LTI MOTION
KÖRBER SOLUTIONS

ServoOne System Catalogue

ServoOne junior from 2 A to 16 A
ServoOne single-axis system from 4 A to 450 A
ServoOne multi-axis system with regeneration from 4 A to 540 A

ServoOne System Catalogue

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Register

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Overview of functions and features of the ServoOne family

The modularity of the ServoOne family guarantees you optimum integration into the machine process at all times. A co-ordinated 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 capabilities.

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

Servo drives from 4-450 A as DC-supplied multi-axis system
with sinusoidal regenerative power supply units

High-speed communication
based on a wide variety of profile-compliant 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

Co-ordinated software functions and packages
with Motion Control functionality for any application

iPlc according 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 optimal switch cabinet utilisation

Flexible cooling methods
featuring air or liquid cooling

Future-proof
thanks to a flexible expansion concept

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

Overview of ServoOne family

ServoOne junior

Chapter 2

Optimised for the lower power range, the ServoOne junior comes with all the technological genes present in the rest of the family. Full functional compatibility and uniform handling within the ServoOne family is guaranteed at all times.

- 3 - 8 A rated current at 1/3 x 230 V AC
- 2 - 16 A rated current at 3 x 400 - 480 V AC
- Up to 300% overload capacity

ServoOne single-axis system

Chapter 3

The ServoOne servocontroller is suitable for a broad spectrum of applications thanks to its very wide power range. From handling systems to complex test rigs, there are no limits to the diversity
of the applications covered.

- 4 - 450 A rated current at 3 x 230 - 480 V AC
- 8 sizes for optimum performance tailoring
- Air or liquid-cooled systems
- Safety control can be integrated

ServoOne multi-axis system

Chapter 4

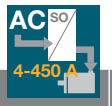
Comprising DC-powered axis controllers and co-ordinated supply units with sinusoidal regenerative power supply, the multi-axis system offers a high degree of solutions expertise and flexibility. A constantly controlled DC link voltage ensures independence from varying mains voltages in different parts 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.

- Axis controllers 4 - 450 A rated current
- DC link fuses integrated
- Supply units with 26 kW - 360 kW
  DC input power

Functions of the ServoOne devices in detail

Hardware					
Performance data					
Mains voltage		1/3 x 230 V AC 3 x 400 - 480 V AC	1 x 230 V AC 3 x 230 - 480 V AC	565 - 770 V DC	3 x 400 - 480 V AC
Rated current at 1 x 230 V AC		3 - 8 A (1/3 x 230 V)	4 A (1 x 230 V)	-	-
Rated current at 3 x 400 V AC		2 - 16 A	4 - 450 A	-	-
Rated current at 565 V DC		-	-	4 - 450 A	-
DC power		-	-	-	26 - 360 kW
Overload factor		3.0	1.5 - 2.0	1.5 - 3.0	1.0 - 2.0
Rotating field frequency		400 Hz	400 Hz 1600 Hz optional	400 Hz 1600 Hz optional	-
Power stage switching frequency		4, 8, 16 kHz	2, 4, 8, 12, 16 kHz	2, 4, 8, 12, 16 kHz	4, 8, 12 kHz
Sinusoidal regeneration		-	-	-	●
Brake chopper electronics integrated		●	●	-	●
Braking resistor integrated		○	○	-	-
Safety technology					
STO - Safe Torque Off		●	●[3)]	●[3)]	-
Integrated safety control		-	○[4)]	○[4)]	-
Control hardware					
Inputs analogue (±10 V DC, 12 bits)		2	2	2	2
Outputs analogue (±10 V DC, 2 x 12 bits)		-	○	○	-
Inputs/outputs digital - standard		8/3	8/3	8/3	8/3
of which touch probe inputs		2	2	2	-
Digital input/output expansion (4 inputs/8 outputs)		○	○ [2)]	○ [2)]	-
Relay		1	1	1	1
Motor temperature monitoring		● PTC, KTY, Klixon	● PTC, NTC, KTY, Klixon	● PTC, NTC, KTY, Klixon	-
Encoder systems					
Encoder channel 1	Resolver	●	●	●	-
Encoder channel 2	SinCos encoder with NP, SSI, EnDat or HIPERFACE®	●	●	●	-
	SSI encoder	●	●	●	-
	EnDat encoder digital	●	●	●	-
	TTL encoder	●	●	●	-
Field bus systems					
CANopen		○	○	○	○
PROFIBUS-DPV1		○	○	○	○
Sercos II		○	○	○	○
Sercos III		○	○	○	○
EtherCAT		○	○	○	○
PROFINET IRT		○	○	○	-
Powerlink[2)]		○	○	○	-
Technology					
Second SinCos encoder	SinCos encoder with NP, SSI, EnDat	○	○	○	-
	SSI encoder	○	○	○	-
	EnDat encoder digital	○	○	○	-
	TTL encoder	○	○	○	-
One-cable system with HIPERFACE DSL encoders		○	-	-	-
TTL encoder simulation		○	○	○	-
SSI encoder simulation		-	○	○	-
TTL master		○	○	○	-
TTL encoder with commutation signals		○	○	○	-
Bidirectional axis cross-communication (TwinSync, max. 2 axes)		○	○	○	-
Cooling methods					
Air cooling		●	● Up to SO84.170	● Up to SO84.170	● Up to SO84.170.S
Liquid cooling		-	● From SO84.016	● From SO84.016	●

● = *Standard* ○ = *Optional* *- Not available* *2) In preparation* *3) See section 3-15 or 4-22* *4) See chap 5 Safety technology*



Hardware				
EMC acceptance				
Mains filter integrated C2 (10 m) / C3 (25 m)	-	● Up to SO84.072	-	-
Mains filter external C2 (10 m) / C3 (30 m)	○	-	-	-
Mains filter external C2 (100 m) / C3 (150 m)	-	○	-	○
Acceptance	CE, UL	CE, UL	CE, UL	CE, UL, UL up to SO84.170.S

● = *Standard* ○ = *Optional* *- Not available* *2) In preparation*

Software functions			
Commissioning			
Automatic motor identification	●	●	●
Automatic encoder offset definition	●	●	●
Autotuning	●	●	●
Motor systems			
Rotary asynchronous motors	●	●	●
Rotary synchronous motors	●	●	●
Linear synchronous motors	●	●	●
Control modes			
Torque/force control	16 kHz	16 kHz	16 kHz
Speed control	8 kHz	8 kHz	8 kHz
Position control	8 kHz	8 kHz	8 kHz
Open-loop motor control VFC	-	○	○
Sensor-less control of synchronous motors	1)	1)	1)
Control functions			
Field weakening for asynchronous motors	●	●	●
Field weakening for synchronous motors	●	●	●
Autocommutation for synchronous motors	●	●	●
Acceleration pre-control	●	●	●
Predictive speed pre-control	●	●	●
Freely configurable filters (PT1-PT4, band elimination filter etc.)	●	●	●
Active vibration damping	●	●	●
Correction methods			
GPOC (encoder correction)	●	●	●
Friction torque compensation	●	●	●
Detent torque compensation	●	●	●
Axis/spindle error correction	●	●	●
Motion profiles			
Point-to-point positioning	●	●	●
Interpolating positioning	Linear, spline	Linear, spline	Linear, spline
Synchronous motion / electronic gearing	●	●	●
Modulo/rotary axis	●	●	●
Cam plates	○	○	○
Axis-guided homing runs	●	●	●
Virtual master	●	●	●
Standards-compliant motion profiles	CANopen CiA 402 sercos EtherCAT CoE PROFIdrive	CANopen CiA 402 sercos EtherCAT CoE PROFIdrive	CANopen CiA 402 sercos EtherCAT CoE PROFIdrive
Scaling in user units (°, µm, …)	●	●	●
Technology			
Programmable in IEC 61131	○	○	○

● = *Standard* ○ = *Optional* *- Not available* *1) Included in function package HF*

Features of the safety control that can be integrated			
System			
Configuration mode		User-programmable safety control [5]	
Safety acceptance		SIL3 acc. to IEC 61508 / IEC 62061, PL e and cat 4 acc. to EN ISO 13849 [4]	
Control hardware			
Safe digital inputs		4 [3]	
Safe digital outputs		4 [3]	
… of which usable as safe pulse outputs		4	
Safe brake outputs		2 [3]	
Safety sensors that can be connected		Light grids, emergency stops, guard doors, laser scanners; mode selector switches, guard locks, enable buttons, two-handed controls, etc.	
Standard analogue inputs (±10 V, 12 bits)		2	
Standard digital inputs		6	
	Safety functions	**Speed-dependent**	**Position-dependent**
STO	Safe Torque Off	●	
SS1	Safe Stop 1	●	
SS2	Safe Stop 2	●	
SLS	Safe Limited Speed	●	
SDI	Safe Direction	●	
SLSmax	Safe Limited Speed maximum	●	
ECS	Encoder Supervisor	●	
ESM	Encoder Standstill Monitoring	●	
SOS	Safe Operating Stop	●	●
SCA	Safe Cam	●	●
SLI	Safe Limited Increment		●
SCA	Safe Cam		●
SEL	Safe Emergency Limit		●
Safety functions (brake)			
SBC	Safe Brake Control	●	
Safety functions (bus systems)			
SCC	Safe Cross Communication	●	
Tools			
SafePLC S for ServoOne		●	
DriveManager (parameter changes)		●	

● = *Standard* O = *Optional* *- Not available*

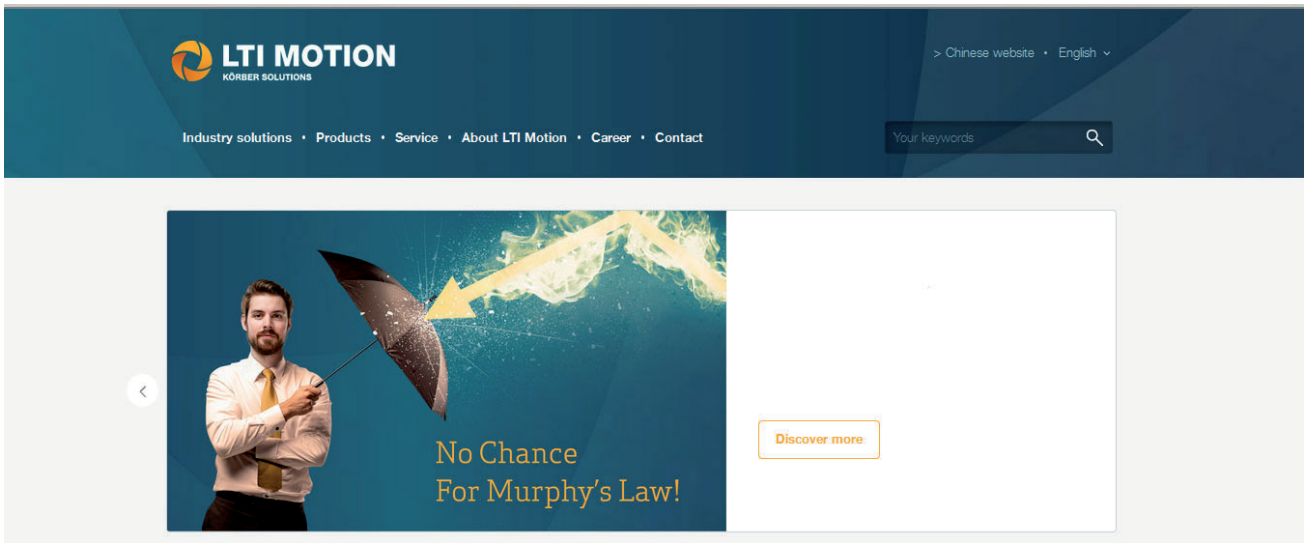
2) Project-specific

3) SIL2; SIL3 with redundant use of the inputs/outputs (2-channel)

4) See section 3-15 or 4-22

5) Only up to BG5, AC and DC - not Junior

Services



LTi Motion offers a wide range of information on the Internet. Whether you are looking for further technical information on our products or on project planning and design, or want to contact your nearest representative - just visit our website.

www.lt-i.com

Or call us on +49 6441 966-0 to obtain detailed information material on our broad range of services, available in printed form as a convenient reference source.

Design-in

Professional project management that keeps you to deadlines and budgets is an important element of our joint success. The sooner you get to market with your new solution the better. That is why we support you in

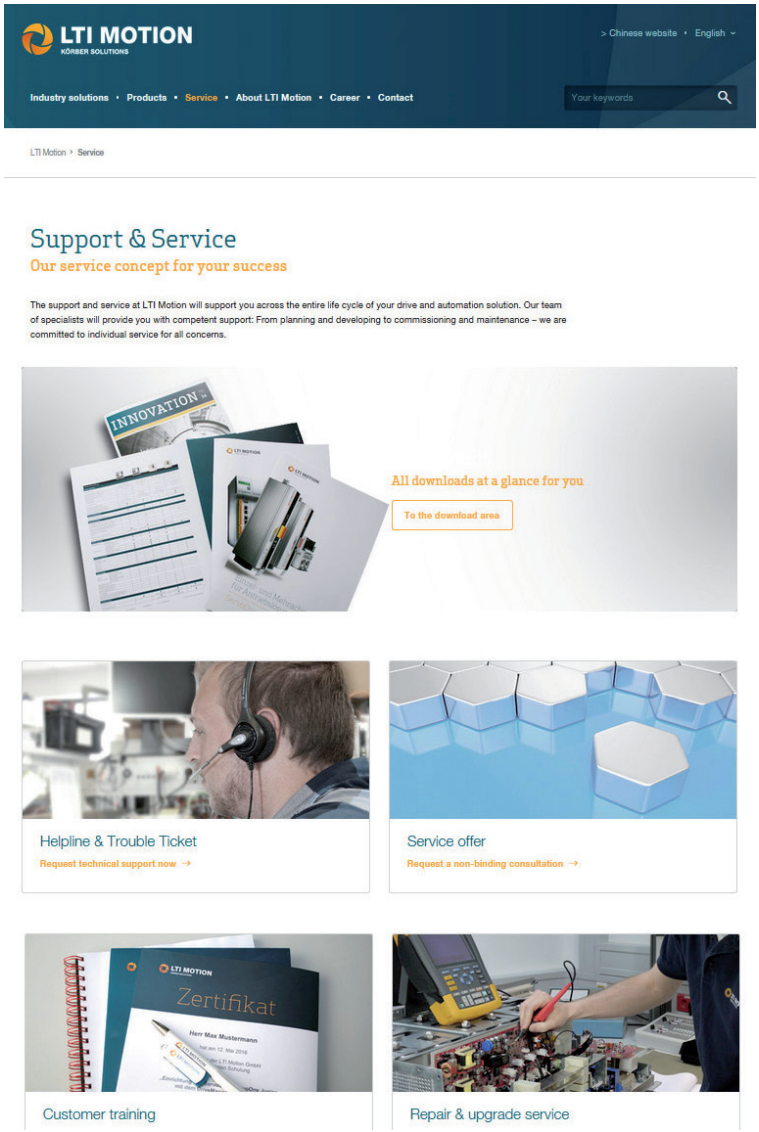
- Analysing requirements
- Project planning and drive design
- Preparing the functional specification
- Total cost analysis
- Project management

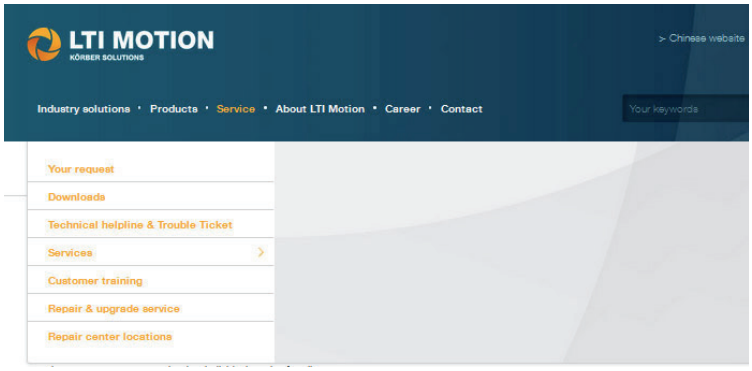
Logistics

To make ordering a routine exercise and reduce or even eliminate unnecessary formalities, the entire process is co-ordinated, from planning through ordering to spare parts supplies.

Software update service

As part of our product maintenance function we are continuously improving the quality of the drive system. Our software update service provides you with information on new releases and enhancements to the various firmware versions.





After-sales

You can call on our service and support wherever and whenever you need assistance. With our flexibility, fast response times, superior technical know-how and extensive user experience, we can offer a wide range of services, e.g.

- On-site commissioning
- Advice and training
- Repairs/service concept

Helpline

Our Helpline can assist you with

- Telephone commissioning of standard products and systems
- Evaluating error and diagnostic indications
- Locating and dealing with reproducible faults
- Software updates

It is available as follows:

Mo.-Fr.: 8 a.m. - 5 p.m. (CET)
Telephone: +49 (0) 6441 966-180
E-mail: helpline@lti-motion.com
Internet: ▶ www.lti-motion.com
▶ Support & Service
▶ Trouble Ticket

Downloads

You will find detailed information on our products in the "Downloads" section on our homepage at www.lt-i.com.

Space for your own notes

ServoOne junior

BG2 BG3 BG4 BG5

Supply voltage 1 x 230 V / 3 x 230 V

Type	Size	Rated current	Current carrying capacity	Technical data
SO22.003	BG2	3 A	Page 2-4	Page 2-8
SO22.006	BG3	5.9 A	Page 2-4	Page 2-12
SO22.008	BG4	8 A	Page 2-4	Page 2-14

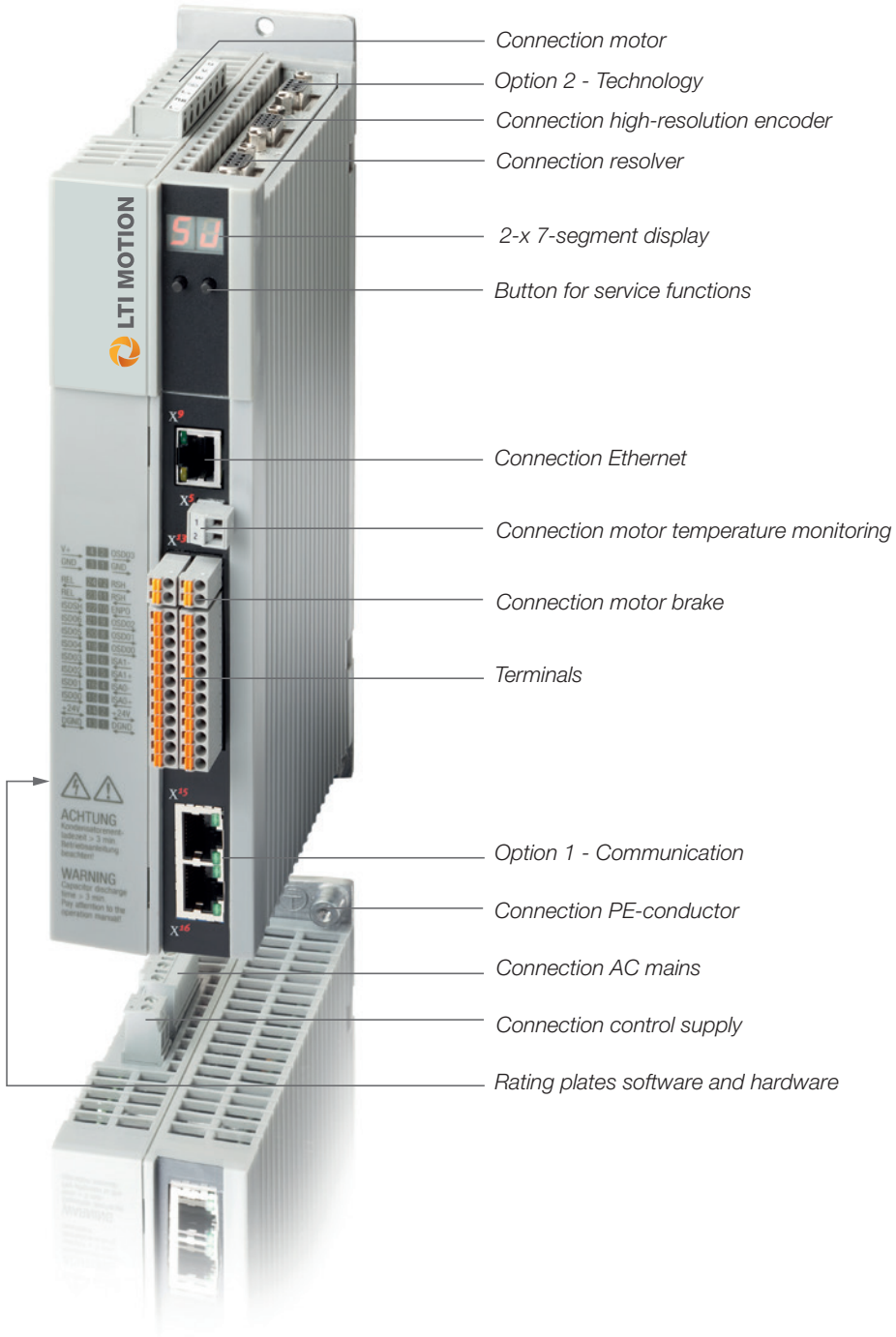
Supply voltage 3 x 400 V

Type	Size	Rated current	Current carrying capacity	Technical data
SO24.002	BG2	2 A	Page 2-5	Page 2-8
SO24.004	BG3	3.5 A	Page 2-5	Page 2-12
SO24.007	BG4	6.5 A	Page 2-5	Page 2-14
SO24.012	BG5	12.0 A	Page 2-5	Page 2-16
SO24.016	BG5	16.0 A	Page 2-5	Page 2-16

Order codes, ServoOne junior

Article designation	S02	4	.	006	.	0	0	2	1	.	0	0	0	0	.	X
ServoOne junior (SOJ)																
Supply voltage: 3 x 400 V		4														
Supply voltage: 1/3 x 230 V		2														
Rated current	BG2	2.0 A		002												
	BG2	3.0 A		003												
	BG3	3.5 A		004												
	BG3	5.9 A		006												
	BG4	6.5 A		007												
	BG4	8 A		008												
	BG5	12 A		012												
	BG5	16 A		016												
Mains supply	AC					0										
Safety technology	STO						0									
Option 1 Communication	Not included							0								
	Sercos II							1								
	PROFIBUS							2								
	EtherCAT							3								
	CANopen							4								
	PROFINET							7								
	Sercos III							8								
Option 2 Technology	Not included								0							
	Second SinCos encoder								1							
	TTL encoder simulation/TTL master encoder								2							
	TwinSync communication								3							
	TTL encoder with commutation signals								5							
	Analogue/digital input/output expansion (MIO)								6							
	Digital input/output expansion (DIO)								8							
	One-cable interface								D							
Housing/cooling method	Air-cooled (standard)										0					
	Air-cooled with internal braking resistor (not BG2)										1					
Function package	Basic (without additional function package)											0				
	iPlc											1				
Special design	None												0			
Protection	Standard													0		
	PCBs with protective varnish													1		
Hardware version	(may be multi-digit)															X

Features, ServoOne junior



Current carrying capacity, ServoOne junior

The rated current of the ServoOne junior and the maximum peak current are dependent on the mains voltage, the motor cable length, the power stage switching frequency and the ambient temperature. If the conditions change, the maximum permissible servocontroller current carrying capacity also changes.

ServoOne junior for 1 x 230 V

Device	Switching frequency of the power stage	Ambient temperature	Rated current I_N [A_{eff}]	Peak current			
				200% (2 I_N)		300% (3 I_N)	
	[kHz]	max. [°C]	at 1 x 230 V	[A_{eff}]	For time [s]	[A_{eff}]	For time [s]
S022.003	4	45	3	6	10	9	0.08
	8	40	3	6		9 [1)]	0.08 [1)]
	16	40	2	4		6 [1)]	0.08 [1)]
S022.006	4	45	5.9	11.8	10	-	-
	8	40					
	16	40					
S022.008	4	45	8	16	10	-	-
	8	40	8	16			
	16	40	5.4	10.8			

1) Automatic power stage switching frequency change to 4 kHz

Data apply for a motor cable length ≤10 m. Maximum permissible motor cable length 30 m.

All current ratings with recommended mains choke

ServoOne junior for 3 x 230 V

Device	Switching frequency of the power stage	Ambient temperature	Rated current I_N [A_{eff}]	Peak current			
				200% (2 I_N)		300% (3 I_N)	
	[kHz]	max. [°C]	at 3 x 230 V	[A_{eff}]	For time [s]	[A_{eff}]	For time [s]
S022.003	4	45	3	6	10	9	0.08
	8	40	3	6		9 [1)]	
	16	40	2	4		6 [1)]	
S022.006	4	45	5.9	11.8	10	17.7	0.08
	8	40				17.7 [1)]	
	16	40				17.7 [1)]	
S022.008	4	45	8	16	10	24	0.08
	8	40	8	16		24 [1)]	
	16	40	5.4	10.8		16.2 [1)]	

1) Automatic power stage switching frequency change to 4 kHz

Data apply for a motor cable length ≤10 m. Maximum permissible motor cable length 30 m.

ServoOne junior for 3 x 400 V

Device	Power stage switching frequency	Ambient temperature	Rated current I_N	Overload capacity			
				Overcurrent		Peak current	
	[kHz]	max. [°C]	[A_{eff}]	[A_{eff}]	For time [s]	[A_{eff}]	For time [s]
S024.002	4	45	2.0	4.0	10[2)]	6.0	0.08[2)]
	8	40	2.0	4.0		6.0[1)] 4.0	
	16	40	0.7	1.4		6.0[1)] 1.4	
S024.004	4	45	5.5	7.1	10[2)]	10.5	0.08[2)]
	8	40	3.5	7.0		10.5[1)] 7.0	
	16	40	2.9	5.8		10.5[1)] 5.8	
S024.007	4	45	8.5	13.0	10[2)]	19.5	0.08[2)]
	8	40	6.5	13.0		19.5[1)] 13.0	
	16	40	4.0	8.0		19.5[1)] 8.0	
S024.012	4	40	13	26	10[2)]	39	0.10[2)]
	8	40	12	24		39[1)] 28.8	
	16	40	10.5	15.8		39[1)] 16.8	
S024.016	4	40	20	40	10[2)]	60	0.10[2)]
	8	40	16	32		60[1)] 33.6	
	16	40	9	14.4		60[1)] 15.3	

1) With activation of the function "Automatic power stage switching frequency change to 4 kHz".

2) Shutdown as per I^2t characteristic

Data apply for a motor cable length ≤ 10 m. Maximum permissible motor cable length 30 m.

ServoOne junior for 3 x 460 V

Device	Switching frequency of the power stage	Ambient temperature	Rated current I_N	Overload capacity			
				Overcurrent		Peak current	
	[kHz]	max. [°C]	[A_{eff}]	[A_{eff}]	For time [s]	[A_{eff}]	For time [s]
S024.002	4	45	2.0	4.0	10[2)]	6.0	0.08[2)]
	8	40	2.0	4.0		6.0[1)] 4.0	
	16	40	0.7	1.4		6.0[1)] 1.4	
S024.004	4	45	4.8	6.2	10[2)]	9.2	0.08[2)]
	8	40	3.5	6.2		9.2[1)] 6.2	
	16	40	2.2	4.4		9.2[1)] 4.4	
S024.007	4	45	7.4	11.8	10[2)]	17	0.08[2)]
	8	40	6.5	11.8		17 [1)] 11.8	
	16	40	2.4	4.8		17 [1)] 4.8	
S024.012	4	40	11.5	23	10[2)]	34.5	0.10[2)]
	8	40	10.5	21		34.5 [1)] 25.2	
	16	40	8.0	12		34.5 [1)] 12.8	
S024.016	4	40	20	40	10[2)]	60	0.10[2)]
	8	40	15	30		60 [1)] 31.5	
	16	40	6.5	10.4		60 [1)] 11	

1) With activation of the function "Automatic power stage switching frequency change to 4 kHz".

2) Shutdown as per I^2t characteristic

Data apply for a motor cable length ≤ 10 m. Maximum permissible motor cable length 30 m.

ServoOne junior for 3 x 480 V

Device	Switching frequency of the power stage	Ambient temperature	Rated current I_N [A_{eff}]	Overload capacity			
				Overcurrent		Peak current	
	[kHz]	max. [°C]	at 480 V	[A_{eff}]	For time [s]	[A_{eff}]	For time [s]
S024.002	4	45	2.0	4.0	10 [2]	6.0	0.08 [2]
	8	40	1.7	3.4		6.0 [1] 3.4	
	16	40	[3]	[3]		[3]	
S024.004	4	45	4.6	6.0	10 [2]	8.8	0.08 [2]
	8	40	2.6	5.2		8.8 [1] 5.2	
	16	40	[3]	[3]		[3]	
S024.007	4	45	7.0	10.7	10 [2]	16	0.08 [2]
	8	40	6.5	10.7		16	
	16	40	1.9	3.8		16 [1] 3.8	
S024.012	4	40	11	22	10 [2]	33 [1]	0.1 [2]
	8	40	10	20		33 [1] 24	
	16	40	7.5	11.3		33 [1] 12	
S024.016	4	40	20	40	10 [2]	60	0.1 [2]
	8	40	14	28		60 [1] 29.4	
	16	40	6	9.6		60 [1] 10.2	

1) With activation of the function "Automatic power stage switching frequency change to 4 kHz".

2) Shutdown as per I^2t characteristic

3) Operation at this operating point is not possible

Data apply for a motor cable length ≤ 10 m. Maximum permissible motor cable length 30 m.

Ambient conditions, ServoOne junior

Ambient conditions	
Protection	IP20 except terminals (IP00), fan opening BG5 (IP10)
Accident prevention regulations	As per local regulations (in Germany e.g. BGV A3)
Installation altitude	Up to 1000 m above MSL, over 1000 m above MSL with power reduction (1% per 100 m, max. 2000 m above sea level)
Pollution degree	2
Type of mounting	Built-in unit, only for vertical installation in a switch cabinet with min. IP4x protection, when using STO safety function min. IP54

Climatic conditions		
In transit	As per EN 61800-2, IEC 60721-3-2 class 2K3 [1]	
	Temperature	-25 °C to +70 °C
	Relative atmospheric humidity	95% at max. +40 °C
In storage	As per EN 61800-2, IEC 60721-3-1 class 1K3 and 1K4 [2]	
	Temperature	-25 °C to +55 °C
	Relative atmospheric humidity	5 to 95%
In operation	As per EN 61800-2, IEC 60721-3-3 class 3K3 [3]	
	Temperature	-10 °C to +45 °C (4 kHz), up to 55 °C with power reduction (2%/°C) -10 °C to +40 °C (8, 16 kHz), up to 55 °C with power reduction (2%/°C)
	Relative atmospheric humidity	5 to 85% without condensation

1) *The absolute humidity is limited to max. 60 g/m³. This means, at 70 °C for example, that the relative atmospheric humidity may only be max. 40%.*

2) *The absolute humidity is limited to max. 29 g/m³. So the maximum values for temperature and relative atmospheric humidity stipulated in the table must not occur simultaneously.*

3) *The absolute humidity is limited to max. 25 g/m³. That means that the maximum values for temperature and relative atmospheric humidity stipulated in the table must not occur simultaneously.*

Mechanical conditions			
Vibration limit in transit	As per EN 61800-2, IEC 60721-3-2 class 2M1		
	Frequency [Hz]	**Amplitude [mm]**	**Acceleration [m/s²]**
	2 ≤ f < 9	3.5	Not applicable
	9 ≤ f < 200	Not applicable	10
	200 ≤ f < 500	Not applicable	15
Shock limit in transit	As per EN 61800-2, IEC 60721-3-2 class 2M1		
	Drop height of packed device max. 0.25 m		
Vibration limits for the system [1]	As per EN 61800-2, IEC 60721-3-3 class 3M1		
	Frequency [Hz]	Amplitude [mm]	Acceleration [m/s²]
	2 ≤ f < 9	0.3	Not applicable
	9 ≤ f < 200	Not applicable	1

1) *Note: The devices are only designed for stationary use. The drive controllers must not be installed in areas where they would be permanently exposed to vibration.*

Acceptance, ServoOne junior

CE marking

The ServoOne junior conform to the requirements of the Low Voltage Directive 2006/95/EC and the product standard EN 61800-5-1.

The servocontrollers thus conform to the requirements for installation in a machine or plant under the terms of the Machinery Directive 2006/42/EC.

The servocontrollers are accordingly CE marked. The CE marking on the rating plate indicates conformity with the above directives.

UL/UR approval

The ServoOne junior servocontrollers have the following approvals:

Servocontroller	Approval
S022.003.xxxx.xxxx.x	UR
S022.006.xxxx.xxxx.x	UL
S022.008.xxxx.xxxx.x	UL
S024.002.xxxx.xxxx.x	UR
S024.004.xxxx.xxxx.x	UL
S024.007.xxxx.xxxx.x	UL
S024.012.xxxx.xxxx.x	UL
S024.016.xxxx.xxxx.x	UL

For details see document "UL-Certification" 0927.01B.X

EMC acceptance

All ServoOne junior models are by design resilient to interference in accordance with EN 61800-3, environment classes 1 and 2.

To limit conducted interference emissions to the permissible level, external EMC mains filters are available (see chapter "Accessories"). The use of these mains filters ensures compliance with the EMC Directive 2004/108/EC:

- Public low-voltage network
  "first environment" (residential C2) up to 10 m motor cable length
- Industrial low-voltage network:
  ”second environment” (industrial C3) up to 30 m motor cable length

STO acceptance

The “STO” (Safe Torque Off) safety function integrated into the ServoOne junior is certified according to the following requirements:

- EN 61800-5-2
- EN ISO 13849-1 "PL e"
- EN 61508 / EN 62061 "SIL3"

Acceptance was undertaken by the accredited certification body "TÜV Rheinland".

Technical data, ServoOne junior BG2

Type SO22.003

SO2_.___.□□□□.□□□□

Rated current

Mains voltage

Article designation

Technical data / Article designation	SO22.003	SO24.002
Output, motor side		
Voltage	3-phase U_{Mains}	
Rated current, effective (I_N) [1]	3 A	2 A [2]
Peak current	See tables on page 2-4	See table on page 2-5
Rotating field frequency	0 ... 400 Hz	
Switching frequency of the power stage	4, 8, 16 kHz	
Input, mains side		
Mains voltage (U_{Mains})	(1 x 230 V AC / 3 x 230 V AC) -20%/+15%	(3 x 400 V AC / 3 x 460 V AC / 3 x 480 V AC) ±10%
Device connected load (with mains choke)	1.3 kVA	1.5 kVA
Current (with mains choke)	5.4 A (1 x 230 V AC) 3.3 A (3 x 230 V AC)	2.2 A [2]
Asymmetry of mains voltage	±3% max. (at 3 x 230 V AC)	±3% max.
Frequency	50/60 Hz ±10%	
Power dissipation at 8 kHz and I_N	75 W	42 W [2]
DC link		
Capacitance	880 µF	220 µF
Brake chopper switch-on threshold	390 V DC	650 V DC [2]
Minimum ohmic resistance of an externally installed braking resistor	72 Ω	230 Ω
Brake chopper peak power with external braking resistor [3]	2.1 kW	1.8 kW
Internal braking resistor	550 Ω (PTC)	7500 Ω (PTC)
Brake chopper continuous power with internal braking resistor [3]	0 W	0 W
Brake chopper peak power with internal braking resistor [3]	400 W	200 W [2]

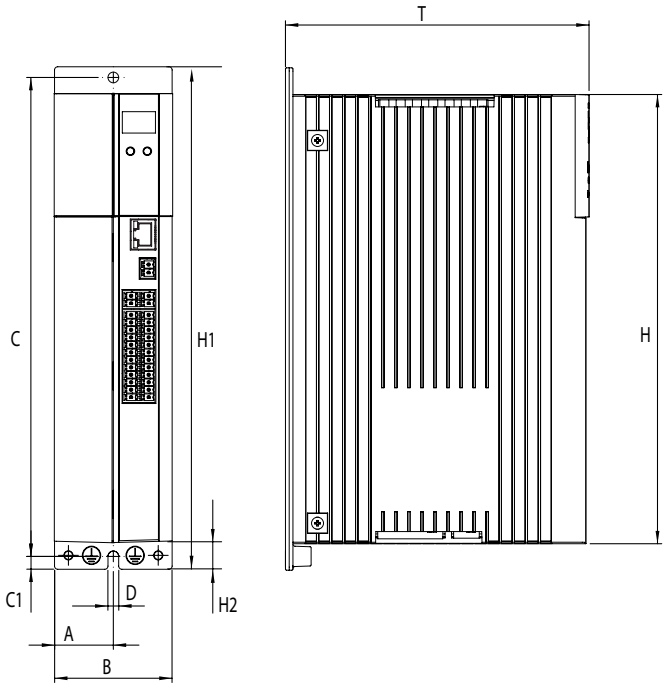
1) Value referred to 4 kHz and 8 kHz switching frequency

2) Value referred to 400 V AC mains voltage

3) A braking resistor is always integrated; connection of an external resistor is permissible.

Mechanism	S022.003	S024.002
Cooling method	Wall mounting	
Protection	IP20 except terminals (IP00)	
Cooling air temperature	Max. 45 °C (at 4 kHz power stage switching frequency)	
Weight	1.0 kg	
Mounting method	Vertical mounting with unhindered air flow	
Row mounting of multiple servocontrollers	Direct butt mounting	
Dimensions	**BG2 [mm]**	
B (width)	55	
H (height)	210	
T (depth)	142 (without terminals)	
A	27.5	
C / C1	225 / 5	
D Ø	4.8	
H1 / H2	235 / 12.5	

Dimensional drawings, BG2

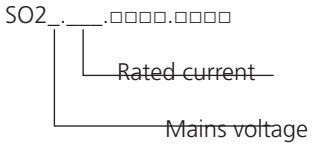


Matching accessories (see chapter 9 f.)

Controller	S022.003	S024.002
Mains choke	LR 32.14-UR (1 x 230 V) LR 34.4-UR (3 x 230 V)	LR 34.4-UR
Braking resistor (ext.)	BR-090.01.540-UR (35 W) BR-090.02.540-UR (150 W) BR-090.03.540-UR (300 W)	BR-260.01.540-UR (35 W) BR-260.02.540-UR (150 W)
Mains filter	EMC8.2-1Ph,UR (1 x 230 V) EMC5.2-3Ph,UR (3 x 230 V)	EMC5.2-3Ph,UR

Technical data, ServoOne junior BG3

Type SO24.004



Article designation

Technical data \ Article designation	SO22.006	SO24.004
Output, motor side		
Voltage	3-phase U_{Mains}	
Rated current, effective (I_N) [1]	5.9 A	3.5 A [2]
Peak current	See tables on page 2-4	See table on page 2-5
Rotating field frequency	0 ... 400 Hz	
Switching frequency of the power stage	4, 8, 16 kHz	
Input, mains side		
Mains voltage (U_{Mains})	(1 x 230 V AC / 3 x 230 V AC) -20%/+15%	(3 x 400 V AC / 3 x 460 V AC / 3 x 480 V AC) ±10%
Device connected load (with mains choke)	2.6 kVA	2.7 kVA
Current (with mains choke)	10.6 A (1 x 230 V) 6.5 A (3 x 230 V)	3.9 A [2]
Asymmetry of mains voltage	±3% max. (at 3 x 230 V AC)	±3% max.
Frequency	50/60 Hz ±10%	
Power dissipation at 8 kHz and I_N	150 W	80 W [2]
DC link		
Capacitance	1320 µF	330 µF
Brake chopper switch-on threshold	390 V DC	650 V DC [2]
Minimum ohmic resistance of an externally installed braking resistor	72 Ω	180 Ω
Brake chopper peak power with external braking resistor	2.1 kW	2.3 kW
Option: internal braking resistor	100 Ω	420 Ω
Brake chopper continuous power with internal braking resistor	Dependent on the effective load on the controller in the corresponding application	
Brake chopper peak power with internal braking resistor	1500 W	1000 W [2]

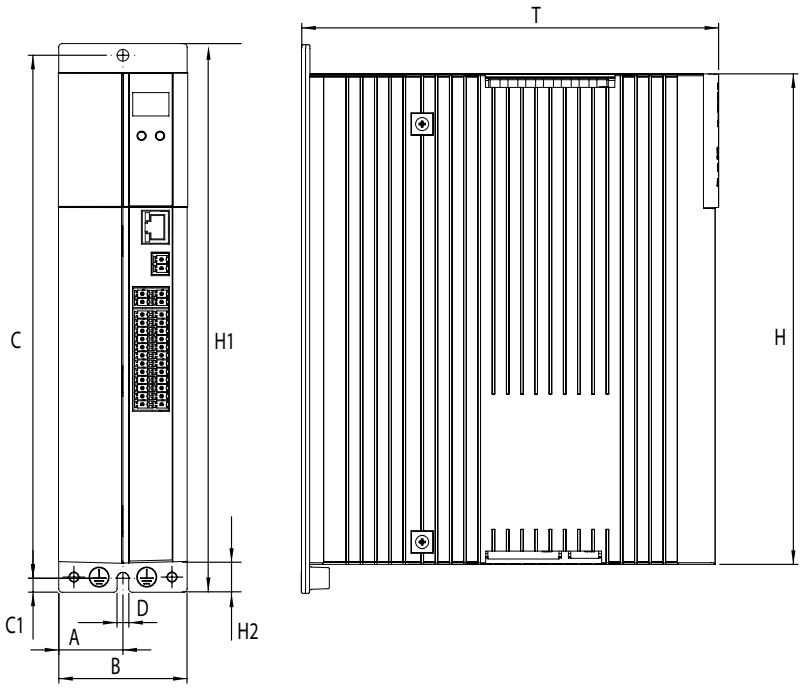
1) Data referred to 4 kHz and 8 kHz switching frequency

2) Data referred to 400 V mains voltage

Mechanical data ServoOne junior BG3

Mechanism	S022.006	S024.004
Cooling method	Wall mounting	
Protection	IP20 except terminals (IP00)	
Cooling air temperature	Max. 45 °C (at 4 kHz power stage switching frequency)	
Weight	1.5 kg	
Mounting method	Vertical mounting with unhindered air flow	
Row mounting of multiple servocontrollers	Direct butt mounting	
Dimensions	**BG3 [mm]**	
B (width)	55	
H (height)	210	
T (depth)	189 (without terminals)	
A	27.5	
C / C1	225 / 5	
D Ø	4.8	
H1 / H2	235 / 12.5	

Dimensional drawings, BG3



Matching accessories (see chapter 9 f.)

Controller	S022.006	S024.004
Mains choke	LR 32.14-UR (1 x 230 V) LR 34.8-UR (3 x 230 V)	LR 34.6-UR
Braking resistor (ext.)	BR-090.01.540-UR (35 W) BR-090.02.540-UR (150 W) BR-090.03.540-UR (300 W) BR-090.10.650-UR (1000 W)	BR-200.01.540-UR (35 W) BR-200.02.540-UR (150 W) BR-200.03.540-UR (300 W)
Mains filter	EMC14.2-1Ph,UR (1 x 230 V) EMC11.2-3Ph,UR (3 x 230 V)	EMC5.2-3Ph,UR

Technical data, ServoOne junior BG4

Type SO24.007

SO2_._____.□□□□.□□□□

Rated current

Mains voltage

Article designation

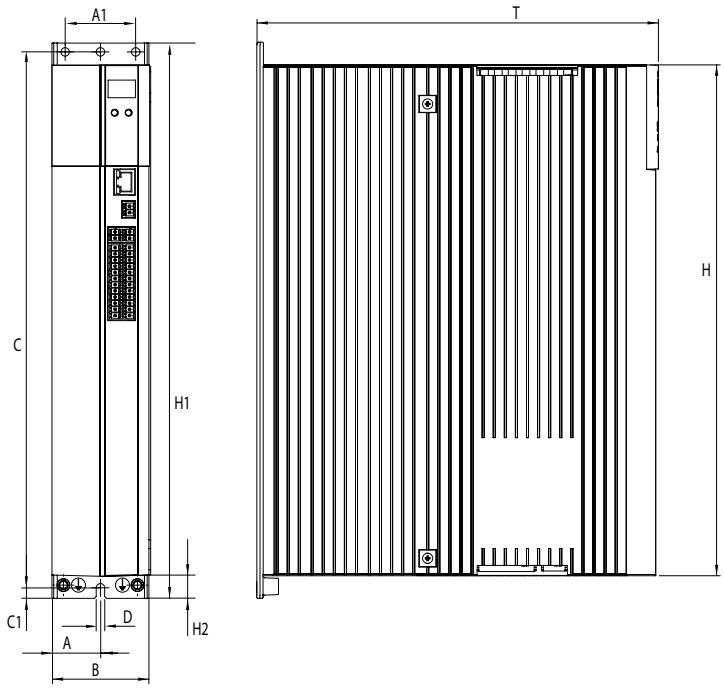
Technical data / Article designation	SO22.008	SO24.007
Output, motor side		
Voltage	3-phase U_{Mains}	
Rated current, effective (I_N) [1]	8.0 A	6.5 A [2]
Peak current	See tables on page 2-4	See table on page 2-5
Rotating field frequency	0 ... 400 Hz	
Switching frequency of the power stage	4, 8, 16 kHz	
Input, mains side		
Mains voltage (U_{Mains})	(1 x 230 V AC / 3 x 230 V AC) -20%/+15%	(3 x 400 V AC / 3 x 460 V AC / 3 x 480 V AC) ±10%
Device connected load (with mains choke)	3.5 kVA	5.0 kVA
Current (with mains choke)	14.4 A (1 x 230 V) 8.8 A (3 x 230 V)	7.2 A [2]
Asymmetry of mains voltage	±3% max. (at 3 x 230 V AC)	±3% max.
Frequency	50/60 Hz ±10%	
Power dissipation at 8 kHz and I_N	200 W	150 W [2]
DC link		
Capacitance	1760 µF	440 µF
Brake chopper switch-on threshold	390 V DC	650 V DC [2]
Minimum ohmic resistance of an externally installed braking resistor	72 Ω	72 Ω
Brake chopper peak power with external braking resistor	2.1 kW	5.9 kW
Option: internal braking resistor	90 Ω	90 Ω
Brake chopper continuous power with internal braking resistor	Dependent on the effective load on the controller in the corresponding application	
Brake chopper peak power with internal braking resistor	1.7 kW	4.7 kW [2]

1) Data referred to 4 kHz and 8 kHz switching frequency

2) Data referred to 400 V mains voltage

Mechanism	SO22.008	SO24.007
Cooling method	Wall mounting	
Protection	IP20 except terminals (IP00)	
Cooling air temperature	Max. 45 °C (at 4 kHz power stage switching frequency)	
Weight	2.8 kg	
Mounting method	Vertical mounting with unhindered air flow	
Row mounting of multiple servocontrollers	Direct butt mounting	
Dimensions	**BG4 [mm]**	
B (width)	55	
H (height)	290	
T (depth)	235.5 (without terminals)	
A / A1	27.5 / 40	
C / C1	305 / 5	
D Ø	4.8	
H1 / H2	315 / 12.5	

Dimensional drawings, BG4



Matching accessories (see chapter 9 f.)

Controller	SO22.008	SO24.007
Mains choke	LR 34.8-UR	LR 34.8-UR
Braking resistor (ext.)	BR-090.01.540-UR (35 W) BR-090.02.540-UR (150 W) BR-090.03.540-UR (300 W) BR-090.10.650-UR (1000 W)	
Mains filter	EMC11.2-3Ph,UR	EMC11.2-3Ph,UR

Technical data, ServoOne junior BG5

Type SO24.016

SO2_.___.□□□□.□□□□

Rated current

Mains voltage

Article designation

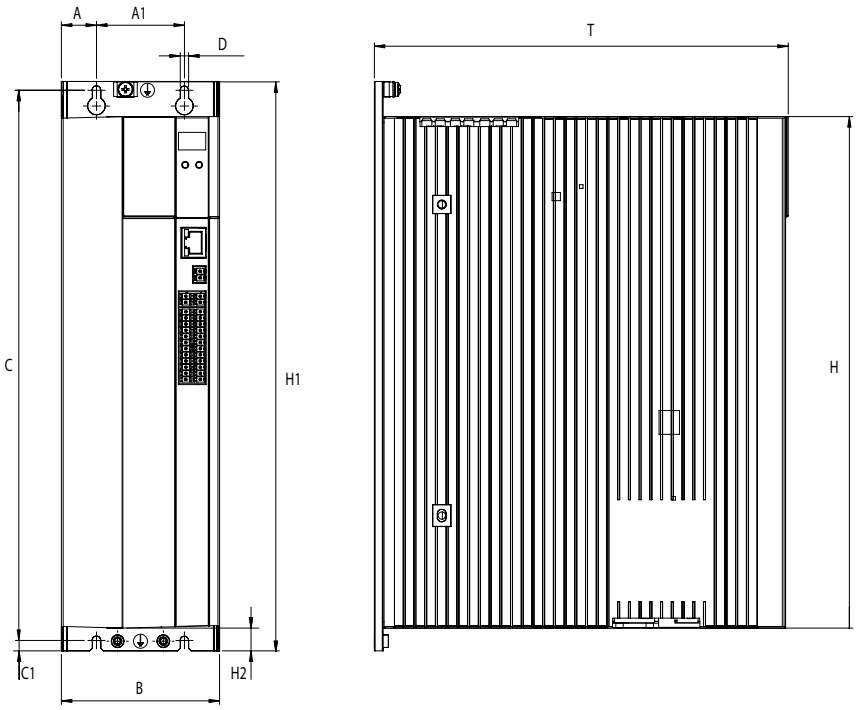
Article designation / Technical data	SO24.012 In preparation	SO24.016 In preparation
Output, motor side		
Voltage	3-phase U_{Mains}	
Rated current, effective (I_N) [1]	12.0	16.0
Peak current	See tables on page 2-5/2-6	See table on page 2-5/2-6
Rotating field frequency	0 ... 400 Hz	
Switching frequency of the power stage	4, 8, 16 kHz	
Input, mains side		
Mains voltage (U_{Mains})	(3 x 400 V AC / 3 x 460 V AC / 3 x 480 V AC) ±10%	
Device connected load (with mains choke)	9.1 kVA	12.2 kVA
Current (with mains choke)	13.2 A	17.6 A
Asymmetry of mains voltage	±3% max.	±3% max.
Frequency	50/60 Hz ±10%	
Power dissipation at 8 kHz and I_N	263 W [1) 2)]	316 W [1) 2)]
DC link		
Capacitance	680 µF	1120 µF
Brake chopper switch-on threshold	650 V DC [2)]	650 V DC [2)]
Minimum ohmic resistance of an externally installed braking resistor	35 Ω	25 Ω
Brake chopper peak power with external braking resistor	12.1 kW [2)]	16.9 kW [2)]
Option: internal braking resistor	90 Ω	90 Ω
Brake chopper continuous power with internal braking resistor	Dependent on the effective load on the controller in the corresponding application	
Brake chopper peak power with internal braking resistor	4.7 kW [2)]	4.7 kW [2)]

1) *Data referred to 8 kHz switching frequency*

2) *Data referred to 400 V mains voltage*

Mechanism	S024.012	S024.016
Cooling method	Wall mounting	
Protection	IP20 except terminals (IP00), fan opening (IP10)	
Cooling air temperature	Max. 45 °C (at 4 kHz power stage switching frequency)	
Weight	5.5 kg	5.9 kg
Mounting method	Vertical mounting with unhindered air flow	
Row mounting of multiple servocontrollers	Direct butt mounting	
Dimensions	**BG5 [mm]**	
B (width)	90	
H (height)	291	
T (depth)	235.5 (without terminals)	
A / A1	20/50	
C / C1	313/6	
D Ø	4.8	
H1 / H2	324/13	

Dimensional drawings - BG5



Matching accessories (see chapter 9 f.)

Controller	S024.012	S024.016
Mains choke	LR 34.14-UR	LR 34.17-UR
Braking resistor (ext.)	BR-090.01.540-UR (35 W) BR-090.02.540-UR (150 W) BR-090.03.540-UR (300 W) BR-090.10.650-UR (1000 W)	
Mains filter	EMC16.2-3PH, UR	EMC25.2-3PH, UR

Space for your own notes

ServoOne single-axis system

BG1 BG2 BG3 BG4 BG5 BG6 BG7

Supply voltage 1 x 230 V

Type	Size	Rated current	Current carrying capacity	Technical data
S082.004.0	BG1	4.0 A	Page 40	Page 50

Supply voltage 3 x 400 V

Type	Size	Rated current		Current carrying capacity	Technical data
		Air cooling	Liquid cooling		
S084.004.0	BG1	4.0 A	-	Page 41	Page 50
S084.006.0		6.0 A	-		
S084.008.0	BG2	8.0 A	-	Page 41	Page 52
S084.012.0		12 A	-		
S084.016.0	BG3	16 A	16 A	Page 41	Page 54
S084.020.0		20 A	20 A		
S084.024.0	BG4	24 A	24 A	Page 41	Page 56
S084.032.0		32 A	32 A		
S084.045.0	BG5	45 A	53 A	Pages Page 42 and Page 43	Page 58
S084.060.0		60 A	70 A		
S084.072.0		72 A	84 A		
S084.090.0	BG6	90 A	110 A	Pages Page 42 and Page 43	Page 60
S084.110.0		110 A	143 A		
S084.143.0	BG6a	143 A	170 A	Pages Page 42 and Page 43	Page 62
S084.170.0		170 A	210 A		
S084.250.0	BG7	-	250 A	Page Page 44	Page 64
S084.325.0		-	325 A		
S084.450.0		-	450 A		

Order codes, ServoOne single-axis system

Article designation	SO8	4	.	006	.	0	0	2	1	.	0	0	0	0	.	X
ServoOne																
Supply voltage	3 x 400 V	4														
	1 x 230 V	2														
Rated current	BG1	4 A		004												
		6 A		006												
	BG2	8 A		008												
		12 A		012												
	BG3	16 A		016												
		20 A		020												
	BG4	24 A		024												
		32 A		032												
	BG5	45 A		045												
		60 A		060												
		72 A		072												
	BG6	90 A		090												
		110 A		110												
	BG6a	143 A		143												
		170 A		170												
	BG7	250 A		250												
		325 A		325												
		450 A		450												
Mains supply	AC					0										
Safety technology	STO						0									
	Integrated safety control [2]						1									
Option 1 Communication	Not included							0								
	Sercos II							1								
	PROFIBUS							2								
	EtherCAT							3								
	CANopen							4								
	CANopen + 2 AO							5								
	PROFINET IRT							7								
	Sercos III							8								
	Powerlink [1]							9								
Option 2 Technology	Not included								0							
	Second SinCos encoder								1							
	TTL encoder simulation / TTL master encoder								2							
	TwinSync communication								3							
	SSI encoder simulation								4							
	TTL encoder with commutation signals								5							
	Multi-IO (analogue and digital) expansion (M19)								6							
	Digital input/output (DIO)								8							
	Second safe SinCos encoder								A							
	Second safe SSI encoder								B							
	Second safe axis monitor (SinCos)								C							
Housing/cooling method	Air-cooled (standard) BG1...BG6-6a										0					
	Air-cooled with int. braking resistor BG1...BG6-6a										1					
	Liquid-cooled with int. braking resistor from BG5 ... BG7										7					
	Liquid-cooled from BG3 ... BG7										8					
Function package	Basic (without additional function package)											0				
	iPlc											1				
	HF											7				
	HF + iPlc											8				
Special design	None												0			
Protection	Standard													0		
	PCBs with protective varnish (from SO84.045 standard)													1		
Hardware version	(may be multi-digit)															X

1) In preparation 2) FS certification BG1 to BG5

Features, ServoOne single-axis system

Features, servocontrollers BG1 to BG5

Features, servocontrollers BG6 to BG6a

Features, servocontroller BG7

Current carrying capacity, ServoOne single-axis system

The maximum permissible servocontroller rated current and peak current are dependent on the mains voltage, the motor cable length, the power stage switching frequency and the ambient temperature. If the conditions change, the maximum permissible servocontroller current carrying capacity also changes.

ServoOne servocontroller BG1 (single phase, air cooling)

Type	Switching frequency of the power stage	Ambient temperature	Rated current at 1 x 230 V AC	Peak current [A_{eff}]			
				At rotating field frequency increasing linearly 0 to 5 Hz		For intermittent operation	For time [1]
	[kHz]	[°C]	[A_{eff}]	0 Hz	5 Hz	> 5 Hz	[s]
S082.004.0xxx.Y [2] (BG1)	4	45	4.0	8.0	8.0	8.0	10
	8	40	4.0	8.0	8.0	8.0	
	12		3.7	7.4	7.4	7.4	
	16		2.7	5.4	5.4	5.4	

1) Shutdown as per I²t characteristic
Data apply for a motor cable length ≤10 m
2) Y=0.1

ServoOne servocontrollers BG1 to BG4 (air and liquid cooling)

Type	Switching frequency of the power stage	Ambient temperature	Rated current			Peak current [A_{eff}] [1]			
			At 3 x 230 V AC At 3 x 400 V AC	At 3 x 460 V AC	At 3 x 480 V AC	At rotating field frequency increasing linearly 0 to 5 Hz		For intermittent operation	For time [2]
	[kHz]	[°C]	[A_{eff}]	[A_{eff}]	[A_{eff}]	0 Hz	5 Hz	> 5 Hz	[s]
S084.004.0xxx.Y [3] (BG1) *Air cooling only*	4	45	4.0	4.0	4.0	8.0	8.0	8.0	10
	8	40	4.0	4.0	4.0	8.0	8.0	8.0	
	12		3.7	2.9	2.7	7.4	7.4	7.4	
	16		2.7	1.6	1.3	5.4	5.4	5.4	
S084.006.0xxx.Y [3] (BG1) *Air cooling only*	4	45	6.0	6.0	6.0	12.0	12.0	12.0	10
	8	40	6.0	6.0	6.0	12.0	12.0	12.0	
	12		5.5	4.4	4.0	11.0	11.0	11.0	
	16		4.0	2.4	1.9	8.0	8.0	8.0	
S084.008.0xxx.Y [3] (BG2) *Air cooling only*	4	45	8.0	8.0	8.0	16.0	16.0	16.0	10
	8	40	8.0	7.2	6.9	16.0	16.0	16.0	
	12		6.7	5.3	4.9	13.4	13.4	13.4	
	16		5.0	3.7	3.3	10.0	10.0	10.0	
S084.012.0xxx.Y [3] (BG2) *Air cooling only*	4	45	12.0	12.0	12.0	24.0	24.0	24.0	10
	8	40	12.0	10.8	10.4	24.0	24.0	24.0	
	12		10.0	8.0	7.4	20.0	20.0	20.0	
	16		7.6	5.6	5.0	15.2	15.2	15.2	
S084.016.0xxx.Z [4] (BG3)	4	45	16.0	16.0	16.0	32.0	32.0	32.0	10
	8	40	16.0	13.9	13.3	32.0	32.0	32.0	
	12		11.0	8.8	8.0	22.0	22.0	22.0	
	16		8.0	5.9	5.2	16.0	16.0	16.0	
S084.020.0xxx.Z [4] (BG3)	4	45	20.0	20.0	20.0	40.0	40.0	40.0	10
	8	40	20.0	17.4	16.6	40.0	40.0	40.0	
	12		13.8	11.0	10.0	27.6	27.6	27.6	
	16		10.0	7.4	6.5	20.0	20.0	20.0	
S084.024.0xxx.Z [4] (BG4)	4	45	24.0	24.0	24.0	48.0	48.0	48.0	10
	8	40	24.0	21.0	20.0	48.0	48.0	48.0	
	12		15.8	12.4	11.3	31.6	31.6	31.6	
	16		11.3	9.2	8.4	22.6	22.6	22.6	
S084.032.0xxx.Z [4] (BG4)	4	45	32.0	32.0	32.0	64.0	64.0	64.0	10
	8	40	32.0	28.0	26.7	64.0	64.0	64.0	
	12		21.0	16.5	15.0	42.0	42.0	42.0	
	16		15.0	12.2	11.2	30.0	30.0	30.0	

1) When supplied with 400 V AC at max. 70% initial load

2) Shutdown as per I²t characteristic

3) Y=0.1

4) Z=0,1,8

All data apply for a motor cable length ≤10 m.

ServoOne servocontroller BG5 to BG6a (air cooling)

Type	Switching frequency of the power stage	Ambient temperature	Rated current			Peak current [A_{eff}] 1)			
			At 3 x 400 V AC	At 3 x 460 V AC	At 3 x 480 V AC	At rotating field frequency increasing linearly 0 to 5 Hz		For intermittent operation	For time 2)
	[kHz]	[°C]	[A_{eff}]	[A_{eff}]	[A_{eff}]	0 Hz	5 Hz	> 5 Hz	[s]
S084.045.0xxx.Y 3) (BG5)	4	45	45	42	41	90	90	90	10
	8	40	45	42	41	90	90	90	
	12 4)		45	42	41	90	90	90	
	16 4)		42	39	38	84	84	84	
S084.060.0xxx.Y 3) (BG5)	4	45	60	56	54	120	120	120	10
	8	40	60	56	54	120	120	120	
	12 4)		58	54	52	116	116	116	
	16 4)		42	39	38	84	84	84	
S084.072.0xxx. Y 3) (BG5)	4	45	72	67	65	144	144	144	10
	8	40	72	67	65	144	144	144	
	12 4)		58	54	52	116	116	116	
	16 4)		42	39	38	84	84	84	
S084.090.0xxx. Y 3) (BG6)	4	45	90	83	81	170	180	180	30
	8	40	90	83	81	134	180	180	
	12		90	83	81	107	144	144	
	16		72	67	65	86	115	115	
S084.110.0xxx. Y 3) (BG6)	4	45	110	102	99	170	220	220	30
	8	40	110	102	99	134	165	165	
	12		90	83	81	107	144	144	
	16		72	67	65	86	115	115	
S084.143.0xxx. Y 3) (BG6a)	4	45	143	132	129	190	286	286	30
	8	40	143	132	129	151	215	215	
	12		115	106	104	121	172	172	
	16		92	85	83	97	138	138	
S084.170.0xxx. Y 3) (BG6a)	4	45	170	157	153	190	315	315	10
	8	40	170	157	153	151	220	220	10
	12	40	136	126	122	121	164	164	10
	16	40	109	101	98	97	131	131	10

1) When supplied with 400 V AC at max. 70% initial load

2) Shutdown as per I^2t characteristic

3) Y=0.1

4) With integrated safety control only up to 8 kHz allowed

All data apply for a motor cable length ≤10 m.

ServoOne servocontroller BG5 to BG6a (liquid cooling)

Type	Switching frequency of the power stage	Ambient temperature	Rated current			Peak current [A_{eff}] [1]			
			At 3 x 400 V AC	At 3 x 460 V AC	At 3 x 480 V AC	At rotating field frequency increasing linearly 0 to 5 Hz		For intermittent operation	For time [2]
	[kHz]	[°C]	[A_{eff}]	[A_{eff}]	[A_{eff}]	0 Hz	5 Hz	> 5 Hz	[s]
S084.045.0xxx.Z [3] (BG5)	4	45	53	49	48	90	90	90	30
	8		53	49	48	90	90	90	
	12 [4]		53	49	48	90	90	90	
	16 [4]		49	45	44	84	84	84	
S084.060.0xxx. Z [3] (BG5)	4	45	70	65	63	120	120	120	30
	8		70	65	63	120	120	120	
	12 [4]		68	63	61	116	116	116	
	16 [4]		49	45	44	84	84	84	
S084.072.0xxx. Z [3] (BG5)	4	45	84	78	76	144	144	144	30
	8		84	78	76	144	144	144	
	12 [4]		68	63	61	116	116	116	
	16 [4]		49	45	44	84	84	84	
S084.090.0xxx. Z [3] (BG6)	4	45	110	102	99	205	220	220	30
	8		110	102	99	165	187	187	
	12		110	102	99	132	165	165	
	16		90	83	81	106	135	135	
S084.110.0xxx. Z [3] (BG6)	4	45	143	132	129	230	286	286	30
	8		143	132	129	190	215	215	
	12		114	105	103	152	172	172	
	16		91	84	82	122	138	138	
S084.143.0xxx. Z [3] (BG6a)	4	45	170	157	153	230	340	340	10
	8		170	157	153	190	255	255	
	12		136	126	122	152	204	204	
	16		109	101	98	122	163	163	
S084.170.0xxx. Z [3] (BG6a)	4	45	210	194	189	230	340	340	10
	8		210	194	189	190	255	255	
	12		168	155	151	152	204	204	
	16		134	124	121	122	163	163	

1) When supplied with 400 V AC at max. 70% initial load

2) Shutdown as per I^2t characteristic

3) Z=7,8

4) With integrated safety control only up to 8 kHz allowed
Data apply for a motor cable length ≤10 m

ServoOne servocontroller BG7 (liquid cooling, 400 V AC) - 2-4 kHz

Type	Switching frequency of the power stage [kHz]	Ambient temperature [°C]	At 400 V AC: Rated current [A_{eff}]	At 400 V AC: At rotating field frequency increasing linearly 0 to 5 Hz [A_{eff}]	At 400 V AC: For intermittent operation > 5 Hz	For time [s]
S084.250.0xxx.70xx.2 S084.250.0xxx.71xx.2 S084.250.0xxx.80xx.2 S084.250.0xxx.81xx.2	2	40	250	425		30
	4		250	375		
S084.325.0xxx.70xx.2 S084.325.0xxx.71xx.2 S084.325.0xxx.80xx.2 S084.325.0xxx.81xx.2	2	40	325	552		30
	4		325	485		
S084.450.0xxx.70xx.2 S084.450.0xxx.71xx.2 S084.450.0xxx.80xx.2 S084.450.0xxx.81xx.2	2	40	450	765		30
	4		450	675		

ServoOne servocontroller BG7 (liquid cooling, HF function package) - 2-16 kHz

Type	Switching frequency of the power stage [kHz]	Ambient temperature [°C]	At 400 V AC: Rated current [A_{eff}]	At 400 V AC: At rotating field frequency increasing linearly 0 to 5 Hz [A_{eff}]		At 400 V AC: For intermittent operation > 5 Hz	For time [s]
S084.250.0xxx.77xx.2 S084.250.0xxx.78xx.2 S084.250.0xxx.87xx.2 S084.250.0xxx.88xx.2	2	40	250	425			30
	4		250	375			
	8		250	250	375	375	
	12		200	200	300	300	
	16		175	175	260	260	
S084.325.0xxx.77xx.2 S084.325.0xxx.78xx.2 S084.325.0xxx.87xx.2 S084.325.0xxx.88xx.2	2	40	325	552			30
	4		325	485			
	8		325	325	485	485	
	12		300	300	450	450	
	16		270	270	400	400	
S084.450.0xxx.77xx.2 S084.450.0xxx.78xx.2 S084.450.0xxx.87xx.2 S084.450.0xxx.88xx.2	2	40	450	765			30
	4		450	675			
	8		450	450	675	675	
	12		400	400	600	600	
	16		- - -				

ServoOne servocontroller BG7 (liquid cooling, 460 V AC) - 2-4 kHz

Type	Switching frequency of the power stage [kHz]	Ambient temperature [°C]	At 460 V AC: Rated current [A_{eff}]	At 460 V AC: At rotating field frequency increasing linearly 0 to 5 Hz [A_{eff}]	At 460 V AC: For intermittent operation > 5 Hz	For time [s]
S084.250.0xxx.70xx.2 S084.250.0xxx.71xx.2 S084.250.0xxx.80xx.2 S084.250.0xxx.81xx.2	2	40	231	425		30
	4		231	375		
S084.325.0xxx.70xx.2 S084.325.0xxx.71xx.2 S084.325.0xxx.80xx.2 S084.325.0xxx.81xx.2	2	40	300	552		30
	4		300	485		
S084.450.0xxx.70xx.2 S084.450.0xxx.71xx.2 S084.450.0xxx.80xx.2 S084.450.0xxx.81xx.2	2	40	416	765		30
	4		416	675		

ServoOne servocontroller BG7 (liquid cooling, HF function package) - 2-16 kHz

Type	Switching frequency of the power stage [kHz]	Ambient temperature [°C]	At 460 V AC: Rated current [A_{eff}]	At 460 V AC: At rotating field frequency increasing linearly 0 to 5 Hz [A_{eff}]		At 460 V AC: For intermittent operation > 5 Hz	For time [s]
S084.250.0xxx.77xx.2 S084.250.0xxx.78xx.2 S084.250.0xxx.87xx.2 S084.250.0xxx.88xx.2	2	40	231	425			30
	4		231	375			
	8		231	231	346	346	
	12		185	185	277	277	
	16		162	162	243	243	
S084.325.0xxx.77xx.2 S084.325.0xxx.78xx.2 S084.325.0xxx.87xx.2 S084.325.0xxx.88xx.2	2	40	300	552			30
	4		300	485			
	8		300	300	450	450	
	12		277	277	415	415	
	16		250	250	375	375	
S084.450.0xxx.77xx.2 S084.450.0xxx.78xx.2 S084.450.0xxx.87xx.2 S084.450.0xxx.88xx.2	2	40	416	765			30
	4		416	675			
	8		416	416	624	624	
	12		370	370	555	555	
	16		- - -				

ServoOne servocontroller BG7 (liquid cooling, 480 V AC) - 2-4 kHz

Type	Switching frequency of the power stage [kHz]	Ambient temperature [°C]	At 480 V AC: Rated current [A_{eff}]	At 480 V AC: At rotating field frequency increasing linearly 0 to 5 Hz [A_{eff}]	At 480 V AC: For intermittent operation > 5 Hz	For time [s]
S084.250.0xxx.70xx.2 S084.250.0xxx.71xx.2 S084.250.0xxx.80xx.2 S084.250.0xxx.81xx.2	2	40	225	425		30
	4		225	375		
S084.325.0xxx.70xx.2 S084.325.0xxx.71xx.2 S084.325.0xxx.80xx.2 S084.325.0xxx.81xx.2	2	40	292	552		30
	4		292	485		
S084.450.0xxx.70xx.2 S084.450.0xxx.71xx.2 S084.450.0xxx.80xx.2 S084.450.0xxx.81xx.2	2	40	405	765		30
	4		405	675		

ServoOne servocontroller BG7 (liquid cooling, HF function package) - 2-16 kHz

Type	Switching frequency of the power stage [kHz]	Ambient temperature [°C]	At 480 V AC: Rated current [A_{eff}]	At 480 V AC: At rotating field frequency increasing linearly 0 to 5 Hz [A_{eff}]		At 480 V AC: For intermittent operation > 5 Hz	For time [s]
S084.250.0xxx.77xx.2 S084.250.0xxx.78xx.2 S084.250.0xxx.87xx.2 S084.250.0xxx.88xx.2	2	40	225	425			30
	4		225	375			
	8		225	225	337	337	
	12		180	180	270	270	
	16		157	157	235	235	
S084.325.0xxx.77xx.2 S084.325.0xxx.78xx.2 S084.325.0xxx.87xx.2 S084.325.0xxx.88xx.2	2	40	292	552			30
	4		292	485			
	8		292	292	438	438	
	12		270	270	405	405	
	16		243	243	364	364	
S084.450.0xxx.77xx.2 S084.450.0xxx.78xx.2 S084.450.0xxx.87xx.2 S084.450.0xxx.88xx.2	2	40	405	765			30
	4		405	675			
	8		405	405	607	607	
	12		360	360	540	540	
	16		- - -				

Space for your own notes

Ambient conditions, ServoOne single-axis system

Ambient conditions	
Protection	IP20 except terminals (IP00), fan opening BG2 (IP10)
Accident prevention regulations	According to local regulations (in Germany e.g. BGV A3)
Installation altitude	Up to 1000 m above MSL, higher with power reduction (1% per 100 m, max. 2000 m above sea level)
Pollution degree	2
Type of mounting	Built-in unit, only for vertical installation in a switch cabinet with min. IP4x protection, when using STO safety function min. IP54.

Climatic conditions			
In transit	As per EN 61800-2, IEC 60721-3-2 class 2K3 [1]		
	Temperature		-25 °C to +70 °C
	Relative atmospheric humidity		95% at max. +40 °C
In storage	As per EN 61800-2, IEC 60721-3-1 class 1K3 and 1K4 [2]		
	Temperature		-25 °C to +55 °C
	Relative atmospheric humidity		5 to 95%
In operation	As per EN 61800-2, IEC 60721-3-3 class 3K3 [3]		
	Temperature	Air cooling	**BG1** -10 °C to +45 °C (4 kHz) -10 °C to +40 °C (8, 12, 16 kHz) **BG2 to BG4** -10 °C to +45 °C (4 kHz), up to 55 °C with power reduction (5%/°C) -10 °C to +40 °C (8, 12, 16 kHz), up to 55 °C with power reduction (4%/°C) **BG5 to BG6a** -10 °C to +45 °C (4 kHz) -10 °C to +40 °C (8, 12, 16 kHz), up to 55 °C with power reduction (2%/°C)
		Liquid cooling	**BG3 and BG4** -10 °C to +45 °C (4 kHz), up to 55 °C with power reduction (5%/°C) -10 °C to +40 °C (8, 12, 16 kHz), up to 55 °C with power reduction (4%/°C) **BG5 to BG6a** -10 °C to +45 °C (4, 8, 12, 16 kHz), up to 55 °C with power reduction (2%/°C) **BG7** -10 °C to +40 °C (2, 4, 8, 12, 16 kHz), up to 55 °C with power reduction (2%/°C)
	Relative atmospheric humidity		5 to 85% without condensation

1) The absolute humidity is limited to max. 60 g/m³. This means, at 70 °C for example, that the relative atmospheric humidity may only be max. 40%.

2) The absolute humidity is limited to max. 29 g/m³. So the maximum values for temperature and relative atmospheric humidity stipulated in the table must not occur simultaneously.

3) The absolute humidity is limited to max. 25 g/m³. That means that the maximum values for temperature and relative atmospheric humidity stipulated in the table must not occur simultaneously.

Mechanical conditions			
Vibration limit in transit	As per EN 61800-2, IEC 60721-3-2 class 2M1		
	Frequency [Hz]	**Amplitude [mm]**	**Acceleration [m/s²]**
	2 ≤ f < 9	3.5	Not applicable
	9 ≤ f < 200	Not applicable	10
	200 ≤ f < 500	Not applicable	15
Shock limit in transit	As per EN 61800-2, IEC 60721-3-2 class 2M1		
	Drop height of packed device max. 0.25 m		
Vibration limits for the system [1]	As per EN 61800-2, IEC 60721-3-3 class 3M1		
	Frequency [Hz]	**Amplitude [mm]**	**Acceleration [m/s²]**
	2 ≤ f < 9	0.3	Not applicable
	9 ≤ f < 200	Not applicable	1

1) Note: The devices are only designed for stationary use. The drive controllers must not be installed in areas where they would be permanently exposed to vibration.

Acceptance, ServoOne single-axis system

CE marking

The ServoOne servocontrollers conform to the requirements of the Low Voltage Directive 2006/95/EC and the product standard EN 61800-5-1.
The servocontrollers thus conform to the requirements for installation in a machine or plant under the terms of the Machinery Directive 2006/42/EC.
The servocontrollers are accordingly CE marked. The CE marking on the rating plate indicates conformity with the above directives.

UL approval

UL approval has been obtained for the ServoOne single-axis controllers.
For details see docurrent "UL-Certification" 0927.01B.X.

Functional safety acceptance

See chapter 5.

EMC acceptance

All ServoOne single-axis controllers have an aluminium housing with an anodised finish (BG1 to BG4) or an aluminium rear panel made of galvanised sheet steel (BG5 to BG7) to enhance interference immunity (as per EN 61800-3, environment classes 1 and 2).
To limit conducted interference emissions to the permissible level, the ServoOne single-axis servocontrollers BG1 to BG5 are fitted with integral mains filters. External mains filters are available for ServoOne single-axis controllers BG6 to BG7 (see chapter 9, "Accessories"). This ensures compliance with the EMC Directive 2004/108/EC:

- Public low-voltage network
  "first environment" (residential C2) up to 10 m motor cable length
- Industrial low-voltage network:
  ”second environment” (industrial C3) up to 25 m motor cable length

Additional external mains filters are also available for all single-axis controllers BG1 to BG5 (see chapter 9, "Accessories").

STO acceptance

The "STO" (Safe Torque Off) safety function integrated into the ServoOne servocontroller is certified according to the requirements of

- EN ISO 13849-1 “PL e” and
- EN 61508 / EN 62061 "SIL3".

Acceptance was undertaken by the accredited certification body "TÜV Rheinland".

Technical data, single-axis system

Technical data, servocontrollers 4 A to 6 A (BG1)

Type SO84.004.0

Technical data \ Article designation	SO82.004.0	SO84.004.0	SO84.006.0
Output, motor side			
Voltage	3-phase U_{Mains}		
Rated current, effective (I_N) [1]	4 A	4 A [2]	6 A [2]
Peak current	See table on page 40	See table on Page 41	
Rotating field frequency	0 ... 400 Hz		
Switching frequency of the power stage	4, 8, 12, 16 kHz (factory setting 8 kHz at 40 °C cooling air temperature)		
Input, mains side			
Mains voltage (U_{Mains})	1 x 230 V ±10%	(3 x 230 V/3 x 400 V/3 x 460 V/3 x 480 V) ±10%	
Device connected load (with mains choke)	2.2 kVA	2.9 kVA [2]	4.4 kVA [2]
Current (with mains choke)	9.5 A [3]	4.2 A [2]	6.4 A [2]
Asymmetry of mains voltage	-	±3% max.	
Frequency	50/60 Hz ±10%		
Power dissipation at I_N [1]	85 W	96 W [2]	122 W [2]
DC link			
Capacitance	1740 µF	400 µF	
Brake chopper switch-on threshold	390 V DC	650 V DC [2]	
Minimum ohmic resistance of an externally installed braking resistor [4]	72 Ω		
Brake chopper peak power with external braking resistor	2.1 kW	5.9 kW	
Option: internal braking resistor	PTC		
Brake chopper continuous power with internal braking resistor	Dependent on the effective load on the controller in the corresponding application		
Brake chopper peak power with internal braking resistor	1.7 kW	4.7 kW	

1) Data referred to 8 kHz switching frequency

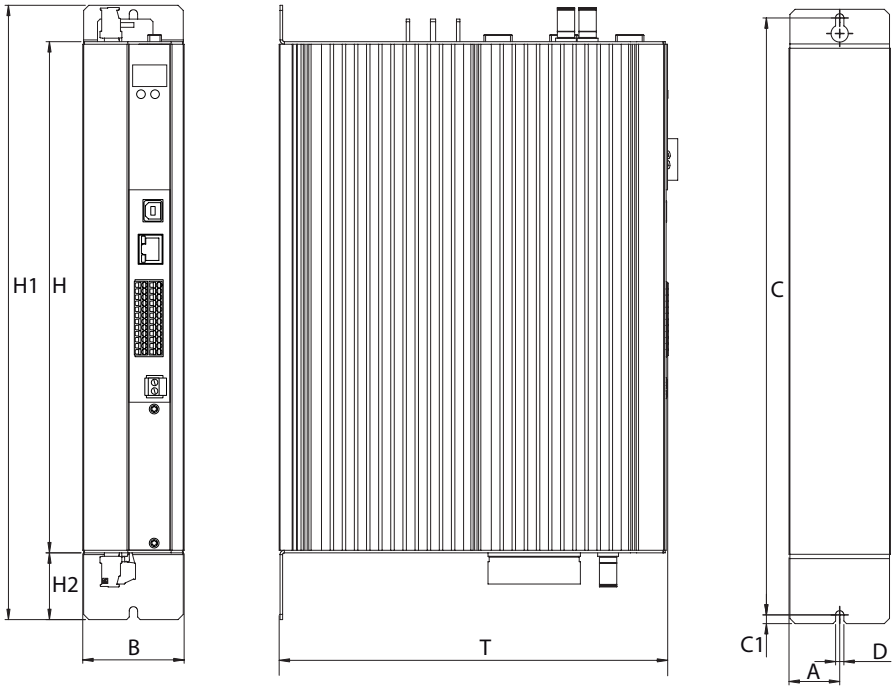
2) Data referred to 3 x 400 V AC mains voltage

3) Without mains choke

4) Connection of an external braking resistor not permitted for device variant with internal braking resistor (SO8x.xxx.xxxx.1xxx).

Mechanics, BG1	SO82.004.0	SO84.004.0	SO84.006.0
Cooling method	Air cooling (wall-mounted)		
Protection	IP20 except terminals (IP00)		
Cooling air temperature	Max. 45 °C (at 4 kHz power stage switching frequency)		
Weight	3.4 kg		
Mounting method	Vertical mounting with unhindered air flow		
Row mounting of multiple servocontrollers	Direct butt mounting		

Dimensional drawings, BG1 air cooling



Dimensions, BG1 [mm]	
B (width)	58.5
H (height)	295 (without terminals)
T (depth)	224 (without terminals)
A	29.25
C / C1	344.5 / 5
D Ø	4.8
H1 / H2	355 / 38.5

Matching accessories (see chapter 9f.)

Controller	SO82.004.0	SO84.004.0	SO84.006.0
Mains choke	LR32.14-UR	LR34.4-UR	LR34.6-UR
Braking resistor		BR-090.01.540-UR (35 W) BR-090.02.540-UR (150 W) BR-090.03.540-UR (300 W) BR-090.10.650-UR (1000 W)	
Mains filter	-	EMC7.1-UR	EMC7.1-UR

Technical data, servocontrollers 8 A to 12 A (BG2)

Type SO84.008.0

Technical data \ Article designation	SO84.008.0	SO84.012.0
Output, motor side		
Voltage	3-phase U_{Mains}	
Rated current, effective (I_N)	8 A [1]	12 A [1]
Peak current	See table on page 41	
Rotating field frequency	0 ... 400 Hz	
Switching frequency of the power stage	4, 8, 12, 16 kHz (factory setting 8 kHz at 40 °C cooling air temperature)	
Input, mains side		
Mains voltage (U_{Mains})	(3 x 230 V/3 x 400 V/3 x 460 V/3 x 480 V) ±10%	
Device connected load (with mains choke)	6.0 kVA [1]	9.1 kVA [1]
Current (with mains choke)	8.7 A [1]	13.1 A [1]
Asymmetry of mains voltage	±3% max.	
Frequency	50/60 Hz ±10%	
Power dissipation at I_N	175 W [1]	240 W [1]
DC link		
Capacitance	725 µF	
Brake chopper switch-on threshold	650 V DC [1]	
Minimum ohmic resistance of an externally installed braking resistor [2]	39 Ω	
Brake chopper peak power with external braking resistor	11 kW	
Option: internal braking resistor	90 Ω	
Brake chopper continuous power with internal braking resistor	Dependent on the effective load on the controller in the corresponding application	
Brake chopper peak power with internal braking resistor	4.7 kW [1]	

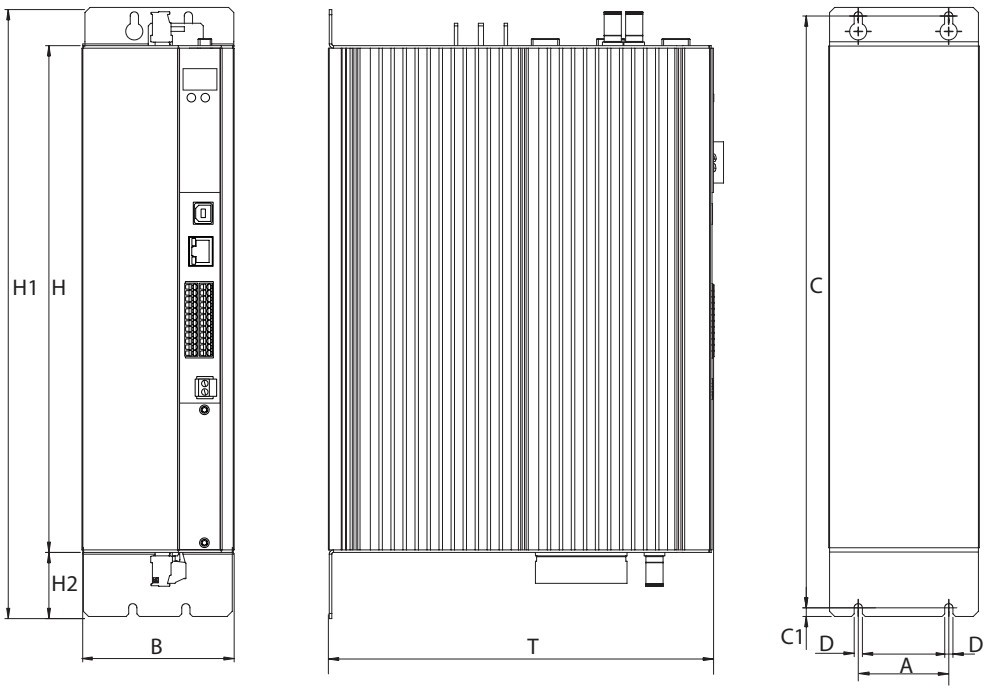
1) Data referred to mains voltage 3 x 400 V AC and 8 kHz switching frequency

2) Connection of an external braking resistor not permitted for device variant with internal braking resistor (SO8x.xxx.xxxx.1xxx).

Mechanics, BG2	SO84.008.0	SO84.012.0
Cooling method	Air cooling (wall-mounted)	
Protection	IP20 except terminals (IP00), fan opening (IP10)	
Cooling air temperature	45 °C (at 4 kHz power stage switching frequency)	
Weight	4.9 kg	
Mounting method	Vertical mounting with unhindered air flow	
Row mounting of multiple servocontrollers	Direct butt mounting	

Dimensions, BG2 [mm]	
B (width)	90
H (height)	295 (without terminals)
T (depth)	224 (without terminals)
A	50
C / C1	344.5 / 5
D Ø	4.8
H1 / H2	355 / 38.5

Dimensional drawings, BG2 air cooling



Matching accessories (see chapter 9)

Controller	SO84.008.0	SO84.012.0
Mains choke	LR34.8-UR	LR34.14-UR
Braking resistor	BR-090.01.540-UR (35 W) BR-090.02.540-UR (150 W) BR-090.03.540-UR (300 W) BR-090.10.650-UR (1000 W)	
Mains filter	EMC16.1-UR	EMC16.1-UR

Technical data, servocontrollers 16 A to 20 A (BG3)

Type SO84.016.0

Technical data / Article designation	SO84.016.0	SO84.020.0
Output, motor side		
Voltage	3-phase U_{Mains}	
Rated current, effective (I_N)	16 A [1]	20 A [1]
Peak current	See table on page 41	
Rotating field frequency	0 ... 400 Hz	
Switching frequency of the power stage	4, 8, 12, 16 kHz (factory setting 8 kHz at 40 °C cooling air temperature)	
Input, mains side		
Mains voltage (U_{Mains})	(3 x 230 V/3 x 400 V/3 x 460 V/3 x 480 V) ±10%	
Device connected load (with mains choke)	12.0 kVA [1]	15.0 kVA [1]
Current (with mains choke)	17.3 A [1]	21.6 A [1]
Asymmetry of mains voltage	±3% max.	
Frequency	50/60 Hz ±10%	
Power dissipation at I_N [3]	330 W [1]	400 W [1]
DC link		
Capacitance	1230 µF	
Brake chopper switch-on threshold	650 V DC [1]	
Minimum ohmic resistance of an externally installed braking resistor [2]	20 Ω	
Brake chopper peak power with external braking resistor	21 kW	
Option: internal braking resistor	90 Ω	
Brake chopper continuous power with internal braking resistor	Dependent on the effective load on the controller in the corresponding application	
Brake chopper peak power with internal braking resistor	4.7 kW [1]	

1) Data referred to mains voltage 3 x 400 V AC and 8 kHz switching frequency

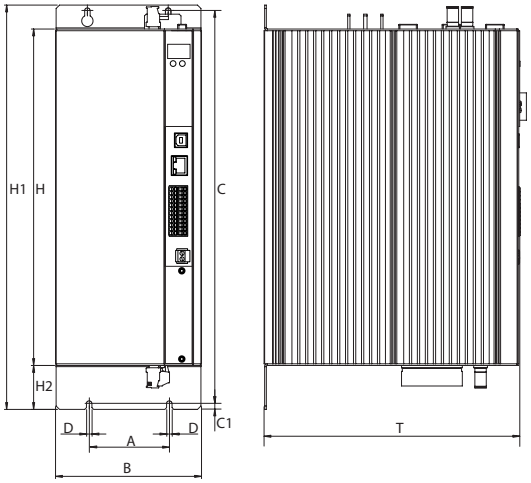
2) Connection of an external braking resistor not permitted for device variant with internal braking resistor (SO8x.xxx.xxxx.1xxx or SO8x.xxx.xxxx.7xxx).

3) With liquid cooling typically 80% of the power dissipation is dissipated by the liquid chiller.

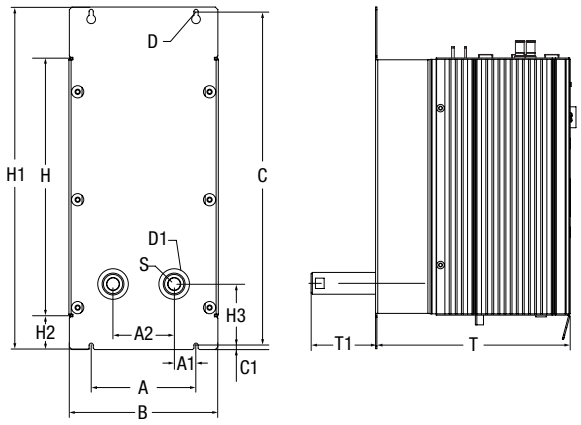
Mechanics, BG3	SO84.016.0	SO84.020.0
Cooling method	Air cooling (wall-mounted) or liquid cooling	
Protection	IP20 except terminals (IP00)	
Cooling air temperature	45 °C (at 4 kHz power stage switching frequency)	
Weight	6.5 kg	
Mounting method	Vertical mounting with unhindered air flow	
Row mounting of multiple servocontrollers	Direct butt mounting	

Dimensions, BG3 [mm]	
B (width)	130
H (height)	295 (without terminals)
T (depth)	224 (without terminals)
A / A1 / A2	80 / 10 / 60
C (air/liquid cooling)	344.5 / 382
C1	5
D Ø	4.8
D1 Ø (bore for pipe fitting)	48
H1 (air/liquid cooling)	355 / 392
H2 / H3	38.5 / 75
S	3/8 inch (female thread)
T1	74

Dimensional drawings, BG3 air cooling



Dimensional drawings, BG3 liquid cooling



Matching accessories (see chapter 9)

Controller	SO84.016.0	SO84.020.0
Mains choke	LR34.17-UR	LR34.24-UR
Braking resistor	BR-026.01.540-UR (35 W) BR-026.02.540-UR (150 W) BR-026.03.540-UR (300 W) BR-026.10.650-UR (1000 W)	
Mains filter	EMC16.1-UR	EMC25.1-UR

Technical data, servocontrollers 24 A to 32 A (BG4)

Type SO84.024.0

Technical data \ Article designation	SO84.024.0	SO84.032.0
Output, motor side		
Voltage	3-phase U_{Mains}	
Rated current, effective (I_N)	24 A [1]	32 A [1]
Peak current	See table on page 41	
Rotating field frequency	0 ... 400 Hz	
Switching frequency of the power stage	4, 8, 12, 16 kHz (factory setting 8 kHz at 40 °C cooling air temperature)	
Input, mains side		
Mains voltage (U_{Mains})	(3 x 230 V/3 x 400 V/3 x 460 V/3 x 480 V) ±10%	
Device connected load (with mains choke)	18.2 kVA [1]	24.2 kVA [1]
Current (with mains choke)	26.2 A [1]	34.9 A [1]
Asymmetry of mains voltage	±3% max.	
Frequency	50/60 Hz ±10%	
Power dissipation at I_N [3]	475 W [1]	515 W [1]
DC link		
Capacitance	2000 µF	
Brake chopper switch-on threshold	650 V DC [1]	
Minimum ohmic resistance of an externally installed braking resistor [2]	12 Ω	
Brake chopper peak power with external braking resistor	35 kW	
Option: internal braking resistor	90 Ω	
Brake chopper continuous power with internal braking resistor	Dependent on the effective load on the controller in the corresponding application	
Brake chopper peak power with internal braking resistor	4.7 kW [1]	

1) Data referred to mains voltage 3 x 400 V AC and 8 kHz switching frequency

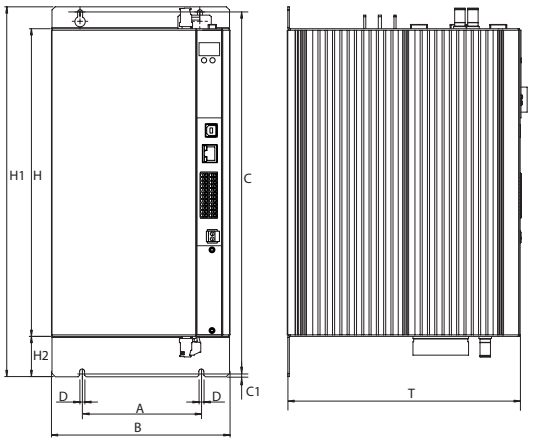
2) Connection of an external braking resistor not permitted for device variant with internal braking resistor (SO8x.xxx.xxxx.1xxx or SO8x.xxx.xxxx.7xxx).

3) With liquid cooling typically 80% of the power dissipation is dissipated by the liquid chiller.

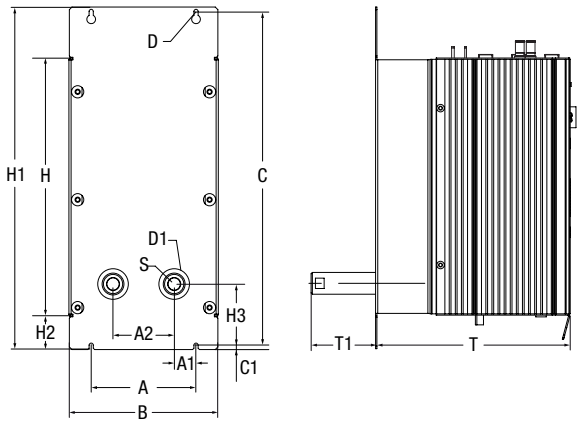
Mechanics, BG4	SO84.024.0	SO84.032.0
Cooling method	Air cooling (wall-mounted) or liquid cooling	
Protection	IP20 except terminals (IP00)	
Cooling air temperature	45 °C (at 4 kHz power stage switching frequency)	
Weight	7.5 kg	
Mounting method	Vertical mounting with unhindered air flow	
Row mounting of multiple servocontrollers	Direct butt mounting	

Dimensions, BG4 [mm]	
B (width)	171
H (height)	295 (without terminals)
T (depth)	224 (without terminals)
A / A1 / A2	120 / 25 / 70
C (air/liquid cooling)	344.5 / 382
C1	5
D Ø	4.8
D1 Ø (bore for pipe fitting)	48
H1 (air/liquid cooling)	355 / 392
H2 / H3	38.5 / 70
S	3/8 inch (female thread)
T1	74

Dimensional drawings, BG4 air cooling



Dimensional drawings, BG4 liquid cooling



Matching accessories (see chapter 9)

Controller	SO84.024.0	SO84.032.0
Mains choke	LR 34.24-UR	LR34.32-UR
Braking resistor	BR-026.01.540-UR (35 W) BR-026.02.540-UR (150 W) BR-026.03.540-UR (300 W) BR-026.10.650-UR (1000 W)	
Mains filter	EMC25.1-UR	EMC35.1-UR

Technical data, servocontrollers 45 A to 84 A (BG5)

Type SO84.045.0 (air cooling)

Technical data \ Article designation	SO84.045.0		SO84.060.0		SO84.072.0	
	Air cooling	Liquid cooling	Air cooling	Liquid cooling	Air cooling	Liquid cooling
Output, motor side						
Voltage	3-phase U_{Mains}					
Rated current, effective (I_N)	45 A [1]	53 A [1]	60 A [1]	70 A [1]	72 A [1]	84 A [1]
Peak current	See tables on page Page 42 (air cooling) and Page 43 (liquid cooling)					
Rotating field frequency	0 ... 400 Hz					
Switching frequency of the power stage	4, 8, 12, 16 kHz (factory setting 8 kHz at 40 °C cooling air temperature)					
Input, mains side						
Mains voltage (U_{Mains})	(3 x 230 V/3 x 400 V/3 x 460 V/3 x 480 V) ±10%					
Device connected load (with mains choke)	31.2 kVA [1]	36.7 kVA [1]	41.6 kVA [1]	48.5 kVA [1]	50 kVA [1]	52.6 kVA [1] *)
Current (with mains choke)	45 A [1]	53 A [1]	60 A [1]	70 A [1]	72 A [1]	76 A [1] *)
Asymmetry of mains voltage	±3% max.					
Frequency	50/60 Hz ±10%					
Power dissipation at I_N [2]	610 W [1]	690 W [1]	830 W [1]	930 W [1]	1010 W [1]	1130 W [1]
DC link						
Capacitance	430 µF		900 µF			
Brake chopper switch-on threshold	820 V DC					
Minimum ohmic resistance of an externally installed braking resistor	18 Ω	10 Ω	18 Ω	10 Ω	13 Ω	10 Ω
Brake chopper peak power with external braking resistor	37 kW	67 kW	37 kW	67 kW	52 kW	67 kW
Option: internal braking resistor	-	20 Ω	-	10 Ω	-	10 Ω
Brake chopper continuous power with internal braking resistor	-	675 W	-	1350 W	-	1350 W
Brake chopper peak power with internal braking resistor	-	34 kW	-	67 kW	-	67 kW

1) Data referred to mains voltage 3 x 400 V AC and 8 kHz switching frequency

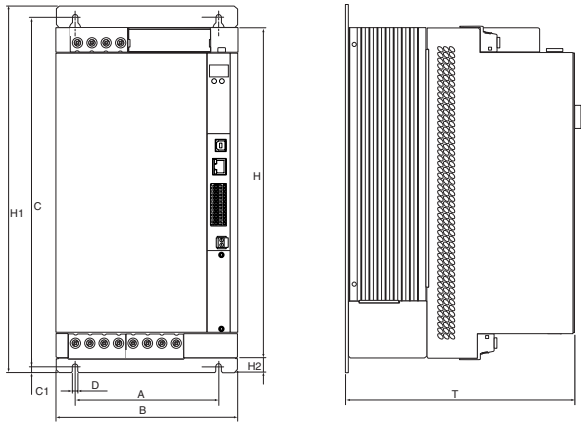
2) With liquid cooling typically 80% of the power dissipation is dissipated by the liquid chiller.

**) D_N input current must be limited to max. 76 A.*

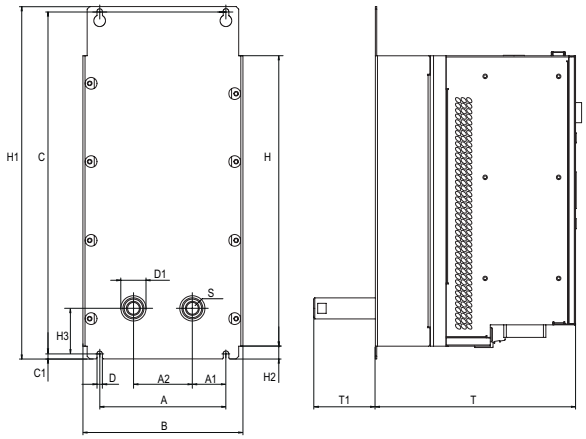
Mechanics, BG5	SO84.045.0	SO84.060.0	SO84.072.0
Cooling method	Air cooling (wall-mounted) or liquid cooling		
Protection	IP20 except terminals (IP00)		
Cooling air temperature	45 °C (at 4 kHz power stage switching frequency)		
Weight (air/liquid cooling)	13 kg / 16.5 kg		
Mounting method	Vertical mounting with unhindered air flow		
Row mounting of multiple servocontrollers	Possible at a distance of 20 mm (air cooling) or 2 mm (liquid cooling)		

Dimensions, BG5 [mm]	
B (width)	190
H (height)	345 (without terminals)
D (depth) (air/liquid cooling)	238 / 198 (without terminals)
A (air/liquid cooling)	150 / 148
A1 / A2	39 / 70
C (air/liquid cooling)	365 / 378
C1 (air/liquid cooling)	6 / 8
D Ø (air/liquid cooling)	5.6 / 7
D1 Ø (bore for pipe fitting)	48
H1 (air/liquid cooling)	382.5 / 394
H2 (air/liquid cooling)	15 / 16.5
H3	53.5
S	3/8 inch (female thread)
T1	73.5

Dimensional drawings, BG5 air cooling



Dimensional drawings, BG5 liquid cooling



Matching accessories (see chapter 9)

Controller	SO84.045.0		SO84.060.0		SO84.072.0	
	Air cooling	Liquid cooling	Air cooling	Liquid cooling	Air cooling	Liquid cooling
Mains choke	LR34.44-UR	LR34.58-UR		LR34.70-UR		LR34.88-UR
Braking resistor	BR-026.01.540-UR (35 W) BR-026.02.540-UR (150 W) BR-026.03.540-UR (300 W) BR-026.10.650-UR (1000 W)		BR-026.20.650-UR (2000 W) BR-020.03.540-UR (300 W) BR-015.03.540-UR (300 W)		*(not for SO84.045.0 and SO84.060.0 with air cooling)*	
Mains filter	EMC63.1-UR		EMC100.1-UR			

Technical data, servocontrollers 90 A to 143 A (BG6)

Type SO84.110.0 (air cooling)

Technical data \ Article designation	SO84.090.0		SO84.110.0	
	Air cooling	Liquid cooling	Air cooling	Liquid cooling
Output, motor side				
Voltage	3-phase U_{Mains}			
Rated current, effective (I_N)	90 A [1]	110 A [1]	110 A [1]	143 A [1]
Peak current	See tables on page Page 42 (air cooling) and Page 43 (liquid cooling)			
Rotating field frequency	0 ... 400 Hz			
Switching frequency of the power stage	4, 8, 12, 16 kHz (factory setting 8 kHz at 40 °C cooling air temperature)			
Input, mains side				
Mains voltage (U_{Mains})	(3 x 230 V/3 x 400 V/3 x 460 V/3 x 480 V) -15%/+10%			
Device connected load (with mains choke)	62 kVA [1]	76 kVA [1]	76 kVA [1]	99 kVA [1]
Current (with mains choke)	90 A [1]	110 A [1]	110 A [1]	143 A [1]
Asymmetry of mains voltage	±3% max.			
Frequency	50/60 Hz ±10%			
Power dissipation at I_N [2]	1300 W [1]	1500 W [1]	1600 W [1]	1940 W [1]
DC link				
Capacitance	1060 µF	2120 µF	2120 µF	
Brake chopper switch-on threshold	820 V DC			
Minimal ohmic resistance of an externally installed Braking resistor	12 Ω		10 Ω	
Brake chopper peak power with external braking resistor	56 kW	56 kW	67 kW	67 kW
Option: internal braking resistor	-	7.5 Ω	-	7.5 Ω
Brake chopper continuous power with internal braking resistor	-	2650 W	-	2650 W
Brake chopper peak power with internal braking resistor	-	90 kW	-	90 kW

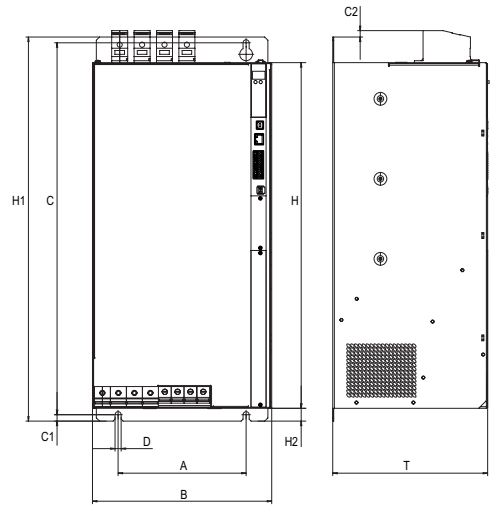
1) Data referred to mains voltage 3 x 400 V AC and 8 kHz switching frequency

2) With liquid cooling typically 80% of the power dissipation is dissipated by the liquid chiller.

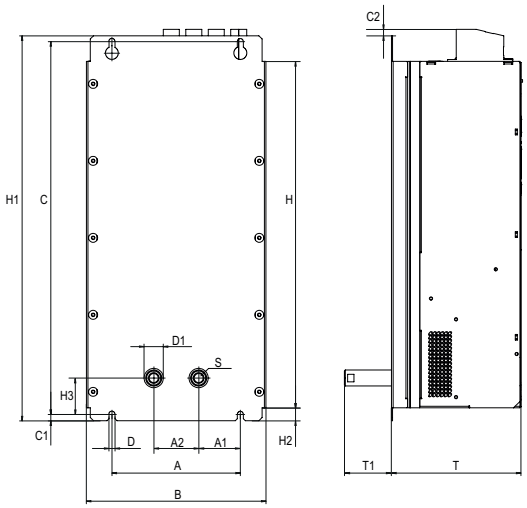
Mechanics, BG6	SO84.090.0	SO84.110.0
Cooling method	Air cooling (wall-mounted) or liquid cooling	
Protection	IP20 except terminals (IP00)	
Cooling air temperature	45 °C (at 4 kHz power stage switching frequency)	
Weight (air/liquid cooling)	28 kg / 31.5 kg	
Mounting method	Vertical mounting with unhindered air flow	
Row mounting of multiple servocontrollers	Possible at a distance of 40 mm (air cooling) or 2 mm (liquid cooling)	

Dimensions, BG6 [mm]	
B (width)	280
H (height)	540 (without terminals)
D (depth) (air/liquid cooling)	242 / 202 (without terminals)
A / A1 / A2	200 / 65 / 70
C / C1 / C2	581 / 10 / 10
D Ø	9.5
D1 Ø (bore for pipe fitting)	48
H1 / H2 / H3	600 / 20 / 56.5
S	3/8 inch (female thread)
T1	73.5

Dimensional drawings, BG6 air cooling



Dimensional drawings, BG6 liquid cooling



Matching accessories (see chapter 9)

Controller	SO84.090.0		SO84.110.0	
	Air cooling	Liquid cooling	Air cooling	Liquid cooling
Mains choke	LR 34.88-UR	LR34.108-UR		LR34.140-UR
Braking resistor	BR-026.01.540-UR (35 W) BR-026.02.540-UR (150 W) BR-026.03.540-UR (300 W) BR-026.10.650-UR (1000 W)	BR-026.20.650-UR (2000 W) BR-020.03.540-UR (300 W) BR-015.03.540-UR (300 W)		
Mains filter	EMC100.1-UR	EMC150.1-UR		

Technical data, servocontrollers 143 A to 210 A (BG6a)

Type SO84.170.0 (air cooling)

Technical data \ Article designation	SO84.143.0		SO84.170.0	
	Air cooling	Liquid cooling	Air cooling	Liquid cooling
Output, motor side				
Voltage	3-phase U_{Mains}			
Rated current, effective I_N	143 A [1)]	170 A [1)]	170 A [1)]	210 A [1)]
Peak current	See tables on page Page 42 (air cooling) and Page 43 (liquid cooling)			
Rotating field frequency	0 ... 400 Hz			
Switching frequency of the power stage	4, 8, 12, 16 kHz (factory setting 8 kHz at 40 °C cooling air temperature)			
Input, mains side				
Mains voltage (U_{Mains})	(3 x 230 V/3 x 400 V/3 x 460 V/3 x 480 V) -15%/+10%			
Device connected load (with mains choke)	99 kVA [1)]	118 kVA [1)]	118 kVA [1)]	128 kVA [1)] *)
Current (with mains choke)	143 A [1)]	170 A [1)]	170 A [1)]	185 A [1)]
Asymmetry of mains voltage	±3% max.			
Frequency	50/60 Hz ±10%			
Power dissipation at I_N [2)]	2100 W [1)]	2380 W [1)]	2500 W [1)]	2650 W [1)] *)
DC link				
Capacitance	3180 µF	4240 µF	4240 µF	
Brake chopper switch-on threshold	820 V DC			
Minimal ohmic resistance of an externally installed Braking resistor	8.5 Ω		6.5 Ω	
Brake chopper peak power with external braking resistor	79 kW	79 kW	103 kW	103 kW
Option: internal braking resistor	-	5 Ω	-	5 Ω
Brake chopper continuous power with internal braking resistor	-	4000 W	-	4000 W
Brake chopper peak power with internal braking resistor	-	135 kW	-	135 kW

1) Data referred to mains voltage 3 x 400 V AC and 8 kHz switching frequency

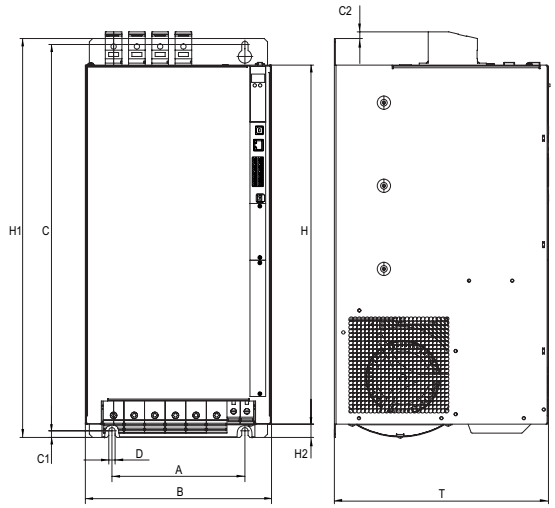
2) With liquid cooling typically 80% of the power dissipation is dissipated by the liquid chiller.

**) The input current must be limited to max. 185 A!*

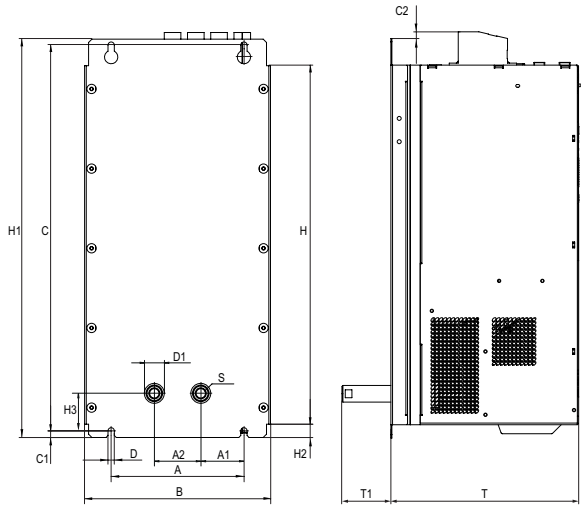
Mechanics, BG6a	SO84.143.0	SO84.170.0
Cooling method	Air cooling (wall-mounted) or liquid cooling	
Protection	IP20 except terminals (IP00)	
Cooling air temperature	45 °C (at 4 kHz power stage switching frequency)	
Weight (air/liquid cooling)	32 kg / 41.1 kg	
Mounting method	Vertical mounting with unhindered air flow	
Row mounting of multiple servocontrollers	Possible at a distance of 40 mm (air cooling) or 2 mm (liquid cooling)	

Dimensions, BG6a [mm]	
B (width)	280
H (height)	540 (without terminals)
D (depth) (air/liquid cooling)	322 / 282 (without terminals)
A / A1 / A2	200 / 65 / 70
C / C1 / C2	581 / 10 / 10
D Ø	9.5
D1 Ø (bore for pipe fitting)	48
H1 / H2 / H3	600 / 20 / 56.5
S	3/8 inch (female thread)
T1	73.5

Dimensional drawings, BG6a air cooling



Dimensional drawings, BG6a liquid cooling



Matching accessories (see chapter 9)

Controller	SO84.143.0		SO84.170.0	
	Air cooling	Liquid cooling	Air cooling	Liquid cooling
Mains choke	LR34.140-UR	LR34.168-UR		LR34.210-UR
Braking resistor	BR-026.01.540-UR (35 W) BR-026.02.540-UR (150 W) BR-026.03.540-UR (300 W) BR-026.10.650-UR (1000 W)	BR-026.20.650-UR (2000 W) BR-020.03.540-UR (300 W) BR-015.03.540-UR (300 W)		
Mains filter	EMC150.1-UR	EMC180.1-UR		EMC220.1-UR

Technical data, servocontrollers 250 A to 450 A (BG7)

Type SO84.250.0 (liquid cooling)

Technical data \ Article designation	SO84.250.0	SO84.325.0	SO84.450.0
Output, motor side			
Voltage	3-phase U_{Mains}		
Rated current, effective (I_N)	250 A [1]	325 A [1]	450 A [1]
Peak current	See table on Page 44, Page 43, Page 46		
Rotating field frequency	0 ... 400 Hz		
Switching frequency of the power stage	2, 4 kHz (factory setting 2 kHz at +40 °C)		
Input, mains side			
Mains voltage (U_{Mains})	(3 x 230 V/3 x 400 V/3 x 460 V/3 x 480 V) ±10%		
Device connected load (with mains choke)	173 kVA [1]	225 kVA [1]	310 kVA [1]
Current (with mains choke)	250 A [1]	325 A [1]	450 A [1]
Asymmetry of mains voltage	±3% max.		
Frequency	50/60 Hz ±10%		
Power dissipation at I_N [2]	3960 W [1]	4800 W [1]	6750 W [1]
DC link			
Capacitance	3600 µF	5400 µF	7200 µF
Brake chopper switch-on threshold	820 V DC		
Minimum ohmic resistance of an externally installed braking resistor	3.2 Ω	2.5 Ω	1.7 Ω
Brake chopper peak power with external braking resistor	210 kW	269 kW	395 kW
Option: internal braking resistor	3.3 Ω	3.3 Ω	2.4 Ω
Brake chopper continuous power with internal braking resistor	5000 W		6800 W
Brake chopper peak power with internal braking resistor	204 kW		280 kW

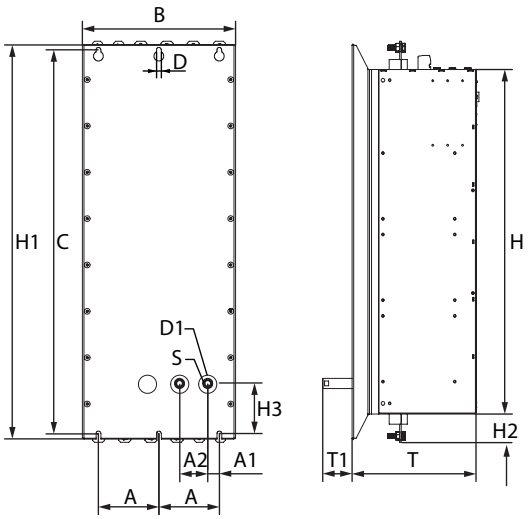
1) Data referred to mains voltage 3 x 400 V AC and 2 kHz switching frequency

2) With liquid cooling typically 80% of the power dissipation is dissipated by the liquid chiller.

Mechanics, BG7	SO84.250.0	SO84.325.0	SO84.450.0
Cooling method	Liquid cooling		
Protection	IP20 except terminals (IP00)		
Coolant temperature	Max. 40 °C, not more than 10 K below the ambient temperature		
Weight	100 kg		
Mounting method	Vertical mounting		
Row mounting of multiple servocontrollers	Direct butt mounting		

Dimensions, BG7 [mm]	
B (width)	380 / 385 (with shield plate)
H (height)	855 / 1171 (with terminal cover) 1315 with shield plates
T (depth)	287 (without terminals)
A / A1 / A2	150 / 29 / 70
C / C1	952 / 14
D Ø	12
D1 Ø (bore for pipe fitting)	48
H1 / H2 / H3	979 / 62 / 124
S	3/8 inch (female thread)
T1	74

Dimensional drawings, BG7 liquid cooling



Matching accessories (see chapter 9)

Controller	SO84.250.0	SO84.325.0	SO84.450.0
Mains choke	LR34.250-UR	LR34.325-UR	LR34.450-UR
Braking resistor	BR-026.10.650-UR (1000 W) BR-026.20.650-UR (2000 W)	BR-020.03.540-UR (300 W) BR-015.03.540-UR (300 W)	
Mains filter	EMC250.1-UR	EMC300.1-UR [1)] EMC400.1-UR [1)]	EMC400.1-UR [1)] EMC500.1-UR [1)]

1) Depending on effective mains current

Space for your own notes

ServoOne multi-axis system

Supply unit BG5 | Axis controller BG5 | Axis controller BG4 | Axis controller BG3 | BG2 | Axis controller BG1

Axis controller

Type	Size	Rated current		Current carrying capacity	Technical data
		Air cooling	Liquid cooling		
S084.004.1	BG1	4.0 A	-	From page Seite 76	Page 92
S084.006.1	BG1	6.0 A	-		
S084.008.1	BG2	8.0 A	-	From page Seite 76	Page 94
S084.012.1	BG2	12 A	-		
S084.016.1	BG3	16 A	20 A	From Seite 76 and from Seite 81	Page 96
S084.020.1	BG3	20 A	25 A		
S084.024.1	BG4	24 A	26 A	From Seite 76 and from Seite 81	Page 98
S084.032.1	BG4	32 A	35 A		
S084.045.1	BG5	45 A	53 A	From Seite 80 and from page 83	Page 100
S084.060.1	BG5	60 A	70 A		
S084.072.1	BG5	72 A	84 A		
S084.090.1	BG6a	90 A	110 A	From Seite 80 and from page 83	Page 102
S084.110.1	BG6a	110 A	143 A		
S084.143.1	BG6a	143 A	170 A		
S084.170.1	BG6a	170 A	210 A		
S084.250.1	BG7	-	250 A	From page 4-16	Page 104
S084.325.1	BG7	-	325 A		
S084.450.1	BG7	-	450 A		

Supply units

Type	Size	Rated current	Current carrying capacity	Technical data
S084.040.S	BG5	40 A	Page 88	Page 106
S084.076.S	BG5	76 A		
S084.115.S	BG6a	115 A	Page 88	Page 110
S084.170.S	BG6a	170 A		
S084.375.S	BG7	375 A	Page 88	Page 110
S084.540.S	BG7	540 A		

Order codes, ServoOne multi-axis system

Order codes, axis controller

Article designation	SO84.	006	.	1	0	2	1	.	0	0	0	0	.	X
ServoOne														
Rated current	BG1	4 A												
		6 A												
	BG2	8 A												
		12 A												
	BG3	16 A												
		20 A												
	BG4	24 A												
		32 A												
	BG5	45 A												
		60 A												
		72 A												
	BG6a	90 A												
		110 A												
		143 A												
		170 A												
	BG7	250 A												
		325 A												
		450 A												
		004												
		006												
		008												
		012												
		016												
		020												
		024												
		032												
		045												
		060												
		072												
		090												
		110												
		143												
		170												
		250												
		325												
		450												
Supply	DC			1										
Safety technology	STO				0									
	Integrated safety control [2]				1									
Option 1 Communication	Not included					0								
	Sercos II					1								
	PROFIBUS					2								
	EtherCAT					3								
	CANopen					4								
	CANopen + 2 AO					5								
	PROFINET IRT					7								
	Sercos III					8								
	Powerlink [1]					9								
Option 2 Technology	Not included						0							
	Second SinCos encoder						1							
	TTL encoder simulation / TTL master encoder						2							
	TwinSync communication						3							
	SSI encoder simulation						4							
	TTL encoder with commutation signals						5							
	Multi_IO (analogue and digital expansion (MIO)						6							
	Digital input/output expansion (DIO)						8							
	Second safe SinCos encoder						A							
	Second safe SSI encoder						B							
	Second safe axis monitor (SinCos)						C							
Housing/cooling method	Air-cooled (standard) without RB BG1 ... BG6a								0					
	Liquid-cooled (standard) without RB from BG3 - BG7								8					
Function package	Basic (without additional function package)									0				
	iPlc									1				
	HF									7				
	HF + iPlc									8				
Special design	None										0			
Protection	Standard											0		
	PCBs with protective varnish (from SO84.045 standard)											1		
Hardware version	(may be multi-digit)													X

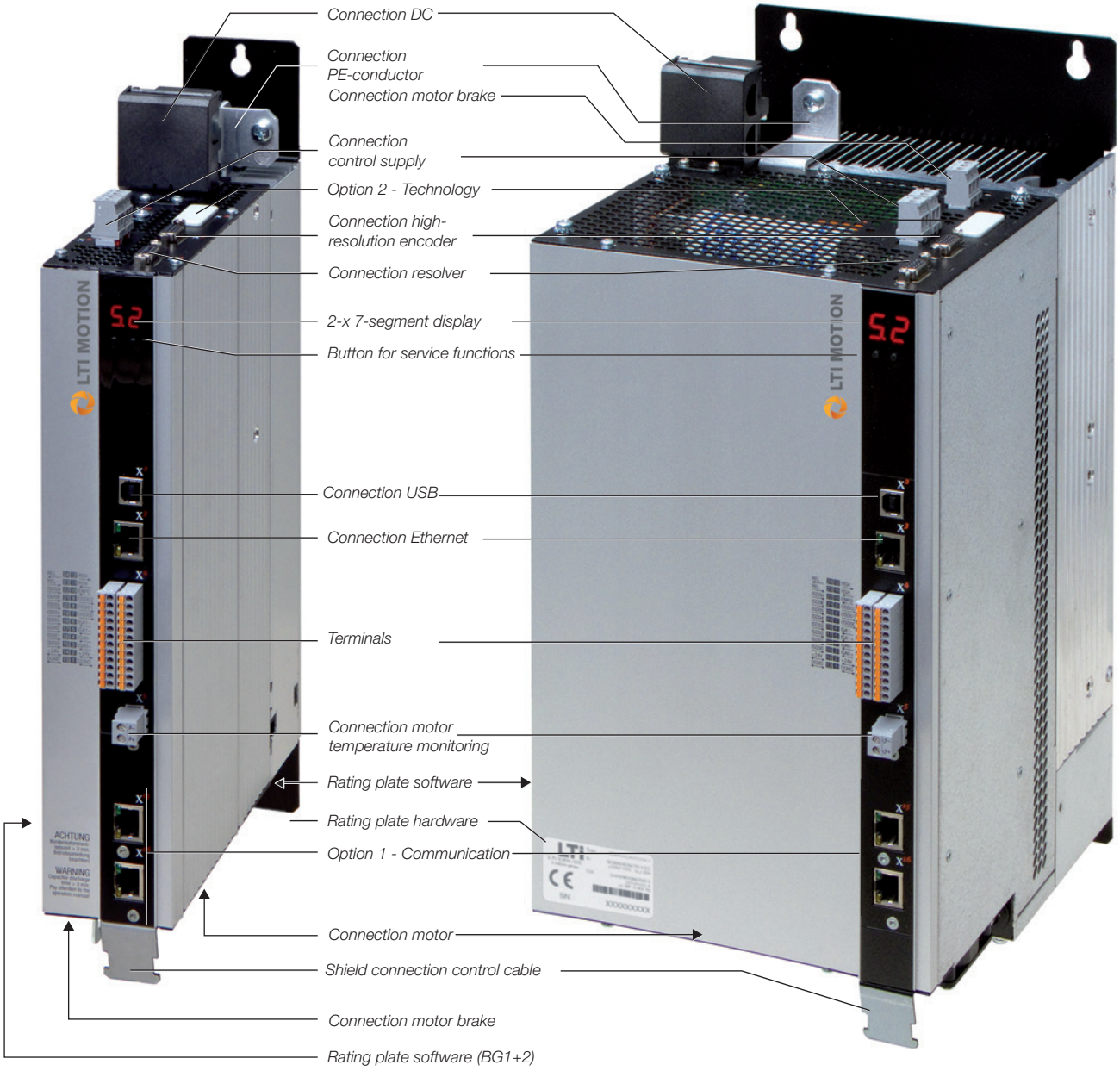
1) In preparation 2) FS certification BG1 - BG5

Order codes, supply unit

Article designation	SO8	4	.	040	.	S	0	2	0	.	0	0	0	0	.	X
ServoOne																
Connection class	3 x 400 V	4														
Rated current	BG5 40 A 76 A			040 076												
	BG6a 115 A 170 A			115 170												
	BG7 375 A 540 A			375 540												
DC supply unit regenerative						S										
Option 1 Communication	Not included Sercos II PROFIBUS EtherCAT CANopen							0 1 2 3 4								
Option 2 Technology	Not included								0							
Housing/cooling method	Air-cooled Liquid-cooled with int. braking resistor Liquid-cooled										0 7 8					
Function package	Basic (without additional function package) iPlc											0 1				
Special design	None												0			
Protection	Standard PCBs with protective varnish													0 1		
Hardware version	(may be multi-digit)															X

Features, ServoOne multi-axis system

Features, axis controllers BG1 to BG5



Features, axis controller BG6a

Features, servocontroller BG7

Features, supply unit BG5

Features, supply unit BG6a

Space for your own notes

Current carrying capacity, ServoOne multi-axis system

The maximum permissible output current of the axis controllers and the peak current are dependent on the DC supply voltage, the motor cable length, the power stage switching frequency and the ambient temperature. If the conditions change, the maximum permissible current carrying capacity of the axis controllers also changes.

ServoOne axis controllers BG1 to BG4 (air cooling, 565 V DC)

Type	Switching frequency of the power stage	Ambient temperature	Rated current	Peak current 1)				
				I_{MAX} 0 Hz	I_{1MAX} ≥5 Hz	t_1 2)	I_{2MAX} ≥5 Hz	t_2 2)
	[kHz]	[°C]	[A_{eff}]	[A_{eff}]	[A_{eff}]	[s]	[A_{eff}]	[s]
S084.004.1xxx.0 (BG1)	4	40	5.3	8.4	8.4	10	11.9	0.5
	8		4.0	8.4	8.4		-	-
	12		3.7	6.6	6.6		-	-
	16		2.7	5.2	5.2		-	-
S084.006.1xxx.0 (BG1)	4	40	8.0	12.7	12.7	10	18.0	0.5
	8		6.0	12.7	12.7		-	-
	12		5.5	9.9	9.9		-	-
	16		4.0	7.7	7.7		-	-
S084.008.1xxx.0 (BG2)	4	40	9.3	15.9	15.9	10	23.9	0.5
	8		9.3	15.9	15.9		-	-
	12		6.7	9.4	9.4		-	-
	16		5.5	7.7	7.7		-	-
S084.012.1xxx.0 (BG2)	4	40	14.0	24.0	24.0	10	36.0	0.5
	8		14.0	24.0	24.0		-	-
	12		10.0	14.1	14.1		-	-
	16		8.2	11.5	11.5		-	-
S084.016.1xxx.0 (BG3)	4	40	20.0	33.6	33.6	10	48.0	0.5
	8		16.0	33.6	33.6		-	-
	12		11.0	23.6	23.6		-	-
	16		8.5	19.4	19.4		-	-
S084.020.1xxx.0 (BG3)	4	40	25.0	42.0	42.0	10	60.0	0.5
	8		20.0	42.0	42.0		-	-
	12		13.8	29.6	29.6		-	-
	16		10.0	22.8	22.8		-	-
S084.024.1xxx.0 (BG4)	4	40	30.0	48.0	48.0	10	72.0	0.5
	8		24.0	48.0	48.0		-	-
	12		15.8	31.6	31.6		-	-
	16		11.3	22.6	22.6		-	-
S084.032.1xxx.0 (BG4)	4	40	40.0	64.0	64.0	10	96.0	0.5
	8		32.0	64.0	64.0		-	-
	12		21.0	42.0	42.0		-	-
	16		15.0	30.0	30.0		-	-

1) At max. 70% initial load

2) Shutdown as per I^2t characteristic

All data apply for a motor cable length ≤10 m

ServoOne axis controllers BG1 to BG4 (air cooling, 650 V DC)

Type	Switching frequency of the power stage	Ambient temperature	Rated current	Peak current 1)				
				I_{MAX} 0 Hz	I_{1MAX} ≥5 Hz	t_1 2)	I_{2MAX} ≥5 Hz	t_2 2)
	[kHz]	[°C]	[A_{eff}]	[A_{eff}]	[A_{eff}]	[s]	[A_{eff}]	[s]
S084.004.1xxx.0 (BG1)	4	40	5.3	8.4	8.4	10	11.9	0.5
	8		3.4	7.2	7.2		-	-
	12		2.8	5.0	5.0		-	-
	16		1.9	3.6	3.6		-	-
S084.006.1xxx.0 (BG1)	4	40	8.0	12.7	12.7	10	18.0	0.5
	8		5.1	10.8	10.8		-	-
	12		4.2	7.5	7.5		-	-
	16		2.9	5.6	5.6		-	-
S084.008.1xxx.0 (BG2)	4	40	8.5	14.6	14.6	10	21.8	0.5
	8		6.7	11.5	11.5		-	-
	12		5.6	7.9	7.9		-	-
	16		4.1	5.8	5.8		-	-
S084.012.1xxx.0 (BG2)	4	40	11.8	20.2	20.2	10	30.3	0.5
	8		10.0	17.1	17.1		-	-
	12		8.4	11.8	11.8		-	-
	16		6.2	8.7	8.7		-	-
S084.016.1xxx.0 (BG3)	4	40	20.0	33.6	33.6	10	48.0	0.5
	8		13.9	29.1	29.1		-	-
	12		8.8	18.9	18.9		-	-
	16		6.5	14.8	14.8		-	-
S084.020.1xxx.0 (BG3)	4	40	25.0	42.0	42.0	10	60.0	0.5
	8		17.4	36.5	36.5		-	-
	12		11.0	23.6	23.6		-	-
	16		7.4	16.8	16.8		-	-
S084.024.1xxx.0 (BG4)	4	40	26.0	41.6	41.6	10	62.4	0.5
	8		21.0	42.0	42.0		-	-
	12		12.4	24.8	24.8		-	-
	16		8.9	17.8	17.8		-	-
S084.032.1xxx.0 (BG4)	4	40	33.7	53.9	53.9	10	80.9	0.5
	8		28.0	56.0	56.0		-	-
	12		16.5	33.0	33.0		-	-
	16		11.9	23.8	23.8		-	-

1) At max. 70% initial load

2) Shutdown as per I^2t characteristic

ServoOne axis controllers BG1 to BG4 (air cooling, 678 V DC)

Type	Switching frequency of the power stage [kHz]	Ambient temperature [°C]	Rated current [A_{eff}]	Peak current 1) I_{MAX} 0 Hz [A_{eff}]	Peak current 1) I_{1MAX} ≥5 Hz [A_{eff}]	Peak current 1) t_1 2) [s]	Peak current 1) I_{2MAX} ≥5 Hz [A_{eff}]	Peak current 1) t_2 2) [s]
S084.004.1xxx.0 (BG1)	4	40	5.3	8.4	8.4	10	11.9	0.5
	8		3.3	7.0	7.0		-	-
	12		2.7	4.8	4.8		-	-
	16		1.8	3.4	3.4		-	-
S084.006.1xxx.0 (BG1)	4	40	8.0	12.7	12.7	10	18.0	0.5
	8		5.0	10.6	10.6		-	-
	12		4.0	7.2	7.2		-	-
	16		2.7	5.2	5.2		-	-
S084.008.1xxx.0 (BG2)	4	40	8.5	14.6	14.6	10	21.8	0.5
	8		6.1	10.4	10.4		-	-
	12		5.4	7.6	7.6		-	-
	16		3.9	5.5	5.5		-	-
S084.012.1xxx.0 (BG2)	4	40	11.4	19.5	19.5	10	29.3	0.5
	8		9.2	15.8	15.8		-	-
	12		8.1	11.4	11.4		-	-
	16		5.8	8.2	8.2		-	-
S084.016.1xxx.0 (BG3)	4	40	20.0	33.6	33.6	10	48.0	0.5
	8		13.3	27.9	27.9		-	-
	12		8.5	18.3	18.3		-	-
	16		6.0	13.7	13.7		-	-
S084.020.1xxx.0 (BG3)	4	40	25.0	42.0	42.0	10	60.0	0.5
	8		16.6	34.8	34.8		-	-
	12		10.0	21.5	21.5		-	-
	16		6.5	14.8	14.8		-	-
S084.024.1xxx.0 (BG4)	4	40	26.0	41.6	41.6	10	62.4	0.5
	8		20.0	40.0	40.0		-	-
	12		11.3	22.6	22.6		-	-
	16		8.4	16.8	16.8		-	-
S084.032.1xxx.0 (BG4)	4	40	32.5	52.0	52.0	10	78.0	0.5
	8		26.7	53.4	53.4		-	-
	12		15.0	30.0	30.0		-	-
	16		11.2	22.4	22.4		-	-

1) At max. 70% initial load

2) Shutdown as per I^2t characteristic

All data apply for a motor cable length ≤10 m

ServoOne axis controllers BG1 to BG4 (air cooling, 770 V DC)

Type	Switching frequency of the power stage [kHz]	Ambient temperature [°C]	Rated current [A_{eff}]	Peak current 1) I_{MAX} 0 Hz [A_{eff}]	I_{1MAX} ≥5 Hz [A_{eff}]	t_1 2) [s]	I_{2MAX} ≥5 Hz [A_{eff}]	t_2 2) [s]
S084.004.1xxx.0 (BG1)	4	40	5.1	8.1	8.1	10	11.5	0.5
	8		3.2	6.8	6.8		-	-
	12		2.1	3.8	3.8		-	-
	16		1.1	2.1	2.1		-	-
S084.006.1xxx.0 (BG1)	4	40	7.6	12.1	12.1	10	17.1	0.5
	8		4.8	10.2	10.2		-	-
	12		3.2	5.7	5.7		-	-
	16		1.6	3.1	3.1		-	-
S084.008.1xxx.0 (BG2)	4	40	8.0	13.7	13.7	10	20.6	0.5
	8		5.9	10.1	10.1		-	-
	12		5.3	7.4	7.4		-	-
	16		3.7	5.2	5.2		-	-
S084.012.1xxx.0 (BG2)	4	40	11.2	19.2	19.2	10	28.8	0.5
	8		8.8	15.1	15.1		-	-
	12		7.9	11.1	11.1		-	-
	16		5.5	7.7	7.7		-	-
S084.016.1xxx.0 (BG3)	4	40	20.0	33.6	33.6	10	48.0	0.5
	8		11.2	23.5	23.5		-	-
	12		7.0	15.0	15.0		-	-
	16		4.5	10.2	10.2		-	-
S084.020.1xxx.0 (BG3)	4	40	25.0	42.0	42.0	10	60.0	0.5
	8		14.0	29.4	29.4		-	-
	12		7.5	16.1	16.1		-	-
	16		5.0	11.4	11.4		-	-
S084.024.1xxx.0 (BG4)	4	40	26.0	41.6	41.6	10	62.4	0.5
	8		18.9	37.8	37.8		-	-
	12		10.5	21.0	21.0		-	-
	16		7.9	15.8	15.8		-	-
S084.032.1xxx.0 (BG4)	4	40	32.0	51.2	51.2	10	76.8	0.5
	8		25.2	50.4	50.4		-	-
	12		14.0	28.0	28.0		-	-
	16		10.5	21.0	21.0		-	-

1) At max. 70% initial load

2) Shutdown as per I^2t characteristic

All data apply for a motor cable length ≤10 m

ServoOne axis controllers BG5 to BG6a (air cooling)

Type	Switching frequency of the power stage	Ambient temperature	Rated current				Peak current [A_{eff}] [1]			
			At 565 V DC (400 VAC) [3]	At 650 V DC (460 VAC) [3]	At 678 V DC (480 VAC) [3]	At 770 V DC	At rotating field frequency increasing linearly 0 to 5 Hz		For intermittent operation	For time [2]
	[kHz]	[°C]	[A_{eff}]	[A_{eff}]	[A_{eff}]	[A_{eff}]	0 Hz	5 Hz	> 5 Hz	[s]
S084.045.1xxx.0 (BG5)	4	40	45	42	41	41	90	90	90	3/10 *)
	8		45	42	41	41	90	90	90	
	12[4]		45	42	41	37	90	90	90	
	16[4]		42	39	38	34	84	84	84	
S084.060.1xxx.0 (BG5)	4	40	60	56	54	54	120	120	120	3/10 *)
	8		60	56	54	54	120	120	120	
	12[4]		58	54	52	48	116	116	116	
	16[4]		42	39	38	34	84	84	84	
S084.072.1xxx.0 (BG5)	4	40	72	67	65	65	144	144	144	3/10 *)
	8		72	67	65	65	144	144	144	
	12[4]		58	54	52	48	116	116	116	
	16[4]		42	39	38	34	84	84	84	
S084.090.1xxx.0 (BG6a)	4	40	90	83	81	73	170	180	180	30
	8		90	83	81	73	134	180	180	
	12		90	83	81	73	107	144	144	
	16		72	67	65	59	86	115	115	
S084.110.1xxx.0 (BG6a)	4	40	110	102	99	90	170	220	220	30
	8		110	102	99	90	134	165	165	
	12		90	83	81	73	107	144	144	
	16		72	67	65	59	86	115	115	
S084.143.1xxx.0 (BG6a)	4	40	143	132	129	116	190	286	286	30
	8		143	132	129	116	151	215	215	
	12		115	106	104	94	121	172	172	
	16		92	85	83	75	97	138	138	
S084.170.1xxx.0 (BG6a)	4	40	170	157	153	138	190	315	315	10
	8		170	157	153	138	151	220	220	
	12		136	126	122	110	121	164	164	
	16		109	101	98	88	97	131	131	

1) When supplied with 565 V DC (corresponding to 400 V AC) at max. 70% initial load

2) Shutdown as per I^2t characteristic

3) When supplied with AC servocontroller

4) With integrated safety control only up to 8 kHz allowed

**) 10 sec. at heat sink temperature < 45 °C*

All data apply for a motor cable length ≤10 m

ServoOne axis controllers BG3 and BG4 (liquid cooling, 565 V DC)

Type	Switching frequency of the power stage [kHz]	Ambient temperature [°C]	Rated current [A_{eff}]	Peak current 1) I_{MAX} 0 Hz [A_{eff}]	I_{1MAX} ≥5 Hz [A_{eff}]	t_1 2) [s]	I_{2MAX} ≥5 Hz [A_{eff}]	t_2 2) [s]
S084.016.1xxx.8 (BG3)	4	40	20.0	33.6	33.6	10	48.0	0.5
	8		20.0	33.6	33.6		-	-
	12		17.4	26.4	26.4		-	-
	16		12.0	18.2	18.2		-	-
S084.020.1xxx.8 (BG3)	4	40	25.0	42.0	42.0	10	60.0	0.5
	8		25.0	42.0	42.0		-	-
	12		21.8	33.1	33.1		-	-
	16		15.0	22.8	22.8		-	-
S084.024.1xxx.8 (BG4)	4	40	30.0	48.0	48.0	10	72.0	0.5
	8		26.3	48.1	48.1		-	-
	12		22.5	31.5	31.5		-	-
	16		16.1	22.5	22.5		-	-
S084.032.1xxx.8 (BG4)	4	40	40.0	64.0	64.0	10	96.0	0.5
	8		35.0	64.0	64.0		-	-
	12		30.0	42.0	42.0		-	-
	16		21.4	29.9	29.9		-	-

1) At max. 70% initial load *2) Shutdown as per I^2t characteristic* *All data apply for motor cable length ≤10 m*

ServoOne axis controllers BG3 and BG4 (liquid cooling, 650 V DC)

Type	Switching frequency of the power stage [kHz]	Ambient temperature [°C]	Rated current [A_{eff}]	Peak current 1) I_{MAX} 0 Hz [A_{eff}]	I_{1MAX} ≥5 Hz [A_{eff}]	t_1 2) [s]	I_{2MAX} ≥5 Hz [A_{eff}]	t_2 2) [s]
S084.016.1xxx.8 (BG3)	4	40	20.0	33.6	33.6	10	48.0	0.5
	8		17.4	29.2	29.2		-	-
	12		12.5	19.0	19.0		-	-
	16		9.1	13.8	13.8		-	-
S084.020.1xxx.8 (BG3)	4	40	25.0	42.0	42.0	10	60.0	0.5
	8		21.8	36.6	36.6		-	-
	12		15.6	23.7	23.7		-	-
	16		11.4	17.3	17.3		-	-
S084.024.1xxx.8 (BG4)	4	40	26.0	41.6	41.6	10	62.4	0.5
	8		23.0	42.0	42.0		-	-
	12		17.7	24.8	24.8		-	-
	16		12.8	17.9	17.9		-	-
S084.032.1xxx.8 (BG4)	4	40	33.7	53.9	53.9	10	80.9	0.5
	8		30.6	55.9	55.9		-	-
	12		23.6	33.0	33.0		-	-
	16		17.0	23.8	23.8		-	-

1) At max. 70% initial load *2) Shutdown as per I^2t characteristic* *All data apply for motor cable length ≤10 m*

ServoOne axis controllers BG3 and BG4 (liquid cooling, 678 V DC)

Type	Switching frequency of the power stage [kHz]	Ambient temperature [°C]	Rated current [A_{eff}]	Peak current 1) I_{MAX} 0 Hz [A_{eff}]	I_{1MAX} ≥5 Hz [A_{eff}]	t_1 2) [s]	I_{2MAX} ≥5 Hz [A_{eff}]	t_2 2) [s]
S084.016.1xxx.8 (BG3)	4	40	20.0	33.6	33.6	10	48.0	0.5
	8		16.6	27.9	27.9		-	-
	12		11.4	17.3	17.3		-	-
	16		8.5	12.9	12.9		-	-
S084.020.1xxx.8 (BG3)	4	40	25.0	42.0	42.0	10	60.0	0.5
	8		20.8	34.9	34.9		-	-
	12		14.3	21.7	21.7		-	-
	16		10.6	16.1	16.1		-	-
S084.024.1xxx.8 (BG4)	4	40	26.0	41.6	41.6	10	62.4	0.5
	8		21.9	40.0	40.0		-	-
	12		16.1	22.5	22.5		-	-
	16		12.0	16.8	16.8		-	-
S084.032.1xxx.8 (BG4)	4	40	32.5	52.0	52.0	10	78.0	0.5
	8		29.2	53.4	53.4		-	-
	12		21.4	30.0	30.0		-	-
	16		16.0	22.4	22.4		-	-

1) At max. 70% initial load *2) Shutdown as per I^2t characteristic* *All data apply for motor cable length ≤10 m*

ServoOne axis controllers BG3 and BG4 (liquid cooling, 770 V DC)

Type	Switching frequency of the power stage [kHz]	Ambient temperature [°C]	Rated current [A_{eff}]	Peak current 1) I_{MAX} 0 Hz [A_{eff}]	I_{1MAX} ≥5 Hz [A_{eff}]	t_1 2) [s]	I_{2MAX} ≥5 Hz [A_{eff}]	t_2 2) [s]
S084.016.1xxx.8 (BG3)	4	40	20.0	33.6	33.6	10	48.0	0.5
	8		15.8	26.5	26.5		-	-
	12		10.7	16.2	16.2		-	-
	16		8.1	12.3	12.3		-	-
S084.020.1xxx.8 (BG3)	4	40	25.0	42.0	42.0	10	60.0	0.5
	8		19.8	33.2	33.2		-	-
	12		13.4	20.3	20.3		-	-
	16		10.1	15.3	15.3		-	-
S084.024.1xxx.8 (BG4)	4	40	26.0	41.6	41.6	10	62.4	0.5
	8		20.7	37.8	37.8		-	-
	12		15.4	21.5	21.5		-	-
	16		11.3	15.8	15.8		-	-
S084.032.1xxx.8 (BG4)	4	40	32.0	51.2	51.2	10	76.8	0.5
	8		27.6	50.5	50.5		-	-
	12		20.5	28.7	28.7		-	-
	16		15.0	21.0	21.0		-	-

1) At max. 70% initial load *2) Shutdown as per I^2t characteristic* *All data apply for motor cable length ≤10 m*

ServoOne axis controllers BG5 and BG6a (liquid cooling)

Type	Switching frequency of the power stage	Ambient temperature	Rated current				Peak current [A_{eff}] [1]			
			At 565 V DC (400 V AC) [3]	At 650 V DC (460 V AC) [3]	At 678 V DC (480 V AC) [3]	At 770 V DC	At rotating field frequency increasing linearly 0 to 5 Hz		For intermittent operation	For time [2]
	[kHz]	[°C]	[A_{eff}]	[A_{eff}]	[A_{eff}]	[A_{eff}]	0 Hz	5 Hz	> 5 Hz	[s]
S084.045.1xxx.8 (BG5)	4	40	53	49	48	48	90	90	90	30
	8		53	49	48	48	90	90	90	
	12[4]		53	49	48	42	90	90	90	
	16[4]		49	45	44	39	84	84	84	
S084.060.1xxx.8 (BG5)	4	40	70	65	63	63	120	120	120	30
	8		70	65	63	63	120	120	120	
	12[4]		68	63	61	55	116	116	116	
	16[4]		49	45	44	39	84	84	84	
S084.072.1xxx.8 (BG5)	4	40	84	78	76	76	144	144	144	30
	8		84	78	76	76	144	144	144	
	12[4]		68	63	61	55	116	116	116	
	16[4]		49	45	44	39	84	84	84	
S084.090.1xxx.8 (BG6a)	4	40	110	102	99	90	205	220	220	30
	8		110	102	99	90	165	187	187	
	12		110	102	99	90	132	165	165	
	16		90	83	81	73	106	135	135	
S084.110.1xxx.8 (BG6a)	4	40	143	132	129	116	230	286	286	30
	8		143	132	129	116	190	215	215	
	12		114	105	103	93	152	172	172	
	16		91	84	82	74	122	138	138	
S084.143.1xxx.8 (BG6a)	4	40	170	157	153	138	230	340	340	10
	8		170	157	153	138	190	255	255	
	12		136	126	122	110	152	204	204	
	16		109	101	98	88	122	163	163	
S084.170.1xxx.8 (BG6a)	4	40	210	194	189	170	230	340	340	10
	8		210	194	189	170	190	255	255	
	12		168	155	151	136	152	204	204	
	16		134	124	121	109	122	163	163	

1) When supplied with 565 V DC (corresponding to 400 V AC) at max. 70% initial load

2) Shutdown as per I^2t characteristic

3) When supplied with AC servocontroller

4) With integrated safety control only up to 8 kHz allowed

All data apply for a motor cable length ≤10 m

ServoOne servocontroller BG7 (liquid cooling, 565 V DC) - 2-4 kHz

Type	Switching frequency of the power stage [kHz]	Ambient temperature [°C]	Rated current [A_{eff}]	At 565 V DC (400 V AC) At rotating field frequency increasing linearly 0 to 5 Hz [A_{eff}]	For intermittent operation > 5 Hz	For time [s]
S084.250.1xxx.80xx.2 S084.250.1xxx.81xx.2	2	45	250	425		30
	4		250	375		
S084.325.1xxx.80xx.2 S084.325.1xxx.81xx.2	2	45	325	552		30
	4		325	485		
S084.450.1xxx.80xx.2 S084.450.1xxx.81xx.2	2	45	450	765		30
	4		450	675		

ServoOne servocontroller BG7 (liquid cooling, HF function package) - 2-16 kHz

Type	Switching frequency of the power stage [kHz]	Ambient temperature [°C]	Rated current [A_{eff}]	At 565 V DC (400 V AC) At rotating field frequency increasing linearly 0 to 5 Hz [A_{eff}]		For intermittent operation > 5 Hz	For time [s]
S084.250.1xxx.87xx.2 S084.250.1xxx.88xx.2	2	40	250	425			30
	4		250	375			
	8		250	250	375	375	
	12		200	200	300	300	
	16		175	175	260	260	
S084.325.1xxx.87xx.2 S084.325.1xxx.88xx.2	2	40	325	552			30
	4		325	485			
	8		325	325	485	485	
	12		300	300	450	450	
	16		270	270	400	400	
S084.450.1xxx.87xx.2 S084.450.1xxx.88xx.2	2	40	450	765			30
	4		450	675			
	8		450	450	675	675	
	12		400	400	600	600	
	16		- - -				

ServoOne servocontroller BG7 (liquid cooling, 650 V DC) - 2-4 kHz

Type	Switching frequency of the power stage [kHz]	Ambient temperature [°C]	Rated current [A_{eff}]	At 650 V DC (460 V AC) At rotating field frequency increasing linearly 0 to 5 Hz [A_{eff}]	For intermittent operation > 5 Hz	For time [s]
S084.250.1xxx.80xx.2 S084.250.1xxx.81xx.2	2	45	231	425		30
	4		231	375		
S084.325.1xxx.80xx.2 S084.325.1xxx.81xx.2	2	45	300	552		30
	4		300	485		
S084.450.1xxx.80xx.2 S084.450.1xxx.81xx.2	2	45	416	765		30
	4		416	675		

ServoOne servocontroller BG7 (liquid cooling, HF function package) - 2-16 kHz

Type	Switching frequency of the power stage [kHz]	Ambient temperature [°C]	Rated current [A_{eff}]	At 650 V DC (460 V AC) At rotating field frequency increasing linearly 0 to 5 Hz [A_{eff}]		For intermittent operation > 5 Hz	For time [s]
S084.250.1xxx.87xx.2 S084.250.1xxx.88xx.2	2	40	231	425			30
	4		231	375			
	8		231	231	346	346	
	12		185	185	277	277	
	16		162	162	243	243	
S084.325.1xxx.87xx.2 S084.325.1xxx.88xx.2	2	40	300	552			30
	4		300	485			
	8		300	300	450	450	
	12		277	277	415	415	
	16		250	250	375	375	
S084.450.1xxx.87xx.2 S084.450.1xxx.88xx.2	2	40	416	765			30
	4		416	675			
	8		416	416	624	624	
	12		370	370	555	555	
	16		- - -				

ServoOne servocontroller BG7 (liquid cooling, 678 V DC) - 2-4 kHz

Type	Switching frequency of the power stage [kHz]	Ambient temperature [°C]	Rated current [A_{eff}]	At 678 V DC (480 V AC) At rotating field frequency increasing linearly 0 to 5 Hz [A_{eff}]	For intermittent operation > 5 Hz	For time [s]
S084.250.1xxx.80xx.2 S084.250.1xxx.81xx.2	2	45	225	425		30
	4		225	375		
S084.325.1xxx.80xx.2 S084.325.1xxx.81xx.2	2	45	292	552		30
	4		292	485		
S084.450.1xxx.80xx.2 S084.450.1xxx.81xx.2	2	45	405	765		30
	4		405	675		

ServoOne servocontroller BG7 (liquid cooling, HF function package) - 2-16 kHz

Type	Switching frequency of the power stage [kHz]	Ambient temperature [°C]	Rated current [A_{eff}]	At 678 V DC (480 V AC) At rotating field frequency increasing linearly 0 to 5 Hz [A_{eff}]		For intermittent operation > 5 Hz	For time [s]
S084.250.1xxx.87xx.2 S084.250.1xxx.88xx.2	2	40	225	425			30
	4		225	375			
	8		225	225	337	337	
	12		180	180	270	270	
	16		157	157	235	235	
S084.325.1xxx.87xx.2 S084.325.1xxx.88xx.2	2	40	292	552			30
	4		292	485			
	8		292	292	438	438	
	12		270	270	405	405	
	16		243	243	364	364	
S084.450.1xxx.87xx.2 S084.450.1xxx.88xx.2	2	40	405	765			30
	4		405	675			
	8		405	405	607	607	
	12		360	360	540	540	
	16		- - -				

ServoOne servocontroller BG7 (liquid cooling, 770 V DC) - 2-4 kHz

Type	Switching frequency of the power stage [kHz]	Ambient temperature [°C]	Rated current [A_{eff}]	At 770 V DC At rotating field frequency increasing linearly 0 to 5 Hz [A_{eff}]	For intermittent operation > 5 Hz	For time [s]
S084.250.1xxx.80xx.2 S084.250.1xxx.81xx.2	2	45	208	425		30
	4		208	375		
S084.325.1xxx.80xx.2 S084.325.1xxx.81xx.2	2	45	270	552		30
	4		270	485		
S084.450.1xxx.80xx.2 S084.450.1xxx.81xx.2	2	45	375	765		30
	4		375	675		

ServoOne servocontroller BG7 (liquid cooling, HF function package) - 2-16 kHz

Type	Switching frequency of the power stage [kHz]	Ambient temperature [°C]	Rated current [A_{eff}]	At 770 V DC At rotating field frequency increasing linearly 0 to 5 Hz [A_{eff}]		For intermittent operation > 5 Hz	For time [s]
S084.250.1xxx.87xx.2 S084.250.1xxx.88xx.2	2	40	210	425			30
	4		210	375			
	8		210	210	315	315	
	12		168	168	252	252	
	16		147	147	220	220	
S084.325.1xxx.87xx.2 S084.325.1xxx.88xx.2	2	40	273	552			30
	4		273	485			
	8		273	273	409	409	
	12		252	252	378	378	
	16		204	204	306	306	
S084.450.1xxx.87xx.2 S084.450.1xxx.88xx.2	2	40	378	765			30
	4		378	675			
	8		378	378	567	567	
	12		336	336	504	504	
	16		- - -				

ServoOne supply units BG5, BG6a and BG7 (air and liquid cooling)

Type	Switching frequency of the power stage	Ambient temperature	Rated current		Peak current		
			At 650 V DC	At 770 V DC	At 650 V DC	At 770 V DC	For time
	[kHz]	[°C]	[A_{eff}]	[A_{eff}]	[A_{eff}]	[A_{eff}]	[s]
S084.040.S (BG5)	12	40	40	34	76	68	10
S084.076.S (BG5)	4	40	76	64	144	122	10
S084.115.S (BG6a)	8	40	115	97	195	165	10
S084.170.S (BG6a)	4	40	170	144	246	207	10
S084.375.S (BG7)[1)]	4	40	375	325	565	487	10
S084.540.S (BG7)[1)]	4	40	540	468	565	487	10

[1)] ... Supply units only available with liquid cooling.

Ambient conditions, ServoOne multi-axis system

Ambient conditions	
Protection	IP20 except terminals (IP00), fan opening BG2 (IP10)
Accident prevention regulations	According to local regulations (in Germany e.g. BGV A3)
Installation altitude	Up to 1000 m above MSL, higher with power reduction (1% per 100 m, max. 2000 m above sea level)
Pollution degree	2
Type of mounting	Built-in unit, only for vertical installation in a switch cabinet with min. IP4x protection, when using STO safety function min. IP54

Climatic conditions		
In transit	As per EN 61800-2, IEC 60721-3-2 class 2K3 [1]	
	Temperature	-25 °C to +70 °C
	Relative atmospheric humidity	95% at max. +40 °C
In storage	As per EN 61800-2, IEC 60721-3-1 class 1K3 and 1K4 [2]	
	Temperature	-25 °C to +55 °C
	Relative atmospheric humidity	5 to 95%
In operation	As per EN 61800-2, IEC 60721-3-3 class 3K3 [3]	
	Temperature	**BG1** -10 °C to +40 °C (4, 8, 12, 16 kHz) **BG2-4** -10 °C to +45 °C (4 kHz), up to 55 °C with power reduction (5%/°C) -10 °C to +40 °C (8, 12, 16 kHz), up to 55 °C with power reduction (4%/°C) **BG5-6a** -10 °C to +40 °C (4, 8, 12, 16 kHz), up to 55 °C with power reduction (2%/°C) **BG7** -10 °C to +40 °C (2, 4, 8, 12, 16 kHz), up to 55 °C with power reduction (2%/°C)
	Relative atmospheric humidity	5 to 85% without condensation

1) *The absolute humidity is limited to max. 60 g/m³. This means, at 70 °C for example, that the relative atmospheric humidity may only be max. 40%.*

2) *The absolute humidity is limited to max. 29 g/m³. So the maximum values for temperature and relative atmospheric humidity stipulated in the table must not occur simultaneously.*

3) *The absolute humidity is limited to max. 25 g/m³. That means that the maximum values for temperature and relative atmospheric humidity stipulated in the table must not occur simultaneously.*

Mechanical conditions			
Vibration limit in transit	As per EN 61800-2, IEC 60721-3-2 class 2M1		
	Frequency [Hz]	**Amplitude [mm]**	**Acceleration [m/s²]**
	$2 \leq f < 9$	3.5	Not applicable
	$9 \leq f < 200$	Not applicable	10
	$200 \leq f < 500$	Not applicable	15
Shock limit in transit	As per EN 61800-2, IEC 60721-3-2 class 2M1		
	Drop height of packed device max. 0.25 m		
Vibration limits for the system [1]	As per EN 61800-2, IEC 60721-3-3 class 3M1		
	Frequency [Hz]	**Amplitude [mm]**	**Acceleration [m/s²]**
	$2 \leq f < 9$	0.3	Not applicable
	$9 \leq f < 200$	Not applicable	1

1) *Note: The devices are only designed for stationary use. The drive controllers must not be installed in areas where they would be permanently exposed to vibration.*

Acceptance, ServoOne multi-axis system

CE marking

The ServoOne multi-axis system conforms to the requirements of the Low Voltage Directive 2006/95/EC and the product standard EN 61800-5-1.

The axis controllers and supply units thus conform to the requirements for installation in a machine or plant under the terms of the Machinery Directive 2006/42/EC.

The axis controllers and supply units are accordingly CE marked. The CE marking on the rating plate indicates conformity with the above directives.

UL approval

UL approval has been obtained for the ServoOne multi-axis controllers.

Exception: supply units are only approved for BG5 and BG6a (40 A up to 179 A).

For details see document "UL-Certification" 0927.01B.X

Functional safety acceptances

See chapter 5.

EMC acceptance

All ServoOne axis controllers SO8x.xxx have an aluminium housing with an anodised finish (BG1 to BG4) or an aluminium rear panel made of galvanised sheet steel (BG5 to BG7) to enhance interference immunity (as per EN 61800-3, environment classes 1 and 2).

To limit conducted interference emissions to the permissible level and to comply with the EMC Directive 2004/108/EC, external filter sets are available for the supply units (see Technical data, supply units from
Seite 96).

STO

The "STO" (Safe Torque Off) safety function integrated into the ServoOne axis controller is certified according to the requirements of

- EN ISO 13849-1 "PL e" and
- EN 61508 / EN 62061 "SIL3".

Acceptance was undertaken by the accredited certification body, "TÜV Rheinland".

Space for your own notes

Technical data, ServoOne multi-axis system

Technical data, axis controllers 4 A to 6 A (BG1)

Type SO84.004.1 (air cooling)

Technical data / Designation		S084.004.1	S084.006.1
Output, motor side			
Voltage		3-phase $U_{ZK}/\sqrt{2}$	
Rated current, effective (I_N)	Air cooling	4 A [1]	6 A [1]
	Liquid cooling	BG1 not available with liquid cooling	
Peak current	Air cooling	See tables auf Seite 76 to 79	
	Liquid cooling	BG1 not available with liquid cooling	
Rotating field frequency		0 ... 400 Hz	
Switching frequency of the power stage		4, 8, 12, 16 kHz	
DC input			
DC voltage (U_{ZK}) nominal [2]		565 V_{DC} / 650 V_{DC} / 678 V_{DC} / 770 V_{DC}	
Current (RMS approximate value) [3]		1.7 · I_{Motor} [A]	
Device connected load [3]		U_{ZK} · 1.7 · I_{Motor} [kVA]	
Power dissipation at I_N	Air cooling	110 W [1]	140 W [1]
	Liquid cooling	BG1 not available with liquid cooling	
DC link			
Capacitance		60 µF	

1) *Data referred to output voltage 400 V_{eff} and switching frequency 8 kHz*

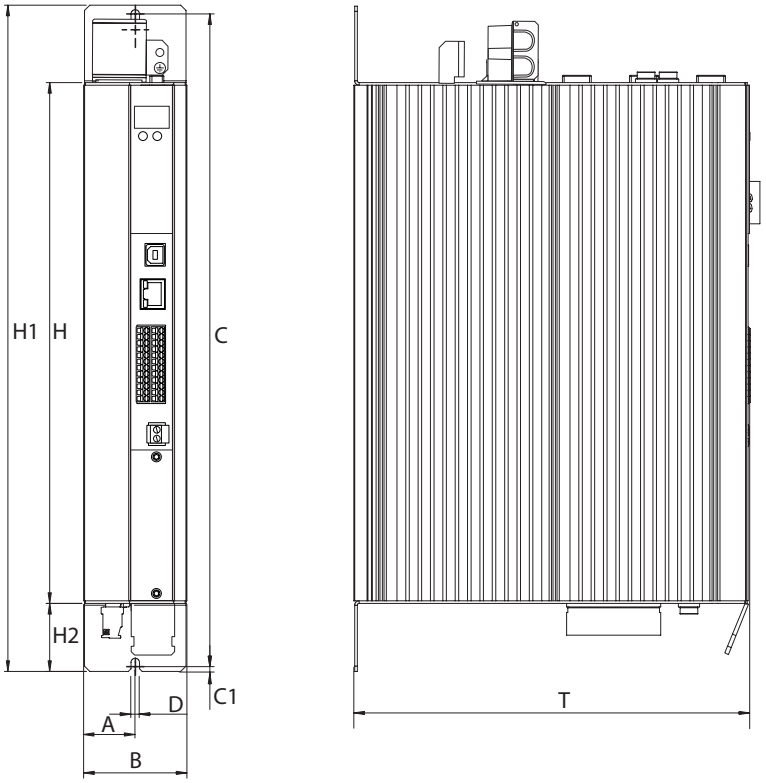
2) *Generated from rectified TN system with grounded star point and phase voltages 3 x 400 V AC, 3 x 460 V AC or 3 x 480 V AC with the approved devices from LTI Motion (ServoOne AC servocontroller or supply unit). Insulation voltage as per EN 61800-5-1, system voltage 277 V, overvoltage category III.*

3) *Approximate value, max. values depending on DC voltage source and load case*

Mechanics, BG1	S084.004.1	S084.006.1
Cooling method	Air cooling (wall-mounted)	
Protection	IP20 except terminals (IP00)	
Cooling air temperature	40 °C	
Weight	3.4 kg	
Mounting method	Vertical mounting with unhindered air flow	
Row mounting of multiple axis controllers	Direct butt mounting, max. 2 mm	

Dimensions, BG1 [mm]	
B (width)	58.5
H (height)	295 (without terminals)
T (depth)	224 (without terminals)
A	29.25
C / C1	382 / 5
D Ø	4.8
H1 / H2	392 / 38.5

Dimensional drawings, BG1 air cooling



Technical data, axis controllers 8 A to 12 A (BG2)

Type SO84.008.1 (air cooling)

Technical data / Designation		S084.008.1	S084.012.1
Output, motor side			
Voltage		3-phase $U_{ZK}/\sqrt{2}$	
Rated current, effective (I_N)	Air cooling	9.3 A [1]	14 A [1]
	Liquid cooling	BG2 not available with liquid cooling	
Peak current	Air cooling	See tables auf Seite 76 to 79	
	Liquid cooling	BG2 not available with liquid cooling	
Rotating field frequency		0 ... 400 Hz	
Switching frequency of the power stage		4, 8, 12, 16 kHz	
DC input			
DC voltage (U_{ZK}) nominal [2]		565 V_{DC} / 650 V_{DC} / 678 V_{DC} / 770 V_{DC}	
Current (RMS approximate value) [3]		1.7 · I_{Motor} [A]	
Device connected load [3]		U_{ZK} · 1.7 · I_{Motor} [kVA]	
Power dissipation at I_N	Air cooling	185 W [1]	255 W [1]
	Liquid cooling	BG2 not available with liquid cooling	
DC link			
Capacitance		105 µF	

1) Data referred to output voltage 400 V_{eff} and switching frequency 8 kHz

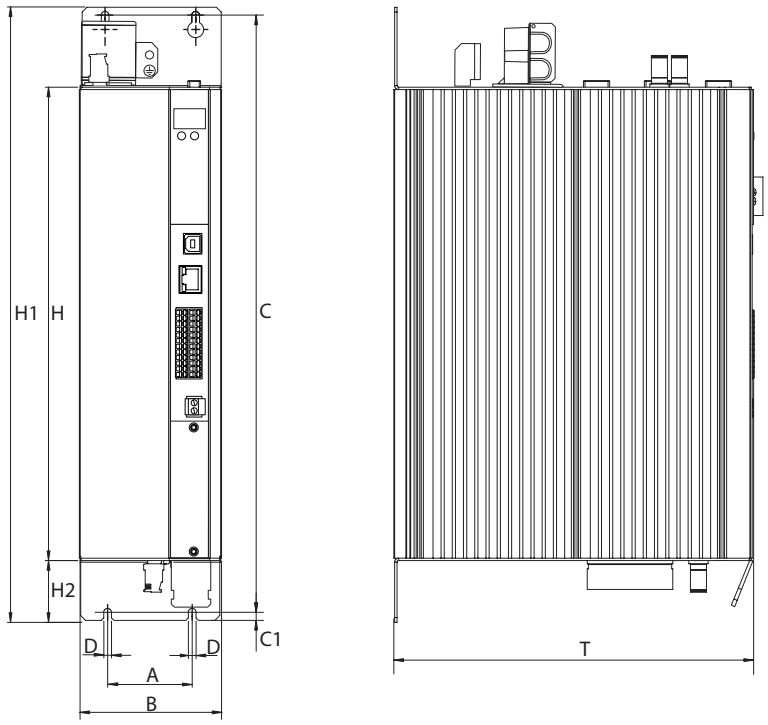
2) Generated from rectified TN system with grounded star point and phase voltages 3 x 400 V AC, 3 x 460 V AC or 3 x 480 V AC with the approved devices from LTI Motion (ServoOne AC servocontroller or supply unit). Insulation voltage as per EN 61800-5-1, system voltage 277 V, overvoltage category III.

3) Approximate value, max. values depending on DC voltage source and load case

Mechanics, BG2	S084.008.1	S084.012.1
Cooling method	Air cooling (wall-mounted)	
Protection	IP20 except terminals (IP00)	
Cooling air temperature	45 °C (at 4 kHz power stage switching frequency)	
Weight	4.9 kg	
Mounting method	Vertical mounting with unhindered air flow	
Row mounting of multiple axis controllers	Direct butt mounting, max. 2 mm	

Dimensions, BG2 [mm]	
B (width)	90
H (height)	295 (without terminals)
T (depth)	224 (without terminals)
A	50
C / C1	382 / 5
D Ø	4.8
H1 / H2	392 / 38.5

Dimensional drawings, BG2 air cooling



Technical data, axis controllers 16 A to 25 A (BG3)

Type SO84.016.1 (liquid cooling)

Technical data / Designation		S084.016.1	S084.020.1
Output, motor side			
Voltage		3-phase $U_{ZK}/\sqrt{2}$	
Rated current, effective (I_N)	Air cooling	16 A [1]	20 A [1]
	Liquid cooling	20 A [1]	25 A [1]
Peak current	Air cooling	See tables auf Seite 76 to 79	
	Liquid cooling	See tables on Seite 81 and 82	
Rotating field frequency		0 ... 400 Hz	
Switching frequency of the power stage		4, 8, 12, 16 kHz (factory setting 8 kHz at 40 °C cooling air temperature)	
DC input			
DC voltage (U_{ZK}) nominal [2]		565 V_{DC} / 650 V_{DC} / 678 V_{DC} / 770 V_{DC}	
Current (RMS approximate value) [3]		1.7 · I_{Motor} [A]	
Device connected load [3]		U_{ZK} · 1.7 · I_{Motor} [kVA]	
Power dissipation at I_N	Air cooling	320 W [1]	390 W [1]
	Liquid cooling[4]	390 W [1]	480 W [1]
DC link			
Capacitance		288 µF	

1) *Data referred to output voltage 400 V_{eff} and switching frequency 8 kHz*

2) *Generated from rectified TN system with grounded star point and phase voltages 3 x 400 V AC, 3 x 460 V AC or 3 x 480 V AC with the approved devices from LTI Motion (ServoOne AC servocontroller or supply unit). Insulation voltage as per EN 61800-5-1, system voltage 277 V, overvoltage category III.*

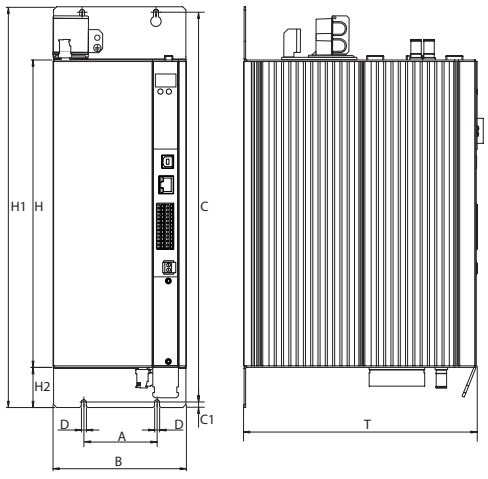
3) *Approximate value, max. values depending on DC voltage source and load case*

4) *With liquid cooling typically 80% of the power dissipation is dissipated by the liquid chiller.*

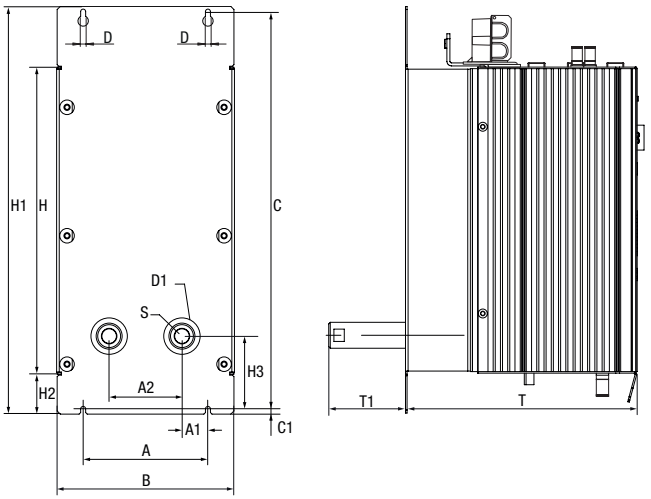
Mechanics, BG3	S084.016.1	S084.020.1
Cooling method	Air cooling (wall-mounted) or liquid cooling	
Protection	IP20 except terminals (IP00)	
Cooling air temperature	45 °C (at 4 kHz power stage switching frequency)	
Weight	6.5 kg	
Mounting method	Vertical mounting with unhindered air flow	
Row mounting of multiple axis controllers	Direct butt mounting, max. 2 mm	

Dimensions, BG3 [mm]	
B (width)	130
H (height)	295 (without terminals)
T (depth)	224 (without terminals)
A / A1 / A2	80 / 10 / 60
C / C1	382 / 5
D Ø	4.8
D1 Ø (bore for pipe fitting)	48
H1 / H2 / H3	392 / 38.5 / 70
S	3/8 inch (female thread)
T1	74

Dimensional drawings, BG3 air cooling



Dimensional drawings, BG3 liquid cooling



Technical data, axis controllers 24 A to 35 A (BG4)

Type SO84.024.1 (liquid cooling)

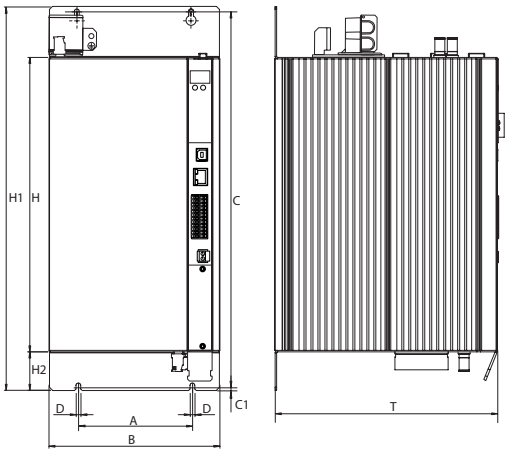
Technical data \ Designation		SO84.024.1	SO84.032.1
Output, motor side			
Voltage		3-phase $U_{ZK}/\sqrt{2}$	
Rated current, effective (I_N)	Air cooling	24 A [1]	32 A [1]
	Liquid cooling	26.3 A [1]	35 A [1]
Peak current	Air cooling	See tables auf Seite 76 to 79	
	Liquid cooling	See tables on Seite 81 and 82	
Rotating field frequency		0 ... 400 Hz	
Switching frequency of the power stage		4, 8, 12, 16 kHz (factory setting 8 kHz at 40 °C cooling air temperature)	
DC input			
DC voltage (U_{ZK}) nominal [2]		565 V_{DC} / 650 V_{DC} / 678 V_{DC} / 770 V_{DC}	
Current (RMS approximate value) [3]		1.7 · I_{Motor} [A]	
Device connected load [3]		U_{ZK} · 1.7 · I_{Motor} [kVA]	
Power dissipation at I_N	Air cooling	420 W [1]	545 W [1]
	Liquid cooling [4]	455 W [1]	595 W [1]
DC link			
Capacitance		504 µF	

1) *Data referred to output voltage 400 V_{eff} and switching frequency 8 kHz*
2) *Generated from rectified TN system with grounded star point and phase voltages 3 x 400 V AC, 3 x 460 V AC or 3 x 480 V AC with the approved devices from LTI Motion (ServoOne AC servocontroller or supply unit). Insulation voltage as per EN 61800-5-1, system voltage 277 V, overvoltage category III.*
3) *Approximate value, max. values depending on DC voltage source and load case*
4) *With liquid cooling typically 80% of the power dissipation is dissipated by the liquid chiller.*

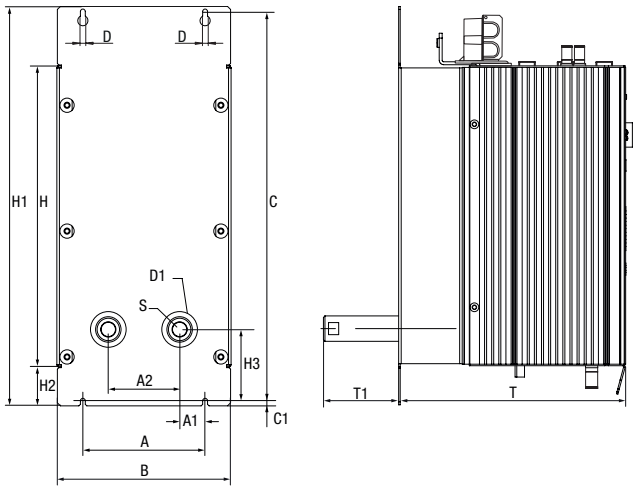
Mechanics, BG4	S084.024.1	S084.032.1
Cooling method	Air cooling (wall-mounted) or liquid cooling	
Protection	IP20 except terminals (IP00)	
Cooling air temperature	45 °C (at 4 kHz power stage switching frequency)	
Weight	7.5 kg	
Mounting method	Vertical mounting with unhindered air flow	
Row mounting of multiple axis controllers	Direct butt mounting, max. 2 mm	

Dimensions, BG4 [mm]	
B (width)	171
H (height)	295 (without terminals)
T (depth)	224 (without terminals)
A / A1 / A2	120 / 25 / 70
C / C1	382 / 5
D Ø	4.8
D1 Ø (bore for pipe fitting)	48
H1 / H2 / H3	392 / 38.5 / 70
S	3/8 inch (female thread)
T1	74

Dimensional drawings, BG4 air cooling



Dimensional drawings, BG4 liquid cooling



Technical data, axis controllers 45 A to 84 A (BG5)

Type SO84.045.1 (air cooling)

Technical data \ Designation		S084.045.1	S084.060.1	S084.072.1
Output, motor side				
Voltage		3-phase $U_{ZK}/\sqrt{2}$		
Rated current, effective (I_N)	Air cooling	45 A [1]	60 A [1]	72 A [1]
	Liquid cooling	53 A [1]	70 A [1]	84 A [1]
Peak current	Air cooling	See table on Seite 80		
	Liquid cooling	See table on Seite 83		
Rotating field frequency		0 ... 400 Hz		
Switching frequency of the power stage		4, 8, 12, 16 kHz (factory setting 8 kHz at 40 °C cooling air temperature)		
DC input				
DC voltage (U_{ZK}) nominal [2]		565 V_{DC} / 650 V_{DC} / 678 V_{DC} / 770 V_{DC}		
Current (RMS approximate value) [3]		$1.2 \cdot I_{Motor}$ [A]		
Device connected load [3]		$U_{ZK} \cdot 1.2 \cdot I_{Motor}$ [kVA]		
Power dissipation at I_N	Air cooling	610 W [1]	830 W [1]	1010 W [1]
	Liquid cooling[4]	690 W [1]	930 W [1]	1130 W [1]
DC link				
Capacitance	Air cooling	430 µF	900 µF	
	Liquid cooling	900 µF		

1) *Data referred to output voltage 400 V_{eff} and switching frequency 8 kHz*

2) *Generated from rectified TN system with grounded star point and phase voltages 3 x 400 V AC, 3 x 460 V AC or 3 x 480 V AC with the approved devices from LTI Motion (ServoOne AC servocontroller or supply unit). Insulation voltage as per EN 61800-5-1, system voltage 277 V, overvoltage category III.*

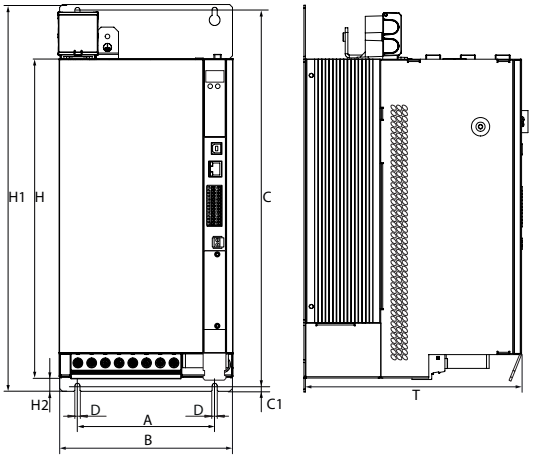
3) *RMS value, max. values depending on DC voltage source and load case*

4) *With liquid cooling typically 80% of the power dissipation is dissipated by the liquid chiller.*

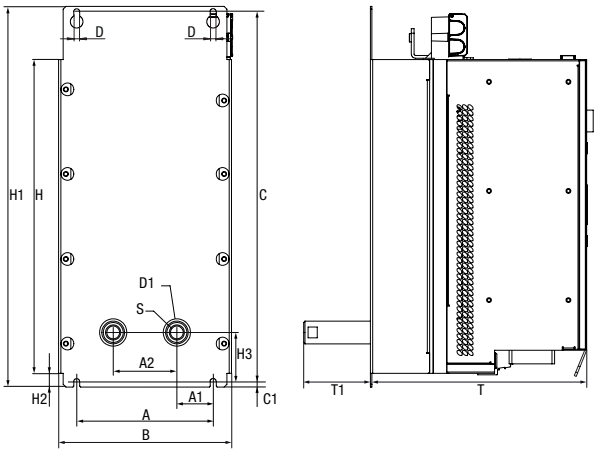
Mechanics, BG5	S084.045.1	S084.060.1	S084.072.1
Cooling method	Air cooling (wall-mounted) or liquid cooling		
Protection	IP20 except terminals (IP00)		
Cooling air temperature	40 °C (at 4 kHz power stage switching frequency)		
Weight	13 kg		
Mounting method	Vertical mounting with unhindered air flow		
Row mounting of multiple axis controllers	Possible at a distance of 20 mm (air cooling) or 2 mm (liquid cooling)		

Dimensions, BG5 [mm]	
B (width)	190
H (height)	345 (without terminals)
T (depth)	238 (without terminals)
A / A1 / A2	150 / 40 / 70
C / C1	406.5 / 6
D Ø (air/liquid cooling)	5.6 / 6.5
D1 Ø (bore for pipe fitting)	48
H1 / H2 / H3	418.5 / 15 / 54
S	3/8 inch (female thread)
T1	73.5

Dimensional drawings, BG5 air cooling



Dimensional drawings, BG5 liquid cooling



Technical data, axis controllers 90 A to 210 A (BG6a)

Type SO84.170.1 (air cooling)

Technical data / Designation		S084.090.1	S084.110.1	S084.143.1	S084.170.1
Output, motor side					
Voltage		3-phase $U_{ZK}/\sqrt{2}$			
Rated current, effective (I_N)	Air cooling	90 A [1]	110 A [1]	143 A [1]	170 A [1]
	Liquid cooling	110 A [1]	143 A [1]	170 A [1]	210 A [1]
Peak current	Air cooling	See table on Seite 80			
	Liquid cooling	See table on Seite 83			
Rotating field frequency		0 ... 400 Hz			
Switching frequency of the power stage		4, 8, 12, 16 kHz (factory setting 8 kHz at 40 °C cooling air temperature)			
DC input					
DC voltage (U_{ZK}) nominal [2]		565 V_{DC} / 650 V_{DC} / 678 V_{DC} / 770 V_{DC}			
Current (RMS approximate value) [3]		1.2 · I_{Motor} [A]			
Device connected load [3]		U_{ZK} · 1.2 · I_{Motor} [kVA]			
Power dissipation at I_N and 8 kHz/ 565 V DC	Air cooling	1300 W	1600 W	2100 W	2500 W
	Liquid cooling[4]	1500 W	1940 W	2380 W	2650 W
DC link					
Capacitance	Air cooling	1060 µF	2120 µF	3180 µF	4240 µF
	Liquid cooling	2120 µF	3180 µF	4240 µF	

1) *All data referred to output voltage 400 V_{eff} and switching frequency 8 kHz*

2) *Generated from rectified TN system with grounded star point and phase voltages 3 x 400 V AC, 3 x 460 V AC or 3 x 480 V AC with the approved devices from LTI Motion (ServoOne AC servo-controller or supply unit). Insulation voltage as per EN 61800-5-1, system voltage 277 V, overvoltage category III.*

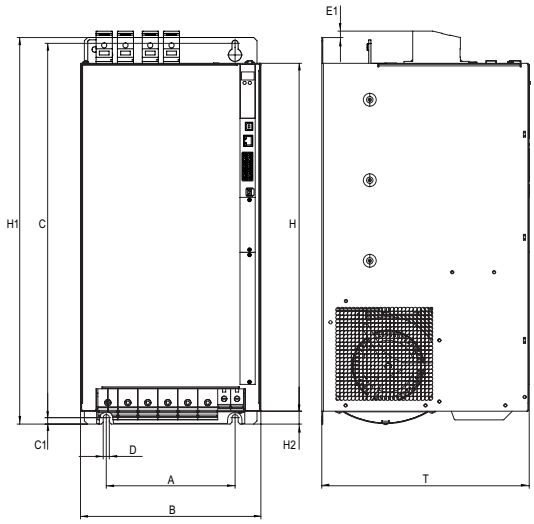
3) *Approximate value, max. values depending on DC voltage source and load case*

4) *With liquid cooling typically 80% of the power dissipation is dissipated by the liquid chiller.*

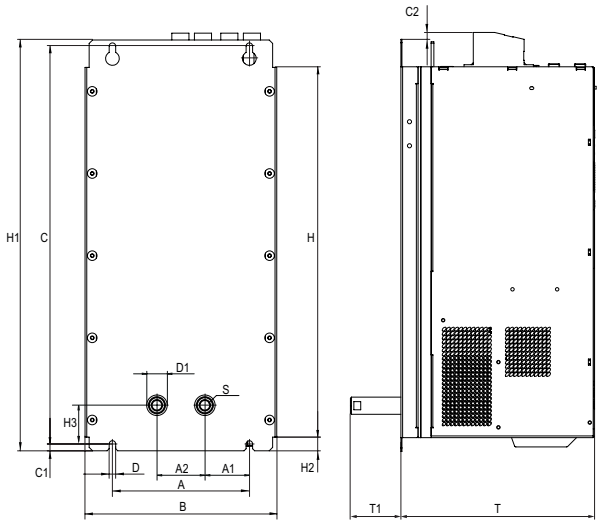
Mechanics, BG6a	S084.090.1	S084.110.1	S084.143.1	S084.170.1
Cooling method	Air cooling (wall-mounted) or liquid cooling			
Protection	IP20 except terminals (IP00)			
Cooling air temperature	40 °C (at 4 kHz power stage switching frequency)			
Weight	32 kg			
Mounting method	Vertical mounting with unhindered air flow			
Row mounting of multiple axis controllers	Max. 2 mm, 40 mm between two BG6a devices with air cooling			

Dimensions, BG6a [mm]	
B (width)	280
H (height)	540 (without terminals)
D (depth) (air/liquid cooling)	322 / 285 (without terminals)
A / A1 / A2	200 / 65 / 70
C / C1	581 / 10
D Ø	9.5
D1 Ø (bore for pipe fitting)	48
H1 (air/liquid cooling)	600 / 540
H2 / H3	20 / 56.5
S	3/8 inch (female thread)
T1	73.5

Dimensional drawings, BG6a air cooling



Dimensional drawings, BG6a liquid cooling



Technical data, axis controllers 250 A to 450 A (BG7)

Type SO84.250.1 (liquid cooling)

Technical data \ Designation	SO84.250.1	SO84.325.1	SO84.450.1
Output, motor side			
Voltage	3-phase $U_{ZK}/\sqrt{2}$		
Rated current, effective (I_N)	250 A [1]	325 A [1]	450 A [1]
Peak current	See tables on Seite <?> to <?>		
Rotating field frequency	0 ... 400 Hz		
Switching frequency of the power stage	2, 4, 8, 12, 16 kHz (factory setting 2 kHz)		
DC input			
DC voltage (U_{ZK}) nominal [2]	565 V_{DC} / 650 V_{DC} / 678 V_{DC} / 770 V_{DC}		
Current (RMS approximate value) [3] [4]	1.2 · I_{Motor} [A]		
Device connected load [3] [4]	U_{ZK} · 1.2 · I_{Motor} [kVA]		
Power dissipation at I_N and 4 kHz/ 565 V_{DC} [5]	3200 W	3800 W	5400 W
DC link			
Capacitance	3600 µF	5400 µF	7200 µF

1) All data referred to output voltage 400 V_{eff} and switching frequency 4 kHz

2) Generated from rectified TN system with grounded star point and phase voltages 3 x 400 V AC, 3 x 460 V AC or 3 x 480 V AC with the approved devices from LTI Motion (ServoOne AC servo-controller or supply unit). Insulation voltage as per EN 61800-5-1, system voltage 277 V, overvoltage category III.

3) All data referred to DC voltage (U_{ZK}) 565 V_{DC}

4) Approximate value, max. values depending on DC voltage source and load case

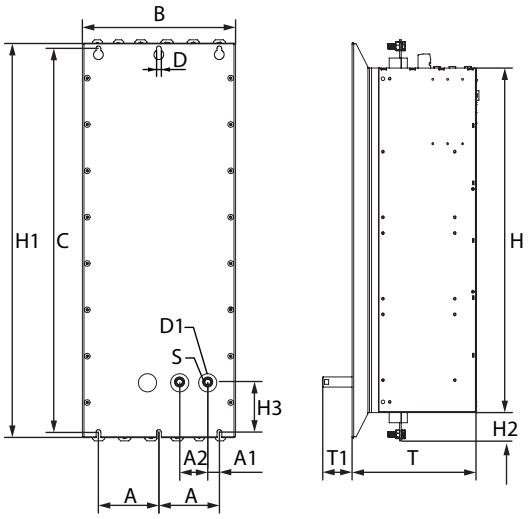
5) With liquid cooling typically 80% of the power dissipation is dissipated by the liquid chiller.

NOTE: High-frequency drive controllers with an output rotating field frequency up to 1600 Hz need the HF function package at power stage switching frequencies 8 to 16 kHz.

Mechanics, BG7	S084.250.0	S084.325.0	S084.450.0
Cooling method	Liquid cooling		
Protection	IP20 except terminals (IP00)		
Coolant temperature	Max. 40 °C, not more than 10 K below the ambient temperature		
Weight	100 kg		
Mounting method	Vertical mounting		
Row mounting of multiple servocontrollers	Direct butt mounting		

Dimensions, BG7 [mm]	
B (width)	380 / 385 (with shield plate)
H (height)	855 / 1171 (with terminal cover) 1315 with shield plates
T (depth)	287 (without terminals)
A / A1 / A2	150 / 29 / 70
C / C1	952 / 14
D Ø	12
D1 Ø (bore for pipe fitting)	48
H1 / H2 / H3	979 / 62 / 124
S	3/8 inch (female thread)
T1	74

Dimensional drawings, BG7 liquid cooling



Technical data, supply units

Technical data, supply units 40 A to 76 A (BG5)

Type SO84.040.S (air cooling)

NOTE:
Project article! The supply units are only allowed to be used after system approval by LTI Motion. Please contact our application specialists on this issue.

Technical data / Designation		S084.040.S	S084.076.S
DC link output			
Voltage		650 V_{DC} / 770 V_{DC}	
Rated current, effective (I_N)	At 650 V_{DC}	40 A	76 A
	At 770 V_{DC}	34 A	64 A
Peak current (for 10 s)	At 650 V_{DC}	80 A	144 A
	At 770 V_{DC}	68 A	122 A
Continuous power		26 kW	50 kW
Peak current (for 10 s)		52 kW	94 kW
DC link capacitance [1]		900 µF	
Input mains			
Voltage		400 V_{AC} / 460 V_{AC} / 480 V_{AC} ±10%	
Continuous current, effective	At 400 V_{AC}	40 A	76 A
	At 460 / 480 V_{AC}	33 A	63 A
Peak current (for 10 s)	At 400 V_{AC}	80 A	144 A
	At 460 / 480 V_{AC}	67 A	120 A
Clock frequency		12 kHz	4 kHz
Continuous power		27.5 kW	52.5 kW
Power dissipation[2]		1010 W	
Asymmetry of mains voltage		±3% max.	
Frequency		50/60 Hz	

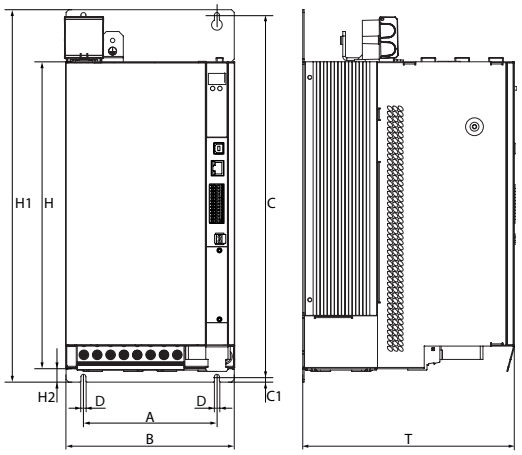
1) The maximum overall capacitance of the multi-axis system DC link for a ServoOne supply unit BG5 (inclusive) must not exceed 10,000 µF.

2) With liquid cooling typically 80% of the power dissipation is dissipated by the liquid chiller.

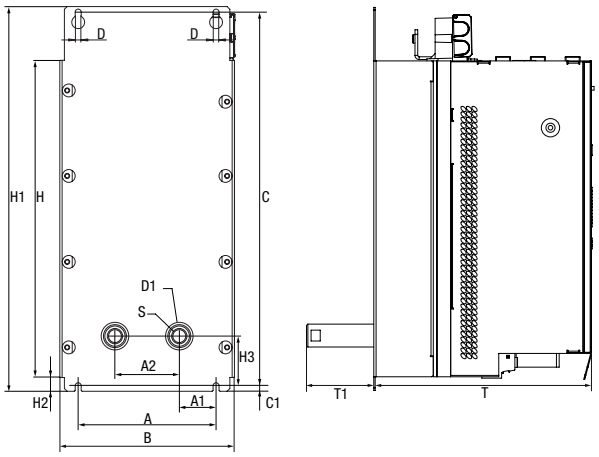
Mechanics, BG5	S084.040.S	S084.076.S
Cooling method	Air cooling (wall-mounted) or liquid cooling	
Protection	IP20 except terminals (IP00)	
Cooling air temperature	40 °C	
Weight	13 kg	
Mounting method	Vertical mounting with unhindered air flow	
Row mounting of multiple supply units	Direct butt mounting, max. 2 mm	

Dimensions, BG5 [mm]	
B (width)	190
H (height)	345 (without terminals)
T (depth)	238 (without terminals)
A / A1 / A2	150 / 40 / 70
C / C1	406.5 / 6
D Ø (air/liquid cooling)	5.6 / 6.5
D1 Ø (bore for pipe fitting)	48
H1 / H2 / H3	418.5 / 15 / 54
S	3/8 inch (female thread)
T1	74

Dimensional drawings, BG5 air cooling



Dimensional drawings, BG5 liquid cooling



Supply unit	S084.040.S	S084.076.S
Mains connection	**LCL-040** Components included: • Mains filter FFU 3x56K • Input choke 40 A including capacitor • Step-up choke 40 A • EMC mounting set CU weight 8.3 kg	**LCL-076** Components included: • Mains filter FFU 3x80K • Input choke 76 A including capacitor • Step-up choke 76 A • EMC mounting set CU weight 17.5 kg

Technical data, supply units 115 A to 170 A (BG6a)

Type SO84.115.S (air cooling)

NOTE:
Project article! The supply units are only allowed to be used after system approval by LTI Motion. Please contact our application specialists on this issue.

Technical data / Designation		S084.115.S	S084.170.S
DC link output			
Voltage		650 V_{DC} / 770 V_{DC}	
Rated current, effective (I_N)	At 650 V_{DC}	115 A	170 A
	At 770 V_{DC}	97 A	144 A
Peak current (for 10 s)	At 650 V_{DC}	195 A	246 A
	At 770 V_{DC}	165 A	207 A
Continuous power		75 kW	110 kW
Peak current (for 10 s)		127 kW	160 kW
DC link capacitance [1]		4240 µF	
Input mains			
Voltage		400 V_{AC} / 460 V_{AC} / 480 V_{AC} ±10%	
Continuous current, effective	At 400 V_{AC}	115 A	170 A
	At 460 / 480 V_{AC}	96 A	142 A
Peak current (for 10 s)	At 400 V_{AC}	195 A	245 A
	At 460 / 480 V_{AC}	163 A	204 A
Clock frequency		8 kHz	4 kHz
Continuous power		80 kW	118 kW
Power dissipation[2]		2500 W	
Asymmetry of mains voltage		±3% max.	
Frequency		50/60 Hz	

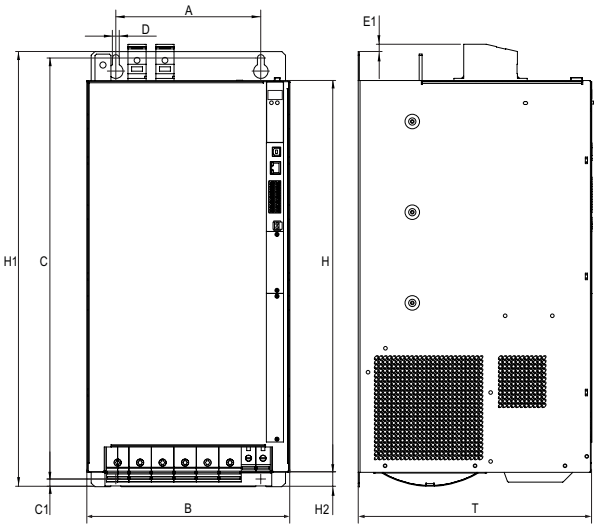
1) The maximum overall capacitance of the multi-axis system DC link for a ServoOne supply unit BG6a (inclusive) must not exceed 20,000 µF.

2) With liquid cooling typically 80% of the power dissipation is dissipated by the liquid chiller.

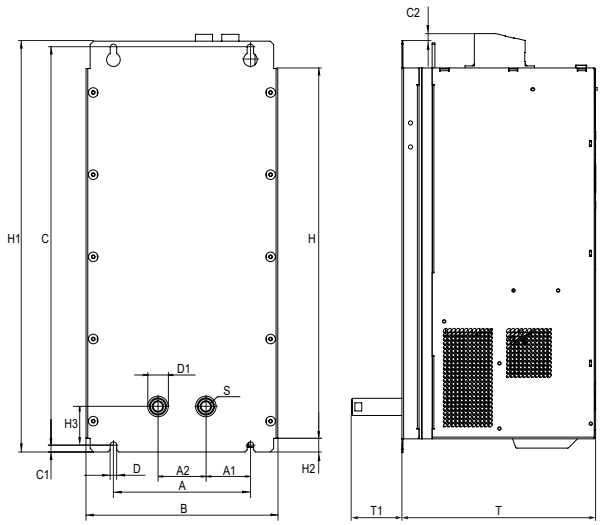
Mechanics, BG6a	S084.115.S	S084.170.S
Cooling method	Air cooling (wall-mounted) or liquid cooling	
Protection	IP20 except terminals (IP00)	
Cooling air temperature	40 °C	
Weight	32 kg	
Mounting method	Vertical mounting with unhindered air flow	
Row mounting of multiple supply units	Direct butt mounting, 40 mm between two BG6a devices with air cooling	

Dimensions, BG6a [mm]	
B (width)	280
H (height)	540 (without terminals)
D (depth) (air/liquid cooling)	321 / 281 (without terminals)
A / A1 / A2	200 / 65 / 70
C / C1 / C2	581 / 10 / 10
D Ø	9.5
D1 Ø (bore for pipe fitting)	48
H1 / H2 / H3	600 / 20 / 56.5
S	3/8 inch (female thread)
T1	73.5

Dimensional drawings, BG6a air cooling



Dimensional drawings, BG6a liquid cooling



Supply unit	S084.115.S	S084.170.S
Mains connection	**LCL-115** Components included: • Mains filter FFU 3x130K • Input choke 115 A including capacitor • Step-up choke 115 A • EMC mounting set CU weight 23.7 kg	**LCL-170** Components included: • Mains filter FFU 3x180K • Input choke 170 A including capacitor • Step-up choke 170 A • EMC mounting set CU weight 37 kg

Technical data, supply units 375 A to 540 A (BG7)

Type SO84.375.S (liquid cooling)

NOTE:
Project article! The supply units are only allowed to be used after system approval by LTI Motion. Please contact our application specialists on this issue.

Technical data / Designation		S084.375.S	S084.540.S
DC link output			
Voltage		650 V_{DC} / 770 V_{DC}	
Rated current, effective (I_N)	At 650 V_{DC}	385 A	553 A
	At 770 V_{DC}	325 A	468 A
Peak current (for 10 s)	At 650 V_{DC}	577 A	577 A
	At 770 V_{DC}	487 A	487 A
Continuous power		250 kW	360 kW
Peak current (for 10 s)		375 kW	375 kW
DC link capacitance [1]		7200 µF	
Input mains			
Voltage		400 V_{AC} / 460 V_{AC} / 480 V_{AC} ±10%	
Continuous current, effective	At 400 V_{AC}	375 A	540 A
	At 460 / 480 V_{AC}	313 A	450 A
Peak current (for 10 s)	At 400 V_{AC}	565 A	565 A
	At 460 / 480 V_{AC}	470 A	565 A
Clock frequency		4 kHz	4 kHz
Continuous power		260 kW	374 kW
Power dissipation[2]		3300 W	4100 W
Asymmetry of mains voltage		±3% max.	
Frequency		50/60 Hz	

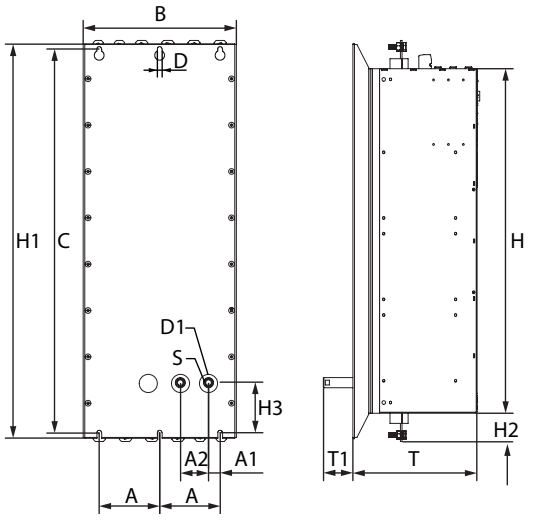
1) The maximum overall capacitance of the multi-axis system DC link for a ServoOne supply unit BG6a (inclusive) must not exceed 20,000 µF.

2) With liquid cooling typically 80% of the power dissipation is dissipated by the liquid chiller.

Mechanics, BG7	S084.375.S	S084.540.S
Cooling method	Liquid cooling (wall-mounted)	
Protection	IP20 except terminals (IP00)	
Coolant temperature	5 °C to 40 °C (not more than 10 °C below ambient temperature)	
Weight	90 kg	
Mounting method	Vertical installation in a switch cabinet	
Row mounting of multiple supply units	Direct butt mounting, 40 mm between two BG7 devices	

Dimensions, BG7 [mm]	
B (width)	380 / 385 (with shield plate)
H (height)	855 / 1171 (with terminal cover) 1315 with shield plates
D (depth) (liquid cooling)	287 (without terminals)
A / A1 / A2	150 / 29 / 70
C / C1	952 / 14
D Ø	12
D1 Ø (bore for pipe fitting)	48
H1 / H2 / H3	979 / 62 / 124
S	3/8 inch (female thread)
T1	74

Dimensional drawings, BG7 liquid cooling



Supply unit	S084.375.S	S084.540.S
Mains connection	**LCL-375** Components included: • Mains filter FN 3359-400-99, 400 A • Input choke 375 A including capacitor • Step-up choke 375 A	**LCL-540** Components included: • Mains filter FN 3359-600-99, 600 A • Input choke 540 A including capacitor • Step-up choke 540 A

PSU mains connection sets

Designation	Type no.
S084.040.Sxxx.xxx1.x	LCL - 040
S084.076.Sxxx.xxx1.x	LCL - 076
S084.115.Sxxx.xxx1.x	LCL - 115
S084.170.Sxxx.xxx1.x	LCL - 170
S084.375.Sxxx.xxx1.x	LCL - 375
S084.540.Sxxx.xxx1.x	LCL - 540

NOTE:

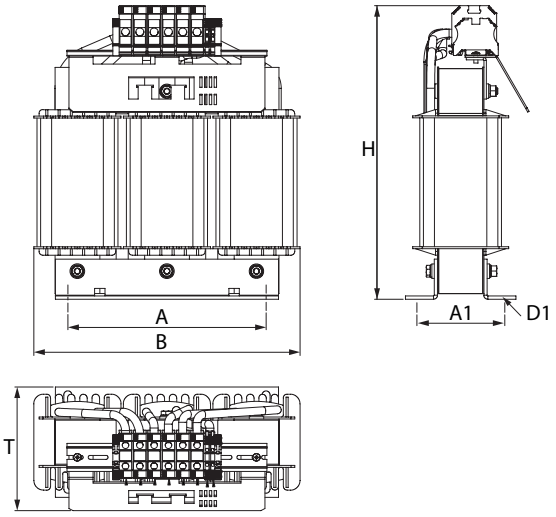
Each set comprises:
1 step-up choke
1 input choke with capacitor
1 mains filter

Dimensions, step-up choke

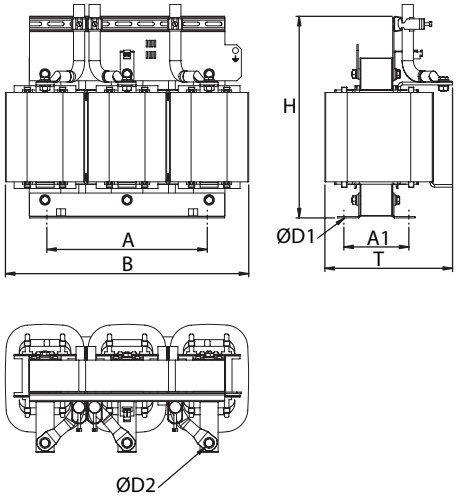
For size	BG5		BG6a		BG7	
For device	S084.040	S084.076	S084.115	S084.170	S084.375	S084.540
B (width)	239	299	335	380	540	454
H (height)	273	300	344	399	447	671
T (depth)	124	135	158	200	283	268
A	185	210	248	280	356	300
A1	75	95	122	127	144	188
D1	10 x 18	12 x 20	12 x 20	12 x 20	12 x 20	12 x 20
D2	-	-	-	-	13	13
Fastening screws	4 x M8	4 x M10	4 x M10	4 x M10	4 x M10	4 x M10
Weight [kg]	16	27	37.5	56	97	127

All dimensions in mm and not including terminals/connectors

Dimensional drawings, step-up choke BG5 and BG6a



Dimensional drawings, step-up choke BG7

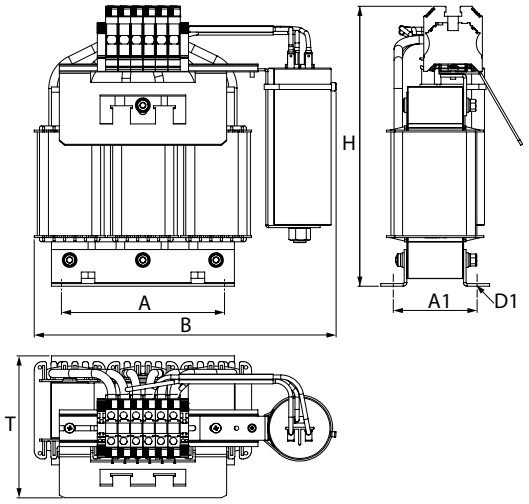


Dimensions, input choke including film capacitor

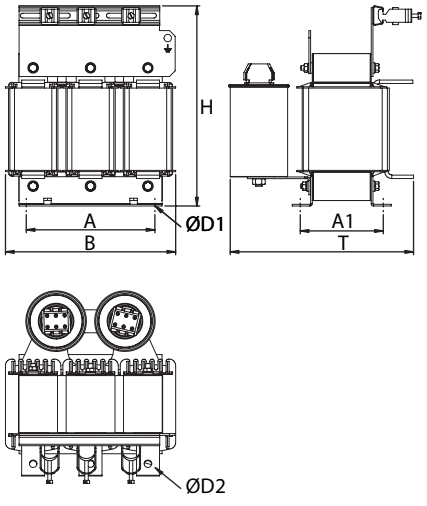
For size	BG5		BG6a		BG7	
For device	S084.040	S084.076	S084.115	S084.170	S084.375	S084.540
B (width)	289	289	342	348	297	357
H (height)	252	268	292	321	347	565
T (depth)	119	136	175	175	319	308
A	156	156	176	176	224	310
A1	63	80	95	95	145	146
D1	7 x 13	7 x 13	9 x 13	9 x 13	10 x 18	12 x 20
D2	-	-	-	-	13	13
Fastening screws	4 x M6	4 x M6	4 x M8	4 x M8	4 x M8	4 x M8
Weight [kg]	10.5	14	20	22	45	71

All dimensions in mm and not including terminals/connectors

Dimensional drawing, input choke including film capacitor BG5



Dimensional drawing, input choke including film capacitor BG7

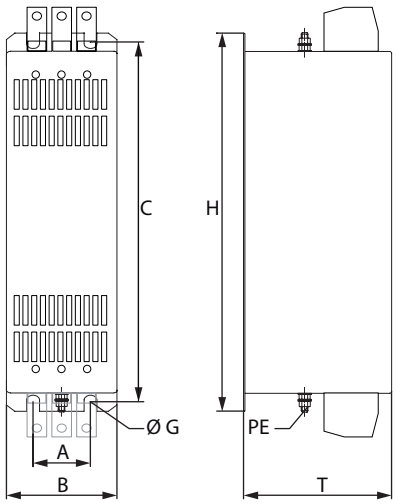


Dimensions, mains filter

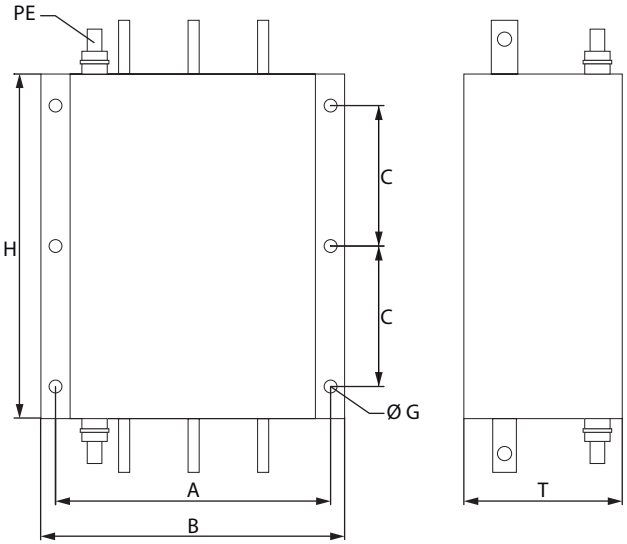
For size	BG5		BG6a		BG7	
For device	**S084.040**	**S084.076**	**S084.115**	**S084.170**	**S084.375**	**S084.540**
Type	FFU 3 x 56 K	FFU 3 x 80 K	FFU 3 x 130 K	FFU 3 x 180 K	FN 3359-400-99	FN 3359-600-99
B (width)	85	80	90	130	260	260
H (height)	250	270	270	380	300	300
T (depth)	90	135	150	180	115	135
A	60	60	65	102	235	235
C	235	225	255	365	120	120
G Ø	5.4	6.5	6.5	6.5	12	12
Mounting screws	M5	M6	M6	M6	M10	M10
Weight [kg]	1.9	2.6	4.2	6.0	10.5	11

All dimensions in mm and not including terminals/connectors

Dimensional drawings, mains filter BG5 and BG6a



Dimensional drawings, mains filter BG7



Space for your own notes

Safety technology

Type	Page	AC SO junior 2-16 A	AC SO 4-450 A	DC SO 4-450 A	PSU 26-360 kW
Integrated safety control	118	-	● Up to S084.072	● Up to S084.072	-

NOTE:
The integrated safety control can only be ordered together with the drive controller.
It is always shipped ready-installed from the factory.

Accessories for the integrated safety control	From Page 120
PC programming software SafePLC S	Page 120
Dongle	Page 121
Network cable for Safe Cross Communication (SCC)	Page 121
I/O expansion module SMC-E12	Page 122
Connection cable for the SMC-E12 module	Page 122

Safety technology - integrated safety control

Integrated safety control

S08□.□□□.□1□□.□□□□

Article designation

Brief description

The safety technology option includes a fully-featured safety control for machines, and has acceptance to the latest standards and the highest safety levels. The Safe Cross Communication feature enables data to be exchanged between up to six ServoOne devices.

NOTE:

Only available built-in ex factory. Only for devices up to and including SO84.072.

NOTE:

The acceptance for the ServoOne with integrated safety control is subject to the Machinery Directive 2006/42/EC. For this reason it is only permitted to place the safety control on the market in countries with the official languages German, English and Italian.

Features of the safety control that can be integrated

Safety functions (speed-dependent)		
STO	Safe Torque Off	6/1 per axis
SS1	Safe Stop 1	12 (optionally SS1 *or* SS2)
SS2	Safe Stop 2	
SLS	Safe Limited Speed	48 (optionally SLS *or* SLSmax)
SLSmax	Safe Limited Speed maximum	
SDI	Safe Direction	6/1 per axis
ECS	Encoder Supervisor	6/1 per axis
ESM	Encoder Standstill Monitoring	6/1 per axis
Safety functions (speed or position-dependent)		
SOS	Safe Operating Stop	6/1 per axis
SCA	Safe Cam	64
SLI	Safe Limited Increment	6/1 per axis
Safety functions (position-dependent)		
SLP	Safe Limited Position	12
SCA	Safe Cam	64
Sref	Safe reference	6
SEL	Safe Emergency Limit	6
Safety functions (brake)		
SBC	Safe Brake Control	1 per axis
SBT [2]	Safe Brake Test	1 per axis
Safety functions (brake)		
SCC	Safe Cross Communication	
FSoE [2]	Functional Safety over EtherCAT	

PC software	
PC programming software SafePLC S	• Configuration • Programming • Validation
DriveManager	For details see page 153
System	
Configuration mode	User-programmable safety control
Safety acceptance	SIL3 acc. to IEC 61508 / IEC 62061, PL e and cat 4 acc. to EN ISO 13849
Control hardware	
Safe digital inputs	4 [1]
Safe digital outputs	4 [1]
… of which usable as safe pulse outputs	4
Safe brake outputs	2 [1]
Safety sensors that can be connected	Light grids, emergency stops, guard doors, laser scanners; mode selector switches, guard locks, enable buttons, etc.
Standard analogue inputs (±10 V, 12 bits)	2
Standard digital inputs	6

1) SIL2; SIL3 with redundant use of the inputs/outputs (2-channel)

2) Project-specific

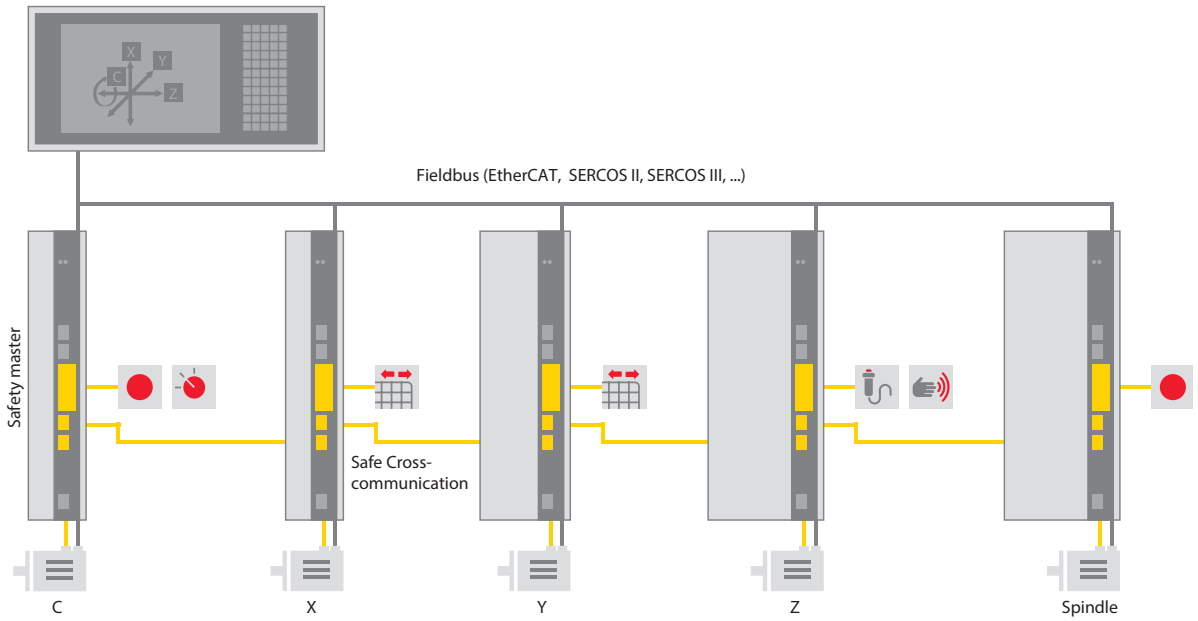
Additional safety technology terminal overview

System description

The ServoOne with integrated safety control provides a complete, freely programmable safety control system for safe operation of machines.

The Safe Cross Communication (SCC) feature enables up to six drives to be linked to form a network. This makes possible to realise a complete machine safety solution independent of the controller.Via SCC, safety switching elements connected to the drives can be evaluated centrally in the safety master and status information exchanged.

For ease of operation of the safety control, the axis group is programmed and its parameters set by a program in the master drive, which also makes serial commissioning much easier. The PLC S programming software includes pre-programmed modules for all commonly used sensor, output and input types, so ensuring a high level of ease of use. This flexibility, in conjunction with the available encoder systems, allows the creation of innovative safety solutions for machines.



5

Accessories for the integrated safety control

PC programming software SafePLC S

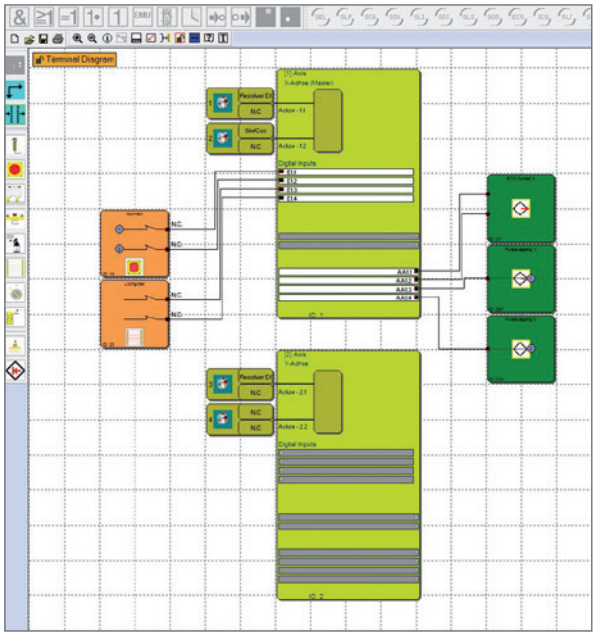
SafePLC S

Order designation

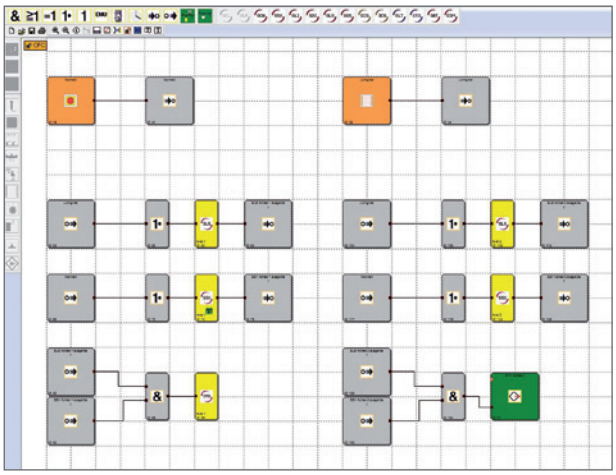
The programming software SafePLC S is only available for download free of charge on the LTI Motion homepage.

Brief description
The graphic PC software SafePLC S is required to create the machine safety application. The entire safety solution for the machine can be programmed using only one program.

Functions	Explanation
Hardware configuration	Selection by Drag-and-Drop of, among other features, the drive controllers, encoders, safety switching elements or safety outputs
Programming	Graphic programming of the machine safety solution using function blocks
Parameter configuration	Setting thresholds for the safety function blocks
Validation	Validation of the safety functionality programmed
Commissioning	Download of the safety program to the drive controller and debugging or PC-based commissioning of the application
Languages	German, English
System requirements	PC with operating system Windows XP (SP2), Windows 7 (32/64 bits) or Windows 8 (32/64 bits)



Hardware configuration



Programming

Dongle

SafePLC S dongle

Order designation

Brief description
The USB dongle is necessary to authenticate the programmer as well as to prepare and change safety programs. The necessary USB driver is supplied together with the SafePLC S programming software.

Network cable for Safe Cross Communication (SCC)

SCC-04

Order designation

Technical data	SCC cable
Cable length	0.4 m
Connections	Ready to connect for networking ServoOne controllers with integrated safety control via Safe Cross Communication (SCC)
Cable diameter	6 mm

I/O expansion module SMC-E12

SMC-E12

Similar to illustration

Order designation

Brief description
The SMC-E12 module expands the number of safe inputs and outputs on the safety control integrated in the ServoOne. Up to 2 SMC-E12 modules can be connected to the Safe Cross Communication (SCC) via the separately available connection cable SCC-08 IO.

Technical data	SMC-E12
Supply voltage, external	24 V (-15%+10%)
Safe inputs	12
Safe inputs or outputs (can be configured)	10
Pulse outputs	2
Type of connection	Plug-in terminals
Fastening	DIN rail mounting
Dimensions (HxDxW [mm])	100x115x68

Connection cable for the SMC-E12 module

SCC-08 IO

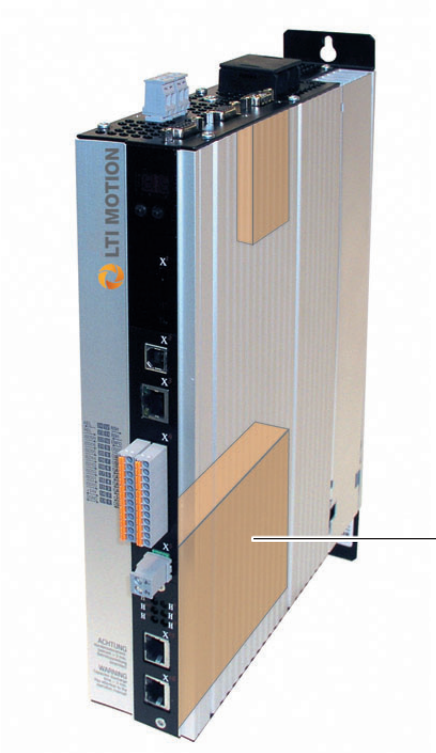
Order designation

Technical data	SCC-08 IO
Cable length	0.8 m
Connections	Ready to connect for connecting an SMC-E12 module to the Safe Cross Communication (SCC)
Cable diameter	6 mm

Space for your own notes

Space for your own notes

Option 1 - Communication



Type	Page	AC SO junior 2-16 A	AC SO 4-450 A	DC SO 4-450 A	PSU 26-360 kW
Field bus module for Sercos II	126	●	●	●	●
Field bus module for PROFIBUS-DPV1	127	●	●	●	●
Field bus module for EtherCAT	128	●	●	●	●
Field bus module for CANopen	129	●	●	●	●
Field bus module for CANopen plus 2 analogue outputs	130	-	●	●	-
Field bus module for PROFINET IRT (isochronous)	131	●	●	●	-
Field bus module for Sercos III	132	●	●	●	-

NOTE:
Option 1 can only be ordered together with the drive controller. It is always shipped ready-installed from the factory.

Option 1 - Sercos II

sercos
the automation bus

Availability

S0□□.□□□.□□1□.□□□□

Sercos II

Article designation

Brief description
The interface conforms to IEC 61491 / EN 61491 for Sercos interfaces and ensures optimum interaction of digital drives and controllers from different manufacturers.

Technical data	Sercos II
Application note	AN17.2 (dated 11.02.2003)
Transfer rate	2/4/8 and 16 Mbit/s
Connections	1 transmitter, 1 receiver, fibre optic cables are compliant with the Sercos interface specification (version 2.4, February 2005)

NOTES:

Only available built-in ex factory.

Sercos III is also available as option 1, for details see page 132.

Option 1 - PROFIBUS

Availability

S0□□.□□□.□□2□.□□□□

Article designation

Brief description
Communication interface for PROFIBUS-DPV1

Technical data	PROFIBUS
Standardisation	EN 50170
Communication	Guideline 2.082
Device profile	PROFIdrive V3.1
Transfer rate/cable length	9.6 kbit/s up to 1200 m 12 Mbit/s up to 100 m
Connection	PROFIBUS D-SUB connector 9-pin

NOTE:
Only available built-in ex factory.

Option 1 - EtherCAT

Availability

S0□□.□□□.□□3□.□□□□

EtherCat

Article designation

Brief description
EtherCAT is an Ethernet-based, real-time capable, synchronous field bus system. It is classed as one of the fastest real-time Ethernet solutions for automation.

Technical data	EtherCAT
Standardisation	IEC 61158 / IEC 61784-2 / IEC 61800-7
Transfer rate	Up to 100 Mbit/s
Transfer medium	Standardised Ethernet to IEEE 802.3
Sampling time	≥125 µs
Synchronisation jitter	≤1 µs (distributed clocks)
Communication profile	CoE (CiA 301) (V1.0.2)
Device profile	CiA 402 (Rev. 2.0)
Network topology	Line, tree or star possible
Connection	RJ45 (shielded)
Cable type	CAT5

NOTE:
Only available built-in ex factory.

Option 1 - CANopen

CANopen

Availability

S0□□.□□□.□□4□.□□□□

CANopen | Article designation

Brief description
Communication interface for CANopen, isolated from device electronics

Technical data	CANopen
Standardisation	ISO 11898 / IEC 61800-7
Communication	CiA 301 (Rev. 4.01)
Device profile	CiA 402 (Rev. 2.0)
Transfer rate/ cable length	20 kbit/s up to 1000 m 1 Mbit/s up to 40 m
Connections	2 x Phoenix Contact connectors (type FMC 1,5/5-ST-3,5 - GY RAL7042) 5-pin (as per CiA 303)
Supply voltage ext.	24 V ±20% (to IEC 61131-2)

NOTE:
Only available built-in ex factory.

6

Option 1 - CANopen + 2AO

CANopen + 2AO

Availability

S08□.□□□.□□5□.□□□□

Article designation

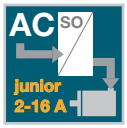
Brief description
Communication interface for CANopen (isolated from device electronics) and two analogue outputs (2AO)

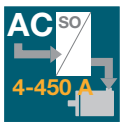
Technical data	CANopen
Standardisation	ISO 11898
Communication	CiA 301 (Rev. 4.01)
Device profile	CiA 402 (Rev. 2.0)
Transfer rate/ cable length	20 kbit/s up to 1000 m 1 Mbit/s up to 40 m
Connections	2 x Phoenix Contact connectors (type FMC 1,5/5-ST-3,5-GY RAL7042) 5-pin (as per CiA 303)
Supply voltage ext.	24 V ±20% (to IEC 61131-2)

Technical data	2AO
Number of channels	2
Voltage range	±10 V differential
Current carrying capacity	Max. 3 mA, short circuit proof
Resolution	12 bits
Accuracy	Max. ± 2% referred to 10 V, offset error < ± 0.1 V
Sampling time	125 µs
Connections	2 x Phoenix Contact connectors (type FMC 1,5/2-ST3,5-GY RAL7042)

NOTE:
Only available built-in ex factory.

Option 1 - PROFINET IRT





Availability on request

S08□.□□□.□□7□.□□□□

PROFINET IRT

Article designation

Brief description
The interface conforms to the international standards IEC 61158-5-10 and IEC 61158-6-10.

Technical data	PROFINET IRT
Communication	PROFINET I/O, V 2.2.4, Conformance Class C (isochronous)
Device profile	PROFIdrive
Sampling time	500 µs to 65 ms (multiples of 500 µs programmable)
Network topology	Line
Connection	RJ45 shielded
Cable type	CAT5

NOTE:
Only available built-in ex factory.

6

Option 1 - Sercos III

sercos
the automation bus

Availability

S0□□.□□□.□□8□.□□□□

Sercos III

Article designation

Brief description
The interface conforms to IEC 61491 / EN 61491 for Sercos interfaces and ensures optimum interaction of digital drives and controllers from different manufacturers. The basis for the Sercos III implementation in the ServoOne is the specification V1.1.2 from Sercos International.

Technical data	Sercos III
Application note	AN17.2 (dated 11.02.2003)
Communication profile	Sercos Communication (V1.1.2.1.7) (Sercos International)
Device profile	Generic Device profile (V1.1.2.1.1) (Sercos International)
Sampling time	125 µs to 65 ms (multiples of 125 µs programmable)
Network topology	Line or ring possible
Connection	RJ45 shielded
Cable type	CAT5e

NOTES:

Only available built-in ex factory. Sercos II is also available as option 1. For details see page 126.

Option 1 - Powerlink

Availability

S0□□.□□□.□□9□.□□□□

Powerlink

Article designation

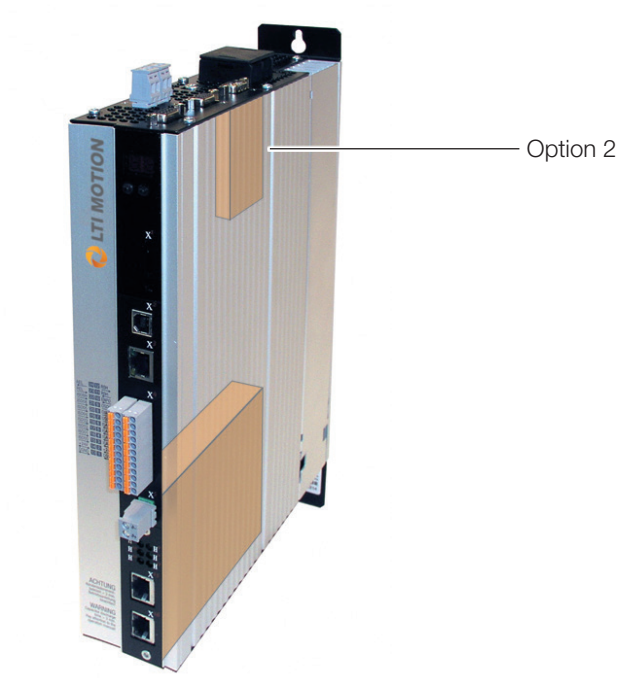
Brief description
Powerlink is an Ethernet-based bus system. Powerlink combines features and advantages of Ethernet, CANopen and real-time capabilities.

Technical data	EtherCAT
Standardisation	IEC 61158-2-12- to IEC 61158-6-22
Transfer rate	Up to 100 Mbit/s
Transfer medium	Standardised Ethernet to IEEE 802.3
Sampling time	≥400 µsec
Communication profile	EPSG DS301 (V1.10)
Device profile	CiA 402 (Rev. 2.0)
Network topology	Line topology
Connection	RJ45 (shielded)
Cable type	Patch cable CAT5e STTP

NOTE:
Only available built-in ex factory. In preparation for ServoOne Safety.

Space for your own notes

Option 2 - Technology



Type	Page	AC SO junior 2-16 A	AC SO 4-450 A	DC SO 4-450 A	PSU 26-360 kW
Interface for second SinCos encoder	136	●	●	●	-
Interface for TTL encoder simulation / TTL master encoder	137	●	●	●	-
Interface for TwinSync communication	138	●	●	●	-
Interface for SSI encoder simulation	139	-	●	●	-
Interface for TTL encoder with commutation signals	140	●	●	●	-
Interface for digital input/output expansion (DIO)	141	●	●[1)]	●[1)]	-
Interface for multi-functional input/output expansion (MIO)	142	●	●	●	-
Interface for second safe SinCos encoder	143	-	●	●	-
Interface for second safe SSI encoder	144	-	●	●	-
Interface for second safe axis monitor (SinCos)	145	-	●	●	-
Interface for one-cable interface	146	●	-	-	-

1) In preparation

NOTE:

Option 2 - Technology can only be ordered together with the drive controller. It is always shipped ready-installed from the factory.

Option 2 - second SinCos encoder

Second SinCos encoder

Availability	
●	Operable without integrated safety control
-	Operable with integrated safety control

S0□□.□□□.□□□1.□□□□

Article designation

Brief description
This option enables parallel evaluation of two SinCos encoders. Evaluation of only one SinCos encoder is included in the device standard (connection via X7). For details of the supported encoder types refer to the function overview on 11 in the technology options section.

Technical data	SinCos encoder
Signals	A/B, zero pulse
Signal level	SinCos, 1 V_{PP} + analogue zero pulse
Signal frequency	500 kHz max.

Technical data	Absolute value encoder
Signals	Data, CLK
Signal level	RS485-compliant
Switching frequency EnDat	2 MHz max.
Switching frequency SSI	1 MHz max.

Technical data	General
Supply voltage ext. encoder, SinCos, SSI, EnDat	5 V ±5% / 250 mA
Cable length	50 m max. (ServoOne junior 30 m max.)
Wave terminating resistance	120 Ω (integrated)

NOTE:
Only available built-in ex factory.

Option 2 - TTL encoder simulation / TTL master encoder

TTL encoder simulation / TTL master encoder

Availability	
●	Operable without integrated safety control
-	Operable with integrated safety control

S0□□.□□□.□□□2.□□□□

Article designation

Brief description
This option permits a TTL encoder simulation of a connected encoder and/or the connection of a TTL master encoder. The following operation modes are possible: • Evaluation of a TTL encoder • Simulation of a TTL encoder (signals from other encoders are converted into TTL signals and made available as output signals) • TTL repeater: evaluation of encoder connected to X7 or X8 and direct floating transmission via encoder simulation

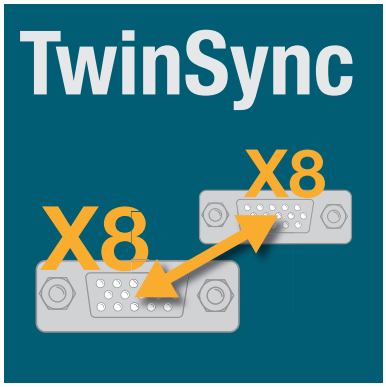
Technical data	TTL encoder simulation
Signals	A/B, zero pulse
Signal level	TTL differential (RS422), electrically isolated from the drive controller
Signal frequency	1 MHz max.

Technical data	TTL master encoder
Signals	A/B, zero pulse or pulse/direction
Signal level	TTL differential (RS422)
Signal frequency	500 kHz max.

Technical data	General
Supply voltage ext. Encoder	5 V ±5% / 250 mA
Cable length	10 m max.
Wave terminating resistance	120 Ω (integrated)

NOTE:
Only available built-in ex factory.

Option 2 - TwinSync communication



TwinSync communication

Availability	
●	Operable without integrated safety control
●	Operable with integrated safety control

S0□□.□□□.□□□3.□□□□

Article designation

Brief description
Using the TwinSync option two drives can be synchronised in master/slave mode. The data mapping for bidirectional cyclic communication between the drives can be flexibly configured in the parameters. The master drive can transmit setpoint (reference) values and control information for the slave drive via TwinSync.

Technical data	TwinSync communication
Signal level	TTL differential (RS422), electrically isolated from the drive controller
User data	8 bytes bidirectional, spread across max. three objects
Transfer mode	Asynchronous, synchronised via Sync pulse
Transfer rate	Max. 8 kHz
Cable length	Max. 10 m
Wave terminating resistance	120 Ω (integrated)

NOTE:
Only available built-in ex factory.

TwinSync connection cable

KTS-S0-010

Article designation

Technical data	TwinSync cable
Cable length	1 m
Connections	2 x SUB-D 9-pin male
Cross-section	4 x 2 x 0.25 + 2 x 0.50

Option 2 - SSI encoder simulation

SSI encoder simulation

Availability	
●	Operable without integrated safety control
-	Operable with integrated safety control

S0□□.□□□.□□□4.□□□□

Article designation

Brief description
This option permits the simulation of an SSI encoder for the output of position information. The length and the protocol for SSI data transfer can be flexibly configured in the parameters. Synchronisation of the control cycle to the external SSI clock signal is possible as an option.

Technical data	SSI encoder simulation
Signal level	TTL differential (RS422), electrically isolated from the drive controller
Baud rate	250, 500, 750, 1000 kBaud
Coding	Gray, binary
Cable length	Max. 10 m
Wave terminating resistance	120 Ω (integrated)

NOTE:
Only available built-in ex factory.

7

Option 2 - TTL encoder with commutation signals

TTL encoder with commutation signals

Availability	
●	Operable without integrated safety control
-	Operable with integrated safety control

S0□□.□□□.□□□5.□□□□

Article designation

Brief description
This option permits the evaluation of a TTL encoder with additional 120° phase-shifted differential commutation signals.

Technical data	TTL encoder with commutation signals
Signals	A/B tracks, zero pulse, U, V, W commutation signals
Signal level	TTL differential (RS422)
Signal frequency	500 kHz max.
Supply voltage ext. Encoder	5 V ±5% / 250 mA
Cable length	10 m max.
Wave terminating resistance	120 Ω (integrated)

NOTE:
Only available built-in ex factory.

Option 2 - digital input/output expansion (DIO)

Digital input/output expansion (DIO)

Availability	
●	Operable without integrated safety control
-	Operable with integrated safety control

SO□□.□□□.□□□8.□□□□.x

Article designation

Brief description
This technology option expands the digital inputs and outputs on the option slot 2 (Technology). The desired function can be configured as required in the parameters equivalent to the standard inputs and outputs.

Technical data	Digital input/output expansion (DIO)
Number of inputs	4 (floating in relation to control electronics)
Number of outputs	8 (floating in relation to control electronics)
Signal level, inputs	+24 V DC +20%; Low/High: ≤4.8 V/ ≥18 V
Signal frequency, inputs	<500 Hz
Signal level, outputs	+24 V DC, Imax = 100 mA
Sampling rate, outputs	1 ms
Supply voltage, input	24 V DC ±20%

Digital IO cable

DIOC-KS002

Article designation

Technical data	Digital IO cable
Cable length	2 m (not including connector or flying leads)
Connectors/connections	End A: Sub-D, 15-pin, male, high-density, metal housing End B: flying lead, 20 cm, stripped with heatshrink sleeve
Cable type/cross-section	6 x 2 x 0.25 + 2 x 0.5 mm² ROHS, UL compliant

NOTE:
Only available built-in ex factory.

Option 2 - multi-functional input/output expansion (MIO)

Multi-functional input/output expansion (MIO)

Availability	
●	Operable without integrated safety control
-	Operable with integrated safety control

S0□□.□□□.□□□6.□□□□.x

Article designation

Brief description
The technology option "MIO" expands the digital inputs and outputs on the option slot 2 (Technology). The desired function can be configured as required in the parameters equivalent to the standard inputs and outputs.

Technical data	Digital input/output expansion (MIO)
2 differential, analogue inputs	-10 V ...+10 V or 0(4) ...20 mA Inputs can be selected as current or voltage inputs!
1 analogue output (floating)	0 ... 10 V, short circuit proof (shutdown on short circuit)
4 digital inputs	PLC-compatible
2 digital outputs	PLC-compatible, short circuit proof (no damage on short circuit)
10.5 V supply voltage	50 mA
24 V DC supply voltage	Supply, polarity reversal protection

Multi-functional IO cable

MIOC-KS00x

Article designation

Technical data	Multi-functional IO cable
Cable length	2 m (not including connectors or flying leads, cable colour: grey)
Connectors/connections	End A: Sub-D, 15-pin, female, "high-density", metal housing End B: Sub-D, 15-pin, male, "high-density", metal housing
Cable type/cross-section	Preferred type/standard: LAPP KABEL Stuttgart UNITRONIC LiYCY (TP) 8 x 2 x 0.25 mm² ROHS, (ready made)

Option 2 - second safe SinCos encoder

Second safe SinCos encoder

Availability	
-	Operable without integrated safety control
●	Operable with integrated safety control

S08□.□□□.□□□A.□□□□

Article designation

Brief description
This option permits evaluation of a second SinCos encoder. Evaluation of only one safe SinCos encoder is included in the device standard (connection via X7). The option permits evaluation of the SinCos encoder as a second safe channel for the drive axis.

Technical data	Safe SinCos encoder
Signals	A/B
Signal level	SinCos, 1 V_{PP}
Signal frequency	400 kHz max.

Technical data	General
Supply voltage ext. encoder, SinCos	5 V ±5% / 250 mA
Cable length	15 m
Wave terminating resistance	120 Ω (integrated)

NOTE:
Only for devices with safety technology option. Only available built-in ex factory.

Option 2 - second safe SSI encoder

Second safe SSI encoder

Availability

-	Operable without integrated safety control
●	Operable with integrated safety control

S08□.□□□.□□□B.□□□□

Article designation

Brief description
This option permits evaluation of a second SSI encoder. Evaluation of only one safe SSI encoder is included in the device standard (connection via X7). The option permits evaluation of the SSI encoder as a second safe channel for the drive axis. Evaluation of a second SSI channel allows use of the SLP (Safe Limited Position) function, subject to certain safety constraints.

Technical data	Absolute value encoder
Signals	Data, CLK
Signal level	RS485-compliant
Switching frequency SSI	1 MHz max.

Technical data	General
Supply voltage ext. encoder	No encoder supply
Cable length	15 m
Wave terminating resistance	120 Ω (integrated)

NOTE:
Only for devices with safety technology option. Only available built-in ex factory.

Option 2 - second safe axis monitor (SinCos)

Second safe axis monitor (SinCos)

Availability	
-	Operable without integrated safety control
●	Operable with integrated safety control

S08□.□□□.□□□C.□□□□

Article designation

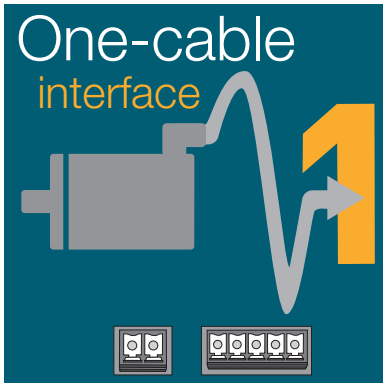
Brief description
This option permits safe evaluation of an external drive axis. The encoder must be a safe encoder, as it can only be evaluated over one channel.

Technical data	SinCos encoder
Signals	A/B
Signal level	SinCos, 1 V_{PP}
Signal frequency	400 kHz max.

Technical data	General
Supply voltage ext. Encoder	No encoder supply
Cable length	15 m (between the monitored drive axis and the option connection)
Wave terminating resistance	Not integrated

NOTE:
Only for devices with safety technology option. Only available built-in ex factory.

Option 2 - one-cable interface



One-cable interface

Availability	
●	Operable without integrated safety control
-	Operable with integrated safety control

S02□□.□□□.□□□D.□□□□.**x**

Article designation

Brief description
This technology option permits evaluation of encoder systems according to the HIPERFACE DSL protocol. The two-wire encoder cable can be integrated directly into the motor cable. A motor temperature sensor is connected to the encoder inside the motor and is evaluated by it. The data are also transferred via the encoder interface. In this way a one-cable motor system is implemented. When using a motor brake, the brake is connected directly to the option module.

Technical data	Encoder interface
Protocol	HIPERFACE DSL two-wire interface
Max. current	150 mA
Motor temperature sensor	Connected and evaluated in the encoder
Purpose	Only with motors in the LSP series with suitable encoder and associated motor cable

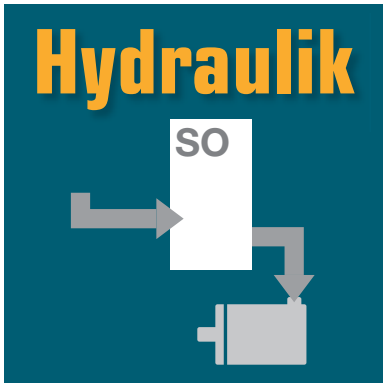
Technical data	Motor brake connection
Output voltage	+24 V DC (typ. U_{IN} – 1.4 V)
Max. output current	2.0 A
Supply U_{IN} (external)	+24 V DC +20%; I_{max} = 2.1 A
Purpose	Short circuit proof, integrated overload protection, cable-break monitoring can be activated (I < 200 mA), functionality as for standard motor brake connection

Accessories:

- 5-pin connector for one-cable interface: order designation 1306.0001.0

NOTE:
Only available built-in ex factory.

Function packages



Type	Page	AC SO junior 2-18 A	AC SO 4-450 A	DC SO 4-450 A	PSU 26-360 kW
Standard function package [1] (See table on page 1-4)	1-4	●	●	●	●
iPlc function package for programming in IEC 61131	148	●	●	●	●
HF function package for rotating field frequencies up to 1600 Hz	149	-	●	●	-
Hydraulic function package	8-4	●	●	●	-

1) Included in the standard scope of supply for the hardware sizes.

Function package iPlc function package - programming in IEC 61131

iPlc software

Availability

iPlc function package: SO□□.□□□.□□□□.□1□□.□

iPlc+HF function package: SO□□.□□□.□□□□.□8□□.□

Article designation

Brief description

The iPlc, programmable in IEC 61131, shares the microcontroller platform in the ServoOne with the drive control, so permitting optimised, fast access to all system and control parameters and interfaces. Extensive motion and interface libraries permit easy, flexible creation of applications and provide a wide range of solution options.

Technical data	General
Platform	Microcontroller 32-bit FPU (integrated in standard drive µC)
FLASH program memory	512 kbyte
Data memory SDRAM	512 kbyte
Remanent data memory NVRAM	512 byte (retain), 512 byte (persistent)
Real-time clock	No
Operating system	Single tasking

Technical data	Controller
Processing time	Dependent on CPU workload
Number of controllable axes	1.5
Real-time tasks	Cyclic (max. 3 tasks), free-running (max. 3 tasks)
Minimum cycle time	1 ms (5 ms recommended)
Online program change	Yes
Watchdog timer	Yes
Field bus access to variables	20 INT16 and INT32, 10 FLOAT32 parameters

Technical data	Programming and debugging
Programming system	CoDeSys V3
Programming languages	STL, LD, FBD, ST, AS, CFC editor
Command set	IEC 61131-3
Debug, single step, watch function	Yes
Simulation, online trace	Yes
Breakpoints	Yes
Source code download	No
Program management	No
Programming interface	Ethernet TCP/IP

NOTE:

Can also be ordered as upgrade to basic function package (article designation 1100.0000.0100.0) or to HF function package (article designation 1100.0000.0800.0).

HF (High Frequency) function package

HF function package

Availability

HF function package:	S08□.□□□.□□□□.□7□□.□
HF+iPlc function package:	S08□.□□□.□□□□.□8□□.□

Article designation

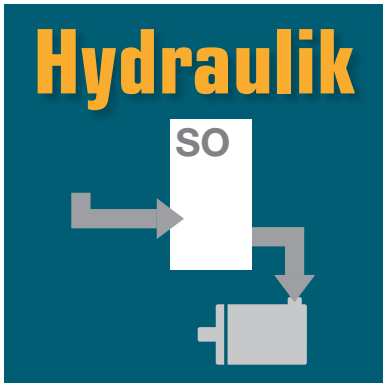
Brief description
Function package for motor-side rotating field frequencies up to 1600 Hz

Technical data	HF functions
Output frequency	0 to 1600 Hz
Operation modes	Closed loop mode for ASM and PSM, U/f mode for ASM, sensor-less control for PSM
Current controller	Fast current controller with double switching frequency
Encoder evaluation	Additional encoder evaluation for digital Hall senders (90° and 120°) with semi-automatic encoder offset calculation
Control circuit	Sine filters and output chokes are integrated into the control loop and are compensated accordingly
Field-weakening mode	For ASM 1:10 and PSM 1:2
	Power failure backup mode and synchronisation
Parallel operation	Via master/slave synchronisation (in option 2 requires the TwinSync interface)
U/f functionality	IxR and slip compensation, anti-oscillation, current limit controller, constant current control, characteristic switchover

NOTE:
Only available built-in ex factory.

NOTE:
The encoder systems EnDat and Hyperface are not supported in the HF function package.
HF function package and functional safety on request.

Hydraulic function package



Hydraulic function package

Availability

Hydraulic function package:	S08□.□□□.□□□□.□2□□.□
Hydraulic+iPLC function package:	S08□.□□□.□□□□.□3□□.□

Article designation

Brief description

The servo hydraulics ("servopump") combine the advantages of an electrical servo system with the power density of a hydraulic drive. The servocontroller for the pump motor takes over the control of the hydraulic state variables (pressure, flow rate, possibly cylinder position).

Servo hydraulics function package:

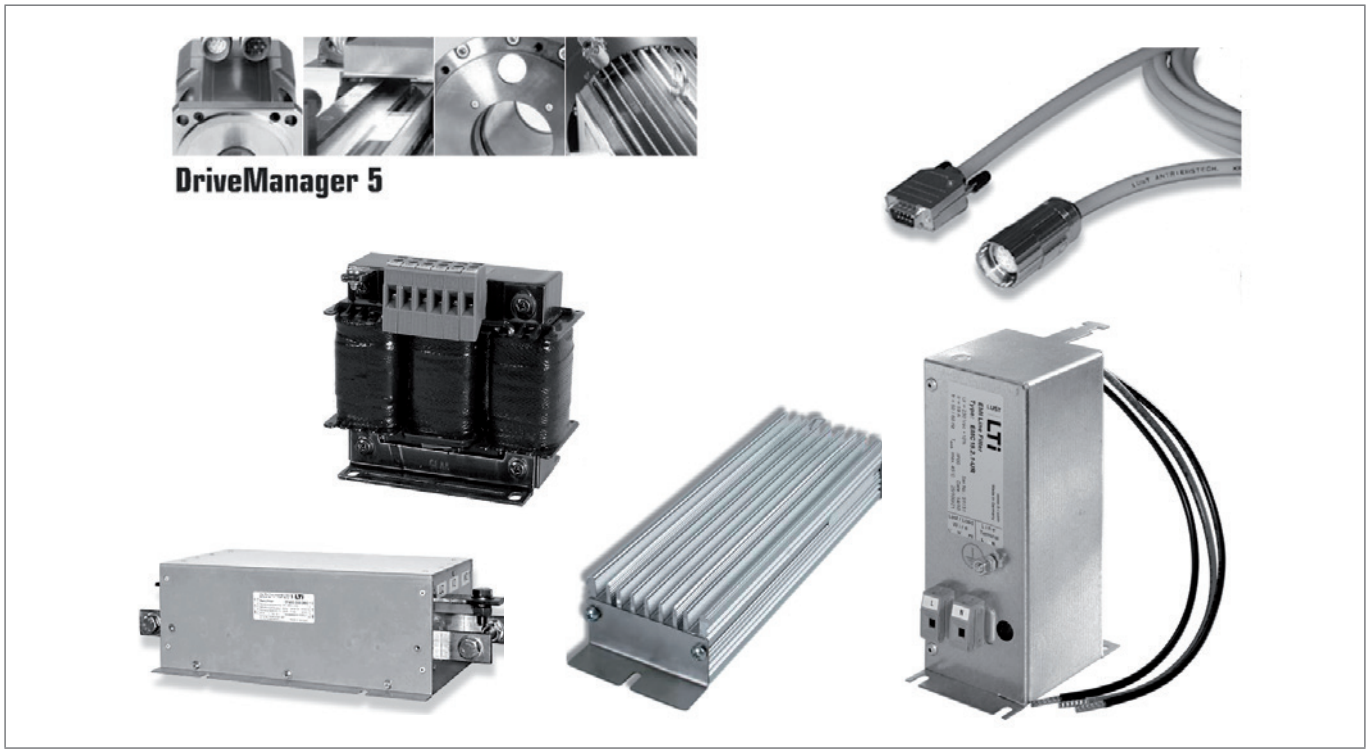
- Pressure control with flow rate limiting
- Flow rate control with pressure limiting
- Speed control for hydraulic cylinders
- Positioning of hydraulic cylinders
- Feedback of pressure and temperature measurements via analogue output or field bus to the higher level controller
- Evaluation of pressure in bar, of flow rate in l/min
- Cavitation protection by maintaining minimum pressure and minimum speed (also for negative pump speeds)
- Non-linear pump characteristic parameters can be set in software
- Indication of active and apparent power

NOTE:

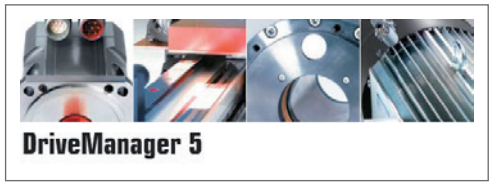
Technology option 2 multi-functional input/output expansion (MIO) SOxxx.xxx.xxx6.xxxx is suitable for expanding the analogue and digital inputs/outputs for hydraulic applications.

Number of digital and analogue inputs and outputs	Digital input/output expansion (MIO)
2 differential, analogue inputs	-10 V ...+10 V or 0(4) ...20 mA Inputs can be selected as current or voltage inputs!
1 analogue output (floating)	0 ... 10 V, short circuit proof (shutdown on short circuit)
4 digital inputs	PLC-compatible
2 digital outputs	PLC-compatible, short circuit proof (no damage on short circuit)
10.5 V supply voltage	50 mA
24 V DC supply voltage	Supply, polarity reversal protection

Accessories



PC user software DriveManager 5



Availability

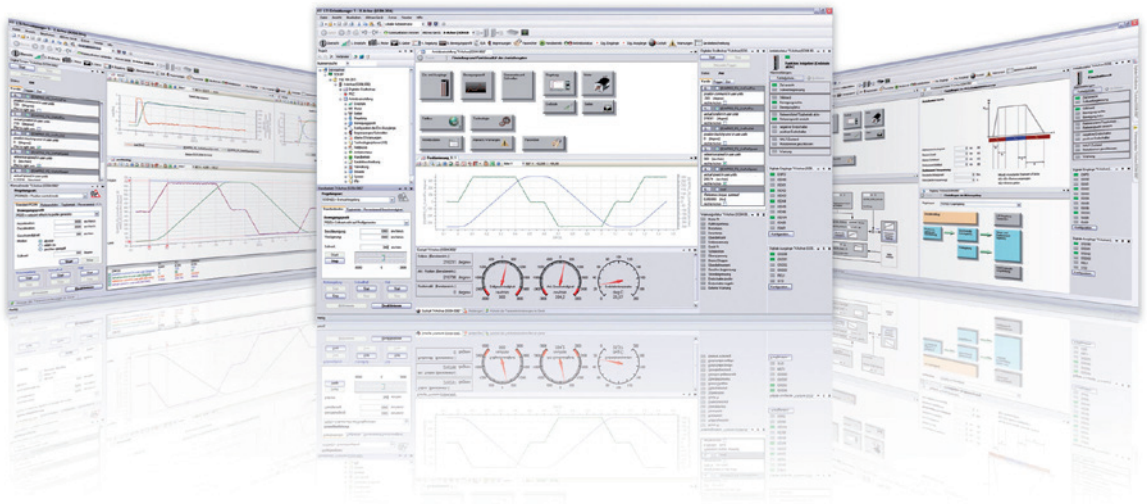
DriveManager 5

DriveManager 5	Article designation

Brief description
The graphic PC user software DriveManager 5, with integrated online help and autotuning, cuts commissioning times substantially. DriveManager 5 has network support and is able to manage multiple axis modules simultaneously in a project. A full version valid for 180 days is available on the LTI Motion homepage (www.lti-motion.com).

Technical data	DriveManager 5
Support for the following functions	• Initial commissioning of one or more servocontrollers
	• Fast serial commissioning with a configurable commissioning file (containing firmware, parameters, iPLC program)
	• Operator control and diagnosis with cockpit, 6-channel oscilloscope, and others
	• Project management

User interface



Data cables

Ethernet

Availability

CC-ECL03
Cable length in metres

Connection cable type CC-ECL03 (Ethernet)

Article designation

Technical data	CC-ECL03
Brief description	Cable for connection from servocontroller Ethernet port to PC running DriveManager
Cable length	3 m
Cable type	Crosslink Ethernet cable, CAT 5
Connections	2 x RJ45 connectors

USB

Availability

CC-USB03
Cable length in metres

Connection cable type CC-USB03 (USB)

Article designation

Technical data	CC-USB03
Brief description	Cable for connection from servocontroller USB port to PC running DriveManager
Cable length	3 m
Cable type	USB connection cable
Connections	1 x connector type A, 1 x connector type B

Selection of motor cables

Ready made motor cable for LSN, LST and LSH servomotors

Availability KM3

Availability KM4

Availability KM5

Ready made motor cables for LSP servomotors

Availability KM6 (with brake)

Availability KM8 (without brake)

Ready made motor cable for LSP servomotors with Hiperface DSL encoders

Availability KM13

Order codes, motor cables for LSN, LST, LSH and LSP servomotors

		KM3	-	KS	-	005	-	XXX
Ready made cable	*C-Line* → **KM2** *ServoOne* → **KM3** *C-Line / ServoOne / ServoOne junior* → **KM4** *ServoOne junior* → **KM5**							
Capable for energy chains								
Cable length						Cable length in metres (1 m to 50 m, on ServoOne junior up to 30 m)		
	005 →					**5 m (example)**		
Motor cables								*Up to I_0 = 16 A* → -
								Up to I_0 = 24 A → **24 A** *(only KM3)*
								Up to Io = 63 A (only LSx-220) → **63 A** *(only KM3)*

Order codes, motor cable for LSP servomotors with Hiperface DSL encoders

	KM13	-	3PHBD	-	I17	-	10A	-	KS	-	001
Ready made motor cable											
Cable layout	**3PHBD** →		3-phases + earth + brake + Hiperface DSL								
Connector	**I17** →		I17 connector motor end								
Rated current	**10A** →		Cable cross-section 1 mm²								
Additional option	**KS** →		Capable for energy chains								
Cable length			Cable length in metres (1 m to 30 m)								
	001 →		1 m (example)								

Technical data

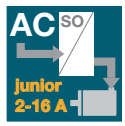
Technical data		KM3	KM4	KM5	KM6	KM8	KM13
Rated current		16 A, 24 A or 63 A	16 A				10 A
Cable length		Up to 50 m, on ServoOne junior up to 30 m					
Structure	16 A	4G1.5+ 2 x 2 x 0.75 mm²	4G1.5	4G1.5 + 2 x 2 x 0.75 mm²	4G1.5 + 2 x 2 x 0.75 mm²	4G1.5	4G1.5 + 2 x 0.75 mm² + 2 x AWG22
	24 A	4G2.5 + 2 x 2 x 1 mm²	-	-	-	-	-
	63 A	4G10 + 2 x 1.5 mm² + 2 x 1 mm²	-	-	-	-	-
Capable for energy chains		Yes					

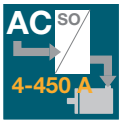
NOTE:
You will find details and the full selection of motor cables available in the System Cables Order Catalogue 0966.04B.X.

Space for your own notes

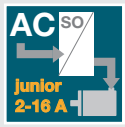
Selection of encoder cables

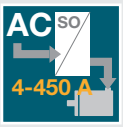
Ready made encoder cable for LSN, LST and LSH servomotors





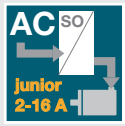
Availability KRY2





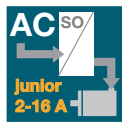
Availability KGS2

Availability KGH3

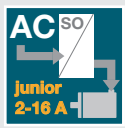


Availability KGH4

Ready made encoder cable for LSP servomotors

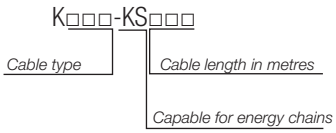


Availability KRY3



Availability KGH5

Encoder cable



Article designation

Technical data	KRY2	KRY3	KGS2	KGH3	KGH4	KGH5
Encoder system	Resolver	Resolver	Single or multiturn with SSI/EnDat interface	Single or multiturn with HIPERFACE® interface		HXX HIPERFACE® rotary encoder
Cable length	Up to 50 m, on ServoOne junior up to 30 m					
Capable for energy chains	Yes					

NOTE:
You will find details and the full selection of encoder cables available in the System Cables Order Catalogue 0966.04B.X.

Mains chokes

LR34.8-UR

Availability

LR3□.□□□-UR

Product range and voltage *Rated current*

Article designation

Technical data	LR32.14-UR	LR34.xxx-UR
Mains voltage	1 x 230 V, -20% +15%, 50/60 Hz [1]	3 x 460 V -25% +10%, 50/60 Hz [1]
Overload factor	1.8 x I_N for 40 s	2.0 x I_N for 30 s
Ambient temperature	-25 °C to +45 °C, with power reduction up to 60 °C (1.3% per °C)	
Installation altitude	1000 m, with power reduction up to 2000 m (6% per 1000 m)	
Relative atmospheric humidity	15 ... 95%, condensation not permitted	
Storage temperature	-25 °C to +70 °C	
Protection	IP00	
Short circuit voltage	U_K 4% (corresponds to 9.2 V at 230 V)	U_K 4% (corresponds to 9.24 V at 400 V) applies for mains chokes with I_N = 4.0 A to 32 A [2] U_K 2% (corresponds to 4.6 V at 400 V) applies for mains chokes with I_N = 45 A to 450 A [3]
Permissible pollution degree	P2 as per EN 61558-1	
Thermal configuration	$I_{eff} \leq I_N$	$I_{eff} \leq I_N$
UL recognition	Model LR3X.xxx-UR has UL recognition for the USA and Canadian markets	

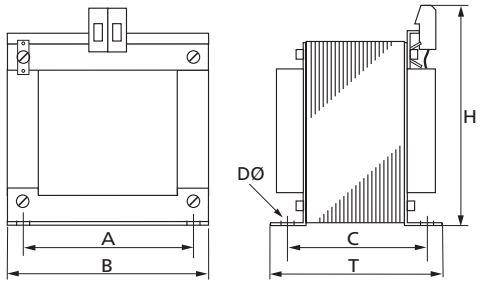
1) At mains frequency 60 Hz the power dissipation increases by approx. 5 - 10%. *2) Only for controllers up to 32 A.* *3) Only for controllers from 45 A.*

NOTE:

For recommended combinations of controllers and mains chokes refer to the relevant page of the controller catalogue.

Single-phase mains chokes

Article designation	Rated current [A]	Short circuit voltage U_K [%]	Power loss total [W]	Inductance [mH]	Weight [kg]	CU weight [kg]	Connection [mm²]
LR32.14-UR	14	4	16	2.1	1.5	0.3	4

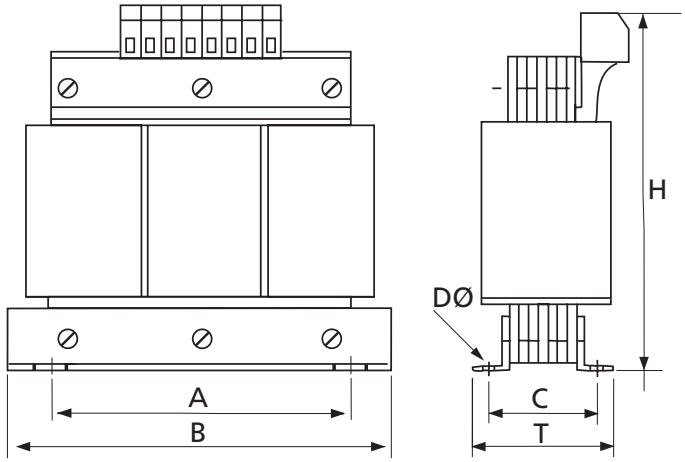
Dimensions [mm]	LR32.14-UR	Dimensional drawing
B (width)	85	
H (height)	100	
T (depth)	65	
A	64	
C	50	
D Ø	4.8	

Three-phase mains chokes

Article designation	Rated current [A]	Short circuit voltage U_K [%]	Power loss total [W]	Inductance [mH]	Weight [kg]	CU weight [kg]	Connection
LR34.4-UR	4.2	4	20	7	2.5	0.4	4 mm²
LR34.6-UR	6		25	4.88		0.8	
LR34.8-UR	8		25	3.66		1.0	
LR34.14-UR	14		45	2.09	4.0	1.5	
LR34.17-UR	17		45	1.72		2.0	
LR34.24-UR	24		50	1.22	5.0	2.0	16 mm²
LR34.32-UR	32		70	0.92	6.0	2.5	
LR34.44-UR	45	2	60	0.33	5.0	2.0	
LR34.58-UR	60		70	0.25	7.0	3.5	
LR34.70-UR	72		80	0.20	10	4.0	
LR34.88-UR	90		120	0.16	13	5.5	35 mm²
LR34.108-UR	110		140	0.13	15	7.0	
LR34.140-UR	143		160	0.10	25	8.5	70 mm²
LR34.168-UR	170		170	0.09	25	9.0	
LR34.210-UR	210		268	0.07	27	6.1	M12
LR34.250-UR	250		285	0.059	28	10.8	
LR34.325-UR	325		351	0.045	43	14.3	
LR34.450-UR	450		296	0.033	46	11.9	M12

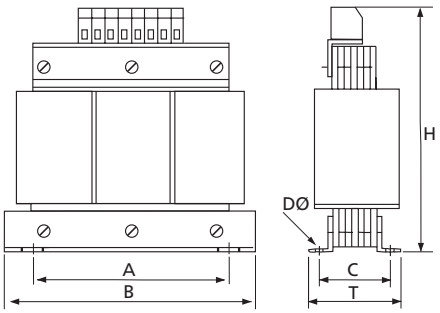
Dimensions [mm]	LR34.4-UR	LR34.6-UR	LR34.8-UR	LR34.14-UR	LR34.17-UR	LR34.24-UR	LR34.32-UR	LR34.44-UR	LR34.58-UR
B (width)	125			155			190	155	190
H (height)	130			160		170	200	170	200
T (depth)	75			80		120	110	120	120
A	100			130			170	130	170
C	55			59		72	58	72	68
D Ø	5			8					

Dimensional drawing for LR34.4-UR to LR34.58-UR

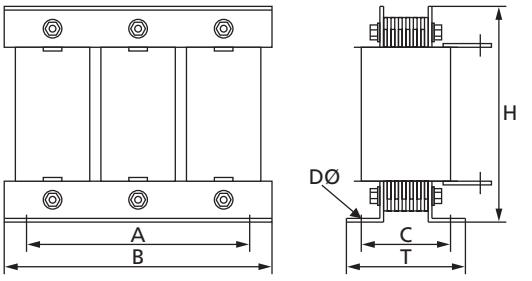


Dimensions [mm]	LR34. 70-UR	LR34. 88-UR	LR34. 108-UR	LR34. 140-UR	LR34. 168-UR	LR34. 210-UR	LR34. 250-UR	LR34. 325-UR	LR34. 450-UR
B (width)	190	230		240		265		300	
H (height)	240	300		330		230		275	
T (depth)	110	160	180	200		152		177	192
A	170	180		190		215		240	
C	78	98	122	125		126	120	145	160
D Ø	8			11					

Dimensional drawing for LR34.70-UR to LR34.168-UR

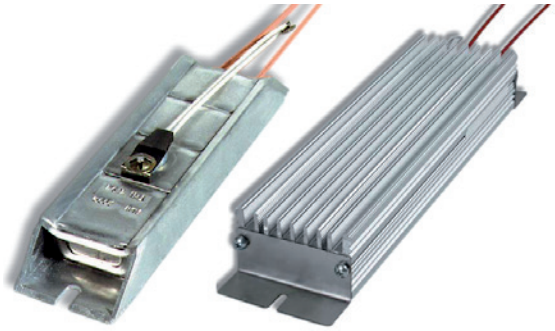


Dimensional drawing for LR34.210-UR to LR34.450-UR



Space for your own notes

Braking resistors



Availability

BR-□□□.□□.□□0-UR

Value (in Ohms) | *Protection* | *Power in (Watts)* *01 = 100 W, 10 = 1 kW*

BR-090.01.540-UR BR-090.02.540-UR

Article designation

Technical data	As per fig. A1	As per fig. A2	As per fig. A3	As per fig. A4	As per fig. A5
Surface temperature	>250 °C				
Touch protection	No				
Voltage	Max. 970 V DC				
High-voltage strength	4000 V DC				
Temperature monitoring	Yes, with bimetallic protector (breaking capacity 0.5 A / 230 V)				
Acceptance	CE-compliant; UL recognition				
Connection	1 m long PTFE-insulated litz wire			Terminal box with PG glands (M12 x 1.5 and M25 x 1.5)	

NOTE:

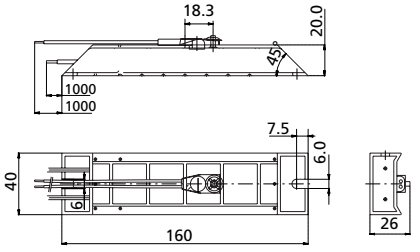
For recommended combinations of controllers and braking resistors refer to the relevant page of the controller catalogue.

Article designation	Continuous power [1] [W]	Resistance [Ω ±10%]	Peak power [W]			Protection	Connection		Figure
			390 V DC	650 V DC	750 V DC		Resistance	Bimetallic protector	
BR-260.01.540-UR	35	260	580	1620	2160	IP54	AWG 16	AWG 18	A1
BR-260.02.540-UR	150	260	580	1620	2160	IP54	AWG 14	AWG 18	A2
BR-200.01.540-UR	35	200	760	2100	2800	IP54	AWG 16	AWG 18	A1
BR-200.02.540-UR	150	200	760	2100	2800	IP54	AWG 14	AWG 18	A2
BR-200.03.540-UR	300	200	760	2100	2800	IP54	AWG 14	AWG 18	A3
BR-090.01.540-UR	35	90	1690	4690	6250	IP54	AWG 16	AWG 18	A1
BR-090.02.540-UR	150	90	1690	4690	6250	IP54	AWG 14	AWG 18	A2
BR-090.03.540-UR	300	90	1690	4690	6250	IP54	AWG 14	AWG 18	A3
BR-090.10.650-UR	1000	90	1690	4690	6250	IP65	Max. AWG 6	Max. AWG 12	A4
BR-026.01.540-UR	35	26	-	16250	21600	IP54	AWG 16	AWG 18	A1
BR-026.02.540-UR	150	26	-	16250	21600	IP54	AWG 14	AWG 18	A2
BR-026.03.540-UR	300	26	-	16250	21600	IP54	AWG 14	AWG 18	A3
BR-026.10.650-UR	1000	26	-	16250	21600	IP65	Max. AWG 6	Max. AWG 12	A4
BR-026.20.650-UR	2000	26	-	16250	21600	IP65	Max. AWG 6	Max. AWG 12	A5
BR-020.03.540-UR	300	20	7600	21100	28100	IP54	AWG 14	AWG 18	A3
BR-015.03.540-UR	300	15	10100	28100	37500	IP54	AWG 14	AWG 18	A3

1) At cycle times of max. 150 s the required rated continuous power can be calculated according to the following formula:
Rated continuous power (W) = max. pulse duration (s) x peak power (W) / cycle time (s)

Dimensions, braking resistors [mm]

A1



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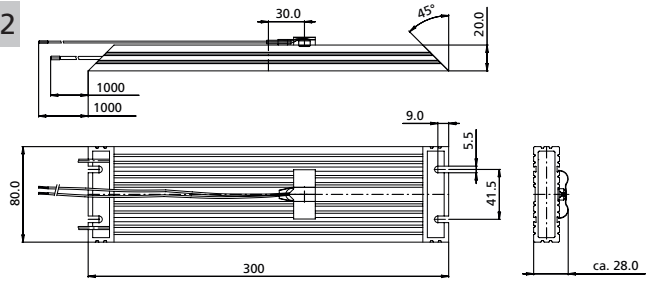

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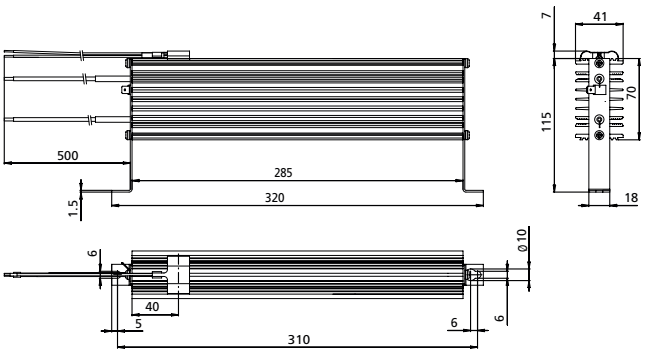

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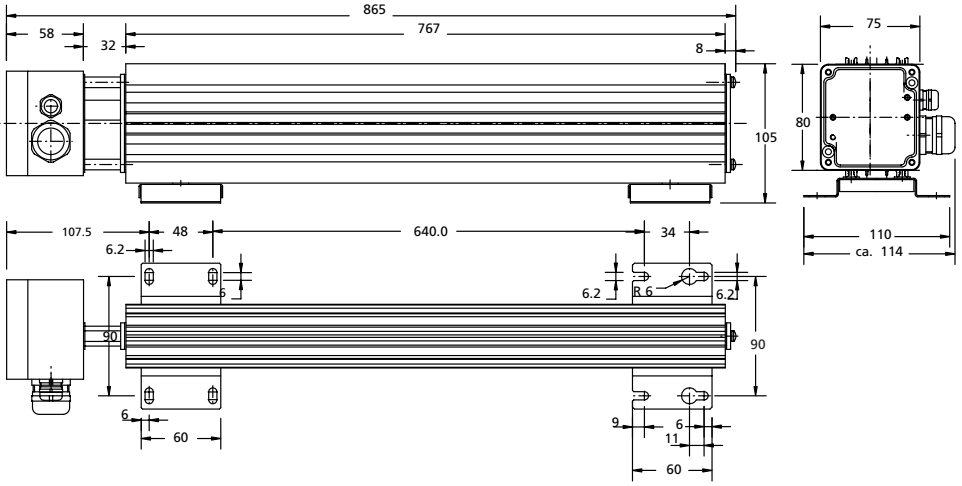

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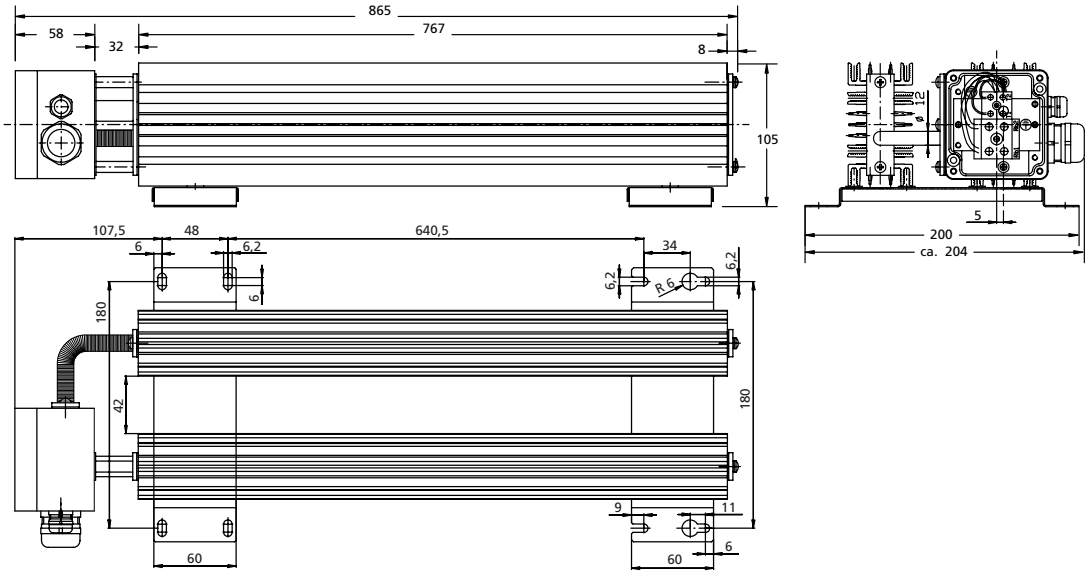


Mains filters, ServoOne junior

EMC19.2-1Ph,UR

Availability

EMC□□.□-□Ph,UR

Rated current | *Number of phases* | *Version*

Article designation

Ambient conditions	EMCxx.x-1Ph,UR	EMCxx.x-3Ph,UR
Rated voltage	1 x 230 V AC +10% at 50/60 Hz	3 x 480 V AC +10% at 50/60 Hz
Overload	2x for 10 seconds, can be repeated after 6 minutes [1]	
Ambient temperature	Max. 45 °C	
IEC climate category	25/085/21	
Ingress protection, connections	IP00	
Acceptance	IEC 60939, UL 508	IEC 60939, UL 1238, UL 508
RFI suppression to EN 61800-3 -residential-	Motor cable length up to 10 m permitted	
RFI suppression to EN 61800-3 -industrial-	Motor cable length up to 30 m permitted	
Connections	Input: Touch-protected terminals (IP20); output: Litz wire	

1) Precondition: Mains filter mounted vertically on bare metal base plate

NOTE:

For recommended combinations of controllers and mains filters, refer to the page in the catalogue for the related controller.

Single-phase mains filters

Usable for servocontrollers	Article designation	Rated current [A]	Power dissipation [W]	Leakage current [1] [mA]	Touch current [2] [mA]		Weight [kg]
					N	F	
SO22.003	EMC8.2-1Ph,UR	8	2.5	7.9	15	25	0.75
SO22.006	EMC14.2-1Ph,UR	14	5.8				
SO22.008	EMC19.2-1Ph,UR	19	6.1				

1) Effective value of leakage current according to EN 60939 (2009) at 50 Hz and rated voltage. The leakage current may increase further due to the suppressed device.

2) Peak value measurement with measurement circuit to EN 60990 at 50 Hz and rated voltage.
N: Peak value of touch current occurring in normal operation with PE conductor circuit open. At a touch current >3.5 mA the mains filter must be provided with a fixed connection as per EN 50178.
F: Peak value of worst-case touch current occurring in case of fault with PE conductor and N conductor circuits open.

Three-phase mains filters

Usable for servocontrollers	Article designation	Rated current [A]	Power loss [W]	Leakage current [1] [mA]	Touch current [2] [mA]		Weight [kg]
					N	F	
S022.003	EMC5.2-3Ph,UR	5	2	1.7	2.3	70	0.75
S024.002							
S024.004							
S022.006	EMC11.2-3Ph,UR	11	7				0.70
S022.008							
S024.007							
S024.012	EMC16.2-3Ph,UR	16	12	6.0	4.5	-	1.20
S024.016	EMC25.2-3Ph,UR	25	17	4.8	4.5		

1) *Effective value of leakage current according to EN 60939 (2009) at 50 Hz and rated voltage with 2% asymmetry. The leakage current may increase further due to the suppressed device.*

2) *Peak value measurement with measurement circuit to EN 60990 at 50 Hz and rated voltage with 2% asymmetry.*
N: Peak value of touch current occurring in normal operation with PE conductor circuit open. At a touch current >3.5 mA the mains filter must be provided with a fixed connection as per EN 50178.
F: Peak value of worst-case touch current occurring in case of fault with PE conductor and N conductor circuits open.

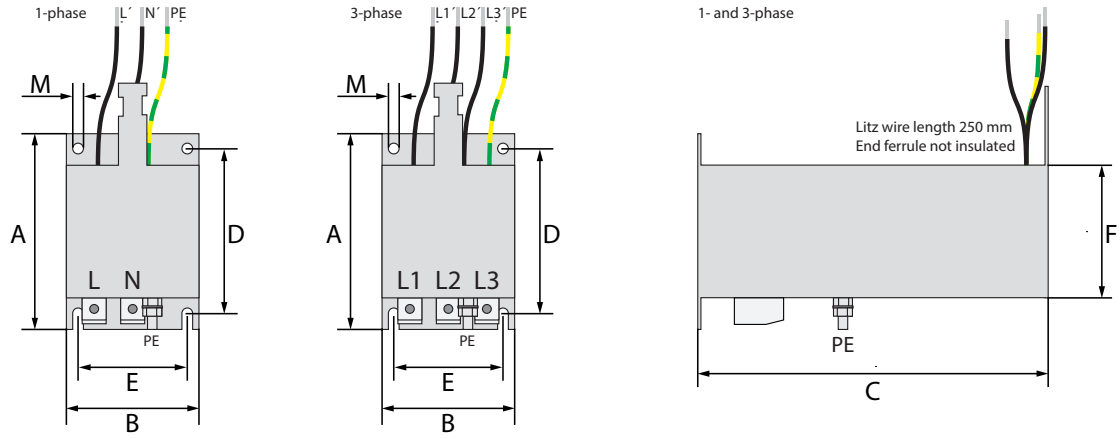
Dimensions, single-phase mains filters

Article designation	Dimensions [mm]							PE	Input		Output
	A	B	C	D	E	F	M Ø		Clamping area [mm²]	Tightening torque [Nm]	Litz wire cross-section
EMC8.2-1Ph,UR	81	55	145	68	45	55	4	M4	0.2 - 4.0	0.6 - 0.8	AWG 16
EMC14.2-1Ph,UR											AWG 16
EMC19.2-1Ph,UR											AWG 14

Dimensions, three-phase mains filters

Article designation	Dimensions [mm]							PE	Input		Output
	A	B	C	D	E	F	M Ø		Clamping area [mm²]	Tightening torque [Nm]	Litz wire cross-section
EMC5.2-3Ph,UR	81	55	145	68	45	55	4	M4	0.2 - 4.0	0.6 - 0.8	AWG 16
EMC11.2-3Ph,UR											
EMC16.2-3Ph,UR	93	90	200	82	50		5	M5			2.5 mm²
EMC25.2-3Ph,UR									0.2 - 6.0	1.5 - 1.8	4 mm²

Dimensional drawings for EMC8.2-1Ph,UR to EMC11.2-3Ph,UR



Mains filters, ServoOne single-axis system

EMC180.1-UR

Availability

EMC□□□.1,UR

Rated current | *Model*

Article designation

Ambient conditions	EMC.xxx.1-UR
Rated voltage	3 x 480 V AC +10% at 50/60 Hz
Ambient temperature	-25 °C to +40 °C, with power reduction up to 60 °C (1.3% per °C)
Installation altitude	1000 m, with power reduction up to 4000 m (6% per 1000 m)
Relative atmospheric humidity	15 ... 85%, condensation not permitted
Storage/transportation temperature	-25 °C to +70 °C / -40 °C to +85 °C
Protection	IP20 (from EMC180.1-UR IP00)
Permissible pollution degree	P2 as per EN 61558-1
Acceptance	CE-compliant UL recognition (EMC7.1-UR to EMC150.1-UR)
RFI suppression to EN61800-3 (category C2 -residential-)	Motor cable length up to 50 m permitted
RFI suppression to EN61800-3 (category C3 - industrial-)	Motor cable length up to 100 m permitted

NOTE:

For recommended combinations of controllers and mains filters, refer to the page in the catalogue for the related controller.

Three-phase mains filters EMC7.1-UR to EMC150.1-UR

Article designation	Rated current [A]	Overload [1] [A]	Power loss [W]	Leakage current [2] [mA]	Touch current [3] [mA]		Weight [kg]
					N	F	
EMC7.1-UR	7	14	7.5	11.7	7.6	195	1.4
EMC16.1-UR	16	32	11	11.7	6.8	194	1.35
EMC25.1-UR	25	50	24	11.7	8.2	223	2.7
EMC35.1-UR	35	64	34	11.7	8.3	225	3.5
EMC63.1-UR	63	125	30	5.5	6.8	195	4.2
EMC100.1-UR	100	150	40	16.9	9.8	252	5.5
EMC150.1-UR	150	225	55	16.9	9.8	253	10.4

1) For 10 s, can be repeated after 6 minutes; precondition: Mains filter mounted vertically on bare metal base plate

2) Effective value of leakage current according to EN 60939 (2009) at 50 Hz and rated voltage with 2% asymmetry. The leakage current may increase further due to the suppressed device.

3) Peak value measurement with measurement circuit to EN 60990 at 50 Hz and rated voltage with 2% asymmetry.
N: Peak value of touch current occurring in normal operation with PE conductor circuit open. At a touch current >3.5 mA the mains filter must be provided with a fixed connection as per EN 50178.
F: Peak value of worst-case touch current occurring in case of fault with PE conductor circuit open and two of three phases open.

Three-phase mains filters EMC180.1-UR to EMC500.1-UR

Article designation	Rated current [A]	Overload [4] [A]	Power loss [W]	Leakage current [5] [mA]	Touch current [6] [mA]		Weight [kg]
					N	F	
EMC180.1-UR	180	270	15	-	9.6	-	10.7
EMC220.1-UR	220	330	20	33.8	7.2	225	7.5
EMC250.1-UR	250	375	40				8.5
EMC300.1-UR	300	450	40				9.5
EMC400.1-UR	400	600	55				11.0
EMC500.1-UR	500	750	60				12.5

4) For 60 s, can be repeated after 30 minutes; precondition: Mains filter mounted vertically on bare metal base plate

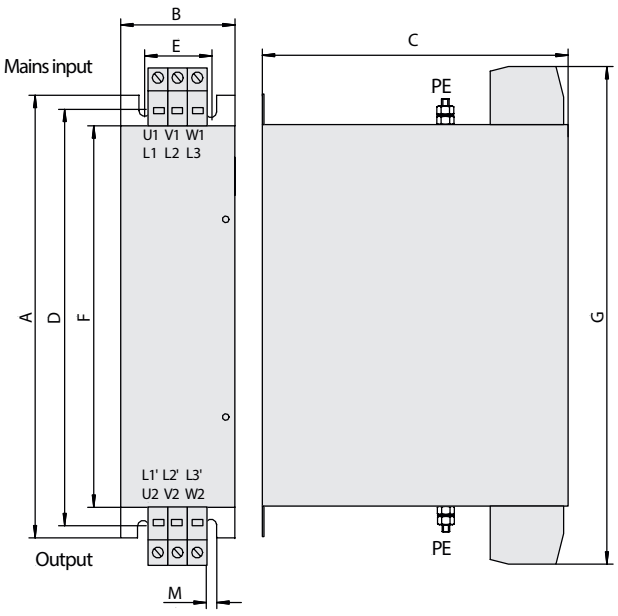
5) Effective value of leakage current according to EN 60939 (2009) at 50 Hz and rated voltage with 2% asymmetry. The leakage current may increase further due to the suppressed device.

6) Peak value measurement with measurement circuit to EN 60990 at 50 Hz and rated voltage with 2% asymmetry.
N: Peak value of touch current occurring in normal operation with PE conductor circuit open. At a touch current >3.5 mA the mains filter must be provided with a fixed connection as per EN 50178.
F: Peak value of worst-case touch current occurring in case of fault with PE conductor circuit open and two of three phases open.

Dimensions, three-phase mains filters EMC7.1-UR to EMC150.1-UR

Article designation	Dimensions [mm]								PE	Input/output	
	A	B	C	D	E	F	G	M Ø		Clamping area (mm²)	Tightening torque (Nm)
EMC7.1-UR	210	55	90	200	40	180	202	4.0	M5	0.2 ... 4.0	0.6 - 0.8
EMC16.1-UR											
EMC25.1-UR	270	62	115	255	40	240	272	5.5	M5	0.2 ... 6.0	1.5 - 1.8
EMC35.1-UR	270	62	145	255	40	240	305	5.5	M5	0.5 ... 16	2.0 - 2.3
EMC63.1-UR	280	62	180	270	40	240	305	7.0	M6	0.5 ... 16	2.0 - 2.3
EMC100.1-UR	290	75	200	270	45	250	336	7.0	M8	16 ... 50	6.0 - 8.0
EMC150.1-UR	320	90	220	300	60	280	380	7.0	M8	16 ... 50	15 - 20

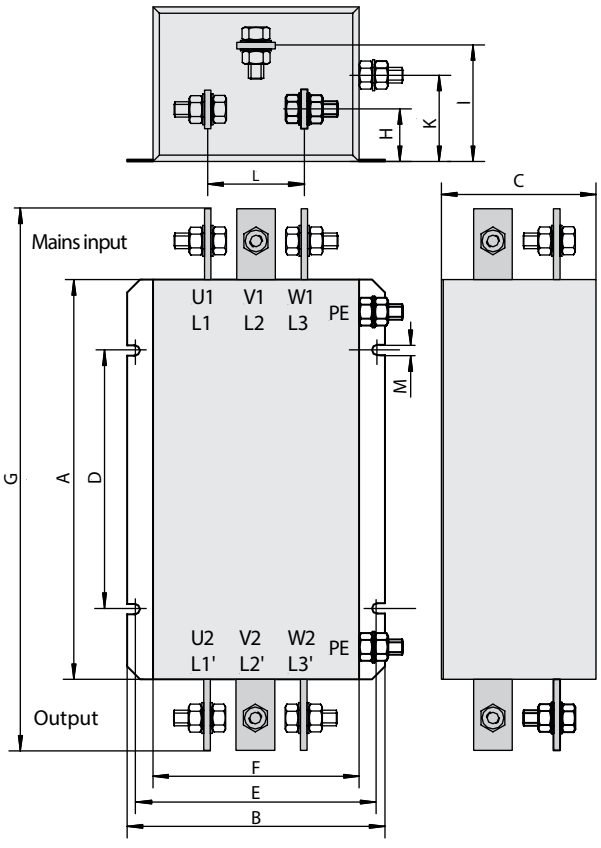
Dimensional drawing for EMC7.1-UR to EMC150.1-UR



Dimensions, three-phase mains filters EMC180.1-UR to EMC500.1-UR

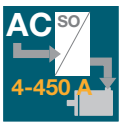
Article designation	Dimensions [mm]												PE	Input/output	
	A	B	C	D	E	F	G	H	I	K	L	M Ø		Busbar [mm]	Hole
EMC180.1-UR	310	200	120	180	180	160	410	45	86	30	91	M8	M10	3 x 25	M10
EMC220.1-UR													M10	4 x 25	M10
EMC250.1-UR								54					M10	5 x 25	M10
EMC300.1-UR													M12	6 x 25	M10
EMC400.1-UR	350	240	150	200	220	200	480	69	110		128		M12	8 x 25	M10
EMC500.1-UR													M12	8 x 30	M12

Dimensional drawing for EMC180.1-UR to EMC500.1-UR



Mounting accessory sets

Liquid cooling connection set



Availability

1150.800.0

LCS01

Article designation

Brief description
The connection set includes all the components needed to connect ServoOne devices with liquid cooling to the cooling system (flow and return lines). It consists of a roll of Teflon tape, two elbows, two quick-fasteners, two couplings and two hose clamps.

NOTE:

Fits all ServoOne devices with liquid cooling.

EMC accessories

NOTE:
Can be used for control and motor cables for all screen connection plates.

Cable clamps and clips

Cable clamps

Availability

1101.910.0	SCS01	3 pieces clamps 10-16 mm
1101.920.0	SCS02	3 pieces clamps 12-22 mm
1101.930.0	SCS03	3 pieces clamps 16-27 mm
1101.940.0	SCS04	3 pieces clamps 35-45 mm
1101.950.0	SCS05	3 pieces clamps 40-66 mm

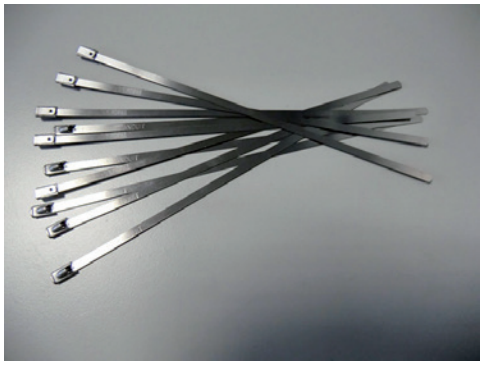
Article designation

Cable clips

Availability

1101.960.0	SCS06	5 pieces clips up to 12 mm

Article designation



Metal cable ties

Availability

1101.970.0	SCS10	10 pieces metal cable ties

Article designation

Shield plates

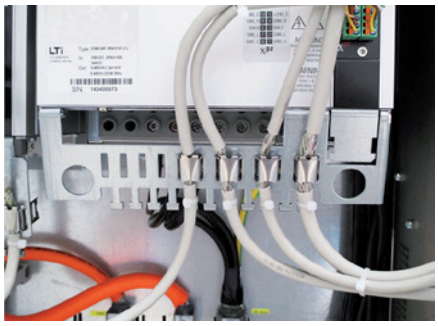
NOTE:
Shield plates are suitable for cable clamps, clips or metal cable ties.
Scope of supply in each case only shield plate (cable clamps, clips or metal cable ties not included).

Shield plates for control connections

Shield terminal expansion BG1-4

Availability

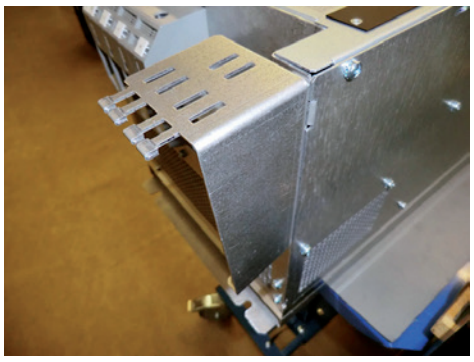
Article designation	
1101.810.0 SCE01	Shield terminal expansion Control connections for BG1-4



Shield terminal expansion BG5

Availability

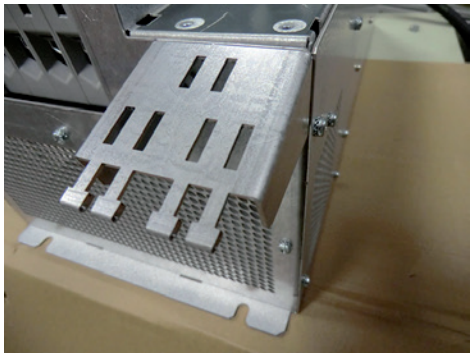
Article designation	
1101.820.0 SCE05	Shield terminal expansion Control connections for BG5



Shield terminal expansion BG6A and BG 7

Availability

Article designation	
1101.830.0 SCE06A	Shield terminal expansion Control connections for BG6A and BG7



Shield plate BG6

Availability

1101.835.0	SCE06	Shield terminal expansion Control connections for BG6

Article designation

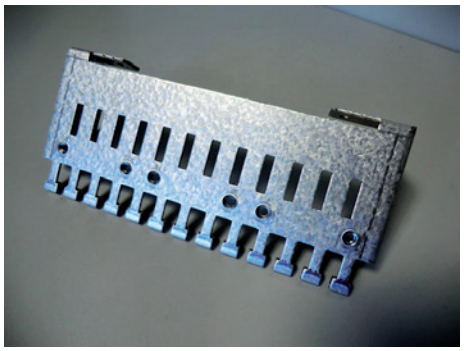
Shield terminal expansion BG7

Availability

1101.840.0	SCE07/SPM05	Shield terminal expansion Control connections for BG7

Article designation

Shield plates for motor connections

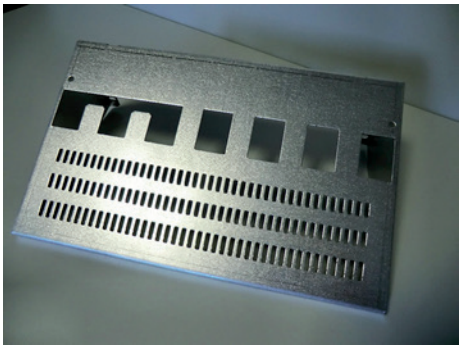


Shield terminal expansion BG5
145 x 65 mm

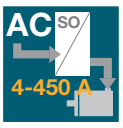
Availability

1101.840.0	SCE07/SPM05	Shield plate for BG5

Article designation

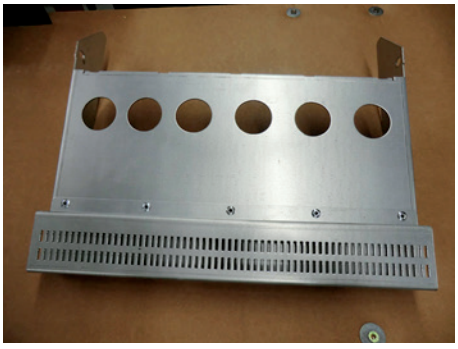


Shield plate BG6
280 x 175 mm

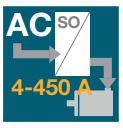


Availability

Article designation	
1101.860.0 SPM06	Shield plate for BG6/BG6A

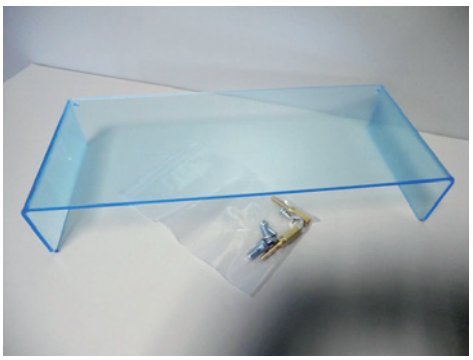


Shield terminal expansion BG7
385 x 230 mm

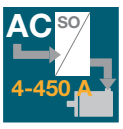


Availability

Article designation	
1101.870.0 SPM07	Shield plate for BG7 (incl. mounting accessories)



Terminal cover for BG7
380 x 157 mm



Availability

Article designation	
1190.802.0 SPC07	Terminal cover for BG7
1101.880.0 SPM / SPC07	Terminal cover for BG7 (incl. SPM07 and mounting accessories)

Overview, servomotors

Contents	Types
 LSH servomotor – the power pack	LSH-050-x to LSH-127-x
 LST servomotor – the versatile one	LST-037-x to LST-220-x
 LSN servomotor – compact and low-cost	LSN-050-x to LSN-090-x
For LSN, LST, LSH motors, see Servomotors Catalogue 0814.05B.X	
 LSP servomotor with optional planetary gearbox – slim and cost-effective (LSP-04-x to LSP-13-x)	 LSP-04-x to LSP-13-x motors among other features with one-cable solution
For LSP motors, see Servomotors Catalogue 0814.08B.X	

Space for your own notes

Subject to technical change without notice.

The content of our order catalogue was compiled with the greatest care and attention, and based on the latest information available to us.

We should nevertheless point out that this document cannot always be updated simultaneously with the on-going technical development of our products.

Information and specifications may be subject to change at any time.
For information on the latest version please visit www.lti-motion.com.

ServoOne System Catalogue
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