EMERSON™
Industrial Automation

Digitax ST

230V / 460V Servo Drive Systems

CONTROL TECHNIQUES™

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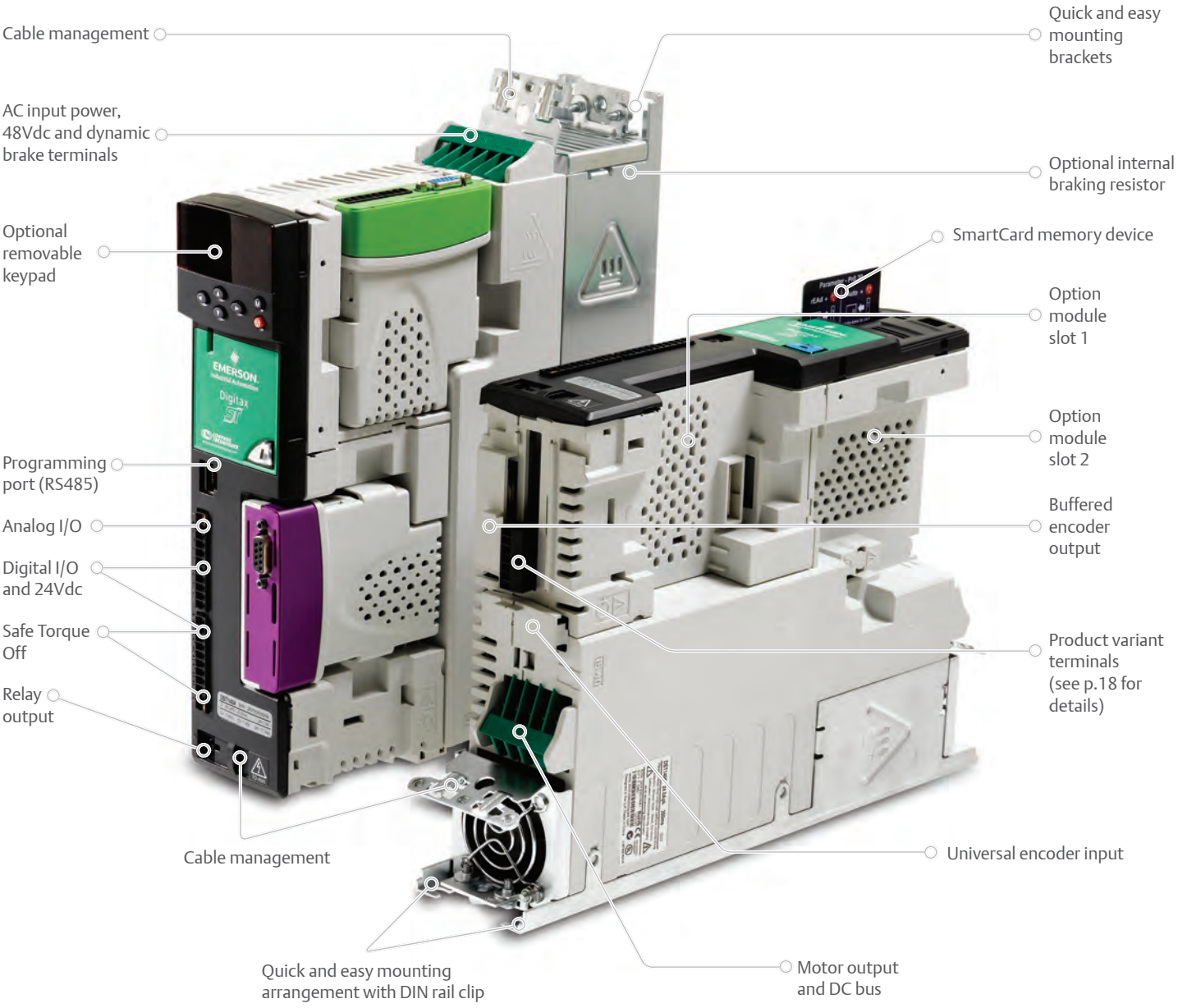
Digitax ST – the Ultimate Servo Drive

Meeting the demands of modern, lean manufacturing requires smaller, more flexible machinery. Digitax ST is the first servo drive designed to help machine designers and system integrators meet these challenges. With a built-in 1.5-axis motion controller, snap-in option modules, innovative mounting options and easy-to-use software tools, the Digitax ST is a smart, versatile servo drive for use in a wide variety of machinery automation applications.



E171230 N1652 ISO 14001 ISO 9001

RoHS Compliant

2 YEAR Digital Drive Warranty

5 YEAR Digital Drive Warranty

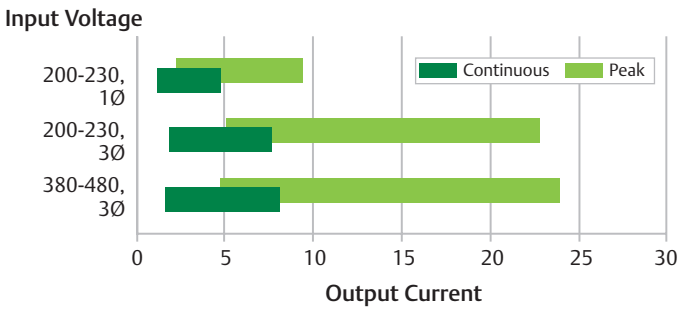
High Performance Motion Control

Fits into Any Application

The Digitax ST Servo drive encompasses many of the features needed to support today's rapid design cycles. Four variants (Base, Indexer, Plus and EZMotion) are available to meet simple to complex motion control applications. This flexibility provides support in multiple control architectures:

- **Centralized control system** with a digital control network such as EtherCAT or SERCOS
- **De-centralized control system** utilizing high-speed peer-to-peer networking of CT-Net and Ethernet
- **Hybrid control system** utilizing a PLC as the machine logic controller and the Digitax ST as the motion engine.

Ratings



Motors controlled	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
Continuous torque	Up to 168lb-in (18.9Nm)
AC Voltage 50/60Hz ± 10%	200-240V ±10% 1Ø; 200-240V ±10% 3Ø; 380-480V ±10% 3Ø
Motor/position feedback	Universal Encoder Port supports 14 feedback devices (including absolute encoders); SM option modules for Resolver, second encoder and universal encoder support with simulated encoder output

Performance Advantage

For added flexibility, a selection of over 25 SM option modules can be snapped into place to enhance the machine's control system with additional functionality. Control networks, communication networks, I/O expansion and motor feedback option can all be added at any time as application requirements grow and change.

Scalability: Four Models to Meet Control Level Needs
Digitax ST offers a product variant to fit your needs without having to change product platforms.

- **BASE**: Simple, standalone model
- **INDEXING**: Point-to-point positioning applications
- **PLUS**: Sophisticated multi-axis motion control
- **EZMOTION**: Sophisticated multi-axis motion control

Powerful: Over 500lb-in Peak Torque in One Frame Size
300% peak current rating in 230V and 460V

Flexibility: Over 25 SM Option Modules
"Snap-in" up to two option modules for digital motion networks, communication networks, I/O expansion or feedback options

Compact: Small Cabinet Footprint Saves Space
"Zero-space" mounting helps maintain high packing density for multiple-axis applications — smaller size/cabinet = lower cost

Connectivity: Simultaneous Multiple Fieldbus Support
Includes EtherNet/IP, ProfiNet, Profibus, Sercos, EtherCAT, CanOPEN, DeviceNet and Interbus

Feedback: Supports Multiple Feedback Interfaces (std.)
14 feedback interfaces — including Heidenhain and SICK-Stegmann, SSI and standard incremental encoders — work with almost any servo motor

Safety: Safe Torque Off / Secure Disable
Prevents motor from generating torque and eliminates the need for external safety contactors; meets EN954-1 Category 3

Ranging from drag-and-drop/fill-in-the-blank simplicity to comprehensive IEC61131-3 set-up, Control Techniques' software tools make it easier to access the drive's full feature set. Our software allows you to optimize the drive tuning, back up the configuration, configure the onboard automation and motion controller and set up the drive-to-drive communications links.

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Faster, Smarter and More Compact

Digitax ST Feature Matrix	Digitax ST Model			
	B	I	P	Z
Analog Position	✓	✓	✓	✓
Analog Velocity	✓	✓	✓	✓
Pulse Follower	✓	✓	✓	✓
Analog Torque	✓	✓	✓	✓
Preset Velocity / Jog	✓	✓	✓	✓
Torque Limits	✓	✓	✓	✓
Software Travel Limits		✓	✓	✓
Homing		✓	✓	✓
Index Chaining		✓	✓	✓
Compound Indexing		✓	✓	✓
Gearing		✓	✓	✓
Timed Index		✓	✓	✓
Multiple Profile Summation		✓	✓	✓
Queuing		✓	✓	✓
Feedhold		✓	✓	✓
Feedrate Override		✓	✓	✓
Programmable Limit Switches		✓	✓	✓
Autotune	✓	✓	✓	✓
Software Oscilloscope	✓	✓	✓	✓
Software Watch Window	✓	✓	✓	✓
Status Display	✓	✓	✓	✓
User Units		✓	✓	✓
User Variables		✓	✓	✓
User Programs		✓	✓	✓
Cyclical Programs		✓	✓	✓
Real-Time Programs		✓	✓	✓
Program Multitasking		✓	✓	✓
Timers		✓	✓	✓
High Speed Position Capture		✓	✓	✓
Modbus RTU	✓	✓	✓	✓
DeviceNet	Opt	Opt	Opt	Opt
Profibus-DP	Opt	Opt	Opt	Opt
EtherNet/IP	Opt	Opt	Opt	Opt
Modbus TCP/IP	Opt	Opt	Opt	Opt
CTNet			✓	
CTSync			✓	
Position Tracker				✓

Faster Installation

- **FREE SmartCard memory device** — quickly and safely stores or copies parameters from one drive to another; significantly reduces commissioning time when installing multiple servo systems with similar configurations

- **Innovative mechanical design** — bottom of the drive quickly clips to a standard DIN rail, considerably reducing installation time
- **Plug-in/screw control terminals** — standard connectors eliminate the need for special cables or connectors
- **Snap-in SM option modules** — over 25 encoder feedback, I/O and communications option modules customize functionality now and in the future

Quick, Easy Set-up Reduces Commissioning Time

- **FREE software** — commissioning software guides the user through the configuration process; provides users with real-time software oscilloscopes for tuning the system and monitoring performance
- **Removable keypad**
- **Auto-tune** — measures machine dynamics and automatically optimizes control loop gains

More Compact Machinery

- **Extremely compact design, smaller-axis footprint** — mount one Digitax ST drive against the next for a smaller axis footprint
- **Safe Torque Off/integrated motion control** — fewer external components further reduces panel size and cost; EN954-compliant

Designed Around You

Digitax ST is optimized for servo applications requiring high peak torque, dynamic response, ease of use and versatile integration features. These feature-rich servo drives are designed to match your specific application and development requirements by offering four product configurations:

Digitax ST – Base. Optimized for centralized control to operate with motion controllers, motion PLCs and industrial PC-based motion systems using a wide range of digital or analog technologies.

Digitax ST – Indexer. Designed for standalone positioning applications using an onboard position controller. Programmed using a flexible IEC61131-3 software environment including PLCOpen Function Blocks. Fieldbus, Ethernet and I/O enable connectivity to other automation components.

Digitax ST – Plus. This full-functionality motion controller incorporates all of the features of the Digitax-I plus high-speed, drive-to-drive networking and additional I/O. The Digitax-P onboard CTNet and CTSync communications make it the ideal choice for decentralized control systems and applications requiring precise synchronization.

Digitax ST – EZMotion. With out-of-the-box motion control in less than five minutes, the Digitax ST EZMotion is the ultimate 1.5-axis servo drive in terms of ease of use and motion performance. Utilizing a familiar Windows® interface, machine builders can quickly set up and program the Digitax ST – EZMotion to perform almost any motion profile. Applications requiring camming, indexing, electronic gearing, velocity and torque modes can be accomplished through simple drag-and-drop, fill-in-the-blank set-up. Real-time programs with “Basic-like” command structured text can be used to program the machine sequencing. The programming interface guides the user through the drive, I/O and motion configurations. The drive offers a standalone solution for many common indexing and synchronized motion applications.

Four Product Variants

Digitax ST Model	Base	Indexer	Plus	EZMotion
Control Hierarchy				
Centralized Control System	✓	✓		
Decentralized Control System			✓	✓
Motion Control Functionality				
Velocity, Torque Mode	✓	✓	✓	✓
Position-Indexing		✓	Prg	✓
Synchronization, Electronic Gearing		✓	✓	✓
CAMS		✓	✓	✓
Programming Environment				
Sequential Function Chart		✓	✓	
Drag-and-Drop, Fill-in-the-Blank				✓
Text Programming		✓	✓	✓
PLC Open		✓	✓	
IEC 61131 Programming		✓	✓	
FREE Application Software				
PowerTools Pro				✓
SyPTPro		✓	✓	
SyPTLite	✓	✓	✓	
CTSoft	✓	✓	✓	
CTScope	✓	✓	✓	
CTOPCServer	✓	✓	✓	✓

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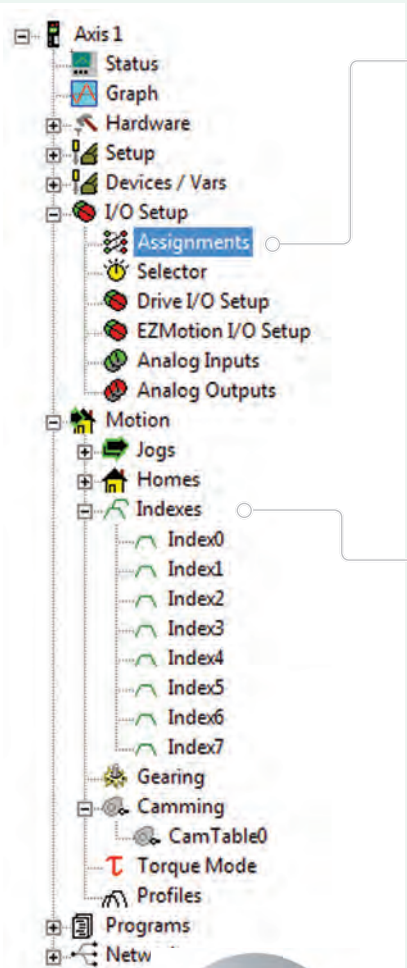
Software Matched to Your Application Requirements

"Motion Made Easy"™

Each step is configured using simple check boxes, drop-down selections and drag-and-drop functionality. A straightforward programming language allows users to develop more complex applications and advanced sequencing by simply dragging functions onto the work area and dropping them in place.



PowerTools Pro Software for Digitax ST EZMotion

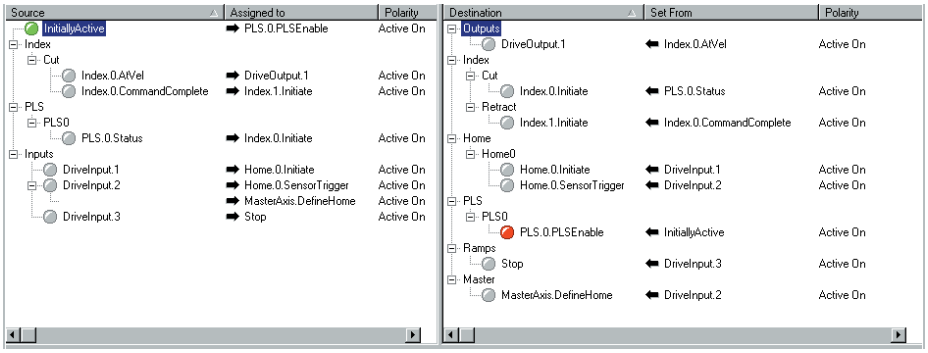
PowerTools Pro

PowerTools Pro software provides advanced motion control programming for Digitax ST-Z drives with the internal motion controller. This FREE software enables users to fully realize the power of our EZMotion motion controller. A familiar Microsoft® Windows® interface provides operators and machine builders with the tools needed to access everything they need for complete servo control — PLS, Queueing, High-Speed Capture, Electronic Gearing, Event Assignments and more.

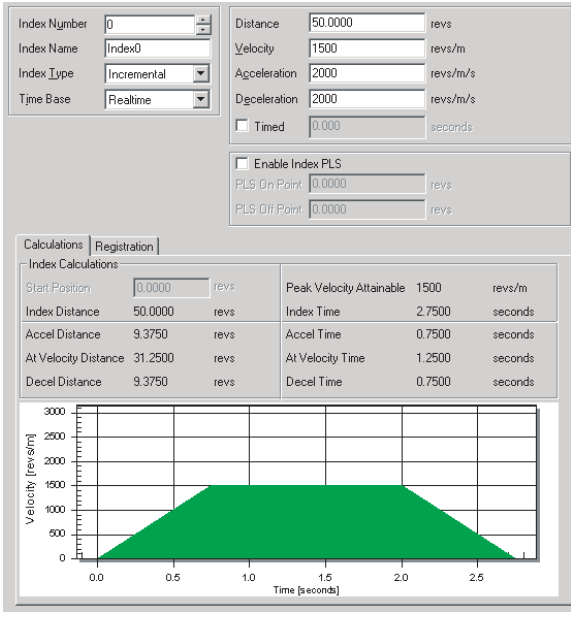
Developing motion applications with PowerTools Pro is a simple "five-step, top-down" process. The five steps are displayed in a familiar "explorer" bar (left) for easier navigation:

1. Hardware configuration
2. Drive setup
3. I/O setup
4. Motion
5. Programs

Assignments – Use "virtual wiring" to create programs right out of the box without writing a single line of code. For example, the assignment screen (below) allows you to drag-and-drop the desired machine function onto the digital inputs and outputs.



Indexes – Indexes are easily set up by filling in the screen's blanks to create an index profile. Select from Incremental, Absolute, Registration or Rotary Plus and Minus Index types. "Position Tracker™" can be used to dynamically adjust any index parameters on-the-fly. Choose the time base of the index by selecting either real-time or synchronization with a master.



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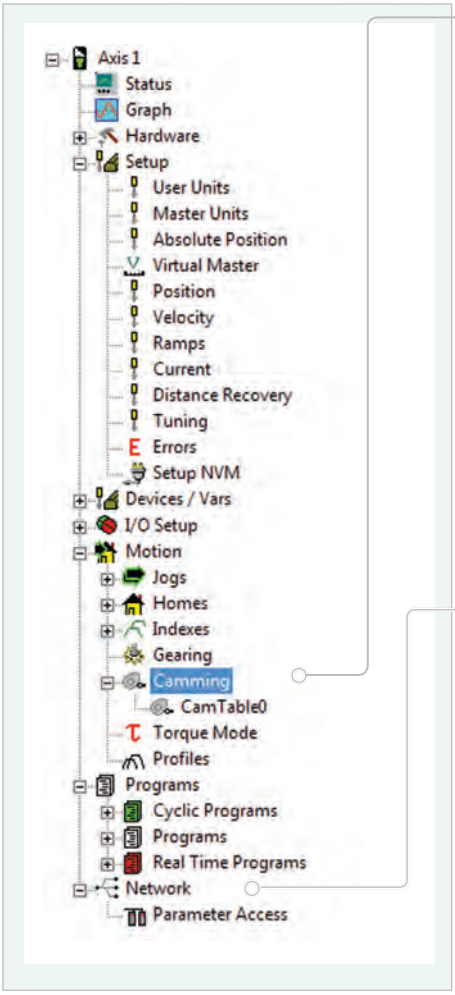
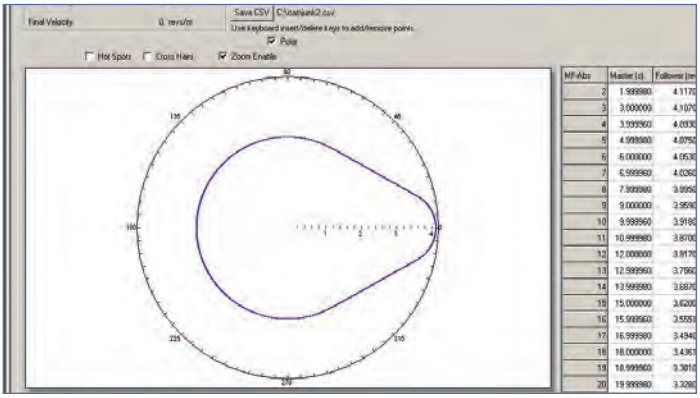
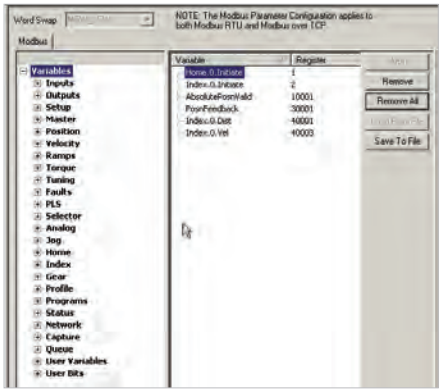


Camming – Cams make set-up and programming of complex motion profiles easy. The use of real-time programs provides smooth transitions when switching between cam profiles. Cam data is easily imported within PowerTools Pro and the cam graphing tool features multiple interpolation types.



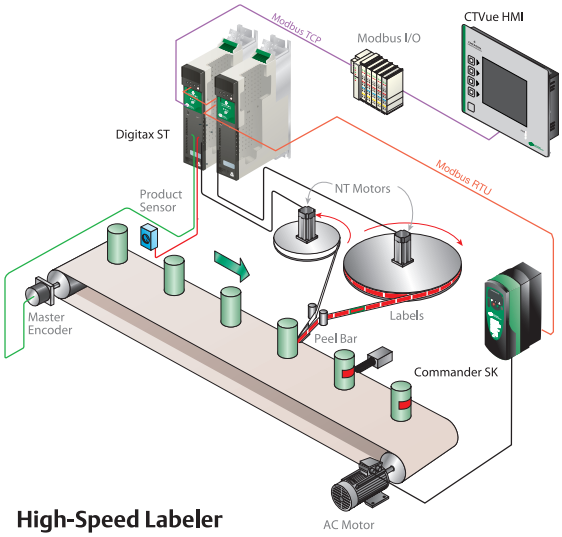
Sophisticated motion routines such as camming, gearing or multiple profile summation are easily implemented with PowerTools Pro and Digitax ST.

Network – Whichever fieldbus is being used, setting up network communications is quick and easy. Fill-in-the-blank, drag-and-drop procedures are used to establish communication. PowerTools Pro's diagnostics allow real-time monitoring of the actual data being sent and received.



Typical Applications

- Rotary knife
- Flying shear
- Pick-and-place machines
- Vertical or horizontal cartoners
- Traverse winders
- Form-fill-sealers
- Packaging systems
- Conveyor controls
- High-speed labeling
- Random infeed – "Smartbelt"
- Phase synchronization
- Extend-retract
- Gluing applications
- Auger filler with analog weight check
- Semiconductor wet bath
- Dancer arm loop control
- Extruders



High-Speed Labeler

Digitax ST, Fast and Easy Integration Flexibility

Software

Base — ST-B

Indexer — ST-I

IEC-61131 Programmable — ST-P

EZMotion Programmable — ST-Z

CTScope

OPC
CTOPCServer

CTSoft CTSoft SyPTPro PowerTools Pro

Every Digitax ST drive includes FREE programming, configuration and sizing software

External Control

Windows 98, NT 4.0, 2000, XP, Vista 32 or 7-Compatible PC

CT-USB-CABLE
USB Port-to-Drive Serial Interface Cable

Programmable Logic Controller

SmartCard

Includes memory device to store and copy drive parameters
SMARTCARD-64

Operator Interface Options

HMI Operator Interface

Interconnect Cable

See the Options & Accessories brochure for order codes

SM Keypad Plus

Remote panel mount LCD multilingual text keypad display to IP54 (NEMA 12)
SM-KEYPAD-PLUS

Interconnect Cable

See the Options & Accessories brochure for order codes

LED Keypad

LED multilingual text keypad display
DST-KEYPAD

Communications

Standard | Options

Modbus RTU

SM Option Modules

SM-CAN
SM-CANOPEN
SM-DEVICENET
SM-ETHERCAT
SM-ETHERNET:
EtherNet/IP, Modbus TCP/IP, email, web server, simple network time Protocol
SM-INTERBUS
SM-PROFIBUS-DP
SM-PROFINET
SM-SERCOS

Ethernet Switch

ETH-S8
ETH-S16

EtherNet/IP DeviceNet CONFORMANCE TESTED
EtherCAT Modbus TCP/IP
PROFINET PROFIBUS

CTNET
Standard on P
Optional on B I Z with SM-APPS-PLUS

Input / Output

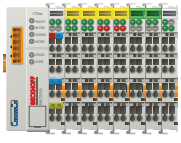
Standard | Options

3 Analog I/O
6 Digital I/O
1 Safe Torque Off
1 Relay output

SM Option Modules

SM-I/O-32 (32 digital I/O)
SM-I/O-24V (Protected)
SM-I/O-LITE
SM-I/O-PLUS
SM-I/O-TIMER (Real-Time Clock)
SM-I/O-120V (120V AC I/O)
SM-PELV

Remote I/O



See the Options & Accessories brochure for order codes

Dynamic Braking Options

Filters

Standard

Internal EMC Filter
EN61800-3

Options

External EMC Filter

See the Options & Accessories brochure for order codes

Internal Zero-Space Braking Resistor, E-Stop Duty

SM-HEATSINK-DBR0

External Dynamic Braking Resistor

See the Options & Accessories brochure for order codes

Feedback

Standard

SinCos Quadrature Frequency/Direction Clockwise/Counter Clockwise

HIPERFACE®

EnDat

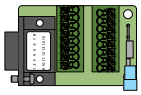
SSI

Options

Master Synchronization Encoder

See the Options & Accessories brochure for order codes

Motor Feedback Breakout Board



SM-ETC

SM Option Modules

SM-UNI-ENCODER*
SM-ENCODER-OUT**
SM-ENCODER-PLUS**
SM-RESOLVER

* Accepts and replicates incremental and absolute feedback types; recommended for servo and positioning applications

** For use with Induction motors and incremental feedback devices

TSYNC
Standard on P
Optional on B, I, A with SM-APPS-PLUS

DC Back-up Power Supply

24Vdc Control

See the Options & Accessories brochure for order codes

48-96Vdc Power

Servo Motors and Motor Cables

(Cables for incremental feedback device shown below)

XV Motors

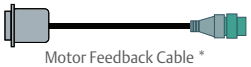
Motor Power Cable*

Motor Feedback Cable*

Motor Brake Cable *

XV Motors 130mm

Motor Power Cable (+Brake)*



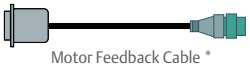
Motor Feedback Cable *

24V, 1 contact, 6A
External Drive Brake Relay

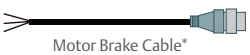
BRM-1

NT Motors

Motor Power Cable*



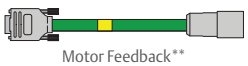
Motor Feedback Cable *



Motor Brake Cable*

Unimotor FM

Motor Power Cable (+Brake)**



Motor Feedback**

Unimotor HD

Cable Notes
* Flex duty version available
** Flex duty cable (std.)

See Servo Motors brochure for order codes

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Additional Software

SyPTPro (Systems Programming Toolkit)

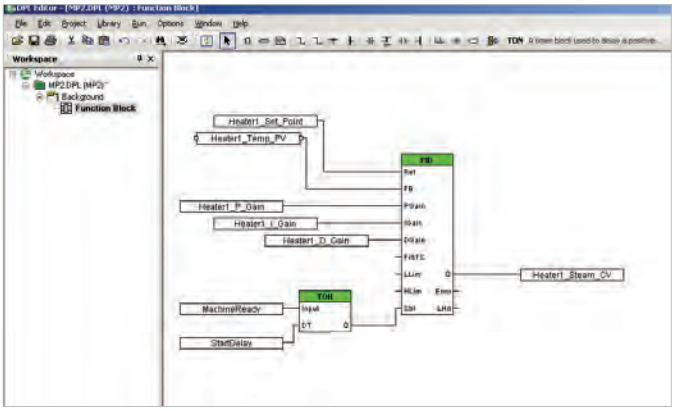
SyPTPro is the professional drive programming tool for OEMs and end users who wish to maximize the performance of their machines and factory. This IEC61131-3 programming software offers greatly enhanced functionality allowing you to connect drives, operator interfaces and I/O to a network and configure how they exchange data. SyPTPro enables you to program in your choice of three different languages — Ladder, Function Block and Structured Text — with a real-time multi-tasking environment. A suite of monitoring and diagnostic features help you reduce development time allowing you to get your machine into service faster. SyPTPro is used to program the Unidrive SP Plus and other drive products containing Control Techniques' SM-Applications Plus, SM-Applications Lite V2 and SM-Register option modules.

With SyPTPro, the user can configure a single drive or a complete drive system connected to networks including CTNet, Ethernet and Modbus RTU (CTNet is a deterministic, robust, industrial network tolerant to noise and interference and is available with SM-Applications Plus and SM-Register option modules).

Programming Flexibility

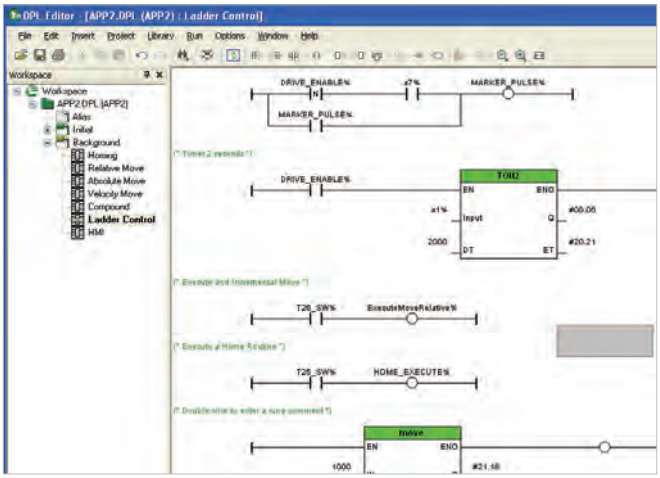
SyPTPro allows the user to program using three programming languages — Function Block diagram, Ladder Logic diagram and Drive Programming Language (DPL) — and offers a multi-tasking environment in which tasks are scheduled according to the required speed of execution or triggered by events.

Function Block



SyPTPro incorporates an IEC61131-3 Function Block diagram editor and includes a library of more than 380 Function Blocks for both simple and complex functions. In addition to the defined Function Blocks, users can create User Defined Function Blocks (UDFB). This feature allows users to create special functions. It is also possible to use pre-defined Function Blocks inside the UDFB. Intellectual property can be protected by creating a UDFB that allows access only to authorized source code users.

Ladder Logic



SyPTPro incorporates an IEC 61131-3 style Ladder Logic editor, the ideal format for sequencing and I/O control familiar to all PLC programmers. Using an SM-Applications Plus option module, over 5000 rungs of logic may be stored and executed. All normal Ladder Logic functions are available plus high-level blocks for communications, word manipulation, math operands and much more.

Drive Programming Language (DPL)

DPL is a structured text language as easy to use as BASIC and incorporates many standard constructs such as IF, THEN, ELSE, FOR and NEXT loops. DPL is ideal for initializing, configuring and general programming. DPL may be mixed throughout the program with the other graphical editors such as Ladder Logic.

PLCOpen – Open Motion Programming

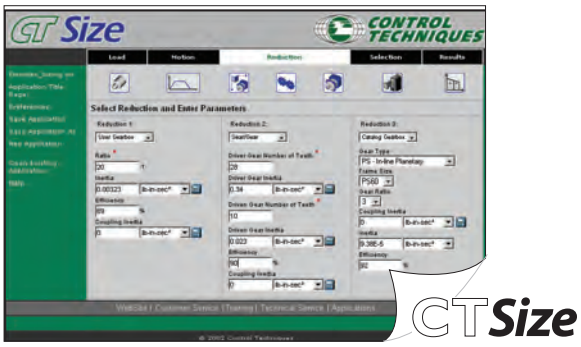
PLCopen-style programming for motion control uses industry standard Function Blocks for motion control. A reduction in development time is realized by taking advantage of this feature integrated in SyPTPro.

Additional Software

CTOPC Server

OPC is the industry standard for connecting industrial automation components to higher level information systems such as SCADA, MRP, ERP and others. Control Techniques' CTOPC server is an OPC-compliant server that allows PCs to communicate with Control Techniques drives via Ethernet, CTNet, RS485 and USB. The OPC standard allows OPC clients to browse data from an OPC server thus eliminating the need for gateway data concentrators or proprietary drivers and gateways. CTOPC server "serves" data to the various OPC clients then polls data from all Control Techniques components connected via Modbus RTU, Modbus TCP/IP or CTNet.

CTSize

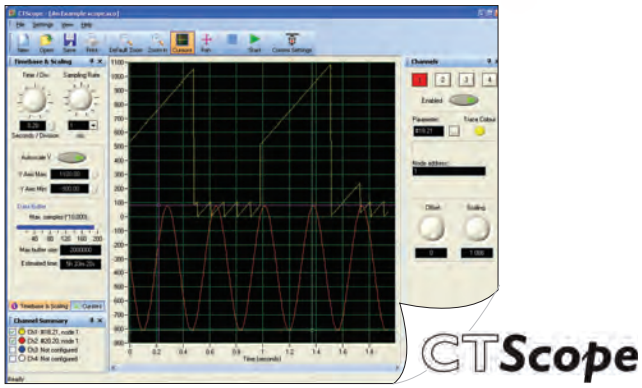


This easy-to-use servo drive sizing software helps select the optimum system in just five steps:

1. Select one of six pre-configured load types: Leadscrew, Rack and Pinion, Conveyor, Cylinder, Feedroll and User Defined.
2. Fill in the load details.
3. Enter the load's motion profile, making use of profile type shortcuts or creating multi-segment profiles.
4. Select speed reduction from Belt/Pulley, Gear/Gear, Chain/Sprocket, or Gearbox for up to three separate stages of reduction.
5. Select from all products or narrow the search to a specific drive and/or motor.

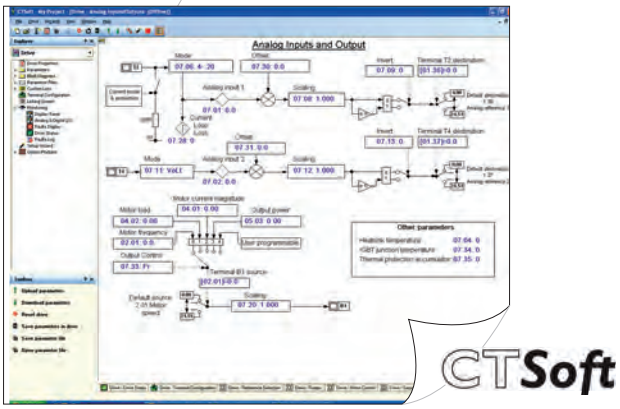
The optimum motor/drive combination appears in the Results tab.

CTScope



This Windows-based software utility is designed to trend/trace parameter values on Control Techniques drives and SM option modules. CTScope has the look and the feel of a traditional hardware oscilloscope and can plot up to four channels of data simultaneously. All channel data in single-scope view for easy comparison and your CTScope files can be saved for future use.

CTSoft



Digitax ST Base and Indexing drives use CTSoft — Control Techniques' free drive configuration tool — to commission, optimize and monitor most Control Techniques drives. CTSoft uses wizards to simplify commissioning, manages data stored on the SmartCard and features robust and graphical tools for monitoring and troubleshooting. CTSoft also incorporates the industry-standard Sequential Function Chart language for configuring the Digitax - Indexer. The status of the program can be monitored and the speed of the motion reduced for commissioning and testing purposes.

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Motors to Match Your Application Needs

The Digitax ST supports 14 feedback devices as standard for flawless operation with nearly any servo motor or actuator to fit a wide range of motion control needs. Control Techniques manufactures several matched motor solutions for Digitax ST Servo drives and supplies a wide range of gear reducers, actuators and other motion products through our One Source program. Control Techniques drive-and-motor combinations provide an optimized system in terms of ratings, performance, cost and ease of use. Some motors fitted with high-resolution SinCos or absolute encoders are pre-loaded with the motor "electronic nameplate" data during the manufacturing process. This data can be read by Control Techniques Servo drives and used to automatically optimize the drive settings. This feature simplifies commissioning and maintenance, ensures consistent performance and saves time.

Servo Motor Product Matrix

Motor Family	HD Motors	NT Motors	XV Motors	FM Motors	MG Motors	MH Motors
Digitax Drive Voltage	**230/460**	**230**	**230**	**230/460**	**230**	**460**
Continuous Stall Torque	Up to 166lb-in (18.8Nm)	Up to 56lb-in (6.3Nm)	Up to 101lb-in (11.4Nm)	Up to 1200lb-in (136Nm)	Up to 124lb-in (14Nm)	Up to 748lb-in (84.5Nm)
Flange	IEC	IEC, NEMA	Metric	IEC	IEC, NEMA	
Frame	55, 67, 89, 115mm	2, 3in	40, 60, 80, 130mm	55, 75, 95, 115, 142, 190, 250mm	2, 3, 4in	3, 4, 6, 8in
Inertia	Low	Low (high inertia opt.)	Low, Medium	Med. (high inertia opt.)	Medium	
Peak Torque	Up to 499lb-in (56.4Nm)	Up to 144lb-in (16.2Nm)	Up to 301lb-in (34Nm)	Up to 1938lb-in (219Nm)	Up to 513lb-in (58Nm)	Up to 1600lb-in (182Nm)
Base Speeds	Up to 6000rpm	Up to 5000rpm	Up to 5000rpm	Up to 6000rpm	Up to 5000rpm	Up to 4000rpm
Brake Options	Holding, high-energy dissipation		Holding			
Connector Options	Circular style frame mounted 90° and rotatable	MS or circular style frame mounted, MS style on 40in lead, flying leads, drive connector terminated leads (20ft max.)	AMP Mat-n-Loc on 1ft. lead (40-80mm); MS style frame-mounted (130mm)	Circular style frame-mounted 90° and rotatable; optional 90° fixed, vertical, or mixed	MS style frame-mounted	
Feedback Options	Incremental encoders, optical SinCos single & multi-turn, inductive SinCos single & multi turn, resolver, Hiperface (SICK) and EnDAT	Incremental 2048 line count, Inductive absolute, Resolver	Incremental 2048 line count	Incremental encoders, optical SinCos single & multi-turn, inductive SinCos single & multi turn, resolver, Hiperface (SICK) and EnDAT	Incremental 2048 line count	
Ingress Protection	IP65	IP65, IP67, IP68	IP55, IP65	IP65	IP65	
Approvals	CE, RoHS	CE, UL (RoHS opt.)	CE, UL, RoHS	CE, UL, RoHS	CE, UL	

Selecting the Right Motor for the Right Drive

Control Techniques drive-and-motor combinations provide an optimized system in terms of ratings, performance, cost and ease of use. Use Control Techniques' FREE CTSize software to select system components or manually select the system using the following steps.

1. Determine the application's continuous and peak torque requirements at various motor shaft speeds, then refer to motor data tables and the visual-reference overview on the facing page to help determine which motor family will be most appropriate for the application.
2. Once the motor family is selected, refer to the Control Techniques *Servo Motors* brochure to select a specific motor that delivers the required torque and speed. Make note of the continuous and peak current (Amps) requirements of the selected motor.
3. Check the specification tables in Control Techniques' brochures for Digitax ST, Epsilon EP or Unidrive SP Servo drives to select the drive model that delivers adequate continuous and peak torque for the selected motor.
4. Go to the Control Techniques *Servo Motors* brochure to select motor power and feedback cables for the selected drive/motor combination.

Double-check that the rotor inertia of the selected motor has a ratio of <10 when calculated with the load inertia using the following equation:

Load inertia)/rotor inertia

Note: A gear reducer will reduce the load inertia based on the following equation:

Reflected load inertia = load inertia/gear ratio^2

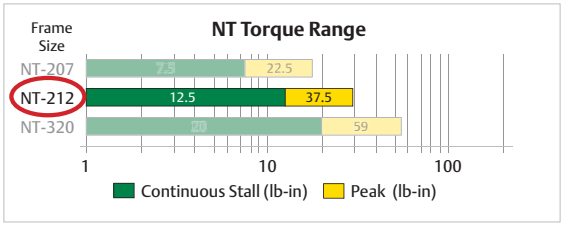
When specifying a motor system, be sure to consider such factors as user-interface (HMI) options, braking resistors and other options and accessories that will enhance the system's performance and value (see *Options & Accessories* brochure for information and order codes).

Electronic nameplates

Some motors fitted with high-resolution SinCos or absolute encoders are pre-loaded with the motor "electronic nameplate" data during the manufacturing process. This data can be read by Control Techniques' Servo drives and used to automatically optimize the drive settings. This feature simplifies commissioning and maintenance, ensures consistent performance and saves time.

Example (using Control Techniques' NT Motor family and Digitax ST Servo drive family)**:**

Step 1: The application requires 10lb-in continuous torque.



Step 2: The Control Techniques *Servo Motors* brochure lists the NT-212 motor with 2.7A continuous torque and 6A peak.

Step 3: Select the Digitax ST drive with adequate current rating.

Ratings - Digitax ST

Drive Model Number	Voltage / Ø	Output Current*	
		Cont. A	Peak A
DST1201	200-230 3Ø	1.7	5.1
DST1202	200-230 3Ø	3.8	11.4
DST1203	200-230 3Ø	5.4	16.2
DST1204	200-230 3Ø	7.6	22.8

Step 4: Select the appropriate power and feedback cables.

NT Motor Specifications

Motor Model	Rated Torque lb-in (Nm)	Cont. Stall Current Arms	Peak Current Arms	Motor Resistance Ohms	Motor Inductance mH	Max Operating Speed rpm	Inertia lb-in-sec^2 (kgm^2)	Motor Ke Vrms/krpm	Motor Kt lb-in/Arms (Nm/Arms)	Motor Weight lb (kg)
NT-207	7.5 (.85)	1.7	3.6	11.1	39.1	5000	0.000094 (.106)	35	5.12 (.58)	3 (1.36)
NT-212	12.5 (1.4)	2.7	6	4.56	18.9	5000	0.000164 (.000019)	35	5.12 (.58)	4 (1.82)
NT-320	20 (2.2)	3.4	16.2	1.5	16.0	4000	0.000328 (.37)	29	3.50 (.40)	6 (2.72)
NT-320 medium inertia	18.0 (2.0)	5.4	16.2	1.5	16.0	4000	0.000558 (.63)	29	3.50 (.40)	6.9 (3.13)

For complete information on Control Techniques' Servo motor offering, refer to brochure number BRO-SRVOMTRS-1107.

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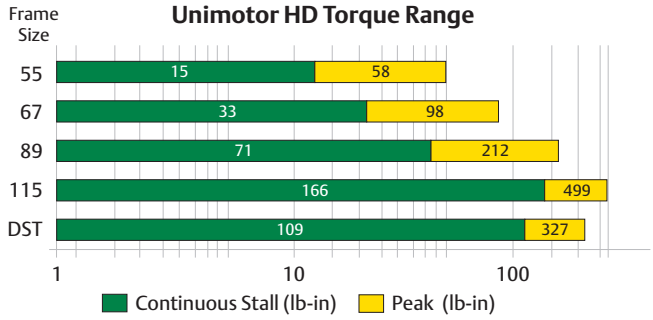
Matched Solution: Digitax ST and Unimotor HD Servo Motor

Unimotor HD Series Servo Motor 230V/460V

The Unimotor HD is a high-dynamic servo motor range designed for maximum torque density. This brushless AC servo motor range provides an exceptionally compact, low-inertia solution for applications where very high torque is required during rapid acceleration and deceleration profiles.

The Unimotor HD torque profile is ideally matched to Digitax ST Servo drives providing up to 300% peak overload for maximum dynamic performance. Unimotor HD incorporates a number of unique performance-enhancing design features.

- Torque range: up to 166lb-in (18.8Nm)
- High torque-to-inertia ratio for high-dynamic performance
- High-energy dissipation brakes
- Compact and powerful
- IP65 conformance, sealed against water spray and dust
- Supported by rigorous testing for performance and reliability



Specifications

Drive Model	Motor Model	Cont. Stall Torque lb-in (Nm)	Peak Stall Torque lb-in (Nm)	Rated Torque @Rated Speed lb-in (Nm)	Rated Power hp (kW)	Rated Operating Speed rpm	Inertia lb-in² (kgm²)	Motor Kt lb-in/Arms (Nm/Arms)
Digitax ST and Unimotor HD – 230V, 3Ø								
DST1202	55EDC600	14.6 (1.65)	48.4 (5.47)	10.6 (1.20)	1.01 (0.75)	6000	0.00032 (.000036)	4.24 (0.48)
DST1203	67EDB600	22.5 (2.54)	67.3 (7.61)	19.5 (2.20)	1.84 (1.38)	6000	0.00043 (0.000057)	4.12 (0.47)
DST1204	89EDB400	47.1 (5.32)	141.2 (16.0)	40.3 (4.55)	2.54 (1.91)	4000	0.00142 (0.000161)	6.20 (0.70)
DST1204	115EDB300	62.6 (7.07)	187.7 (21.2)	62.6 (7.07)	2.96 (2.22)	3000	0.00566 (0.000639)	8.23 (0.93)
Digitax ST and Unimotor HD – 460V, 3Ø								
DST1402	55UDC600	14.6 (1.65)	58.4 (6.60)	10.6 (1.20)	1.01 (0.75)	6000	0.00032 (0.000036)	7.35 (0.83)
DST1403	67UDB600	22.6 (2.55)	67.7 (7.65)	19.5 (2.20)	1.84 (1.38)	6000	0.00047 (0.000053)	7.08 (0.80)
DST1404	89UDC400	44.6 (1.65)	187.9 (21.23)	56.2 (6.35)	2.81 (2.11)	4000	0.00207 (0.000234)	10.6 (1.20)
DST1404*	115UDB300	79.4 (8.97)	250.6 (28.32)	64.7 (7.31)	3.06 (2.30)	3000	0.00391 (0.000441)	14.2 (1.60)

NOTES: Drive switching frequency 12kHz unless noted; motors listed above are factory stock; refer to *Servo Motors* brochure for complete motor model number

* 6kHz switching frequency

Order Information

Order Code Digit #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	0	6	7	E	D	B	6	0	0	B	A	C	A	A	BCD*			DIA*		

[1] to [3] Frame Size
055
067
089
115

[4] to [5] Voltage
ED = 230V

[5] Peak Torque
2 = Std. Peak Torque

[6] Stator Length
A - H

[7] to [8] Rated Speed
Ex.: 60 = 6,000rpm

[9] Brake
0 = No Brake
1 = Brake

[10] Connector
B = 90° (rotatable)

[11] Shaft Key
A = With Key

[12] to [13] Feedback Device
CA = 4,096 Incremental Encoder (standard)

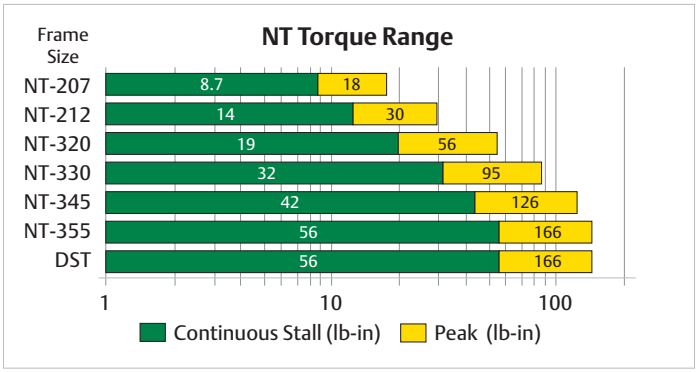
[14] Inertia
A = Standard

Matched Solution: Digitax ST and NT Servo Motor

NT Series Servo Motor 230V

The rugged NT motor is designed for the most stringent servo applications. Now available with multiple feedback options and white epoxy food-grade finish, the NT motor is an economical, high-performance motor manufactured to maximize torque and minimize size. The NT motor uses powerful Neodymium magnets and is manufactured with a segmented core to maximize stator efficiency and further reduce size.

- Continuous torque range up to 56lb-in (6.3Nm)
- Peak torque over 2.5X continuous torque
- Low-inertia, high-performance motor
- Rated speeds: 3000, 4000 and 5000rpm
- Frame sizes in English (NEMA 23 or 34) or Metric (IEC-72-1)
- Flying-lead cabling options
- Incremental encoder
- IP65, IP67 and IP68 rating, UL and CE compliant, RoHS optional



Specifications

Digitax ST and NT servo motor – 230V, 3Ø

Drive Model	Motor Model*	Continuous Stall Torque lb-in (Nm)	Peak Stall Torque lb-in (Nm)	Rated Torque @ Rated Speed lb-in (Nm)	Rated Power hp (kW)	Rated Operating Speed rpm	Motor Kt lb-in/Arms (Nm/Arms)
DST1201	NT207	7.5 (0.8)	18.4 (2.1)	7.5 (0.8)	0.59 (0.44)	5000	5.1 (0.58)
DST1202	NT212	12.5 (1.4)	30.7 (3.5)	12.0 (1.4)	0.95 (0.71)	5000	5.1 (0.58)
DST1203	NT320*	18.5 (2.1)	56.7 (6.4)	16.0 (1.8)	1.01 (0.76)	4000	3.5 (0.40)
DST1204	NT355*	56.0 (6.3)	166.0 (18.7)	48.0 (5.4)	2.27 (1.70)	3000	7.3 (0.82)

NOTES: Drive switching frequency 12kHz unless noted; motors listed above are factory stock; refer to *Servo Motors* brochure for complete motor model number
*Available in medium-inertia option

Order Information

	NT		M	2	12		C	0	N	S	0000			
Order Code Digit #	1	2	3	4	5	6	7	8	9	10	11	12	13	14

[1] to [2] Motor Family
NT = 230V

[3] Mounting Flange
E = NEMA
M = Metric (IEC-72-1)

[4] Frame Size
2 = 2" NEMA 23
3 = 3" NEMA 34

[5] to [6] Torque Rating
07, 12, 20, 30, 45, 55

[7] Connection Type
C = MS Connectors (IP65)
T = MS Connector on Leads (IP65)
L = Flying Leads, No Connector (IP65)
E = 90° Rotatable (IP67)
F = Flying Leads w/White Epoxy Finish (IP68S)

[8] Brake Option (24V)
0 = No Brake
B = With Brake

[9] Feedback Device
N = 2048ppr Encoder (std)

[10] Inertia
S = Standard
I = Medium

[11] to [12] Flying Lead (opt)
00 = No Connector
DP = 15-pin D-sub feedback connector for direct connection to Epsilon EP and Unidrive SP

[13] to [14] Flying Lead Length
00 = No connector
05 = 5ft (+5-ft increments); max. Length = 20ft

* Bolt circle and shaft diameter are standard dimensions; see *Servo Motors brochure* for additional options

White epoxy food-grade option

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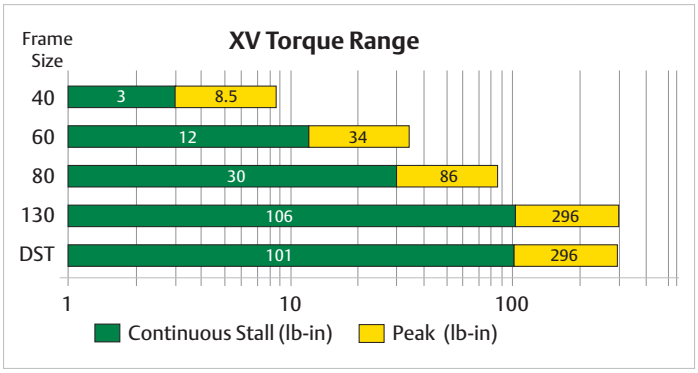
Matched Solution: Digitax ST and XV Servo Motor

XV Series Servo Motor 230V

The XV series servo motors provide a low-cost, high-quality servo motor solution for light industrial applications. The XV offers the smallest frame sizes of any servo motors from Control Techniques starting at 40mm. This compact motor is a great solution for many servo applications and is also a good option for stepper motor replacements. XV Servo motors are available in 230Vac input voltage rating with a 2048ppr incremental encoder.

- Available in four frame sizes: 40, 60, 80 and 130mm
- Speed range from 2000 to 5000rpm
- Cost effective replacement for stepper motor
- CE, UL and RoHS approved



Specifications

Digitax ST and XV series servo motor – 230V, 3Ø

Drive Model	Motor Model	Cont. Stall Torque lb-in (Nm)	Peak Stall Torque lb-in (Nm)	Rated Torque @Rated Speed lb-in (Nm)	Rated Power hp (kW)	Rated /Max Operating Speed rpm	Motor Kt lb-in/Arms (Nm/Arms)
DST1201	XV403	2.8 (0.32)	7.7 (0.87)	2.8 (0.32)	0.13 (0.10)	3000/5000	2.21 (0.25)
DST1201	XV604	2.8 (0.32)	8.5 (.96)	2.8 (0.32)	0.13 (0.10)	3000/5000	1.82 (0.21)
DST1202	XV8017	16.9 (1.91)	48.6 (5.49)	16.9 (1.91)	0.8 (0.60)	3000/5000	5.00 (0.56)
DST1203	XV8028	28.1 (3.18)	81.1 (9.16)	28.1 (3.18)	1.3 (1.00)	3000/5000	5.57 (0.63)
DST1204	XV13042	40.7 (4.59)	122.0 (13.8)	40.7 (4.59)	2.0 (1.47)	3000/5000	5.35 (0.60)
DST1204	XV13046	46.5 (5.25)	137.2 (15.5)	46.5 (5.25)	1.5 (1.10)	2000/3000	7.71 (0.85)
DST1204	XV130101	101.4 (11.5)	296.5 (33.5)	101.8 (11.5)	1.6 (1.20)	1000/2000	13.88 (1.54)

NOTES: Drive switching frequency 12kHz unless noted; motors listed above are factory stock; refer to *Servo Motors* brochure for complete motor model number

Order Information

	XVM	060	101	C	B	N	S	0000			
Order Code Digit #	1	2	3	4	5	6	7	8	9	10	11

[1] Motor Family
XVM = 230V

[2] Frame Size
40, 60, 80, 130mm

[3] Torque Rating
40: 1, 2, 3
60: 4, 6, 11
80: 17, 22, 23, 28
130: 46, 51, 68, 89, 101

[4] Connection Type
C = MS Connector (130 frame)
T = AMP connector on leads (40-80 frame)

[5] Brake (24 V)
0 = No Brake
B = With Brake

[6] Feedback Device
N = 2048ppr Encoder

[7] Inertia
S = Standard

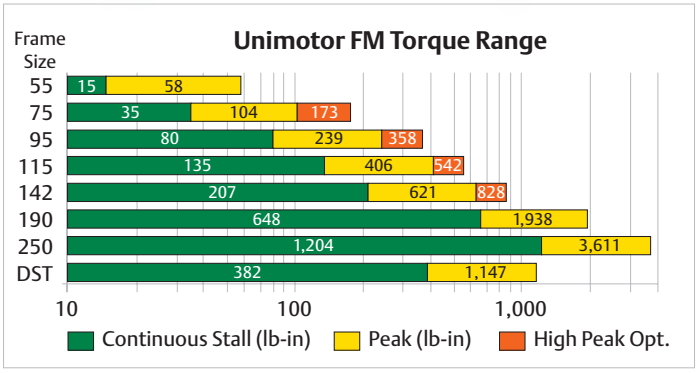
[8] to [11] Special Options
0000 = Standard

Matched Solution: Digitax ST and Unimotor FM Servo Motor

Unimotor FM Series Servo Motor 230V/460V

Control Techniques' Unimotor FM series is designed to accommodate a wide range of applications with a highly configurable selection of feedback devices, shafts, inertias and more.

- High inertia
- IEC mounting (NEMA option on 95 and 142 only)
- Configuration options include brake, bolt circle, shaft diameter, plus high-peak and high-inertia options
- Multiple feedback options
- IP65 rating, UL, CE and RoHS compliant



Specifications

Drive Model	Motor Model	Cont. Stall Torque lb-in (Nm)	Peak Stall Torque lb-in (Nm)	Rated Torque @ Rated Speed lb-in (Nm)	Rated Power hp (kW)	Rated Operating Speed rpm	Motor Kt lb-in/Arms (Nm/Arms)
Digitax ST and Unimotor FM – 230V, 3Ø							
DST1201	075E2A40	10.6 (1.20)	31.9 (3.6)	8.9 (1.00)	0.56 (0.42)	4000	6.37 (0.72)
DST1202	055E2C30	14.6 (1.65)	58.4 (6.6)	13.1 (1.48)	0.62 (0.46)	3000	8.05 (0.91)
DST1202	075E2B40	19.5 (2.20)	58.4 (6.6)	15.0 (1.70)	0.95 (0.71)	4000	6.37 (0.72)
DST1203	055E2C60	14.6 (1.65)	58.4 (6.6)	10.6 (1.20)	1.01 (0.75)	6000	4.25 (0.48)
DST1203	075E2C40	27.4 (3.10)	82.3 (9.3)	20.4 (2.30)	1.28 (0.96)	4000	6.37 (0.72)
DST1204	095E2D30†	62.6 (7.07)	187.6 (21.2)	60.2 (6.80)	2.85 (2.14)	3000	8.23 (0.93)
Digitax ST and Unimotor FM – 460V, 3Ø							
DST1401	055U2C30	14.6 (1.65)	58 (6.60)	13.1 (1.48)	0.62 (0.46)	3000	14.6 (1.65)
DST1401	075U2B40	15.9 (1.80)	48 (5.40)	15.0 (1.70)	0.95 (0.71)	4000	10.6 (1.20)
DST1402	055U2C60	14.6 (1.65)	58 (6.60)	10.6 (1.20)	1.01 (0.75)	6000	7.3 (0.83)
DST1402	075U2C40	27.4 (3.10)	82 (9.30)	20.4 (2.30)	1.28 (0.96)	4000	10.6 (1.20)
DST1403	095U2B40†	38.1 (4.30)	114 (12.90)	26.6 (3.00)	1.68 (1.26)	4000	10.6 (1.20)
DST1404*	115U2C30	77.3 (8.74)	250 (28.2)	66.4 (7.50)	3.14 (2.36)	3000	14.2 (1.60)
DST1405*	115U2D30	99.1 (11.2)	329 (37.2)	83.2 (9.40)	3.94 (2.95)	3000	14.2 (1.60)

NOTES: Drive switching frequency 12kHz unless noted; motors listed above are factory stock; refer to *Servo Motors* brochure for complete motor model number
* 6kHz switching frequency
** See *Servo Motors* brochure for relevant configurations; bolt circle and shaft diameter are standard dimensions; see *Servo Motors* brochure for additional options
†NEMA 34 option available

Order Information

	055			E	2	A	60		0	V	A	CA		A	BCD**			DIA**		
Order Code Digit #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

[1] to [3] Frame Size
055, 067, 075, 089, 095, 115, 142, 190mm

[4] to [5] Voltage
UD = 230V

[5] Peak Torque
2 = Std. peak torque
P = High peak torque

[6] Stator Length
A - H

[7] to [8] Rated Speed
Ex.: 60 = 6000rpm

[9] Brake
0 = No brake
1 = With brake

[10] Connector
B = 90° (rotatable)

[11] Shaft Key
A = With Key

[12] to [13] Feedback Device
CA = 4096 Incremental encoder (standard)

[14] Inertia
A = Standard
B = High inertia

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Terminals and Pinouts

RS485 - Communications RJ45	
Pin #	**Signal**
1	120Ω termination resistor
2	RX TX
3	Isolated OV
4	+24V (100mA)
5	Isolated OV
6	TX enable
7	RX/ TX/
8	RX/ TX/ (if termination resistors are required, link to pin 1)
Shield	Isolated 0V

Terminal 1 - I/O Screw-In Terminals	
Pin #	**Signal**
1	0V Common
2	External 24Vdc
3	0V Common
4	10 Vdc Source
5	Analog 1 +
6	Analog 1 -
7	Analog 2
8	Analog 3
9	Analog Out 1
10	Analog Out 2
11	0V Common

Terminal 2 - I/O Screw-In Terminals	
Pin #	**Signal**
21	0V Common
22	24Vdc Output, Selectable
23	0V Common
24	I/O 1
25	I/O 2
26	I/O 3
27	Input 4
28	Input 5
29	Input 6
30	0V Common
31	Safe Torque Off, Drive Enable

Terminal 3 - N/O Relay Screw-in terminals	
Pin #	**Signal**
41	Relay Contacts/Drive OK
42	

Buffer Encoder Output - D-Sub Female			
	Signal		
Pin #	**Quadrature**	**Freq/ Dir**	**FWD REV**
1	A	F	F
2	A/	F/	F/
3	B	D	R
4	B/	D/	R/
5	Z		
6	Z/		
7	n/c		
8	n/c		
9	n/c		
10	n/c		
11	n/c		
12	n/c		
13	n/c		
14	OV		

(Bottom View)

Power - Screw-in Terminals	
Pin #	**Signal**
1	Brake
2	Brake
3	48Vdc+
4	48Vdc-
5	L1
6	L2
7	L3

Z Product Variant Terminals - I/O Cage Clamp		
Pin #	**Signal**	
1	0V Common	High-speed capture inputs
2	Input 1	
3	Input 2	
4	Input 3	
5	Input 4	
6	Output 1	
7	Output 2	

P Product Variant Terminals - I/O Cage clamp	
Pin #	**Signal**
TB1 1	OV RS485
2	RX/
3	RX
4	TX/
5	TX
TB2 6	A
7	Shield
8	B
TB3 9	OV Digital I/O
10	Input 0 - Freeze Input
11	Input 1
12	Output 0
13	Output 1

Motor Encoder Input - D-Sub Female			
Pin #	**INC**	**ABS**	**PULSE**
1	A	Cos	F
2	A/	Cosref	F/
3	B	Sin	D,R
4	B/	Sinref	D/,R/
5	Z	Data	Z
6	Z/	Data	Z/
7	U	n/c	U
8	U/	n/c	U/
9	V	n/c	V
10	V/	n/c	V/
11	W	Clock	W
12	W/	Clock	W/
13	+V	+V	+V
14	0V	0V	0V
15	Thermistor	Thermistor	Thermistor

Encoder pinout function is controlled by Pr3.38. See manual for details.

Motor Power - Screw-In Terminals	
Pin #	**Signal**
1	U
2	V
3	W
4	DC Bus +
5	DC Bus -

Specifications, Ratings and Dimensions

Specifications

Power Requirements

AC input voltage: model dependent: nominal 200 to 240Vac or 380 to 480Vac
48 to 65Hz, ±10%

Switching Frequency: 6 to 12kHz selectable

System Efficiency: 93%

Cooling Method: Internal fan

Drive Control Inputs

Analog, high precision (1) +/-10Vdc, 16 bit + sign

Analog, general purpose (2) +/-10Vdc, 0 to 20mA, 4 to 20mA, 10 bit + sign

Digital (3-6): Selectable. 10 to 30Vdc, 6kΩ, sinking/sourcing

Safe Torque Off/Drive Disable: Certified EN954-1 cat. 3

Digitax Z additional inputs: Digital (4): 15 to 30Vdc, 6kΩ, sourcing

Digitax P additional inputs: Digital (2): 24Vdc

Drive Control Outputs

Analog, general purpose (2) +/-10Vdc, 0 to 20mA, 4 to 20mA, 10 bit + sign

Digital (0 to 3): Selectable, 24Vdc, 200mA total, sinking/sourcing

Relay (1): Drive OK contact, 2A @240Vac, 4A @30Vdc resistive load, 0.5A @24Vdc inductive load

Digitax Z additional outputs: Digital (2): 10 to 30Vdc, 20mA, sourcing

Digitax P additional outputs: Digital (2): 24Vdc, 20mA, sourcing

I/O Supply: 24Vdc ±10%

200mA max including all digital I/O. Can be switched on or off to act as a fourth digital output

Encoder Output

Quadrature, quadrature w/ marker, pulse/direction, pulse pulse. EIA485 differential, 512kHz max, +/-14Vdc

Communications

Serial Interface: 1 RS-485 Modus RTU, 9,600 to 115.2k baud

Digitax P additional communications: CTNet and EIA RS485

Environmental

Rated ambient temperature: 32 °F to 122 °F (0°C to 50 °C); Derate output above 104 °F (40 °C)

Maximum altitude: 0 to 9,900ft. Derate output power by 1% per 330ft over 3,300ft

Vibration: Tested in accordance with IEC60068-2-6/64

Mechanical shock: Tested in accordance with IEC60068-2-29

Electromagnetic immunity: Complies with EN61800-3 (2nd environment)

Electromagnetic emissions: Complies with EN61800-3 (2nd environment) with onboard filter. EN61000-6-3 and EN61000-6-4 with optional footprint EMC filter

Relative humidity: 95% non-condensing at 104 °F (40 °C)

Ingress protection: IP-20

Weight: 4.6lbs

Ratings

Drive Model Number	Voltage / Ø	Input Current Peak A	Output Current*	
			Cont. A	Peak A
DST1201	200-230 1Ø	3.1	1.1	2.3
DST1202	200-230 1Ø	6.4	2.4	4.8
DST1203	200-230 1Ø	8.6	2.9	5.8
DST1204	200-230 1Ø	11.8	4.7	9.4
DST1201	200-230 3Ø	3.5	1.7	5.1
DST1202	200-230 3Ø	7.3	3.8	11.4
DST1203	200-230 3Ø	9.4	5.4	16.2
DST1204	200-230 3Ø	13.4	7.6	22.8
DST1401	380-480 3Ø	2.8	1.5	4.5
DST1402	380-480 3Ø	4.3	2.7	8.1
DST1403	380-480 3Ø	6	4	12
DST1404	380-480 3Ø	8	5.9	17.7
DST1405	380-480 3Ø	9.9	8	24

Drive switching frequency at 6kHz for rated performance
*Peak current is duty cycle limited
**Derate continuous current above 6kHz drive switching frequency

Order Information

Order Code Digit #	DST			1	2	01		Z
	1	2	3	4	5	6	7	8

[1] to [3] Drive Family
DST = Digitax ST

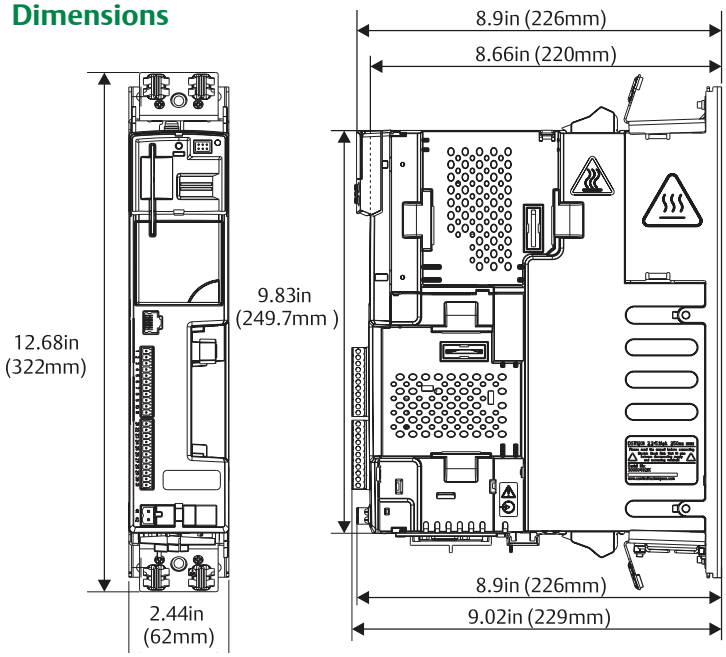
[4] Frame Size

[5] Line Voltage
2 = 200 to 240V
4 = 380 to 480V

[6] to [7] Current Rating Step

[8] Variant
B = Base
I = Indexer
P = Plus
Z = EZMotion

Dimensions



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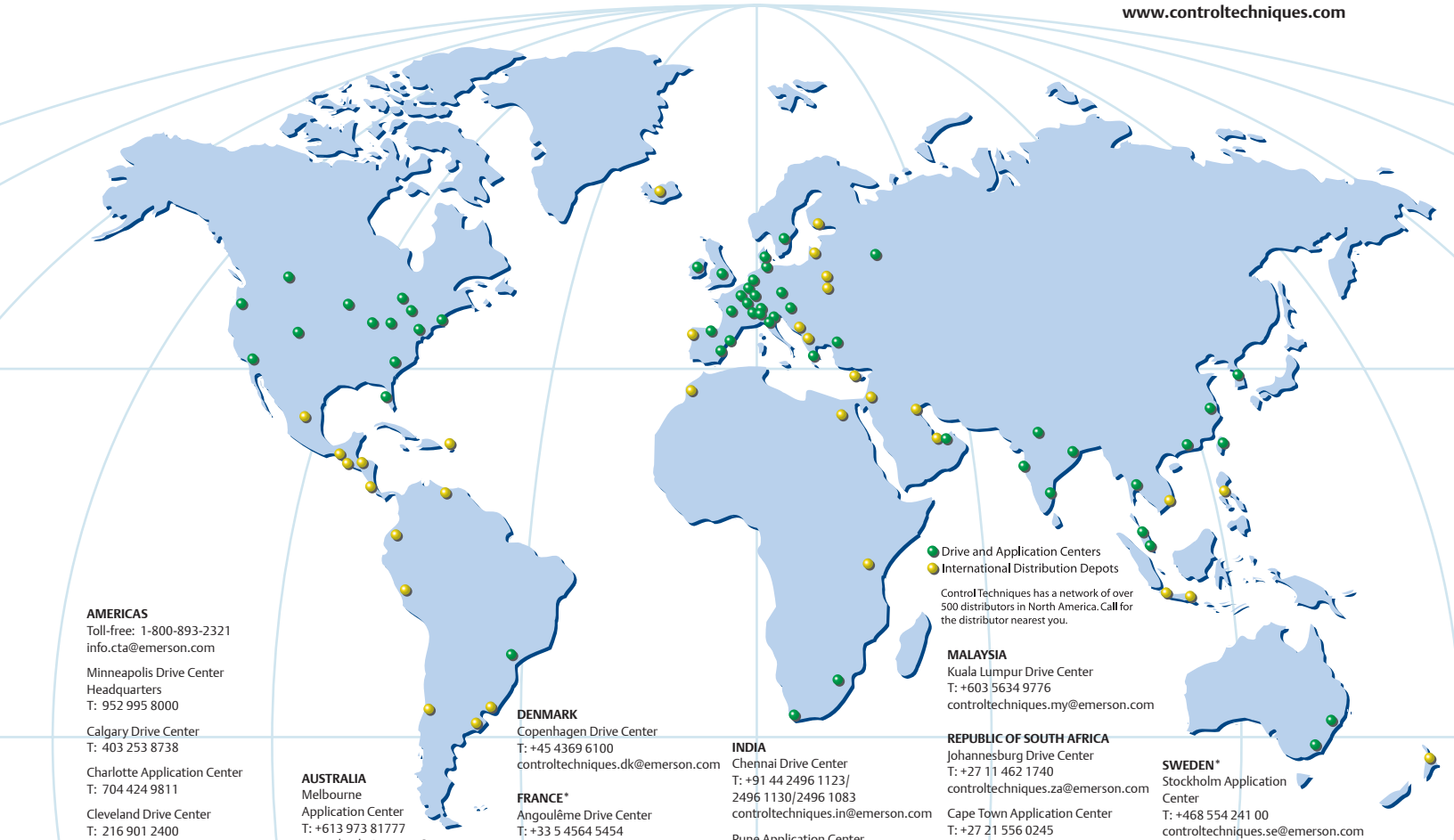

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