



QuickSilver Controls, Inc.

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Success Stories

This document will highlight applications where our servos are commonly used.

General Markets/Applications

Markets

- Document/Paper Handling
- Electronic Assembly and Test
- Entertainment Industry
- Factory Automation
- Food Processing
- Labeling
- Material Handling
- Medical/Pharmaceutical
- Packaging
- Pick and Place
- Robotics
- Semiconductor
- Stepmotor Replacement
- Tensioning Systems
- Test and Measurement Equipment
- Textile
- Web Handler
- Wire/Rope Manufacturing
- Military
- Telemetry Systems
- Wind/Unwind
- Camera positioning

Detailed Applications

Anti-Lock Brake System Tester: Two servos are used to test the anti-lock brake system on the Joint Strike Force fighter. The servos spin the wheel encoders through a velocity profile.

Automotive Testing: The servos are cycling automobile components, i.e. brake pedal, door handle, switches and knobs.

Autonomous Vehicles: The servos are used for steering and throttle control for such things as bomb detecting vehicles or surveillance aircraft. Since 2004, QuickSilver motors have powered all the 1st place vehicles in the annual IGVC contest. The servos run well from car batteries.

Binder/Cutter: Book binding and cutting machine. Servos are used on paper guides, transport and cutting. Key Features: High torque and PC based control.

Bottling: Inspection/Labeling. Our servos spin bottles using the servo's camming feature. An HMI is used to download a specific label profile (Cam table). Key Features: High torque, high inertial miss-match.

Camera Positioning: Moving professional cameras on a gantry for recording commercials and movies. High inertial ratio capability allows direct drive and smooth motion; high efficiency (34 frame) allows for long on-site operation from batteries w/o recharging.

Cap/Bolt Tightening: Tighten caps (i.e. bottles, syringes...). We have accurate torque control allows for advanced "tightening" profile. Encoder feedback allows for detections of such things as no bottle and cross thread. Key feature: High torque at low speed, adjustable torque, analog input.

Caulk Tube Filling Machine: Key feature: High torque at low speed.

Chip Handling: The servos move chip trays, palletize and de-palletize IC chips.

Circuit Board Assembly/ Soldering/ Thermal Bonding. Key Feature: Extreme accuracy of 1 count on a billion count move, short, fast moves ideal for our torque curves.

Circuit Board Vision Inspection: Key Features: Anti-Hunt used for clear images, no servo dither.

Conveyer Control: Good for both position and velocity control. Key Feature: "Drag" mode (slip clutch) feature prevents velocity "windup" during a jam, high inertial miss-match.

Data Collection System: 1 Axis holds a probe that is moved at a slow, steady speed across the test material for measurements. The PC commands the move and then periodically polls the servo for its position to correlate a sensor reading with the sensor position. Alternatively, the controller can read data from its analog inputs and record it in real-time to its on-board non-volatile memory for latter retrieval. Key Feature: Low speed, smooth operation.

Door Open/Close/Lock: Encoder allows detection of door/lock position. Key features: High torque at low speed, versatile open/close profile, high inertial miss-match, high holding torque.

Drill/Blade Sharpener: Automated drill sharpening/band saw re-tip/saw sharpener.

Eye Scanner: Scans cornea for eye surgery. Key Features: Quiet operation, serial interface to PC. compact design, low power consumption.

Filament Winding: Winding filament for bulbs.

Film Processing: Servos direct drive 70mm film reels to shuttle film through an editing station or processing station. Drag mode used to keep constant torque on film. High inertial miss-match allows a 23 frame servo to direct drive 70mm film reel. . Key features: High torque at low speed.

Food Processing: IP65 motors.

Grinding Wheel Dresser: Multiple axis system to re-dress grinding wheels.

Guide Adjuster: Replaced a hand operated guides on a machine tools.

Hard Drive Test/Assembly: Multi-axis arm to move drive. Servos are networked for PC or PLC control.

Index Tables: With our high holding torque, high inertial miss-match, and high resolution encoder, we can direct drive these tables.

Labeling: Key Features: Variable torque used in feed/take-up rolls, high acceleration/deceleration to apply label with no overshoot, compact design.

Machine Builders: Our high versatile, cost effective controllers allows them to learn one system and use it over and over.

Material Cutting: Key Feature: High holding torque for accurate cuts.

Medical Sample Testing: This is an XYZ system that lays down and grid of test tubes (i.e. blood, DNA,...).

Multiple Axis via Step and Dir: Cutting applications including water jet, knife and laser. Engravers. Gluing. Better response to Step and Dir than typical stepper systems due our patented servo algorithm.

Oven/Test Chamber Feeds: Used in semi-conductor, light bulbs and wafer processing. Key Feature: Continuously controllable low speed torque great for feed process.

Packaging: Conveyor Control/ Diverters/ Sorters/ Labeling/ Wrapping.

Prescription Medicine Dispensing Machine: These multi-axis machines require a compact design and low power consumption. The required torque curves are ideal for stepper motors, but need servo control for accuracy and to reduce power consumption.

Part Sorter: The servo is programmed to go to a unique position using inputs from a PLC.

Pill Crusher/Presser: Read position at time load cell hits a certain threshold.

Pneumatic/Hydraulic Axis Replacement: A servo + an Actuator is less expensive than a pneumatic axis with 4 or more stops. Eliminates: Valves, Stop Cylinders, Shock Absorbers, PLC IO, Switches, etc.

Precision Pumps: Precise speed and position control allow for ultra accurate fluid delivery. Low speed high torque is ideal for most precision mechanical pumps. Applications include, medical, harsh chemicals, oil fields, printer cartridges..

Printing: Used on high end printing machines for magazines and books. Requires multiple axis networks, compact design and high torque.

Projector/Camera Shutter Control: Millisecond moves allow for accurate shutter control.

Rope/Wire Braiding: Electronic Gearing used to braid rope or wire based on line speed using gear ratios accurate to 7 decimal places.

Rotary Knife: Rotary knife systems are widely used to cut, seal or perforate material moving along a conveyor. Rotary knife system consists of a cylinder with a knife blade fastened along the longitudinal axis. As the cylinder rotates, it cuts the material passing underneath it. During the cut, the tangential knife velocity must match the linear speed of the material. During the rest of the revolution, the knife must either speed up or slow down to be ready for

the next cut. Cut lengths can be calculated by reading registration mark on the material or can come from the user via an HMI.

Show Playback (Entertainment Industry): Playback position data to the network at 24 or 30 frames per second. Standard entertainment industry format DMX512 supported. Used in stage props/theme parks/movie sets. Using multiple servos networked together for control of animated puppets.

Sewing Machine: Material Feed + Stitch Axis to precision stitching (spacing and number).

Nozzle Calibration: Precise amount of liquid squeezed through nozzle to allow calibration of spray (i.e. nasal spray).

Rope/Twine/Silk Spooling: Spool axis follows feed speed and traverses spool to create an exact, stable pattern. Gearing for pattern requires extreme precision. QCI's EGM command with trapezoid move is specially designed for these applications (gear ratios to 7 decimal places, programmable trapezoid move over given feed distance). High accel/decel.

Test Equipment: Our low EMI does not interfere with sensitive instrumentation (i.e. ultrasonic).

Test Fixtures for Schools and Labs: Moving probes for data collection. Software configuration and PC based data collection allows the servos to be used over again on many different fixtures.

Trolley: The servo is mounted on a battery operated or buss bar feed trolley. The servo moves the trolley in response to digital signals. The advantages include, lightweight, battery operated (12VDC), compact, high torque at low speeds and low voltage.

Unmanned Parachute Control: Servo used to guide unmanned parachutes. Key Feature: High torque at low (battery) voltage.

Vending Machines: Vending machines for special products (i.e. movies, car keys at dealerships,...). Multi-axis arm used to move product. The servo's compact size, servo accuracy and low power requirements are an ideal alternative to the usual stepper or DC brushed motor.

Welding Machine: We do well in these noisy applications with the addition of a connector filter (QCI-D15HD-FIL).

Wafer Handling: The servos are used to move video cameras used for inspection. Key Feature: Anti-Hunt (no servo dither while stopped).

Wind/Un-Wind: The servo's precise torque control and electronic slip clutch feature ("drag" mode) allows for servo to keep a constant web tension as wind/un-wind reels payout and take up product. Analog inputs can be used to input dancer arms. High, variable inertial miss-match.

X-Y or Pan and Tilt Positioning: Telescope/ Microscope/ Antenna/ Cameras/ Laser/ Targeting/ Stage Lighting: Accurate position. Anti-Hunt command provides for steady

holding. Feed position using analog (Joystick) or serial input. Playback mode. Multiple speeds.