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ServoOne
The art of drive engineering



LTi



ServoOne

German universities and scientists have repeatedly set the international standard in drive technology. Identification and active compensation of natural frequencies in oscillatory mechanics, status controls with monitoring structures incorporating acceleration sensors, adaptive compensation of measurement system deficiencies, self-adjusting detent torque compensation... everything invented with only a single aim in mind: to continue improving the motion control, dynamics, precision and processing speed of your machines. For the industrial applicability of this technology scientific publications in proceedings and laboratory test rigs are not enough. These features consequently need to be converted into cost-efficient and easily manageable products. That's exactly what we have done.

So in future, if you should need more than today's market can offer you, now everything is going to be alright. With our new high-performance ServoOne drive series you will experience things of which you could only dream of until today.

ServoOne. The name sets standards.





Outline

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ServoOne _ always the best drive solution

The modularity of the ServoOne family guarantees you optimum integration into the machine process at all times. A coordinated single-axis and energy-efficient multi-axis system meet the needs of any application across a wide power range. Whether in high-speed field bus communication with the central multi-axis machine controller or with distributed Motion Control intelligence in the drive controller – the ServoOne is a master of both. So enjoy the surprising diversity of functionality of the ServoOne, and make use of its future-proof specification for your application!

Alongside top product quality, we offer you sound, specifically targeted advice, expert commissioning support, a sophisticated, needs-oriented ordering and shipment logistics system, as well as outstanding service and diagnostic capability.



Servo drives from 2 to 450 A for AC-powered single-axis motion with 1/3 x 230 V-3 x 480 V AC mains connection



Servo drives from 4 to 170 A as DC-powered multi-axis systems with sinusoidally regenerative supply units



High-speed communication based on a wide variety of profile-conformable field bus interfaces (EtherCAT, SERCOS II & III, PROFINET IRT, CANopen, ...)



High-performance motor control for precise, dynamic movement of a wide variety of linear and rotary motor systems



Coordinated software functions and packages with Motion Control functionality for any application



iPLC to IEC 61131 integrated permitting rapid adaptation to the application with direct access to the drive controller peripherals



Integrated functional safety Ensures personal protection directly in the drive controller



Compact size For optimum cabinet utilisation



Flexible cooling concepts featuring air or fluid cooling



Future-proof thanks to a flexible expansion concept



Extensive PC software for planning, commissioning and programming of multi-axis drive systems



ServoOne _ limitless freedom of integrateability

Regardless of how your Motion Control concept looks like, the ServoOne is a comprehensive, intelligent and – above all – future-proof solution to your motion requirements. The range of motion profiles that can be generated – all of course to international standards – can occur in superimposed Motion Control as well as in direct drive.

The ServoOne is the ideal solution for operating a superimposed CNC control with a cyclic setpoint via bus systems. Interpolation values of a path curve are translated with the aid of a wide range of interpolation modes into uniform, profile persistent motion. The extensive choice in this regard ranges from linear, through quadratic, to complex cubic spline interpolation methods. And precision, synchronized processing on all axes is implemented as a matter of course. Maximum dynamism and path contouring are ensured by the flexible speed and torque feed-forward. The setpoints required are optionally calculated by interpolation or preset over the bus with up to 48-bit accuracy.

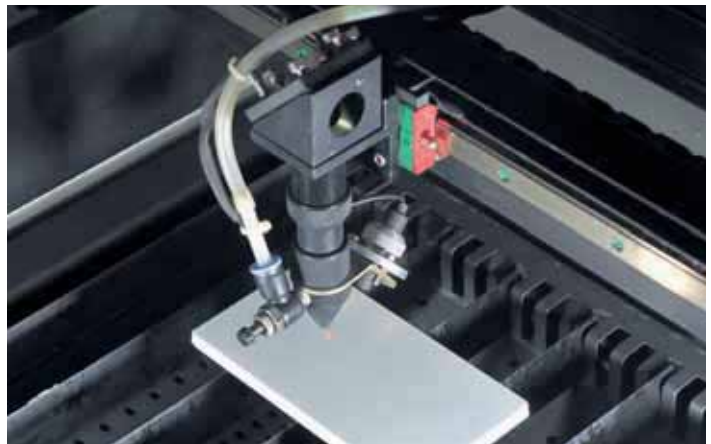
Single-axis motion is implemented with the integrated profile generator. In this, the controller transmits only the driving set. Independent acceleration, deceleration and jerk setting enhances the diversity of choice in this classic point-to-point positioning solution.

Synchronous control of multiple axes is also easily implementable with the ServoOne. High accuracy in motion is attained by the advanced control engineering and high-resolution transfer of setpoint values by Ethernet-based cross-communication. Short sampling rates in setpoint coupling provide the ideal solution to your real-time requirements. The individual axes are gently coupled and decoupled with the aid of the integrated profile generator.

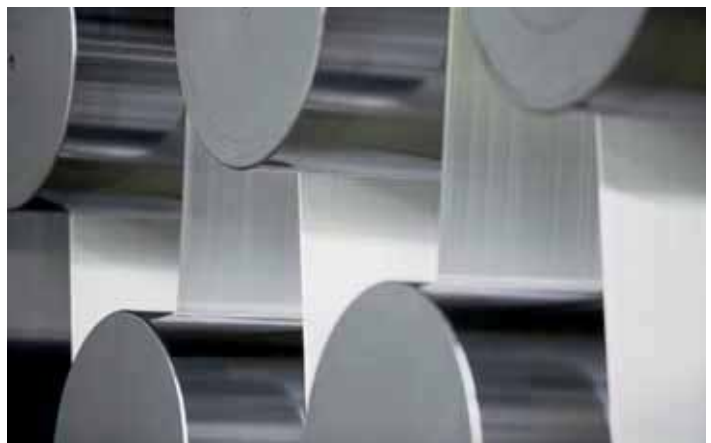
CNC systems



Point-to-point controls



Synchronous controls



ServoOne-iPlc _ maximum application capability

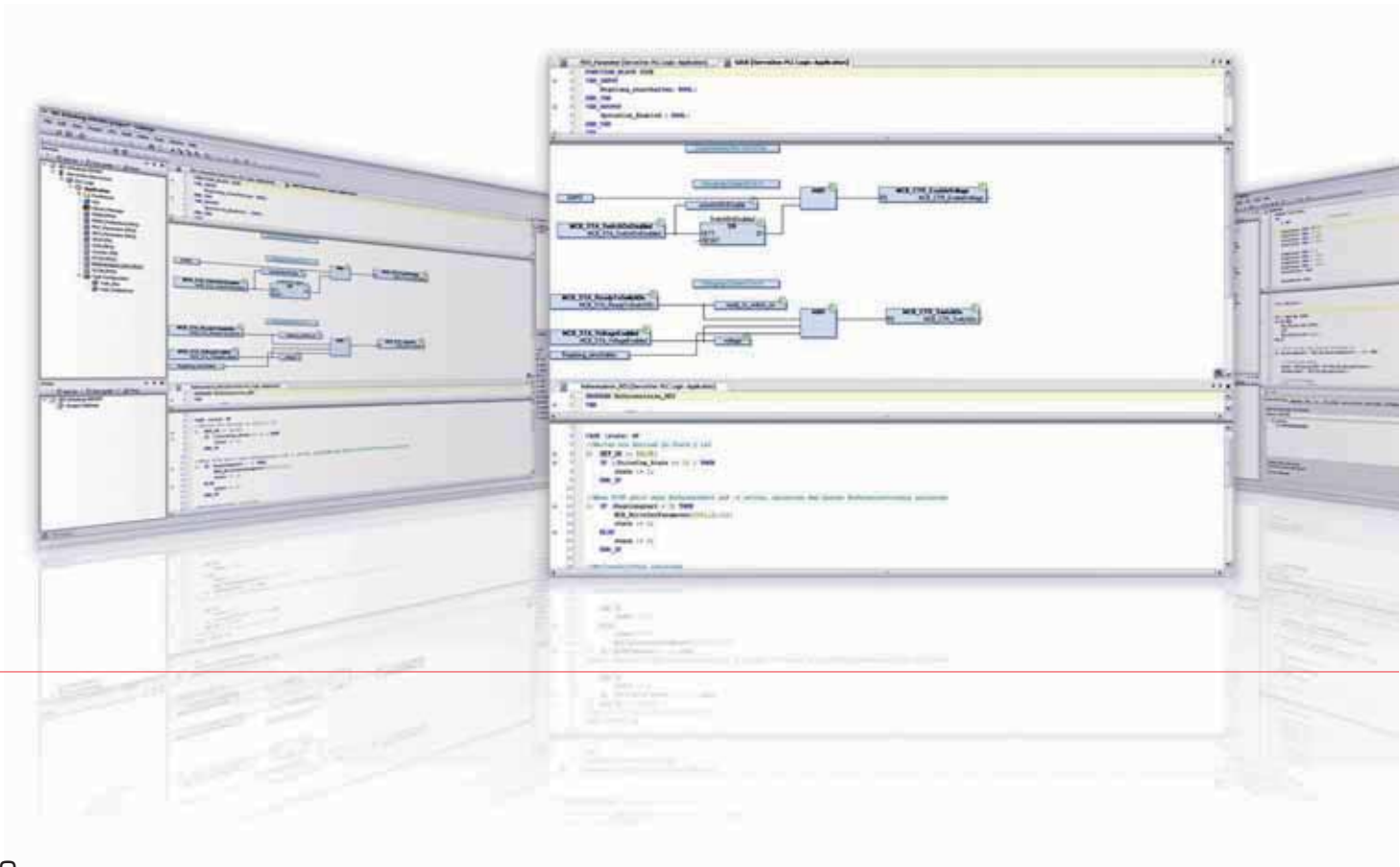
Our motivation was to provide the ServoOne with a high degree of flexibility. The ServoOne firmware in itself is a highly sophisticated system for many applications and their motion requirements. However, maximum application capability is offered by the integrable iPlc user-programmable single-axis positioning control.

The iPlc, programmable in IEC 61131, shares the microcontroller platform of the ServoOne with the drive control, so permitting optimized, fast access to all system and control parameters and interfaces.

An extensive range of function blocks to the IEC 61131 standard and drive-oriented ServoOne libraries deliver a high level of solutions expertise and enables rapid commissioning.

You, or our trained applications personnel, can respond immediately to sudden changes in requirements. The library of function blocks conforming to the PLCOpen definition will additionally permit cross-platform programming of motion sequences. This means it will also be possible to implement existing and tested applications with the ServoOne.

See for yourself just how powerful the ServoOne can be – with iPlc!



Technology functions _ for a wide range of drive tasks

The demands faced by modern-day processing machinery include small and variable lot sizes and frequent product changes. The technology functions of the ServoOne offer the ideal solution for any drive task.

„Electronic cam plate“ technology can be flexibly deployed and configured with the function blocks of the ServoOne iPLC. This enables applications such as discontinuous material feed, cross-cutters or „flying saws“ to be rapidly implemented.

Functional highlights:

- Curve calculation based on analytical functions conforming to VDI 2143
- Maximum dynamism and short cycles thanks to synchronized feed-forward
- On-the-fly switching of cam plate segments
- Compensation for inaccuracies in the switchover point based on prediction and short cycle times
- Master position via encoder, field bus or virtual master
- Mark synchronization
- Jerk-free coupling and decoupling functions

In addition to Motion Control, the ServoOne offers an extensive range functions:

- Touchprobe for fast, precise mark synchronization
- Master position sensing via encoder interface or field bus
- Axis-guided homing with over 40 variants
- Application-specific, motion-dependent measurement units



Functional safety _ optimally integrated

The scaleable LTi Safe Motion architecture enables optimum machine safety solutions to be designed. Whether you favour a safety solution based on drives or on controls, our Safe Motion architecture is a master of both. The operation, handling and programming of the safety control system is absolutely identical, regardless of its physical location.

Take a look at the tremendous range of safety functions provided by the ServoOne with integrated SIL 3 safety control, and find out what special solutions are possible with the ServoOne system!

With external Safe Monitoring Control, safe monitoring of ServoOne family members with purely STO functionality and additional mechanical components is possible.



ServoOne with integrated safety control in SIL 3
Servo drives from 4 to 72 A with AC or DC feed

Safe Monitoring Control in SIL 3
The modular safety control with various encoder interfaces and scaleable I/Os'

Featuring the following safety functions:



Safe Stop SS1/2
With monitoring of the speed curve



Safe Torque Off
Shutdown category 4/HFT 2



Safe Operating Stop
Monitors the rotation speed or position at standstill



Safe Limited Torque
Monitors exceeding of a maximum torque or force



Safe Limited Speed
Monitors exceeding of a maximum speed



Safe Limited Increment
Monitors exceeding of a preset incremental feed

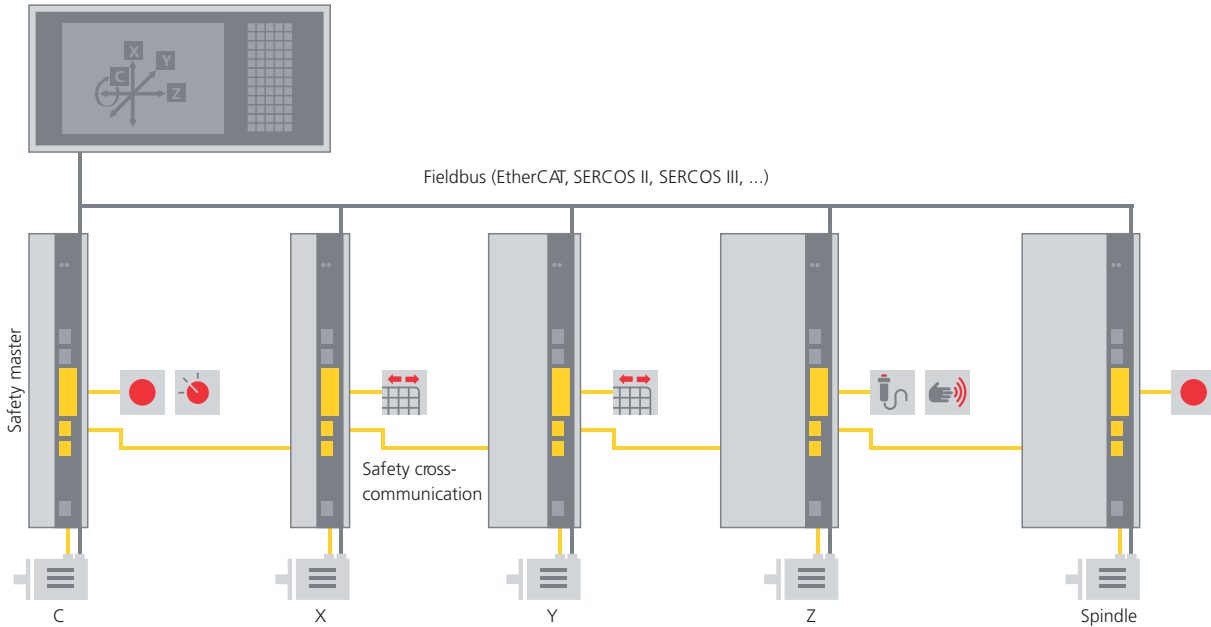


Safe Limited Position
Monitors exceeding of a preset position



Safe Direction
Monitors blocking of a direction of rotation





The safety control integrable into the ServoOne meets all your needs in terms of safe motion and communication:

- Flexible and safe sequence programming
- Parameterization of the connected safety switching elements
- Safety sensors connectable directly to the ServoOne
- Safe cross-communication
- Optional safe monitoring of external axes

Safety sensors such as light grids, emergency stops or guard door switches, as well as other sensors for a wide variety of safety functions, can be connected to the ServoOne. Two-hand operator control directly on the servocontroller is also certified.

Safe cross-communication enables you to implement distributed connection of safety switching elements. The ServoOne Safety Master collects all required information over the bus, enabling it to initiate the necessary reactions rapidly. As well as considerably reducing the required assembly and installation, machine control of all safety functions is also made easier. The safety intelligence in the ServoOne Master also permits controllers without safety technology to be deployed, depending on application. And safety upgrades or modifications to machinery become child's-play too, because the controller does not have to be changed.



SERCOS interface

PROFI BUS

EtherCAT

SERCOS interface

PROFI NET

CANopen

Communication _ for a good connection

What would the machine world be without communication?

The modularity of ServoOne brings you flexibility of integration into the world of control and automation technology. To that end, we have fitted out the ServoOne with a broad range of different field bus systems.

State-of-the-art EtherCAT, Sercos III, PROFINET IRT or VARAN communication interfaces, based on the latest real-time Ethernet technology, support the extensive Motion Control functions of the ServoOne.

Synchronized ServoOne controllers with cycle times of up to 125 μ s and axis synchronization with jitter in the range of a few microseconds are realistic. And of course, the ServoOne supports all buses in conformance to the standardized profiles. They enable the servo-axes to move both in interpolating modes and in modes in which the controller itself generates the driving profile based

on a predefined driving set. The broad range of these bus systems means there is also adequate flexibility remaining for comprehensive, fast bus-based ServoOne diagnostics.

EtherCAT is the key to a fast and uncomplicated integration of the ServoOne into the Automation system MotionOne. After a short automatic configuration of the EtherCAT interface MotionOne offers a wide range of motion requirements for machines.

By way of the Sercos II integrated into the machine tool, the ServoOne can meet any dynamic, precision-contour motion requirement.

Tried and proven field bus interfaces such as CANopen based on the DS301/DSP402 profiles and PROFIBUS DP-V1 round off the field bus portfolio of the ServoOne.

Control engineering _ as if from another world

The ServoOne meets the highest demands in terms of dynamics and smoothness thanks to its integration of the most advanced control algorithms currently known to science. So it is natural that the ServoOne should be able to drive a wide range of motors – from synchronous servomotors, through asynchronous motors, to linear and torque motors.

High control sampling rates at 16 kHz for current control and 8 kHz for speed and position control result in minimal dead times and so guarantee optimum motor control. Moreover, the latest loop control methods enable speed control of asynchronous and synchronous motors in the field-weakening range – that is to say, above nominal speed. Predictive feed-forward structures for speed and torque result in optimum guidance. Higher-order filters additionally damp the mechanical oscillation caused by resonance frequencies.

Flexible, modular encoder concepts and interference-immune electronics, paired with powerful software, provide the foundations of the ServoOne's high-precision motion control. The ServoOne is capable of evaluating a broad range of different encoders, also of course including resolver interface and Sin/Cos single-turn and multi-turn encoders. Even the standard configuration features a high-resolution Sin/Cos interface alongside the resolver. This means point-precise positioning is

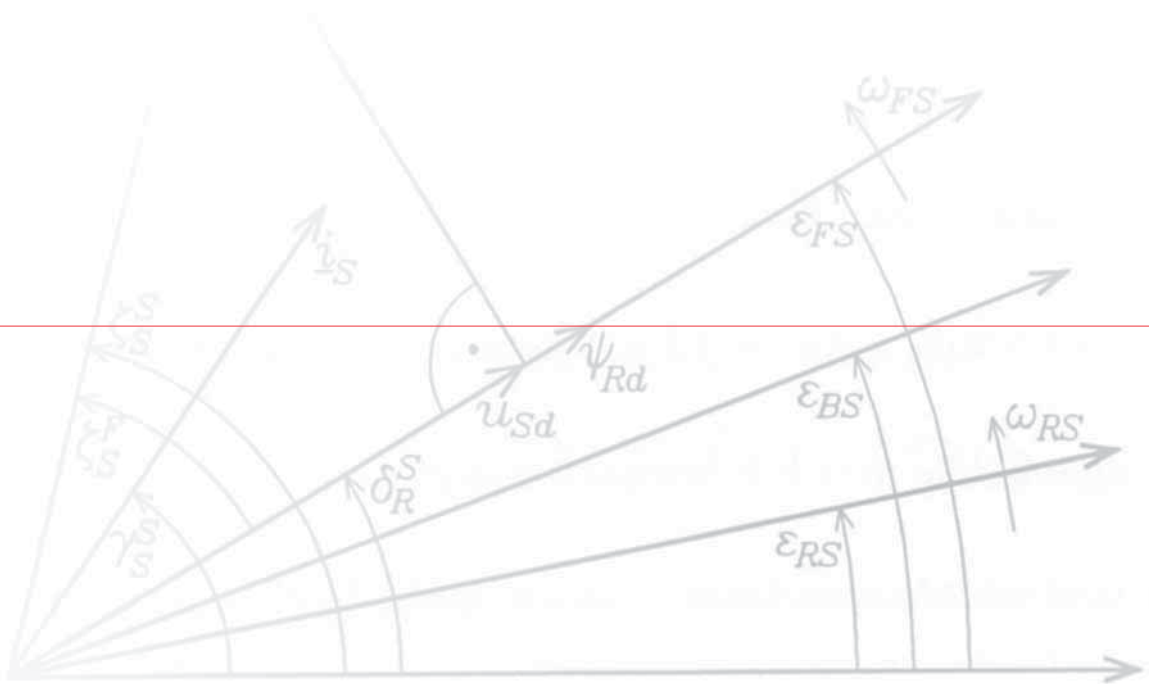
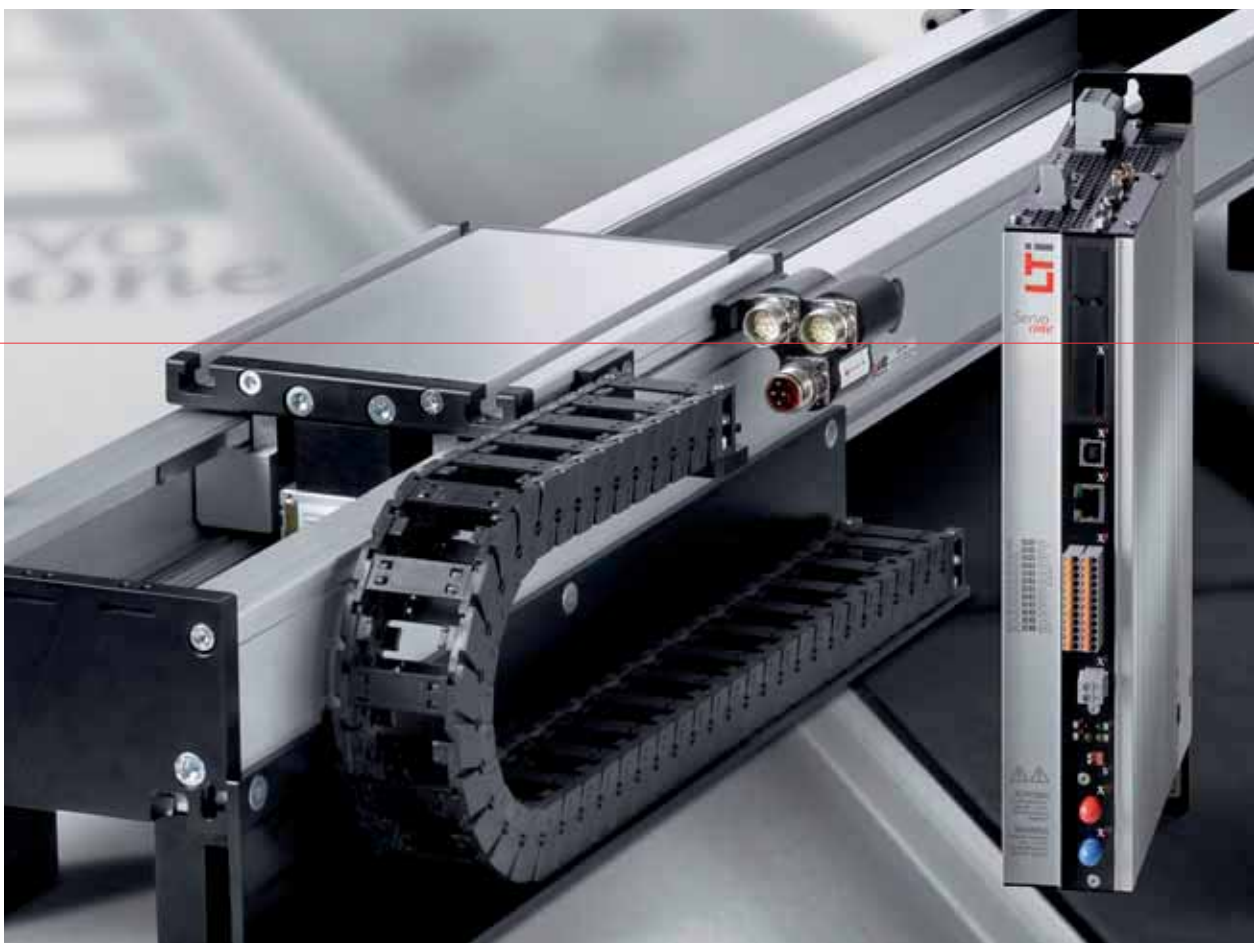
possible with an additional second encoder even in the case of backlash mechanisms. A third optional encoder interface also permits evaluation of special encoder systems.

Smoothness and positioning accuracy are optimized by various compensation and correction routines. LTI's patented GPOC method eliminates offset, gain, phase and eccentricity errors of analog encoder signals.

Compensation for motor cogging reduces static and dynamic torque ripple, so helping achieve optimum smoothness.

Precision quadrant transitions are ensured by friction torque correction. Ultimately, directional correction of the mechanical manufacturing tolerances of a spindle enhances absolute positioning accuracy.

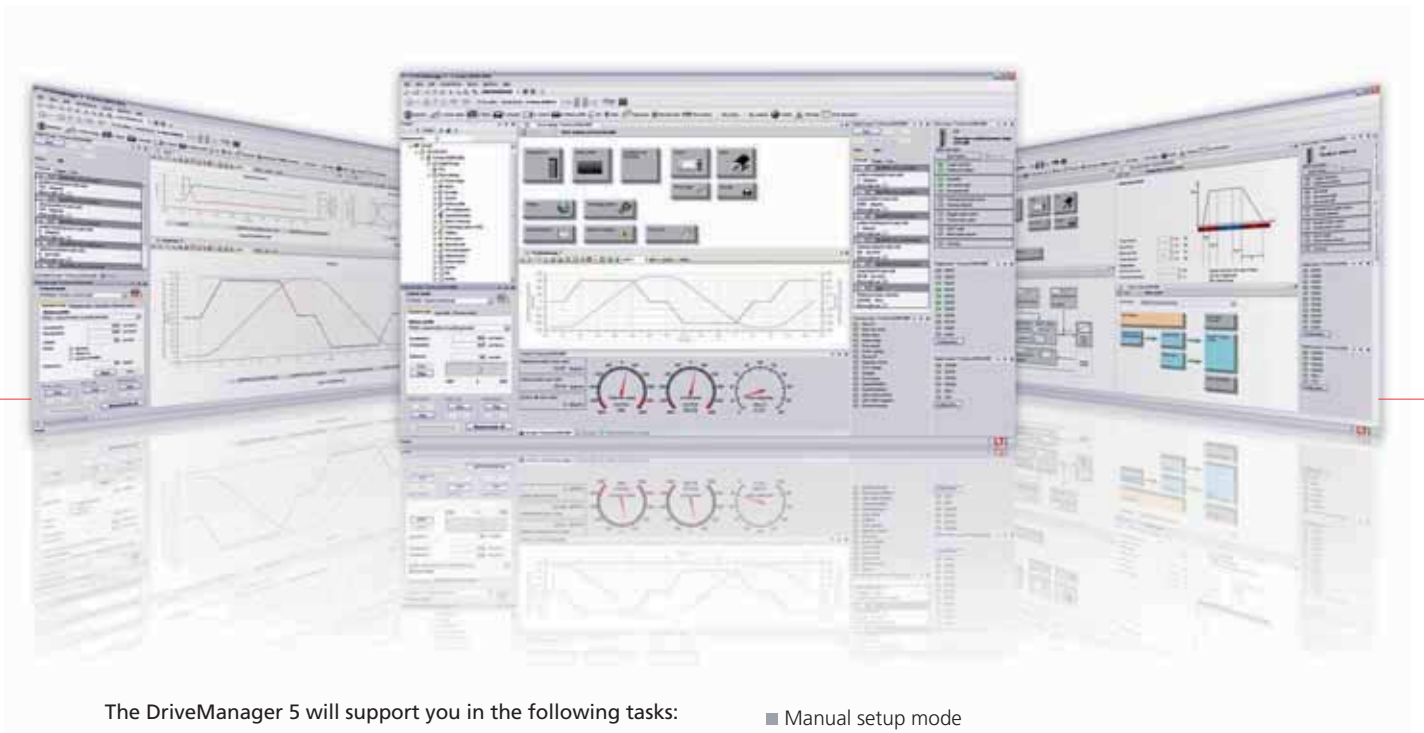
Automatic commutation position identification for synchronous motors enables them to be controlled even without an absolute measurement system. In the case of synchronous linear motors especially, this means costly absolute measurement systems can be replaced by incremental derivatives. A wide variety of processes ensure consistently correct motor commutation, even in conjunction with braked axes or suspended loads.



DriveManager _ Generation 5

Despite its versatility, the ServoOne is easy to use. From initial commissioning through to process diagnostics, DriveManager 5 provides a comprehensive package of tools and functions tailored to any task. The graphical PC surface, based on the latest .NET technology, significantly shortens commissioning times. This is supported by the integrated online help and autotuning. Different user levels ensure that only the essential parameters are displayed at any given time. Docking Views technology enables you to adapt the DriveManager 5 to your specific needs, allowing you to create and store user- or application-specific workspaces.

The DriveManager 5 of course offers full network capability. This means communication can optionally be handled via USB or TCP/IP interfaces and over field bus. Multiple axis modules can be managed simultaneously in a project.



The DriveManager 5 will support you in the following tasks:

- Initial and serial commissioning, operator control and diagnostics of the ServoOne drive system
- Project management – multiple devices in one overview

Tools and functions:

- Data set handling for initial and serial commissioning
- Automatic motor identification
- Automatic determination of mass moment of inertia/force
- 6-channel oscilloscope for setup of control loops and checking of motion profiles
- FFT functions for analysis of oscillating mechanisms

- Manual setup mode
- Test signal generator for optimization of control loops
- Graphical status and actual value displays
- Log file/Undo and Redo functions for rapid tracing and modification of previous work steps
- Online help
- Firmware download
- Language switching
- ServoOne iPLC
 - Up-and Download of previously created iPLC-applications in IEC 61131-3
 - Monitoring and setting of iPLC parameters

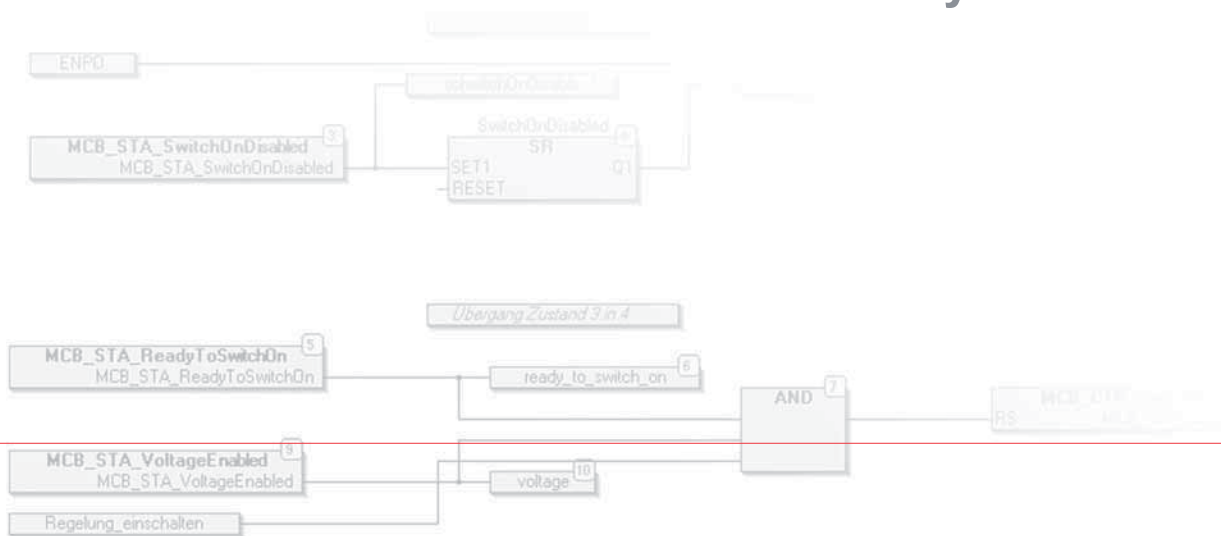
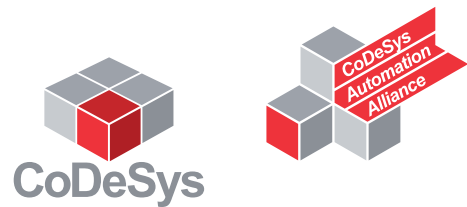
CoDeSys V3 programming system _ international standard

With the latest-version CoDeSys V3 you can program the ServoOne iPLC in the languages of IEC 61131-3. The application of international standards provides for a familiar programming environment and uniform programming methodology, which also minimizes the required training and project planning commitment.

- Programming in the 5 languages of IEC 61131 and CFC
- Docking Views technology to customize the workspace to your needs
- Project archive for rapid exchange of applications
- Object-oriented programming delivers enormous application benefits
- Context-sensitive online help

Download your machine code to the ServoOne at the click of a mouse. When CoDeSys V3 is connected to the ServoOne, the tool offers extensive functionality enabling you to debug, test and launch your control applications quickly and efficiently:

- Display and edit variables in online mode
- ,Online Program Change' function to reduce development lead time
- Break points for error analysis and step-by-step commissioning
- Break points with conditions to detect program errors in an even more targeted way
- Single-step mode for tracking changes
- Watchdog timer



Safe Monitoring PLC _ graphical programming

The core of the ServoOne integrated safe monitoring is the programming interface "Safe Monitoring PLC". This software provides you with a high-quality programming environment as well as a set of configuration, parameter-setting and validation tools.

Configure and parameterize the connection, monitoring and processing requirements of safety sensors and actuators suitable to the safety level of the machine application. The tool provides user-friendly support, enabling easy selection and configuration of the optimum safety setup.














The safety application is programmed graphically by way of a dedicated on-screen form. The preconfigured sensors, encoders and actuators are available as logical elements. Then the safety functions for motion monitoring (SLS, SLI, SLP etc.) are selected and configured by way of the associated context-sensitive menu fields.

The configuration, parameterization and programming process is completed by validation in accordance with the specified standards. Here, too, the Safe Monitoring PLC provides assistance.



Tailored service offers _ to meet individual needs

Our aim is to meet your individual needs and wishes, in keeping with the highest quality standards. In doing so, our focus is on one thing: providing expert advice and support to our customers from highly qualified staff. The people you will be dealing with have a wealth of experience in their field and you can be sure they will be familiar with the latest state of the art with regard to the rapidly advancing technologies we apply. Our comprehensive portfolio of tailored service offers is backed by a program of in-house training and development to ensure our skills and competencies are continually enhanced and extended. This section sets out our comprehensive portfolio of service offers.

-  Logistics service
-  Motor identification
-  Application-specific programming service
-  On-site commissioning
-  Drive design testing
-  Inspection service
-  Telephone support
-  Customer training
-  On-site troubleshooting
-  On-site firmware updating
-  Repair service
-  Parts service
-  Installation and refit service

Do you have a specific drive task?

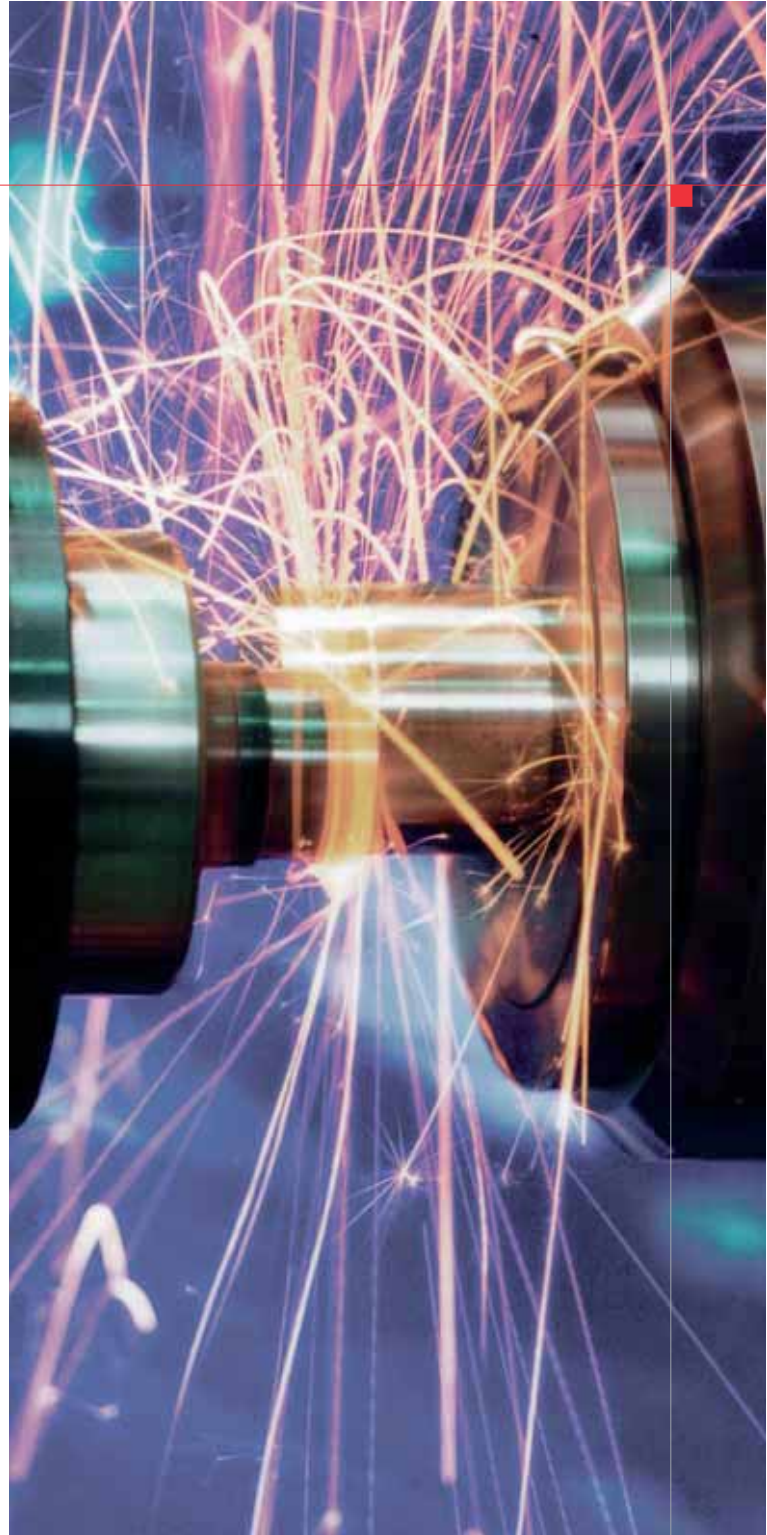
LTi will always provide you with a drive system tailored optimally to your application. What we offer:

- Analysis of your motion requirements
- Design of your drive system

The program ServoSoft is a powerful engineering tool capable of designing not only a motor or drive controller but all the components of a multi-axis system – that is to say: the complete drive system. They select from a range of drive mechanisms and configure drive systems with up to 20 axes. Complex motion profiles with all dynamic properties are also incorporated.

Are you looking for using the integrated iPLC, but are not used to programming via CoDeSys? Then we offer you:

- Joint drafting and validation of the requirements profile
- Selection of required system components
- iPLC programming to IEC 61131
- On-site commissioning and optimization of the servo system
- Project documentation
- Training of your departments in commissioning
- Customized CoDeSys and programming training courses





Products



ServoOne junior _ small and full of ideas



The ServoOne junior is the youngest and smallest product in the ServoOne family. Optimized for the lower power output range, it comes with all the technological genes present in the rest of the family. So full functional compatibility and continuous handling within the ServoOne family is guaranteed at all times.

- Maximum performance in three compact designs
- 3.0-8.0 A rated current with 1/3 x 230 V AC mains power supply
- 2.0-6.5 A rated current with 3 x 400-480 V AC mains power supply

The ServoOne-Junior effortlessly combines cost-optimization, minimal size and maximum functionality. The integration of high-speed field bus systems as well as the latest encoder interfaces such as the digital EnDat 2.2 interface demonstrates clearly once again that future-proofing and flexibility remain cornerstones of our development efforts. Extensive Motion Control functions provide a wide variety of potential solutions. Fully pluggable connections ensure rapid installation and commissioning of the ‚junior‘.

Thanks to its 300 % overload capacity, the ServoOne junior is ideally suited to highly dynamic motion tasks, particularly with linear motors.

Here, too, we have considered the safety of your machine. The ServoOne junior's SIL 3-certified STO functionality means it can be integrated into your safety concept as part of the LTi Safe Motion architecture. Combined with the programmable Safe Monitoring Control (SMC), standard speed-dependent functions and a wide variety of position-dependent functions can be safely monitored.



ServoOne _ a multi-talented single-axis expert



The AC-powered ServoOne single-axis servo is suitable for a broad spread of applications thanks to its very wide power output range. From handling systems to complex test rigs, there are no limits to the diversity of applications covered:

- 4-450 A rated current with 3 x 400-480 V AC mains power supply
- Overload factor up to 200 % at 8 kHz switching frequency
- 8 sizes for optimum performance tailoring

The fluid-cooled model greatly enhances performance. Protection against overheating due to malfunctions in the fluid circuit is provided by a fluid separation sensor integrated into the servocontroller. Regenerative energy is discharged by integrable braking resistors. Mounting of the resistors directly on the fluid cooler permits continuous braking power of up to 4 kW. To limit line-borne interference emission to the permissible level, all ServoOne units up to 72 A are fitted with an integral mains filter.

Maximum flexibility is ensured by two option slots in the ServoOne. Alongside many different field bus modules, other options available include analog outputs, encoder simulators, etc. And of course the options are already factory-fitted as an aid to installation and commissioning. Quick and easy serial commissioning is enabled by the MMC memory card, which holds all the drive data, the firmware and also your iPLC programs.

The integrable safety control enables you to fulfill your safety requirements with a solution which is economical, compliant with standards, and above all future-proof. This drive-based machine safety solution is particularly well suited to complex motion tasks.



ServoOne _ energy-efficient multi-axis system



Do you want kinetic braking energy to be not only converted into heat?

Do the drive axes in your system have a low simultaneity factor?

Are you looking to support a wide variety of mains voltages on the global market?

The ServoOne multi-axis system provides you with the answer. Comprising DC-powered axis modules and coordinated supply modules, the multi-axis system offers a high degree of solutions expertise and flexibility. Reduced wiring and shorter installation times are demands which can be easily met with the ServoOne multi-axis system. DC axis modules in seven different sizes offer a wide diversity of potential applications thanks to their comprehensive power range coverage:

- 4-170 A rated current
- Overload factor up to 300 % at 4 kHz switching frequency
- DC link fuses built-in

The ServoOne supply units are equipped as standard with sinusoidal power system feedback. A constantly controlled DC link voltage and the associated drive output ensure independence from differing mains voltages or fluctuations in different parts of the world. Surplus kinetic braking energy is converted into electric power and fed back into the supply system in sinusoidal form, thereby helping to preserve the environment as well as delivering financial benefits.

- Wide AC mains input range from 3 x 230 V to 3 x 480 V
- 26 kW, 50 kW, 75 kW and 110 kW DC input



A cost-effective, space-saving variant for supply to the DC axis modules, with a low simultaneity factor, is provided via the DC link of a ServoOne single-axis (Shared-DC system). In this, the total power output of the DC link corresponds to the output of the AC axis module. Kinetic braking energy is converted into heat by way of a shared braking resistor.

The ServoOne multi-axis system naturally offers you the full range of benefits of the ServoOne family:

- Extensive Motion Control functionality for complex synchronized multi-axis motion
- Various cooling concepts, such as internal cooling or fluid cooling
- Integrable safety control

System solutions _ all from one source



Its high degree of flexibility, its extensive functionality and its broad power range make the ServoOne a universally usable drive system for machinery manufacturers. Together with the MotionOne automation system and a complete motor range the ServoOne is capable of meeting any of your motion needs.

The modular MotionOne automation system provides a wide range of options for machine automation. No matter whether you are looking for scaleable HMI Panel solutions, you want to automate complex movements or require precise and dynamic drive technology, with everything having to meet the latest safety requirement (EN 13849) and featuring the very best programming on the market – our MotionOne automation system combines all components in a single solution.



ControlOne – Control platform
400 MHz Power PC to 1.1 GHz Atom
System field bus EtherCAT and CANopen
Fanless operation



MotionControl in the following areas:
Single-axis motion, electronic gearing
Cam plate to flying saw



HMI Panel – Stationary operator control units

With DVI interface
Display sizes from 8.4" to 15"
16 on-board inputs.



HMI Panel – Mobile operator control units

With Ethernet link
Display sizes from 3.4" to 6.5"
Integrated confirmation button and emergency stop



COconnect – Expansion modules

Digital inputs/outputs complying with IEC 61131
Analog modules with 14-bit resolution
Temperature measuring modules for J, K, L and PT100 thermocouples
Position detection modules with latch inputs





The wide spectrum of the LSH/LST motor series meets all requirements of dynamics, overload behaviour and speed range.

The LSH synchronous servomotor is the one to choose, because it features innovative compressed-winding technology. The LSH motor is just as impressive in standard applications, thanks to its high power density and the very good value for money it offers as a result. Thanks to its classic six-pole design, the LST synchronous servomotor is particularly suitable for applications involving nominal speeds above 3000 rpm. The LST motor is also the right choice for extreme overloads at standstill (e.g. press applications). Its increased moment of inertia is ideal for optimized adaptation to the inertia of the mechanics.

As a result, optimum control properties can be attained. The LSH/LST motors offer a wide variety of potential solutions:

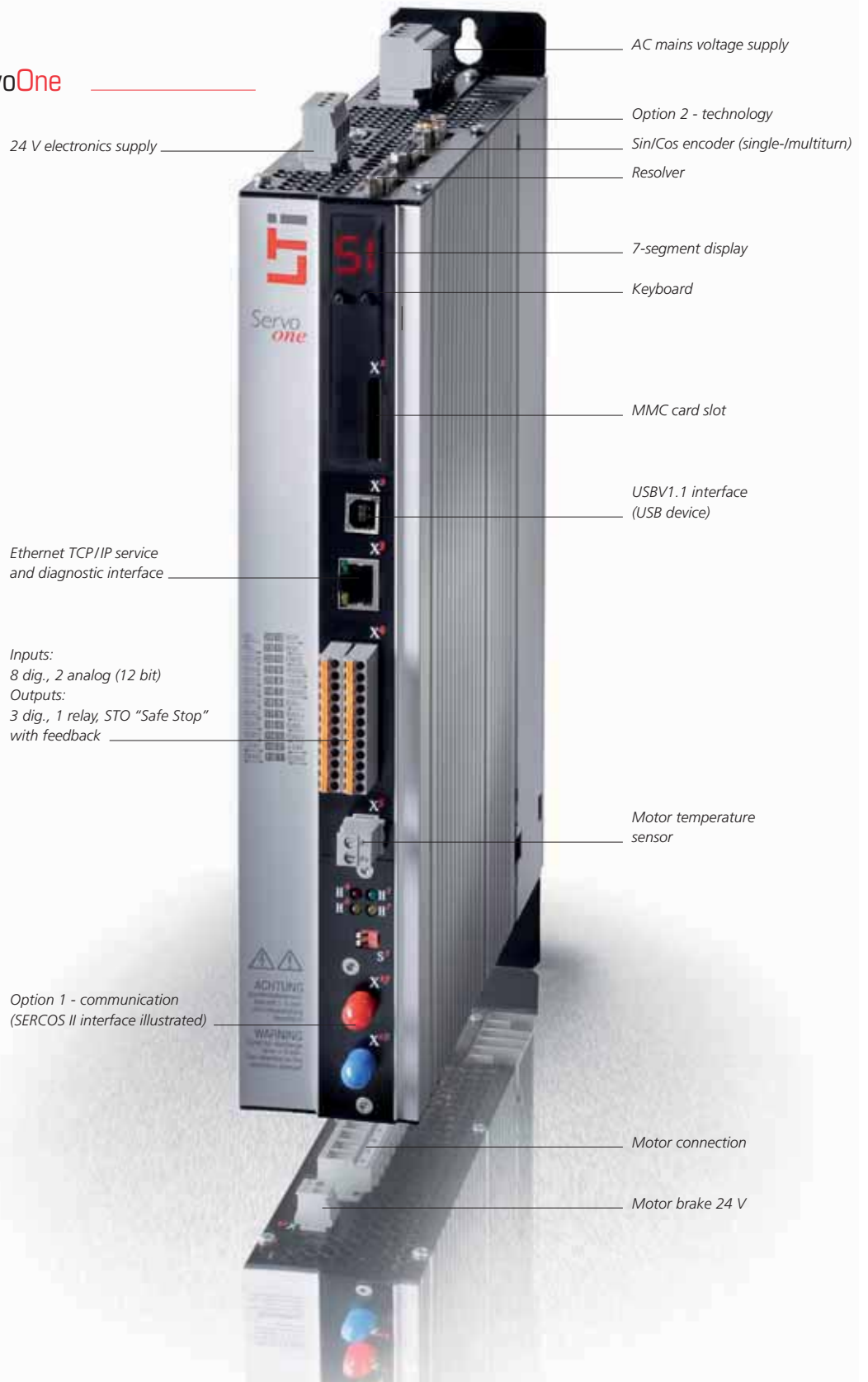
- Various encoder systems integrable (resolver, Sin/Cos single-turn and multi-turn encoders with EnDat or Hiperface interface)
- All connections pluggable, or also directly with line out
- Assembled system cables for power and encoder

Ironless synchronous linear motors will meet your need for maximum dynamics. The lack of cogging means that outstanding smoothness can be achieved. The linear motors can be combined with various optical or magnetic linear scales.





ServoOne





ServoOne junior

ServoOne junior

	BG2	BG3	BG4
Nominal voltage	1/3 x 230 V AC	1/3 x 230 V AC	1/3 x 230 V AC
	3 x 400/480 V AC	3 x 400/480 V AC	3 x 400/480 V AC
Rated current [Arms]	3 (230 V)	5.9 (230 V)	8 (230 V)
	2 (400 V)	3.5 (400 V)	6.5 (400 V)
Peak current [Arms]	9 (230 V)	17.7 (230 V)	24 (230 V)
	6 (400 V)	10.5 (400 V)	19.5 (400 V)
Cooling	Air cooling		
Field buses (Option 1)	EtherCAT, SERCOS II & III, CANopen, PROFIBUS-DPV1		
Technology (Option 2)	Sin/Cos-encoder, TTL-Encodersimulation/Encoder input		
Safety technology	STO according SIL 3 to IEC 61508/IEC 62061, PL e to EN ISO 13849		
Integrated safety control	1)		
Approvals	CE, UL		
Dimensions (W x H x D) [mm]	55 x 235 x 145	55 x 235 x 190	55 x 315 x 240

ServoOne _ Single-axis sy

with air cooling (A) or liquid cooling (L)

	BG1	BG2
Nominal voltage		3 x 2
		!
Rated current [Arms]	4/6 (A)	8/12 (A)
Peak current [Arms]	8/12 (AC)	16/24 (AC)
	12/18 (DC)	24/36 (DC)
Cooling	Air cooling	
Field buses (Option 1)		
Technology (Option 2)		
Safety technology		
Integrated safety control	optional	
Approvals		
Dimensions (W x H x D) [mm]	58.5 x 355 x 224	90 x 355 x 2

1) with external Safe Monitoring Control (SMC) 2) dif

Servomotors _ LSH/LST

	LSH-050	LSH-074	LSH-097	LSH-127	LST-037	LST-050	LST074	LST-097
Standstill torque [Nm]	0.26-0.95	0.95-4.2	4.1-8.6	11.6-27.0	0.1-0.3	0.20-0.95	0.65-3.0	2.6-9.5
Rated torque [Nm]	0.24-0.84	0.86-3.1	3.2-6.1	8.4-21	0.09-0.27	0.19-0.85	0.6-2.5	2.3-8.5
Rated speed [min ⁻¹]	4500	3000	3000	3000	6000	4500	3000	3000
Installation window [mm]	55	86	98	142	37	55	86	98
Design length [mm] ¹⁾	67-112	96-186	129-189	172-290	81-111	98-158	109-181	146-236
Moment of inertia [kgcm ²] ¹⁾	0.06-0.12	0.5-1.5	1.7-3.5	6.8-15.3	0.06-0.08	0.6-0.18	0.5-1.5	1.9-6.1

1) with resolver, without brake



BG3



BG4



BG5



BG6



BG7

stem (AC)/Multi-axis system (DC)

BG3	BG4	BG5	BG6	BG6a	BG7
30/400/480 V AC (AC)			3 x 400/480 V AC (AC)		3 x 400/480 V AC
565/770 V DC (DC)			565/770 V DC (DC)		
16/20 (A)	24/32 (A)	45/60/72 (A)	90/110 (A)	143/170 (A)	
20/25 (L)	30/40 (L)	53/70/84 (L)	110/143 (L)	170/210 (L)	250/325/450 (L)
32/40 (AC)	48/64 (AC)	90/120/144 (A)	180/220 (A)	286/315 (A)	425/552/765 (L)
48/60 (DC-A/L)	72/96 (DC-A/L)	90/120/144 (L)	220/286 (L)	340/340 (L)	
Air/liquid cooling		Air/liquid cooling			liquid cooling
EtherCAT, SERCOS II & III, PROFINET IRT, VARAN, CANopen, PROFIBUS-DPV1					
Sin/Cos-encoder, TTL-Encodersimulation/Encoder input					
STO according SIL 3 to IEC 61508/IEC 62061, PL e to EN ISO 13849					
(SIL 3 to IEC 61508/IEC 62061, PL e to EN ISO 13849) ²⁾			1)		
CE, UL					
24	130 x 355 x 224	175 x 355 x 224	190 x 382.5 x 240	280 x 600 x 242	280 x 600 x 322
					380 x 900 x 300

ifferent versions in preparation

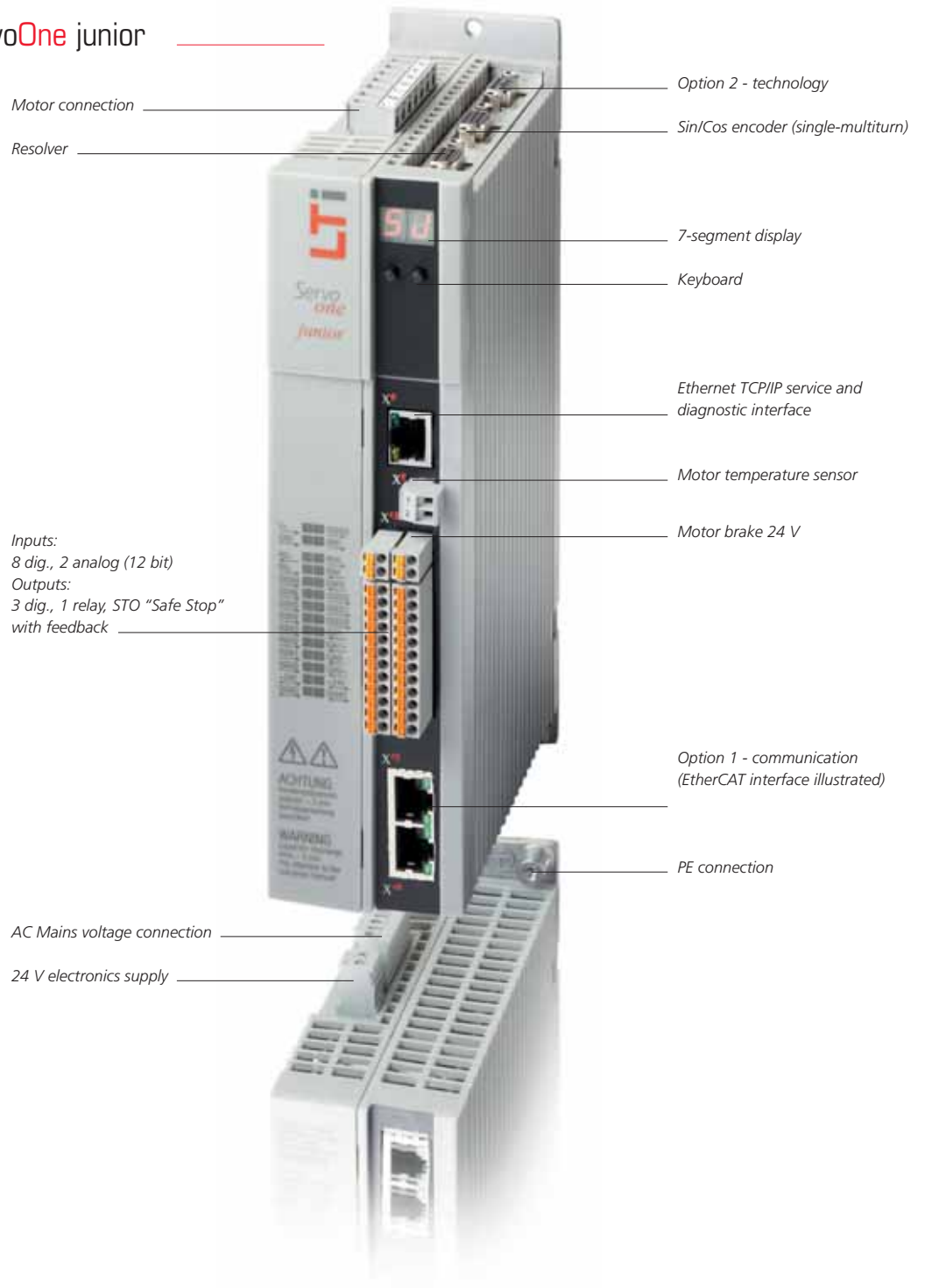
Supply units

LST-127	LST-158	LST190	LST-220
6.6-22.0	13.5-35.0	27.0-40.0	40.0-115.0
5.7-17.0	13.0-26.0	21.0-26.0	30.0-50.0
3000	3000	3000	3000
142	190	190	240
185-304	201-395	242-287	310-514
5.9-11.7	13.1-46.0	36.0-46.0	76.0-190.0

	BG5	BG6a
Nominal voltage	3 x 230/400/480 V AC	
DC-output voltage	max. 770 V (controlled)	
DC-power [kW]	26/50	75/110
Peak power [kW]	52/94	127/160
Cooling	Air-/liquid cooling	
Field buses (Option 1)	EtherCAT, SERCOS II & III, PROFINET IRT, CANopen, PROFIBUS-DPV1	
Approvals	CE, UL ¹⁾	
Dimensions (W x H x D) [mm]	190 x 418.5 x 238.5	280 x 600 x 320

¹⁾ UL in preparation

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