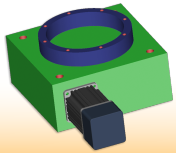


SmartMotor™ Applications Guide



Programmable Rotary Index Table



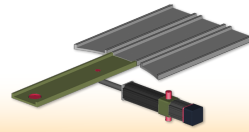
Modulo Position Mode

- Biomedical
- Oil Industry
- Semiconductor
- Chemical Coatings
- Cryogenics

Centrifugal applications, destructive and g-force testing, paint mixing and manufacturing, oil separation & mfg., anode wire welding, etc.

By adding a SmartMotor to any servo-rated worm gear box or flange output gear reducer, the system becomes a fully programmable rotary index table and can be programmed to any practical number of indexes and dwell times. Given the I/O and control capabilities, the dwells can be based on end-of-process contrary to fixed mechanical CAM, speeding up overall production cycle times.

3-Position Parts Diverter



Position Mode

BCD Input

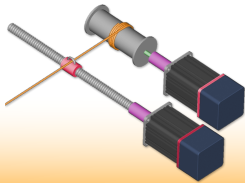
Absolute Position Mode

- Packaging
- Material Handling
- Food and Beverage
- Agricultural
- Chemical
- Medical

Product separation for mid production, package diverting, grouping and ungrouping, product inspection and diverting

A simple upgrade to a SmartMotor from a two or three position pneumatic air cylinder allows multi-point programmable positioning while maintaining I/O trigger control from any PLC.

Traverse & Take-up Spool Winders



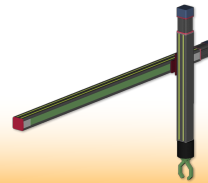
Velocity Mode & Electronic Gearing Summed Together

- Textile or other engineered fibers
- Transformer Mfg.
- Audio Electronics
- Tank Mfg.
- Motor Mfg.

Spooling/winding yarn, thread, carbon fiber, or other converted material, voice coil winders, musical instrument cord, wire and string production

Using programmable software travel limits, electronic gearing, and special firmware drive control, winders can work with unlimited variations of spool width, wind angle and end-point dwell as well as step, stack and tapered winding applications. SmartMotor's low inertia and high speed acceleration enable extremely precise winding.

Multi-Axis Pick & Place



Position Mode

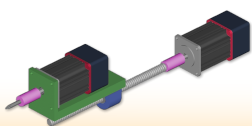
Absolute Position Mode

- Automotive
- Semiconductor
- Packaging
- Material Handling
- Biomedical
- Food and Beverage

Product packaging, wafer processing, hazardous material handling, liquid filling applications, capping applications, palletizing machines

Up to 120 individually addressed motors can be placed on a communications bus allowing for easy coordination of multiple axis applications.

Drill & Tap/Nut Runner



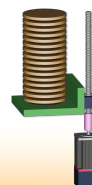
Follow Mode with Velocity Mode and Monitoring Position Error

- Automotive
- General Fabrication
- Machining
- Aerospace

Dashboard control button/switch testing, eyeglass mfg., any operation requiring drilling, tapping or screw feed.

Set a rotating SmartMotor as the Master and have the linear axis electronically gear off of it to provide high speed drilling and tapping and screw feed control with limited torque. Adding proper torque detection, the unit can detect when the screw or tap has become dull or worn. As a nut/screw runner, it can detect cross thread, broken or stripped thread, or missing or jammed parts.

Input/Output Stacker



Position Mode

Absolute Position Mode

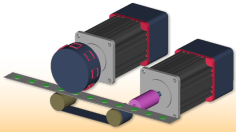
Relative Position Mode

- Semiconductor
- Food and Beverage
- Consumer Electronics
- Consumer Goods

Compact disk mfg., wafer processing, pizza or tortilla stacking, flatware and dishware production, etc.

Start stacking and continue in incremental stack shifts while maintaining part counts. Having localized I/O within the integrated controls, all parts handling can be dealt with by the stack motor itself.

Print & Die Cut Alignment



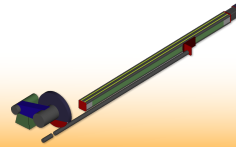
Follow Mode with Phase Offset Electronic Gearing

- Metal Working
- Consumer Goods
- Packaging
- Government
- Any industry that labels their products

Puzzle piece production, product label die cutting & blister pack sealing, printing, scrapbooking piece production, leather die cutting for consumer products, jewelry stamping, metal embossing, stencil making, stamp and adhesive precision layer cutting, etc.

With electronic gearing, you can accomplish phase offset moves to properly align die cut processes with printed registration marks. The same technique can ensure over-mold and multi-layer print alignment and pocketed blister pack parts placement.

Programmable Cut-to-Length Stop or Back Stop Gage



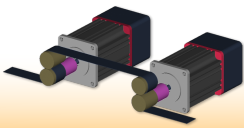
Index with Position Mode

- Biomedical
- Industrial Mfg.
- Chemical
- Construction

Glass tube cutting, precision pipe cutting, trim finishing, framing, window mfg., etc.

With the ability to program up to 1,000 subroutines and 32K of extra storage space, the system can be programmed for hundreds of back stop positions and sequences. You only need a simple HMI; no PLC or PC is required.

Process Tension Control (with one or multiple nip rollers)



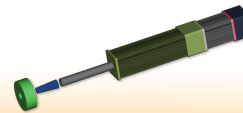
Follow Mode with Phase Offset

- Packaging
- Consumer Goods
- Paper
- Material Handling
- Consumer Electronics

Package labeling, lateral position control, paper processing, film and foil processing, converted materials mfg.

Using phase offset moves while electronically gearing Master to Slave, you can easily control tension between two sets of nip rollers. Tension is regulated by pre-test measurement or live analog, serial or digital feedback even with varying speeds and up or downstream loads.

Programmable Force Press to Fit



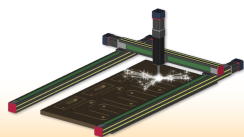
Position Mode with Derivative Error Control

- Medical
- Military
- Computer
- Automotive Production
- Wine and Spirits
- Consumer Products
- Cell Phone Mfg.

Resistive welding, power tool production, computer hardware mfg., bottle corking, medical device mfg., toy production, consumer electronics production, any general capping applications.

A SmartMotor allows for closely regulated positioning and position error control. This results in highly repeatable torque limited machine cycles. The result is a very good solution for pressing parts together or any other force-limited application where both cycle time and proper force must be tightly regulated.

Parallel Axis Gantry



Position Mode with Contouring Mode

- Automotive
- Government
- Military
- Metal Working
- Wood Working
- Aerospace
- Marine Sciences

Glue dispensing, coordinate measurement, topographical mapping, CNC wood or metal cutting, many other CNC operations.

Proper fault handling will prevent gantry racking in the event that either Master or Slave faults out during a move. Homing is done only once during power-up and the Master and Slave sync up all times after maintaining perfect alignment. Works perfectly with Animatics' CNC software.

High Speed Parts Counter & Verification



Velocity Mode or Follow Mode with High Speed Counter Input

- Medical
- Chemical
- Materials Handling
- Consumer Goods Mfg.
- Government
- Military
- Quality Inspection

Pharmaceutical container filling, quality control, RFID tag mfg., battery mfg., office chair wheel processing, cabinetry knob counting, currency and coin production, ammunition mfg., any high-speed part inspection process.

The external encoder input can be used to read quadrature incremental encoders, step and direction input or just as a counter where input pulses can be counted at a rate of up to 2 Megahertz. As a result, the motor can feed parts and part count even at high speed and with little distance between each part.