Motion Control

Featuring Distributed and Centralized Motion Control Solutions

CONTROL TECHNIQUES

Motion Control

A Comprehensive Selection of Motion Control Solutions

Control Techniques offers the most comprehensive selection of motion control products in the industry. These include products for single, axis-and-a-half and multi-axis servo systems, designed to perform in both distributed and centralized control architectures.

PowerTools Pro software and the Epsilon EP line of compact servo drives continue Emerson's quarter-century tradition of providing machine builders and OEM's with *"Motion Made Easy"*™ solutions that are economical, reliable, and get applications up and running quickly.
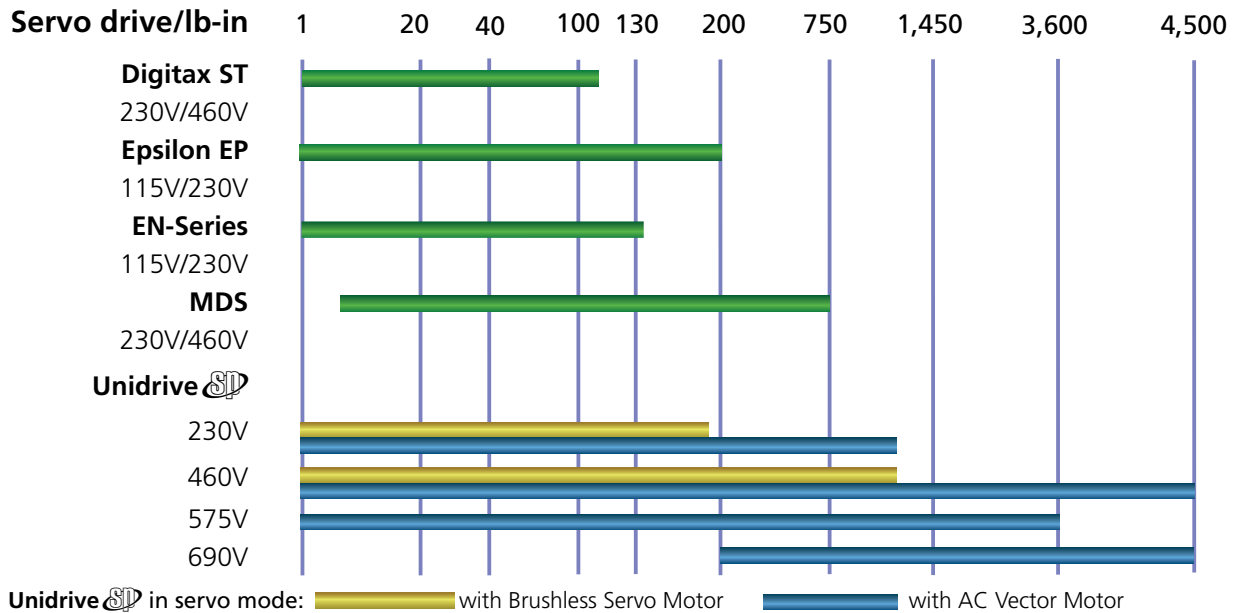
The new **Digitax ST** line of compact servo drives consists of base, indexing drives and fully programmable drives. Software choices are *Motion Made Easy*™ using our **PowerTools Pro** or IEC-61131-3-compliant *SyPTPro*. The **Digitax ST** like the **Unidrive SP,** uses **Solution Modules** to provide nearly unlimited I/O and fieldbus options, including the fastest Ethernet protocol available, **EtherCAT**.

The new **FM Series** servo motors expand the capabilities of Control Techniques motion systems with its wide speed, torque and inertia range, multiple shaft and flange options, and support for incremental encoders, absolute encoders, and resolver motor feedback.

The new Digitax ST has four flexible models ... Base, Indexer, EZMotion and Plus.

Continuous Torque

Servo drive/lb-in	1	20	40	100	130	200	750	1,450	3,600	4,500
Digitax ST 230V/460V										
Epsilon EP 115V/230V										
EN-Series 115V/230V										
MDS 230V/460V										
Unidrive SP										
230V										
460V										
575V										
690V										

Unidrive SP in servo mode: ▬▬ with Brushless Servo Motor ▬▬ with AC Vector Motor

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Why motion customers choose Control Techniques' solutions.

- PowerTools Pro greatly reduces programming time
- SyPTPro offers the ultimate programming capability
- Virtually all fieldbus protocols supported, inc. EtherCAT, EtherNet I/P, Modbus TCP/IP and more
- High-speed Peer-to-Peer communications
- 14 feedback types supported as standard, including absolute, plus support for 2nd encoders and resolvers
- A drive for nearly any kind of motor or actuator
- A full line of servo motors, from 1 lb-in to 750 lb-in

- Eliminated need for PLC — all programs are in the drive
- Great support from the Drive and Application Centers
- Control Techniques' solutions lower total system costs
  - □ *Affordable and highly reliable motors and controls*
  - □ *Zero-space EMI and dynamic braking options*
  - □ *No-footprint I/O and multiple fieldbus options*
  - □ *Through-panel mounting eliminates air conditioning*
- Control Techniques provides "One Source" for all your motion needs.

The "Right" Solution

To help you find the best motion control solution, the following matrices provide an overview of product specifications, features and benefits.

Servo Drive Matrix ▶

Servo Motor Matrix ▶▶

Software Matrix ▶▶▶

The New FM line of servo motors are built to your specifications.

Servo Drive *Product Matrix*

	Digitax ST *p. 98*	Epsilon EP *p. 122*
Drive Family		
Motors Controlled	Servo motors, Linear Motors, Linear Actuators, Gearmotors	Servo motors, Linear Motors, Linear Actuators, Gearmotors
Control Modes	Analog Velocity, Analog Torque, Digital Velocity Preset, Indexing Pulse/Pulse, Pulse/Direction, and Pulse/Quadrature following. Some models have programmable modes.	Analog Velocity, Analog Torque, Digital Velocity Preset, Summation of A/D Velocity, Pulse/Pulse, Pulse/Direction, and Pulse/Quadrature. Indexing and Programmable Positioning, Analog Positioning - Position Tracker™
Continuous Torque	Up to 109 lb-in	Up to 200 lb-in
AC Voltage 50/60Hz ± 10%	200-240V ±10% 1Ø 200-240V ±10% 3Ø 380-480V ±10% 3Ø	90 to 264 VAC 1Ø, 208 to 240 VAC 3Ø, Epsilon EP 216 only
Motor/Position Feedback	Universal Encoder Port supports 14 feedback devices (including ABS, ENC) Optional Solution Modules for Resolver, Second encoder, and Universal encoder support with simulated encoder output	Incremental Encoders
Input/Output	Input Output Digital 3 3* Analog 3 2 Relay 1 *Selectable input or output	Input Output Indexer, Programmable: Digital 16 8 Base: Digital 4 3 Analog 1 2 Pulse Single-Ended 1 Pulse Dif. 1 1
Input/Output options	Extended I/O via a wide range of SM I/O modules up to 32 I/O points	Via on board MODBUS Master
Communication	MODBUS RTU standard Optional Solution Modules for EtherCAT, Profibus DP, DeviceNet, CAN, CANopen, Interbus-S, CTSync, CTNet, EtherNet/IP, and SERCOS	MODBUS RTU Standard all models EP-I: Optional DeviceNet EP-P: Modbus TCP/IP & EtherNet/IP standard Optional: Profibus DP, DeviceNet
Configuration & Programming	CTSoft, SyPTLite, SyPTPro (IEC-61131-3), PowerTools Pro for SM-EZMotion	PowerTools Pro
Application Co-processor	P - Programming - Integrated standard Z - EZMotion - Integrated standard	N/A
Approvals	UL, CE, C-Tick, RoHS, ISO14001, ISO9001:2000	UL, CUL, RoHS Option, CE

CONTROL TECHNIQUES

Motion Control

Drive Family	Unidrive SP p. 149	EN p. 176	MDS p. 191
Motors Controlled	Servo motors, Linear Motors, Linear Actuators, Gearmotors, Vector Motors	Servo motors, Linear Motors, Linear Actuators, Gearmotors	Servo motors, Linear Motors, Linear Actuators, Gearmotors
Control Modes	Analog Velocity, Analog Torque, Digital Velocity Preset, Summation of A/D Velocity, and with Second Encoder: Pulse/Pulse, Pulse/Direction, and Pulse/Quadrature	Analog Velocity, Analog Torque, Digital Velocity Preset, Summation of A/D Velocity, and Pulse/Pulse, Pulse/Direction, and Pulse/Quadrature	Analog Velocity, Analog Torque, Digital Velocity Preset, Summation of A/D Velocity, and Pulse/Pulse, Pulse/Direction, and Pulse/Quadrature
Continuous Torque	Up to 748 lb-in (brushless) Up to 4,500 lb-in (vector)	Up to 132 lb-in	Up to 748 lb-in
AC Voltage 50/60Hz ± 10%	200-240V ±10% 1Ø & 3Ø 380-480V ±10% 3Ø 575-690V ±10% 3Ø	90 to 264 VAC 1Ø & 3Ø	187 to 528 VAC 3Ø
Motor/Position Feedback	Universal Encoder Port supports 14 feedback devices (including ABS, ENC) Optional Solution Modules for Resolver, Second encoder, and Universal encoder support with simulated encoder output	Incremental Encoders	Incremental Encoders
Input/Output	Input Output Digital 3 3* Analog 3 2 Relay 1 Pulse Dif. with 2nd Encoder *Selectable input or output	Input Output Digital 5 3 Analog 1 2 Pulse Single-Ended 1 Pulse Dif. 1 1	Input Output Digital 5 3 Analog 1 2 Pulse Single-Ended 1 Pulse Dif. 1 1
Input/Output options	Extended I/O via a wide range of SM I/O modules up to 32 I/O points	Extended I/O via FM Modules	Extended I/O via FM Modules
Communication	MODBUS RTU standard Optional Solution Modules for EtherCAT, Profibus DP, DeviceNet, CAN, CANopen, Interbus-S, CTSync, CTNet, EtherNet/IP, and SERCOS	MODBUS RTU standard FM-modules for Profibus DP, DeviceNet, Ethernet, and EtherNet/IP	MODBUS RTU standard FM-modules for Profibus DP, DeviceNet, Ethernet, and EtherNet/IP
Configuration & Programming	CTSoft, SyPTLite, SyPTPro (IEC-61131-3), PowerTools Pro for SM-EZMotion	PowerTools FM PowerTools Pro	PowerTools FM PowerTools Pro
Application Co-processor	SM Application Plus SM Application Lite V2 SM EZMotion Servo Control	FM-modules for Indexing Programmable Positioning	FM-modules for Indexing Programmable Positioning
Approvals	UL, CUL, CE, C-Tick, ISO14001, ISO9001:2000	UL, CUL, CE	UL, CUL, CE

Servo Motor *Product Matrix*

Motor Family	FM Motors *p. 230*	NT Motors *p. 240*
AC Supply Voltage	115/230/460	115/230
Frame	55 mm, 75 mm, 95 mm, 115 mm, 142 mm, 190 mm	2", 3"
Flange	IEC (options available)	IEC
Continuous Torque	Up to 647 lb-in (73.2 Nm)	Up to 52 lb-in (6.3 Nm)
Peak Torque	Up to 1938 lb-in (219 Nm) High Peak Torque option available (~5x continuous)	Up to 116 lb-in (13.1 Nm)
Standard Rated Speeds	2000, 3000, 4000, 6000 rpm	3000, 4000, 5000 rpm
Brake options	Holding brake High energy dissipation	Holding brake
Connector options	Circular style frame mounted 90 degree rotatable standard Optional 90 degree fixed, vertical, or mixed	MS style frame mounted, MS Style on 40" lead, Flying leads, Drive terminated leads (20ft. Max.)
Inertia	Medium (High inertia option)	Low, Medium
Encoder resolutions	4096 line count standard (2048 55 mm), up to 16 million line count optional Sin/Cos	2048 line count
Feedback options	Incremental encoders, Optical Sin/Cos single & multi-turn, Inductive Sin/Cos single & multi turn, Resolver	Incremental only
Insulation Class	Class H, BS EN 60034-1	Class F, EN 60034-1
Thermal Protection	PTC Thermistor, 170°C switch	Thermostat, 155°C switch
Ingress Protection	IP65	IP65
Approvals	CE, UL	CE, UL (RoHS optional)

Servomotors

* Lead times vary with some non-standard options
** See XV motor IP rating specifications

CONTROL TECHNIQUES

Servomotors

Motor Family	XV Motors *p. 245*	MG Motors *p. 248*	MH Motors *p. 251*
AC Supply Voltage	115/230	115/230	460
Frame	40 mm, 60 mm, 80 mm, 130 mm	2", 3", 4"	3", 4", 6", 8"
Flange	Metric	NEMA, IEC	NEMA, IEC
Continuous Torque	Up to 101 lb-in (11.4 Nm)	Up to 163 lb-in (18.4 Nm)	Up to 748 lb-in (84.5 Nm)
Peak Torque	up to 301 lb-in (34 Nm)	Up to 382 lb-in (43.2 Nm)	Up to 1500 lb-in (170 Nm)
Standard Rated Speeds	2000, 3000, 5000 rpm	3000, 4000, 5000 rpm	2500, 3000, 4000 rpm
Brake options	Holding brake	Holding brake	Holding brake
Connector options	AMP Mat-n-Loc on 1ft. Lead (40-80 mm), MS style frame mounted (130 mm)	MS style frame mounted	MS Style frame mounted
Inertia	Low, Medium	Low	Low
Encoder resolutions	2048 line count	2048 line count	2048 line count
Feedback options	Incremental only	Incremental only	Incremental only
Insulation Class	Class H, BS EN 60034-1	Class F, EN 60034-1	Class F (H 8"), EN 60034-1
Thermal Protection	Drive Algorithm	Thermostat, 155°C switch	Thermostat, 155°C switch
Ingress Protection	IP55, IP65**	IP65	IP65
Approvals	CE, UL, RoHS	CE, UL	CE, UL

* Lead times vary with some non-standard options
** See XV motor IP rating specifications

Software Matirx *Functionality Overview and Feature Matrix*

Software	Description	Fieldbus Support

Motion Control

PowerTools Pro

PowerTools **Pro**

Extremely intuitive configuration and integrated programming toolkit for single axis and axis-and-a-half application development. Features "point and click", "fill in the blank" and "drag & drop" programming for building applications quickly and easily, from point-to-point applications to high-speed labeling. The library of Application Roadmaps provide valuable macros for many common high performance applications.

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**Modbus RTU
EtherNet/IP
Modbus TCP/IP
DeviceNet
Profibus**

SyPTPro

SyPT**Pro**

This robust IEC 61131-3 programming environment has all the tools needed to develop high speed, highly coordinated multi-axis applications such as gearless printing presses and automotive assembly systems. Programmers will appreciate its highly capable machine logic and powerful motion control capabilities, and OEM's and integrators will find the intellectual property protection a valuable feature.

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**Modbus RTU
EtherNet/IP
EtherCAT
Modbus TCP/IP
DeviceNet
Profibus
CAN
CANOpen
and others**

MotionPerfect2

MOTION**Perfect2**

Very powerful, centralized multi-axis programming environment for developing applications having 2 to 24 axis. Powerful programming toolset for fully interpolated control of sophisticated multi-axis motion applications.

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**EtherNet/IP
Modbus TCP/IP
Profibus
CAN
SERCOS**

CTSoft

CT**Soft**

Configuration tool for Digitax ST and Unidrive SP drives, and other Control Techniques drives. This free software also can be used to program the Digitax ST-I for single axis indexing applications using the Sequential Flow Chart function.

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Application Development Software
and Hardware Supported

Software Features	**PowerTools Pro** for Epsilon EP-I, EP-P, and MDS & EN with FM3E, FM4E, Unidrive SP with SM-EZMotion and Digitax ST-Z drives	**SyPT Pro** for Unidrive SP with SM-Applications Plus and Digitax ST-P drives	**MOTIONPerfect2** MC206X and MC224 multi-axis controllers
"Motion Made Easy"™ Programming	Yes		
Sequential Function Chart		Yes	
IEC 61131-3 Programmable		Yes	
Ladder Logic Programming		Yes	
PLC Open Function Blocks		Yes	
Text Based Programming	Yes	Yes	Yes
Software Oscilloscope	Yes	Yes	Yes
Software Watch Window	Yes	Yes	Yes
Secure Download	Yes	Yes	
Axis and Axis-and-a-half Control	Yes	Yes	
Multi-Axis Coordination	Yes		Yes
Multi-Axis Synchronization	Yes	Yes	Yes
Multi-Axis Interpolation			Yes
Intellectual Property Protection	Yes	Yes	
Program Multi-Tasking	Yes	Yes	Yes
Auto-Tune	Yes	Yes	
Parameter Cloning		SmartCard	
Real-Time Programs	Yes	Yes	
Drive to Drive Networking	Ethernet, RS485	CTNet, CTSync, Ethernet, RS485	Yes
Fieldbus Support	Yes*	Yes*	Yes*
Web Page	Yes		
Email	Yes		
User Units	Yes	Yes	Yes
High Speed Inputs	Yes	Yes	Yes
Programmable Limit Switch	Yes	Yes	Yes
S-Curve Ramps	Yes*	Yes	Yes
Indexing - Chained / Compound	Yes*	Yes*	Yes
Synchronized Motion	Yes*	Yes*	Yes
Gearing	Yes*	Yes*	Yes
Camming	Yes*	Yes*	Yes
Timed Index	Yes*	Yes*	Yes
Queuing	Yes*	Yes*	
User Programs	Yes	Yes	Yes
User Variables	Yes	Yes	Yes
Position Capture	Yes	Yes	Yes

* Module or model dependent.

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