



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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Subject to technical change without notice.

The content of our 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.



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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

optimal switch cabinet utilization



Flexible cooling methods

featuring air or liquid cooling



Future-proof

thanks to a flexible expansion concept



Comprehensive PC software

for 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 $1/3 \times 230$ V AC
- 2 - 16 A rated current at $3 \times 400 - 480$ V AC
- Up to 300% overload capacity



ServoOne single-axis system

Chapter 3

The ServoOne servocontroller is suitable for a broad spread 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 $3 \times 230 - 480$ 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				
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 touchprobe 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	PTC, NTC, KTY, Klixon	-
Encoder systems				
Encoder channel 1	Resolver	●	●	●
	SinCos encoder with NP, SSI, EnDat or HIPERFACE®	●	●	●
Encoder channel 2	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	○	○	○
Single-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 S084.170	● Up to S084.170	● Up to S084.170.S
Liquid cooling	-	● From S084.016	● From S084.016	●

● = 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)	-	●	-	-
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 S084.170.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	-	○	○
Sensorless 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 PROFldrive	CANopen CiA 402 sercos EtherCAT CoE PROFldrive	CANopen CiA 402 sercos EtherCAT CoE PROFldrive
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

○ = Optional

- Not available

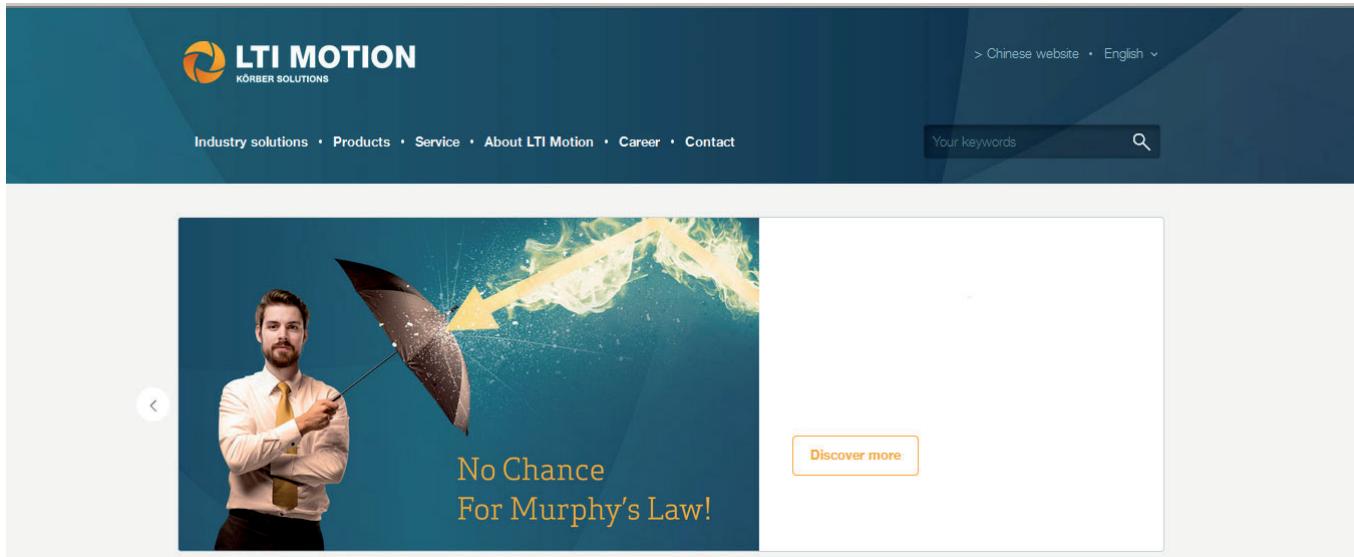
2) Project-specific

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



The image shows the LTI MOTION website homepage. At the top left is the LTI MOTION logo with 'KÖRBER SOLUTIONS' underneath. At the top right are links for 'Chinese website' and 'English'. Below the header is a navigation bar with links: 'Industry solutions', 'Products', 'Service', 'About LTI Motion', 'Career', and 'Contact'. To the right of the navigation is a search bar with the placeholder 'Your keywords' and a magnifying glass icon. The main banner features a man in a white shirt and tie holding a black umbrella, standing next to a large yellow lightning bolt striking through a dark blue background. The text 'No Chance For Murphy's Law!' is overlaid on the banner. A 'Discover more' button is located in the bottom right corner of the banner area.

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
- 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.

LTI Motion > Service

Support & Service

Our service concept for your success

The support and service at LTI Motion will support you across the entire life cycle of your drive and automation solution. Our team of specialists stand by your side with competent support. Everything from planning and developing to starting and maintenance - we are committed to individual service for all concerns.

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With our flexibility, fast response times, superior technical know-how and extensive user experience, we can offer a wide range of services, e.g.

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- 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

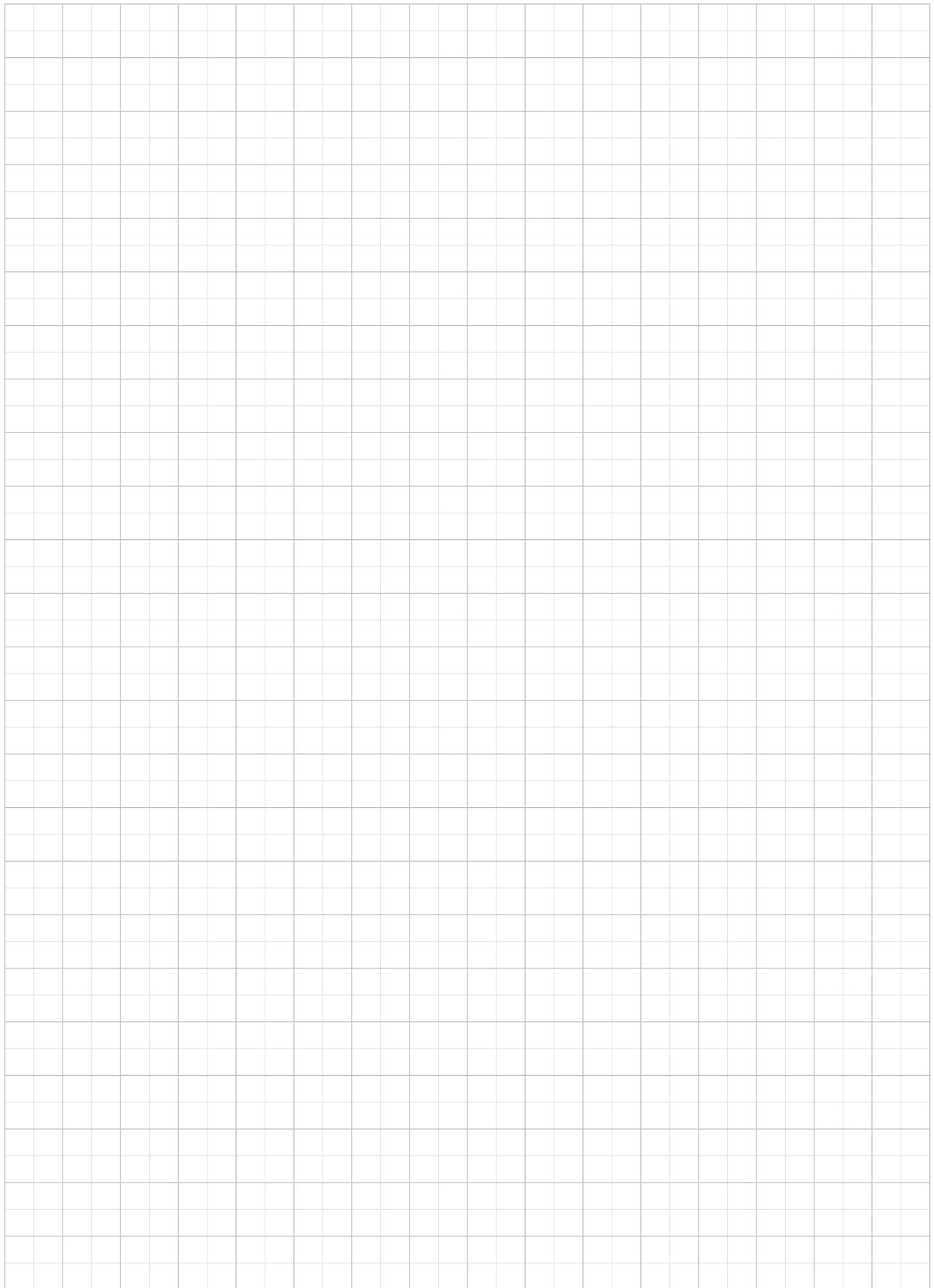
► Support & Service

► 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

2



BG2

BG3

BG4

BG5

Supply voltage 1 x 230 V / 3 x 230 V

Type	Size	Rated current	Current carrying capacity	Technical data
S022.003	BG2	3 A	Page 2-4	Page 2-8
S022.006	BG3	5.9 A	Page 2-4	Page 2-12
S022.008	BG4	8 A	Page 2-4	Page 2-14

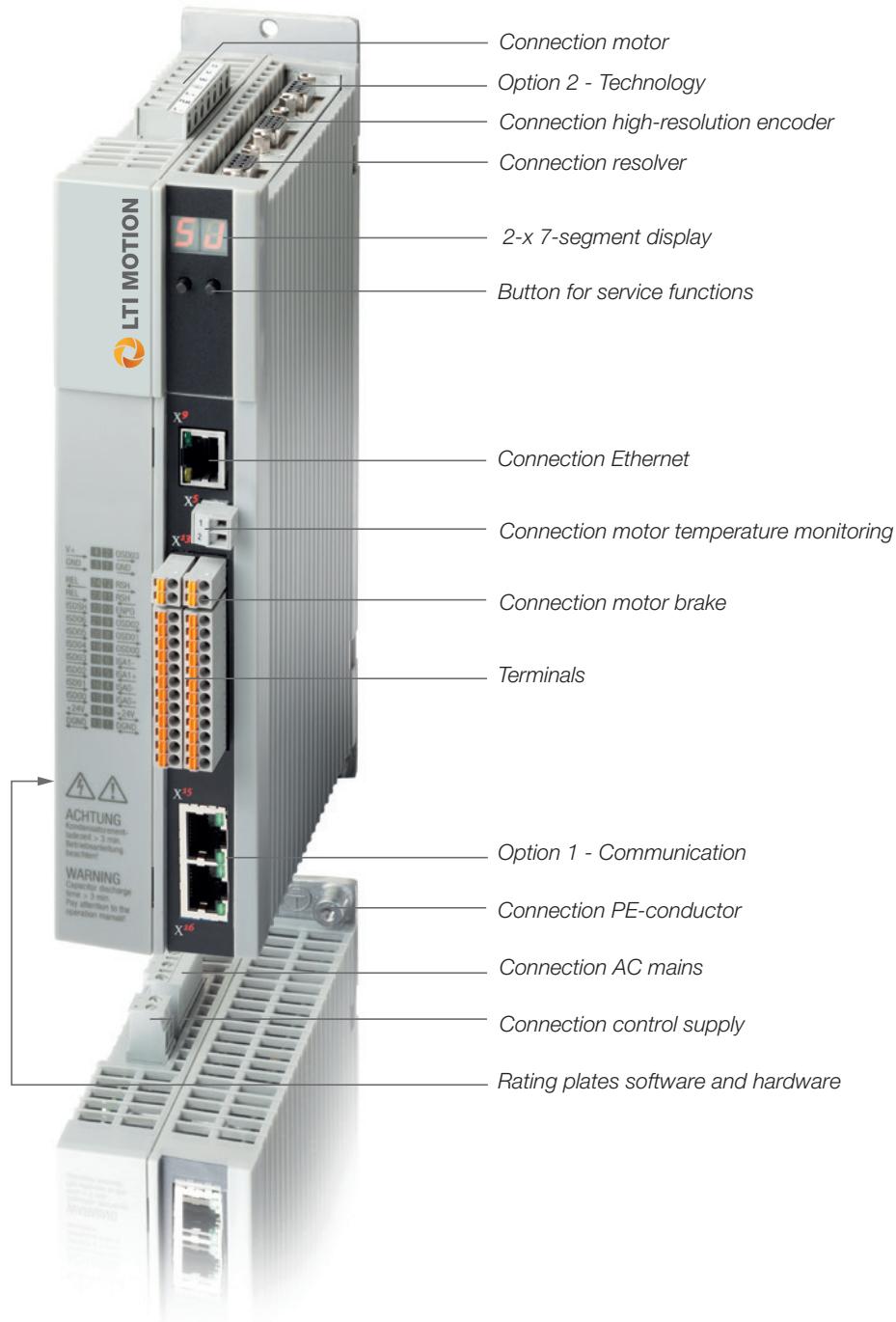
Supply voltage 3 x 400 V

Type	Size	Rated current	Current carrying capacity	Technical data
S024.002	BG2	2 A	Page 2-5	Page 2-8
S024.004	BG3	3.5 A	Page 2-5	Page 2-12
S024.007	BG4	6.5 A	Page 2-5	Page 2-14
S024.012	BG5	12.0 A	Page 2-5	Page 2-16
S024.016	BG5	16.0 A	Page 2-5	Page 2-16

Order codes, ServoOne junior

Article designation	SO2	4	.	006	.	0	0	2	1	.	0	0	0	0	0	X
ServoOne junior (SOJ)																
Supply voltage: 3 x 400 V 1/3 x 230 V		4		2												
Rated current	BG2	2.0 A	002													
		3.0 A	003													
	BG3	3.5 A	004													
		5.9 A	006													
	BG4	6.5 A	007													
		8 A	008													
	BG5	12 A	012													
		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) Air-cooled with internal braking resistor (not BG2)		0													
Function package	Basic (without additional function package) iPlc		0													
Special design	None		0													
Protection	Standard PCBs with protective varnish		0													
Hardware version	(may be multi-digit)															X

Features, ServoOne junior



2

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 [kHz]	Ambient temperature max. [°C]	Rated current I_N [A _{eff}] at 1 x 230 V	Peak current			
				[A _{eff}]	200% (2 I_N) for time [s]	[A _{eff}]	300% (3 I_N) 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 [kHz]	Ambient temperature max. [°C]	Rated current I_N [A _{eff}] at 3 x 230 V	Peak current			
				[A _{eff}]	200% (2 I_N) for time [s]	[A _{eff}]	300% (3 I_N) 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 [kHz]	Ambient temperature max. [°C]	Rated current I_N [A _{eff}]	Overload capacity		
				[A _{eff}]	for time [s]	Peak current [A _{eff}]
S024.002	4	45	2.0	4.0	10 ²⁾	6.0
	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
	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
	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
	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
	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 I²t 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 [kHz]	Ambient temperature max. [°C]	Rated current I_N [A _{eff}]	Overload capacity		
				[A _{eff}]	for time [s]	Peak current [A _{eff}]
S024.002	4	45	2.0	4.0	10 ²⁾	6.0
	8	40	2.0	4.0		6.0 ¹⁾
	16	40	0.7	1.4		4.0
S024.004	4	45	4.8	6.2	10 ²⁾	9.2
	8	40	3.5	6.2		9.2 ¹⁾
	16	40	2.2	4.4		6.2
S024.007	4	45	7.4	11.8	10 ²⁾	17
	8	40	6.5	11.8		17 ¹⁾
	16	40	2.4	4.8		11.8
S024.012	4	40	11.5	23	10 ²⁾	34.5
	8	40	10.5	21		34.5 ¹⁾
	16	40	8.0	12		25.2
S024.016	4	40	20	40	10 ²⁾	34.5 ¹⁾
	8	40	15	30		12.8
	16	40	6.5	10.4		60 ¹⁾
						60
						31.5
						11

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

2) Shutdown as per I^2t characteristicData 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 [kHz]	Ambient temperature max. [°C]	Rated current I_N [A _{eff}] at 480 V	Overload capacity		
				[A _{eff}]	for time [s]	Peak current [A _{eff}] for time [s]
S024.002	4	45	2.0	4.0	10 ²⁾	6.0
	8	40	1.7	3.4		6.0 ¹⁾ 3.4
	16	40	3) ³⁾	3) ³⁾		3) ³⁾
S024.004	4	45	4.6	6.0	10 ²⁾	8.8
	8	40	2.6	5.2		8.8 ¹⁾ 5.2
	16	40	3) ³⁾	3) ³⁾		3) ³⁾
S024.007	4	45	7.0	10.7	10 ²⁾	16
	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⁾
	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
	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)
Accident prevention regulations	As per local regulations (in Germany e.g. BGV A3)
Mounting height	Up to 1000 m above MSL, over 1000 m above MSL with power reduction (1% per 100 m, max. 2000 m above MSL)
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		
		As per EN 61800-2, IEC 60721-3-2 class 2K3 ¹⁾
In transit	Temperature	-25 °C to +70 °C
	Relative atmospheric humidity	95% at max. +40 °C
		As per EN 61800-2, IEC 60721-3-1 class 1K3 and 1K4 ²⁾
In storage	Temperature	-25 °C to +55 °C
	Relative atmospheric humidity	5 to 95%
		As per EN 61800-2, IEC 60721-3-3 class 3K3 ³⁾
In operation	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			
As per EN 61800-2, IEC 60721-3-2 class 2M1			
Vibration limit in transit	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 60721-2-2 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 continuous power with external braking resistor ³⁾	2.1 kW	1.8 kW	
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⁾	

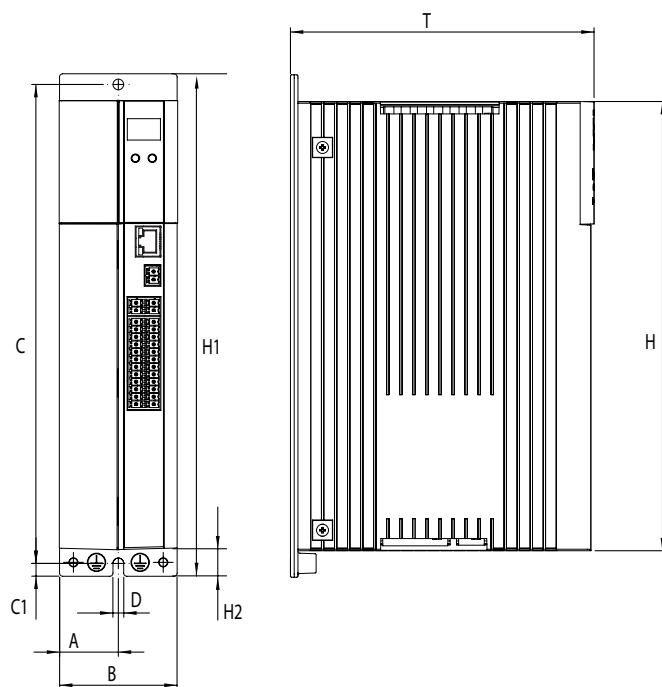
1) Value referred to 4 kHz and 8 kHz switching frequency

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



SO2..._____.□□□□.□□□□

 Rated current

 Mains voltage

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 continuous power with external braking resistor	2.1 kW	2.3 kW	
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⁾	

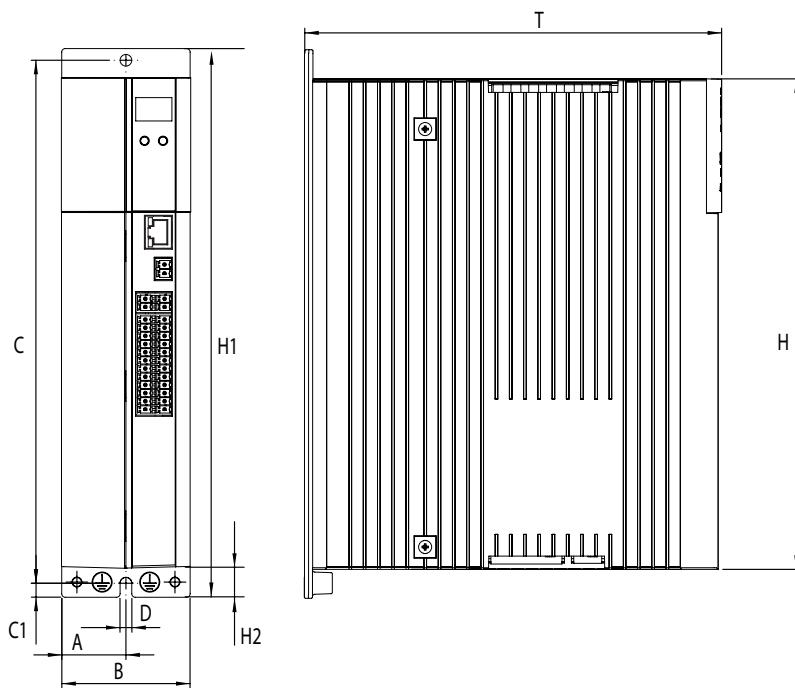
1) Data referred to 4 kHz and 8 kHz switching frequency

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	2
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

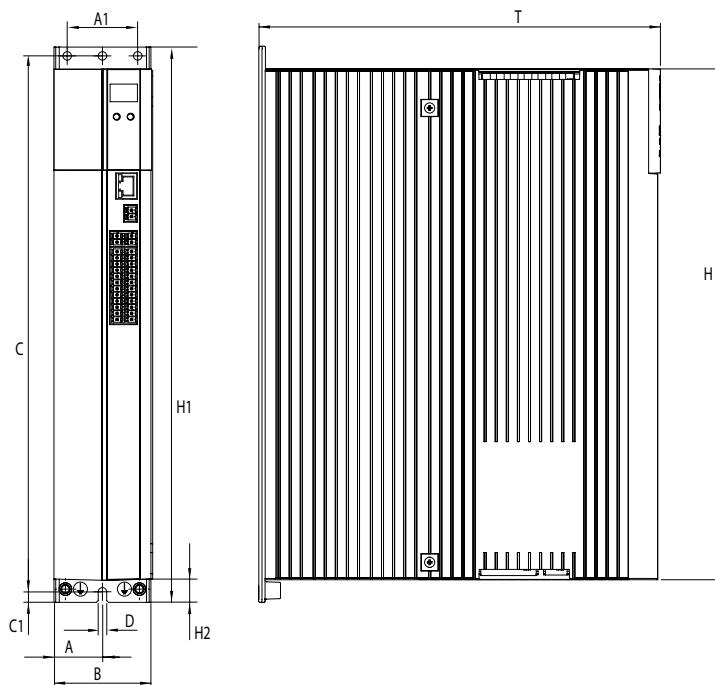
Technical data	Article designation	SO22.008	SO24.007
Output, motor side			
Voltage		3-phase U_{Mains}	
Rated current, effective (I_N) ¹⁾	8.0 A	6.5 A ²⁾	
Peak current	See tables on page 2-4		See table on page 2-5
Rotating field frequency		0 ... 400 Hz	
Switching frequency of the power stage		4, 8, 16 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 continuous power with external braking resistor	2.1 kW	5.9 kW	
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	S022.008	S024.007
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	S022.008	S024.007
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

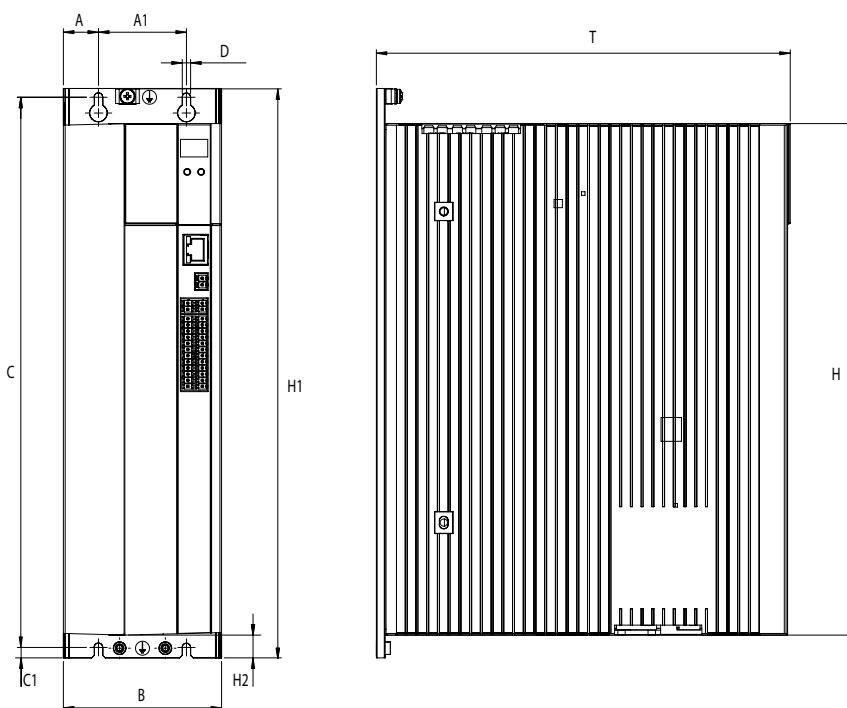
Capacitance	680 µF	1120 µF
Brake chopper switch-on threshold	650 V DC ²⁾	650 V DC ²⁾
Minimum ohmic resistance of an externally installed braking resistor	35 Ω	25 Ω
Brake chopper continuous power with external braking resistor	12 kW ²⁾	16.9 kW ²⁾
Brake chopper peak power with external braking resistor	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)
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	

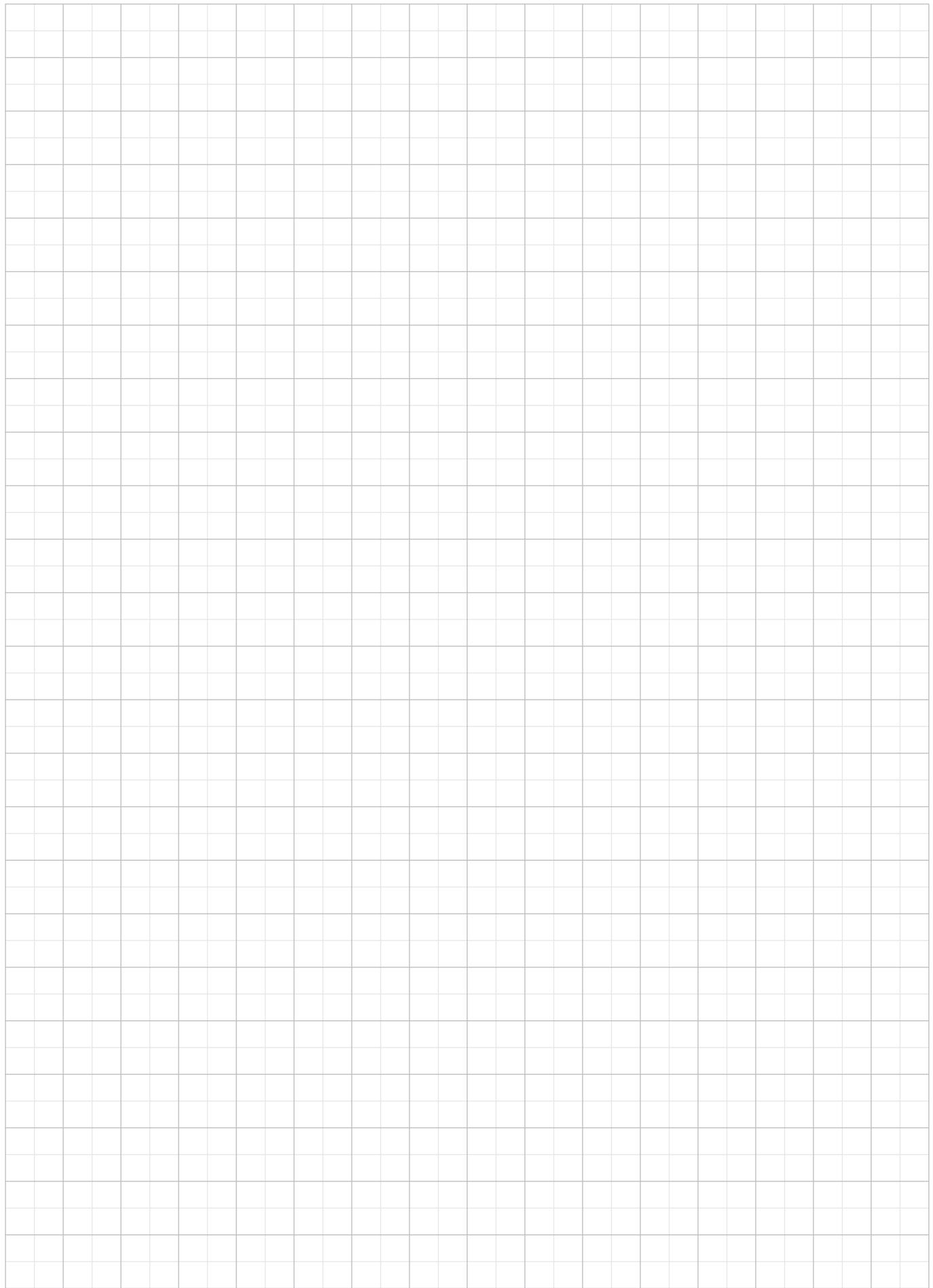
Dimensional drawings - BG5



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



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 3-16

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 3-41	Page 3-16
S084.006.0		6.0 A	-		
S084.008.0	BG2	8.0 A	-	Page 3-41	Page 3-18
S084.012.0		12 A	-		
S084.016.0	BG3	16 A	16 A	Page 3-41	Page 3-20
S084.020.0		20 A	20 A		
S084.024.0	BG4	24 A	24 A	Page 3-41	Page 3-22
S084.032.0		32 A	32 A		
S084.045.0	BG5	45 A	53 A	Page 42 and Page 43	Page 3-24
S084.060.0		60 A	70 A		
S084.072.0		72 A	84 A		
S084.090.0	BG6	90 A	110 A	Page 42 and Page 43	Page 3-26
S084.110.0		110 A	143 A		
S084.143.0	BG6a	143 A	170 A	Page 42 and Page 43	Page 3-28
S084.170.0		170 A	210 A		
S084.250.0	BG7	-	250 A	Page 44	Page 3-30
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 1 x 230 V	4 2														
Rated current	BG1 BG2 BG3 BG4 BG5 BG6 BG6a BG7	4 A 6 A 8 A 12 A 16 A 20 A 24 A 32 A 45 A 60 A 72 A 90 A 110 A 143 A 170 A 250 A 325 A 450 A	004 006 008 012 016 020 024 032 045 060 072 090 110 143 170 250 325 450													
Mains supply	AC			0												
Safety technology	STO Integrated safety control 2)				0	1										
Option 1 Communication	Not included Sercos II PROFIBUS EtherCAT CANopen CANopen + 2 AO PROFINET IRT Sercos III Powerlink 1)						0	1	2	3	4	5	7	8	9	
Option 2 Technology	Not included Second SinCos encoder TTL encoder simulation / TTL master encoder TwinSync communication SSI encoder simulation TTL encoder with commutation signals Multi-I/O (analogue and digital) expansion (M19) Digital input/output (DIO) Second safe SinCos encoder Second safe SSI encoder Second safe axis monitor (SinCos)						0	1	2	3	4	5	6	8	A B C	
Housing/cooling method	Air-cooled (standard) BG1...BG6-6a Air-cooled with int. braking resistor BG1...BG6-6a Liquid-cooled with int. braking resistor from BG5 ... BG7 Liquid-cooled from BG3 ... BG7						0	1	2	3	4	5	6	8		
Function package	Basic (without additional function package) iPic HF HF + iPic						0	1	7							
Special design	None						0									
Protection	Standard PCBs with protective varnish (from SO84.045 standard)													0	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



3



Features, servocontrollers BG6 to BG6a





Features, servocontroller BG7



3



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 [kHz]	Ambient temperature [°C]	Rated current At 1 x 230 V AC [A _{eff}]	Peak current [A _{eff}]			For time ¹⁾ [s]
				At rotating field frequency increasing linearly 0 to 5 Hz 0 Hz	5 Hz	> 5 Hz	
S082.004.0xxx.Y ²⁾ (BG1)	4	45	4.0	8.0	8.0	8.0	10
	8		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 [kHz]	Ambient temperature [°C]	Rated current			At rotating field frequency increasing linearly 0 to 5 Hz			Peak current [A_{eff}] ¹⁾	For intermittent operation	For time ²⁾ [s]
			at 3 x 230 V AC	at 3 x 400 V AC	at 3 x 460 V AC	at 3 x 480 V AC	0 Hz	5 Hz			
S084.004.0xxx.Y ³⁾ (BG1) <i>Air cooling only</i>	4	45 40	4.0	4.0	4.0	8.0	8.0	8.0	8.0	10	
	8		4.0	4.0	4.0	8.0	8.0	8.0	8.0		
	12		3.7	2.9	2.7	7.4	7.4	7.4	7.4		
	16		2.7	1.6	1.3	5.4	5.4	5.4	5.4		
S084.006.0xxx.Y ³⁾ (BG1) <i>Air cooling only</i>	4	45 40	6.0	6.0	6.0	12.0	12.0	12.0	12.0	10	
	8		6.0	6.0	6.0	12.0	12.0	12.0	12.0		
	12		5.5	4.4	4.0	11.0	11.0	11.0	11.0		
	16		4.0	2.4	1.9	8.0	8.0	8.0	8.0		
S084.008.0xxx.Y ³⁾ (BG2) <i>Air cooling only</i>	4	45 40	8.0	8.0	8.0	16.0	16.0	16.0	16.0	10	
	8		8.0	7.2	6.9	16.0	16.0	16.0	16.0		
	12		6.7	5.3	4.9	13.4	13.4	13.4	13.4		
	16		5.0	3.7	3.3	10.0	10.0	10.0	10.0		
S084.012.0xxx.Y ³⁾ (BG2) <i>Air cooling only</i>	4	45 40	12.0	12.0	12.0	24.0	24.0	24.0	24.0	10	
	8		12.0	10.8	10.4	24.0	24.0	24.0	24.0		
	12		10.0	8.0	7.4	20.0	20.0	20.0	20.0		
	16		7.6	5.6	5.0	15.2	15.2	15.2	15.2		
S084.016.0xxx.Z ⁴⁾ (BG3)	4	45 40	16.0	16.0	16.0	32.0	32.0	32.0	32.0	10	
	8		16.0	13.9	13.3	32.0	32.0	32.0	32.0		
	12		11.0	8.8	8.0	22.0	22.0	22.0	22.0		
	16		8.0	5.9	5.2	16.0	16.0	16.0	16.0		
S084.020.0xxx.Z ⁴⁾ (BG3)	4	45 40	20.0	20.0	20.0	40.0	40.0	40.0	40.0	10	
	8		20.0	17.4	16.6	40.0	40.0	40.0	40.0		
	12		13.8	11.0	10.0	27.6	27.6	27.6	27.6		
	16		10.0	7.4	6.5	20.0	20.0	20.0	20.0		
S084.024.0xxx.Z ⁴⁾ (BG4)	4	45 40	24.0	24.0	24.0	48.0	48.0	48.0	48.0	10	
	8		24.0	21.0	20.0	48.0	48.0	48.0	48.0		
	12		15.8	12.4	11.3	31.6	31.6	31.6	31.6		
	16		11.3	9.2	8.4	22.6	22.6	22.6	22.6		
S084.032.0xxx.Z ⁴⁾ (BG4)	4	45 40	32.0	32.0	32.0	64.0	64.0	64.0	64.0	10	
	8		32.0	28.0	26.7	64.0	64.0	64.0	64.0		
	12		21.0	16.5	15.0	42.0	42.0	42.0	42.0		
	16		15.0	12.2	11.2	30.0	30.0	30.0	30.0		

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

2) Shutdown as per I^2t 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 [kHz]	Ambient temperature [°C]	Rated current			Peak current [A_{eff}] ¹⁾			For time ²⁾ [s]
			at 3 × 400 V AC [A_{eff}]	at 3 × 460 V AC [A_{eff}]	at 3 × 480 V AC [A_{eff}]	At rotating field frequency increasing linearly 0 to 5 Hz 0 Hz	5 Hz	> 5 Hz	
S084.045.0xxx.Y ³⁾ (BG5)	4	45 40	45	42	41	90	90	90	10
	8		45	42	41	90	90	90	
	12		45	42	41	90	90	90	
	16		42	39	38	84	84	84	
S084.060.0xxx.Y ³⁾ (BG5)	4	45 40	60	56	54	120	120	120	10
	8		60	56	54	120	120	120	
	12		58	54	52	116	116	116	
	16		42	39	38	84	84	84	
S084.072.0xxx.Y ³⁾ (BG5)	4	45 40	72	67	65	144	144	144	10
	8		72	67	65	144	144	144	
	12		58	54	52	116	116	116	
	16		42	39	38	84	84	84	
S084.090.0xxx.Y ³⁾ (BG6)	4	45 40	90	83	81	170	180	180	30
	8		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 40	110	102	99	170	220	220	30
	8		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 40	143	132	129	190	286	286	30
	8		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 40	170	157	153	190	315	315	10
	8		170	157	153	151	220	220	
	12		136	126	122	121	164	164	
	16		109	101	98	97	131	131	

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

2) Shutdown as per I^2t characteristic

3) Y=0,1

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



ServoOne servocontroller BG5 to BG6a
(liquid cooling)

Type	Switching frequency of the power stage [kHz]	Ambient temperature [°C]	Rated current			Peak current [A_{eff}] ¹⁾			For time ²⁾ [s]
			at 3 × 400 V AC [A_{eff}]	at 3 × 460 V AC [A_{eff}]	at 3 × 480 V AC [A_{eff}]	At rotating field frequency increasing linearly 0 to 5 Hz 0 Hz	5 Hz	> 5 Hz	
S084.045.0xxx.Z ³⁾ (BG5)	4	45	53	49	48	90	90	90	30
	8		53	49	48	90	90	90	
	12		53	49	48	90	90	90	
	16		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		68	63	61	116	116	116	
	16		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		68	63	61	116	116	116	
	16		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% pre-load

2) Shutdown as per P_t characteristic

3) $Z=7,8$

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]	Rated current [A _{eff}]	At 400 V AC		For intermittent operation > 5 Hz	for time [s]
				At rotating field frequency increasing linearly 0 to 5 Hz			
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]	Rated current [A _{eff}]	At 400 V AC		For intermittent operation > 5 Hz	for time [s]
				At rotating field frequency increasing linearly 0 to 5 Hz			
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			
S084.325.0xxx.77xx.2 S084.325.0xxx.78xx.2 S084.325.0xxx.87xx.2 S084.325.0xxx.88xx.2	8	40	250	250	375	375	30
	12		200	200	300	300	
S084.450.0xxx.77xx.2 S084.450.0xxx.78xx.2 S084.450.0xxx.87xx.2 S084.450.0xxx.88xx.2	16	40	175	175	260	260	
	2		325	552			
S084.325.0xxx.77xx.2 S084.325.0xxx.78xx.2 S084.325.0xxx.87xx.2 S084.325.0xxx.88xx.2	4	40	325	485		30	
	8		325	325	485	485	
S084.450.0xxx.77xx.2 S084.450.0xxx.78xx.2 S084.450.0xxx.87xx.2 S084.450.0xxx.88xx.2	12	40	300	300	450	450	30
	16		270	270	400	400	
S084.250.0xxx.77xx.2 S084.250.0xxx.78xx.2 S084.250.0xxx.87xx.2 S084.250.0xxx.88xx.2	2	40	450	765		30	
	4		450	675			
S084.325.0xxx.77xx.2 S084.325.0xxx.78xx.2 S084.325.0xxx.87xx.2 S084.325.0xxx.88xx.2	8	40	450	450	675	675	
	12		400	400	600	600	
S084.450.0xxx.77xx.2 S084.450.0xxx.78xx.2 S084.450.0xxx.87xx.2 S084.450.0xxx.88xx.2	16		---				



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

Type	Switching frequency of the power stage [kHz]	Ambient temperature [°C]	Rated current [A _{eff}]	At 460 V AC		For intermittent operation > 5 Hz	for time [s]
				At rotating field frequency increasing linearly 0 to 5 Hz			
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	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	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	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 460 V AC		For intermittent operation > 5 Hz	for time [s]
				At rotating field frequency increasing linearly 0 to 5 Hz			
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	30
	4		231		375		
S084.325.0xxx.77xx.2 S084.325.0xxx.78xx.2 S084.325.0xxx.87xx.2 S084.325.0xxx.88xx.2	8	40	231	231	346	346	30
	12		185	185	277	277	
	16		162	162	243	243	
	2		300		552		
	4	40	300		485	30	30
	8		300	300	450	450	
	12	40	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	30
	4		416		675		
	8	40	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]	Rated current [A _{eff}]	At 480 V AC		For intermittent operation > 5 Hz	for time [s]
				At rotating field frequency increasing linearly 0 to 5 Hz			
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]	Rated current [A _{eff}]	At 480 V AC		For intermittent operation > 5 Hz	for time [s]
				At rotating field frequency increasing linearly 0 to 5 Hz			
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			
S084.325.0xxx.77xx.2 S084.325.0xxx.78xx.2 S084.325.0xxx.87xx.2 S084.325.0xxx.88xx.2	8	40	225	225	337	337	30
	12		180	180	270	270	
	16		157	157	235	235	
	2		292	552			
S084.450.0xxx.77xx.2 S084.450.0xxx.78xx.2 S084.450.0xxx.87xx.2 S084.450.0xxx.88xx.2	4	40	292	485		30	
	8		292	292	438	438	
	12		270	270	405	405	
	16		243	243	364	364	
	2		405	765			
	4		405	675			
S084.450.0xxx.77xx.2 S084.450.0xxx.78xx.2 S084.450.0xxx.87xx.2 S084.450.0xxx.88xx.2	8	40	405	405	607	607	30
	12		360	360	540	540	
	16		---				

Space for your own notes



2



Ambient conditions, ServoOne single-axis system

Ambient conditions

Protection	IP20 except terminals (IP00)
Accident prevention regulations	According to local regulations (in Germany e.g. BGV A3)
Mounting height	Up to 1000 m above MSL, higher with power reduction (1% per 100 m, max. 2000 m above MSL)
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

As per EN 61800-2, IEC 60721-3-2 class 2K3 ¹⁾			
In transit	Temperature	-25 °C to +70 °C	
	Relative atmospheric humidity	95% at max. +40 °C	
As per EN 61800-2, IEC 60721-3-1 class 1K3 and 1K4 ²⁾			
In storage	Temperature	-25 °C to +55 °C	
	Relative atmospheric humidity	5 to 95%	
As per EN 61800-2, IEC 60721-3-3 class 3K3 ³⁾			
In operation	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)	
	Liquid cooling	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)	
		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), 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			
Shock limit in transit	200 ≤ f < 500					
	Not applicable					
As per EN 61800-2, IEC 60721-2-2 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			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. Exception:

BG7 (S084.250 - S084.450) with integrated braking resistor.

For details see document "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 aluminised/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".

3



Technical data, single-axis system

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



Type SO84.004.0

Article designation	SO82.004.0	SO84.004.0	SO84.006.0
Technical data			
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

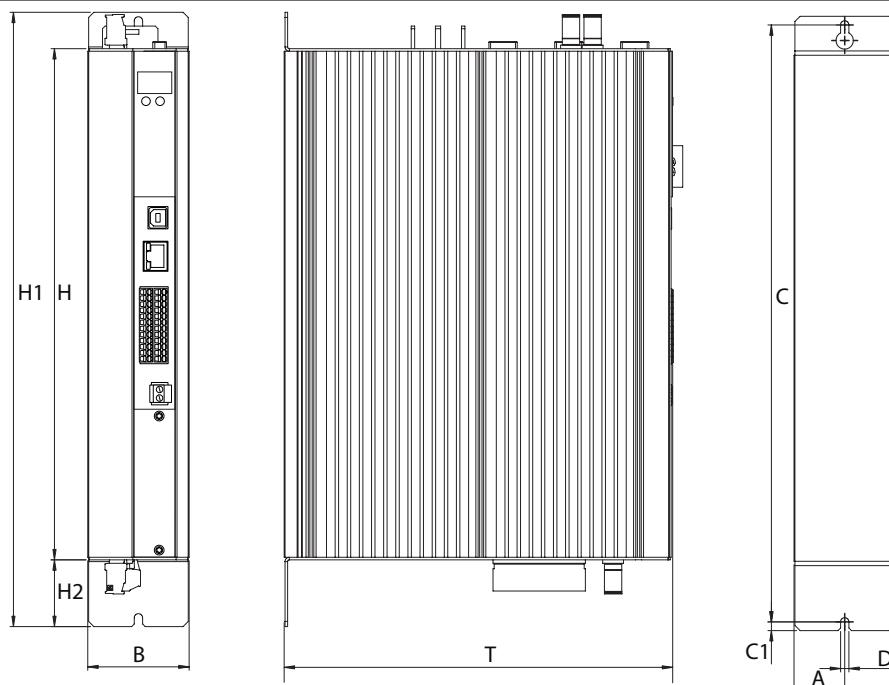
3) Without mains choke

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



3

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

Article designation		SO84.008.0	SO84.012.0		
Technical data					
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 3-41			
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⁾				

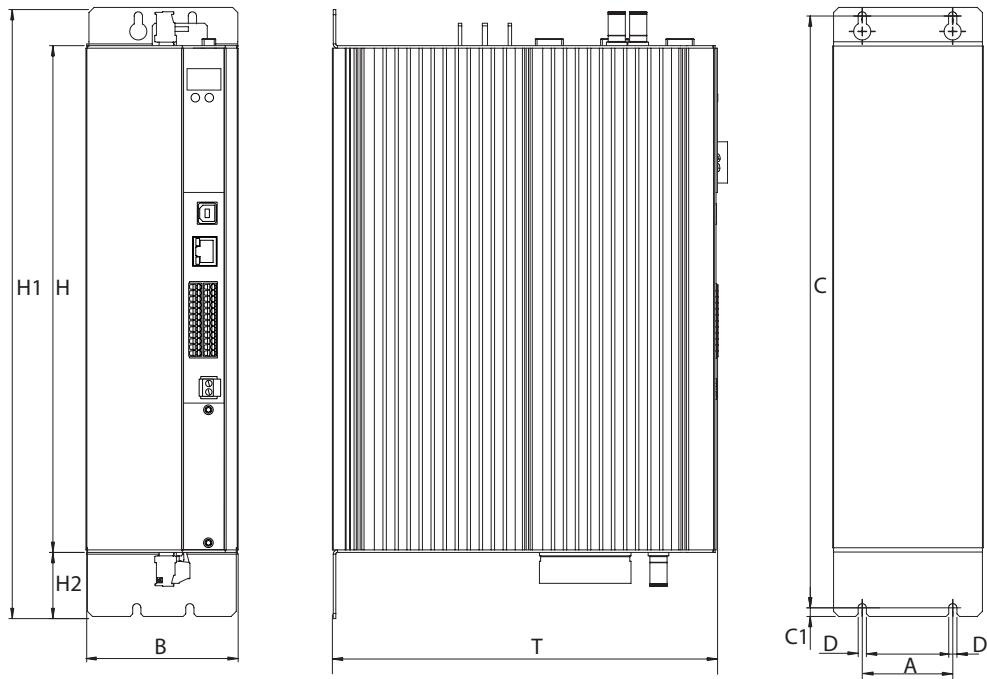
1) Data referred to mains voltage 3 x 400 V AC and 8 kHz switching frequency

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 (IPO0)	
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	3
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

Article designation	SO84.016.0	SO84.020.0
Technical data		
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 3-41	
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	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

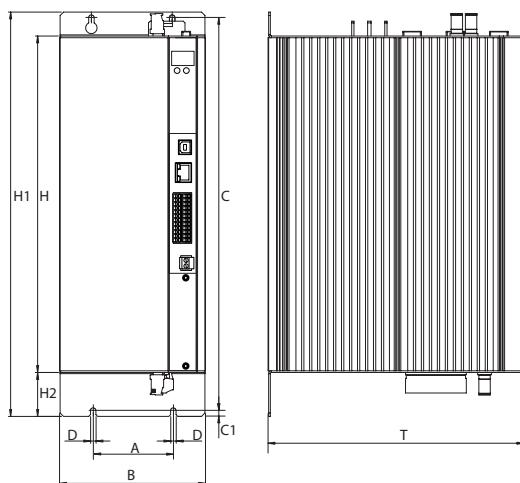
2) Connection of an external braking resistor not permitted for device variant with internal braking resistor (SO8x.xxx.xxxx.1xxx or SO8x.xxx.xxxx.7xxx).



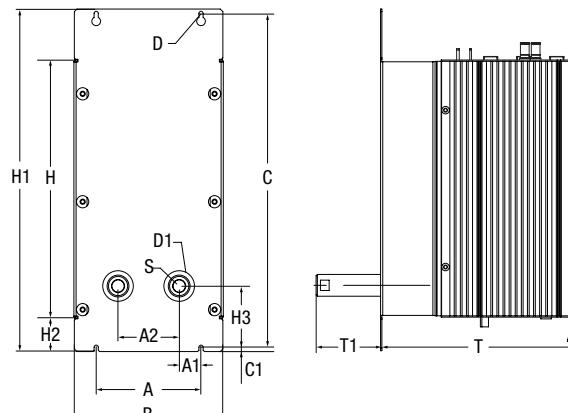
Mechanics, BG3	SO84.016.0	SO84.020.0
Cooling method	Air cooling (wall-mounted) or liquid cooling	
Protection	IP20 except terminals (IP00)	
Cooling air temperature	45 °C (at 4 kHz power stage switching frequency)	
Weight	6.5 kg	
Mounting method	Vertical mounting with unhindered air flow	
Row mounting 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 (hole for pipe connection)	48
H1 (air/liquid cooling)	355 / 392
H2 / H3	38.5 / 75
S	3/8 inch (inside 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

Article designation	SO84.024.0	SO84.032.0
Technical data		
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 3-41	
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})	$(3 \times 230 \text{ V} / 3 \times 400 \text{ V} / 3 \times 460 \text{ V} / 3 \times 480 \text{ V}) \pm 10\%$	
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	$\pm 3\% \text{ max.}$	
Frequency	50/60 Hz $\pm 10\%$	
Power dissipation at I_N	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⁾	

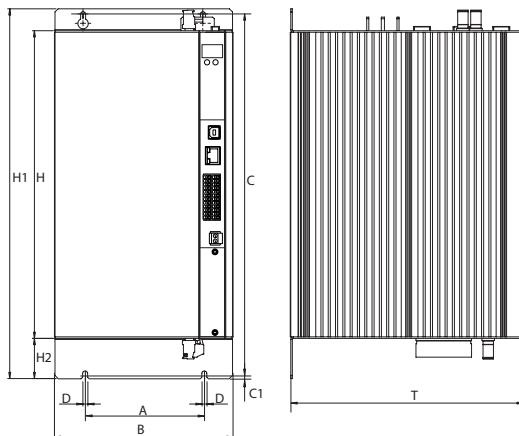
1) Data referred to mains voltage 3 x 400 V AC and 8 kHz switching frequency

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).

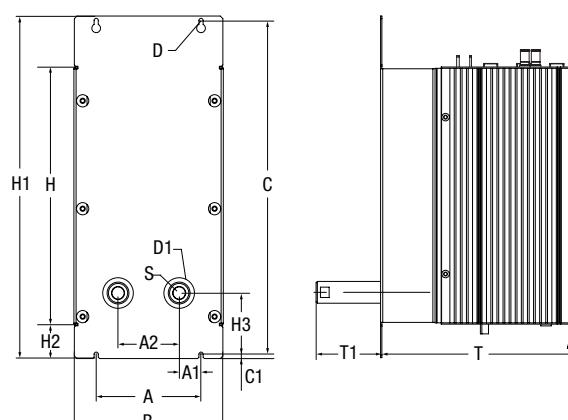


Mechanics, BG4	SO84.024.0	SO84.032.0
Cooling method	Air cooling (wall-mounted) or liquid cooling	
Protection	IP20 except terminals (IPO0)	
Cooling air temperature	45 °C (at 4 kHz power stage switching frequency)	
Weight	7.5 kg	
Mounting method	Vertical mounting with unhindered air flow	
Row mounting 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 (hole for pipe connection)	48	
H1 (air/liquid cooling)	355 / 392	
H2 / H3	38.5 / 70	
S	3/8 inch (inside 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)

Article designation	SO84.045.0		SO84.060.0		SO84.072.0	
Technical data	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})	$(3 \times 230 \text{ V} / 3 \times 400 \text{ V} / 3 \times 460 \text{ V} / 3 \times 480 \text{ V}) \pm 10\%$					
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	$\pm 3\% \text{ max.}$					
Frequency	50/60 Hz $\pm 10\%$					
Power dissipation at I_N	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

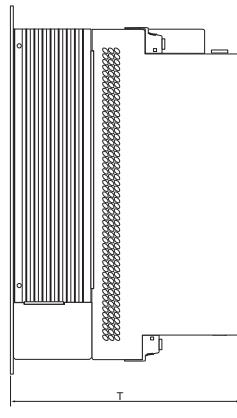
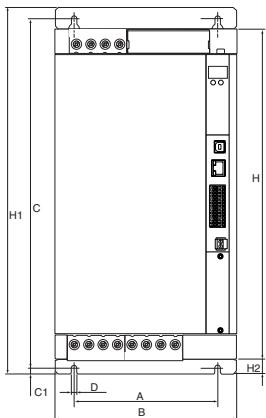
¹⁾ Data referred to mains voltage 3 x 400 V AC and 8 kHz switching frequency

^{*} D_N input current must be limited to max. 76 A.

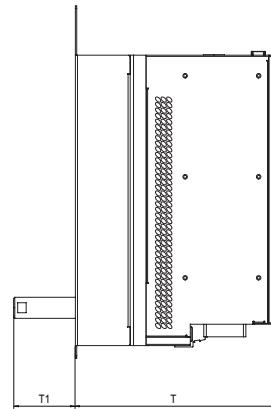
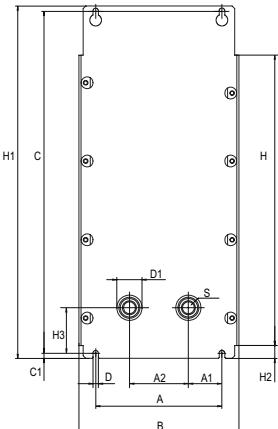


Mechanics, BG5	SO84.045.0	SO84.060.0	SO84.072.0
Cooling method	Air cooling (wall-mounted) or liquid cooling		
Protection	IP20 except terminals (IP00)		
Cooling air temperature	45 °C (at 4 kHz power stage switching frequency)		
Weight (air/liquid cooling)	13 kg / 16.5 kg		
Mounting method	Vertical mounting 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) (air/liquid cooling)	345 / 346.5 (without terminals)		
D (depth) (air/liquid cooling)	240 / 198.3 (without terminals)		
A (air/liquid cooling)	150 / 148		
A1 / A2	39 / 70		
C (air/liquid cooling)	365 / 377.25		
C1	6		
D Ø (air/liquid cooling)	5.6 / 7		
D1 Ø (hole for pipe connection)	48		
H1 (air/liquid cooling)	387.5 / 420		
H2 / H3	15 / 53.75		
S	3/8 inch (inside 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)

Article designation	SO84.090.0		SO84.110.0	
	Air cooling	Liquid cooling	Air cooling	Liquid cooling
Output, motor side				
Voltage				
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	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



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 (hole for pipe connection)	48	
H1 / H2 / H3	600 / 20 / 56.5	
S	3/8 inch (inside 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)

Article designation	SO84.143.0		SO84.170.0	
	Air cooling	Liquid cooling	Air cooling	Liquid cooling
Output, motor side				
Voltage				
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	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

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

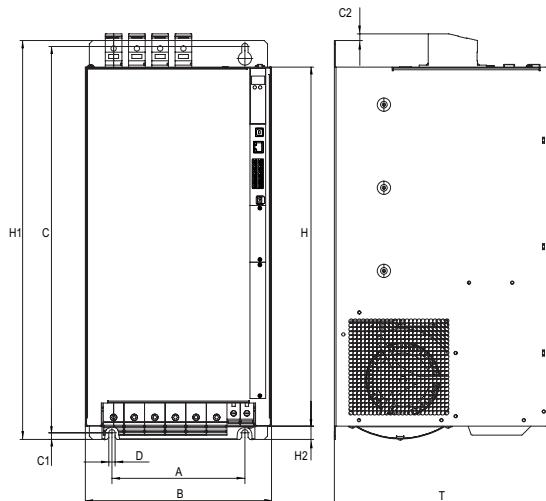


Mechanics, BG6a	SO84.143.0	SO84.170.0
Cooling method	Air cooling (wall-mounted) or liquid cooling	
Protection	IP20 except terminals (IP00)	
Cooling air temperature	45 °C (at 4 kHz power stage switching frequency)	
Weight (air/liquid cooling)	32 kg / 41.1 kg	
Mounting method	Vertical mounting with unhindered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

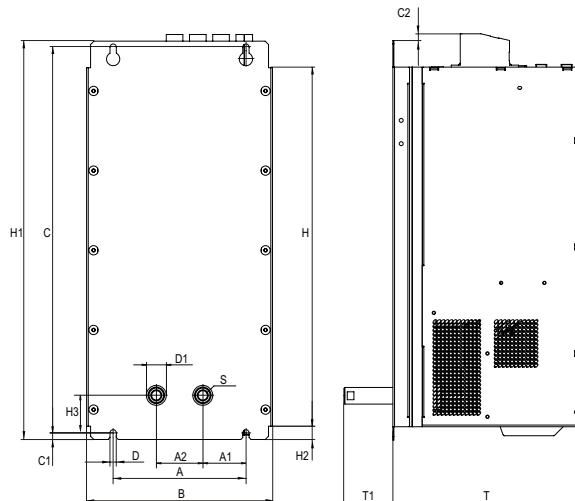
Dimensions, BG6a [mm]

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 (hole for pipe connection)	48
H1 / H2 / H3	600 / 20 / 56.5
S	3/8 inch (inside 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)

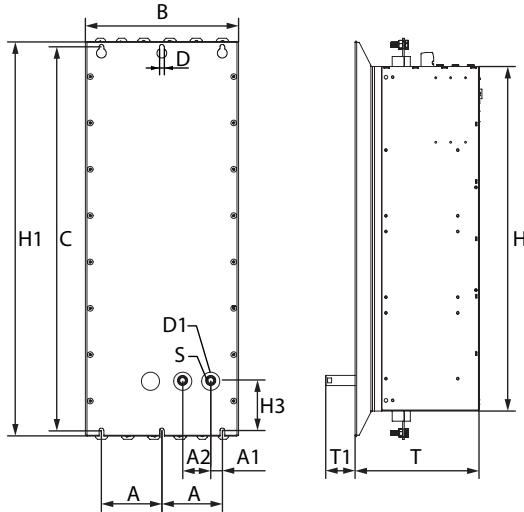
Article designation	SO84.250.0	SO84.325.0	SO84.450.0
Technical data			
Output, motor side			
Voltage		3-phase U_{Mains}	
Rated current, effective (I_N)	250 A ¹⁾	325 A ¹⁾	450 A ¹⁾
Peak current	See table on Page 44, Page 43, Page 46		
Rotating field frequency	0 ... 400 Hz		
Switching frequency of the power stage	2, 4 kHz (factory setting 2 kHz at +40 °C)		
Input, mains side			
Mains voltage (U_{Mains})	$(3 \times 230 \text{ V}/3 \times 400 \text{ V}/3 \times 460 \text{ V}/3 \times 480 \text{ V}) \pm 10\%$		
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	$\pm 3\% \text{ max.}$		
Frequency	50/60 Hz $\pm 10\%$		
Power dissipation at I_N	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		
Brake chopper peak power with internal braking resistor	204 kW		

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



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 (with terminal covers: 392)	
H (height)		952 (with terminal covers and shield plates: 1305)	
T (depth)		286.5 (without terminals)	
A / A1 / A2		150 / 29 / 70	
C / C1		952 / 12	
D Ø		12	
D1 Ø (hole for pipe connection)		48	
H1 / H2 / H3		971 / 60 / 124	
S		3/8 inch (inside thread)	
T1		73.5	

Dimensional drawings, BG7 liquid cooling

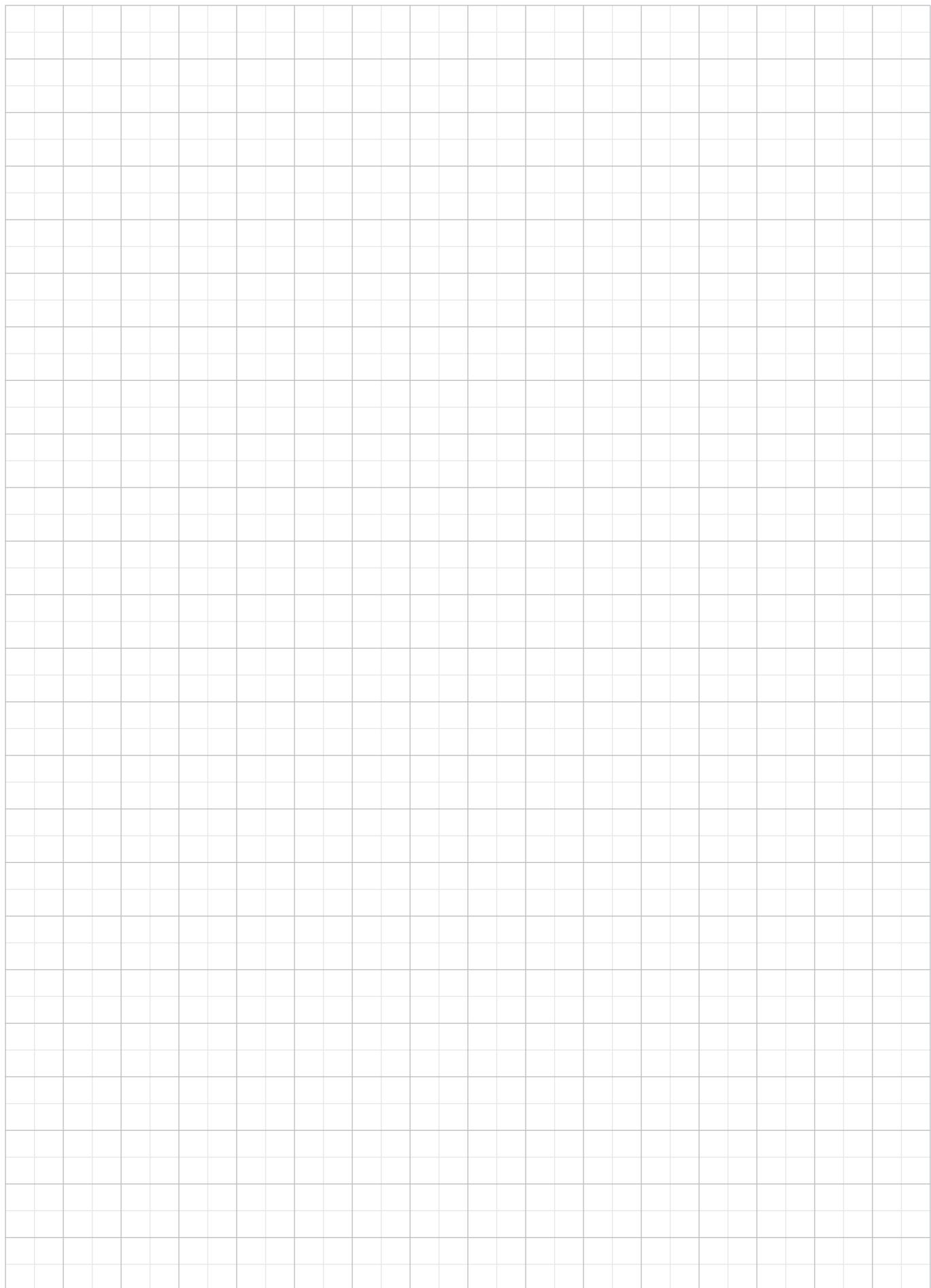


Matching accessories (see chapter 9)

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 BG5Axis controller
BG5Axis controller
BG4Axis controller
BG3Axis controller
BG2Axis controller
BG1

Axis controller

4

Type	Size	Rated current		Current carrying capacity	Technical data
		Air cooling	Liquid cooling		
S084.004.1	BG1	4.0 A	-		
S084.006.1	BG1	6.0 A	-	From Page 76	Page 4-26
S084.008.1	BG2	8.0 A	-		
S084.012.1	BG2	12 A	-	From Page 76	Page 4-28
S084.016.1	BG3	16 A	20 A		
S084.020.1	BG3	20 A	25 A	From Page 76 and from Page 81	Page 4-30
S084.024.1	BG4	24 A	26 A		
S084.032.1	BG4	32 A	35 A	From Page 76 and from Page 81	Page 4-32
S084.045.1	BG5	45 A	53 A		
S084.060.1	BG5	60 A	70 A	From Page 80 and from page 4-17	Page 4-34
S084.072.1	BG5	72 A	84 A		
S084.090.1	BG6a	90 A	110 A		
S084.110.1	BG6a	110 A	143 A		
S084.143.1	BG6a	143 A	170 A	From Page 80 and from page 4-17	Page 4-36
S084.170.1	BG6a	170 A	210 A		
S084.250.1	BG7	-	250 A		
S084.325.1	BG7	-	325 A	From page 4-16	Page 104
S084.450.1	BG7	-	450 A		

Supply units

Type	Size	Rated current	Current carrying capacity	Technical data
S084.040.S	BG5	40 A		
S084.076.S	BG5	76 A	Page 88	Page 106
S084.115.S	BG6a	115 A		
S084.170.S	BG6a	170 A	Page 88	Page 4-44
S084.375.S	BG7	375 A		
S084.540.S	BG7	540 A	Page 88	Page 110



Order codes, ServoOne multi-axis system

Order codes, axis controller

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

1) In preparation 2) FS certification BG1 - BG5



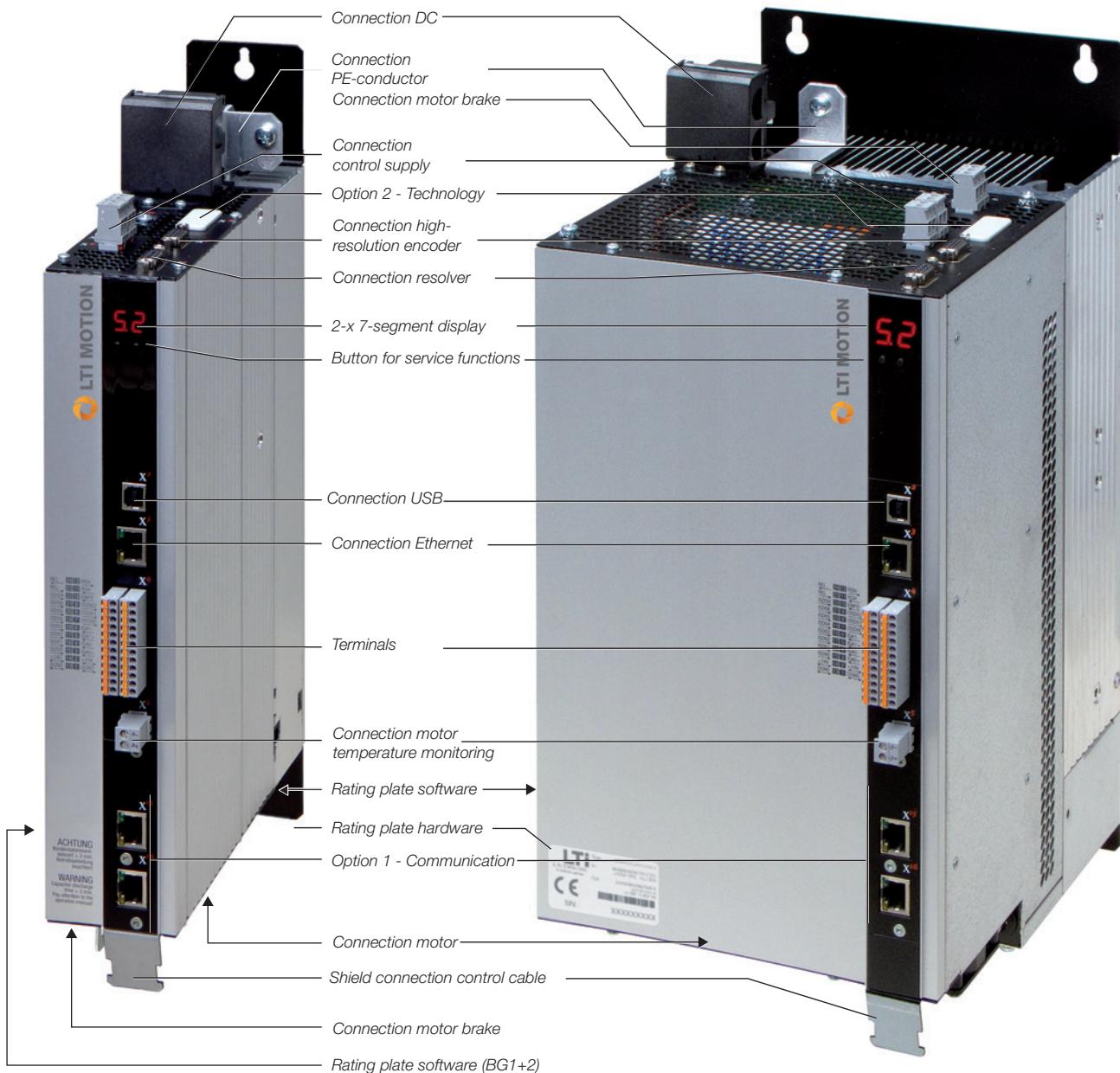
Order codes, supply unit

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		040												
		76 A		076												
	BG6a	115 A		115												
		170 A		170												
	BG7	375 A		375												
		540 A		540												
DC supply unit regenerative						S										
Option 1 Communication	Not included						0									
	Sercos II						1									
	PROFIBUS						2									
	EtherCAT						3									
	CANopen						4									
	PROFINET IRT						7									
	Sercos III						8									
Option 2 Technology	Not included						0									
Housing/cooling method	Air-cooled							0								
	Liquid-cooled with int. braking resistor							7								
	Liquid-cooled							8								
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 multi-axis system

Features, axis controllers BG1 to BG5





Features, axis controller BG6a



4

Features, servocontroller BG7



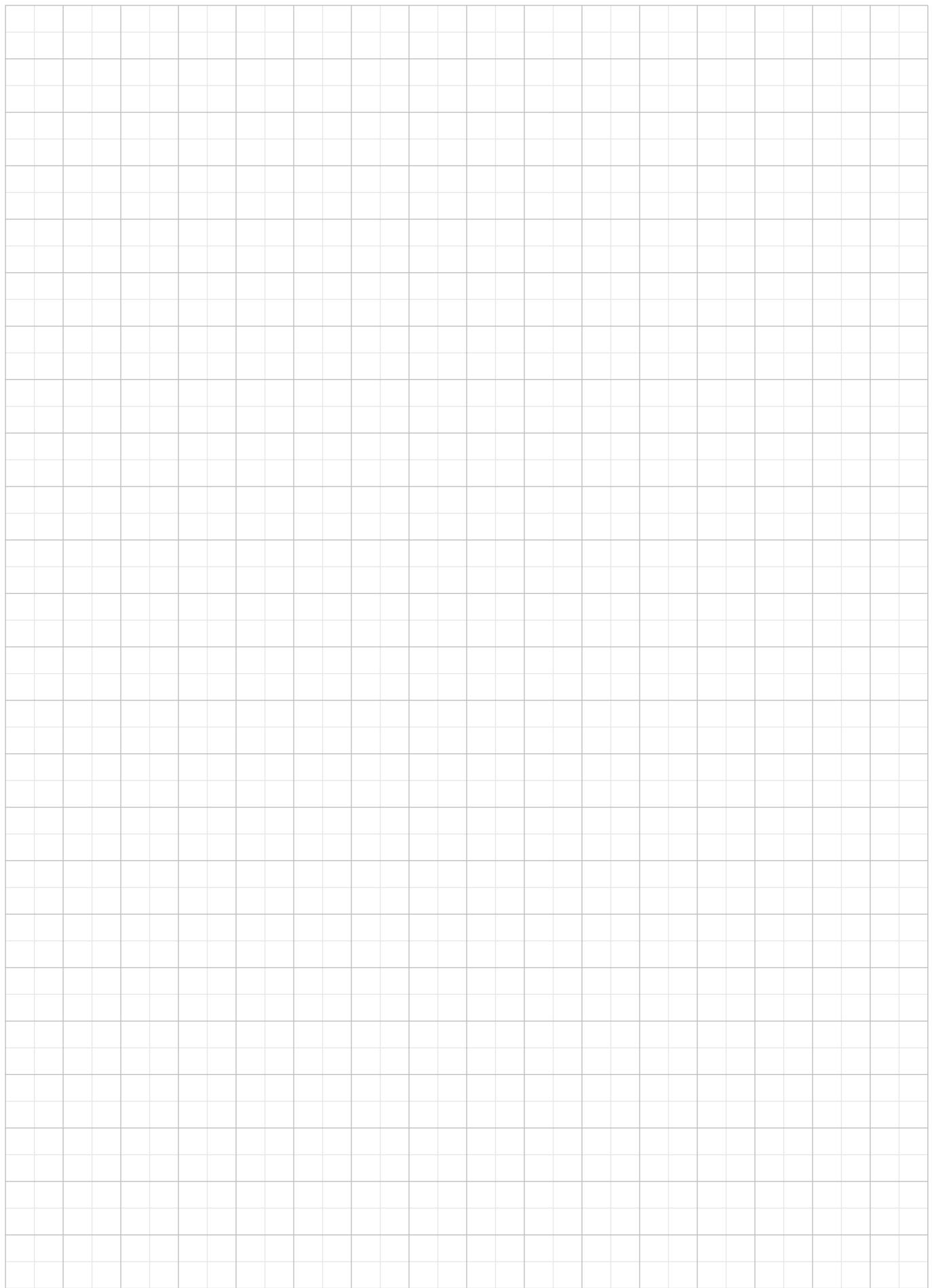
Features, supply unit BG5



Features, supply unit BG6a



Space for your own notes

A large grid of squares, approximately 20 columns by 25 rows, intended for users to write their own notes.

2



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 [kHz]	Ambient temperature [°C]	Rated current [A _{eff}]	Peak current ¹⁾				
				I _{MAX 0 Hz} [A _{eff}]	I _{MAX ≥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	5.3	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% pre-load

2) Shutdown as per I²t 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 [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	5.3	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% pre-load²⁾ Shutdown as per I_{st} 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}]	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	5.3	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% pre-load²⁾ 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		11.5	0.5
	8		3.2	6.8	6.8	10	-	-
	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		17.1	0.5
	8		4.8	10.2	10.2	10	-	-
	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		20.6	0.5
	8		5.9	10.1	10.1	10	-	-
	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		28.8	0.5
	8		8.8	15.1	15.1	10	-	-
	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		48.0	0.5
	8		11.2	23.5	23.5	10	-	-
	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		60.0	0.5
	8		14.0	29.4	29.4	10	-	-
	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		62.4	0.5
	8		18.9	37.8	37.8	10	-	-
	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		76.8	0.5
	8		25.2	50.4	50.4	10	-	-
	12		14.0	28.0	28.0		-	-
	16		10.5	21.0	21.0		-	-

¹⁾ At max. 70% pre-load²⁾ Shutdown as per I_{st} 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 [kHz]	Ambient temperature [°C]	Rated current				Peak current [A_{eff}] ¹⁾			For time ²⁾ [s]
			at 565 V DC (400 VAC) ³⁾ [A_{eff}]	at 650 V DC (460 VAC) ³⁾ [A_{eff}]	at 678 V DC (480 VAC) ³⁾ [A_{eff}]	At 770 V DC [A_{eff}]	At rotating field frequency increasing linearly 0 to 5 Hz 0 Hz	5 Hz	> 5 Hz	
S084.045.1xxx.0 (BG5)	4	40	45	42	41	41	90	90	90	3/10 ⁴⁾
	8		45	42	41	41	90	90	90	
	12		45	42	41	37	90	90	90	
	16		42	39	38	34	84	84	84	
S084.060.1xxx.0 (BG5)	4	40	60	56	54	54	120	120	120	3/10 ⁴⁾
	8		60	56	54	54	120	120	120	
	12		58	54	52	48	116	116	116	
	16		42	39	38	34	84	84	84	
S084.072.1xxx.0 (BG5)	4	40	72	67	65	65	144	144	144	3/10 ⁴⁾
	8		72	67	65	65	144	144	144	
	12		58	54	52	48	116	116	116	
	16		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% pre-load

2) Shutdown as per I^2t characteristic

3) When supplied with AC servocontroller

*) 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% pre-load

2) Shutdown as per I²t characteristic

All data apply for motor cable length ≤10 m

4

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% pre-load

2) Shutdown as per I²t 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% pre-load

2) Shutdown as per I²t 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% pre-load

2) Shutdown as per I²t 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 [kHz]	Ambient temperature [°C]	Rated current				Peak current [A_{eff}] ¹⁾			For time ²⁾ [s]
			at 565 V DC (400 V AC) ³⁾ [A_{eff}]	at 650 V DC (460 V AC) ³⁾ [A_{eff}]	at 678 V DC (480 V AC) ³⁾ [A_{eff}]	At 770 V DC [A_{eff}]	At rotating field frequency increasing linearly 0 to 5 Hz 0 Hz	5 Hz	> 5 Hz	
S084.045.1xxx.8 (BG5)	4	40	53	49	48	48	90	90	90	30
	8		53	49	48	48	90	90	90	
	12		53	49	48	42	90	90	90	
	16		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		68	63	61	55	116	116	116	
	16		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		68	63	61	55	116	116	116	
	16		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% pre-load

2) Shutdown as per I^2t characteristic

3) When supplied with AC servocontroller

All data apply for a motor cable length $\leq 10\text{ m}$



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)		For intermittent operation > 5 Hz	for time [s]
				At rotating field frequency increasing linearly 0 to 5 Hz			
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)			For intermittent operation > 5 Hz	for time [s]
				At rotating field frequency increasing linearly 0 to 5 Hz				
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)		For intermittent operation > 5 Hz	for time [s]
				At rotating field frequency increasing linearly 0 to 5 Hz			
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

4

Type	Switching frequency of the power stage [kHz]	Ambient temperature [°C]	Rated current [A _{eff}]	At 650 V DC (460 V AC)			For intermittent operation > 5 Hz	for time [s]
				At rotating field frequency increasing linearly 0 to 5 Hz				
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)		For intermittent operation > 5 Hz	for time [s]
				At rotating field frequency increasing linearly 0 to 5 Hz			
S084.250.1xxx.80xx.2 S084.250.1xxx.81xx.2	2	45	225		425	> 5 Hz	30
	4		225		375		
S084.325.1xxx.80xx.2 S084.325.1xxx.81xx.2	2	45	292		552	> 5 Hz	30
	4		292		485		
S084.450.1xxx.80xx.2 S084.450.1xxx.81xx.2	2	45	405		765	> 5 Hz	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)		For intermittent operation > 5 Hz	for time [s]
				At rotating field frequency increasing linearly 0 to 5 Hz			
S084.250.1xxx.87xx.2 S084.250.1xxx.88xx.2	2	40	225		425	> 5 Hz	30
	4		225		375		
S084.325.1xxx.87xx.2 S084.325.1xxx.88xx.2	8	40	225	225	337	337	30
	12		180	180	270	270	
	16	40	157	157	235	235	30
	2		292		552		
	4	40	292		485		30
	8		292	292	438	438	
	12	40	270	270	405	405	30
	16		243	243	364	364	
S084.450.1xxx.87xx.2 S084.450.1xxx.88xx.2	2	40	405		765		30
	4		405		675		
	8	40	405	405	607	607	30
	12		360	360	540	540	
	16	40		---			

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		For intermittent operation > 5 Hz	for time [s]
				At rotating field frequency increasing linearly 0 to 5 Hz			
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		For intermittent operation > 5 Hz	for time [s]
				At rotating field frequency increasing linearly 0 to 5 Hz			
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 [kHz]	Ambient temperature [°C]	Rated current		Peak current		for time [s]
			at 650 V DC [A _{eff}]	at 770 V DC [A _{eff}]	at 650 V DC [A _{eff}]	at 770 V DC [A _{eff}]	
S084.040.S (BG5)	12	40	40	34	76	68	10
S084.076.S (BG5)	4	40	80	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)
Accident prevention regulations	According to local regulations (in Germany e.g. BGV A3)
Mounting height	Up to 1000 m above MSL, higher with power reduction (1% per 100 m, max. 2000 m above MSL)
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	Temperature	As per EN 61800-2, IEC 60721-3-2 class 2K3 ¹⁾
	Relative atmospheric humidity	-25 °C to +70 °C 95% at max. +40 °C
In storage	Temperature	As per EN 61800-2, IEC 60721-3-1 class 1K3 and 1K4 ²⁾
	Relative atmospheric humidity	-25 °C to +55 °C 5 to 95%
In operation	Temperature	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)
	Relative atmospheric humidity	BG7 -10 °C to +40 °C (2, 4, 8, 12, 16 kHz), to 55 °C with power reduction (2%/°C)
		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/s ²]
	2 ≤ f < 9	3.5	Not applicable
Shock limit in transit	9 ≤ f < 200	Not applicable	10
	200 ≤ f < 500	Not applicable	15
Vibration limits for the system ¹⁾	As per EN 61800-2, IEC 60721-2-2 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/s ²]
	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 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.

UR approval

UR approval has been obtained for the ServoOne axis controller in sizes BG5, BG6 and BG6a (45 A to 210 A rated current) as well as the supply units BG5 and BG6a (40 A to 170 A).

NOTE: UR approval is in preparation for the axis controllers in sizes BG1 to BG4 (4 A to 35 A).

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

For 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 aluminised/galvanised sheet steel (BG5 to BG7) to enhance interference immunity in accordance with 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 of supply units starting from Page 96).

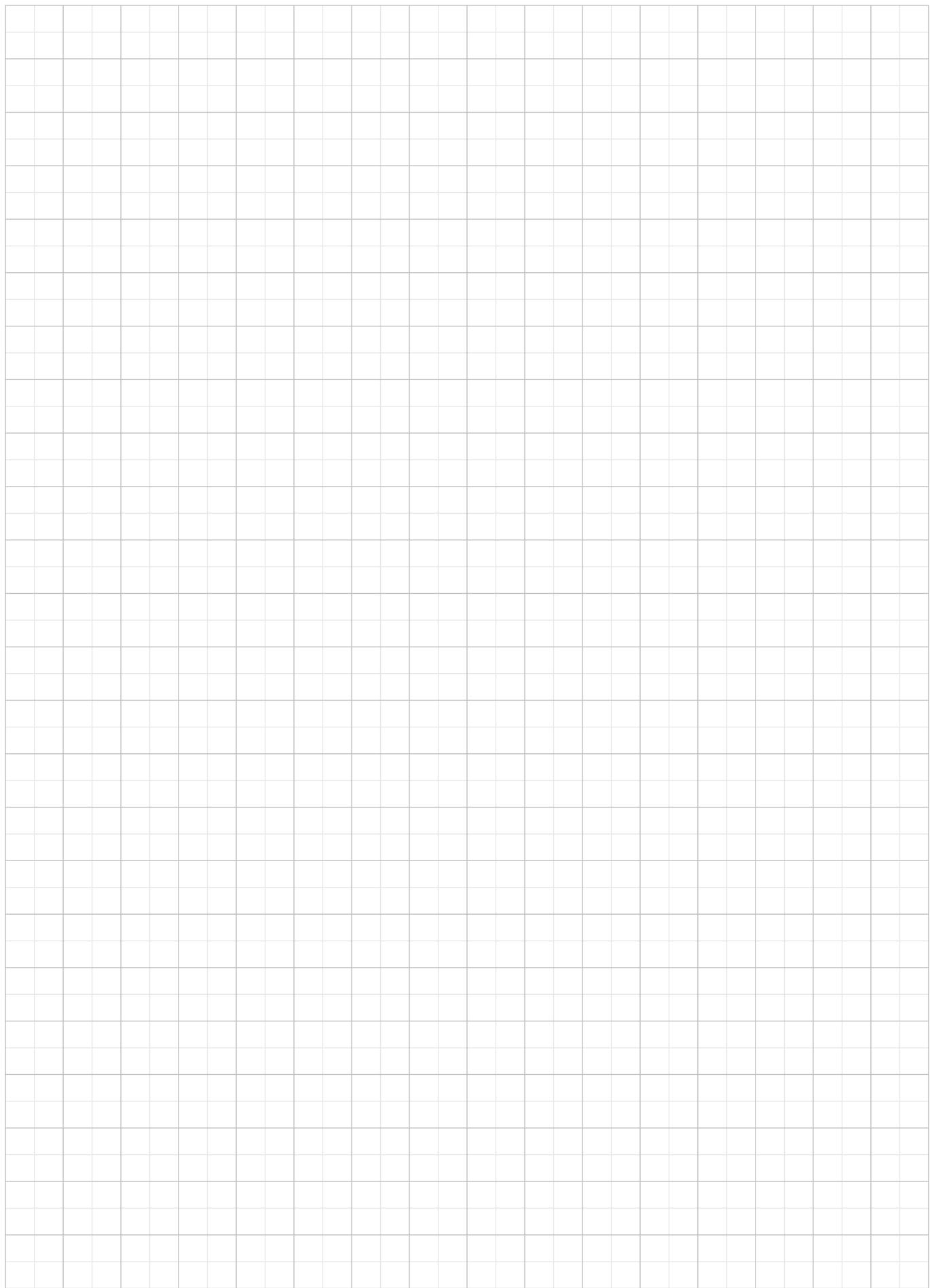
STO

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

A large grid of squares, approximately 20 columns by 25 rows, intended for users to write their 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	
	SO84.004.1	SO84.006.1
Output, motor side		
Voltage	3-phase $U_{ZK}/\sqrt{2}$	
Rated current, effective (I_N)	Air cooling Liquid cooling	4 A ¹⁾ BG1 not available with liquid cooling
Peak current	Air cooling Liquid cooling	See tables auf Page 76 toPage 79 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⁾	$U_{ZK} \cdot 1.7 \cdot I_{Motor}$ [kVA]	
Power dissipation at I_N	Air cooling Liquid cooling	110 W ¹⁾ 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

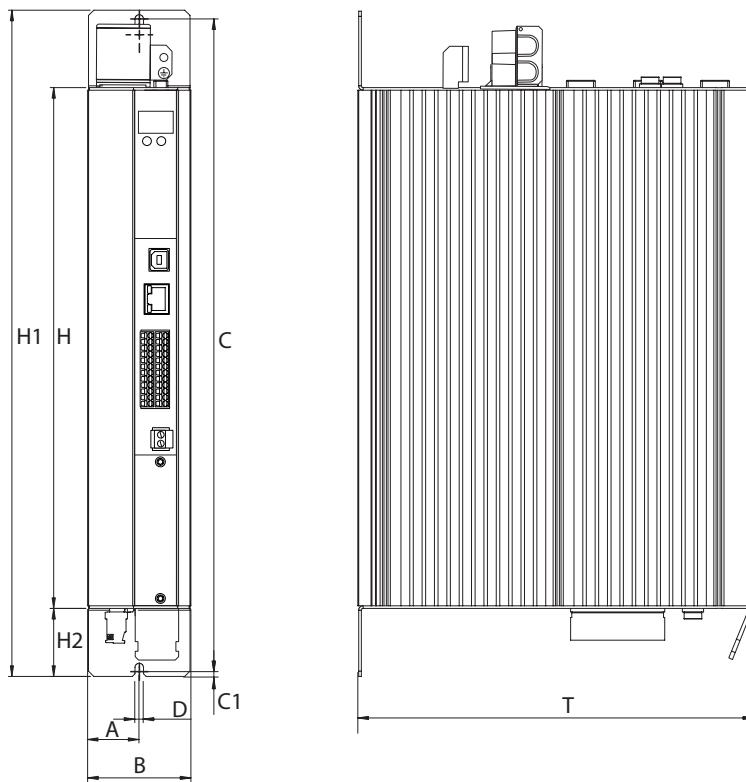


Mechanics, BG1	S084.004.1	S084.006.1
Cooling method	Air cooling (wall-mounted)	
Protection	IP20 except terminals (IP00)	
Cooling air temperature	40 °C	
Weight	3.4 kg	
Mounting method	Vertical mounting with unhindered air flow	
Row mounting of multiple axis controllers	Direct butt mounting, max. 2 mm	

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	SO84.008.1	SO84.012.1
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 Page 76 toPage 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} \cdot 1.7 \cdot 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

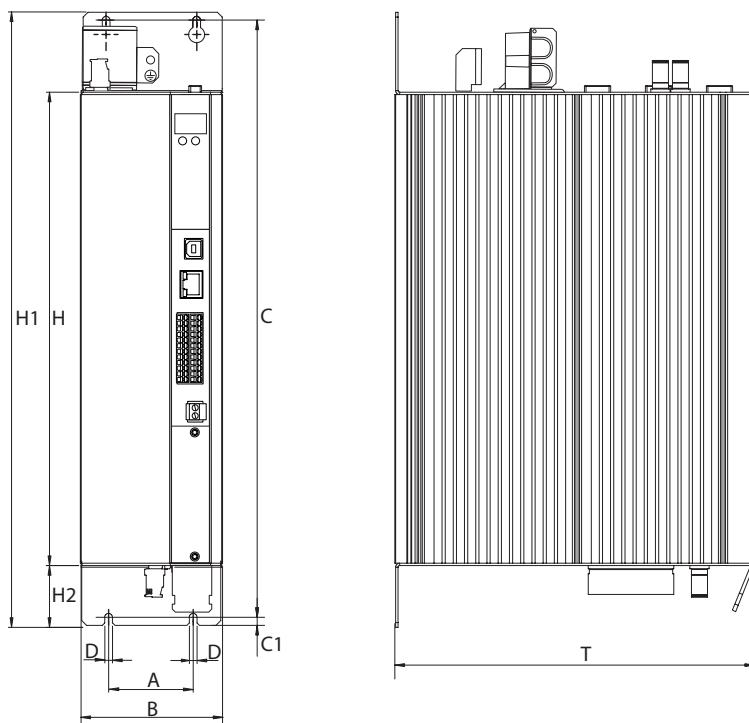


Mechanics, BG2	S084.008.1	S084.012.1
Cooling method	Air cooling (wall-mounted)	
Protection	IP20 except terminals (IP00)	
Cooling air temperature	45 °C (at 4 kHz power stage switching frequency)	
Weight	4.9 kg	
Mounting method	Vertical mounting with unhindered air flow	
Row mounting of multiple axis controllers	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	SO84.016.1	SO84.020.1
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 Page 76 toPage 79	
	Liquid cooling		See tables on Page 81 andPage 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⁾				$U_{ZK} \cdot 1.7 \cdot I_{Motor}$ [kVA]
Power dissipation at I_N	Air cooling	320 W ¹⁾		390 W ¹⁾
	Liquid cooling	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



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 (hole for pipe connection)	48
H1 / H2 / H3	392 / 38.5 / 70
S	3/8 inch (inside 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					
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 Page 76 toPage 79			
	Liquid cooling	See tables on Page 81 andPage 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⁾	$U_{ZK} \cdot 1.7 \cdot I_{Motor}$ [kVA]				
Power dissipation at I_N	Air cooling	420 W ¹⁾	545 W ¹⁾		
	Liquid cooling	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



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 (hole for pipe connection)	48
H1 / H2 / H3	392 / 38.5 / 70
S	3/8 inch (inside 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	SO84.045.1	SO84.060.1	SO84.072.1			
Output, motor side							
Voltage							
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 Page 80					
	Liquid cooling	See table on Page 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⁾	$U_{ZK} \cdot 1.2 \cdot I_{Motor}$ [kVA]						
Power dissipation at I_N	Air cooling	610 W ¹⁾	830 W ¹⁾	1010 W ¹⁾			
	Liquid cooling	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

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) (air/liquid cooling)	345 / 346.5 (without terminals)
D (depth) (air/liquid cooling)	240 / 238.5 (without terminals)
A / A1 / A2	150 / 40 / 70
C / C1	406.5 / 6
D Ø (air/liquid cooling)	5.6 / 6.5
D1 Ø (hole for pipe connection)	48
H1 / H2 / H3	418.5 / 15 / 54
S	3/8 inch (inside 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	SO84.090.1	SO84.110.1	SO84.143.1	SO84.170.1	
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 Page 80				
	Liquid cooling	See table on Page 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⁾		$565 \text{ V}_{DC} / 650 \text{ V}_{DC} / 678 \text{ V}_{DC} / 770 \text{ V}_{DC}$				
Current (RMS approximate value) ³⁾		$1.2 \cdot I_{Motor} [\text{A}]$				
Device connected load ³⁾		$U_{ZK} \cdot 1.2 \cdot I_{Motor} [\text{kVA}]$				
Power dissipation at I_N and 8 kHz/ 565 V DC	Air cooling	1300 W	1600 W	2100 W	2500 W	
	Liquid cooling	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



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 (hole for pipe connection)	48
H1 (air/liquid cooling)	600 / 540
H2 / H3	20 / 56.5
S	3/8 inch (inside 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	S084.250.1	S084.325.1	S084.450.1
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)}		$1.2 \cdot I_{Motor}$ [A]		
Device connected load ^{3) 4)}		$U_{ZK} \cdot 1.2 \cdot I_{Motor}$ [kVA]		
Power dissipation at I_N and 4 kHz / 565 V _{DC}	3200 W	3800 W	5400 W	
DC link				
Capacitance	3600 μ F	5400 μ F	7200 μ F	

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



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

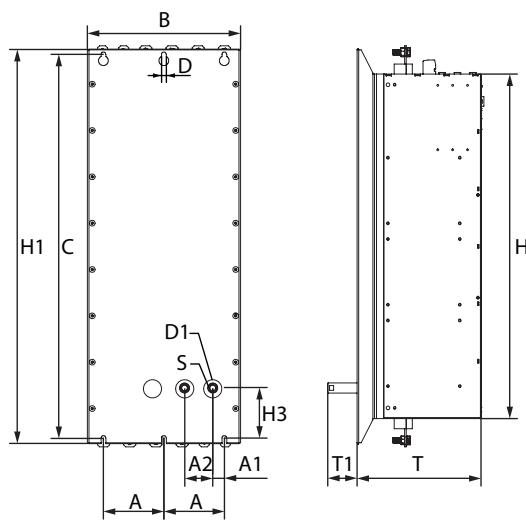


Mechanics, BG7	S084.250.0	S084.325.0	S084.450.0
Cooling method		Liquid cooling	
Protection		IP20 except terminals (IP00)	
Coolant temperature		Max. 40 °C, not more than 10 K below the ambient temperature	
Weight		100 kg	
Mounting method		Vertical mounting	
Row mounting of multiple servocontrollers		Direct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

Dimensions, BG7 [mm]	
B (width)	380 (with terminal covers: 392)
H (height)	952 (with terminal covers and shield plates: 1305)
T (depth)	286.5 (without terminals)
A / A1 / A2	150 / 29 / 70
C / C1	952 / 12
D Ø	12
D1 Ø (hole for pipe connection)	48
H1 / H2 / H3	971 / 60 / 124
S	3/8 inch (inside thread)
T1	73.5

4

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)

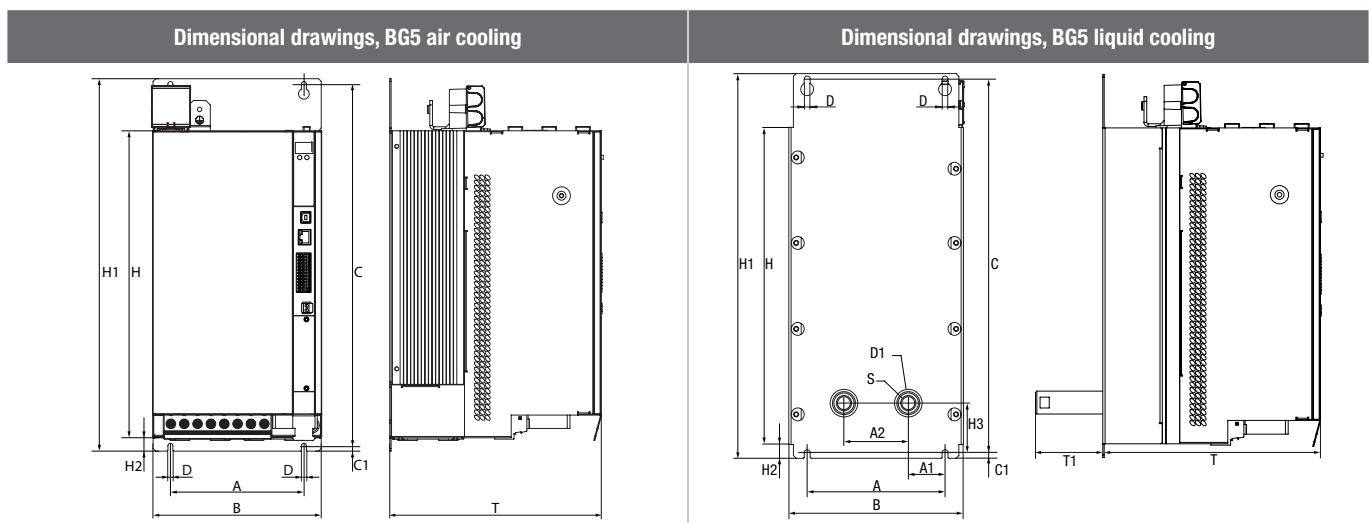
Technical data	Designation	SO84.040.S	SO84.076.S
DC link output			
Voltage		650 V _{DC} / 770 V _{DC}	
Rated current, effective (I _N)	At 650 V _{DC}	40 A	76 A
	At 770 V _{DC}	34 A	64 A
Peak current (for 10 s)	At 650 V _{DC}	80 A	144 A
	At 770 V _{DC}	68 A	122 A
Continuous power		26 kW	50 kW
Peak current (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		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.



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	

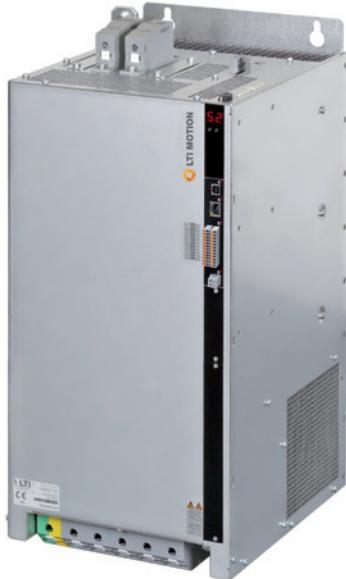
Dimensions, BG5 [mm]	
B (width)	190
H (height) (air/liquid cooling)	345 / 346.5 (without terminals)
D (depth) (air/liquid cooling)	240 / 238.5 (without terminals)
A / A1 / A2	150 / 40 / 70
C / C1	406.5 / 6
D Ø (air/liquid cooling)	5.6 / 6.5
D1 Ø (hole for pipe connection)	48
H1 / H2 / H3	418.5 / 15 / 54
S	3/8 inch (inside thread)
T1	73.5



Supply unit	S084.040.S	S084.076.S
Mains connection	LCL-040 Included components: <ul style="list-style-type: none"> 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 Included components: <ul style="list-style-type: none"> 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)



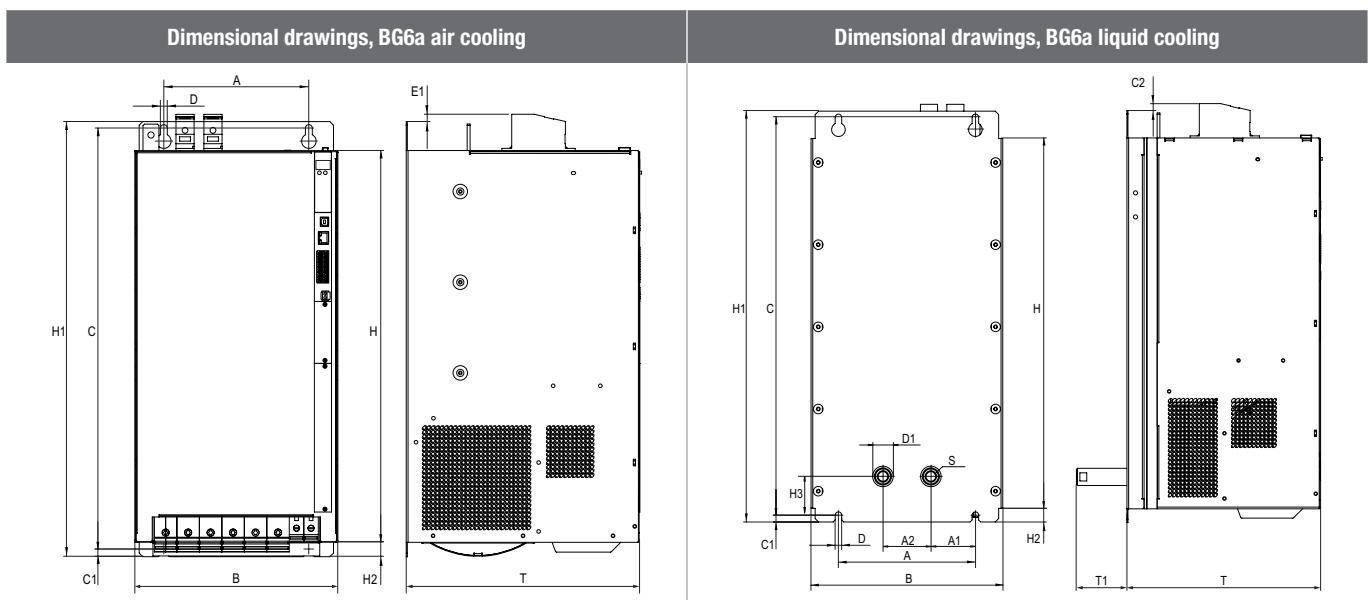
Type SO84.115.S (air cooling)

Technical data	Designation	SO84.115.S	SO84.170.S		
DC link output					
Voltage					
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					
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		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

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 end-to-end 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 (hole for pipe connection)	48
H1 / H2 / H3	600 / 20 / 56.5
S	3/8 inch (inside thread)
T1	73.5



Supply unit	S084.115.S	S084.170.S
Mains connection	LCL-115 Included components: <ul style="list-style-type: none"> 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 Included components: <ul style="list-style-type: none"> 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)

Technical data	Designation	SO84.375.S	SO84.540.S
DC link output			
Voltage		650 V _{DC} / 770 V _{DC}	
Rated current, effective (I_{V})	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} $\pm 10\%$	
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		3300 W	4100 W
Asymmetry of mains voltage		$\pm 3\%$ 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 .

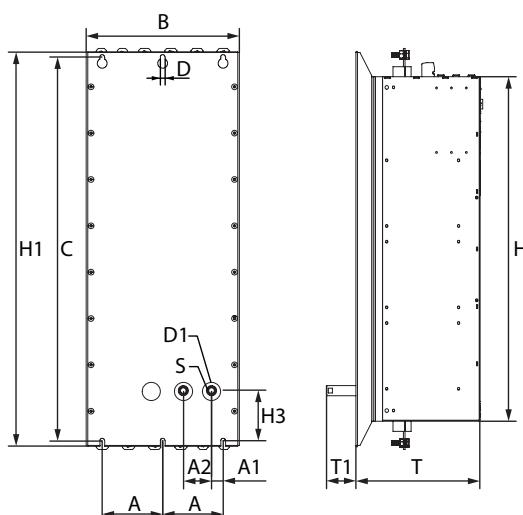


Mechanics, BG7	S084.375.S	S084.540.S
Cooling method	Liquid cooling (wall-mounted)	
Protection	IP20 except terminals (IP00)	
Coolant temperature	5 °C to 40 °C (not more than 10 °C below ambient temperature)	
Weight	90 kg	
Mounting method	Vertical installation in a switch cabinet	
Row mounting of multiple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

Dimensions, BG7 [mm]	
B (width)	380
H (height)	855 (without terminals)
D (depth) (liquid cooling)	287 (without terminals)
A / A1 / A2	150 / 69 / 70
C / C1	955 / -
D Ø	12
D1 Ø (hole for pipe connection)	48
H1 / H2 / H3	980 / - / 124
S	3/8 inch (inside thread)
T1	74

4

Dimensional drawings, BG7 liquid cooling



Supply unit	S084.375.S	S084.540.S
Mains connection	LCL-375 Included components: <ul style="list-style-type: none"> • Mains filter FN 3359-400-99, 400 A • Input choke 375 A including capacitor • Step-up choke 375 A • EMC mounting set 	LCL-540 Included components: <ul style="list-style-type: none"> • Mains filter FN 3359-600-99, 600 A • Input choke 540 A including capacitor • Step-up choke 540 A • EMC mounting set

PSU mains connection sets

Designation	Type no.
S084.076.Sxxx.0xx1.x	LCL - 076
S084.115.Sxxx.0xx1.x	LCL - 115
S084.170.Sxxx.0xx1.x	LCL - 170
S084.375.Sxxx.0xx1.x	LCL - 375
S084.540.Sxxx.0xx1.x	LCL - 540

**NOTE:**

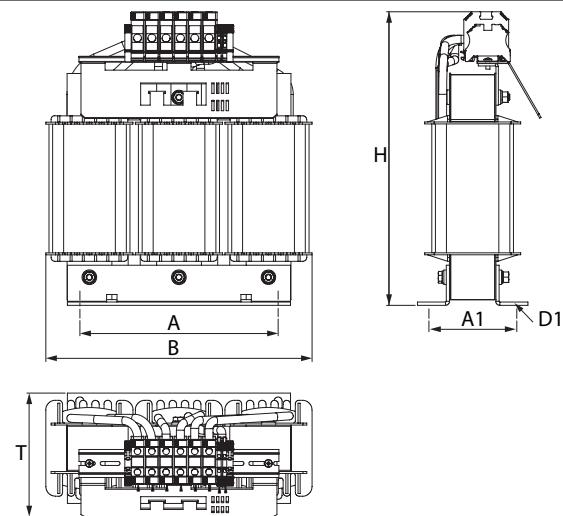
- Each set comprises:
- 1 step-up choke
- 1 input choke with capacitor
- 1 mains filter

Dimensions, step-up choke

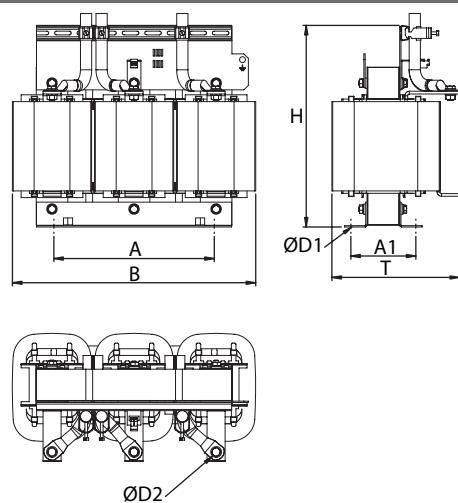
For size	BG5		BG6a		BG7	
For device	S084.040	S084.076	S084.115	S084.170	S084.375	S084.540
B (width)	239	299	335	380	540	454
H (height)	273	300	344	399	447	671
T (depth)	124	135	158	200	283	268
A	185	210	248	280	356	300
A1	75	95	122	127	144	188
D1	10 x 18	12 x 20				
D2	-	-	-	-	13	13
Fastening screws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

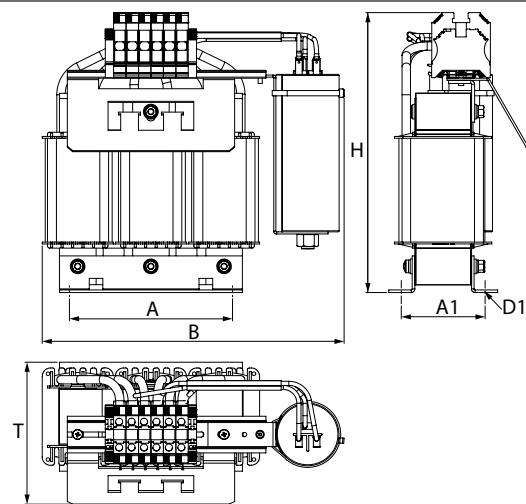


Dimensions, input choke including film capacitor

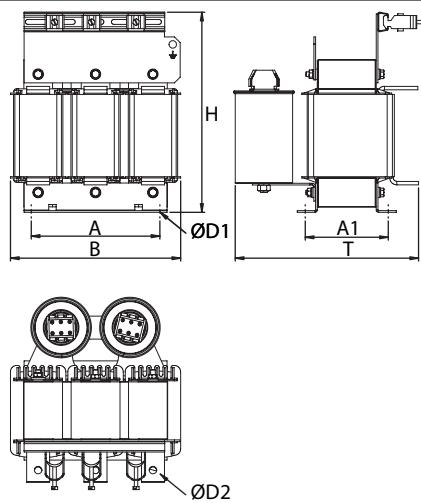
For size	BG5		BG6a		BG7	
For device	S084.040	S084.076	S084.115	S084.170	S084.375	S084.540
B (width)	289	289	342	348	297	357
H (height)	252	268	292	321	347	565
T (depth)	119	136	175	175	319	308
A	156	156	176	176	224	310
A1	63	80	95	95	145	146
D1	7 x 13	7 x 13	9 x 13	9 x 13	10 x 18	12 x 20
D2	-	-	-	-	13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

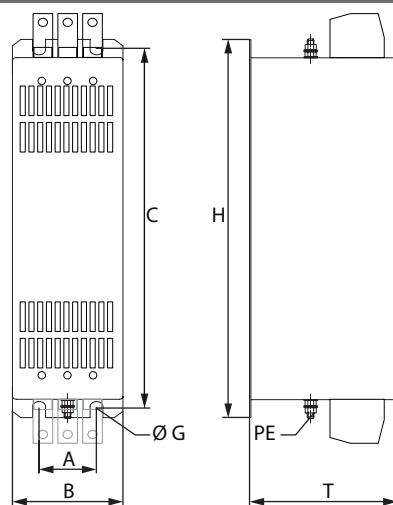


Dimensions, mains filter

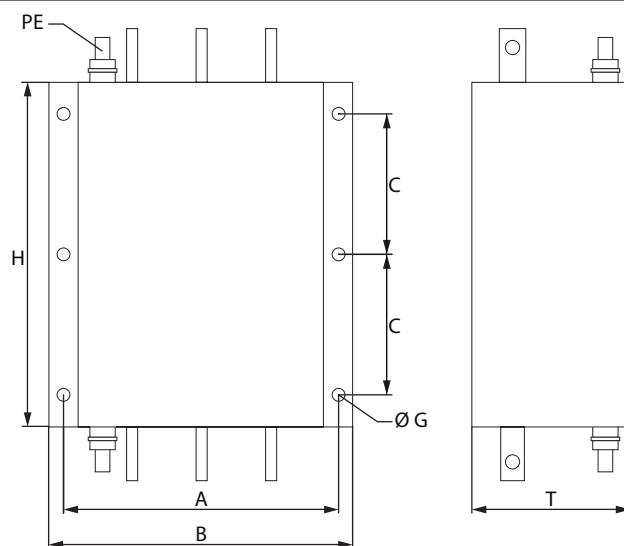
For size	BG5		BG6a		BG7	
For device	S084.040	S084.076	S084.115	S084.170	S084.375	S084.540
Type	FFU 3 x 56 K	FFU 3 x 80 K	FFU 3 x 130 K	FFU 3 x 180 K	FN 3359-400-99	FN 3359-600-99
B (width)	85	80	90	130	260	260
H (height)	250	270	270	380	300	300
T (depth)	90	135	150	180	115	135
A	60	60	65	102	235	235
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

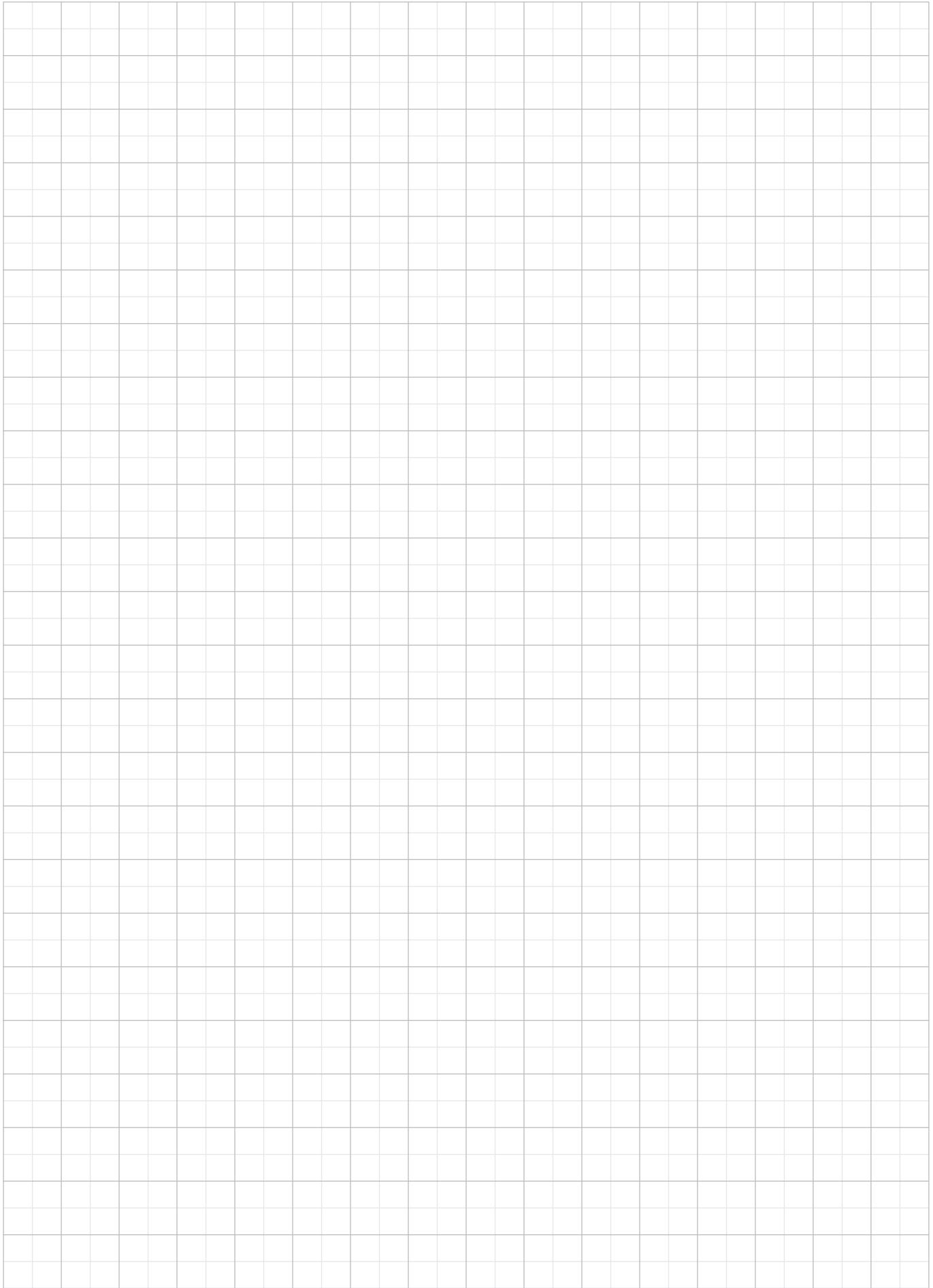
Dimensional drawings, mains filter BG5 and BG6a



Dimensional drawings, mains filter BG7



Space for your own notes



Safety technology



5

Type	Page	AC SO/ Junior 2-10 A	AC SO/ 4-450 A	DC SO/ 4-450 A	PSU 26-360 kW
Integrated safety control	5-2	-	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 the 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



SO80.000.0100.0000

Integrated safety control

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	<ul style="list-style-type: none"> • Configuration • Programming • Validation
DriveManager	For details see page 9-3
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



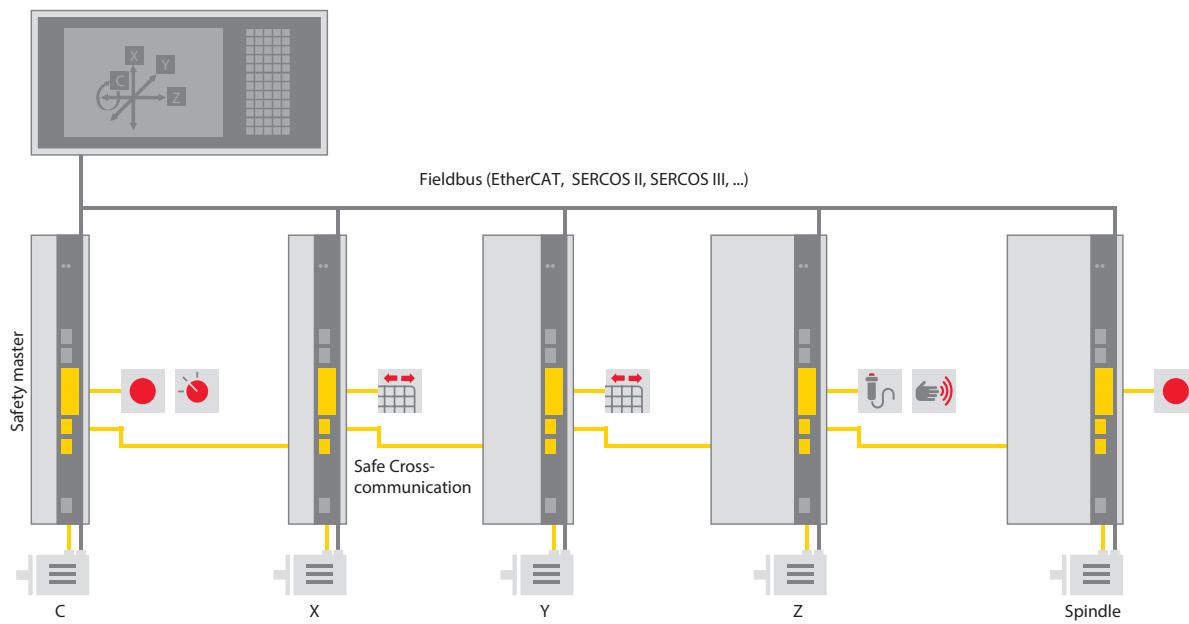
System description

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 the 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

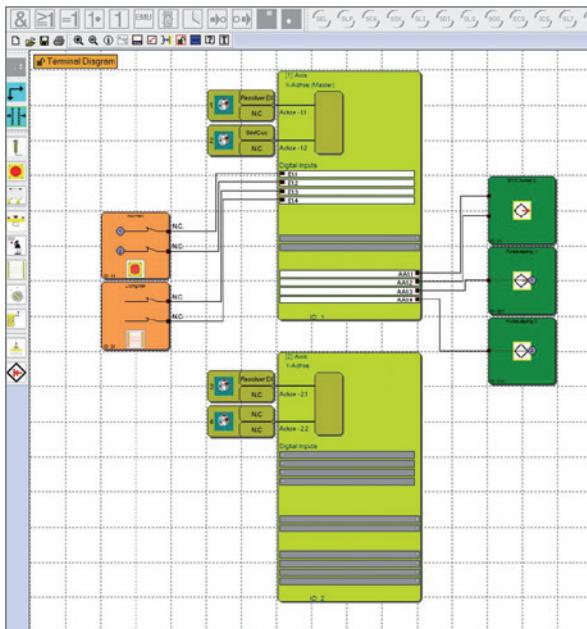
The programming software SafePLC S is only available for download free of charge on the LTI Motion homepage.

Brief description

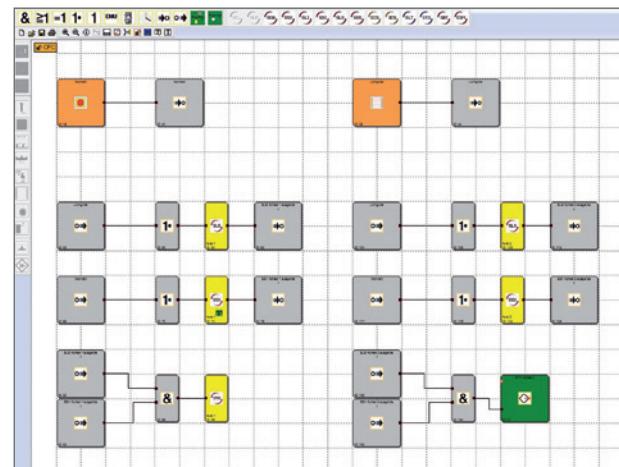
The graphic PC software SafePLC S is required to create the machine safety application. The entire safety solution for the machine can be programmed using only one program.

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

5

Order designation



Technical data	SCC cable
Cable length	0.4 m
Connections	Ready to connect for networking ServoOne controllers with integrated safety control via the 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

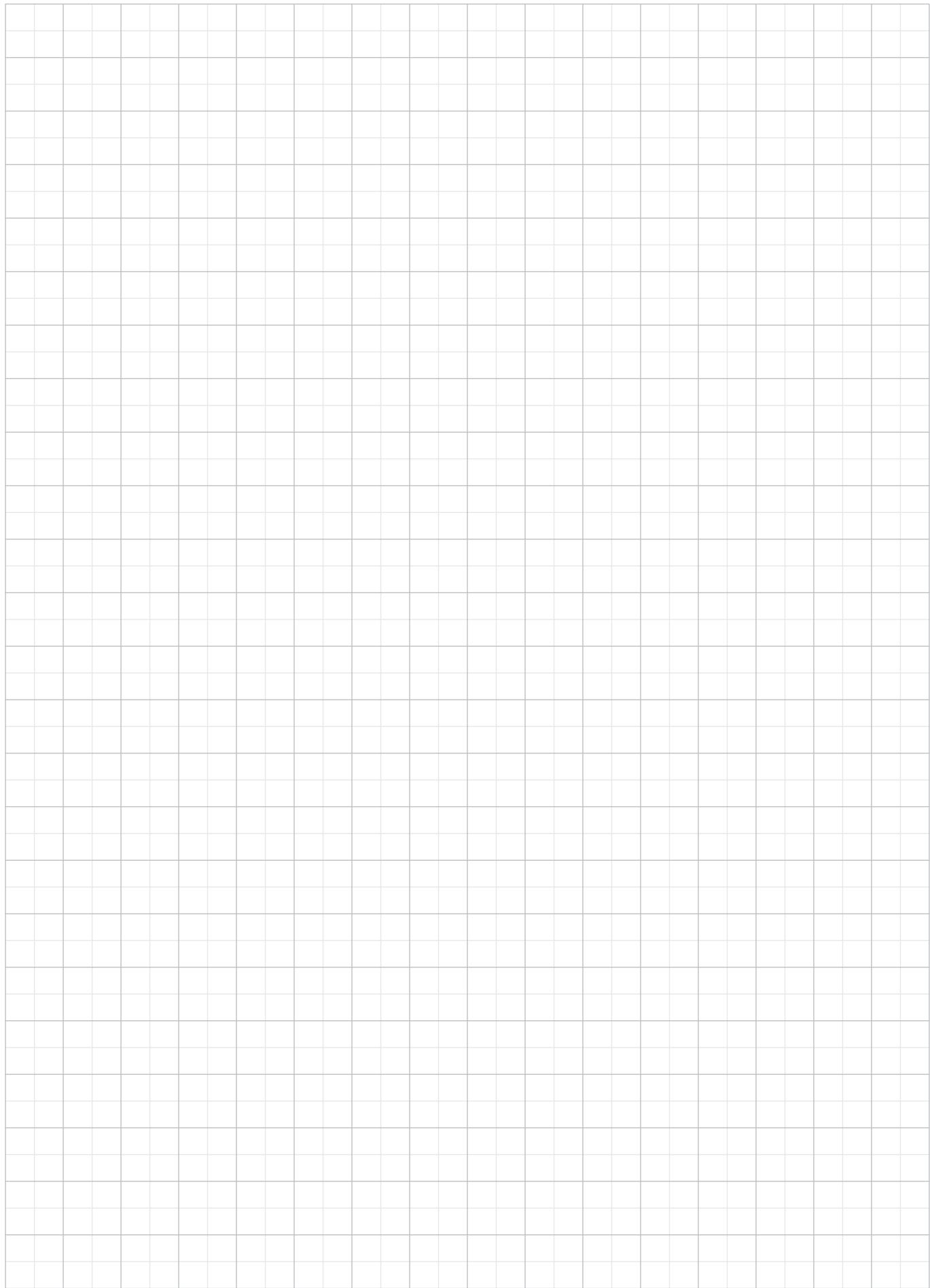
Connection cable for the SMC-E12 module

SCC-08 IO

Order designation

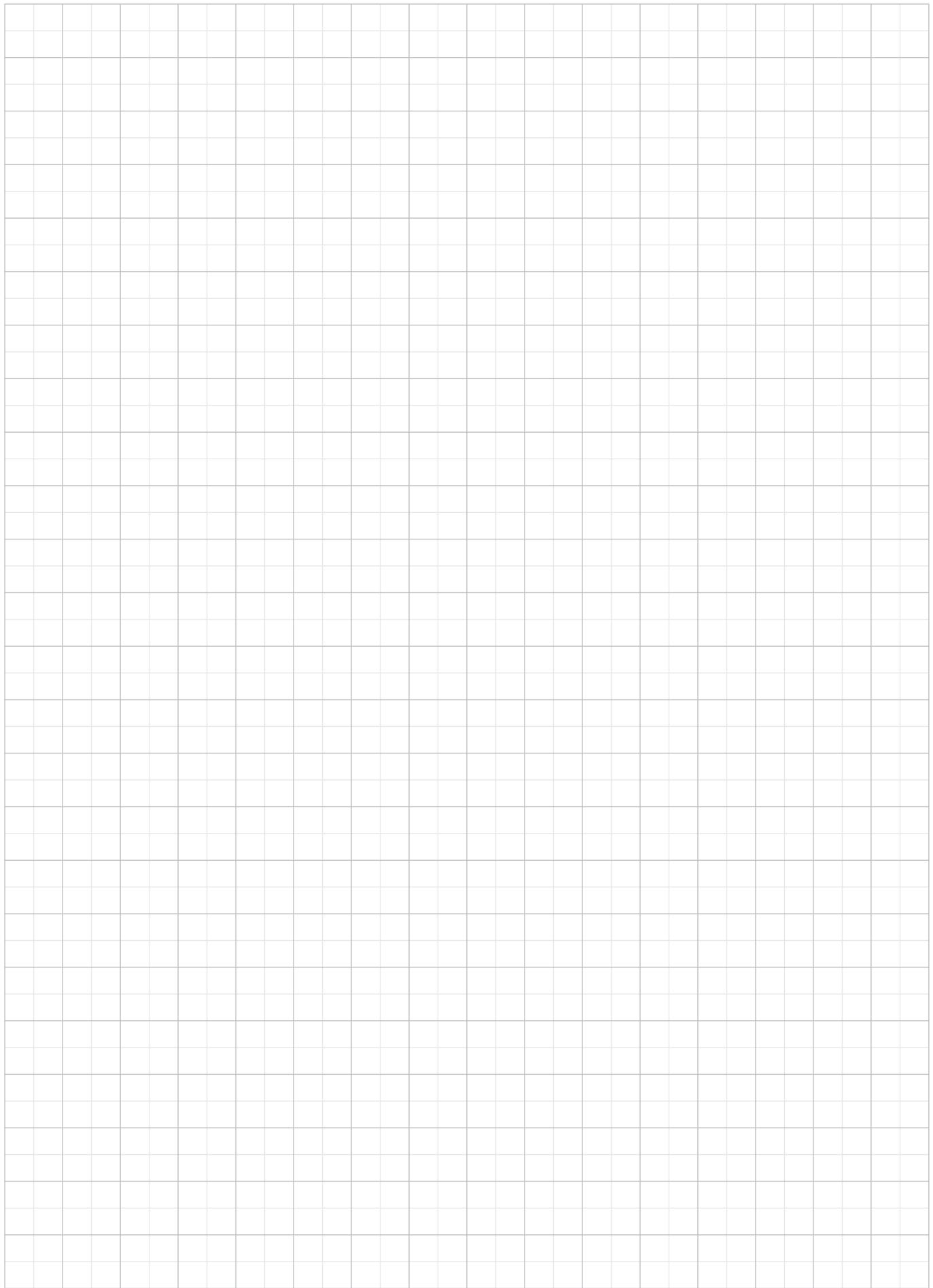
Technical data	SCC-08 IO
Cable length	0.8 m
Connections	Ready to connect for connecting an SMC-E12 module to the Safe Cross Communication (SCC)
Cable diameter	6 mm

Space for your own notes

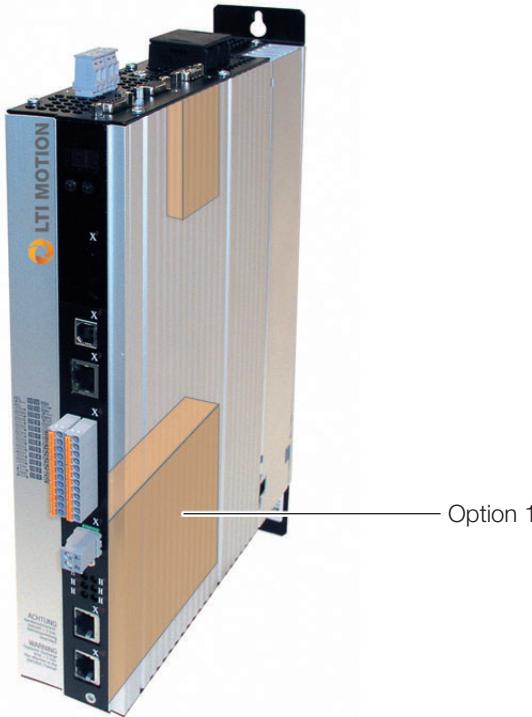
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2

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	6-2	●	●	●	●
Field bus module for PROFIBUS-DPV1	6-3	●	●	●	●
Field bus module for EtherCAT	6-4	●	●	●	●
Field bus module for CANopen	6-5	●	●	●	●
Field bus module for CANopen plus 2 analogue outputs	6-6	-	●	●	-
Field bus module for PROFINET IRT (isochronous)	6-7	●	●	●	-
Field bus module for Sercos III	6-8	●	●	●	-



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



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 6-8.

Option 1 - PROFIBUS



Availability

S0□□.□□□.□□2□.□□□□

PROFIBUS

Article designation

Brief description

Communication interface for PROFIBUS-DPV1

Technical data	PROFIBUS
Standardisation	EN 50170
Communication	Guideline 2.082
Device profile	PROFldrive 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.

6

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	$\geq 125 \mu\text{s}$
Synchronisation jitter	$\leq 1 \mu\text{s}$ (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



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.

Option 1 - CANopen + 2AO

CANopen

Analog **out**



X33

CANopen + 2AO



AC SO
4-450 A



DC SO
4-450 A



PSU
2G-360 kW

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.

Option 1 - Sercos III



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 6-2.

Option 1 - Powerlink



Availability

S0□□.□□□.□□9□.□□□□

Powerlink

Article designation

Brief description

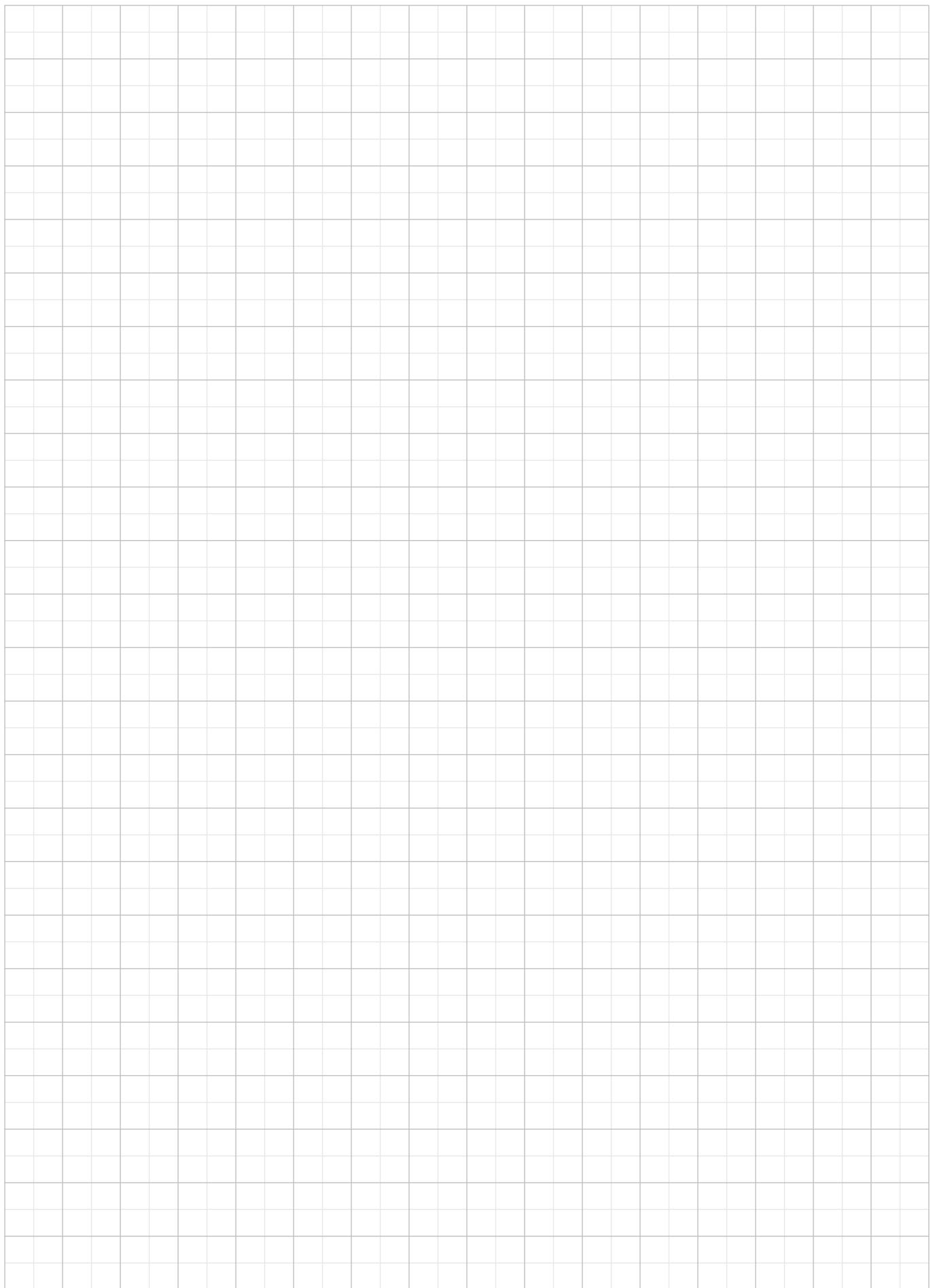
Powerlink is an Ethernet-based bus system. Powerlink combines features and advantages of Ethernet, CANopen and real-time capabilities.

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	$\geq 400 \mu\text{sec}$
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 STP


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 2-18 A	AC SO 4-450 A	DC SO 4-450 A	PSU 26-360 kW
Interface for second SinCos encoder	7-2	●	●	●	-
Interface for TTL encoder simulation / TTL master encoder	7-3	●	●	●	-
Interface for TwinSync communication	7-4	●	●	●	-
Interface for SSI encoder simulation	7-5	-	●	●	-
Interface for TTL encoder with commutation signals	7-6	●	●	●	-
Interface for digital input/output expansion (DIO)	141	●	● ¹⁾	● ¹⁾	-
Interface for multi-functional input/output expansion (MIO)	<?>	●	●	●	-
Interface for second safe SinCos encoder	7-9	-	●	●	-
Interface for second safe SSI encoder	7-10	-	●	●	-
Interface for second safe axis monitor (SinCos)	7-11	-	●	●	-
Interface for one-cable interface	7-12	●	-	-	-

¹⁾ In preparation

7



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 TTL encoder simulation of a connected encoder and/or 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.

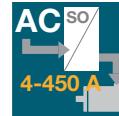
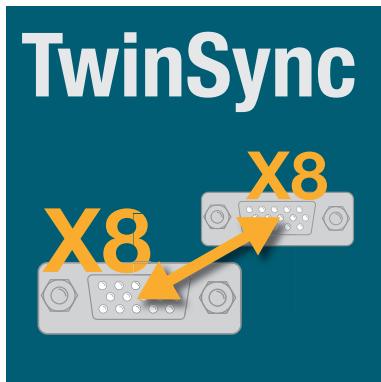
Technical data	TTL master encoder
Signals	A/B, zero pulse or pulse/direction
Signal level	TTL differential (RS422)
Signal frequency	500 kHz max.

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



Availability

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

S0□□.□□□.□□□3.□□□□

TwinSync communication

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-SO-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 SSI encoder simulation 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)

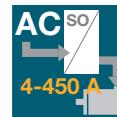

NOTE:

Only available built-in ex factory.

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 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)

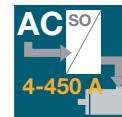
**NOTE:**

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

7

Technical data	Digital IO cable
Cable length	2 m (without plug and cable ends)
Plug/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 mm ² 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

SO□□.□□□.□□□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

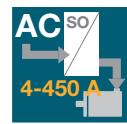
Article designation

Technical data	Multi-functional IO cable
Cable length	2 m (without plug and cable ends, cable colour: grey)
Plug/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 mm ² 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)

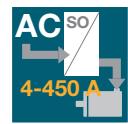

NOTE:

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.

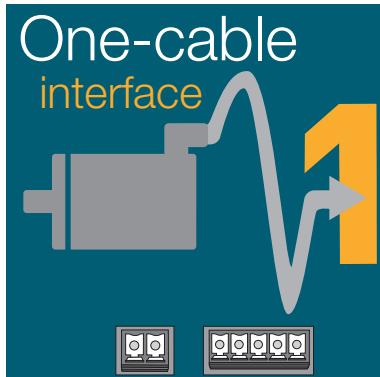
Technical data	General
Supply voltage ext. Encoder	No encoder supply
Cable length	15 m (between the monitored drive axis and the option connection)
Wave terminating resistance	Not integrated

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 single-cable motor system is implemented. When using a motor brake, the brake is connected directly to the option module.

Technical data	Encoder interface
Log	HIPERFACE DSL two-wire interface
Max. current	150 mA
Motor temperature sensor	Connected and evaluated in the encoder
Purpose	Only with motors of 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

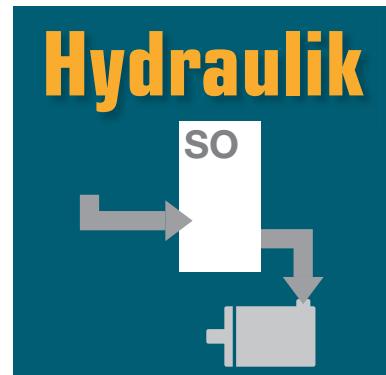
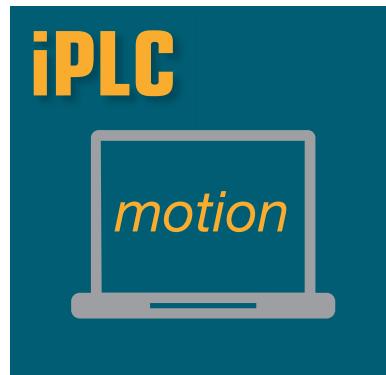
Accessories:

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

**NOTE:**

Only available built-in ex factory.

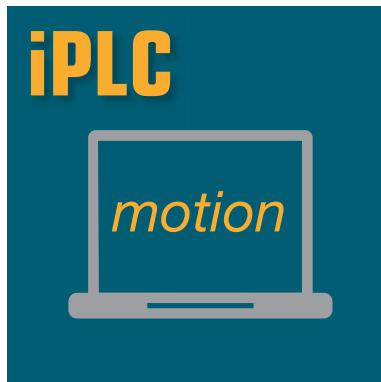
Function packages



Type	Page				
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	8-3	-	●	●	-
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: S0□□.□□□.□□□□.□1□□.□

iPlc+HF function package: S0□□.□□□.□□□□.□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	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

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

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: S080.000.0000.0700.0

HF+iPlc function package: S080.000.0000.0800.0

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, sensorless 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

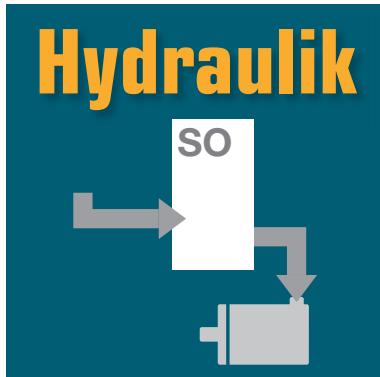

NOTE:

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:

Hydraulic+iPLC function package:

S08□.□□□.□□□□.□2□□.□

S08□.□□□.□□□□.□3□□.□

Article designation

Brief description

The servo hydraulics ("servopump") combines 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

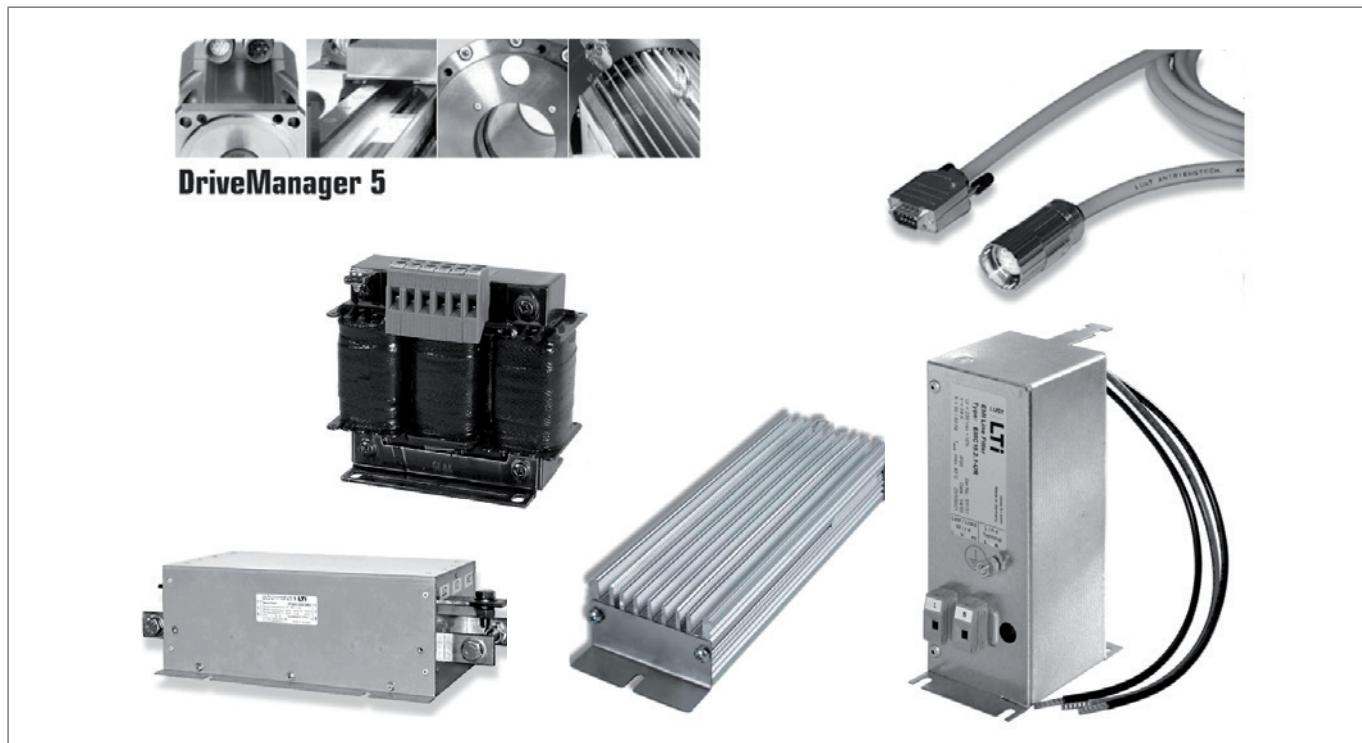


NOTE:

Technology option 2 multi-functional input/output expansion (MIO) S0xxx.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



Contents	Type	Page
PC user software DriveManager 5	Full version	153
Data cables	Ethernet, USB	153
Selection of motor cables	KM3, KM4, KM5, KM6, KM8	9-4
Selection of encoder cables	KRY2, KRY3, KGS2, KGH3, KGH4, KGH5	9-8
Mains chokes	LR32.14-UR, LR34.4-UR ... LR34.450-UR	9-10
Braking resistors	BR-200.0x.xx0-UR ... BR-026.xx.xx0-UR	9-14
Mains filters, ServoOne junior	EMC8.2-1Ph,UR ... EMC11.2-3Ph,UR	9-16
Mains filters, ServoOne single-axis system	EMC7.1-UR ... EMC500.1-UR	9-18
Liquid cooling connection set	LCS01	172
Cable clamps and clips	1101.910.0 SCS01 ... 1101.970.0 SCS10	173
Shield plates for control connections	1101.810.0 SCE01 ... 1101.840.0 SCE07/SPM05	174
Shield plates for motor connections	1101.840.0 SCE07/SPM05 ... 1101.880.0 SPM07	175

PC user software DriveManager 5



Availability

DriveManager 5

DriveManager 5

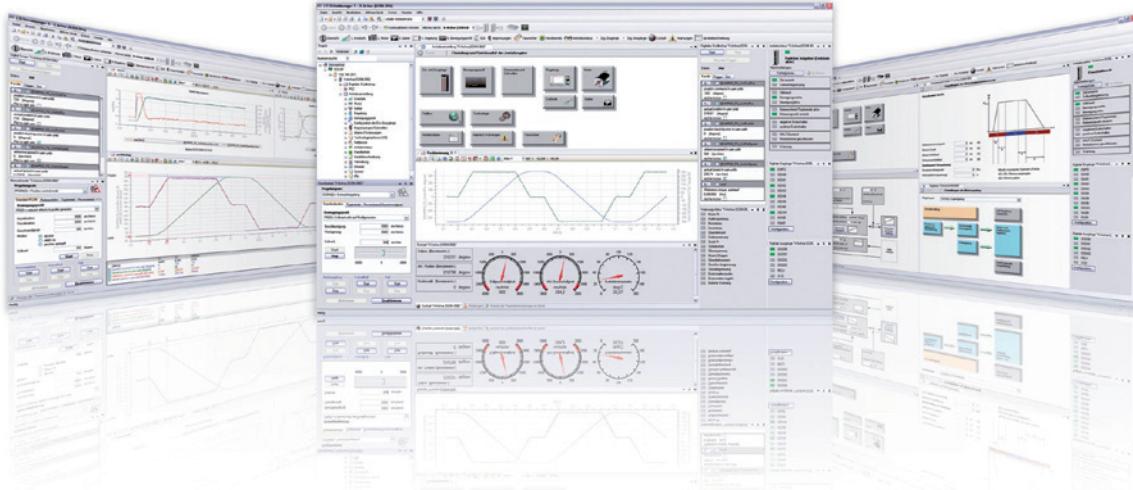
Article designation

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	<ul style="list-style-type: none"> 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

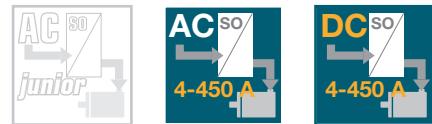
Connection cable type CC-USB03 (USB)

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) 5 m (example)					
Motor cables							<i>Up to $I_0 = 16 \text{ A}$ → - Up to $I_0 = 24 \text{ A}$ → 24 A (only KM3) Up to $I_0 = 63 \text{ A}$ (only LSx-220) → 63 A (only KM3)</i>

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 mm ²									
Additional option	KS →	Capable for energy chains									
Cable length		Cable length in metres (1 m to 30 m) 001 → 1 m (example)									

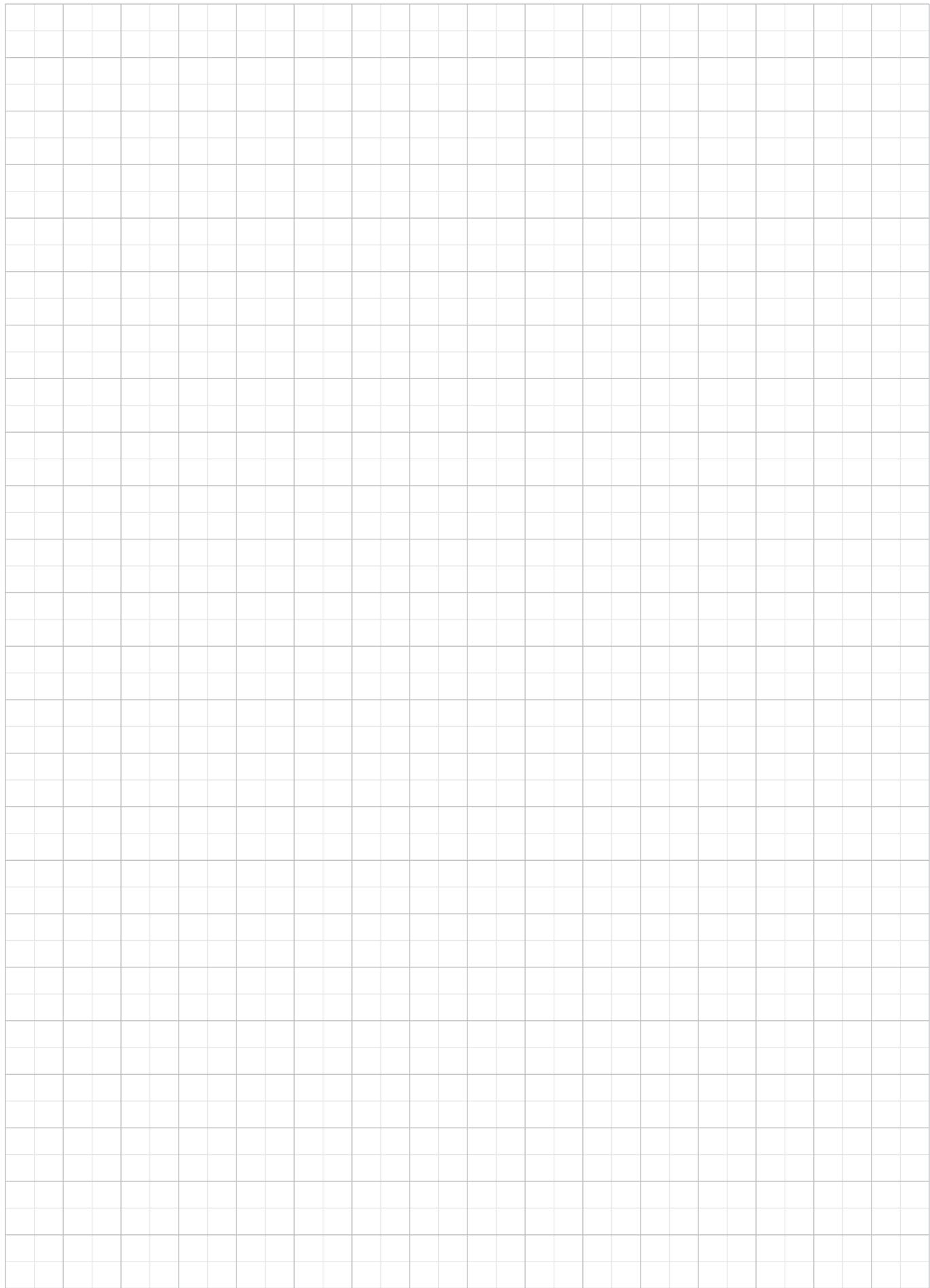
Technical data

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 mm ²	4G1.5	4G1.5 + 2 x 2 x 0.75 mm ²	4G1.5 + 2 x 2 x 0.75 mm ²	4G1.5
	24 A	4G2.5 + 2 x 2 x 1 mm ²	-	-	-	-
	63 A	4G10 + 2 x 1.5 mm ² + 2 x 1 mm ²	-	-	-	-
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

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2

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

K□□□-KS□□□
Cable type Cable length in metres
Capable for energy chains

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® 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



Availability

LR3□.□□□-UR

Product range and voltage

Rated current

LR34.8-UR

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	$1.8 \times I_N$ for 40 s	$2.0 \times I_N$ for 30 s
Ambient temperature	-25 °C to +45 °C, with power reduction up to 60 °C (1.3% per °C)	
Mounting height	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.

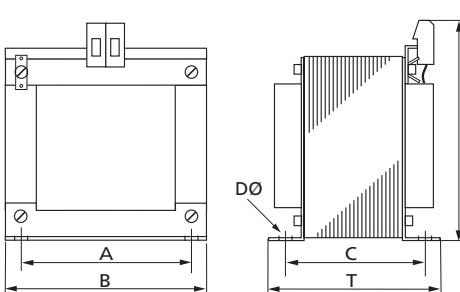
3) Only for controllers from 45 A.

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 [mm ²]
LR32.14-UR	14	4	16	2.1	1.5	0.3	4

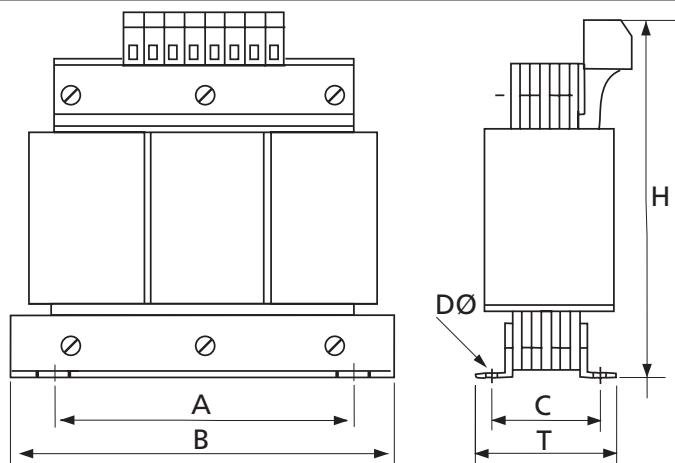
Dimensions [mm]	LR32.14-UR	Dimensional drawing
B (width)	85	
H (height)	100	
T (depth)	65	
A	64	
C	50	
D Ø	4.8	

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	4.0	0.4	4 mm ²
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		1.5	
LR34.17-UR	17		45	1.72		2.0	
LR34.24-UR	24		50	1.22	5.0	2.0	
LR34.32-UR	32		70	0.92	6.0	2.5	
LR34.44-UR	45		60	0.33	5.0	2.0	16 mm ²
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	
LR34.108-UR	110	2	140	0.13	15	7.0	35 mm ²
LR34.140-UR	143		160	0.10	25	8.5	
LR34.168-UR	170		170	0.09	25	9.0	
LR34.210-UR	210		268	0.07	27	6.1	
LR34.250-UR	250		285	0.059	28	10.8	
LR34.325-UR	325	1	351	0.045	43	14.3	M12
LR34.450-UR	450		296	0.033	46	11.9	

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				

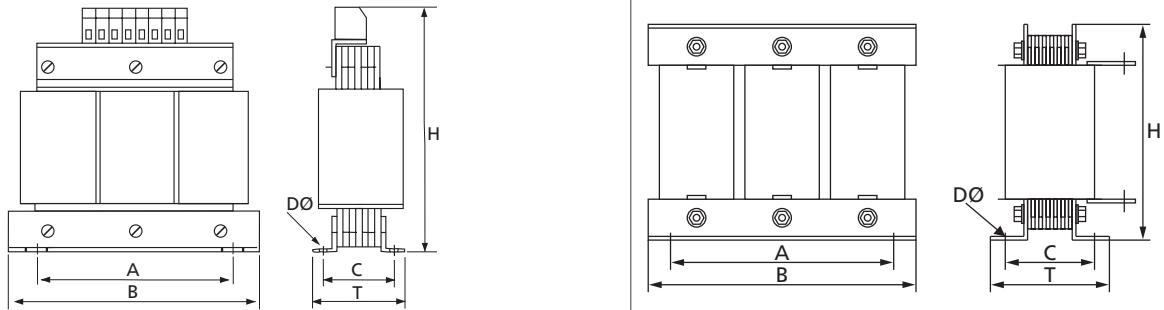
Dimensional drawing for LR34.4-UR to LR34.58-UR



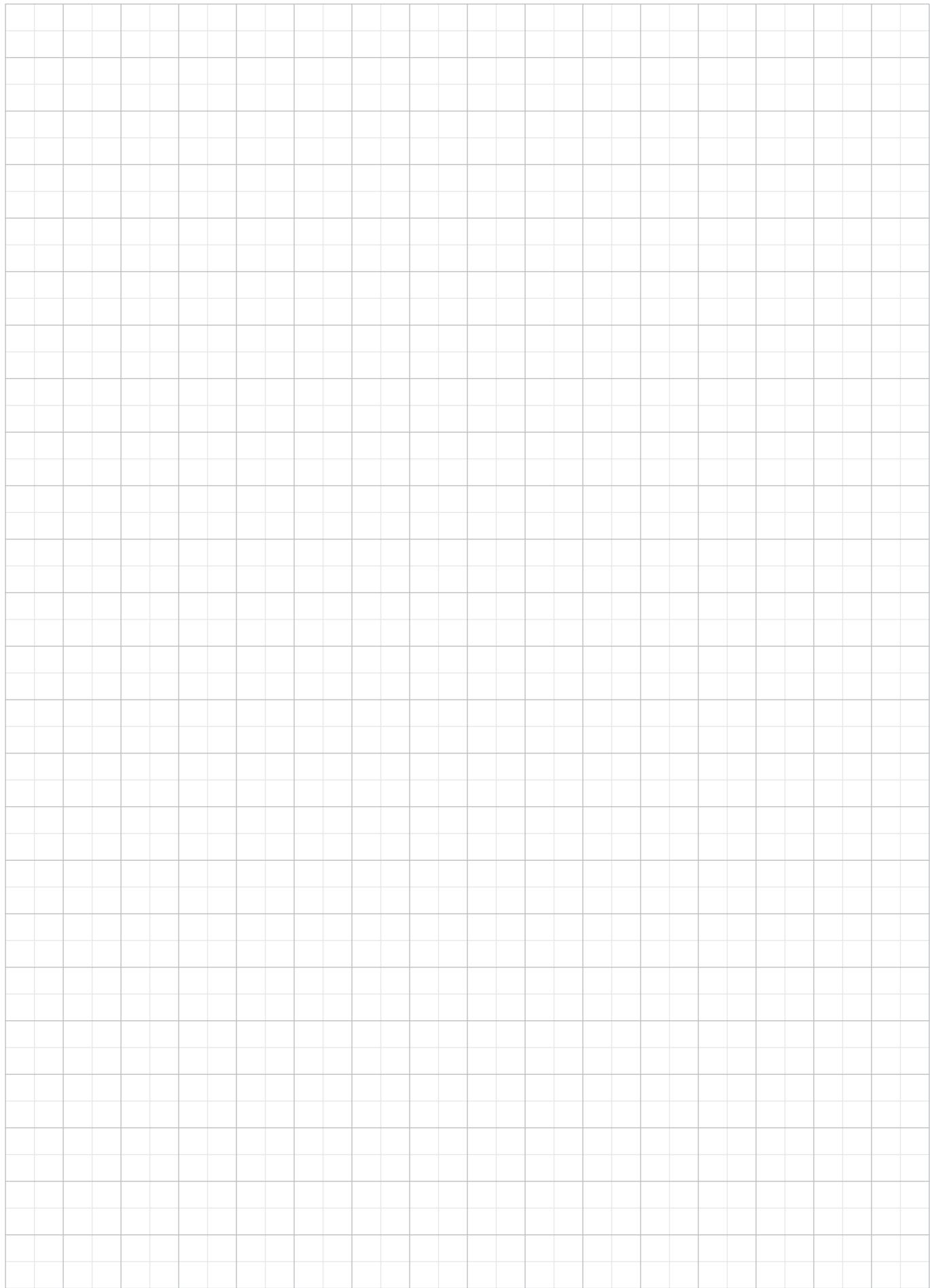
Dimensions [mm]	LR34.70-UR	LR34.88-UR	LR34.108-UR	LR34.140-UR	LR34.168-UR	LR34.210-UR	LR34.250-UR	LR34.325-UR	LR34.450-UR
B (width)	190	230		240		265		300	
H (height)	240	300		330		230		275	
T (depth)	110	160	180	200		152		177	192
A	170	180		190		215		240	
C	78	98	122		125		126	145	160
D Ø	8				11				

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

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

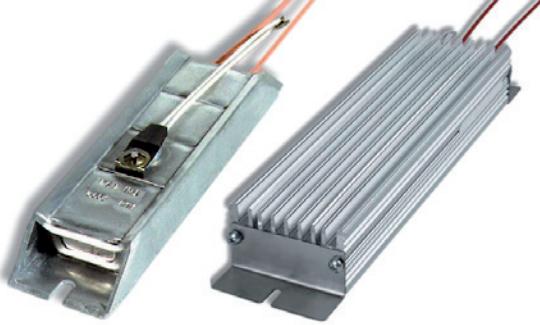


Space for your own notes

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2

Braking resistors



AC SO
Junior
2-16 A
AC SO
4-450 A
DC SO
4-450 A
PSU
2G-360 kW

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)	

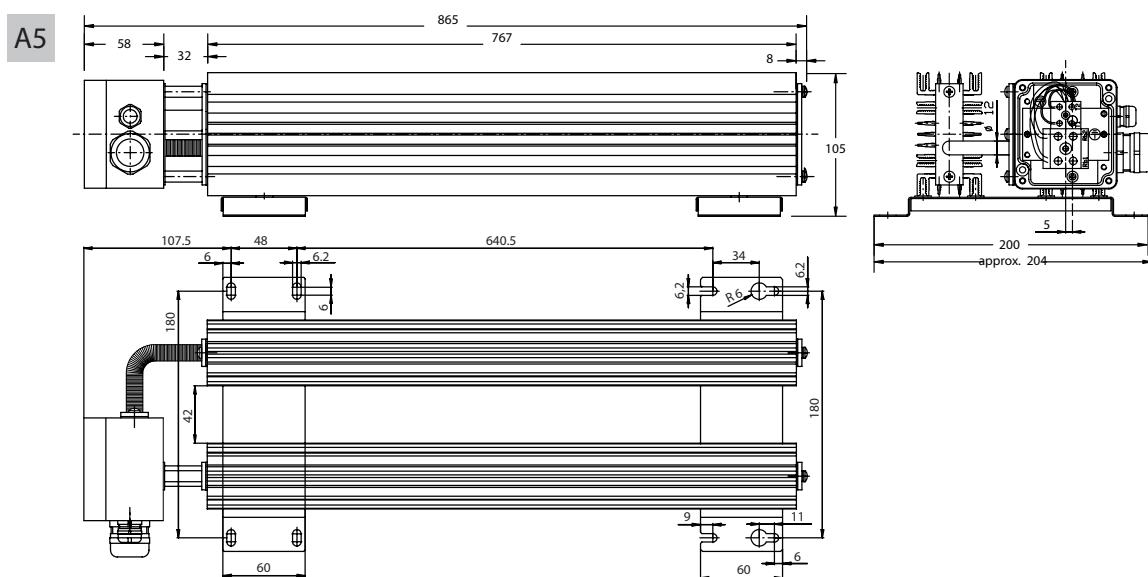
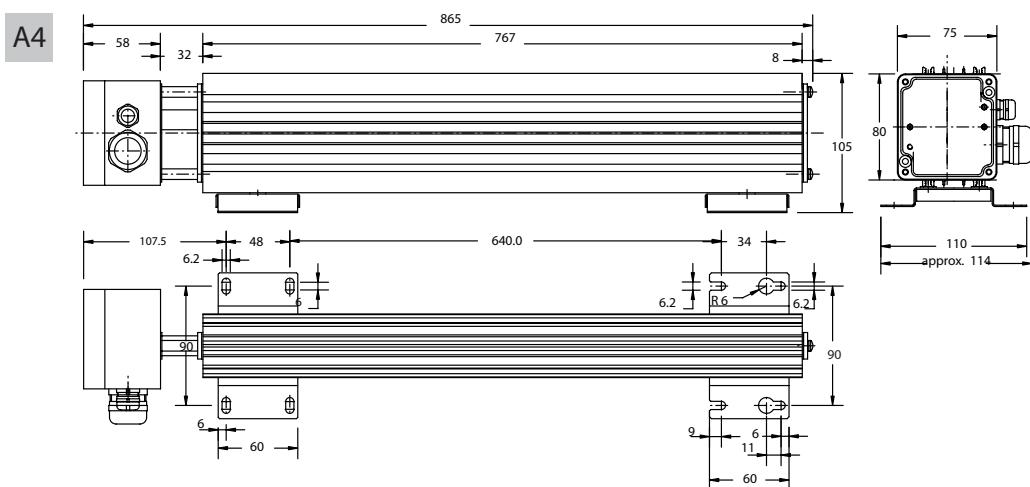
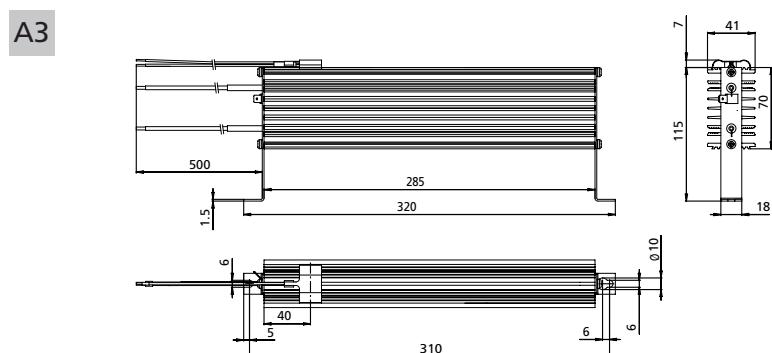
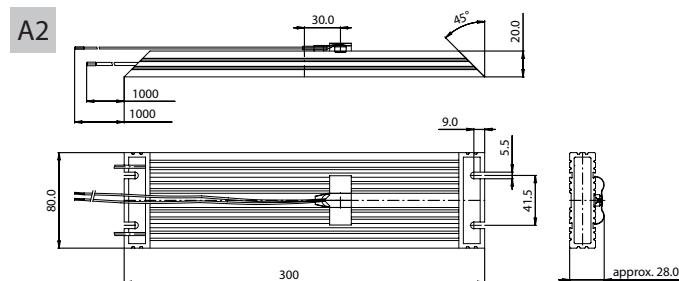
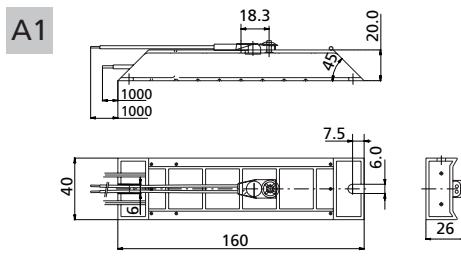
i

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 [$\Omega \pm 10\%$]	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]



G

Mains filters, ServoOne junior



Availability

EMC $\square\square.\square-\square$ Ph,UR

Rated current

Number of phases

Version

EMC19.2-1Ph,UR

Article designation

Ambient conditions	EMCx \square . \square -1Ph,UR	EMCx \square . \square -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	
S022.003	EMC8.2-1Ph,UR	8	2.5				
S022.006	EMC14.2-1Ph,UR	14	5.8	7.9	15	25	
S022.008	EMC19.2-1Ph,UR	19	6.1				0.75

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							
S024.002	EMC5.2-3Ph,UR	5	2				0.75
S024.004							
S022.006				1.7	2.3	70	
S022.008	EMC11.2-3Ph,UR	11	7				0.70
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

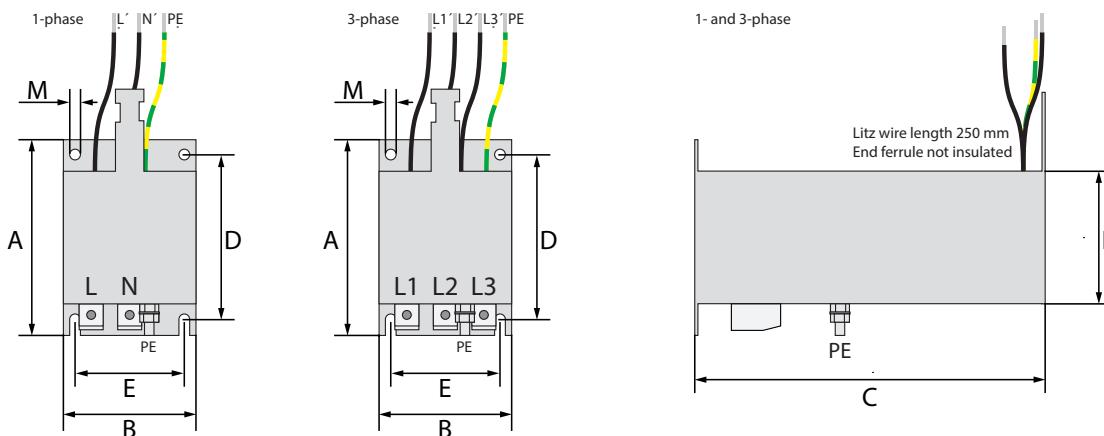
Article designation	Dimensions [mm]							PE	Input		Output Litz wire cross-section
	A	B	C	D	E	F	M Ø		Clamping area [mm ²]	Tightening torque [Nm]	
EMC8.2-1Ph,UR											AWG 16
EMC14.2-1Ph,UR	81	55	145	68	45	55	4	M4	0.2 - 4.0	0.6 - 0.8	AWG 16
EMC19.2-1Ph,UR											AWG 14

Dimensions, three-phase mains filters

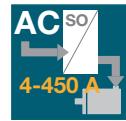
Article designation	Dimensions [mm]							PE	Input		Output Litz wire cross-section
	A	B	C	D	E	F	M Ø		Clamping area [mm ²]	Tightening torque [Nm]	
EMC5.2-3Ph,UR	81	55	145	68	45	55	4	M4	0.2 - 4.0	0.6 - 0.8	AWG 16
EMC11.2-3Ph,UR											

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

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



Mains filters, ServoOne single-axis system



Availability

EMC□□□.1,UR

 Rated current Model

EMC180.1-UR

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)
Mounting height	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 EN 61800-3 (category C2 -residential-)	Motor cable length up to 50 m permitted
RFI suppression to EN 61800-3 (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, repeatable 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				7.5
EMC250.1-UR	250	375	40				8.5
EMC300.1-UR	300	450	40	33.8	7.2	225	9.5
EMC400.1-UR	400	600	55				11.0
EMC500.1-UR	500	750	60				12.5

4) For 60 s, repeatable 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.

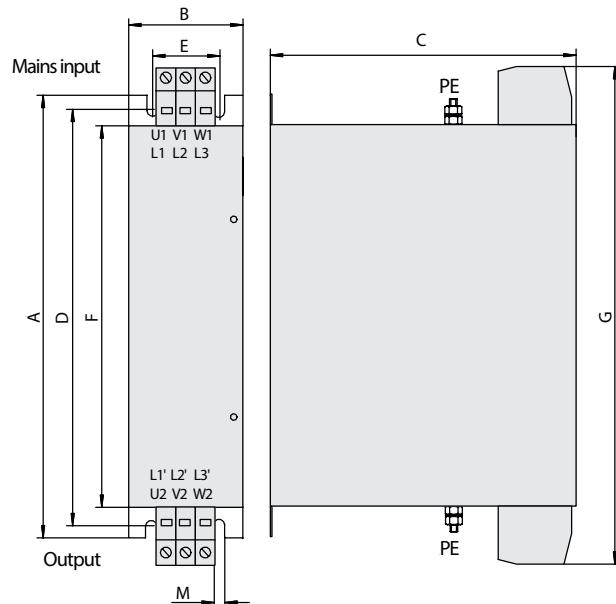
N: Peak value of touch current occurring in normal operation with PE conductor circuit open. At a touch current >3.5 mA the mains filter must be provided with a fixed connection as per EN 50178.

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 (mm ²)	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

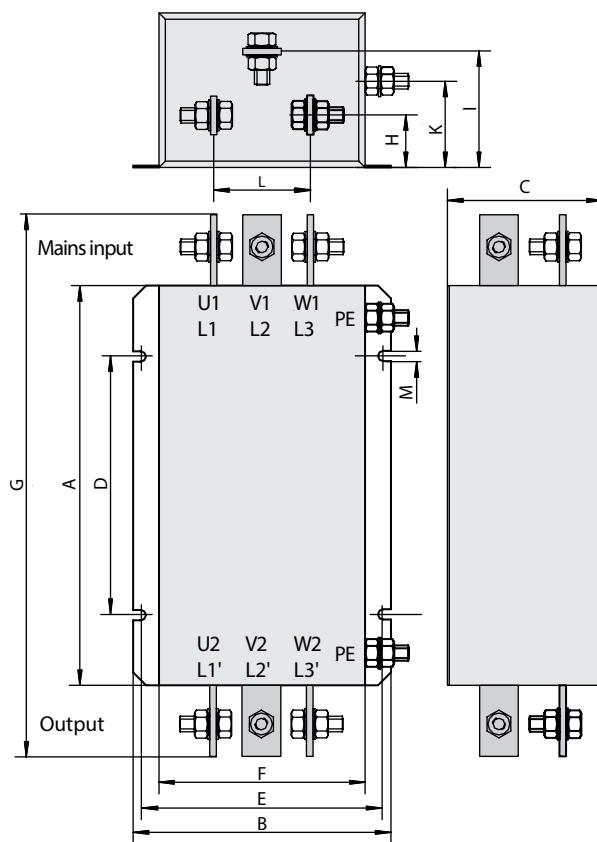
Dimensional drawing for EMC7.1-UR to EMC150.1-UR



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								45					M10	3 x 25	M10
EMC220.1-UR	310	200	120	180	180	160	410		86				M10	4 x 25	M10
EMC250.1-UR								54					M10	5 x 25	M10
EMC300.1-UR										30			M12	6 x 25	M10
EMC400.1-UR	350	240	150	200	220	200	480	69	110				M12	8 x 25	M10
EMC500.1-UR											128		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 (intake 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



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

Availability



Article designation



Cable clips

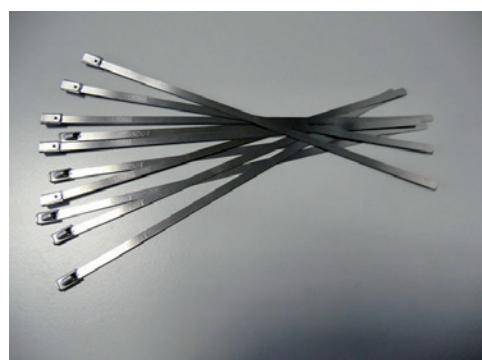


1101.960.0 SCS06	5 pieces clips up to 12 mm
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Availability



Article designation

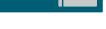


Metal cable ties



1101.970.0 SCS10	10 pieces metal cable ties
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Availability



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

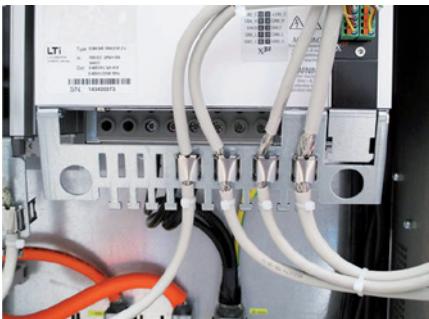


Availability

1101.810.0 SCE01

Shield terminal expansion
Control connections for BG1-4

Article designation



Shield terminal expansion BG5

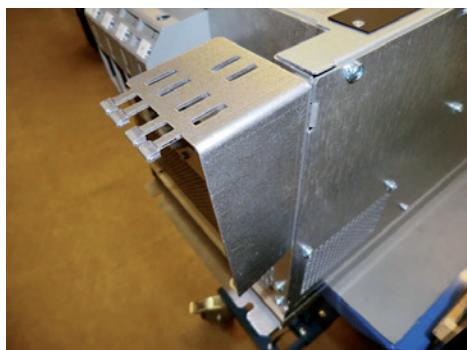


Availability

1101.820.0 SCE05

Shield terminal expansion
Control connections for BG5

Article designation



Shield terminal expansion BG6A and BG 7

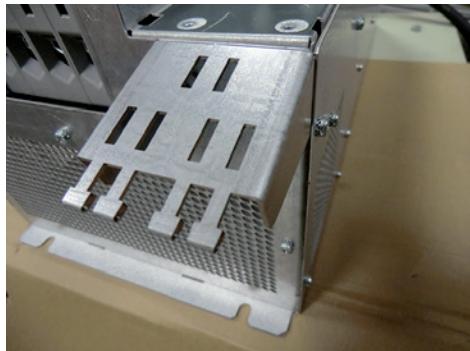


Availability

1101.830.0 SCE06A

Shield terminal expansion
Control connections for BG6A and BG7

Article designation

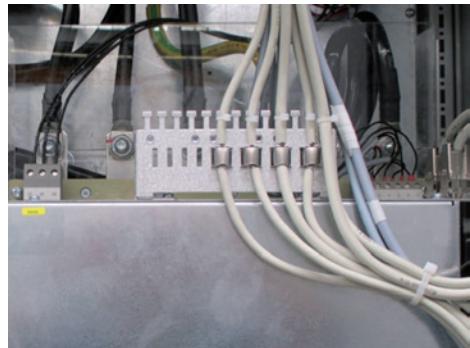


Shield plate BG6



Availability

1101.835.0 SCE06

Shield terminal expansion
Control connections for BG6

Shield terminal expansion BG7

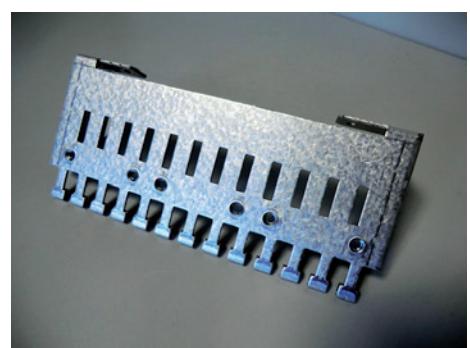


Availability

1101.840.0 SCE07/SPM05

Shield terminal expansion
Control connections for BG7

Shield plates for motor connections

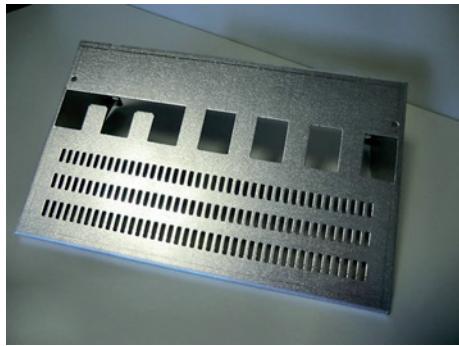
Shield terminal expansion BG5
145 x 65 mm

Availability

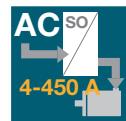
1101.840.0 SCE07/SPM05

Shield plate for BG5

Article designation



Shield plate BG6
280 x 175 mm



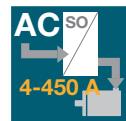
Availability

1101.860.0 SPM06

Shield plate for BG6/BG6A



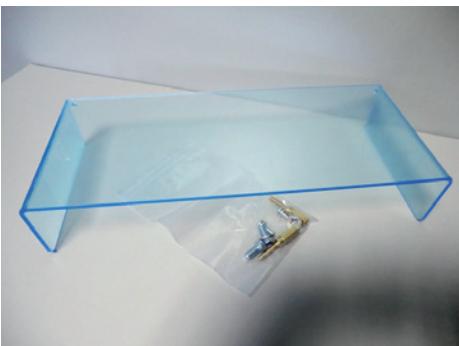
Shield terminal expansion BG7
385 x 230 mm



Availability

1101.870.0 SPM07

Shield plate for BG7
(incl. mounting accessories)



Terminal cover for BG7
380 x 157 mm



Availability

1101.880.0 SPC07

Terminal cover for BG7
(incl. SPM07 and mounting
accessories)

Article designation

Overview, servomotors

Contents

Types



LSH servomotor – the power pack

LSH-050-x to SH-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



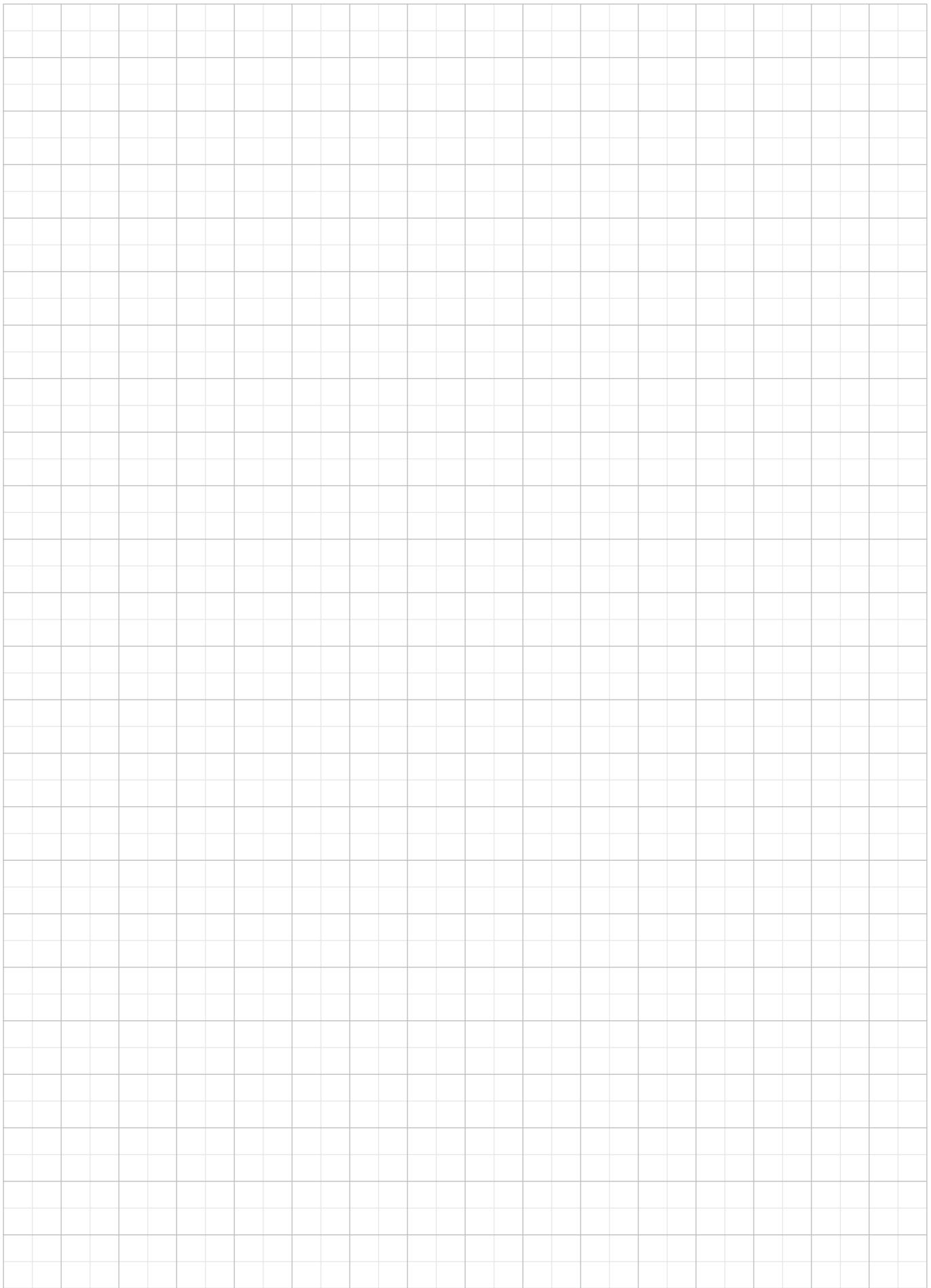
LSP servomotor with optional planetary gearbox –
slim and cost-effective (LSP-04-x to LSP-13-x)



LSP-04-x to LSP-13-x motors among other features with
single-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.

SystemOne Order Catalogue
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