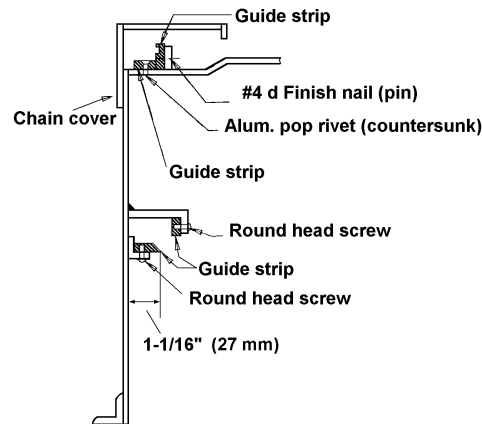
**D7. Drive Sprocket Idler Bearings:** Lubrication should be done periodically to insure trouble free operation. The drive sprocket idler shafts are equipped with grease fittings. The grease fittings are located above the outside radius drive shaft bearing, on the upper portion of the bearing plate. The drive shaft idler bearings should be lubricated every 240 hrs of operation using Mobil 1 synthetic grease. One pump with a grease gun should be sufficient in each drive sprocket idler assembly.

**Note: Do not use the same grease that is used to lubricate the drive chain (Lubriplate Molith #2 grease). Premature failure of the drive sprocket idlers will result.**

**Do not over grease the drive sprocket idlers. This will allow grease to get onto the underside of belt.**

**D8. Chain guides:** The belt drive chain is held in place on the outside radius of the belt by the chain guides. When properly maintained, the chain guides will provide many years of service. If the chain guides are damaged or excessively worn, they may be replaced as follows:

- a) Remove the chain cover.
- b) Remove the belt and chain assembly.
- c) Remove the old chain guides and fasteners.
- d) The lower guide with a 45° edge must be installed using self-tapping screws (provided). A pilot hole must be drilled for each screw.



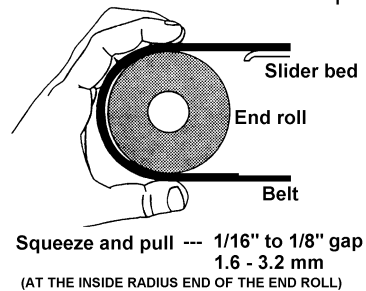
**Note:** When butting pieces end to end, use a fastener near the end of both pieces.

- e) The lower guide with the notch must be spaced as shown and attached with self-tapping screws (provided).
- f) The upper guide, with the notch, sits on the bed and is held in place with 4d finish nails (provided) acting as pins. The notch is positioned as shown. The head should be flush with the material and the excess pin material should be snipped off if it extends beyond the metal backing.
- g) The horizontal guide lays flat on the bed and positioned against the vertical guide. It is attached with 1/8" (3.2 mm) pop rivets (provided) which are countersunk to eliminate a protruding head.
- h) Contour the ends where the chain enters and exits the chain guides similar to the shape of the old chain guides. This reduces chain noise and results in smoother operation.
- i) Reinstall the belt and chain assembly.
- j) Lubricate the chain and reset the chain tension.
- k) Check the position of drive sprocket to insure that it is in the center of the chain path.
- l) Replace the chain cover.

**D9. Conveyor belt:** The conveyor belt on a Portec Belt Power Curve is powered by a chain that is attached to its outside edge. The chain-powered belt does not rely on friction between the end roll and the bottom of the belt, so the end roll should not be tight against the belt. The belt and chain assembly has a positive direct drive system that is not effected by loading or environmental conditions. While the system is rugged and reliable, a few adjustments will keep the conveyor operating well for many years.

**Belt adjustment:** The belt tension on the outside radius is set by adjusting the chain tension.

- a) Remove the chain cover to reveal the drive chain and end roll idlers. Be careful not to bend or distort the chain cover when removing it.
- b) Adjust chain tension by loosening one or both of the outside radius adjustment bolts and nuts and moving the end roll assembly until the chain deflection between the end roll idler and the end of the chain guide strips is between 1/32-1/16" (.8-1.6mm).
- c) Adjust the inside radius end of the end roll until there is a 1/16-1/8" (1.6-3.2mm) gap between the end roll and the belt when the end roll is squeezed and pulled slightly.



**Note: Over tensioning may damage the belt and attachment components.**

**Belt replacement (laced seams on both ends):** If the belt becomes worn or damaged, it may be replaced as follows:

- a) Remove the chain cover.
- b) Loosen all end roll adjustment nuts and bolts and slide the end roll assemblies to their minimum adjustment positions.
- c) Move the belt assembly until the chain connecting link is on the top side of the conveyor.
- d) Remove the chain connecting link and the seam-lacing pin next to the end of the chain.
- e) Place the new belt assembly on the conveyor and attach one end of the new belt to the end of the old belt by installing a connecting link and lacing pin. As the old belt is pulled off the conveyor, the new belt will be pulled over the end roll and underneath the conveyor. As the end of the new belt is pulled around the second end roll, it may be disconnected from the old belt.
- f) Pull both ends of the chain together in the chain guides and attach the special connecting link. **Note:** Sidebow connecting links must be used joining the chain ends. Standard roller chain links will not fit properly and will tend to work loose or stiffen the chain.
- g) **Note:** The connecting link clip must be placed on the outer side of the chain with the open end facing away from the direction of travel.
- h) Adjust the chain tension by moving both end roll assemblies until the chain deflection is 1/32-1/16" (.8-1.6 mm). The belt at the inside radius end of the end rolls should remain loose.
- i) Lay both belt ends together, align the outside edges and install the lacing pin. Bend the lacing pin over on the outside radius and insert the end of the lacing pin into the lacing hooks. Ensure that at least 1/2" (13 mm) of the lacing pin is inserted into the lacing hooks. Pull lacing pin taut on the inside radius, bend the lacing pin back and insert the end of the lacing pin into the lacing hooks. The lacing pin may have to be cut to length so that about 1/2" (13 mm) of the lacing pin is inserted into the lacing hooks.
- j) Adjust the belt tension on the inside radius.
- k) Replace the chain cover.

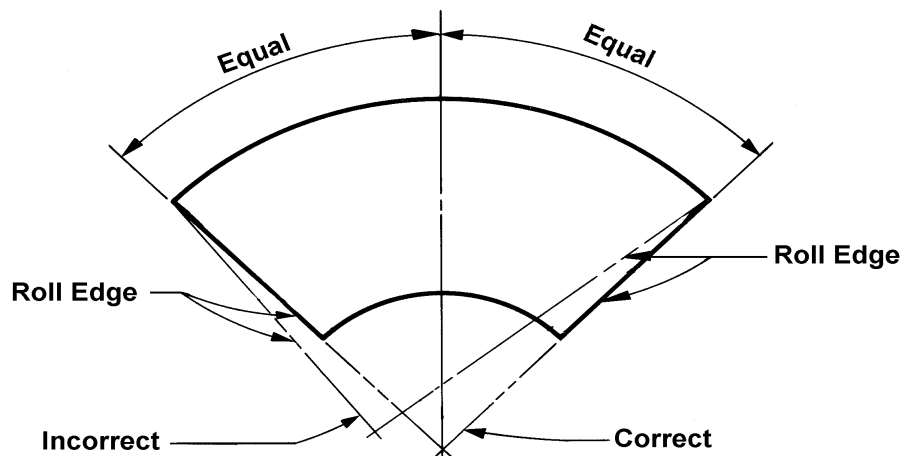
**Belt segment replacement (belt with laced seams):** If the belt is damaged in only one spot, it may be possible to replace only the damaged segment instead of the entire belt. Belt segments are specified by the required number of grommets. The segment has additional belt material on each end to allow the technician to cut both ends of the segment to length while it is on the conveyor. Replacement is as follows:

- a) Remove the chain cover.
- b) Disconnect the drive unit by removing the gear reducer (shaft mounted reducer) or removing the chain between the drive shaft and gear reducer (chain or belt driven units).
- c) Loosen all end roll adjustment nuts and bolts and slide the end roll assemblies to their minimum adjustment positions.
- d) Move the belt assembly until the damaged area is on topside of the conveyor.
- e) Break the chain at both sides of the damaged area.
- f) Cut and remove the damaged area of belt material. Be careful to leave additional material near the ends in order to cut to fit and install belt lacing.
- g) Place the new belt segment on the conveyor and attach the ends of the new segment of chain to the old chain with two connecting links. The belt segment should lie flat on top of the old belt and overlap the ends of the old belt.

**Note:** Sidebow connecting links must be used joining the chain ends. Standard roller chain links will not fit properly and will tend to work loose or stiffen the chain.

**Note:** The connecting link clip must be placed on the outer side of the chain with the open end facing away from the direction of travel.

- h) Adjust the chain tension by moving both end roll assemblies until the chain deflection is  $1/32$ - $1/16$ " (.8-1.6mm). The inside radius end of the end rolls should remain loose.
- i) Pull the inner radius ends of the belt together so that the ends overlap each other and the inside curvature matches along the lap. Usually, this will occur with the belt lying on the slider bed in a relaxed state.



- j) Using one end of the belt as a guide, draw a line on the other end to be joined. Then measure back  $5/16$ " (8 mm) (to leave a  $5/16$ " (8 mm) gap between ends) from that line and cut using a straight edge and razor knife.

**Note:** Place a piece of scrap material under the belt to prevent the slider bed from being marred.

- k) Disconnect the chain at the seam to be laced.
- l) Install the belt lacing hooks in both belt ends.
- m) Rejoin the chain ends by reinstalling the chain-connecting link.
- n) Lay both belt ends together, align the outside edges and install the lacing pin. Bend the lacing pin over on the outside radius and insert the end of the lacing pin into the lacing

- hooks. Ensure that at least 1/2" (13 mm) of the lacing pin is inserted into the lacing hooks. Pull lacing pin taut on the inside radius, bend the lacing pin back and insert the end of the lacing pin into the lacing hooks. The lacing pin may have to be cut to length so that about 1/2" (13 mm) of the lacing pin is inserted into the lacing hooks.
- o) Repeat the process to cut the second seam and install lacing.
  - p) Adjust the belt tension on the inside radius.
  - q) Connect the drive unit by installing the gear reducer (shaft mounted reducer) or reinstalling the drive chain or belt.
  - r) Replace the chain cover.

## D10. Return rolls

**Inspection:** During periodic inspections of the power turn, the return rollers should be checked to insure they are in good working condition. They should roll freely without any dents, gouges, or other damage. They should be clean without any foreign matter, such as adhesive tape, stuck to the surface or wound around the shaft. The rubber covers on the rubber tire-style rollers should be in good condition.

**Replacement:** If the return rolls are damaged or badly worn, they may be replaced as follows:

- a) Remove the inside radius hanger bracket.
- b) Remove the return roll shaft.
- c) Replace the roll(s) on the shaft.
- d) Reinstall the return roll shaft and attach the inside radius hanger bracket.

## D11. Drive Unit - Gear reducer:

**Mounting bolts:** The mounting bolts should periodically be inspected to be sure that they remain tight and that no misalignment has occurred.

**Lubricant:** The gear reducer should be checked to insure that the lubricant level is maintained at the manufacturer's recommended level. Consult the gear reducer manufacturer or their owner's manual before adding lubricant to insure that the correct lubricant is used. Some gear reducers are permanently sealed with an internal pressure compensation device. These gear reducers normally do not need the lubricant levels to be checked.

**Vent plug:** Some gear reducers are shipped with a plastic plug in place of the vent plug. The plastic plug prevents oil from leaking during transportation. The plastic plug must be removed during the installation process and replaced with the correct vent plug. The vent plug is normally included with the package of fasteners or is fastened to the gear reducer. However, not all gear reducers are equipped with vent plugs.

**Temperature:** Temperature alone is not a good way to determine whether a gear reducer is going to fail. Some gear reducers are designed to operate for extended periods at elevated temperature levels that may seem excessive.

**Note:** Because temperature and noise levels can vary substantially between different brands or types of gear reducers, it is best to consult the gear reducer manufacturer or their owner's manual before performing maintenance on a gear reducer.

## D12. Troubleshooting guide

Problem	Cause & Solution
Belt lacing pulling out at inside radius	1) Belt tension on inside radius too tight. <b>SOLUTION: Adjust inside radius end roll position.</b>  2) Damaged belt from jam. <b>SOLUTION: Replace belt assembly.</b>  3) Excessively worn belt. <b>SOLUTION: Replace belt assembly.</b>
Problem	Cause & Solution
Grommets pulling out	1) Belt tension inside radius too tight. <b>SOLUTION: Adjust inside radius end roll position.</b>  2) Foreign object rubbing against belt. <b>SOLUTION: Remove foreign object. Repair grommet or replace belt.</b>
Problem	Cause & Solution
Belt drive chain jumping the sprocket teeth	1) Tension too loose. <b>SOLUTION: Adjust belt tension.</b>  2) Drive sprocket positioning. <b>SOLUTION: Adjust drive sprocket height.</b>  3) Drive sprocket idler damage. <b>SOLUTION: Replace the drive sprocket idler.</b>  4) Worn teeth on sprocket <b>SOLUTION: Replace sprocket.</b>

## D12. Troubleshooting Guide - continued

<b>Problem</b>	<b>Cause &amp; Solution</b>
Ticking noise near end of conveyor	<p>1.) End roll idler bearing damage. <b>SOLUTION: Replace end roll idler assembly.</b></p> <p>2.) Worn chain guide material. <b>SOLUTION: Replace chain guide material.</b></p> <p>3.) Segmented end roll roller damage. <b>SOLUTION: Replace damaged segmented end roll roller (s).</b></p>
<b>Problem</b>	<b>Cause &amp; Solution</b>
Loose end roll and end roll shaft.	<p>1.) End roll adjustment bolts and nuts worked loose. <b>SOLUTION: Adjust chain tension and Tighten end roll adjustment bolts and nuts.</b></p> <p>2.) Excessive end roll idler wear. <b>SOLUTION: Replace end roll idlers.</b></p> <p>3.) Broken spacers between segmented end roll rollers. <b>SOLUTION: Replace broken spacers.</b></p>
<b>Problem</b>	<b>Cause &amp; Solution</b>
Squealing noise under the conveyor	<p>1.) Frozen return wheel/roll bearing <b>SOLUTION: Replace return wheel or roll.</b></p> <p>2.) Foreign matter stuck between return wheel/roll and belt <b>SOLUTION: Remove foreign matter.</b></p>

### D13. Preventative maintenance schedule

Component	Service Interval	Maintenance Inspection	
Complete Curve	<b>First 40 hours</b>	1.) Visual check 2.) Chain tension 3.) Lubricate chain wear guides	
Complete Curve	<b>monthly</b>	1.) Visual check 2.) Assure tightness of fasteners; especially the bolts on the side of the frame. 3.) Grease drive sprocket idlers.	
Conveyor Belt	<b>quarterly</b>	Belt inspection - tension adjustment - general condition and cleanliness - lacing and lacing pin Drive chain - Lubricate as indicated in lubrication schedule - Inspect attachment links - Inspect seams	
Drive Motor and gear reducer assembly	<b>quarterly</b>	Drive component inspection(visual) - insure tightness of fasteners - temperature - excessive noise - vibration	
Complete curve	<b>semi-annual</b>		
Complete curve	<b>annual</b>		

## E. Spare parts

### E1. Recommended spare parts list for Z-Turn power curves

Listed below are the Spare Parts we recommend be stocked for Z-Turn Flomaster® Power Curves. By utilizing genuine Portec Flomaster spare parts, you can be assured that these components are proper for your particular unit's continual operation and are backed by the full Flomaster warranty. When ordering please indicate the model and serial number to insure accuracy in parts replacement. Allow 2-3 weeks from receipt of order for shipment. We ship EXW Cañon City, CO, USA Net 30 days. NOTE: Model and serial numbers of unit are located on the inside radius frame of the curve; stamped into a metal identification plate.

<b>Quantity</b>	<b>Portec Item Number</b>	<b>Description</b>
1	2**	Replacement belt w/chain
20	4*	SP connecting links
10	5*	SP attachment links
10	6*	Rivet and washer set
10	7*	Nylon bushing
10	8*	Grommets
2	9*	End roll idler assembly
2	10*	Drive Sprocket idler assembly
4	11*	Segmented End roll roller assembly
1	12*	Drive Sprocket
1	13	End roll shaft
1	14	Drive shaft (with extension)
1	15	Drive shaft Bearing
1	16	Return roll assembly
1	17	Outside perimeter chain guide set

\* These parts are universal on all sizes

\*\* Belts with laced seams will have lacing in both ends unless otherwise specified.

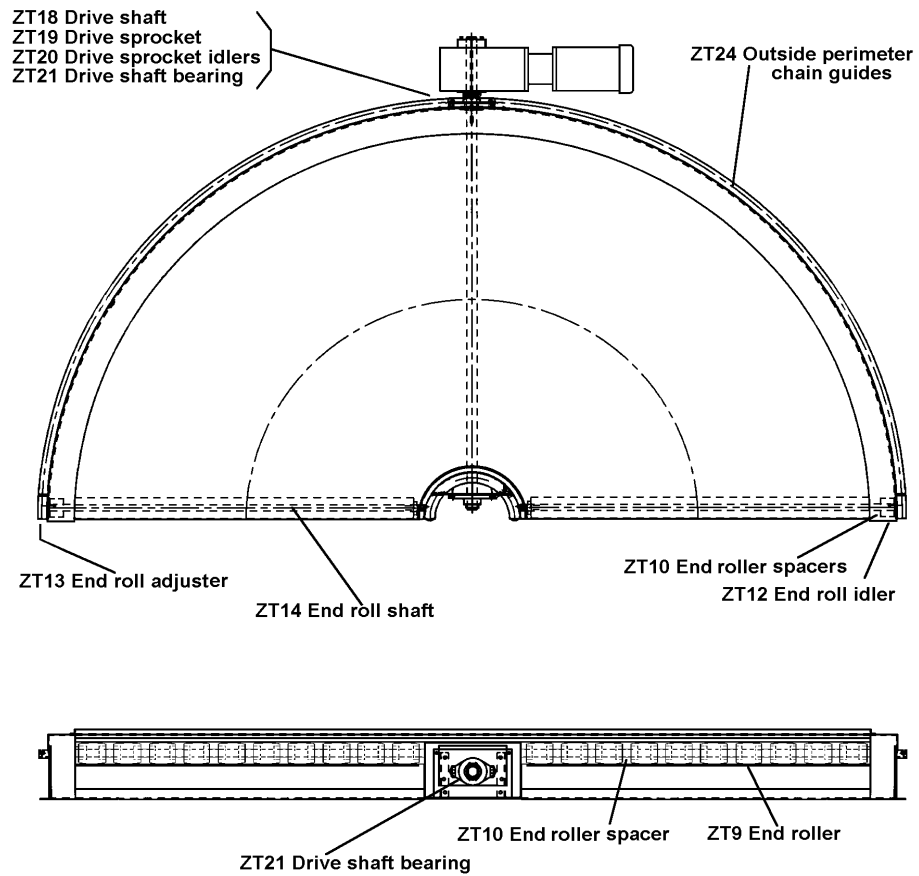
## E2. Parts list - Flomaster Z-Turn Power Curves

Always supply the following information when ordering or corresponding regarding replacement parts for your Portec Flomaster Z-Turn Power Curve: SERIAL NUMBER and MODEL NUMBER from name plate on unit, and REF. ITEM NUMBER corresponding to your requirement from the Illustrated Parts Diagram. We cannot stress the importance of the Serial Number too strongly since a complete production record is kept on each turn ordered listing the exact components including special purpose items that may be on your specific unit. With the serial number, you are assured of an exact replacement. To procure any parts not listed or shown, please consult PORTEC FLOMASTER.

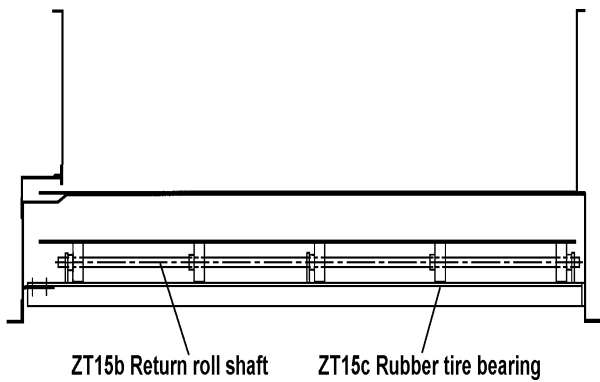
REF ITEM #	PART NAME AND DESCRIPTION	PORTEC PART#
ZT2	<b>Curved belt assembled with drive chain</b> - Complete assembly, ready for replacement. Note: For curves with laced belts, standard replacement belts have seam lacing installed on both ends for easy belt replacement.	
	<b>Chain breaker tool</b> – For breaking chain to replace special attachment link	
4	<b>Special connecting link</b> - A necessity in assembling turn drive chain. This is not a standard roller chain link, although the appearance is similar. Standard links will not permit proper tracking and may result in chain and belt damage.	
5	<b>Special attachment link</b> – Connecting part between chain and belt. To replace broken attachment links, two special connecting links must be used with each attachment link.	
6	<b>Rivet and washer set</b> – Attaches chain to belt.	
7	<b>Nylon bushing</b> – Use with rivet and washer assembly.	
8	<b>Grommet</b> – Installed in belt (Installation punch and die tools Item # 8CT).	
ZT9	<b>End roller</b> – includes bearings.	
ZT10	<b>End roller spacer</b> – Spacer separating the end rollers and or end roll idler along the end roll shaft. (1 ft. piece to be cut to length in the field)	
ZT11	<b>End Roll Shaft Collar</b>	

REF ITEM #	PART NAME AND DESCRIPTION	PORTEC PART#
ZT12	<b>End Roll Idler</b> – Includes shaft, roller and bearings.	
ZT13	<b>End roll adjuster</b> – includes eye bolt, adjustment bolt and (4) hex nuts.	
ZT14	<b>End roll shaft</b> - includes end roll shaft adjustment pin.	
ZT15	<b>Return roll assembly</b> – Includes shaft and roll(s).	
ZT15a	<b>Single roll with bearings</b> - Single return rolls are utilized instead of rubber tire style bearings on curves with rough top or white belt material	
ZT15b	<b>Return roll shaft only</b>	
ZT15c	<b>Rubber tire bearing</b> – For return roll assemblies.	
ZT16	<b>(Optional) Bed idler roll</b> – Single with bearings.	
ZT17	<b>(Optional) Bed idler roll shaft</b>	
ZT18	<b>Drive Shaft</b>	
ZT19	<b>Drive Sprocket</b> – Includes shaft key	
ZT20	<b>Drive Sprocket Idler</b> – Includes shaft, roller and bearings	
ZT21	<b>Drive Shaft Bearing</b>	
ZT22	<b>Sideguard; Outside Radius</b>	
ZT23	<b>Sideguard; Inside Radius</b>	
ZT24	<b>Outside perimeter chain guides</b> - Complete upper and lower set with installation hardware and instructions.	
	<b>Belt seam lacing</b> - Belt lacing hooks with pin.	
	<b>Belt lacing pin</b>	
	<b>Vise lacing tool</b> - For field installation of belt seam lacing.	
ZT25	<b>Outside radius chain cover</b>	

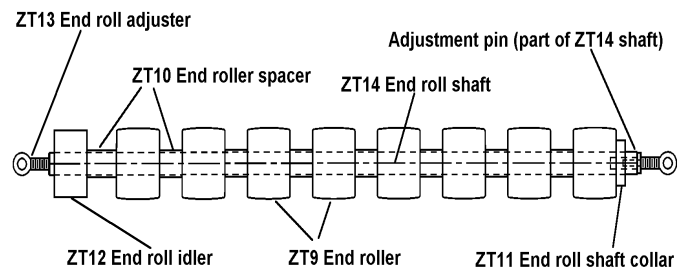
### E3. Illustrated parts diagram



**Figure 1: Top and Front Views**



**Figure 2: Cross Sectional View**



**Figure 3: End Roll Assembly**

# TERMS AND CONDITIONS

**VALIDITY** – Quotations shall be considered current if outstanding no more than thirty (30) days from date of quotation, unless otherwise stated on quotation.

**FREIGHT POLICY** – Shipments of products, unless otherwise stated, is EX WORKS PORTEC FLOMASTER'S factory. Written claims for damage in shipment should be made against the carrier. Written claims for shortages should be made against the carrier, specifically if there is evidence of shipping carton/container damage and/or if according to the shipping records there is a discrepancy in numbers of containers shipped versus numbers received.

Only in a situation where the container(s) shipped have been received in good condition, checked for physical content, and signed for verification within three days of delivery, and if such shortage has been found, and if PORTEC FLOMASTER® is notified in writing within 10 days upon receipt of order, PORTEC FLOMASTER will establish that there was or was not a shortage. If a shortage is determined, PORTEC FLOMASTER will provide the customer with the product/parts at PORTEC FLOMASTER'S expense and shall ship F.O.B. as stated in the freight policy. If no shortage is determined, or if others than PORTEC FLOMASTER caused the shortage, the claim shall be deemed invalid and it shall be the responsibility of the customer to arrange payment to PORTEC FLOMASTER to fill the requirements of the deficiency.

**PRICE ACCEPTANCE** – The prices quoted herein are based on the quantities specified. Any change in quantities may affect quoted price. All orders are subject to acceptance at PORTEC FLOMASTER'S factory. Any expense incurred by PORTEC FLOMASTER as a result of cancellation or the making of any change will be included in PORTEC FLOMASTER'S invoice unless prior waiver of such expense is obtained from PORTEC FLOMASTER.

**SHIPMENTS** – Quoted Shipment dates are subject to change, without liability for delays beyond PORTEC FLOMASTER'S control.

**TERMS OF PAYMENT** – Invoices are payable net cash 30 days, unless otherwise noted. There will be an interest charge of 1-1/2% per month for all payments received after 35 days. International (**except Canada**) orders are shipped against confirmed irrevocable letters of credit. All payments shall be in U.S. dollars. If the financial responsibility of a purchaser becomes impaired or is unsatisfactory, or if credit is not established, PORTEC FLOMASTER reserves the right to request payment in advance or satisfactory guarantee that invoices will be paid promptly when due.

**QUALITY ASSURANCE** – All of its manufactured products are subject to PORTEC FLOMASTER'S Warranty for material and workmanship.

**GENERAL** – Terms conditions, and product specifications are subject to change without further obligation to PORTEC FLOMASTER.

**LIMITED WARRANTY ON NEW EQUIPMENT** – PORTEC FLOMASTER provides a Limited Warranty that warrants the material and workmanship of its manufactured products, with exceptions noted, for a period for 24 months beginning one month from the date of shipment from PORTEC FLOMASTER'S factory, according to recorded serial numbers.

Within the stated warranty period, any material or workmanship showing defects will be repaired or replaced,

provided PORTEC FLOMASTER is given written notice within 30 days after failure, and a willingness is expressed to submit the product to PORTEC FLOMASTER, and if PORTEC FLOMASTER authorizes the return of the product, and the product is returned. This warranty does not cover against normal wear of parts or materials. Warranty parts are supplied via EX WORKS PORTEC FLOMASTER'S factory and unless PORTEC FLOMASTER makes express agreement the purchaser shall bear the expense of installation. PORTEC FLOMASTER reserves the right at any time to supervise or install any part of replacement, or supervise adjustment incident to satisfactory operation of equipment. *A possible Warranty PO for parts and/or service may be required prior to shipping parts or exercising warranty labor.*

**ITEMS IDENTIFIED AS COMPONENT AND REPLACEMENT PARTS** – will be warranted for a period of one (1) year from the date of shipment from the PORTEC FLOMASTER Factory. This warranty on parts will cover only defects in workmanship or material. The warranty *does not cover the costs of the installation of such parts unless authorized by the designated PORTEC FLOMASTER representative.*

Unauthorized returns, modifications, additions or variations, from procedures and information contained in PORTEC FLOMASTER'S Owner's Manuals, and Product Data bulletins, or any misuse, negligence, accident, product jam, or loading beyond rated capacity invalidates this warranty.

## **EXCEPTIONS:**

1. Because of varying operating conditions, all belting supplied will necessarily be subject to manufacturers', warranty rather than that of PORTEC FLOMASTER.
2. Some OEM equipment including motors and gear reducers will be subject to the manufacturer's warranty, not PORTEC FLOMASTER'S. PORTEC FLOMASTER Customer & Product Support will provide assistance in contacting the proper manufacturer's representative. If a replacement is provided from PORTEC FLOMASTER stock, a Possible Warranty PO must be provided. If the warranty is deemed invalid and PORTEC FLOMASTER is not reimbursed for the warranty claim, the PO will be exercised.
3. PORTEC FLOMASTER further reserves the right to void its warranty where final destination and specific application are withheld; product is improperly installed or maintained by others; product is modified without the consent from the designated PORTEC FLOMASTER service representative; product is improperly protected against hazards and adverse environmental conditions during storage prior to or during installation; and/or product is used for applications/conditions other than indicated upon placement of order.

***The foregoing warranty is exclusive and in lieu of all other warranties whether written, oral, or implied (including any warranty of merchantability or fitness for any purpose). Under no circumstances shall PORTEC FLOMASTER be liable for incidental or consequential damages. The foregoing warranty cannot be changed except by written authorization signed by an authorized PORTEC FLOMASTER representative, and no attempt to repair or promise to repair or improve PORTEC FLOMASTER products by any other representative of PORTEC FLOMASTER shall change or extend said warranty in any manner whatsoever.***