

# SYSTEM ONE



**SystemOne** CM  
Multi-axis system for safe  
automation solutions



The range of machinery in the engineering sector is enormous. Nevertheless, the demands placed on a new machine development can often be broken down into just a few points: It has to be smaller, faster and more precise; cheaper, and also safer. These demands appear entirely contradictory, and solutions to them barely conceivable. Yet the challenge has to be met, in order to survive and prosper in the face of global competition.

So we have accepted that challenge. LTi perfectly integrates a motion controller, a safety PLC, a central supply unit and multi-axis controller in a single form factor, setting entirely new standards in terms of:

- Compact design and cost-effectiveness
- Simplicity
- Flexibility
- Safety
- Dynamics and precision



REVOLUTION!!



# SYSTEM ONE

## The revolution in automation

We are revolutionising automation – with SystemOne CM. We have found a revolutionary way to combine apparently contrary attributes in a single, unique solution. This is made possible by a radical increase in integration at all levels. As a result, material input and thus size is reduced, and performance in terms of dynamics and precision is enhanced. Another advantage of the high level of integration and the reduced number of components is improved availability of the system, and thus of the machine. At the same time, this approach also reduces the system's complexity and simplifies engineering. With SystemOne CM, LTi has achieved the challenging goal of marrying state-of-the-art technology with economy – an attribute which makes us unique.

## The best of both worlds

As part of the Körber Group, a leading international technology concern, LTi is able to call upon long-standing know-how and a broad spread of applications expertise in many different sectors. The interchange of experience gathered enables LTi to create solutions which always deliver benefits to customers in their specific applications.



GET READY TO  
OPTIMIZE ON SIZE!

-75%

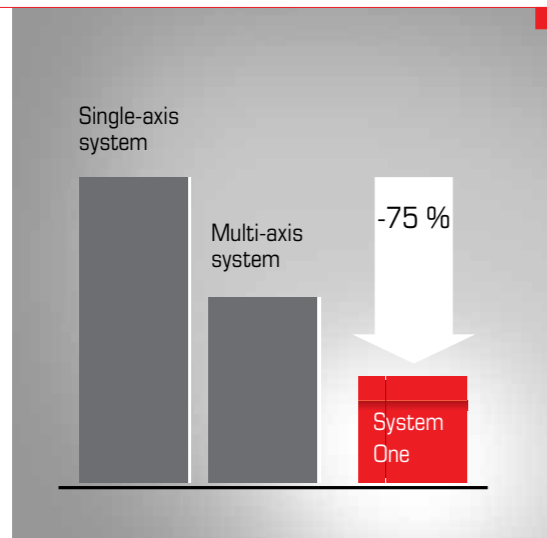


75 % more compact. SystemOne.

The rapid development of ever more compact form factors continues apace. The revolution is only just beginning! LTI is leading the way with radical ideas and new methods. And in SystemOne it offers a real innovation: Greatly reduced space take-up allied to improved power and performance. Welcome to a better world of machine control.



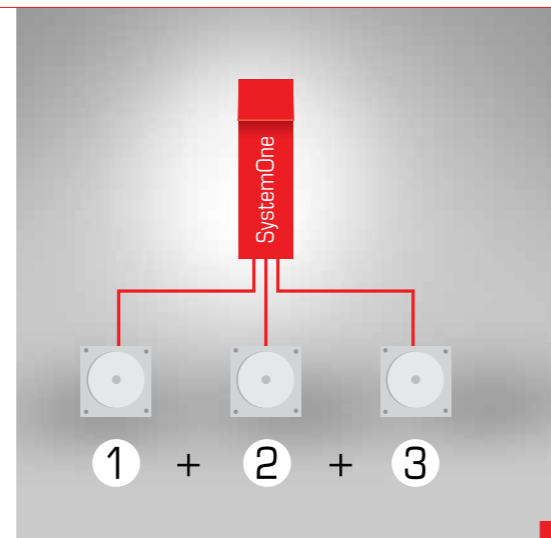
## 01



### The new benchmark

With a typical configuration of six axes, including motion controller, safety PLC and auxiliary power supply, SystemOne CM saves around 40 % on cabinet space compared to multi-axis systems commonly available on the market, and a further 60 % compared to the use of single axes.

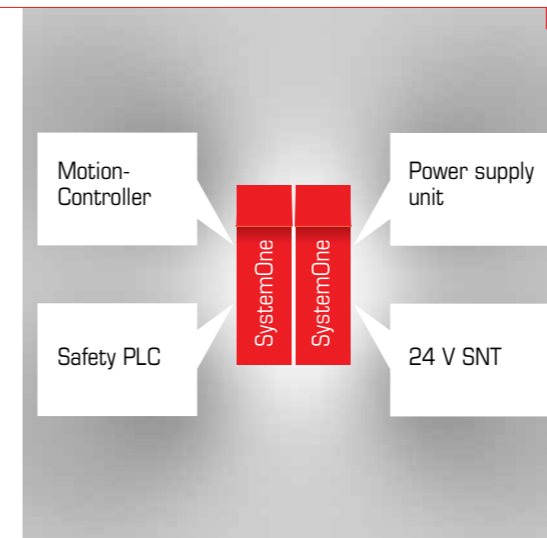
## 02



### Unique: 3-axis controller

Integration is the key to success. In keeping with that principle, the single and double axis controllers and the unique three-axis controller each have just one housing, one control electronics unit, and one switched-mode power supply. That ensures optimum cost-effectiveness and minimal space take-up.

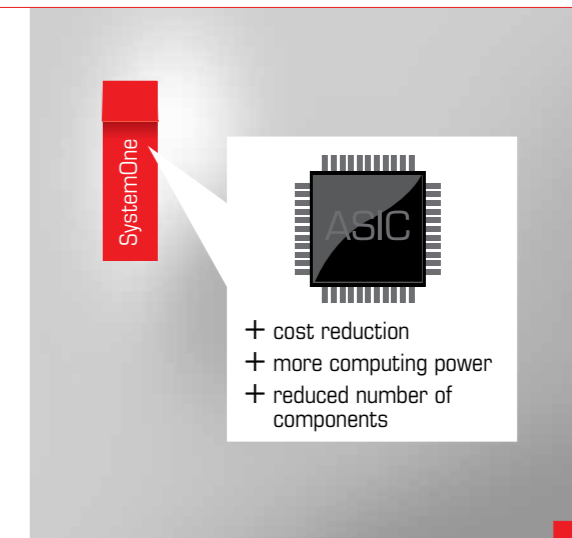
## 03



### Integration on a large scale

Integration is implemented consistently throughout the automation system. The motion controller and safety PLC are integrated into one module, and the multi-axis supply unit together with a 500 W switched-mode power supply in another.

## 04



### Integration on a small scale

Integration starts at circuit level. The drive controllers feature a newly developed control ASIC integrating the necessary computing power and the drive-specific hardware functionality in a low-cost implementation on a single chip.

Don't think about it,  
just do it !!!

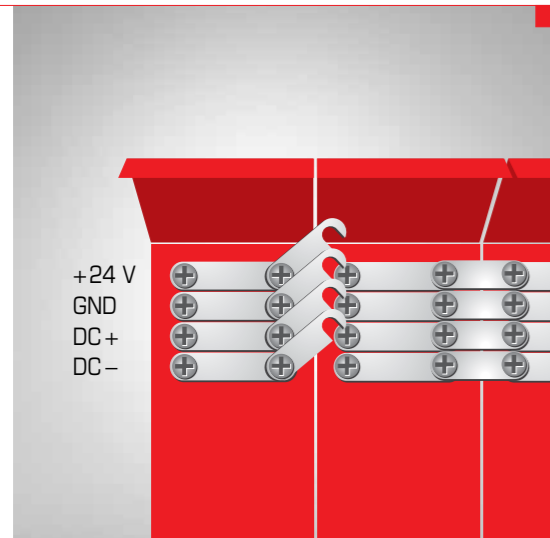


#### Simple is simple. SystemOne.

Why are intelligent steps to make things more simple so rarely recognised? Quite simply, because no one misses things that are superfluous! LTI's strong commitment to user benefit resulted in the radical simplicity of SystemOne, opening up entirely new possibilities.

# S I M P L I C I T Y

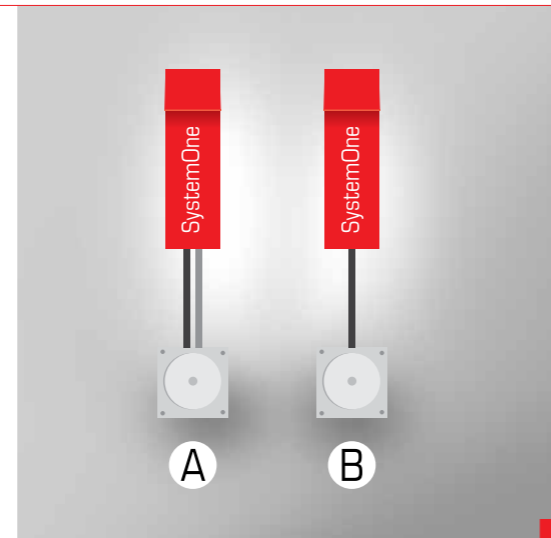
## 01



### Simple installation

Installation is much less complex than for conventional solutions, firstly because few components are needed, and secondly because the components can be interconnected by a simple, time-saving system.

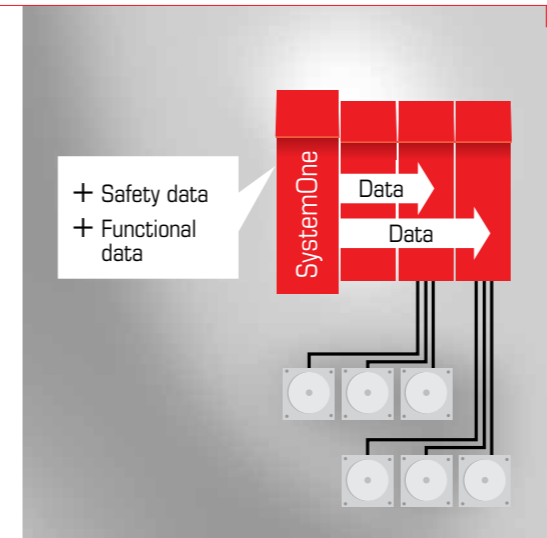
## 02



### Single-cable technology

As well as the conventional encoder systems, SystemOne CM also supports single-cable technology. This means the encoder cable can be omitted altogether, so making the installation process even simpler. The encoder data and the motor temperature are transmitted by just two wires of the motor cable.

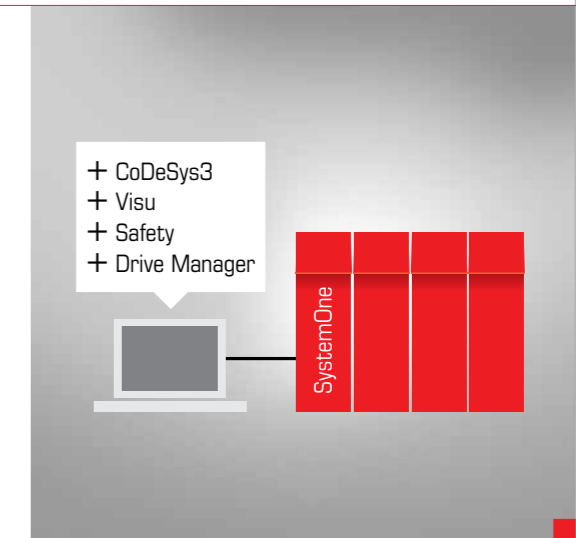
## 03



### One central data pool

Safe and functional data is held centrally in the motion controller and delivered to the drive controllers after power-on. This makes configuration much simpler because, for example, the necessary scaling of encoders and distance units is carried out only once, centrally. This reduces potential sources of error and simplifies engineering.

## 04



### One tool for all

The engineering, configuration and programming of the complete automation system is handled centrally by the MotionCenter PC tool. Its intuitive user-friendliness saves valuable engineering time.



BE FLEXIBLE  
Without breaking  
your back!



#### Focused flexibility. SystemOne.

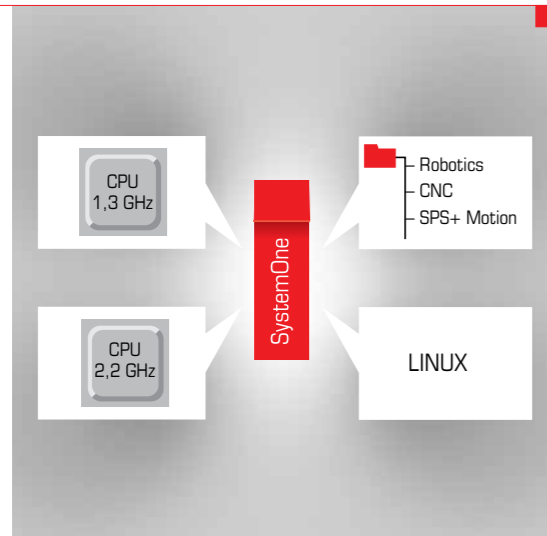
The flexible system beats the rigid one; open is replacing closed. SystemOne CM is open, so as to respond flexibly to the needs of today and to meet the challenges of tomorrow. We are open to new ideas, willing to go down new routes.

Are you coming with us?



# FLEXIBILITY

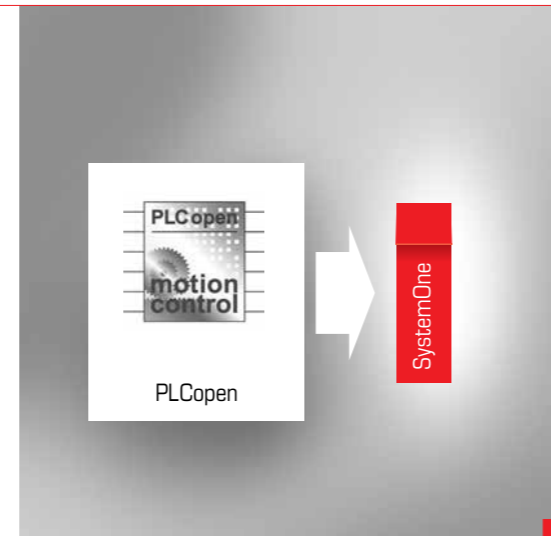
## 01



### Universal platform

The motion controller integrated in the SystemOne CM delivers scalable processor power from 1.3 GHz (Intel Atom) up to 2.2 GHz (Intel Core i3) and is suitable both for simple control applications and for dynamic and complex applications. Users have the choice of writing their applications themselves on a Linux platform, or using function packages from LTI.

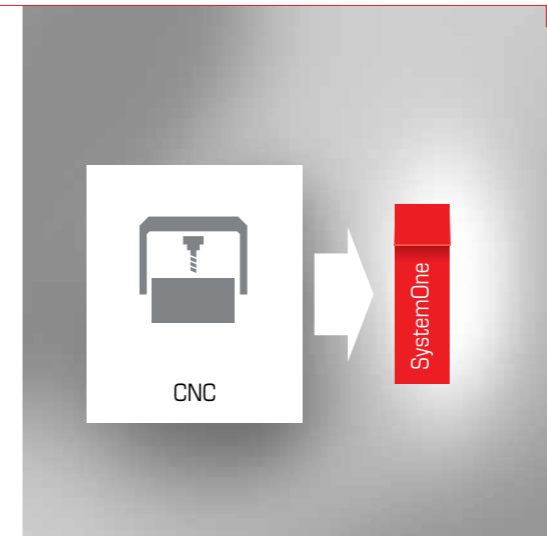
## 02



### PLC function package

The motion control function blocks based on PLCopen conform to an international control engineering standard. SystemOne CM also supports logic functions in addition to the function blocks for single and multi-axis motion. The programming languages defined in IEC 61131 are supported.

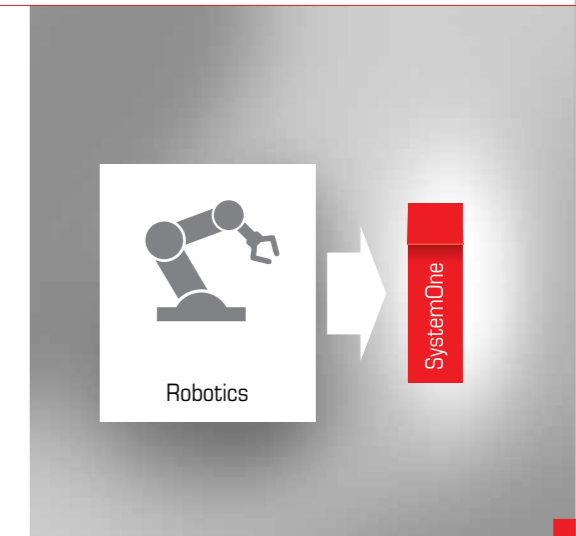
## 03



### CNC function package

Comprehensive, industry-specific function packages based on in-house developed and powerful andronic CNC cores are available for the automation of machine tools. For example, for laser machining, HSC machining, EDM machining, but also for special applications such as tool, crankshaft and cam shaft grinding. The applications range from simple 3-axis machining to complex, multiple-axis high end CNC machining. Powerful hardware and software enhancements are also optionally available, such as fast I/Os with time resolution of 10 ns for laser control.

## 04



### Robotics function package

The SystemOne CM robotics function packages cover simple handling tasks as well as robotics applications with their typical kinematics. They also incorporate the PLC function package. This provides a simple and elegant solution for combining synchronous and robotics applications for example.



GET READY  
FOR IMPROVEMENTS  
IN SAFETY AS WELL!



Safety to rely on. SystemOne.

How much safety is justified in machinery manufacture? Machines serve people. People need to be protected. Always. LTI devoted most of its development work on SystemOne to safety. The result is revolutionary: SystemOne offers complex safety functions which are unique. They enable solutions which were barely conceivable before.



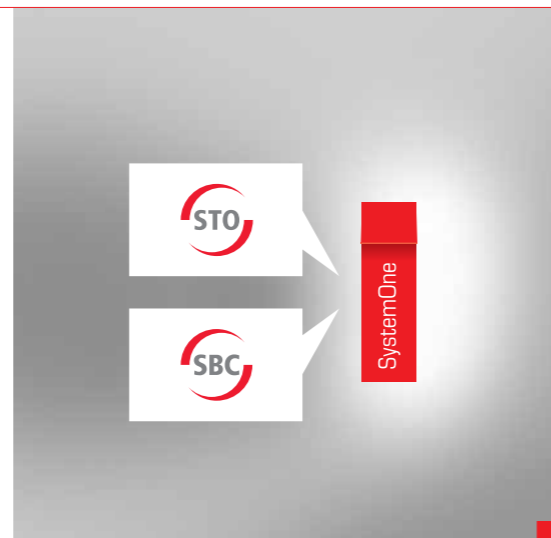
## 01



### ... in the safety PLC

SystemOne CM features a full-grade safety PLC which can be equipped with up to 32 safe on-board I/Os and enables highly economical safety solutions to be implemented. The safety PLC's safety program manages the safe I/Os in an entirely uncomplicated way as well as handling any necessary safe movements in the drive controllers.

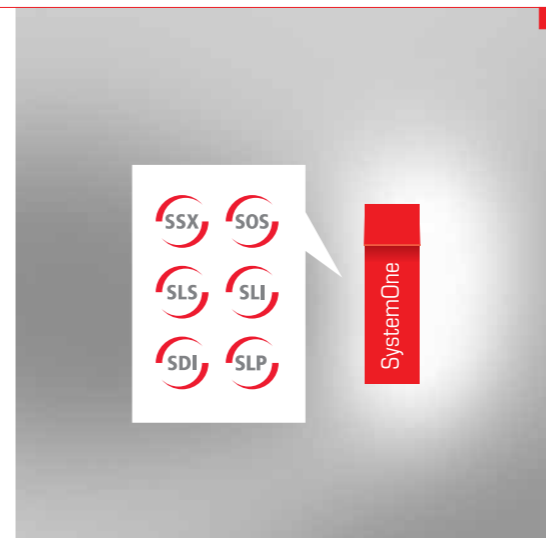
## 02



### ... in the axis controller as standard

The drive controllers in their standard version feature STO according to SIL 3, PL e, Cat 4 and SBC according to SIL 2, PL d, Cat 3, making them also suitable for demanding safety applications such as handling of suspended loads and presses.

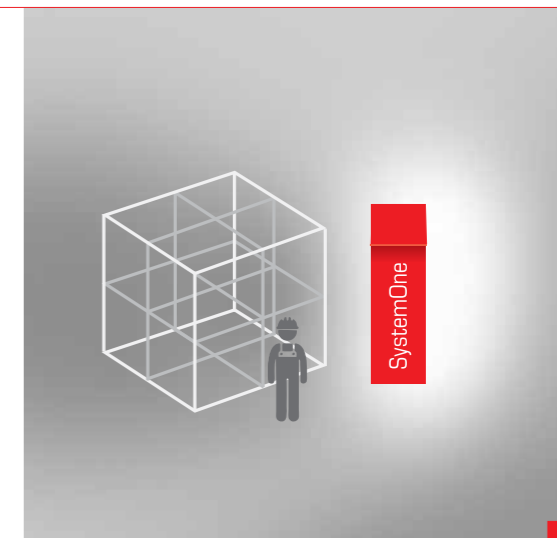
## 03



### ... in the axis controller as an option

The drive controllers can optionally incorporate safe monitoring of their motion. This involves the use of two safety controllers, monitoring the motion and each other. Such a configuration implements the SS1, SS2, SOS, SLS, SLI, SDI and SLP functions according to SIL3, PL e, Cat 4. This high safety level enables them to be deployed in any application.

## 04



### ... in the working area

A safety highlight is the safe working area monitoring. In this, the drive controllers transmit the safe positions to the safety PLC via EtherCATFSOE. With known kinematics, the safety PLC is then able to safely monitor a working area or safeguard collaboration between human operators and robots.



GET TO SUCCESS

F A S T !!



Precision in spite of dynamism.

SystemOne.

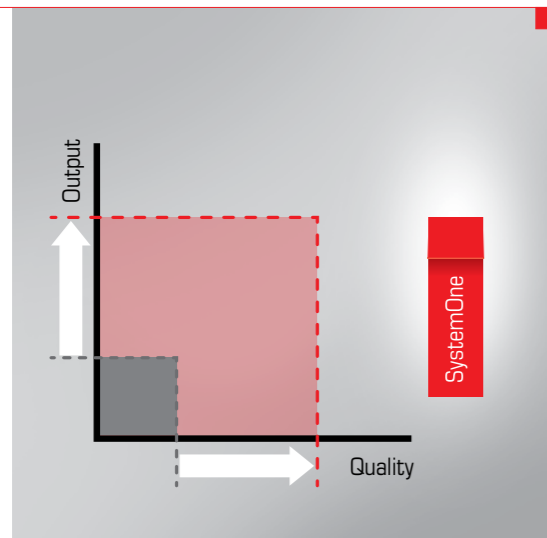
Why is every machine manufacturer a potential revolutionary? Developers operate at the extremes, striving continuously to expand the limits of speed and accuracy. LTI is at the forefront of those efforts, and with SystemOne has launched the next revolution.

We are pushing the boundaries of dynamics and precision, setting new standards as we go.



# DYNAMICS + PRECISION

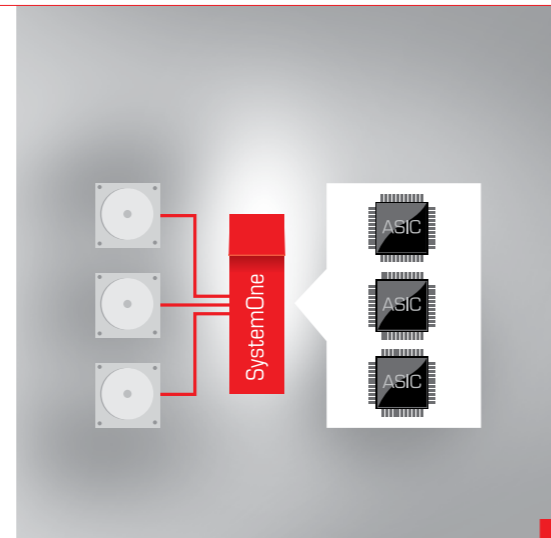
## 01



### Increase productivity

One of the key characteristics of a machine is its productivity. The higher the output per time unit, the more economical the machine is. More and more often, high demands in terms of precision are being made alongside the need for high output rates. SystemOne CM incorporates a whole range of functionality and features aimed at increasing the dynamics and precision of machinery.

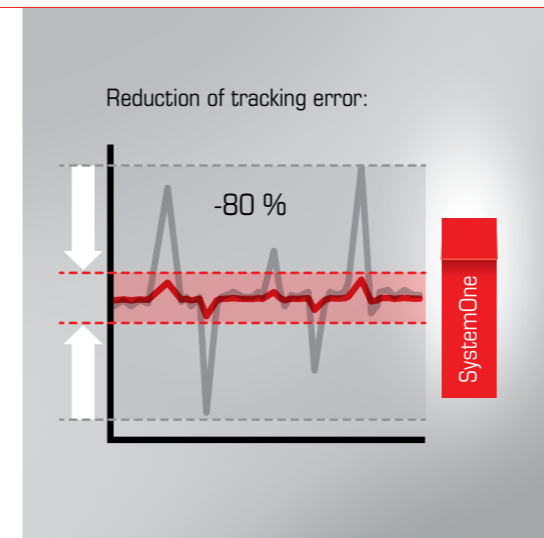
## 02



### High-performance hardware

Each axis module has a high-performance ASIC with a 32-bit microcontroller and floating-point unit for each axis controller. A three-axis controller thus has three ASICs, meaning its computing power is entirely unrestricted by comparison to a single-axis controller. As a result, it can implement a 16 kHz current controller clock if required. Together with the built-in noise suppression functions, this provides outstanding control performance.

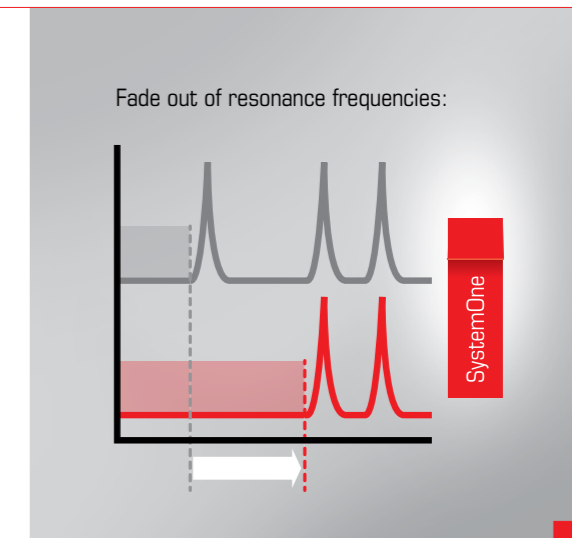
## 03



### Compensation functions

Functions to compensate for encoder errors, mechanical natural frequencies and errors in the mechanical transmission path are available, as are detent and friction torque compensation functions. This is complemented by a predictive pre-control structure with pico-interpolation. With the integrated autotuning functions you are therefore just one click away from the optimum setting.

## 04

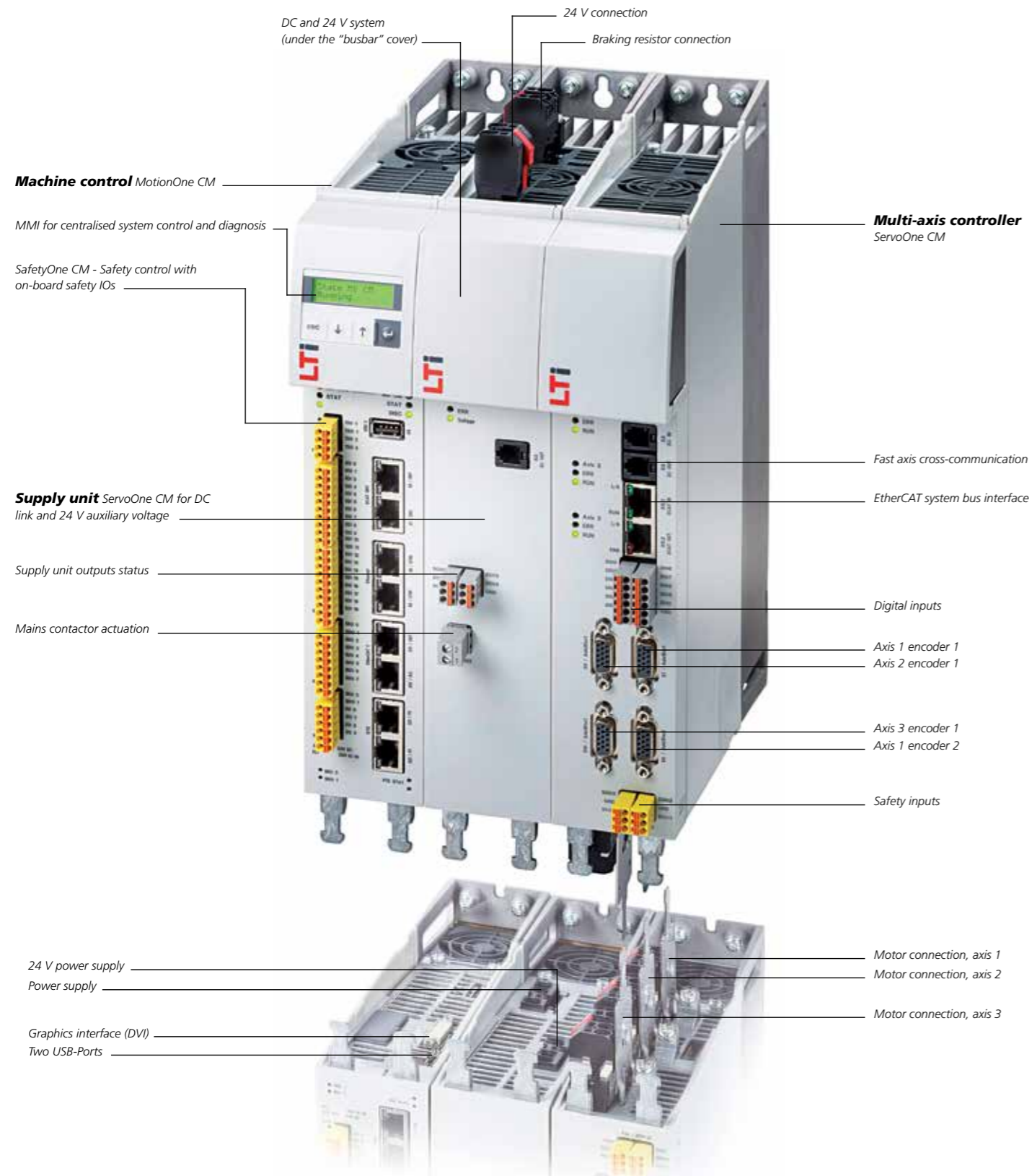


### Eliminating vibration

To provide optimum control of vibrating mechanisms, SystemOne CM identifies the mechanical transmission path with its frequency response and natural frequencies. Based on that data, state controllers with observer structures are automatically parameterised, and provide dynamics and precision at the outer limits of the physically possible.



## Multi-axis system SystemOne CM



## MotionOne CM (Safety)

Open-loop control	Motion (basic)	Motion + (advanced)
Processor	1,1 GHz Atom	Intel i3 2,2 GHz
Operating system	Linux	
Dimensions [mm]	55 x 310 x 241	
RAM	512 MB	1 GB
Interfaces	Master: EtherCAT, Ethernet (Gigabit), USB, graphics (DVI) Slave: SERCOS III, PROFINET, Ethernet IP	
Digital inputs	over EtherCAT module cluster	
Digital outputs	over EtherCAT module cluster	
Storage media	CFast, SD, USB	
SafetyOne basic	Safe IO: 8DI, 4DO	
SafetyOne advanced	Safe IO: 20DI, 10DO, 2 Relais	

## ServoOne CM

ServoOne CM axis controller							
Maximum output current [A] <sup>(1)</sup>	4,5	9	18	36	48 (40) <sup>(2)</sup>	72	80
Nominal current [A]	1,5	3	6	12	16	24	32
Dimensions [mm]	Size 1: 55 x 310 x 241			Size 2: 110 x 310 x 241			
Single-axis controller	Size 1			Size 2			
Double-axis controller	Size 1		Size 2		-		
Triple-axis controller	Size 1		Size 2		-		
Encoderinterface	Resolver, SinCos, Hiperface, Hiperface DSL, EnDAT						
Field bus	EtherCAT CoE						
Default inputs	11 DI						
Safety inputs	4 DI						
Standard safety	STO (SIL3, PL e, Kat 4)						
Optional safety	Programmable in combination with SafetyOne CM						
Cooling method	Wall-mounted, cold plate, push-through						

<sup>(1)</sup> Overload for 500 ms <sup>(2)</sup> For Size 2

ServoOne CMP supply unit	10 kW	22 kW
Dimensions [mm]	55 x 310 x 241	110 x 310 x 241
Supply voltage	3 x 400 V AC	
Brake resistor	Yes, internal resistor optional	
Precharging	Charging current limitation	
Power supply unit 24V DC, 20 A	built-in	
Mains contactor	Actuation for external mains contactor	
Mains filter	External collective mains filter	

systemone-cm.com



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