

Servo inverters



0.37 ... 110 kW



Lenze inverters – universally applicable

The servo inverters set new standards in terms of precision and dynamics thanks to their innovative control technology. Pre-designed drive solutions, consisting of geared motors and servo inverters, ensure time savings in engineering and flexibility in production.

Lenze inverters are an important component in modern drive solutions which range from the cloud via controllers to motors and gearmotors.

Typical application fields

- Winders
- Textile machines
- Packaging technology
- Forming technology
- And many more

Features

- The modular and scalable concept allows for the selection of the right inverter required for the respective application.
- The compact design allows an efficient installation for applications where space means money.
- Energy efficiency and high functionality

The benefits for you

- Lower investment costs
- Less control cabinet space
- More productivity
- More time for innovation
- Sustainability
- Reliability

Features at a glance

Servo drives



Actuators are widely used in servo technology. The basis for this in our product portfolio is the i750 cabinet servo inverter with single and double axes in the power range 1.1 ... 15 kW.

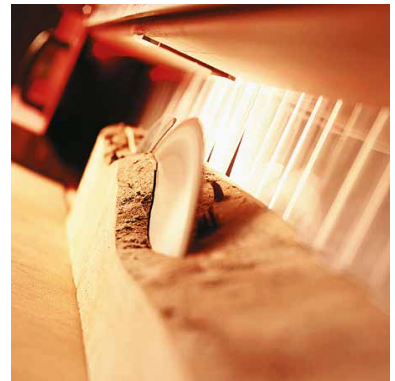
In the power range 0.37 ... 110 kW, the i950 cabinet is available in parallel as an intelligent servo inverter. It is designed for easy coupling to the i750 cabinet in the high power range.

Control performance



Our claim is that the best machines in the world run with Lenze. For this reason, we deal intensively with the machine processes and kinematics of modern machine tasks. Our servo inverters set new standards in integrated control technology.

Functional safety



The safety functions integrated in the inverter are certified in accordance with EN ISO 13849-1.

Depending on the requirements of the machine, three different versions of the servo inverters with integrated safety functions can be used.

Technology application



The i950 cabinet combines state-of-the-art servo technology with the requirements of future-oriented machine automation. In addition to outstanding servo characteristics, the i950 cabinet technology applications (TA) have been implemented. The use of these software modules saves time and money when implementing machine tasks.

Ready for the cloud



Modern production systems are based on comprehensive networking and an extensive exchange of important user data between production and management. At the same time, more networked machines mean more complexity - and therefore higher demands on processes and technologies. Knowledge of the merging of the IT and OT worlds has become a prerequisite for success.

Programmable



Pre-tested, documented and reusable software modules lead to better quality and optimized resource management. You can easily reuse, expand and maintain these software modules - efficiently, reliably, and securely. In addition, standards such as PLCopen ensure the openness of our Lenze system.

Scaled portfolio for machines

As a powerful motion control element in the automation system, the smart servo axis combines several approaches that save the OEM time and money while supporting the user's productivity goals. This is how mechanics, electronics, and digitalization come together to create an intelligent solution.

i750 cabinet – this inverter offers everything for precise and dynamic motion control in complex multi-axis applications.

i950 cabinet – this inverter can be easily integrated into modular machine solutions on the basis of prepared technology applications - parameterizing instead of programming.

Our scalable servo inverters are perfectly tailored to your needs.

The EASY Engineering Tools simplify the engineering of the machine and support the selection of the most suitable controllers, inverters and motors - energy-efficiently and sustainably.

	i750 cabinet	i950 cabinet
		
Design/mounting	Control cabinet	Control cabinet
Power range	1.1 ... 30 kW	0.37 ... 110 kW
Degree of protection	IP20	IP20
Functional safety	Basic Safety - STO Advanced Safety - L or Extended Safety - L	Basic Safety - STO or Extended Safety - LT
Communication	-	CANopen
	EtherCAT	EtherCAT
	-	EtherNet/IP
	-	PROFINET
Additional functions	Energy compensation	Energy compensation
	Regenerative feedback mode	Regenerative feedback mode
	Technology applications (with controller)	Technology applications

Basic Safety - STO

Advanced Safety - L

Extended Safety - L

Extended Safety - LT

Safety function "Safe Torque Off (STO)" via terminals

Safety technology with STO, SS1, SBC and MUT functions via safety bus FSoE

Safety technology with various functions via safety bus FSoE

Safety technology with various functions via safety buses and terminals

Product comparison

Servo inverter i750 cabinet



Servo inverter i950 cabinet



Design/mounting	Control cabinet	Control cabinet
Degree of protection	IP20	IP20

Mains connection/power range

	i750 cabinet	i950 cabinet
1 AC 230/240 V	-	0.37 ... 1.5 kW
3 AC 230/240 V	1.1 ... 30 kW	0.37 ... 5.5 kW
3 AC 400/480 V	1.1 ... 30 kW	0.55 ... 110 kW

Market approvals

	i750 cabinet	i950 cabinet
CE	✓	✓
UKCA	✓	✓
cULus	✓	✓
RoHS	✓	✓
Energy efficiency	Class IE2	Class IE2

Ambient conditions

	i750 cabinet	i950 cabinet
Degree of pollution	2	2
Vibration resistance during operation	Up to 1 g	Up to 1 g
Insulation resistance	Category III	Category III
Operation (EN 60721-3-3)	3K3 (-10 ... +55 °C)	3K3 (-10 ... +55 °C)
Derating	2.5 % / °C above 40 °C	2.5 % / °C above 45 °C
Storage (EN 60721-3-1)	1K3 (-25 ... +60 °C)	1K3 (-25 ... +60 °C)
Transport (EN 60721-3-2)	2K3 (-25 ... +70 °C)	2K3 (-25 ... +70 °C)

Control connections

	i750 cabinet	i950 cabinet
Digital inputs	2	4 (optional: 5 / 4)
Digital outputs	-	- (optional: 5 / 2)
Analog inputs	-	1 (optional 0 / 1)
Analog outputs	-	- (optional (0 / 1)
Relay	-	-

✓ = standard, O = option, P = planned

Protective measures

	i750 cabinet	i950 cabinet
Earth-fault protected	✓	✓
Short-circuit-proof	✓	✓
Overvoltage-proof	✓	✓
Motor stall protection	✓	✓
Motor overtemperature	PT 1000, I ² ×T	PT 1000, I ² ×T
Wiring check	✓	✓

Operation on public networks

	i750 cabinet	i950 cabinet
Device below 1 kW (EN IEC 61000-3-2)	-	With Mains choke
Devices above 1 kW up to 16 A (EN IEC 61000-3-2)	✓	✓
Devices above 16 A up to 75 A (EN IEC 61000-3-12)	With mains choke	With Mains choke

Motor cable lengths

	i750 cabinet	i950 cabinet
EMC category C1	-	-
EMC category C2	Depending on the number of axes	Max. 20 m above this with filter

Fusing

	i750 cabinet	i950 cabinet
Fuses, characteristic	gG/gI or gRL	gG/gI or gRL
Circuit breakers, characteristic	C	B or C
Residual current devices (RCD), characteristic	-	Type B

Communication

	i750 cabinet	i950 cabinet
CANopen	-	O
EtherCAT	✓	✓
EtherNet/IP	-	O
IO-Link	-	-
Modbus RTU	-	-
Modbus TCP	-	-
POWERLINK	-	-
PROFIBUS	-	O
PROFINET	-	O
Digital frequency	-	O

Feedback

	i750 cabinet	i950 cabinet
HIPERFACE DSL® absolute value encoder (One Cable Technology OCT)	O	✓ (up to 22 kW)
Resolver	O	O
HIPERFACE® SinCos absolute value encoder	O	O
Endat (V2.1&V2.2) SinCos absolute value encoder	O	O
SSI absolute value encoder	O	O
SSI SinCos absolute value encoder	O	O

	i750 cabinet	i950 cabinet
TTL incremental encoder	O	O
HTL incremental encoder	-	O

Motor controls

	i750 cabinet	i950 cabinet
V/f characteristic control	✓	✓
Vector control for asynchronous motors	✓	✓
Vector control for synchronous motors	✓	✓
Vector control for synchronous motors with frequency support at low speeds	✓	✓
V/f characteristic control with feedback	✓	✓
Vector control for asynchronous motors with feedback	✓	✓

Additional functions for the motor controls

	i750 cabinet	i950 cabinet
Auto-tuning	✓	✓
Boost	✓	✓
Slip compensation	✓	✓
Oscillation damping	✓	✓
Torque control	✓	✓
Skip frequencies	✓	✓
Motor stall protection	✓	✓
Motor monitoring	✓	✓

Component control/additional functions

	i750 cabinet	i950 cabinet
Fixed frequencies (jog values)	-	-
Motor potentiometer	-	-
Sequence control	-	-
Logic PLC	O (with controller and FAST)	O (With controller and FAST)
Table positioning	O (With controller and FAST)	O (Technology application)
PID controller	-	-
Position counter	-	-
Parameter set changeover	-	-
Oscilloscope function	✓	✓

Technology applications

	i750 cabinet	i950 cabinet
Speed Control	✓ (With controller and FAST)	O
Table Positioning	✓ (With controller and FAST)	O
Electronic Gearbox	✓ (With controller and FAST)	O
Sync and Correction	✓ (With controller and FAST)	O
Winder Dancer	✓ (With controller and FAST)	O
Winder Tension	✓ (With controller and FAST)	O
CiA 402 Advanced	✓ (With controller and FAST)	O
AC Drive Profile	✓ (With controller and FAST)	O

Energy efficiency

	i750 cabinet	i950 cabinet
Energy compensation	✓	✓
Energy-saving function "VFC eco"	✓	✓
Regenerative feedback mode	✓	✓

Additional motor functions

	i750 cabinet	i950 cabinet
Flying restart circuit	✓	✓
DC-injection brake	✓	✓
Holding brake control	✓	✓
Switching frequency setting	✓	✓

System protection

	i750 cabinet	i950 cabinet
Access protection	✓	✓
Temperature monitoring	✓	✓

✓ = standard, O = option, P = planned

	i750 cabinet	i950 cabinet
Mains failure control	✓	✓
Operation on a UPS	-	-

Safe stop functions

	i750 cabinet	i950 cabinet
Safe Torque Off (STO)	✓	✓
Safe stop 1 (SS1)	O	O
Safe stop emergency (SSE)	O	O
Safe stop 2 (SS2)	O	O
Safe Operational Stop (SOS)	O	O
Safe brake control (SBC)	O	O
Cascading STO (CAS)	O	O

Safe monitoring functions

	i750 cabinet	i950 cabinet
Safe maximum speed (SMS)	O	O
Safely limited speed (SLS)	O	O
Safe speed monitoring (SSM)	O	O
Safely limited increment (SLI)	O	O
Safe direction (SDI)	O	O
Safely limited position (SLP)	O	O
Position dependent safe speed (PDSS)	O	O
Safe cam (SCA)	O	O

Auxiliary and maintenance functions for functional safety

	i750 cabinet	i950 cabinet
Safe Homing (SHom)	O	O
Operation mode selector (OMS)	O	O
Repair mode selector (RMS)	O	O
Enable switch (ES)	O	O
Safe Muting (MUT)	O	O

Safety bus

	i750 cabinet	i950 cabinet
FSoE	O	O
CIP Safety	-	-
PROFIsafe	-	O

Options

	i750 cabinet	i950 cabinet
Mains connection	- (terminals)	- (terminals)
Motor connection	- (terminals)	- (terminals)
I/Os	Basic-I/O (standard)	Basic-I/O (standard), additional digital I/O module or Extended-I/O module
Feedback	One Cable Technology OCT, resolver or multi encoder	One Cable Technology OCT, resolver, multi encoder or digital frequency
Functional safety	Basic Safety - STO, Advanced Safety - L or Extended Safety - L	Basic Safety - STO or Extended Safety - LT
Diagnostics	onboard EtherCAT (with controller)	onboard EtherCAT, diagnostic interface

i750 cabinet

The i750 cabinet servo inverter offers everything for precise and dynamic motion control in complex multi-axis applications. Extended safety functions and One Cable Technology reduce wiring and control complexity. Intelligent data-based functions and IIoT enable innovative motion control concepts.

As a single or double axis, the i750 cabinet with matching power supply module fits seamlessly into the Lenze automation system. The strengths can be seen in numerous applications in a network with Lenze controllers and the FAST Application Software Toolbox. The scalable range of hardware, software, engineering services, and digital services supports the realization of end-to-end automation systems from the cloud to the drive shaft.

As a power extension of the i750 cabinet servo inverter in the range of 45 ... 110 kW, the i950 cabinet servo inverter can be used.

Mains connection/power range

3 AC 230/240 V	1.1 ... 30 kW
3 AC 400/480 V	1.1 ... 30 kW

(DC supply via power supply module)

Highlights

- Integrated DC-bus connection
- Small overall width from 50 mm for the double axis
- Axis modules capable of multiple overloads for peak output currents between 5 and 64 A, double axes up to 32 A
- One Cable Technology OCT
- Autotuning function for quick and easy controller setting
- Integrated safety technology with a wide range of functions, complies with up to SIL 3/PL e Cat. 4



Product overview

Power supply modules

V_{mains} [V]	P_{rated} [kW]	I_{DC} [A]	I_{rated} [A]	Degree of protection	[kg]	H x W x D [mm]	Info	Product
3 AC 230/400/480 V	-	30	-	IP20	2.5	350 x 49.5 x 261		i700-CV30/400-3
	-	60	-	IP20	5.3	350 x 99.5 x 261		i700-CV60/400-3

Axis modules

V_{mains} [V]	P_{rated} [kW]	I_{DC} [A]	I_{rated} [A]	Degree of protection	[kg]	H x W x D [mm]	Info	Product
-	1.1	-	5	IP20	2.7	350 x 49.5 x 261		i750-C1.1/400-3
-	2.2	-	9.3	IP20	2.7	350 x 49.5 x 261		i750-C2.2/400-3
-	4	-	18.7	IP20	2.7	350 x 49.5 x 261		i750-C4/400-3
-	7.5	-	29.8	IP20	5.2	350 x 99.5 x 261		i750-C7.5/400-3
-	11	-	44.6	IP20	5.2	350 x 99.5 x 261		i750-C11/400-3
-	15	-	59.2	IP20	5.2	350 x 99.5 x 261		i750-C15/400-3
-	22	-	89	IP20		350 x 149.5 x 261	P	i750-C22/400-3
-	30	-	113	IP20		350 x 149.5 x 261	P	i750-C30/400-3
-	1.1	-	9.3	IP20	2.9	350 x 49.5 x 261		i750-C1.1/400-3
-	2.2	-	18.7	IP20	2.9	350 x 49.5 x 261		i750-C2.2/400-3
-	4	-	37	IP20	5.2	350 x 99.5 x 261		i750-C4/400-3
-	7.5	-	59.2	IP20	5.2	350 x 99.5 x 261		i750-C7.5/400-3

Options



Communication	Functional safety	Feedback
	 Basic Safety - STO	 One Cable Technol- ogy OCT
	 Advanced Safety - L	 Resolver
	 Extended Safety - L	 Multi encoder

Axis modules

Single axis	Axis module for a motor
Double axis	Axis module for two motors

Communication and I/Os

	Communication		I/Os	
Basic-I/O	EtherCAT	RJ45	2 x digital input (per axis), external 24 V supply	3-pole spring terminal, 2-pole spring terminal

Functional safety

Basic Safety - STO	Safe torque off (STO)	3-pole double spring terminal
Advanced Safety - L	Stop functions: Safe torque off (STO), safe stop 1 (SS1), safe brake control (SBC) Safety bus: FSoE	
Extended Safety - L	Stop functions: Safe torque off (STO), safe stop 1 (SS1), safe stop 2 (SS2), safe stop emergency (SSE), safe operating stop (SOS), safe brake control (SBC) Monitoring functions: Safe maximum speed (SMS), safely limited speed (SLS), safe speed monitoring (SSM), safely limited increment (SLI), safe direction (SDI), safely limited position (SLP), position-dependent safe speed (PDSS), safe cam (SCA) Safety bus: FSoE	

Feedback

One Cable Technology OCT	Motor feedback	HIPERFACE DSL® absolute value encoder	2-pole spring terminal
Resolver	Motor feedback	Resolver	9-pole Sub-D
Multi encoder	Motor feedback	HIPERFACE® SinCos absolute value encoder Endat SinCos absolute value encoder SSI absolute value encoder SSI SinCos absolute value encoder SinCos incremental encoder TTL incremental encoder	15-pole Sub-D

Accessories

System cables

		Info	ID
OCT motor cables			
Motor cables	See brochure "Accessories for frequency and servo inverters"		
Blower cables			
Feedback cables			
Communication cables	0.25 m Ethernet cable	 	13426097
	0.5 m Ethernet cable	 	13641901
	1 m Ethernet cable	 	13641902
	2 m Ethernet cable	 	13641903
	3 m Ethernet cable	 	13641904
	5 m Ethernet cable	 	13641905

Power supply units

24 V power supply units	See brochure "Accessories for frequency and servo inverters"		
48 V power supply units			

Accessories – power supply modules

Connection

		Info	ID
Mounting kits	Mounting kit for 30 A power supply module	 	13402984
	Mounting kit for 60 A power supply module	 	13402985

RFI and mains filters

RFI and mains filters IOFAE	See brochure "Accessories for frequency and servo inverters"		
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Mains chokes

EZAELN3 mains chokes	See brochure "Accessories for frequency and servo inverters"		
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Braking operation and brake control

Brake resistors	See brochure "Accessories for frequency and servo inverters"		
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i950 cabinet

The intelligent i950 cabinet servo inverter can be easily integrated into modular machine solutions on the basis of prepared technology applications - parameterizing instead of programming.

The same architecture, the same engineering and the use of the same application software, based on decades of application experience, dissolve the boundaries between centralized and decentralized motion control. Our FAST application software toolbox becomes universally usable. If required, the pre-designed software modules can be easily customized and extended.

In addition, the i950 cabinet servo inverter serves as a power extension to the i750 cabinet servo inverter in the Lenze automation system in the range of 45 ... 110 kW.

The requirements of the Ecodesign Directive are met.

Mains connection/power range

1 AC 230 V	0.37 ... 1.5 kW
3 AC 230 V	0.37 ... 5.5 kW
3 AC 400 V	0.55 ... 110 kW

Highlights

- Prepared technology applications, e.g. table positioning, electronic gearbox, winder
- One Cable Technology OCT
- Modular scalability for feedback system and fieldbus connections
- Autotuning function for quick and easy controller setting
- Integrated safety technology with a wide range of functions, complies with up to SIL 3/PL e Cat. 4



Product overview

V_{mains} [V]	P_{rated} [kW]	I_{rated} [A]	Degree of protection	[kg]	H x W x D [mm]	Info	Product
1/3 AC 230/240 V	0.37	2.4	IP20	1.6	287 x 60 x 187		i950-C0.37/230-2
	0.55	3.2	IP20	1.6	287 x 60 x 187		i950-C0.55/230-2
	0.75	4.2	IP20	1.6	287 x 60 x 187		i950-C0.75/230-2
	1.5	7	IP20	1.6	287 x 60 x 187		i950-C1.5/230-2
3 AC 230/240 V	2.2	9.6	IP20	1.6	287 x 60 x 187		i950-C2.2/230-3
	4	16.5	IP20	3.9	320 x 120 x 187		i950-C4.0/230-3
	5.5	23	IP20	3.9	320 x 120 x 187		i950-C5.5/230-3
3 AC 400/480 V	0.55	1.8 / 1.6	IP20	1.6	287 x 60 x 187		i950-C0.55/400-3
	0.75	2.4 / 2.1	IP20	1.6	287 x 60 x 187		i950-C0.75/400-3
	2.2	5.6 / 4.8	IP20	1.6	287 x 60 x 187		i950-C2.2/400-3
	4	9.5 / 8.2	IP20	1.6	287 x 60 x 187		i950-C4.0/400-3
	7.5	16.5 / 14	IP20	3.9	320 x 120 x 187		i950-C7.5/400-3
	11	23.5 / 21	IP20	3.9	320 x 120 x 187		i950-C11/400-3
	15	32 / 27	IP20	3.9	320 x 120 x 187		i950-C15/400-3
	22	47 / 40.4	IP20	10.7	371 x 205 x 253		i950-C22/400-3
	30	61 / 52	IP20	16.7	520 x 250 x 245		i950-C30/400-3
	45	89 / 77	IP20	16.7	520 x 250 x 245		i950-C45/400-3
	55	110 / 96	IP20	24	623 x 250 x 281		i950-C55/400-3
	75	150 / 124	IP20	24	623 x 250 x 281		i950-C75/400-3
	90	180 / 156	IP20	36	775 x 258 x 321		i950-C90/400-3
	110	212 / 180	IP20	36	775 x 258 x 321		i950-C110/400-3

Options



Communication

Functional safety

Feedback

Communication and I/Os

	Slot	Communication	
CANopen network module	Top slot	CANopen	3-pole double spring terminal
EtherCAT network module	Top slot	EtherCAT	RJ45
EtherNet/IP network module	Top slot	EtherNet/IP	RJ45
PROFINET network module	Top slot	PROFINET	RJ45
PROFIBUS network module	Top slot	PROFIBUS	9-pole Sub-D
	Slot	I/Os	
Basic-I/O	- (permanently integrated)	4 x digital input 1 x digital output 1 x analog input	10-pole spring terminal
Digital I/O module	Slot A or B	5 x digital input 5 x digital output	10-pole spring terminal
Extended-I/O module	Slot A or B	4 x digital input 2 x digital output 1 x analog input 1 x analog output	Digital inputs can also be used for HTL incremental encoders 10-pole spring terminal

Feedback

	Slot	Feedback	
One Cable Technology OCT	- (No module may be inserted in slot A)	Motor feedback	HIPERFACE DSL® absolute value encoder 2-pole spring terminal
Resolver module	Slot A	Motor feedback	Resolver 9-pole Sub-D
Multi-encoder module	Slot A	Motor feedback	HIPERFACE® SinCos absolute value encoder Endat SinCos absolute value encoder SSI absolute value encoder SSI SinCos absolute value encoder TTL incremental encoder 15-pole Sub-D
Resolver module	Slot B	Position feedback	Resolver 9-pole Sub-D
Multi-encoder module	Slot B	Position feedback	HIPERFACE® SinCos absolute value encoder Endat SinCos absolute value encoder SSI absolute value encoder SSI SinCos absolute value encoder TTL incremental encoder 15-pole Sub-D

	Slot	Feedback		
Digital frequency module	Slot B	Frequency signal (Master/slave)	Digital frequency	2 x 9-pole Sub-D
Functional safety				
Basic Safety - STO	Safe torque off (STO)			3-pole double spring terminal
Extended Safety - LT	Stop functions: Safe torque off (STO), safe stop 1 (SS1), safe stop 2 (SS2), safe stop emergency (SSE), safe operating stop (SOS), safe brake control (SBC) Monitoring functions: Safe maximum speed (SMS), safely limited speed (SLS), safe speed monitoring (SSM), safely limited increment (SLI), safe direction (SDI), safely limited position (SLP), position-dependent safe speed (PDSS), safe cam (SCA) Safety bus: PROFIsafe, FSoE			1 x 14-pole spring terminal 1 x 16-pole spring terminal
FAST Application Software				
Application Credit	50 ... 4000 Credit			

Accessories

Connection

Shield mounting	See brochure "Accessories for frequency and servo inverters"
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System cables

		Info	ID
OCT motor cables			
Motor cables			
Blower cables	See brochure "Accessories for frequency and servo inverters"		
Feedback cables			
Digital frequency cables			
	0.5 m Ethernet cable	 	13641901
	1 m Ethernet cable	 	13641902
Communication cables	2 m Ethernet cable	 	13641903
	3 m Ethernet cable	 	13641904
	5 m Ethernet cable	 	13641905

RFI and mains filters

RFI and mains filters IOFAE	See brochure "Accessories for frequency and servo inverters"
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Mains chokes

EZAELN3 mains chokes	See brochure "Accessories for frequency and servo inverters"
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Braking operation and brake control

Brake resistors	See brochure "Accessories for frequency and servo inverters"
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Power supply units

24 V power supply units	See brochure "Accessories for frequency and servo inverters"
48 V power supply units	

Electrical protection devices and busbars

Fuses	
Fuse holders	See brochure "Accessories for frequency and servo inverters"
Busbars	

Power recovery

		Info	ID
Regenerative modules	13 kW r750 regenerative module for feeding energy back into the mains	 	13603882
	26 kW r750 regenerative module for feeding energy back into the mains	 	13603883



Accessories

By simply selecting the accessories, the operation of the inverter can be optimally adjusted. This is how a modern drive solution can be safely achieved.

The scalable concept enables easy selection, sophisticated accessories saves space and time during installation, and energy-efficient requirements can be optimally solved. Your benefits from this are more productivity and functional safety as well as sustainability and reliability.

Information on accessories can be found on the Internet and in the brochure "[Accessories for frequency and servo inverters](#)".



