YORK INDUSTRIES

An ISO 9001:2015 Company

Timing Pulley Drive Specialists

Manufacturing for 75 Years

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Drive Design with Tensioners

A tensioner is a powerful tool to meet and exceed your design objectives. Belt tensioning may prevent cogging or slipping, while extending belt life in the field. Both your customers and your assembly and service people will appreciate the ease to assemble, adjust and maintain. There is one drive component that, while often overlooked, can make a big contribution to all the above goals – a belt tensioner!

Tensioners extend belt life and may prevent belt slipping in any belt drive system, even fractional horsepower systems. Tensioners adjust for drive tolerances and make your design task easier by letting you achieve exact center distances using stock belt lengths and enabling sharp turns in your belt layout, and as mentioned is easier for installation and servicing in the field.

WHICH TYPE TENSIONER SHOULD I USE?

So once you decide that a tensioner should be part of your design, you have a choice of a static tensioner or a dynamic tensioner, both types in two sizes. **Static tensioners** are often used in drives that don't have a lot of varying force, such as a copier paper path. The static tensioner is a 'lock it and leave it' sort of device where you install it at the factory and use it to optimize the belt tension and compensate for any drive tolerances for applications where the belt isn't expected to be subject to heavy wear and stretching.

Dynamic tensioners because they are self-adjusting, are most useful for drives where belt wear is to be expected, or accessing the drive for tension measurement is difficult or where drive assemblers or field service people do not have accurate tools or jigs to accurately tension the drive. The dynamic tensioners are generally more forgiving of any minor inaccuracies in their adjustment or installation in the field.

Note: Dynamic tensioners should generally be locked in place once spring pressure applies the proper tension. Avoid using a non locked spring loaded tensioner on a reversing drive unless the belt is only lightly loaded in the reverse direction (where the tensioner is on the tight span). Do not use a non locked dynamic tensioner on applications where high load fluctuations are likely to occur.

There are two ways that either a static or dynamic tensioner can contact the belt. They can use a slot in the tensioner base to allow them to directly move in or out, generally at a right angle to the belt, or they can pivot about a single point with the side of the tensioner contacting the belt.

Tensioner Placement

Tensioners can be placed either inside or outside of the belt, and on any span of a belt drive. Idler pulleys / tensioners will produce some additional bending stress to the belt. The negative effects can be minimized with proper sizing and location. It is generally better to place the tensioner on the belt span with the least tension (slack span on a 2-pt drive) and on the inside / tooth side, as belts are manufactured to be shaped more easily in the inward direction. Outside tensioners are useful to increase belt wrap and are generally quieter especially on high speed applications. Both tensioner types are usually mounted with their direction of travel bisecting the belt path to take full advantage of their range of motion and spring force. Because of their geometry, slotted tensioners rarely find use as inside idler pulleys on short center distance drives unless the drive has large diameter sprockets. Because of a pivoting tensioner's physical construction they can often fit where a slotted tensioner cannot.

Designing Your Tensioner

Now that you understand the benefits a tensioner brings to your drive design, you can design one yourself (or design with York's exclusive easy to use on line configurator that walks you through the designing process). You can evaluate bearings, material, forces, and the whole host of items that go into good designs. Then you can create all the individual part drawings, find and qualify vendors, life test prototypes, and have your manufacturing staff buy and assemble all the pieces. Or you can purchase **in stock**, catalog tensioners from York Industries that have all the work done for you. Tested to over a **million cycles**, York tensioners can be dropped into your design with minimal effort. All York tensioners, static and dynamic, are stainless steel with a wide choice of bearings and idlers to match the needs of your design. Tensioners help make great drive designs, and York makes great tensioners that are:

Flexible
- Universal - works with any small drive
- Slot and pivot designs available
- Extremely low belt clearance

Convenient
- Drops right into your design
- Small footprint
- CAD drawings and 3D models already available
- Stock mounting spacers if needed in your design.

Cost Effective
- Standard catalog item
- Save cost of designing your own
- Save tooling costs

After choosing your type of tensioner (slot or pivot and their dynamic or static versions), pick your specific tensioner size using the following chart.
This can be found online at http://www.york-ind.com/tensioners/help.htm
On the web page, you can click on the type of tensioner in the left hand column to see detailed dimensional data and 3-D CAD models. Be sure to call York at (800) 534-8466 / (516) 746-3736 with any questions you have.

Size 4 Tensioners

(dimensions in inches)	Min Pulley Height Above Mounting Plate (1)	Range of Adjustments (2)	Tensioner Stroke (3)	Continuous Max Force Against Belt	Peak Shock Loads	Approx. Footprint w/o Pulley
SS-4 Static Slot Tensioner	0.18	0.80	n/a	10 lbs.	15 lbs.	.90 wide x 2.6 long
DS-4 Dynamic Slot Tensioner	0.23	0.80	0.35	5 lbs.	15 lbs.	.90 wide x 3.1 long
SP-4 Static Pivot Tensioner	0.18	1.25 44 deg	n/a	10 lbs.	15 lbs.	1.12 wide x 2.25 long
DP-4 Dynamic Pivot Tensioner	0.23	1.25 22 dig	0.50	5 lbs.*	15 lbs	1.70 wide x 2.55 long

*(10 lbs. max avail as special order)

Size 3 Tensioners

(dimensions in inches)	Min Pulley Height Above Mounting Plate (1)	Range of Adjustments (2)	Tensioner Stroke (3)	Continuous Max Force Against Belt	Peak Shock Loads	Approx. Footprint w/o Pulley
SS-3 Static Slot Tensioner	0.18	0.50	n/a	8 lbs.	10 lbs.	.85 wide x 1.81 long
DS-3 Dynamic Slot Tensioner	0.21	0.50	0.25	2.5 lbs.	10 lbs.	.95 wide x 2.07 long
SP-3 Static Pivot Tensioner	0.18	0.73 44 dig	n/a	8 lbs.	10 lbs.	.70 wide x 1.36 long
DP-3 Dynamic Pivot Tensioner	0.21	1.20 75 dig	0.73	2.5 lbs.	10 lbs.	1.2 wide x 1.5 long

1. ***Minimum pulley height*** for Size 4 is .05 higher for plastic sleeved bearings, for Size 3 add .03
2. ***Adjustment*** is the movement possible when mounting the tensioner to its mounting surface.
3. ***Stroke*** is the range of operating travel possible for a mounted, dynamic tensioner from stop to stop of the spring

Maximum pulley height above the mounting surface depends on specific pulley width. Consult factory for details.

Mounting Spacers

York tensioners are designed to mount securely onto a flat surface with just a single screw. The tensioners allow minimal clearance between the belt and mounting surface. Tensioners also feature different shaft lengths so they are also adjustable by York to provide greater clearance heights if needed.
Where even greater belt clearances are needed, York can provide machined, anodized spacers to act as a raised tensioner mounting base. York offers spacers in .38 inch increments up to 1.12 thick for Size 4 tensioners and in .25 inch increments up to .75 inches for Size 3 tensioners to lift the entire tensioner above the plate yet provide excellent mechanical holding for drive operation. Custom thicknesses are also available. So generally, pulley clearances up to nearly 1 inch from the mounting surface are not a problem.