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Stepper Motors

High-torque Stepping Motors

SureStep high-torque stepping motors are designed to handle a wide range of automation applications such as woodworking, assembly, and test machines.

Available in both single-shaft and dual-shaft configurations:

- NEMA 14, 17, 23, 34 and 42 mounting flanges
- Holding torque ranges from 8 to 4532 oz-in
- 1ft. cable and locking connector included
- Optional 6, 10, or 20-foot extension cables with locking connectors for interface to step drives
- Extension cables can be easily cut to length, if desired
- Square frame design produces high torque
- 1.8° per step, 200 steps per revolution
- CE compliant

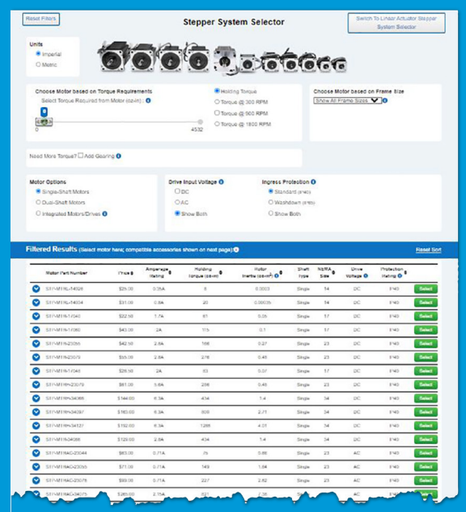
Dual shaft motors feature:

- All "D" model (dual-shaft) step motors come with pre-drilled holes in the rear end cap for easy encoder mounting
- Encoder included with "E" model (for position feedback)
- Encoder adapter plate available for NEMA 42 motors

Click here to learn more about Stepper Systems

IP65 Stepper Motors ("W" Models):

- Available in single-shaft models only
- NEMA 17, 23, and 34 frame sizes
- Holding torque ranges from 61 to 1288 oz-in.
- 1.8° per step, 200 Steps per Revolution
- Waterproof white epoxy coating on the motor laminations
- 1-foot pigtail cable with IP65-rated connector
- Extension cables with IP65 connector: 6, 10, 20 ft lengths.
- Special bearings and seals to keep moisture out of the motor
- CE Compliant



Need help selecting a Stepper System? Use our interactive selector tool to configure and order...

...and get all the required AND optional accessories on your first order!

For the latest prices, please check AutomationDirect.com.

Stepper Drives

Leadshine 2-phase Digital Stepper Drives

High-quality, 2-phase, digital stepper drives offering a basic feature set at an unbeatable value.

- All drives support step and direction control (some support CW/CCW)
- Model DM805-AI also supports multiple analog control modes
- Motor auto-configuration on power up
- Micro-stepping for smooth motor movement
- Wide range of input voltages supported (12-110 VDC, 18-80 VAC)
- Pulse input frequency up to 200kHz
- Soft-start at power on
- Automatic idle-current reduction
- Over-voltage and overcurrent protection
- Removable screw terminals for easy hook-up
- Optically-isolated inputs ready for +5VDC logic or use dropping resistors for 12/24VDC; switch selectable 5/24VDC (EM series only)
- No software required for configuration; DIP switch and/or rotary-dial setup
- DIP switch used for built-in self-test, microstep resolution selection, current level selection, and optional idle-current-reduction
- Optional Pro Tuner software for EM-S Series and DM-805-AI drives
- NEMA 11, 14, 17, 23, 24, 34 and 42 frame size step motors supported

Leadshine

SureStep High-performance Stepper Drives

SureStep stepper drives use advanced microstepping technology to smooth the motor motion and stepping response.

Standard drive features:

- Six models: 5 with DC input, 1 with AC Input (high-bus voltage)
- 2-phase digital stepper drives
- High-speed pulse input: pulse and direction, CW/CCW
- Wide range of input voltages supported (12-80 VDC, 115/230 VAC)
- Pulse input frequency up to 2MHz
- Automatic idle-current reduction
- Over-voltage and overcurrent protection
- NEMA 11, 14, 17, 23, 24, 34 and 42 frame size step motors supported
- On-board or removable screw terminals for easy hook-up
- Optically-isolated inputs ready for +5VDC logic or 5-24 VDC available
- No software or add-on resistors required for drive configuration; DIP switch and/or rotary-dial set-up
- DIP switch used for built-in self-test, microstep resolution selection, current level selection, and optional idle current reduction

Advanced drive features:

Two models with all the features of the standard drives, plus:

- Software configurable (no DIP switches)
- 200 - 51,200 microsteps (software selectable)
- Higher output currents (up to 10A)
- High-speed pulse input (pulse/direction, CW/CCW, A/B quadrature)
- Adjustable input filtering for smooth motion and quiet operation
- Analog velocity mode (0-5V or potentiometer)
- Internal indexer allows point-to-point moves via ASCII commands (SCL over RS-232)

Stepper Drives (Continued)

Ever Motion Solutions Stepper Drives

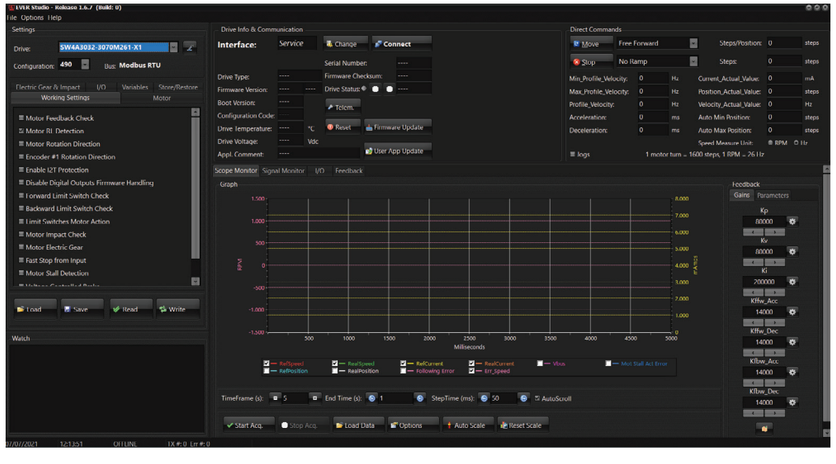
Titanio series drives provide the highest performance levels and most advanced features

The Titanio family of stepper drives from Ever Motion Solutions are high-performance vector drives that provide industry-leading quality and control. The drives support open-loop (no encoder feedback) control with an option for closed-loop (motor mounted encoder provides position feedback to the drive) control on the LW4D model. Like most closed-loop stepper drives, these drives can dynamically adjust current and speed to the motor to maintain the commanded speed or position if binding or missed-steps occur. The Titanio drives also have stall detection capability in open-loop control mode, where the drive uses the motor's back EMF to monitor motor position faults. This means the Titanio drives can detect and report motor stalling without encoder feedback. The Titanio ELSE (Error Less Servo Efficient)advanced current control technology in both open-loop and closed-loop modes allows for extremely smooth motor operation (motors run much quieter, smoother, and cooler than with other drives).

- Support for pulse & direction, or CW/CCW pulse inputs
- Monitoring of motor back EMF enables step loss detection without an encoder
- Proprietary, patented algorithms use sinusoidal current control to:
  - Reduce the parasitic phase current harmonics
  - Reduce audible motor noise
  - Smooth the movement of the motor, regardless of microstep resolution
  - Dampen motor vibrations and resonances
  - Reduce heating and increase efficiency of the motor and drive system
- Increased positioning accuracy
- Better and more constant torque output at all speeds
- Protection against short circuit and open circuit
- Alarms for over/under voltage, temperature, short circuit
- Basic setup with DIP switches
- Advanced software setup (optional for LW3A and LW4D drives) using Ever Studio configuration software, a free download at AutomationDirect.com
- Open-loop drives work with SureStep NEMA 14, 17, 23, 34, and 42 frame size motors
- Closed-loop drive (LW4D) is preconfigured (DIP switch select) for select SureStep encoder-mounted (E) motors and encoder-ready (D) motors, or can be fully configured in software to run any open or closed loop stepper motor.
- High-bus voltage drive (LW3A) accepts 100-220 VAC input and works with high-voltage SureStep motors (STP-MTRAC or STP-MTRACH) in NEMA 23, 34, and 42 frame sizes

Ever Studio

While basic dip-switch setup is possible for all Ever models, the optional Ever Studio configuration software (a free download) allows advanced configuration of the LW3A and LW4D stepper drives, including setup of additional microstepping resolutions, and even allows jogging/indexing and a built-in oscilloscope for tuning and debugging the LW4D.



For the latest prices, please check AutomationDirect.com.

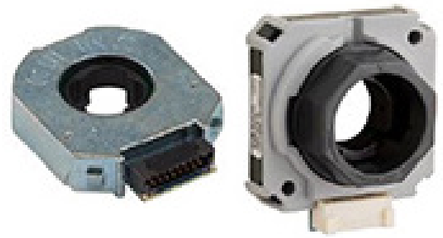
Stepper Encoders

Modular Kit Encoders for Stepper Motors

same sky Capacitive Encoders

AMT series encoders from SameSky (formerly CUI Devices) are advanced capacitive encoders that are typically mounted to the back of a stepper motor but can also be used in many other applications

- Software configurable models with resolutions up to 4096 ppr using quadrature (that's over 16k counts per revolution!)
- DIP switch configurable units with up to 2048 ppr
- All AMT incremental encoders have quadrature output signals and are available in single-ended (totem-pole) and line driver output models
- Models available to use as replacement encoders for those pre-mounted on STP-MTR(x)-xxxxE stepper motors
- Add as an optional encoder (purchased separately) for standard integrated motor/drives and standalone dual-shaft motors in all NEMA 14, 17, 23, 34, and 42 motors
- All SureStep (D) model (dual shaft) motors come with pre-drilled holes in the rear end cap for easy encoder mounting (NEMA 42 models require STP-MTRA-42ENC encoder mounting plate)
- Installation tools and mounting hardware are included with all replacement encoders



Capacitive encoders are rugged

Derived from the same principles used in digital calipers, these encoders:

- Tolerate a range of environmental contaminants such as dust, dirt, and oil
- Offer excellent immunity to vibration and temperature extremes
- Longer life (no LED), smaller footprint, and lower current consumption (6 to 18 mA) than an optical encoder
- Immune to magnetic interference and electrical noise

SureStep® Optical Stepper Encoders

- Optional encoders can be purchased separately for standard integrated motor/drives and standalone dual-shaft motors in all NEMA 14, 17, 23, 34, and 42 sizes
- All (D) model (dual-shaft) step motors come with pre-drilled holes in the rear end cap for easy encoder mounting (NEMA 42 models require STP-MTRA-42ENC encoder mounting plate)
- Pre-installed encoders on standalone dual-shaft motors and standard integrated motor/drives can be retrofitted with a different encoder if desired

Available for the pre-installed units on "E" model standard motors and integrated motor/drive standard models with encoders. Installation tool and mounting hardware is included with all replacement encoders.

Need other styles of encoders?

GO TO: **OVERVIEW PDF**

Optical Encoders

- Fixed resolutions of 400 ppr or 1000 ppr
- Choose line driver or push-pull (totem) output signals

AMT Viewpoint - FREE Stepper Encoder Configuration Utility

For configurable encoders STP-MTRA-ENC9, STP-MTRA-ENC10, AMT11, AMT31, AMT13, and AMT33

- AMT Viewpoint autodetects the encoder and allows PPR selection from 40 to 4096 ppr
- Viewpoint PC software utility connects to encoder using the AMT-PGRM-17C or AMT-PGRM-18C cable
- Software allows custom Z Pulse alignment at any position, before or after the encoder is installed

Industrial Rotary Encoders

- Resolutions from 3 to 16384 pulses/revolution
- Open collector, line driver outputs or universal outputs

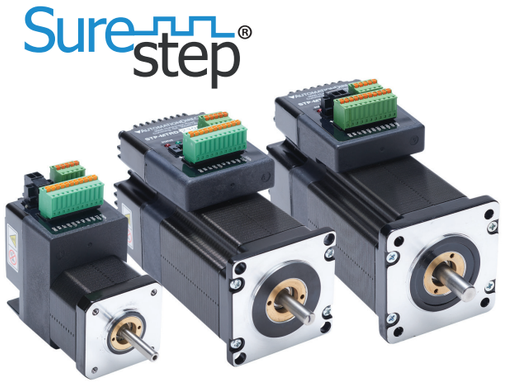
JTEKT Formerly Koyo Encoders lika®

Stepper Systems

SureStep® Integrated Motor and Drive Systems

Integrated drive/motor units that combine accurate position and speed control will save panel space, require less wiring, and are less expensive!

- DC power supply required (12-48 VDC or 12-70 VDC)
- Pulse Input (Step/Direction, CW/CCW, A/B Quad), Internal Indexing, and Analog Velocity control modes available
- Digital input filtering
- "E" models include an encoder (externally-wireable for Standard models, internal-only for Advanced models)
- Three optically isolated digital inputs, 5 to 24 volts
- Step input signal smoothing (microstep emulation), performs high resolution stepping by synthesizing coarse steps into fine microsteps
- Dynamic smoothing, software-configurable filtering for use in removing spectral components from command sequence, reduces jerk, limiting excitation of system resonance
- Anti-resonance (electronic damping): raises the system-damping ratio to eliminate midrange instability and allow stable operation throughout the speed range of the motor
- Idle current reduction range of 0-90% of running current after a delay selectable in milliseconds (Standard models = 50/90%, DIP switch selectable)
- Configurable hardware digital noise filter, software noise filter
- Non-volatile storage, configurations are saved in FLASH memory on-board the DSP
- Dynamic current control, software configurable for running current, accel current, idle current, to make motion smoother and the motor run cooler



Integrated systems combine a high-performance microstepping drive with a high-torque stepper motor to provide simple and accurate control of position and velocity where open or closed-loop control is desired, and cost is a factor.

Standard Integrated Motors/Drives (STP-MTRD-x)

- Configurable via DIP switches
- Available torque from 68 to 210 oz-in
- Configurable via DIP switches
- Available torque from 68 to 210 oz-in
- Models with optional encoder ("E" models) have an externally wireable encoder which can provide feedback to an external controller

Advanced Integrated Motors/Drives (STP-MTRD-xR)

- Step and Direction, CW/CCW, and AB Quadrature/Encoder following
- Velocity and position modes (internal indexing)
- Control via streaming SCL commands over RS-485
- RS-485 ASCII (2- or 4-wire) communications
- Models with optional encoder ("E" models) have an internal encoder to provide improved position and speed control
- Four "Variable I/O" points, 5 to 24 volts (NEMA 24 models)
- Analog input for speed and position, 0 to 5 VDC
- Configurable via SureMotion Pro software
- Available torque from 54 to 340 oz-in

For the latest prices, please check AutomationDirect.com.

SureServo2 AC Servo Systems

SureServo2® AC servo systems

The SureServo family of brushless servo systems is fully digital and offers a rich set of features to cover a broad range of motion control applications. There are 26 standard servo motors that can be operated in combination with one of sixteen standard servo drives.

The SureServo family includes standard accessories such as: servo motor encoder cables, servo motor power/brake cables, direct mount and DIN-rail mount I/O break-out kits for easy connection of external command and I/O signals, optional battery backup for the encoder, optional external braking resistors, and optional AC input filters. Optional Modbus TCP and EtherNet/IP modules for networking (full command and control capability).

- 13 different power ratings
- Support for 110VAC and 220VAC single-phase input power on systems 2kW and below
- Support for 220VAC three-phase input power on systems from 100W to 15kW
- Support for 460VAC three-phase input power on systems from 400W to 15kW
- Control via analog speed or torque signal, high-speed pulse train (up to 4MHz), internal indexing, or with serial or Ethernet communications (Modbus TCP and Ethernet/IP)
- Professionally manufactured cables for motor power, encoder feedback, and brake (optional)
- Compatible with most AutomationDirect PLCs; or any other host controller or HMI
- Servo drives feature on-board motion controller with registration, electronic camming, and event-based logic control
- Option modules for networking capability
- Absolute Encoder functionality
- External (secondary) encoder support for Full Closed Loop Control
- Servo drives feature Safe Torque Off (STO)
- Free set-up software includes graphing/trending oscilloscope and the ability to generate a custom Ethernet/IP EDS file (define exactly what is transferred via Implicit Messaging)

Why use a servo?

The SureServo2 servo systems provide the highest possible level of performance for precise control of position, velocity, and torque. Compared to lower cost stepping systems, or lower featured servo systems, the SureServo2 products provide:

- More torque at higher speeds (up to 6,000 rpm)
- Broader range of power (up to 15kW)
- Higher response with closed-loop control (high hit rate without stalling or lost position)

Click here to learn more about SureServo2 Systems

LS ELECTRIC AC Servo Systems

LS Electric AC servo systems

The LS Electric families of brushless servo systems are fully digital and offer a rich set of features to cover a broad range of motion control applications. There are 46 standard servo motors, with and without holding brakes, which can be operated in combination with one of 18 standard servo drives.

The LS families include standard accessories such as: factory-made encoder cables & power/brake cables, and DIN-rail mount I/O break-out kits for easy connection of external command and I/O signals, optional external braking resistors, and optional AC input filters and even a set of matched gearboxes available in three gear ratios for each motor.

Basic, intermediate, and advanced features at fantastic prices!

LS Electric Servos provide the most requested features: setup wizards, auto tuning, built-in indexer and more - in an extremely cost-effective package. The basic systems offer an impressive array of servo features at the price of some stepper systems. Step up to an intermediate system for a 19-bit absolute encoder, along with vibration reduction circuitry, additional I/O capability – with greater range of power input options. Or upgrade to the advanced servo system for precision coordinated multi-axis control over EtherCAT or ModbusTCP networks.

Why use a servo?

Servo systems provide the highest possible level of performance for precise control of position, velocity, and torque. Compared to lower cost stepping systems, servo systems provide:

- More torque at higher speeds (up to 5,000 rpm)
- Higher response with closed-loop control (high hit rate without stalling or lost position)

Servo System Features

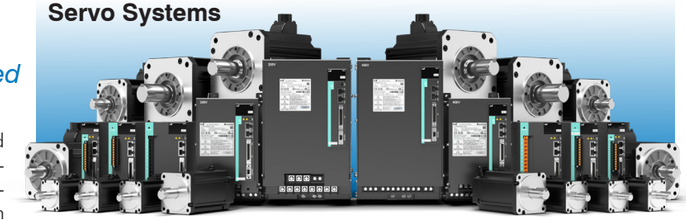
- Control via analog speed or torque signal, high-speed pulse train, or internal indexing or network control
- Free Drive CM set-up software
- Compatible with most AutomationDirect PLCs; or any other host controller or HMI
- IP67 motors and IP65 gearboxes
- Select servo drives feature on-board motion controller (initiate moves with PLC outputs or with serial Modbus communication)
- Field upgradable firmware to keep your systems up-to-date
- Professionally manufactured cables for motor power, encoder feedback, and brake - with standard and continuous flexing cable options

L7C Basic Servo Systems

L7C Basic Servo Systems

- 5 Sizes from 100W to 1kW
- Low inertia models
- 230VAC single-phase input power
- Speed/torque, pulse train, internal indexing and/or serial Modbus control

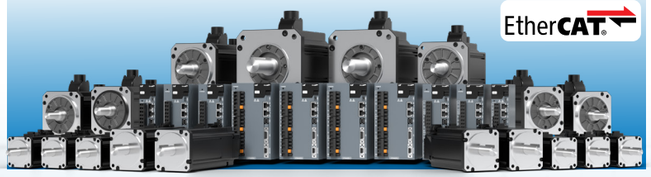
L7P Intermediate Servo Systems



L7P Intermediate Servo Systems

- 12 Sizes from 100W to 7.5kW
- Low and medium inertia models
- 230VAC & 460VAC three-phase input power (230VAC single-phase up to 2.2kW)
- Speed/torque, pulse train, internal indexing and/or serial Modbus control

iX7 Advanced Servo Systems



iX7 Advanced Servo Systems

- 9 Sizes from 100W to 3.5kW
- EtherCAT and ModbusTCP connectivity
- Low and medium inertia models
- 110VAC single-phase up to 400W
- 230VAC single-phase up to 2.2kW
- All sizes accept 230VAC 3ϕ input power

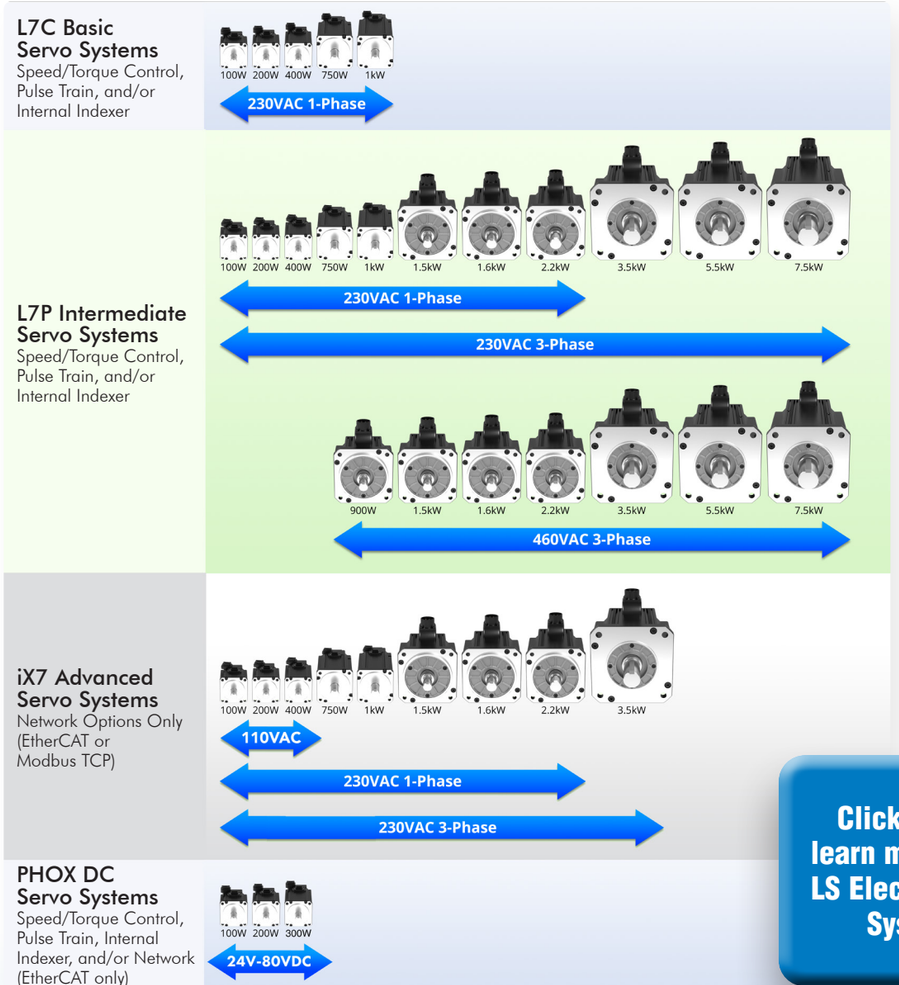
PHOX DC Servo Systems

PHOX DC Servo Systems

- 4 Sizes from 100W to 300W
- Non-EtherCAT speed/torque, pulse train, and/or internal indexer control
- Network control with EtherCAT
- Supports external encoder feedback for full closed loop control
- Perfect for mobile applications
- Or share a DC power source between multiple axes

For the latest prices, please check AutomationDirect.com.

Control Types, Motor Sizes & Input Power options



Click here to learn more about LS Electric Servo Systems

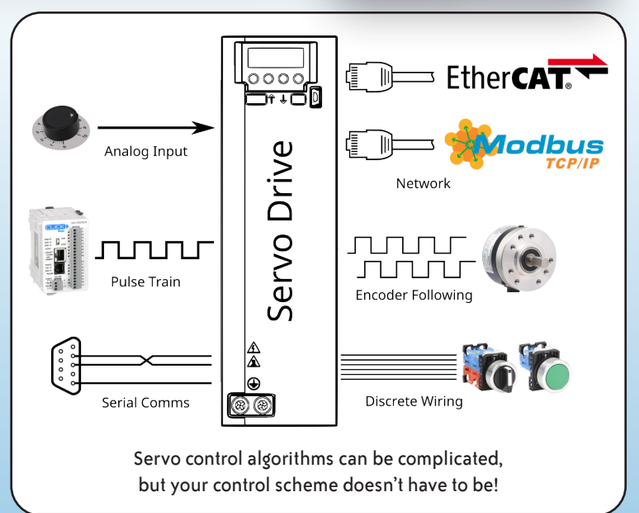
Control Options (see chart above - not all systems accept all control options)

Speed or Torque Control: The servo drive accepts a +10/-10V signal from a motion controller, PLC, or potentiometer. Just scale the voltage signal to your desired speed or torque (in the servo drive), it's that simple. LS Electric servo drives even allow an "analog deadband" setting to eliminate jitter or drift when using a manual (potentiometer) signal for speed control.

Pulse Train: This is the most popular option for PLC-based control; the servo drive accepts a high-speed pulse input signal up to 1.4MHz (line driver) or 200kHz (open collector). If your PLC has a slower pulse train output (max speed), the servo drive can scale the value. Works with all AutomationDirect PLC families (hardware must support high-speed outputs). Most LS servo systems also accept quadrature pulse and CW/CCW input signals for encoder following applications.

Internal Indexing: Get high-performance motion control with a simple PLC (or no PLC at all). The servo drive accepts standard PLC discrete outputs to command internally predefined moves OR use serial communications (Modbus) commands to set dynamic speeds & distances AND to initiate those moves. You can even use the internal indexer to provide manual machine control with just a few buttons and switches. For example, use selector switches to select predefined moves from an index, and then use a pushbutton to START that move. Simple registration operations can even be handled with the built-in indexer – see the user manual for details.

Network Command and Control: Achieve advanced control of multi-axis servo systems over EtherCAT or ModbusTCP networks. With EtherCAT cyclic modes, all drives are updated every EtherCAT cycle (~1 millisecond) with position, velocity, or torque setpoints. In profile modes, drives receive target setpoints for each move (over EtherCAT or ModbusTCP).



Servo control algorithms can be complicated, but your control scheme doesn't have to be!

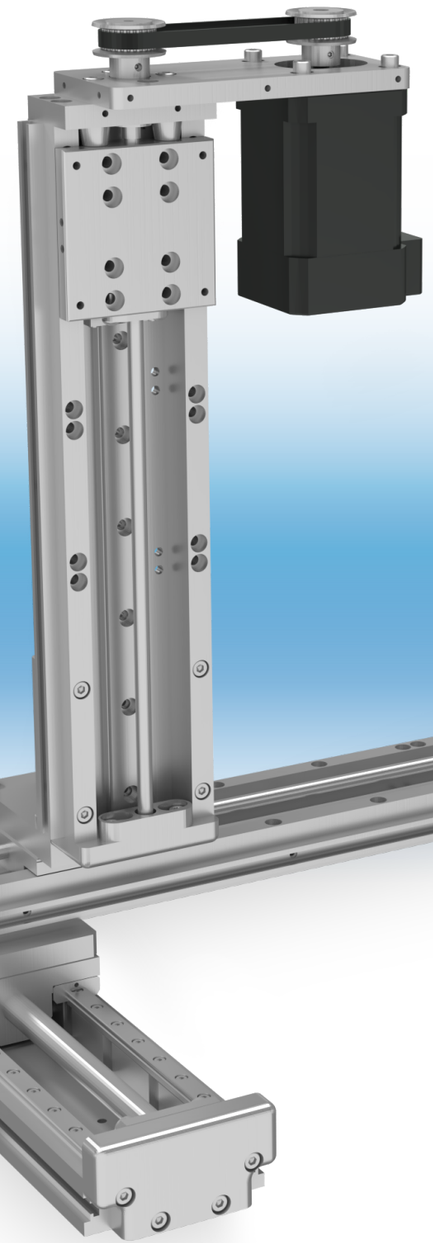
For the latest prices, please check AutomationDirect.com.

Linear Motion Slides and Components to Create up to 3 Axes of Motion

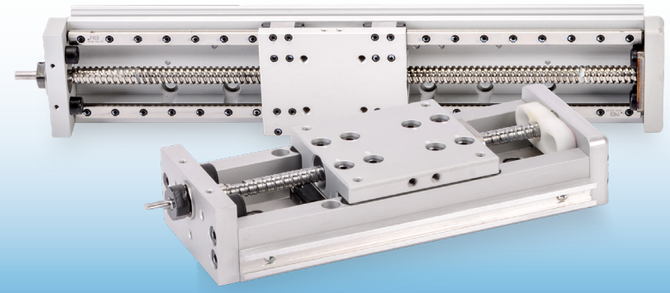
Sure motion

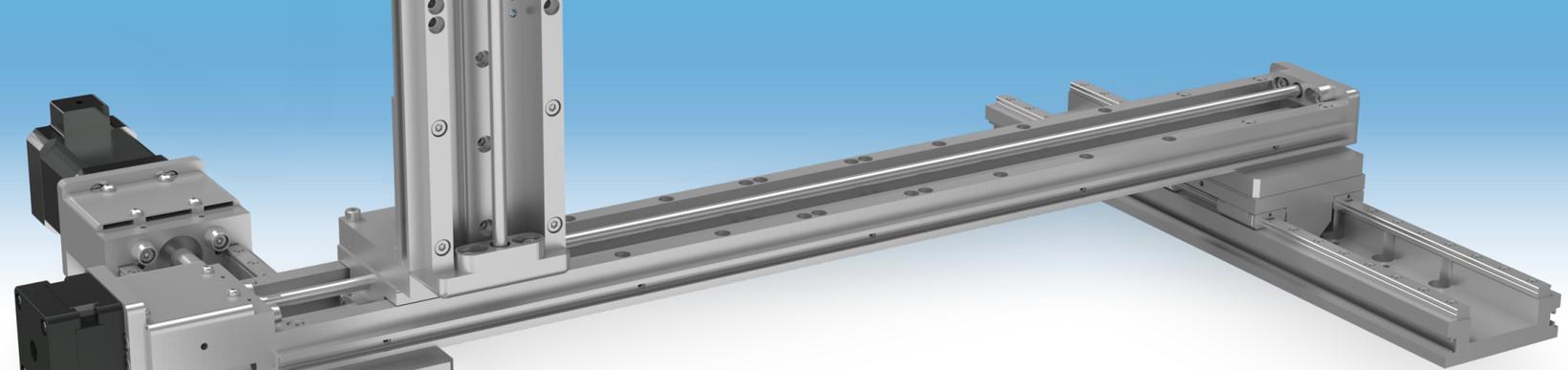
SureMotion linear slide actuators easily mate to SureStep motors, SureServo motors and other NEMA motors. Everything you need to mount your SureStep motor is included!

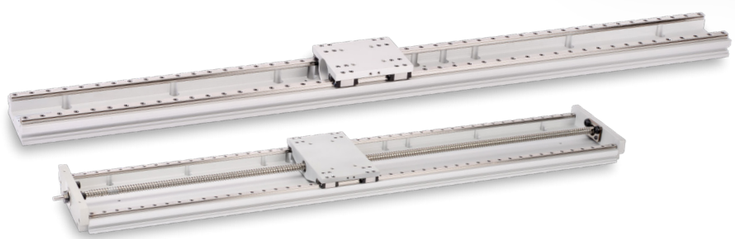
SureMotion linear actuators provide high performance linear motion. Available in lead screw or ball screw controlled versions. Coupling and hardware to mount small NEMA frame and SureServo motors are available as well as hardware to attach units together to create motion in 2 or 3 axes of movement.



LAHP units can be attached to each other to provide up to 3 axes of motion and from 52mm to 910mm of travel.

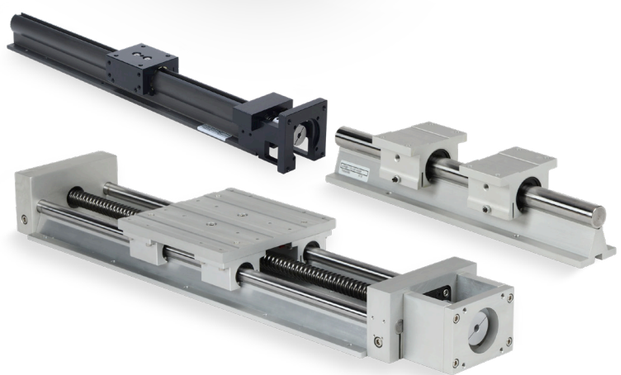






18 models, with travels from 6 to 36 inches

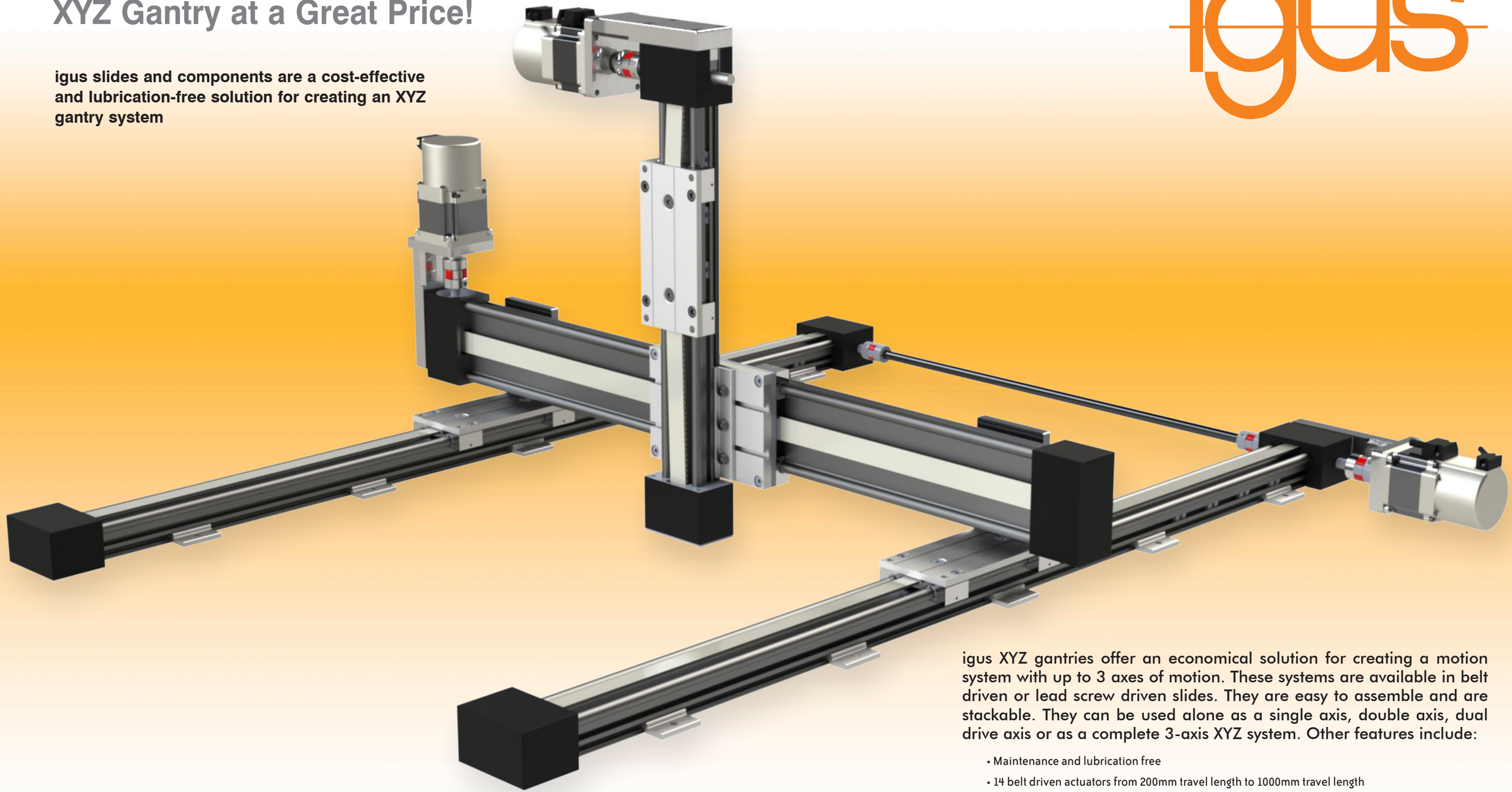
Ready to mount NEMA 17, 23 or 34 motors



For the latest prices, please check AutomationDirect.com.

igus Linear Slides and Components can be used to create an XYZ Gantry at a Great Price!

igus slides and components are a cost-effective and lubrication-free solution for creating an XYZ gantry system



igus XYZ gantries offer an economical solution for creating a motion system with up to 3 axes of motion. These systems are available in belt driven or lead screw driven slides. They are easy to assemble and are stackable. They can be used alone as a single axis, double axis, dual drive axis or as a complete 3-axis XYZ system. Other features include:

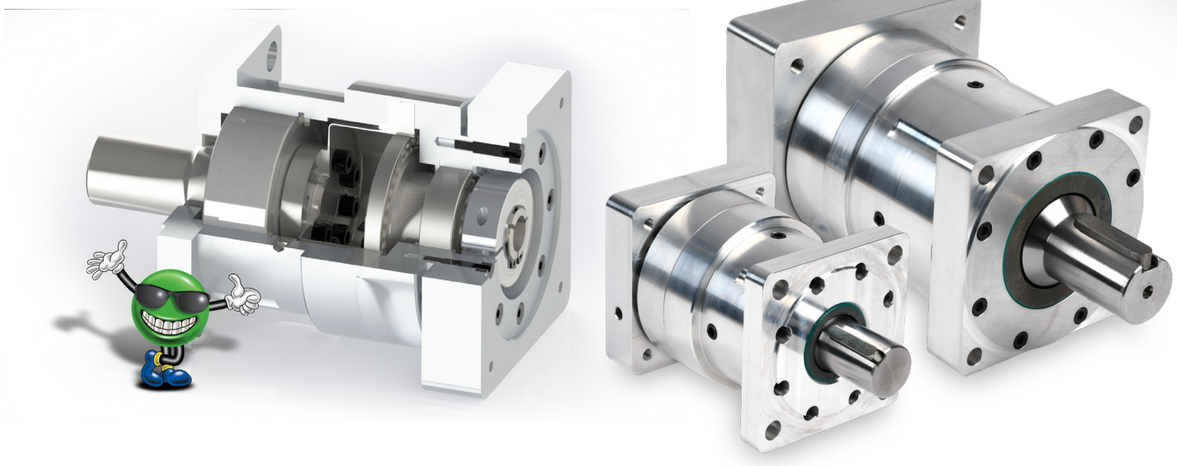
- Maintenance and lubrication free
- 14 belt driven actuators from 200mm travel length to 1000mm travel length
- 13 lead screw driven actuators from 100mm travel length to 750mm travel length
- Rails made from durable 6061-T6 aluminum with hard anodized finish
- Motor mounts for SureServo and SureStep motors
- T-slots in rails allow switches and sensors to be easily installed

SureGear High-Precision Inline Strain Wave Gearboxes

Strain wave gearboxes offer many advantages over planetary and helical gearboxes. Strain wave technology allows for a higher gear ratio and efficiency in an inline form-factor and smaller size. Many different gear ratios and input flange sizes are available and are designed to work with SureServo2 and SureStep motors.

Strain wave technology provides:

- High gear ratios compared to similar-sized planetary gearboxes (up to 160:1 for stepper gearboxes and 200:1 for servo gearboxes)
- Low heat and noise generation
- Lifetime zero backlash
- Pre-lubricated for life



NEMA Planetary Gearboxes

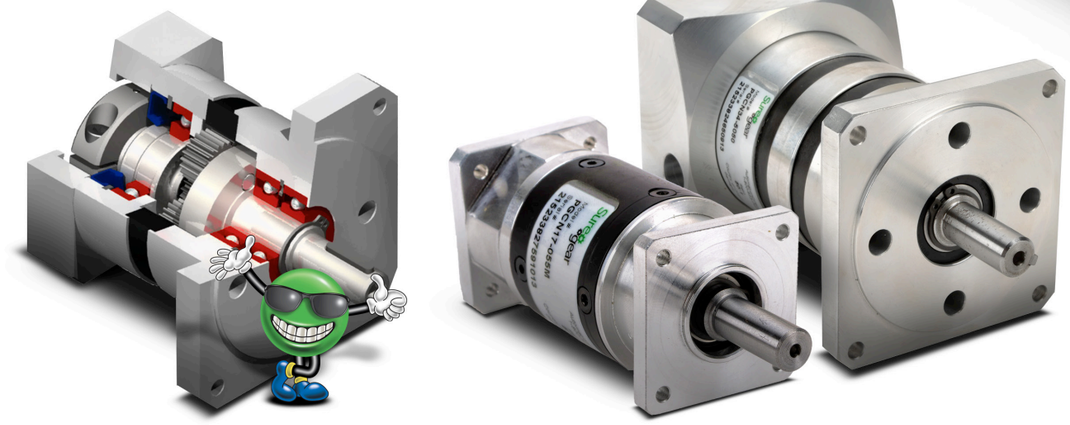
The SureGear PGCN series easily mates to SureStep motors, and other NEMA frame motors. Everything you need to mount your SureStep motor is included!

It is the perfect solution for applications such as material handling, pick and place, automation, packaging, and other motion control applications requiring a NEMA input/output interface.

Precision Gearboxes for Stepper Motors

15 models, five gear ratios available in NEMA 17, 23 and 34 frame sizes

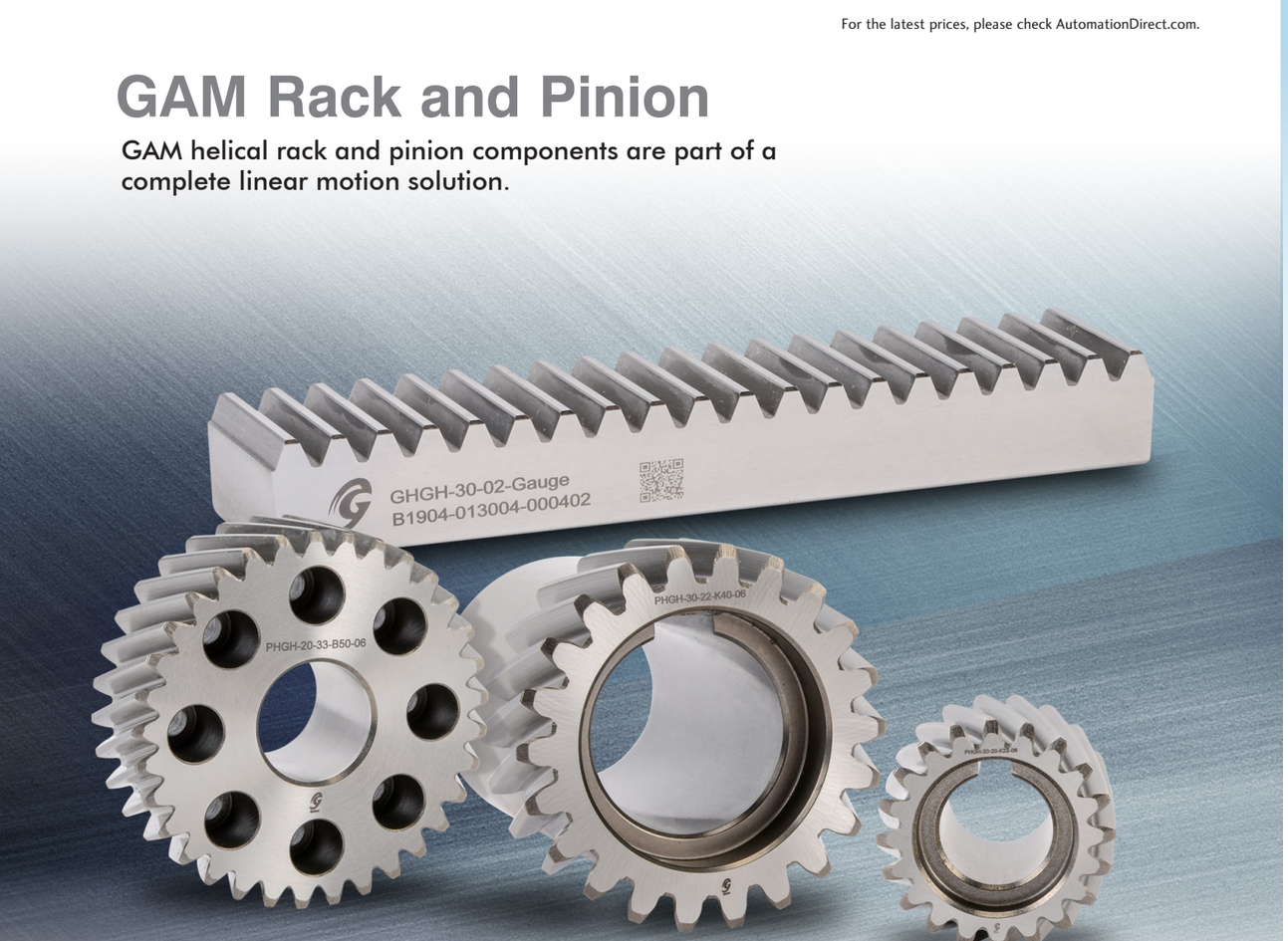
Tough on the outside, precision quality on the inside



For the latest prices, please check AutomationDirect.com.

GAM Rack and Pinion

GAM helical rack and pinion components are part of a complete linear motion solution.



- High precision helical rack for smooth, quiet operation available in module sizes of 1.5, 2 and 3 that mate with GAM pinions
- Pinions can be mounted to SureGear® gearboxes, are hardened to work with ISO 10 hardened rack
- Pinions available in module sizes of 1.5, 2 and 3 from 18 to 40 teeth
- Most cost-effective solution for linear motion greater than 2 meters
- Rack installation gauges available for use when installing multiple racks

For the latest prices, please check AutomationDirect.com.

Sure-step® Linear Actuators

Optional screw end machining: bearing journal and groove for snap ring. Ready to mount!

Triangular flange nut (standard) fits confined spaces. Optional circular nut also available

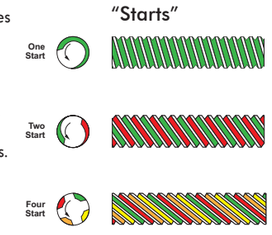
PITCH VS LEAD

"Pitch" refers to the number of threads per inch of a screw, while "lead" indicates the amount of travel per revolution. Lead is typically used to specify ball screws.

Pitch and lead values are equivalent with single start screws.

For multiple start screws: lead equals pitch multiplied by the number of starts.

Multi-start screws have increased bearing surface for extra thrust.



Nine standard "leads" in stock: 1.25mm/rev, 3mm/rev, 6mm/rev, 8mm/rev, 10.2mm/rev, 0.25in/rev, 0.5in/rev, and 1.0in/rev:

- Small leads provide high thrust
- Large leads allow high speed

Three standard screw lengths in stock: 6-in, 9-in, & 12-in

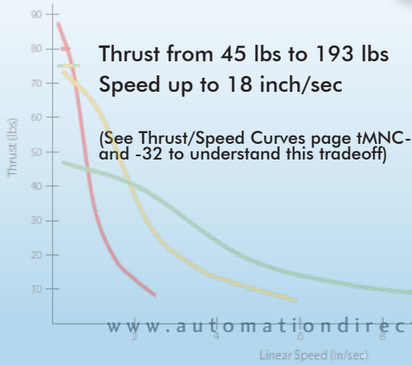
Three standard motor cable lengths in stock: 6-ft, 10-ft and 20-ft

Wide variety of actuators in stock for immediate delivery!

NEMA17 and NEMA23 motor sizes in multiple stack lengths to match the thrust & speed of your application.

Thrust from 45 lbs to 193 lbs
Speed up to 18 inch/sec

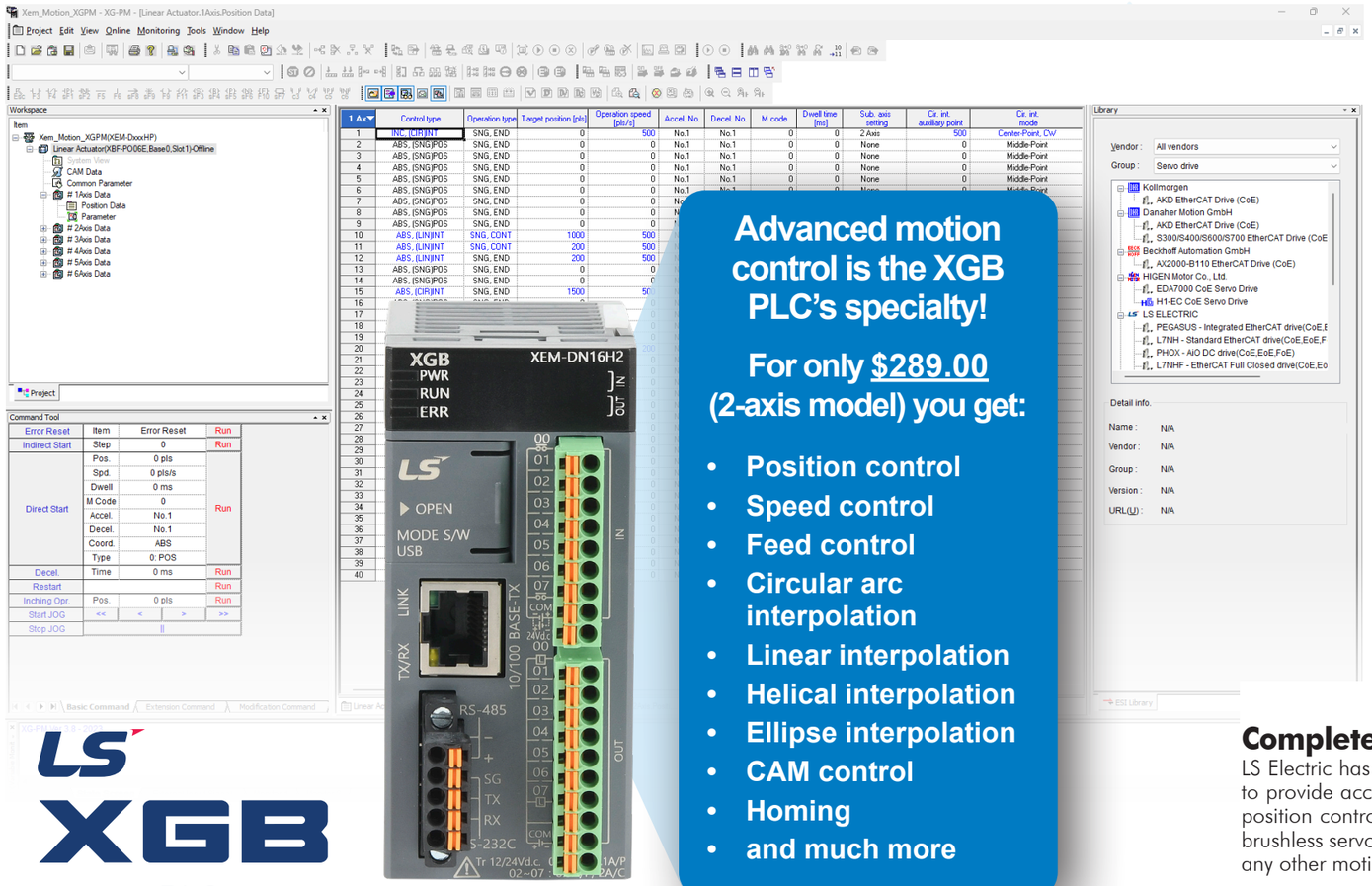
(See Thrust/Speed Curves page tMNC-31 and -32 to understand this tradeoff)



Need Feedback? Optional rear motor shaft and threaded holes for encoder mounting

For the latest prices, please check AutomationDirect.com.

LS Electric Motion Control (PLC-Based)



LS XGB PLC

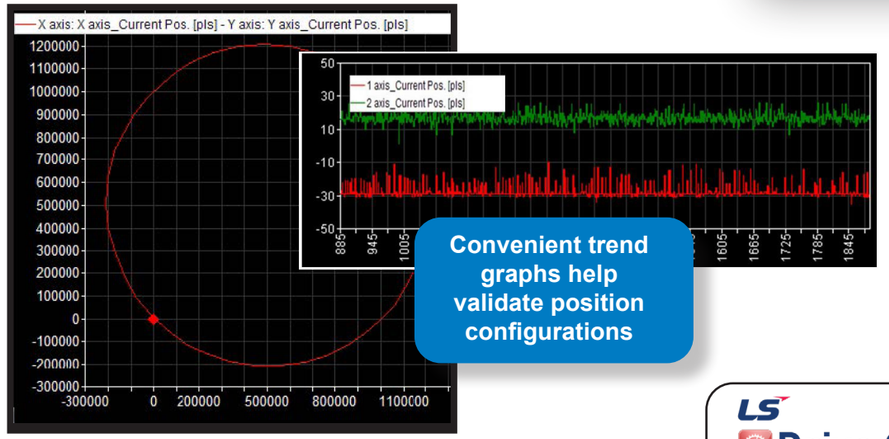
Motion-capable LS Electric XGB series controllers are motion control powerhouses. These PLCs provide numerous motion control capabilities using the integrated 2- or 6-axis pulse/direction motion inputs/outputs (up to 200kHz) on the CPU modules, plus up to 4 channels of high-speed inputs at up to 500kHz on each high-speed counter module, and up to 16 axes of motion control utilizing EtherCAT modules. With LS XGB PLC's advanced motion you get:

- Precision moves that can be executed from the position table or within the program code
- Various single-axis operations: position control, speed control, feed control, multi-axis simultaneous start, and point operation
- Single-axis torque control supported with EtherCAT (XBF-PN0xB) modules
- Various multi-axis operations: circular arc interpolation, linear interpolation, helical interpolation, ellipse interpolation
- Switching control during operation: position/speed control switching, speed/position control switching, position/torque control switching
- CAM control: 8 types
- Seven homing methods: in positioning control, use Homing method supported by each servo driver (17 types); set the origin of machine without homing by setting the floating origin
- Acceleration/deceleration methods of Trapezoid or S-type
- High-speed start process: 1ms (1~2 axes), 2ms (3~5 axes), 3ms (6 axes); no delay time between axes in simultaneous start and interpolation start

The XG-PM software is provided free of charge in the same download as the FREE LS Electric XG5000 programming software. This software provides table-based position configurations of up to 400 moves per axis and a run command tool for easy position testing. The XG-PM software also has a System View feature that allows all 6 axes to be seen at once and any modifications needed to the motion profiles can be made without touching the user program.

To aid with validation, convenient 2D dimensional trend graphs of position configurations are provided and the XG-PM software utilizes an intuitive error code system for easy troubleshooting.

Click here to learn more about LS Electric PLCs



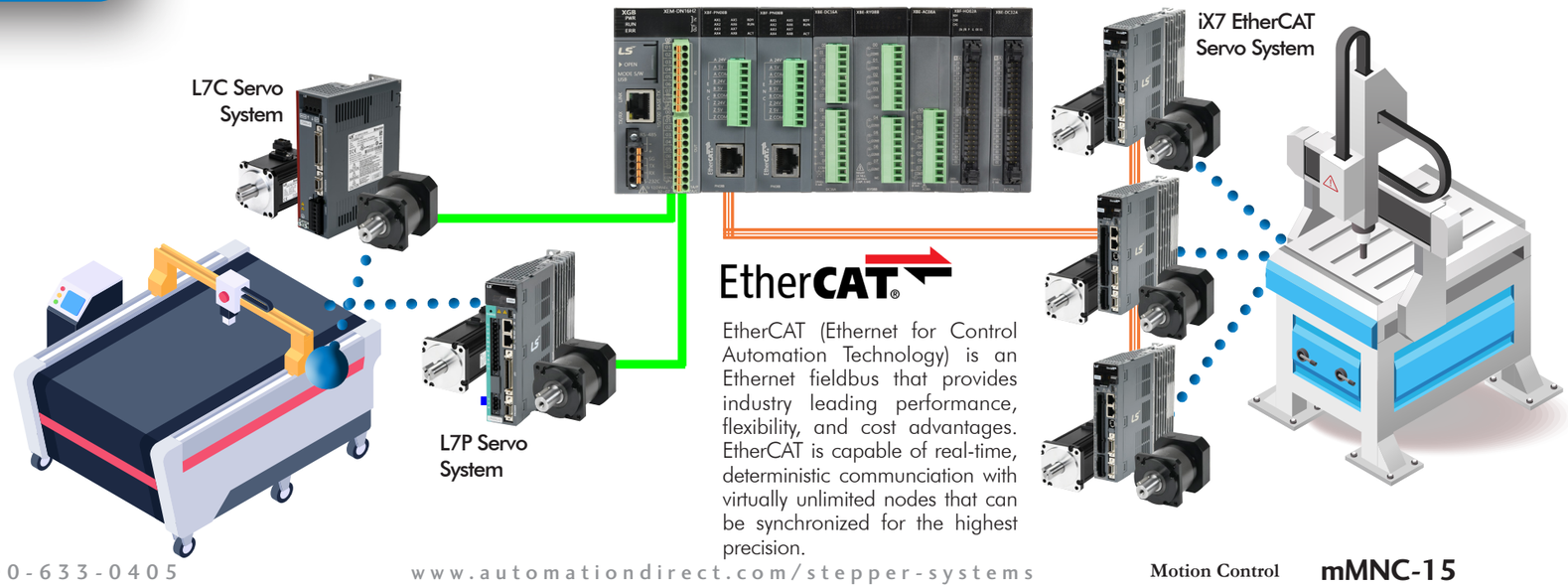
Convenient trend graphs help validate position configurations

LS Drive CM
Servo Configuration

Included in the FREE XG5000 software package is the Drive CM utility which allows you to easily configure any LS servo drive. Once configured, the file can be uploaded directly to the drive and can be edited, saved, and downloaded as needed.

Completely Integrated Solution

LS Electric has several other motion control products that can work together seamlessly to provide accurate positioning and precision movements. Build a complete LS Electric position control solution using LS XGB PLCs, multiple servo drives, and low inertia AC brushless servo motors perfect for pick-and-place systems, flying cutoffs, rotary tables, or any other motion control application.



EtherCAT

EtherCAT (Ethernet for Control Automation Technology) is an Ethernet fieldbus that provides industry leading performance, flexibility, and cost advantages. EtherCAT is capable of real-time, deterministic communciation with virtually unlimited nodes that can be synchronized for the highest precision.

For the latest prices, please check AutomationDirect.com.

XMC for Expansive EtherCAT Motion Control

The LS Electric XMC motion controller has numerous state-of-the-art features built into it's compact brick-style design. These controllers are optimized for advanced motion control, are available in 8- or 16-axis models, and offer a variety of high-tech capabilities for a price that can't be beat.

One of the great things about the XMC controller is that it is a full EtherCAT master, meaning it can communicate with any EtherCAT capable device including up to 16 EtherCAT servo or stepper systems and up to 32 remote EtherCAT I/O racks. The XMC utilizes the powerful XG5000 software to configure and program all the control logic for advanced motion as well as basic PLC applications.

EtherCAT®

Click here to learn more about LS XMC motion controllers

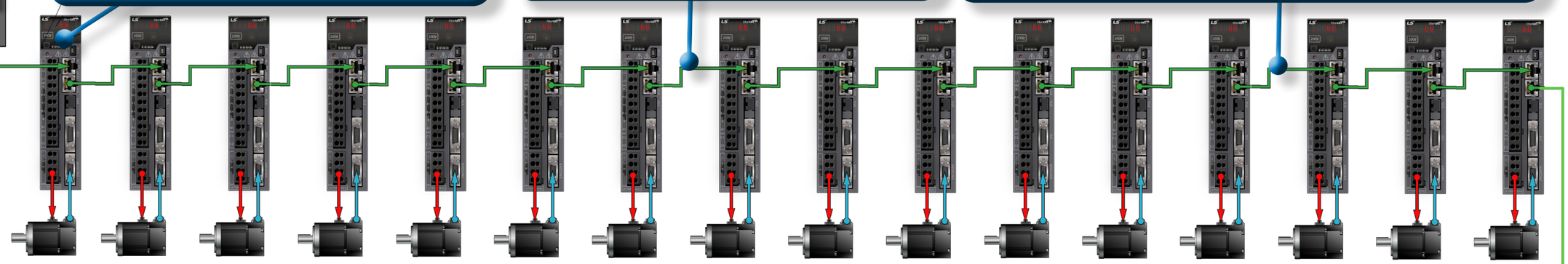
LS XMC MOTION CONTROLLER

LS XG5000 PLC Programming

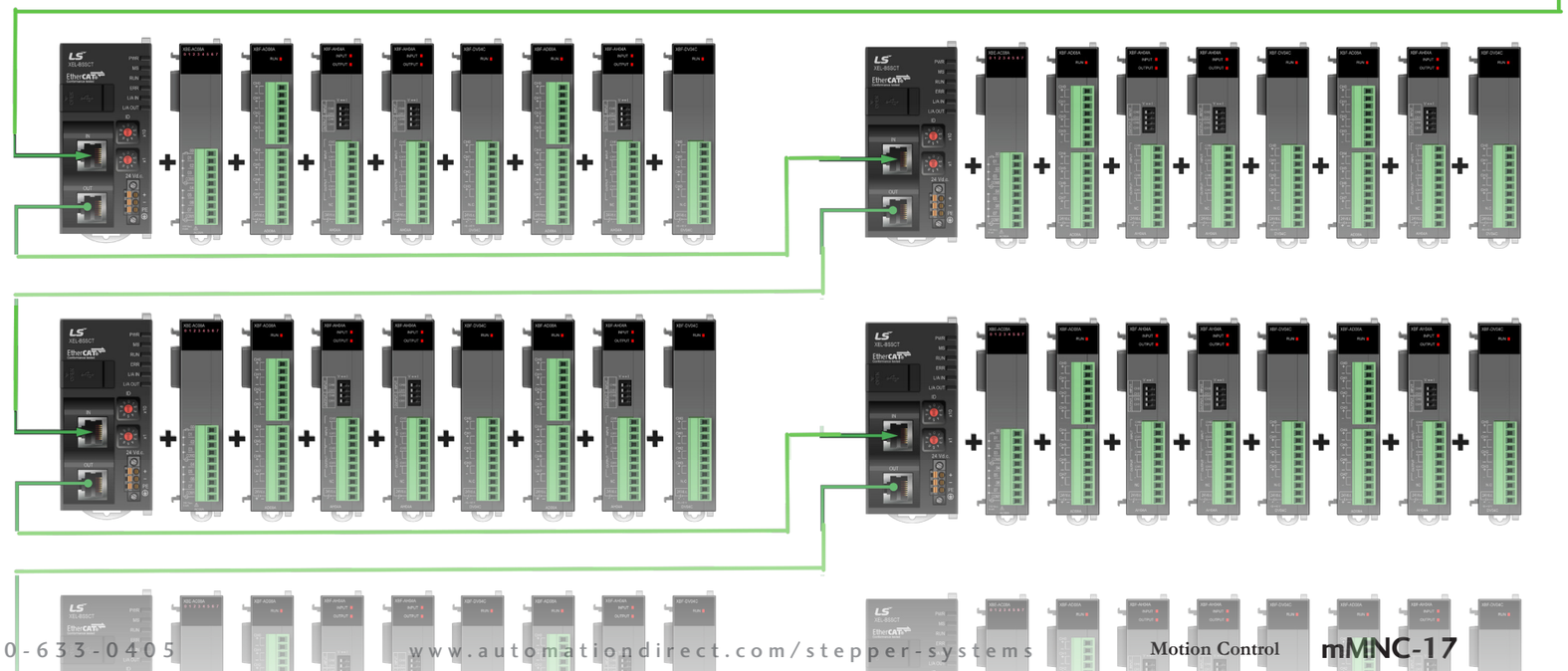
Add up to 16 Motion Axes
Add servos, steppers, or VFDs with simple Ethernet (EtherCAT) connections. Easily load configuration files in the ESI Library and jump start your project. You can also add up to 18 virtual axes to coordinate tricky multi-axis solutions.

Fast, Accurate Motion Control
Use EtherCAT cyclic mode to update the position of ALL axes on every EtherCAT cycle, with selectable update times of 0.5/1/2/4ms. These super-fast updates ensure highly accurate motion profiles.

Simple System Connections
EtherCAT is a relief to anyone familiar with wiring pulse and direction based servo or stepper systems. That's because you won't have to be deal with the discrete signal wiring of the past, no sinking/sourcing concerns, no common reference voltages, totem-pole or linedriver headaches, etc. Just daisy-chain simple network cables (any Ethernet cable CAT 5 or 6) from the controller to each motion axis and I/O bus coupler as needed. It's that simple!



Add up to 32 I/O Racks
With the XEL-BSSCT bus coupler you can add thousands of additional I/O. Up to eight I/O modules can be installed per bus coupler - that's 256 discrete or 64 analog channels per coupler! AND it's ALL updated synchronously on EVERY EtherCAT cycle.



For the latest prices, please check AutomationDirect.com.

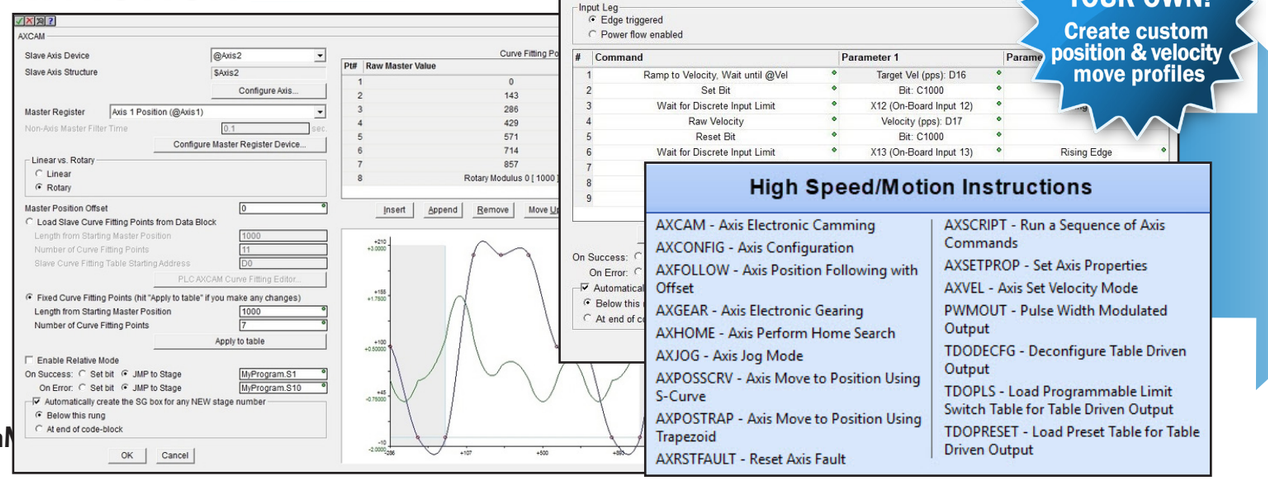
BRX Motion Control (PLC-Based)

All BRX PLC models with 24VDC I/O have high-speed inputs and outputs built in with an additional 128 250kHz or 2MHz local high-speed I/O points possible through expansion. This high-speed I/O can be used to track rapid encoder pulses, drive stepper motors, or can be configured for other counter/timer, axis/pulse, pulse-width-modulated or table-driven functions:

- Timer/Counter: BRX PLCs can be configured to count input pulses, or measure the time between pulses, up to a 2MHz maximum pulse rate.
- Axis/Pulse: BRX PLCs can control up to 27 independent axes of motion or 7 groups of coordinated motion with additional virtual axes for internal control and following applications.
- Pulse Width Modulation (PWM): The high-speed outputs can also be used to generate a carrier frequency with varying pulse widths.
- Table-driven: Tables of preset values can be used to turn the high-speed outputs ON and OFF based on the pulse count values of one high-speed input.

Do-more Designer software includes many easily configured function blocks for several common motion profiles. Choose the one you need and fill in the blanks for your particular application. If you need a custom profile, the AXSCRIPT instruction allows you to quickly create your own sequence of axis commands.

Do-more! in MOTION



BUILD YOUR OWN!
Create custom position & velocity move profiles

High Speed/Motion Instructions

- AXCAM - Axis Electronic Camming
- AXCONFIG - Axis Configuration
- AXFOLLOW - Axis Position Following with Offset
- AXGEAR - Axis Electronic Gearing
- AXHOME - Axis Perform Home Search
- AXJOG - Axis Jog Mode
- AXPOSSCRV - Axis Move to Position Using S-Curve
- AXPOSTRAP - Axis Move to Position Using Trapezoid
- AXRSTFAULT - Reset Axis Fault
- AXSCRIPT - Run a Sequence of Axis Commands
- AXSETPROP - Set Axis Properties
- AXVEL - Axis Set Velocity Mode
- PWMOUT - Pulse Width Modulated Output
- TDODECFG - Deconfigure Table Driven Output
- TDOPLS - Load Programmable Limit Switch Table for Table Driven Output
- TDOPRESET - Load Preset Table for Table Driven Output

Industry 4.0 and IIoT ready!

On top of BRX PLCs' advanced motion capabilities, BRX also offers numerous built-in connectivity options. With these options you can monitor or control your plant-floor motion application from anywhere.

For more detailed analysis of system-wide performance, BRX controllers' embedded Rest API and native MQTT(S) protocols allow it to easy integrate with corporate-level IT systems or IIoT cloud platforms. This integration allows process data to be compiled and analyzed with data from other departments, like procurement or logistics, for a bird's eye view of the complete production process, from start-to finish.

BRX PLCs have it all:

- **Up to 27 independent axes of motion**
- **Up to 7 groups of coordinated motion - 3 coordinated axes using on board I/O and 4 coordinated axes on each HSIO module (up to 6 HSIO modules in local rack)**
- **Up to 9 virtual axes**
- **High-powered motion instructions**
- **Advanced IIoT functions**

INDUSTRY 4.0 IIoT

Microsoft Azure Certified Device

API

MQTT HTTP(S)

WWW

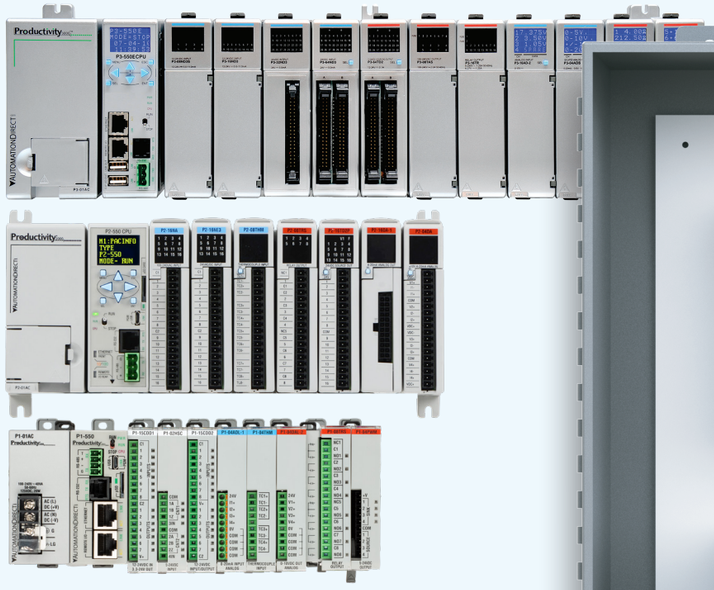
FTP

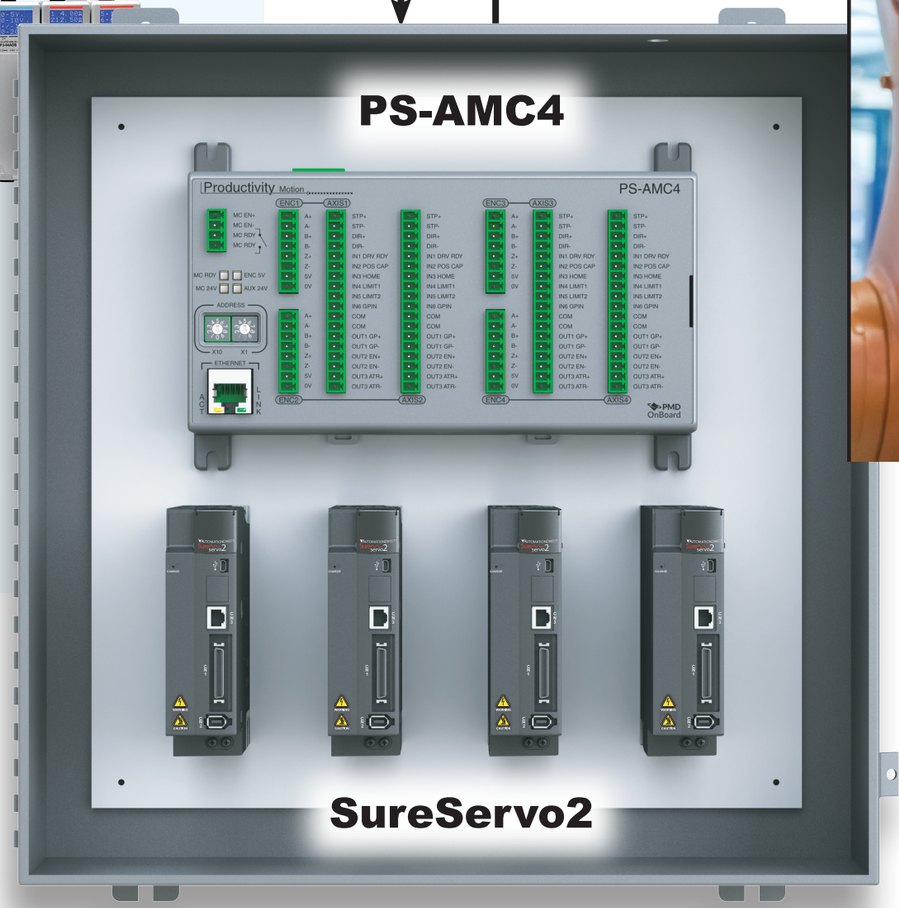
Click here to learn more about BRX motion

For the latest prices, ple

Productivity Motion Control (PLC-Based)

Productivity PLCs





Productivity PLCs are known for their extreme versatility and ease of use. With ProductivityMotion products, you can easily add motion control to your Productivity system that's as simple or sophisticated as you need.

Productivity HSI/HSO modules are a great option for basic motion control applications. Able to perform simple motion commands like homing routines and preset tables, these modules slide right into any open slot in any local or remote rack of a Productivity PLC system.

Pulse width modulation and high-speed counter modules are also available for applications requiring rapid and varying-width pulsed I/O.

Available in one to four axes models, the PS-AMC motion controller (shown at top of panel above) provides highly accurate positioning using encoder fed control and is ideal for applications requiring several independent axes of motion and/or coordinated motion between some or all axes. Used in conjunction with select Productivity CPUs and programmed with the FREE Productivity Suite software, the AMC can supply up to 1MHz of pulse-train command signals to servo or stepper drives for extremely responsive movements.

Click here to learn more about ProductivityMotion and the PS-AMC controller

Productivity Suite has numerous built-in motion instructions that allow you to quickly and easily configure complex motion profiles like flying cut off, rotary tables and more using simple drop-down selections.

If you need something different, you can also create your own custom move profiles using the convenient Motion Sequencer (MSEQ) instruction.

BUILD YOUR OWN!
Create custom position & velocity move profiles

Motion Instruction Set

- AEN AMC Axis Enable
- AREG Automatic Registration
- FCO Flying Cutoff
- GEAR Gear Drivetrain
- HOME Find Home
- MREG Manual Registration
- MSEQ Motion Sequencer
- RTA Rotary Table Application
- SMOV Simple Move
- SPOS Set Position
- VMOV Velocity Move
- WAMO Write AMC Outputs

Motion Sequencer (MSEQ)

Axis Name: AMC-1-AXIS-1

Module Name: AMC-1

Sequence Input: barrFlagsIn

Ramp Rate: Ramps (pulses/sec²)

Jerk: Jerk (pulses/sec³)

Sequence Setup

Number of Segments: 7

Position Units: pulses Velocity Units: pulses/sec

Seg	Command	Attr1	Attr2	Parameter1	Parameter2
1	Write Seq Output	False		2	
2	Wait For Input	In2 - Pos Cap	Off->On		
3	Relative Position Move	Linear Ramps	Positive	100000	2500
4	Wait For Pos Move Complete				
5	Output Control	Out1-GPOut	Pulse On	2000	
6	Wait For Input	In2 - Pos Cap	Off->On		
7	Dwell Timer			5000	