TECHTALK UPDATE ADVICE SERIES

ZLW BELT ACTUATORS BY IGUS®

I have been in the industry for 13 years now, and I have never witnessed a time where engineers have been under so much pressure to move products from the design phase, to testing, to manufacturing in departments, but also by purchasing departments, who are demanding shorter and shorter lead times from suppliers. What used to be a 4-6 week lead-time manufacturers are now asking for in 1-2 weeks. Although this may seem like a negative thing there is a silver lining – your company can save money and time, and build better machinery by purchasing sub-assembled parts from companies specializing in those types of products. Think about it, less time spent could be spent designing components and more time spent designing and improving your equipment through the use of bolt-on parts. The DryLin® ZLW toothed-belt actuator is one such sub-assembly in the igus tool kit that can help.

Designed around the workhorse DryLin® W product range, the ZLW tooth-belt driven linear actuators were designed as low-cost, shorter lead-time alternatives to traditional re-circulating ball bearing systems. As with all DryLin® products they are engineered with wear-resistant, dry-running, oil-free linear bearings which do not require any maintenance and offer technical advantages in many applications. Here are some design guidelines to help you specify one into your application, and determine if this is a good application for a belt-drive system.

When to use a tooth-belt drive actuator

Belt-drive systems are the ideal for shuttle transport and conveyance applications, especially if you are trying to achieve high speeds over long stroke lengths. They typically fare better than lead screws for high speed/long stroke applications, especially in vertical applications where lead screw-driven systems may be prone to noise and resonance. The belts are designed to maintain the proper tension over the actuator's lifetime (providing they are used within the guidelines of the published specifications), so there is no need to be concerned about belt elongation for your application. Industries using belt-driven systems

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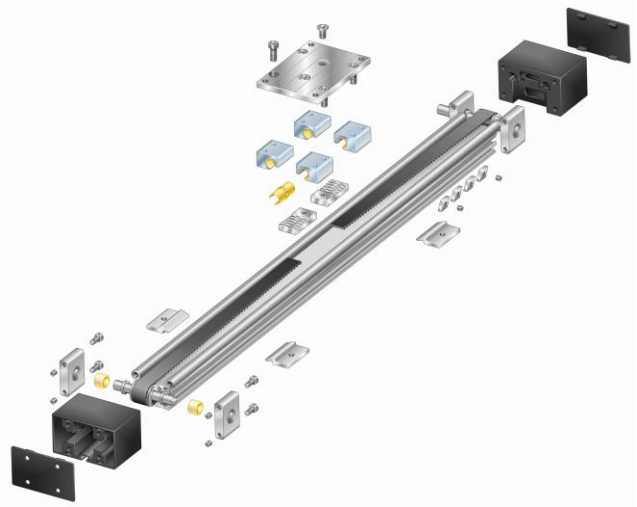
include laboratory automation, packaging machinery, gaming and amusement equipment, screen-printing, test fixtures, and many other applications where quite operation and dry-running systems are critical.

Here is a quick checklist to see if DryLin® ZLW systems are ideal for your application:

1. Generally speaking belt-driven systems are ideal for positioning small to medium loads (less than 100N (22lbf) at high speeds (up to 5 m/s). igus®, new DryLin® ZLW-1660 profile adds even higher radial load capabilities up to 2000N (450lbf) for applications requiring a more robust system.
2. Speeds up to 5 m/s (16.4 FPS).
3. Stroke lengths 1mm – 3000mm. Longer strokes may be possible, please contact igus®.
4. Minimum linear positioning +/- 0.2mm.
5. Belt-Drive systems are often ideal for applications with high duty cycles, especially when compared to a lead screw system as there is no concern about frictional heat buildup in the nut.
6. For low-weight vertical actuator applications they may also be better than lead screws, which are sometimes prone to noise and resonance issues, especially at lengths longer than a few hundred millimeters of stroke.
7. For applications in sensitive environments such as laboratory or food processing equipment, where noise and oil may be problematic.

Materials used in igus ZLW systems:



All ZLW systems are based on hard-anodized aluminum guide rail profiles, which offer the ideal mating surface for the linear bearing liners. Several linear bearing housings are available including low-cost zinc-castings, lightweight and corrosion-resistant hard-anodized aluminum machined parts, as well as adjustable versions (WJUME) which allow the flexibility to eliminate or increase the linear bearing clearance per the application requirements.

Most sizes are available as either a “Standard” version, offering higher speed and load carrying capabilities - or a “LCB” low-cost-basic version, which offers aggressive pricing and only slightly limited performance. The standard versions use steel-reinforced polyurethane toothed-belts and several machined metal components versus the LCB version which use glass-filled neoprene belts and which is designed with more injection-molded plastic components to help lower the costs.

igus also offers a few specialist tables including the DryLin® ZLW-1040-UW table is designed to be used underwater, the ZLW-1040-OD, “Opposite Drive”, system for self-centering applications requiring two carriages traveling in opposite directions, and the ZAW system is designed primarily for z-axes in which the carriage contains the pulley system and the guide rails are intended to be the dynamic parts of the assembly.