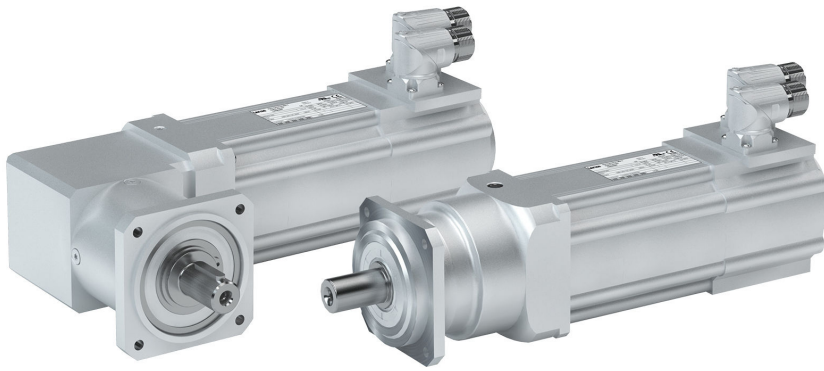




Geared motors

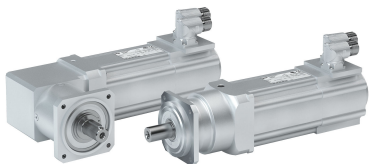
g7xx-P and g8xx-P / MCS planetary geared servo motor
g7xx-B and g8xx-B / MCS bevel planetary geared servo motor

Contents

About this document	5
Document description	5
Further documents	5
Notations and conventions	6
Safety instructions	7
Basic safety instructions.....	7
Application as directed	7
Residual hazards	8
Product information	9
Identification of the products.....	9
Nameplates.....	9
Product codes	10
Transport	14
Storage	15
Mechanical installation	16
Important notes.....	16
Preparation.....	16
Dimensions.....	16
Installation.....	16
Mounting positions	16
Ventilation.....	16
Mounting.....	17
Electrical installation	19
Important notes.....	19
Preparation.....	19
Motor connection.....	20
Connection via terminal box.....	20
Connection via ICN connector	23
Commissioning	30
Important notes.....	30
Before initial switch-on	30
Functional test.....	30
Maintenance	31
Repair	32
Diagnostics and fault elimination	33
Malfunctions.....	33

Contents

Technical data	34
Standards and operating conditions	34
Conformities and approvals	34
Protection of persons and device protection	34
EMC data	34
Environmental conditions	35
Motor data	36
Rated data	36
Inverter mains connection 400 V, Self-ventilated motors	36
Inverter mains connection 400 V, Forced ventilated motors	42
Inverter mains connection 230 V, Self-ventilated motors	46
Environmental notes and recycling	49



About this document

WARNING!

Read this documentation carefully before starting any work.

► Please observe the safety instructions!

Document description

This document is intended for skilled personnel who work with the products described.

The data and information compiled in this document serve to support you in the electrical and mechanical installation and commissioning.

- The document is only valid together with the complete documentation of the product!
- For safety-rated attachments observe the enclosed operating instructions of the manufacturer!
- The document includes safety instructions which must be observed.
- All persons working on and with the drives must have the documentation at hand during work and observe the information and notes relevant for it.
- The documentation must always be complete and in a perfectly readable state.

Further documents

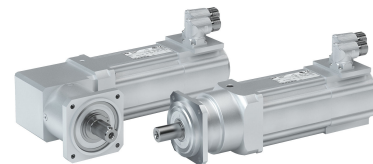


Information and tools with regard to the Lenze products can be found on the Internet:

www.Lenze.com → Downloads

About this document

Notations and conventions



Notations and conventions

Conventions are used in this document to distinguish between different types of information.

Numeric notation		
Decimal separator	Point	Generally shown as a decimal point. Example: 1 234.56
Warnings		
UL Warnings	UL	Are used in English and French.
UR warnings	UR	
Text		
Engineering Tools	" "	Software Example: "Engineer", "EASY Starter"
Icons		
Page reference		Reference to another page with additional information. Example:  16 = see page 16
Documentation reference		Reference to other documentation with additional information. Example:  EDKxxx = see documentation EDKxxx

Layout of the safety instructions

DANGER!

Indicates an extremely hazardous situation. Failure to comply with this instruction will result in severe irreparable injury and even death.

WARNING!

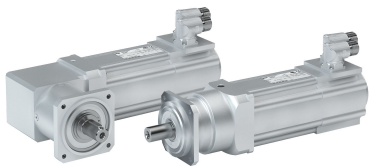
Indicates an extremely hazardous situation. Failure to comply with this instruction may result in severe irreparable injury and even death.

CAUTION!

Indicates a hazardous situation. Failure to comply with this instruction may result in slight to medium injury.

NOTICE

Indicates a material hazard. Failure to comply with this instruction may result in material damage.



Safety instructions

Basic safety instructions

Disregarding the following basic safety instructions and safety information may lead to severe personal injury and damage to property!

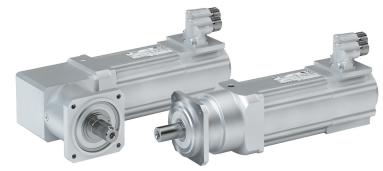
- Only use the product as directed.
- Never commission the product in the event of visible damage.
- Never modify the product technically.
- Never commission the product before assembly has been completed.
- Never operate the product without the required covers.
- Connect/disconnect all pluggable connections only in deenergized condition!
- Only remove the product from the installation in the deenergized state.
- The product can – depending on their degree of protection – have live, movable or rotating parts during or after operation. Surfaces can be hot.
- Observe all specifications of the corresponding documentation supplied. This is the condition for safe and trouble-free operation and the achievement of the specified product features.
- The procedural notes and circuit details given in the associated documentation are suggestions and their transferability to the respective application has to be checked. The manufacturer of the product does not take responsibility for the suitability of the process and circuit proposals.
- All work with and on the product may only be carried out by qualified personnel.
IEC 60364 and CENELEC HD 384 define the qualifications of these persons:
 - They are familiar with installing, mounting, commissioning, and operating the product.
 - They have the corresponding qualifications for their work.
 - They know and can apply all regulations for the prevention of accidents, directives, and laws applicable at the place of use.

Application as directed

- The product is a professional equipment intended for use by trades, specific professions or industry and not for sale to the general public. IEC 60050 [IEV 161-05-05]
- To prevent personal injury and damage to property, higher-level safety and protection systems must be used!
- All transport locks must be removed.
- Mounted eye bolts on the motor are not suitable for transporting geared motors.
- The product may only be operated under the specified operating conditions and in the specified mounting positions.
- The product may only be operated on the inverter.
- Built-in brakes must not be used as safety brakes.
- The product must not be operated in private areas, in potentially explosive atmospheres and in areas with harmful gases, oils, acids and radiation.

Safety instructions

Residual hazards



Residual hazards

Even if notes given are taken into consideration and protective measures are implemented, the occurrence of residual risks cannot be fully prevented.

The user must take the residual hazards mentioned into consideration in the risk assessment for his/her machine/system.

If the above is disregarded, this can lead to severe injuries to persons and damage to property!

Product

Observe the warning labels on the product!



Dangerous electrical voltage:

Before working on the product, make sure there is no voltage applied to the power terminals! After mains disconnection, the power terminals will still carry the hazardous electrical voltage for the time given next to the symbol!



High leakage current:

Carry out fixed installation and PE connection in compliance with:
EN 61800-5-1 / EN 60204-1



Hot surface:

Use personal protective equipment or wait until the device has cooled down!

Protection of persons

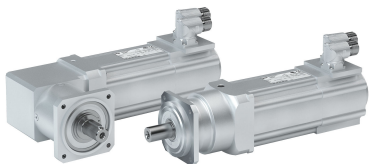
- The power terminals may carry voltage in the switched-off state or when the motor is stopped.
 - Before working, check whether all power terminals are deenergized.
- Voltages may occur on the drive components (e.g. capacitive, caused by inverter supply).
 - Careful earthing in the marked positions of the components must be carried out.
- There is a risk of burns from hot surfaces.
 - Provide protection against accidental contact.
 - Use personal protective equipment or wait until the device has cooled down.
 - Prevent contact with flammable substances.
- There is a risk of injury due to rotating parts.
 - Before working on the drive system, ensure that the motor is at a standstill.
- There is a risk of accidental start-up or electric shock.

Motor protection

- Installed temperature sensors are no full protection for the machine.
 - If necessary, limit the maximum current. Parameterize the inverter so that it will be switched off after some seconds of operation with $I > I_{rated}$, especially if there is a risk of blocking.
 - Integrated overload protection does not prevent overloading under all conditions.
- The fuses are no motor protection.
 - Use a current-dependent motor protection switch.
 - Use the built-in temperature sensors.

Gearbox protection

- Excessive torques will damage the gearboxes.
 - Do not exceed the output torques specified on the nameplate.
- Excessive input speeds lead to increased temperatures.
 - Do not exceed the input speeds specified on the nameplate.
- Avoid excessive lateral forces on the gearbox shaft.
 - Align the shafts of the gearbox and driven machine exactly with each other.
- Machine elements can be damaged by a lack of lubricant.
 - When changing the lubricant, use the lubricant type and quantity specified on the nameplate.



Product information

Identification of the products

Nameplates



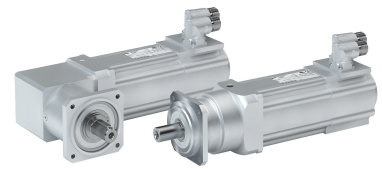
The nameplate is attached to the motor.

Lenze					1		DE		17			
3					2		8.2		16		7.6	
4					8.1		7.1		7.4		7.7	
9					14		7.2		18		7.8	
10					10.1		10.2		10.3		10.4	
11					11.1		11.2		11.3		5.7	
12.1					12.2		5.9		5.8		5.4	
13					12.3		19					

Pos.	Contents	Pos.	Contents
1	Manufacturer/production location	9	Encoder type designation
2	Motor type/standard	10	Brake data
3	Gearbox type	10.1	Brake type
4	Motor type	10.2	AC/DC brake voltage
5.4	Ratio (gearbox)	10.3	Performance
5.7	Load capacity (gearbox)	10.4	Braking torque
5.8	Output speed (geared motor)	11	Fan specifications
5.9	Output torque (geared motor)t	11.1	AC/DC fan voltage
7.1	Rated voltage/motor voltage	11.2	Rated frequency
7.2	Rated current/motor current	11.3	Electrical power input
7.3	Rated power/motor power	12.1	Material number
7.4	Output torque (motor)	12.2	Serial number
7.5	Motor speed [rpm]	12.3	Year of manufacture/week of manufacture
7.6	Motor code for controller parameterization (C86 Y 1. Frequency)	13	Bar code
7.7	Rated frequency	14	Permissible ambient temperature
7.8	Cos phi 1. Frequency	15	Weight
8.1	Temperature class (motor)	16	UL file number
8.2	Degree of protection (motor)	17	Conformity/approvals
8.3	Motor protection	18	Continuous standstill torque M_0 [Nm]
		19	Additional customer data

Product information

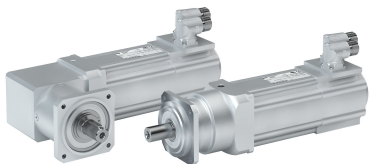
Identification of the products
Product codes



Product codes

Planetary and bevel planetary gearbox product code g7□0

Example		G	7	5	A	P	113	M	V	C	R	1	C00
Portfolio segment	Gearbox	G											
Product	7		7										
Product type	0			0									
	2			2									
	3			3									
	5			5									
	8			8									
Product generation	A				A								
Product type	bevel planetary gearbox					B							
	Planetary gearbox					P							
torque (Examples)	44 Nm						044						
	97 Nm						097						
	130 Nm						113						
	195 Nm						119						
Type of construction	Geared motor							M					
	Gearbox							N					
Output shaft	Output shaft with featherkey								V				
	Smooth output shaft								G				
	Flanged output shaft with dowel hole								E				
Housing type	Without foot with centering									C			
Flange mounting	Without flange										R		
	Flange with through holes										K		
Number of stages	1-stage											1	
	2-stage											2	
	3-stage											3	
Motor mounting	Motor integrated												C00
	IEC adapter with jaw coupling												Nxx Txx
	NEMA adapter with jaw coupling												Axx
	Servo motor-adapter with plug-in hollow shaft												Sxx



Product information

Identification of the products
Product codes

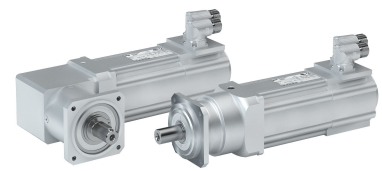
Planetary and bevel planetary gearbox product code g8□0

Example		G	8	4	A	P	040	M	V	C	R	1	C00
Portfolio segment	Gearbox	G											
Product	8		8										
Product type	2			2									
	4			4									
	5			5									
	6			6									
	7			7									
	8			8									
Product generation	A				A								
Product type	bevel planetary gearbox					B							
	Planetary gearbox					P							
torque (Examples)	40 Nm						040						
	80 Nm						080						
	130 Nm						113						
	300 Nm						130						
	1000 Nm						210						
	1800 Nm						218						
Type of construction	Geared motor							M					
	Gearbox							N					
Output shaft	Output shaft with featherkey								V				
	Smooth output shaft								G				
	Toothed output shaft								Z				
	Flanged output shaft								F				
	Flanged output shaft with dowel hole								E				
	Flanged hollow output shaft with dowel hole								K				
	Shrink disc								S				
	Hollow shaft								H				
Housing type	Without foot with centering									C			
Flange mounting	Without flange										R		
	Flange with through holes										N		
Number of stages	1-stage											1	
	2-stage											2	
Motor mounting	Motor integrated												C00
	IEC adapter with jaw coupling												Nxx Txx
	NEMA adapter with jaw coupling												Axx
	Servo motor-adapter with plug-in hollow shaft												Sxx

Product information

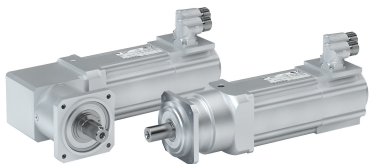
Identification of the products

Product codes



Product code of MCS synchronous servo motor

Example		M	C	S	06	C	41	-	RS0	B0
Meaning	Variant	Product code								
Product family	Motor	M								
Type	Compact servo motors		C							
Version	Synchronous			S						
Motor frame size	Square dimension 62 mm				06					
	Square dimension 89 mm				09					
	Square dimension 116 mm				12					
	Square dimension 142 mm				14					
	Square dimension 192 mm				19					
Overall length						C ... P				
Rated speed	rpm x 100						11 ... 60			
Inverter mains connection	3 x 230 V							L		
	3 x 400 V							-		
Feedback	SinCos absolute value encoder, single-turn, EnDat AS2048-5V-E								ECN	
	Digital absolute value encoder, multi-turn, Hiperface DSL® AM20-8V-D								EKM	
	SinCos absolute value encoder, multi-turn, EnDat AM32-5V-E								EQI	
	SinCos absolute value encoder, multi-turn, EnDat AM2048-5V-E								EQN	
	Digital safety absolute value encoder, multi-turn, Hiperface DSL® AM20-8V-D2								EVM	
	Resolver p=1								RS0	
	Safety resolver, p=1 RV03								RV0	
	SinCos absolute value encoder, multi-turn, Hiperface® AM128-8V-H								SKM	
	SinCos absolute value encoder, multi-turn, Hiperface® AM1024-8V-H								SRM	
	SinCos absolute value encoder, single-turn, Hiperface® AS1024-8V-H								SRS	
	SinCos safety absolute value encoder, multi-turn, Hiperface® AM128-8V-K2								SVM	
	SinCos safety absolute value encoder, multi-turn, Hiperface® AM1024-8V-K2								SVM	
	SinCos safety absolute value encoder, single-turn, Hiperface® AS1024-8V-K2								SVS	
Brake	Without brake									B0
	Permanent magnet brake DC 24V									P1
	Permanent magnet brake DC 24V, reinforced									P2

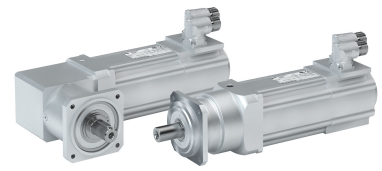


Product information

Identification of the products
Product codes

Product code feedbacks

Example		AS	1024	-	8 V	-	K	2
Meaning	Variant	Product code						
Product family	Resolver	RS						
	Resolver for safety function	RV						
	Incremental encoder	IG						
	Incremental encoder with commutation signal	IK						
	Absolute value encoder, singleturn	AS						
	Absolute value encoder, multiturn	AM						
Number	2-pole Resolver for servo motors		0					
	2-pole Resolver for three-phase AC motors		1					
	Number of pole pairs for resolvers		2					
			3					
			4					
		...						
Number of bits, steps or increments per revolution		20						
		32						
		128						
		512						
		1024						
		2048						
	...							
Supply voltage					5 V 8 V 15 V 24 V ...			
Interface or signal level	Standard							
	TTL						T	
	HTL (for incremental encoders)						H	
	Hiperface (for absolute value encoders)						H	
	EnDat						E	
	SinCos 1 Vss						S	
	Digital						D	
	For safety function							
	TTL						U	
	HTL (for incremental encoders)						K	
	Hiperface (for absolute value encoders)						K	
	EnDat						F	
	SinCos 1 Vss						V	
	Digital						D	
	Safety Integrity Level (SIL)							1 2 3 4



Transport

- Ensure appropriate handling.
- Make sure that all component parts are securely mounted. Secure or remove loose component parts.
- Only use safely fixed transport aids (e.g., eye bolts or support plates).
- Do not damage any components during transport.
- Avoid electrostatic discharges on electronic components and contacts.
- Avoid impacts.
- Check the carrying capacity of the hoists and load handling devices. The weights can be found in the shipping documents.
- Secure the load against tipping and falling down.
- Standing beneath suspended loads is prohibited.



The transport weights can be found in the shipping documents!



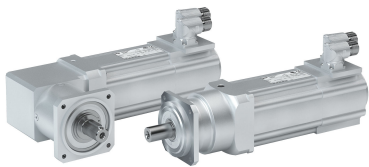
The motors mounted on the gearbox are sometimes equipped with ears. These are exclusively intended for mounting the motor on/removing the motor from the gearbox and must not be used for the complete geared motor!

CAUTION!

Danger from tipping or falling loads!

Standing beneath suspended loads is prohibited!

- ▶ Use additional appropriate lifting aids, if required, to achieve a direction of loading which is as vertical as possible (highest load carrying capacity). Secure lifting aids against shifting!
- ▶ Screw in the transport aids completely. They must have even and full-surface contact!
- ▶ Transport aids must be loaded vertically in the direction of the screw axis! Diagonal or lateral tension reduces the load carrying capacity! Observe data in standard DIN 580!



Storage

Storage up to one year:

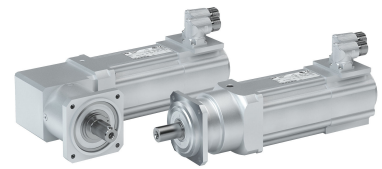
- Observe the climatic conditions according to the technical data
 - [► Environmental conditions](#)  35
- Store in a dry, low-vibration environment ($V_{\text{eff}} < 0.2 \text{ mm/s}$) without aggressive atmosphere in the interior
- Protect from dust, shocks and sunlight
- Avoid temperature changes with condensate formation.
- Treat damaged corrosion protection on shafts and bare surfaces subsequently

Storage for more than one year, up to two years:

- Apply a long-term corrosion preventive (e.g. Anticorit BW 366 from the Fuchs company) to the shafts and uncoated surfaces before storing the motor away.

Mechanical installation

Important notes
Mounting positions



Mechanical installation

Important notes

- Install the product according to the information in the chapter "Standards and operating conditions".
 - ▶ [Standards and operating conditions](#) 34
- The technical data and the data regarding the supply conditions can be found on the nameplate and in this documentation.
- Ambient media – especially chemically aggressive ones – may damage shaft sealing rings, lacquers and plastics.
- Lenze offers special surface and corrosion protection in this case.

Preparation

- Protect shaft sealing rings from contact with solvents.
- Remove protection covers from shafts.
- Thoroughly remove anticorrosion agents from the shaft and from flange faces.
- Draw the transmission elements onto the output shaft only by using the centering thread.
- Align the output shaft and transmission elements exactly to avoid tensions.
- Mount belt pulleys, sprockets, or gear wheels as close as possible to the shaft shoulder in order to keep the bending load of the shaft and the bearing forces at a minimum level.
- Tighten all screw connections with the specified torques and secure them with standard screw locking adhesive.
- Check paint for damage and repair professionally.

Dimensions



Dimensions are contained in the configuration document.

Installation

- The mounting surfaces must be plane, torsionally rigid and free from vibrations.
- The mounting areas must be suited to absorb the forces and torques generated during operation.
- Ensure an unhindered ventilation.
- For versions with a fan, keep a minimum distance of 10 % from the outside diameter of the fan cover in intake direction.

Mounting positions

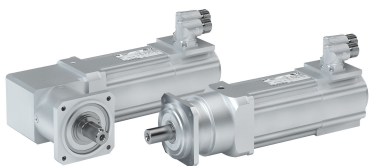


The gearboxes can be mounted in any position.

Ventilation



No ventilation measures are required for the gearboxes.



Mounting

Transmission elements

- Fit or remove transmission elements only using suitable equipment.
- For fitting the transmission elements use the center hole in the shaft.
- Avoid impacts and shocks.
- In case of a belt drive, tension the belt in a controlled manner according to manufacturer information.
- Be sure to carry out mounting in a manner free from distortion.
- Compensate minor inaccuracies by suitable flexible couplings.

Fastening

- Use screws with a minimum property class of 8.8.
- Observe prescribed tightening torques.
- Secure against unintended loosening.
- For alternating loads, we recommend applying anaerobic curing adhesive between flange and mounting surface.

Thread		M3	M4	M5	M6	M8	M10	M12	M16	M20	M24	M27	M30
Strength		Tightening torque Nm $\pm 10\%$											
8.8	Nm	1.3	3.0	5.9	10.1	24.6	48	84	206	415	714	1050	1428
10.9	Nm	1.9	4.6	8.6	14.9	36.1	71	123	302	592	1017	1496	2033

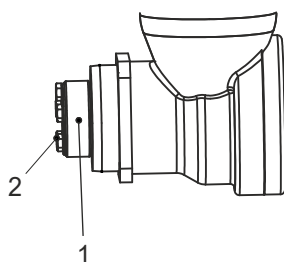
Gearbox with hollow shaft and shrink disc

NOTICE

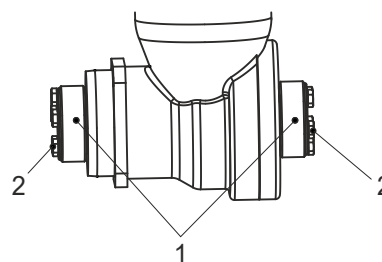
- ▶ Never disassemble the new shrink disc.
- ▶ Thoroughly clean and degrease hollow shaft bore and machine shaft!
- ▶ Do not tighten clamping screws before the machine shaft has been inserted, the hollow shaft may undergo plastic deformation.
- ▶ Cover the shrink disc during operation so that it is secured against contact by implementing suitable measures (e.g. cover).

Mounting the machine shaft

One-sided shrink disc



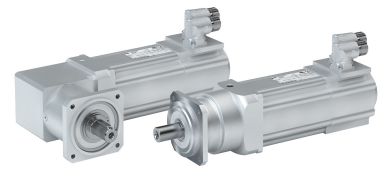
Two-sided shrink disc



- 1 Shrink disc
- 2 Clamping screws

Mechanical installation

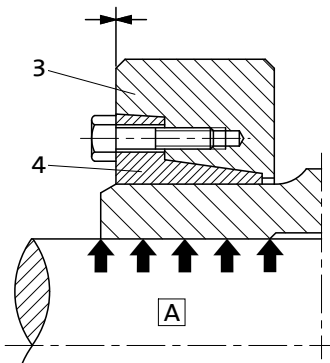
Mounting



1. Check machine shaft
 - Diameter in fit tolerance h6
 - Material yield point $Re \geq 360 \text{ MPa}$
 - E-module approx. 210000 MPa
 - Surface roughness $R_z \leq 15 \text{ }\mu\text{m}$
 - Concentricity (to prevent unnecessary additional forces caused by tensioning)
2. Thoroughly clean and degrease the contact surfaces of the hollow shaft bore and machine shaft.
3. Slightly loosen clamping screws (2) one after the other, do not unscrew.
4. Push gearbox onto machine shaft.
5. Slightly tighten clamping screws manually.
6. Tighten clamping screws (2) one after the other (approx. 5) in several passes, with rising torque, evenly until the indicated screw-tightening torque is reached at all screws.

NOTICE

- The shrink disc is mounted correctly and fixed when the faces of the outer ring and the inner ring are aligned. Minimum misalignments are permissible.



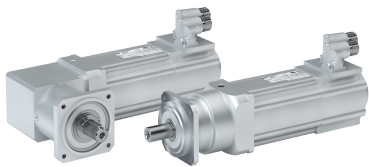
- 3 Outer ring
4 Inner ring
[A] Free of grease

NOTICE

- If a different tightening torque is indicated on the shrink disc, this tightening torque has priority over the value indicated in the table.

Tightening torques of clamping screws

g860 gearbox		-B45	-B70	-B140	-B320
Thread	mm	M6	M6	M8	M8
Wrench size	mm	10	10	13	13
Tightening torque	Nm	12	12	30	30



Electrical installation

Important notes

DANGER!

Risk of injury and risk of burns from dangerous voltage

Power terminals may also carry voltage in the switched-off state or when the motor is stopped and may cause life-threatening cardiac arrhythmia and serious burns.

- ▶ Disconnect the product from the mains.
- ▶ Check that the power terminals are deenergized before starting work.

- When working on energized products, comply with the applicable national accident prevention regulations.
- The electrical installation must be carried out according to the appropriate regulations (e.g. cable cross-sections, fuses, PE connection).
- The manufacturer of the system or machine is responsible for adherence to the limits required in connection with EMC legislation.

Operation on an external inverter

A max. pulse voltage amplitude of $U_{pk} = 1560 \text{ V}$ at the motor terminals must not be exceeded. Here, the minimum pulse rise time must be $t_R = 0.1 \text{ } \mu\text{s}$.

If it cannot be ruled out that the permissible voltage peaks will be exceeded or that the minimum pulse rise time will not be reached, the following measures must be initiated:

- Reduction of the DC-bus voltage (threshold for brake chopper voltage)
- Use of filters, chokes
- Use of special motor cables

Preparation



The notes for the electrical connection can be found in the enclosed mounting instructions.

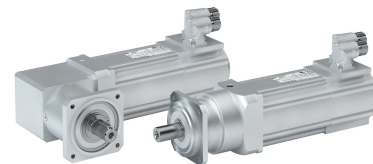
EMC-compliant wiring



The EMC-compliant wiring is described in detail in the documentation of the Lenze inverters.

Electrical installation

Motor connection
Connection via terminal box



Motor connection

Connection via terminal box

Observe the notes on wiring, data on the nameplate, and the connection diagram in the terminal box.

The connection must ensure a continuous and safe electrical supply:

- No protruding wire ends
- Use assigned cable end fittings
- Ensure good electrical conductivity of the contact (remove paint residues) if an additional PE connection is used
- Establish a safe protective earth connection
- After the connection is completed, make sure that all connections on the terminal board are firmly tightened
- The terminal box has to be free of foreign bodies, dirt, and humidity
- All unused cable entries and the terminal box itself must be sealed so that they are dust-tight and waterproof

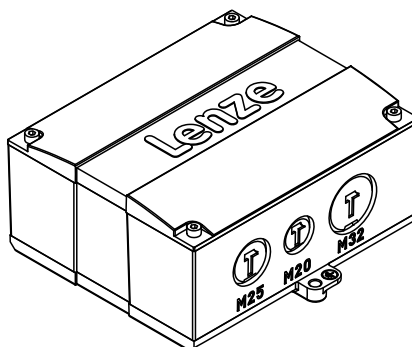
The smallest air gaps between uncoated, live parts and against earth must not fall below the following values:

Minimum requirements for basic insulation according to IEC/EN 60664-1 (CE)	Higher requirements for UL design	Motor diameter
3.87 mm	6.4 mm	<178 mm
	9.5 mm	> 178 mm

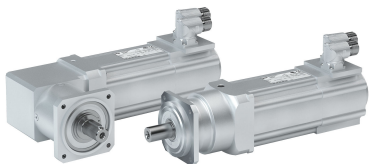
Cable glands



The bore holes for the cable glands M25, M20 and M32 are located on both sides and closed. They can be opened according to need.



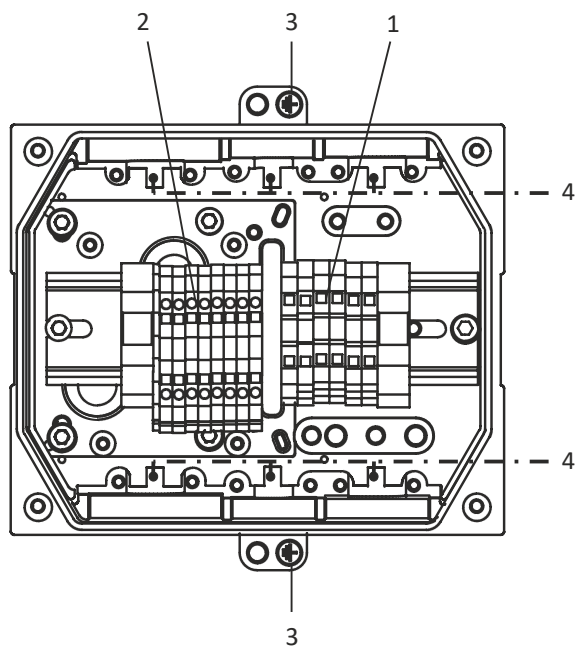
Motor		MCS09 MCS12 MCS14H	MCS14L15 MCS14P14 MCS19F15 MCS19J15	MCS14L32 MCS14P32 MCS19F13 MCS19J30 MCS19P
Screwed connections		2x M20 2x M25 2x M32		
cable cross-section	mm ²	0.08 ... 2.5 4 (without wire end ferrule)		0.2 ... 10
Stripping length	mm	10 ... 11		
Terminal design		Spring-loaded terminal		



Electrical installation

Motor connection
Connection via terminal box

Position of the connections



Position	Meaning
1	Power connection Brake connection
2	Feedback connection Connection of temperature monitoring
3	PE connection
4	Large area shield contact.

Terminal box, power

Kontakt	Bezeichnung	Bedeutung
U1	L1	Motor winding phase
V1	L2	
W1	L3	
PE	PE	PE conductor

Terminal box, DC brake

Kontakt	Bezeichnung	Bedeutung
BD1	+	Brake +
BD2	-	Brake -

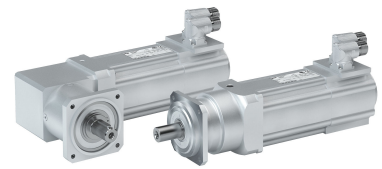
Terminal box, resolver

Kontakt	Bezeichnung	Bedeutung
B1	+Ref	Transformer windings (reference windings)
B2	-Ref	
B3	+VCC ETS	Supply: Electronic nameplate (only for variant with electronic nameplate ETS)
B4	+COS	Cosine stator windings
B5	-COS	
B6	+SIN	Sine stator windings
B7	-SIN	
B8		Not assigned

Electrical installation

Motor connection

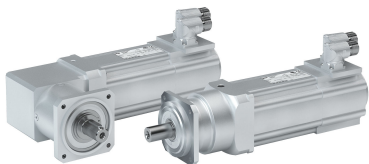
Connection via terminal box



Terminal box, SinCos absolute value encoder with Hiperface		
Kontakt	Bezeichnung	Bedeutung
B1	+ UB	Supply +
B2	GND	Mass
B3	A	Track A / + COS
B4	A ⁻	Track A inverse /-COS
B5	B	Track B / +SIN
B6	B ⁻	Track B inverse/-SIN
B7	Z	Zero track / + RS485
B8	Z ⁻	Zero track inverse /-RS485
B10		Incremental encoder shield

Terminal box, SinCos absolute value encoder with EnDat		
Kontakt	Bezeichnung	Bedeutung
B1	+ UB	Supply +
B2	GND	Mass
B3	A	Track A / + COS
B4	A ⁻	Track A inverse /-COS
B5	B	Track B / +SIN
B6	B ⁻	Track B inverse/-SIN
B7	Daten	EnDat interface data
B8	Daten ⁻	Data inverse EnDat interface
B20	Takt	EnDat interface cycle
B21	Takt ⁻	Inverse EnDat interface cycle
B22	Up Sensor	Up Sensor
B23	0 V Sensor	0 V sensor
B24	Schirm	Encoder housing shield
B25		Not assigned

Terminal box with temperature monitoring R		
Kontakt	Bezeichnung	Bedeutung
R1	+	Temperature sensor +
R2	-	Temperature sensor -



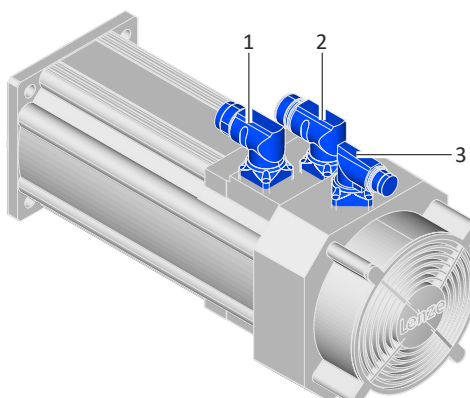
Electrical installation

Motor connection
Connection via ICN connector

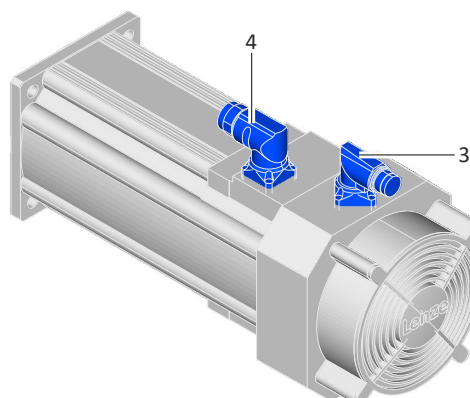
Connection via ICN connector

Position of the connections

Standard connection



One Cable Technology (OCT)



Position	Meaning	Position	Meaning
1	ICN-M23 connector, 6-pole ICN-M40 connector, 8-pole - Power connection - Brake connection - PE connection	4	For One Cable Technology (OCT) ICN-M23 connector, hybrid ICN-M40 connector, hybrid - Power connection - Brake connection - PE connection - Connection of digital absolute value encoder - Connection of temperature monitoring
2	ICN-M23 connector - Feedback connection - Connection of temperature monitoring		
3	ICN-M17 connector Blower connection		

Motor/ICN connector assignment

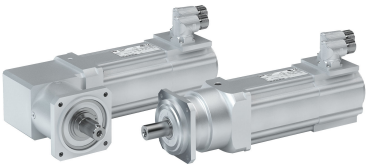
Standard connection: Power and brake

One Cable Technology (OCT): Power connection, brake, feedback and temperature monitoring

Motor	Connector	Motor	Connector	Motor	Connector	Motor	Connector
MCS06...	ICN-M23	MCS14H15-	ICN-M23	MCS14P14-	ICN-M23	MCS19J14-	ICN-M23
MCS09...	ICN-M23	MCS14H28-	ICN-M40	MCS14P26-	ICN-M40	MCS19J29-	ICN-M40
MCS12...	ICN-M23	MCS14H32-	ICN-M23	MCS14P32-	ICN-M40	MCS19J30-	ICN-M40
MCS14D14-	ICN-M23	MCS14L14-	ICN-M23	MCS19F12-	ICN-M23	MCS19P12-	ICN-M40
MCS14D15-	ICN-M23	MCS14L15-	ICN-M23	MCS19F14-	ICN-M23	MCS19P14-	ICN-M40
MCS14D30-	ICN-M23	MCS14L30-	ICN-M40	MCS19F29-	ICN-M40	MCS19P29-	ICN-M40
MCS14D36-	ICN-M23	MCS14L32-	ICN-M40	MCS19F30-	ICN-M40	MCS19P30-	ICN-M40
MCS14H12-	ICN-M23	MCS14P11-	ICN-M23	MCS19J12-	ICN-M40		

Electrical installation

Motor connection
Connection via ICN connector

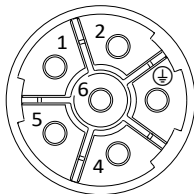


Standard connection

Connection of power and brake

ICN-M23 connector assignment

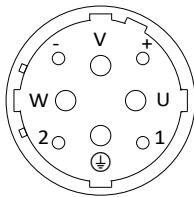
6-pole



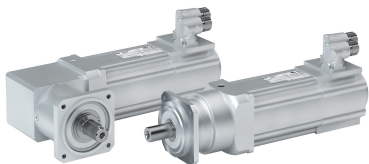
ICN M23 6-pole		
Kontakt	Bezeichnung	Bedeutung
PE	PE	PE conductor
1	BD1	DC +/AC brake
2	BD2	DC -/AC brake
4	U	Power phase U
5	V	Power phase V
6	W	Power phase W

ICN-M40 connector assignment

8-pole



ICN M40 8-pole		
Kontakt	Bezeichnung	Bedeutung
U	U	Power phase U
+	BD1	Holding brake +
-	BD2	Holding brake -
W	W	Power phase W
V	V	Power phase V
PE	PE	PE conductor
1		Not assigned
2		Not assigned



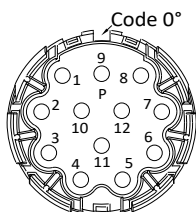
Electrical installation

Motor connection
Connection via ICN connector

Feedback and temperature monitoring connection

ICN-M23 connector assignment

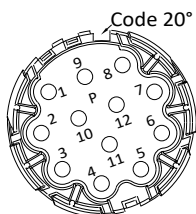
Resolver



ICN M23 for resolvers		
Kontakt	Bezeichnung	Bedeutung
1	+Ref	Transformer windings
2	-Ref	Transformer windings
3	+VCC ETS	Supply: Electronic nameplate (Only for motors and inverters that support this function)
4	+COS	Cosine stator windings
5	-COS	Cosine stator windings
6	+SIN	Sine stator windings
7	-SIN	Sine stator windings
8		Not assigned
9		Not assigned
10	Schirm	Encoder housing shield
11	+	Temperature monitoring: PT1000
12	-	Temperature monitoring: PT1000

ICN-M23 connector assignment

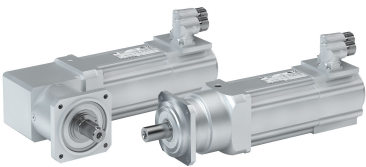
Incremental and SinCos absolute value encoder Hiperface©



ICN M23 for incremental and SinCos absolute value encoder Hiperface		
Kontakt	Bezeichnung	Bedeutung
1	B	Track B / +SIN
2	A ⁻	Track A inverse /-COS
3	A	Track A / + COS
4	+UB	Supply +
5	GND	Mass
6	Z ⁻	Zero track inverse /-RS485
7	Z	Zero track / + RS485
8		Not assigned
9	B ⁻	Track B inverse/-SIN
10	Schirm	Encoder housing shield
11	+	Temperature monitoring: PT1000
12	-	Temperature monitoring: PT1000

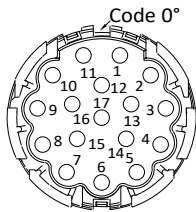
Electrical installation

Motor connection
Connection via ICN connector



ICN-M23 connector assignment

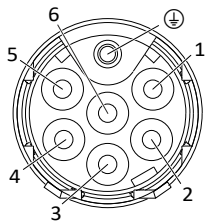
SinCos absolute value encoder with EnDat interface



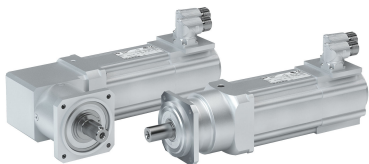
ICN M23 SinCos absolute value encoder with EnDat		
Kontakt	Bezeichnung	Bedeutung
1	UP Sensor	Up Sensor
2		Not assigned
3		Not assigned
4	0 V Sensor	0 V sensor
5	+	PT1000/KTY temperature sensor
6	-	PT1000/KTY temperature sensor
7	+UB	Supply +
8	Takt	EnDat interface cycle
9	Takt-	Inverse EnDat interface cycle
10	GND	Mass
11	Schirm	Encoder housing shield
12	B	Track B
13	B-	Track B inverse/-SIN
14	Daten	EnDat interface data
15	A	Track A
16	A-	Track A inverse /-COS
17	Daten-	Data inverse EnDat interface

Blower

Pin assignment ICN-M17



ICN M17 for blowers 1-ph		
Kontakt	Bezeichnung	Bedeutung
PE	PE	PE conductor
1	U1	Fan
2	U2	Fan
3		Not assigned
4		Not assigned
5		Not assigned
6		Not assigned



Electrical installation

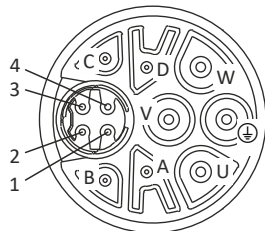
Motor connection
Connection via ICN connector

One Cable Technology (OCT)

Connection of power, brake, feedback and temperature monitoring

ICN-M23 connector assignment, hybrid

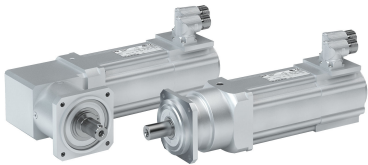
For One Cable Technology (OCT) with digital absolute value encoder



ICN M23 Hybrid for One Cable Technology (OCT) with digital absolute value encoder		
Kontakt	Bezeichnung	Bedeutung
U	U	Power phase U
V	V	Power phase V
W	W	Power phase W
PE	PE	PE
A	BD1	Holding brake +
B	BD2	Holding brake -
C	+	Optional temperature monitoring: PTC +
D	-	Optional temperature monitoring: PTC -
1		Not assigned
2	+	VCC/data +
3	-	GND/data -
4		Not assigned

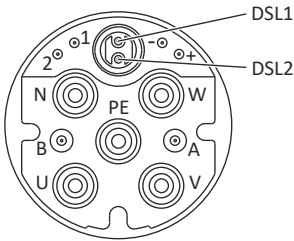
Electrical installation

Motor connection
Connection via ICN connector

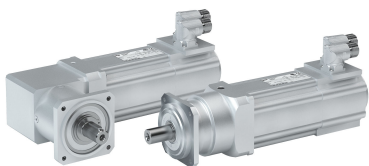


ICN-M40 connector assignment, hybrid

For One Cable Technology (OCT) with digital absolute value encoder



ICN M40 Hybrid for One Cable Technology (OCT) with digital absolute value encoder		
Kontakt	Bezeichnung	Bedeutung
U	U	Power phase U
V	V	Power phase V
W	W	Power phase W
A	BD1	Holding brake +
B	BD2	Holding brake -
PE	PE	PE
N		Not assigned
DSL1	+	VCC/data +
DSL2	-	GND/data -
+		Not assigned
-		Not assigned
1	+	Optional temperature monitoring: PTC +
2	-	Optional temperature monitoring: PTC -



Assembly of ICN connectors

NOTICE

Live cables!

Possible destruction of the connector.

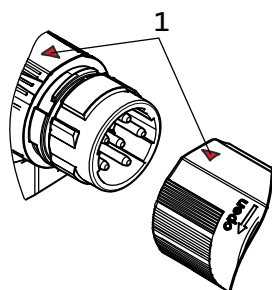
- ▶ Never remove connector when voltage is being applied!
- ▶ Disable inverter before removing the connector!

NOTICE

Loss of the protection class due to incorrect mounting!

Malfunctions may occur.

- ▶ ICN connector with screwed connection: Do not remove O-ring
- ▶ ICN connector with bayonet lock: remove O-ring and dispose of it.

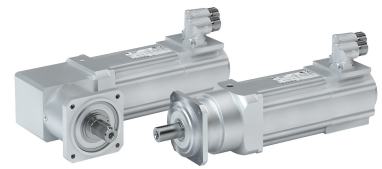


1. When connecting the connector to the motor connector, make sure that the aids to orientation (pos. 1) are facing each other.
2. Tighten the box nut of the connector!

Motors with additional PE conductor connection

As an additional protective measure, a second PE conductor can be connected at the motor housing if required:

- Use PE-labelled bore hole at the motor housing
- Remove coating for contact surface in the area of the bore hole
- Ensure a good electrical conductivity of the contact
- Establish a permanently safe electrical connection



Commissioning

Important notes

NOTICE

Do not brake the motor by short-circuit operation.

Short-circuit braking may damage the motor.

Before initial switch-on

- That the drive does not show any visible signs of damage.
- Is the mechanical fixing o.k.?
- Is the electrical connection ok?
- Are all rotating parts and surfaces that may become hot protected against contact?
- Is the featherkey radially secured during the test run without output elements?
- Have all screwed connections of the mechanical and electrical parts been tightened?
- Is it ensured that the cooling air can be freely supplied and discharged?
- Has the PE conductor been connected correctly?
- Are the protective devices against overheating (e.g. thermal sensor evaluation) working?
- Has the inverter been parameterized suitably for the motor?
- Is the phase sequence of the motor connection correct?
- Is the contact of good electrical conductivity if a PE connection on the motor housing is used?

After a long period of downtime or after overhauling the motor, check the insulation resistance prior to initial switch-on, as condensation may have formed.

- If the values measured are $\leq 1 \text{ k}\Omega$ per volt of the rated voltage, the insulation resistance is inadequate and no voltage is to be applied.
- Dry the winding until the insulation resistance is $> 1 \text{ k}\Omega$ per volt of the rated voltage.

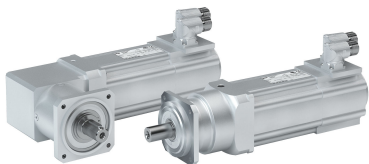
Functional test

After commissioning, check all individual functions of the drive:

- Rotating direction in decoupled state
- Torque behavior and current consumption
- Function of the feedback system
- Brake function

During operation, carry out inspections on a regular basis. Pay special attention to:

- Unusual noises
- Irregular running
- Increased vibration
- Loose fixing elements
- Condition of electrical cables
- Speed variations
- Deposits on the drive and in the cooling channels



Maintenance

WARNING!

Risk of injury due to non-compliance with the following safety measures

Disregarding the following safety measures may lead to severe personal injury and damage to property.

- ▶ Only work on the drive system when it is de-energised.
- ▶ Wait for the surfaces to cool down.
- ▶ Put the drive system in a load-free state or secure any loads acting on the drive.
- ▶ Protect the motors against the ingress of foreign bodies.

Brake



The brakes are not accessible from the outside.

Brake maintenance work must only be carried out by the Lenze Service department.

Feedback

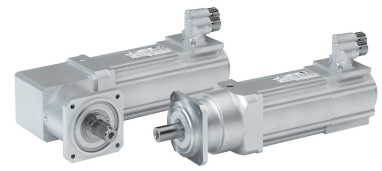
WARNING!

Functional safety

Certain feedback systems support safety functions according to the requirements of the 2006/42/EC: Machinery Directive [UKCA: S.I. 2008/1597 - The Supply of Machinery (Safety) Regulations 2008] .

Any work on the safety encoder which has not been executed professionally will cause a loss of the safety functions.

- ▶ The safety encoder may only be repaired or replaced by the Lenze service or its authorised persons.



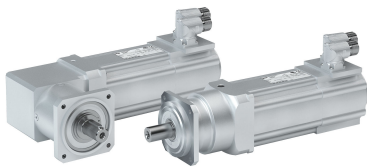
Repair

NOTICE

We recommend having all repairs carried out by the Lenze service department.

If faults occur during the operation of the drive system:

- First check the possible causes of malfunction according to the [► Diagnostics and fault elimination](#)  33
- If the fault cannot be remedied using one of the measures listed, please contact the Lenze service department. The contact data can be found on the rear of this documentation.



Diagnostics and fault elimination

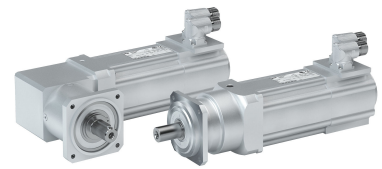
Malfunctions

If faults occur during the operation of the drive, the table below helps you to identify the causes. If it is not possible to remedy the fault using the measures listed, please contact the Lenze service department.

Error	Possible causes	Remedy
Motor too hot Can only be evaluated by measuring the surface temperature: - Non-ventilated motors >140 °C - Externally ventilated or self-ventilated motors > 110 °C	Insufficient cooling air, blocked air ducts.	Ensure unimpeded circulation of cooling air
	Preheated cooling air	Ensure a sufficient supply of fresh cooling air
	Overload, with normal mains voltage the current is too high and the speed too low	Use larger drive (determined by power measurement)
	Rated operating mode (S1 to S8 IEC/EN 60034-1) exceeded	Adjust rated operating mode to the specified operating conditions. Determination of correct drive by expert or Lenze customer service
	Loose contact in supply cable (temporary single-phase operation!)	Tighten loose contact
	Fuse has blown (single-phasing!)	Replace fuse
	Overload of the drive	Check load and, if necessary, reduce by means of longer ramp-up times Check winding temperature
	Heat dissipation impeded by deposits	Clean surface and cooling fins of the drives
	Heat dissipation hindered by thermally insulated attachment	Note the cooling effect of the mounting flange during project planning
Motor suddenly stops and does not restart	Overload monitoring of the inverter is activated	Check inverter settings
		Reduce load caused by longer acceleration times
Incorrect direction of rotation of the motor, correct display on the inverter	Motor cable with reverse polarity	Check and correct polarity
	Polarity of encoder cable reversed	
Motor rotates normally but does not reach the expected torque	Motor cable interchanged cyclically Not all motor phases connected	Connect the phases at the motor cable connection correctly
Motor turns in one direction at maximum speed in an uncontrolled manner	Motor cable interchanged cyclically	Check motor connection and, if necessary, correct
	Polarity of encoder cable reversed	Check encoder connection and, if necessary, correct
Motor slowly rotates in one direction and is not influenced by the inverter	Polarity of motor cable and encoder cable reversed	Check and correct polarity
Irregular running	Insufficient shielding of motor or resolver cable	Checking shielding and earth connection
	Inverter gain too large	Adjust the gains of the controllers (see operating instructions for the inverter)
Vibrations	Insufficiently balanced coupling elements or machine	Rebalance
	Inadequate alignment of drive train	Realign machine unit, check foundation, if necessary.
	Loose fixing screws	Check and tighten screw connections
Running noises	Foreign particles inside the motor	Repair by the manufacturer, if necessary
	Bearing damage	

Technical data

Standards and operating conditions
Conformities and approvals



Technical data

Standards and operating conditions

Conformities and approvals

More information and certificates of approval can be found under

[g7x0-B/g8x0-B + MCS bevel planetary geared motors \(Lenze.com\)](https://www.lenze.com/g7x0-B/g8x0-B+MCS+bevel+planetary+geared+motors)

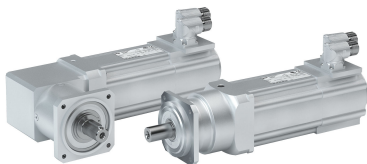
Europe		
Land	Konformität/Zulassung	Darstellung Produkt
European Union	CE	CE mark
Great Britain	UKCA	UKCA mark
America		
Land	Konformität/Zulassung	Darstellung Produkt
Canada	CSA	cURus mark
USA	UL	
Asia		
Land	Konformität/Zulassung	Darstellung Produkt
China	-	CEL mark
		EFUP mark

Protection of persons and device protection

Degree of protection			
-	EN IEC 60529, EN IEC 60034-5	IP54	Self-ventilated: MCS06 ... MCS19
			Forced ventilated: MCS12 ... MCS19
		IP65	Self-ventilated: MCS06 ... MCS19
Temperature class			
-	EN IEC 60034-1	F (155 °C)	Insulation system
Permissible voltage			
-	IEC 60034-18-41	IVIC C	At 500 V
	IEC/TS 60034-25:2007	Limit curve A	Of the pulse voltage

EMC data

Noise emission		
-	EN IEC 60034-1	A final overall assessment of the drive system is indispensable
Noise immunity		
-	EN IEC 60034-1	A final overall assessment of the drive system is indispensable



Technical data

Standards and operating conditions
Environmental conditions

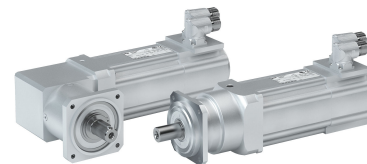
Environmental conditions

Climate			
Storage	EN 60721-3-1:1997	1K3 (-20 ... +40 °C)	>3 months
		1K3 (-20 ... +60 °C)	<3 months
Transport	EN 60721-3-2:1997	2K3 (-20 ... +70 °C)	
Operation	EN 60721-3-3:1995 + A2:1997	3K3 (-10 ... +40 °C)	Operation, without brake
		3K3 (-15 ...+40 °C)	Operation without brake, forced ventilated
		3K3 (-20 ...+40 °C)	Operation without brake, self-ventilated
Site altitude			
0 ... 1000 m amsl	-	Without current derating	
1000 ... 4000 m amsl		Reduce rated output current by 5 %/1000 m	
Air humidity			
-	-	Average relative humidity 85 %	Without condensation

Technical data

Motor data

Rated data

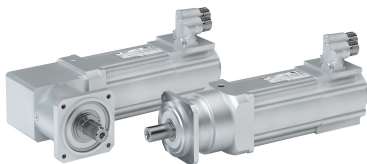


Motor data

Rated data

Inverter mains connection 400 V, Self-ventilated motors

Motor			MCS06C60-	MCS06C41-	MCS06F60-	MCS06F41-	MCS06I60-	MCS06I41-
Stillstandsrehmoment	M_0	Nm	0.800	0.800	1.50	1.50	2.00	2.00
Bemessungsrehmoment	M_N	Nm	0.500	0.600	0.900	1.20	1.20	1.50
Max. Drehmoment	M_{max}	Nm	2.40	2.40	4.40	4.40	6.20	6.20
Bemessungsdrehzahl	n_N	rpm	6000	4050	6000	4050	6000	4050
Max. Drehzahl	n_{max}	rpm	8000	8000	8000	8000	8000	8000
Bemessungsleistung	P_N	kW	0.31	0.25	0.57	0.51	0.75	0.64
Stillstandsstrom	I_0	A	2.50	1.30	2.90	1.50	3.40	1.70
Bemessungsstrom	I_N	A	2.40	1.30	2.50	1.50	2.90	1.60
Max. Strom	I_{max}	A	10.8	5.40	10.5	5.30	11.8	5.90
Bemessungsspannung	U_N	V	135	225	180	320	190	325
Bemessungsfrequenz	f_N	Hz	400	270	400	270	400	270
Massenträgheitsmoment	J	kgcm ²	0.140	0.140	0.220	0.220	0.300	0.300
Wirkungsgrad	η		0.7	0.65	0.81	0.77	0.84	0.81
Drehmomentkonstante	$K_{t_{0\ 150}}$	Nm/A	0.320	0.615	0.517	1.00	0.588	1.18
Spannungskonstante	$K_{E_{LL\ 150}}$	V/(1000/min) °C	17.89	35.79	29.33	58.76	35.88	71.77
Ständerklemmenwiderstand	$R_{UV\ 20}$	Ω	6.8	27	5.4	21.8	4.6	18.8
Ständerklemmenwiderstand	$R_{UV\ 150}$	Ω	10.248	40.689	8.138	32.853	6.932	28.332
Ständerinduktivität	L	mH	12.8	51.0	15.9	63.5	15.1	60.2
Gewicht	m	kg	2.30	2.30	2.70	2.70	3.40	3.40



Technical data

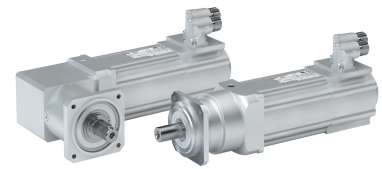
Motor data
Rated data

Motor			MCS09D60-	MCS09D41-	MCS09F60-	MCS09H60-	MCS09F38-	MCS09L51-
Stillstands Drehmoment	M_0	Nm	3.30	3.30	4.20	5.50	4.20	7.50
Bemessungs Drehmoment	M_N	Nm	1.80	2.30	2.40	3.00	3.10	3.60
Max. Drehmoment	$M_{\max}$	Nm	9.50	9.50	15.0	20.0	15.0	32.0
Bemessungs Drehzahl	n_N	rpm	6000	4050	6000	6000	3750	5100
Max. Drehzahl	$n_{\max}$	rpm	7000	7000	7000	7000	7000	7000
Bemessungsleistung	P_N	kW	1.1	1	1.5	1.9	1.2	1.9
Stillstandsstrom	I_0	A	5.30	2.60	6.00	8.50	3.00	12.4
Bemessungsstrom	I_N	A	3.80	2.30	4.50	6.00	2.50	6.90
Max. Strom	$I_{\max}$	A	20.0	10.0	30.0	40.0	15.0	64.0
Bemessungsspannung	U_N	V	210	320	230	190	330	180
Bemessungsfrequenz	f_N	Hz	400	270	400	400	250	340
Massenträgheitsmoment	J	kgcm ²	1.10	1.10	1.50	1.90	1.50	2.80
Wirkungsgrad	η		0.87	0.82	0.9	0.91	0.9	0.91
Drehmomentkonstante	$K_{t_{0\ 150}}$ °C	Nm/A	0.623	1.27	0.700	0.647	1.40	0.605
Spannungskonstante	$K_{E_{LL\ 150}}$ °C	V/ (1000/ min)	34.81	69.62	39.01	36.96	78.02	35.1
Ständerklemmenwiderstand	$R_{UV\ 20}$ °C	Ω	1.8	7	1.2	0.8	5.2	0.44
Ständerklemmenwiderstand	$R_{UV\ 150}$ °C	Ω	2.713	10.549	1.808	1.206	7.836	0.663
Ständerinduktivität	L	mH	6.30	25.1	6.15	4.02	24.6	2.50
Gewicht	m	kg	4.80	4.80	5.70	6.60	5.70	8.40

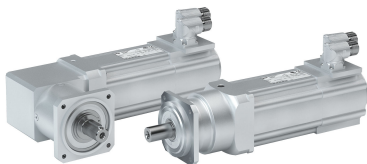
Technical data

Motor data

Rated data



Motor			MCS09H41-	MCS09L41-	MCS12D41-	MCS12D20-	MCS12H35-	MCS12H15-
Stillstands Drehmoment	M_0	Nm	5.50	7.50	6.40	6.40	11.4	11.4
Bemessungs Drehmoment	M_N	Nm	3.80	4.50	4.30	5.50	7.50	10.0
Max. Drehmoment	M_{max}	Nm	20.0	32.0	18.0	18.0	29.0	29.0
Bemessungs Drehzahl	n_N	rpm	4050	4050	4050	1950	3525	1500
Max. Drehzahl	n_{max}	rpm	7000	7000	6000	6000	6000	6000
Bemessungsleistung	P_N	kW	1.6	1.9	1.8	1.1	2.8	1.6
Stillstandsstrom	I_0	A	4.30	6.20	5.50	2.70	8.20	4.10
Bemessungsstrom	I_N	A	3.40	4.20	4.50	2.60	5.70	3.80
Max. Strom	I_{max}	A	20.0	32.0	20.0	10.0	24.0	12.0
Bemessungsspannung	U_N	V	300	295	310	345	325	300
Bemessungsfrequenz	f_N	Hz	270	270	270	130	235	100
Massenträgheitsmoment	J	kgcm ²	1.90	2.80	4.00	4.00	7.30	7.30
Wirkungsgrad	η		0.91	0.91	0.84	0.85	0.91	0.88
Drehmomentkonstante	$K_{t_{0.150}}$ °C	Nm/A	1.28	1.21	1.16	2.37	1.39	2.78
Spannungskonstante	$K_{E_{LL 150}}$ °C	V/ (1000/ min)	74.02	70.1	67.07	133.95	84.58	169.15
Ständerklemmenwiderstand	$R_{UV 20}$ °C	Ω	3.2	1.8	2.2	8.7	1.4	5.8
Ständerklemmenwiderstand	$R_{UV 150}$ °C	Ω	4.822	2.713	3.315	13.111	2.11	8.741
Ständerinduktivität	L	mH	16.1	9.90	13.0	52.2	10.5	42.1
Gewicht	m	kg	6.60	8.40	7	7	10.1	10.1



Technical data

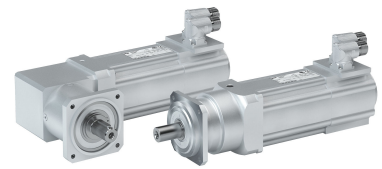
Motor data
Rated data

Motor			MCS12L41-	MCS12L20-	MCS14D36-	MCS14D15-	MCS14H32-	MCS14H15-
Stillstands Drehmoment	M_0	Nm	15.0	15.0	11.0	11.0	21.0	21.0
Bemessungs Drehmoment	M_N	Nm	11.0	13.5	7.50	9.20	14.0	16.0
Max. Drehmoment	$M_{\max}$	Nm	56.0	56.0	29.0	29.0	55.0	55.0
Bemessungs Drehzahl	n_N	rpm	4050	1950	3600	1500	3225	1500
Max. Drehzahl	$n_{\max}$	rpm	6000	6000	6000	6000	6000	6000
Bemessungsleistung	P_N	kW	4.7	2.8	2.8	1.45	4.7	2.5
Stillstandsstrom	I_0	A	12.4	6.20	10.0	5.00	16.9	8.50
Bemessungsstrom	I_N	A	10.2	5.90	7.50	4.50	11.9	6.60
Max. Strom	$I_{\max}$	A	56.0	28.0	33.0	16.5	51.5	25.8
Bemessungsspannung	U_N	V	300	330	295	305	295	325
Bemessungsfrequenz	f_N	Hz	270	130	240	100	215	100
Massenträgheitsmoment	J	kgcm ²	10.6	10.6	8.10	8.10	14.2	14.2
Wirkungsgrad	η		0.91	0.9	0.92	0.88	0.93	0.92
Drehmomentkonstante	$K_{t_{0\ 150}}$ °C	Nm/A	1.21	2.42	1.10	2.20	1.24	2.47
Spannungskonstante	$K_{E_{LL\ 150}}$ °C	V/ (1000/ min)	72.94	145.69	62.77	126.13	74.6	149.6
Ständerklemmenwiderstand	$R_{UV\ 20}$ °C	Ω	0.6	2.2	1	4	0.52	2.08
Ständerklemmenwiderstand	$R_{UV\ 150}$ °C	Ω	0.904	3.315	1.507	6.028	0.784	3.135
Ständerinduktivität	L	mH	5.45	21.8	12.5	49.8	8.53	34.1
Gewicht	m	kg	13.2	13.2	11.4	11.4	16.2	16.2

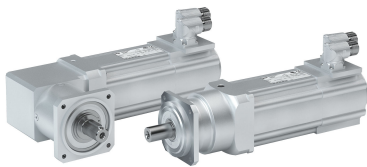
Technical data

Motor data

Rated data



Motor			MCS14L32-	MCS14P32-	MCS14L15-	MCS14P14-	MCS19F30-	MCS19F14-
Stillstands Drehmoment	M_0	Nm	28.0	37.0	28.0	37.0	32.0	32.0
Bemessungs Drehmoment	M_N	Nm	17.2	21.0	23.0	30.0	21.0	27.0
Max. Drehmoment	M_{max}	Nm	77.0	105	77.0	105	86.0	86.0
Bemessungs Drehzahl	n_N	rpm	3225	3225	1500	1350	3000	1425
Max. Drehzahl	n_{max}	rpm	6000	6000	6000	6000	4000	4000
Bemessungsleistung	P_N	kW	5.8	7.1	3.6	4.2	6.6	4
Stillstandsstrom	I_0	A	24.0	24.3	12.0	12.2	19.8	9.90
Bemessungsstrom	I_N	A	15.0	15.6	9.70	10.8	14.0	8.60
Max. Strom	I_{max}	A	74.5	92.0	37.3	46.0	62.5	31.3
Bemessungsspannung	U_N	V	275	315	315	340	300	335
Bemessungsfrequenz	f_N	Hz	215	215	100	90	200	95
Massenträgheitsmoment	J	kgcm ²	23.4	34.7	23.4	34.7	65.0	65.0
Wirkungsgrad	η		0.93	0.93	0.9	0.9	0.93	0.92
Drehmomentkonstante	$K_{t_{0\ 150}}$ °C	Nm/A	1.17	1.52	2.33	3.03	1.62	3.23
Spannungskonstante	$K_{E_{LL\ 150}}$ °C	V/ (1000/ min)	74.5	87.41	148.62	175.02	95.04	190.66
Ständerklemmenwiderstand	$R_{UV\ 20}$ °C	Ω	0.4	0.28	1.2	1.2	0.32	1.3
Ständerklemmenwiderstand	$R_{UV\ 150}$ °C	Ω	0.603	0.422	1.808	1.808	0.482	1.959
Ständerinduktivität	L	mH	5.51	5.99	22.0	23.9	5.20	20.8
Gewicht	m	kg	20.8	25.6	20.8	25.6	24	24



Technical data

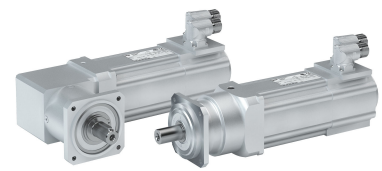
Motor data
Rated data

Motor			MCS19J30-	MCS19P30-	MCS19J14-	MCS19P14-
Stillstands Drehmoment	M_0	Nm	51.0	64.0	51.0	64.0
Bemessungs Drehmoment	M_N	Nm	29.0	32.0	40.0	51.0
Max. Drehmoment	M_{max}	Nm	129	190	129	190
Bemessungs Drehzahl	n_N	rpm	3000	3000	1425	1350
Max. Drehzahl	n_{max}	rpm	4000	4000	4000	4000
Bemessungsleistung	P_N	kW	9.1	10	6	7.2
Stillstandsstrom	I_0	A	30.5	34.9	15.2	17.5
Bemessungsstrom	I_N	A	18.5	19.0	12.3	14.3
Max. Strom	I_{max}	A	89.6	120	44.8	60.0
Bemessungsspannung	U_N	V	300	320	330	330
Bemessungsfrequenz	f_N	Hz	200	200	95	90
Massenträgheitsmoment	J	kgcm ²	105	160	105	160
Wirkungsgrad	η		0.93	0.93	0.92	0.92
Drehmomentkonstante	$K_{t_{0.150}}$ °C	Nm/A	1.67	1.83	3.36	3.66
Spannungskonstante	$K_{E_{LL 150}}$ °C	V/ (1000/ min)	97.29	105.6	194.57	211.19
Ständerklemmenwiderstand	$R_{UV 20}$ °C	Ω	0.16	0.14	0.66	0.54
Ständerklemmenwiderstand	$R_{UV 150}$ °C	Ω	0.241	0.211	0.995	0.814
Ständerinduktivität	L	mH	3.20	2.40	12.8	9.60
Gewicht	m	kg	31	41	31	41

Technical data

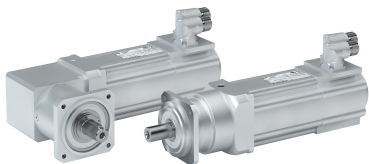
Motor data

Rated data



Inverter mains connection 400 V, Forced ventilated motors

Motor			MCS12H34-	MCS12H14-	MCS12L39-	MCS12L17-	MCS12D35-	MCS12D17-
Stillstands Drehmoment	M_0	Nm	12.8	12.8	19.0	19.0	7.50	7.50
Bemessungs Drehmoment	M_N	Nm	10.5	12.0	14.0	17.0	6.00	7.00
Max. Drehmoment	M_{max}	Nm	29.0	29.0	56.4	56.4	17.7	17.7
Bemessungs Drehzahl	n_N	rpm	3375	1350	3900	1650	3525	1650
Max. Drehzahl	n_{max}	rpm	6000	6000	6000	6000	6000	6000
Bemessungsleistung	P_N	kW	3.7	1.7	5.7	2.9	2.2	1.2
Stillstandsstrom	I_0	A	8.50	4.60	14.4	7.20	6.40	3.20
Bemessungsstrom	I_N	A	7.50	4.10	11.7	6.70	5.60	3.00
Max. Strom	I_{max}	A	24.0	12.0	57.0	28.0	20.0	10.0
Bemessungsspannung	U_N	V	320	310	295	300	300	330
Bemessungsfrequenz	f_N	Hz	225	90	260	110	235	110
Massenträgheitsmoment	J	kgcm ²	7.30	7.30	10.6	10.6	4.00	4.00
Wirkungsgrad	η		0.86	0.8	0.94	0.9	0.85	0.75
Drehmomentkonstante	$K_{t_{0.150}}$ °C	Nm/A	1.51	2.78	1.32	2.64	1.17	2.34
Spannungskonstante	$K_{E_{LL 150}}$ °C	V/ (1000/ min)	84.58	169.15	72.94	145.69	67.07	133.95
Ständerklemmenwiderstand	$R_{UV 20}$ °C	Ω	1.4	5.8	0.6	2.2	4.4	17.4
Ständerklemmenwiderstand	$R_{UV 150}$ °C	Ω	2.11	8.741	0.904	3.315	6.631	26.222
Ständerinduktivität	L	mH	10.5	42.1	5.45	21.8	13.0	52.2
Gewicht	m	kg	12.2	12.2	15.3	15.3	9.1	9.1



Technical data

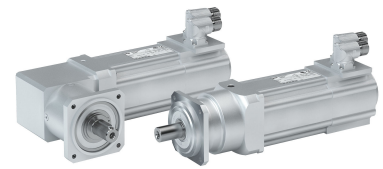
Motor data
Rated data

Motor			MCS14D30-	MCS14D14-	MCS14H28-	MCS14H12-	MCS14L30-	MCS14L14-
Stillstands Drehmoment	M_0	Nm	12.5	12.5	25.5	25.5	34.5	34.5
Bemessungs Drehmoment	M_N	Nm	10.5	12.0	20.5	23.5	25.5	30.5
Max. Drehmoment	M_{max}	Nm	29.0	29.0	54.8	54.8	77.1	77.1
Bemessungs Drehzahl	n_N	rpm	3000	1350	2775	1200	3000	1350
Max. Drehzahl	n_{max}	rpm	6000	6000	6000	6000	6000	6000
Bemessungsleistung	P_N	kW	3.3	1.7	6	3	8	4.3
Stillstandsstrom	I_0	A	11.4	5.70	18.4	9.30	26.7	13.4
Bemessungsstrom	I_N	A	9.70	5.40	15.0	8.30	20.8	11.8
Max. Strom	I_{max}	A	33.0	16.5	51.5	25.8	74.5	37.3
Bemessungsspannung	U_N	V	325	345	325	335	310	335
Bemessungsfrequenz	f_N	Hz	200	90	185	80	200	90
Massenträgheitsmoment	J	kgcm ²	8.10	8.10	14.2	14.2	23.4	23.4
Wirkungsgrad	η		0.92	0.84	0.93	0.87	0.92	0.88
Drehmomentkonstante	$K_{t0\ 150}$ °C	Nm/A	1.10	2.19	1.39	2.74	1.29	2.57
Spannungskonstante	$K_{E\ LL\ 150}$ °C	V/ (1000/ min)	62.77	126.13	74.6	149.6	74.5	148.62
Ständerklemmenwiderstand	$R_{UV\ 20}$ °C	Ω	1	4	0.52	2.08	0.4	1.2
Ständerklemmenwiderstand	$R_{UV\ 150}$ °C	Ω	1.507	6.028	0.784	3.135	0.603	1.808
Ständerinduktivität	L	mH	12.5	49.8	8.53	34.1	5.51	22.0
Gewicht	m	kg	15.2	15.2	20.2	20.2	24.7	24.7

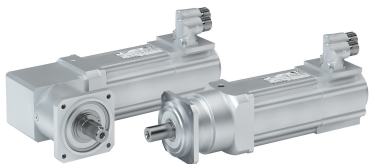
Technical data

Motor data

Rated data



Motor			MCS14P26-	MCS14P11-	MCS19F29-	MCS19F12-	MCS19J29-	MCS19P29-
Stillstands Drehmoment	M_0	Nm	43.5	43.5	41.5	41.5	70.5	86.0
Bemessungs Drehmoment	M_N	Nm	33.0	42.0	32.5	38.0	50.5	53.0
Max. Drehmoment	M_{max}	Nm	105	105	86.0	86.0	129	190
Bemessungs Drehzahl	n_N	rpm	2625	1050	2850	1200	2850	2850
Max. Drehzahl	n_{max}	rpm	6000	6000	4000	4000	4000	4000
Bemessungsleistung	P_N	kW	9.1	4.6	9.7	4.8	15.1	15.8
Stillstandsstrom	I_0	A	28.3	14.1	24.5	12.2	40.6	44.7
Bemessungsstrom	I_N	A	21.9	13.4	20.1	11.3	31.0	29.5
Max. Strom	I_{max}	A	92.0	46.0	62.5	31.3	89.6	120
Bemessungsspannung	U_N	V	325	330	320	320	315	315
Bemessungsfrequenz	f_N	Hz	175	70	190	80	190	190
Massenträgheitsmoment	J	kgcm ²	34.7	34.7	65.0	65.0	105	160
Wirkungsgrad	η		0.92	0.86	0.95	0.9	0.93	0.93
Drehmomentkonstante	$K_{t_{0\ 150}}$ °C	Nm/A	1.54	3.09	1.69	3.40	1.74	1.92
Spannungskonstante	$K_{E_{LL\ 150}}$ °C	V/ (1000/ min)	87.41	175.02	95.04	190.66	97.29	105.6
Ständerklemmenwiderstand	$R_{UV\ 20}$ °C	Ω	0.28	1.2	0.32	1.3	0.16	0.14
Ständerklemmenwiderstand	$R_{UV\ 150}$ °C	Ω	0.422	1.808	0.482	1.959	0.241	0.211
Ständerinduktivität	L	mH	5.99	23.9	5.20	20.8	3.20	2.40
Gewicht	m	kg	29.7	29.7	30	30	37	47



Technical data

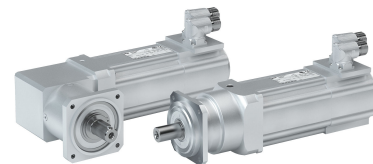
Motor data
Rated data

Motor			MCS19J12-	MCS19P12-
Stillstands Drehmoment	M_0	Nm	70.5	86.0
Bemessungs Drehmoment	M_N	Nm	62.5	72.0
Max. Drehmoment	M_{max}	Nm	129	190
Bemessungs Drehzahl	n_N	rpm	1200	1200
Max. Drehzahl	n_{max}	rpm	4000	4000
Bemessungsleistung	P_N	kW	7.9	9
Stillstandsstrom	I_0	A	20.3	22.4
Bemessungsstrom	I_N	A	18.3	21.3
Max. Strom	I_{max}	A	44.8	60.0
Bemessungsspannung	U_N	V	320	310
Bemessungsfrequenz	f_N	Hz	80	80
Massenträgheitsmoment	J	kgcm ²	105	160
Wirkungsgrad	η		0.89	0.9
Drehmomentkonstante	$K_{t0\ 150}$ °C	Nm/A	3.47	3.84
Spannungskonstante	$K_{E\ LL\ 150}$ °C	V/ (1000/ min)	194.57	211.19
Ständerklemmenwiderstand	$R_{UV\ 20}$ °C	Ω	0.66	0.54
Ständerklemmenwiderstand	$R_{UV\ 150}$ °C	Ω	0.995	0.814
Ständerinduktivität	L	mH	12.8	9.60
Gewicht	m	kg	37	47

Technical data

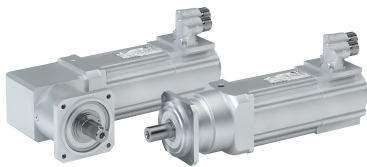
Motor data

Rated data



Inverter mains connection 230 V, Self-ventilated motors

Motor			MCS06C60L	MCS06C41L	MCS06F60L	MCS06F41L	MCS06I60L	MCS06I41L
Stillstands Drehmoment	M_0	Nm	0.800	0.800	1.50	1.50	2.00	2.00
Bemessungs Drehmoment	M_N	Nm	0.500	0.600	0.900	1.20	1.20	1.50
Max. Drehmoment	M_{max}	Nm	2.40	2.40	4.40	4.40	6.20	6.20
Bemessungs Drehzahl	n_N	rpm	6000	4050	6000	4050	6000	4050
Max. Drehzahl	n_{max}	rpm	8000	8000	8000	8000	8000	8000
Bemessungsleistung	P_N	kW	0.31	0.25	0.57	0.51	0.75	0.64
Stillstandsstrom	I_0	A	4.30	2.50	3.80	2.90	4.20	3.10
Bemessungsstrom	I_N	A	4.00	2.50	3.40	2.90	3.60	2.90
Max. Strom	I_{max}	A	18.5	10.8	16.5	10.5	16.0	11.8
Bemessungsspannung	U_N	V	85	125	125	165	150	175
Bemessungsfrequenz	f_N	Hz	400	270	400	270	400	270
Massenträgheitsmoment	J	kgcm ²	0.140	0.140	0.220	0.220	0.300	0.300
Wirkungsgrad	η		0.7	0.65	0.82	0.81	0.84	0.81
Drehmomentkonstante	$K_{t_{0.150}}$ °C	Nm/A	0.186	0.320	0.395	0.517	0.476	0.645
Spannungskonstante	$K_{E_{LL 150}}$ °C	V/ (1000/ min)	12.22	21.02	21.71	33.73	27.87	37.15
Ständerklemmenwiderstand	$R_{UV 20}$ °C	Ω	2.148	5.926	2.222	5.481	2.519	4.593
Ständerklemmenwiderstand	$R_{UV 150}$ °C	Ω	3.237	8.93	3.349	8.26	3.796	6.922
Ständerinduktivität	L	mH	4.30	12.8	6.90	15.9	9.30	15.1
Gewicht	m	kg	2.30	2.30	2.70	2.70	3.40	3.40



Technical data

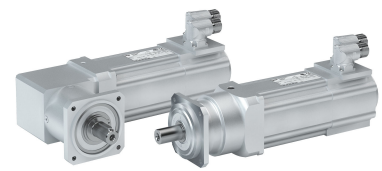
Motor data
Rated data

Motor			MCS09D60L	MCS09D41L	MCS09F60L	MCS09H60L	MCS09F38L	MCS09H41L
Stillstands Drehmoment	M_0	Nm	3.30	3.30	4.20	5.50	4.20	5.50
Bemessungs Drehmoment	M_N	Nm	1.80	2.30	2.40	3.00	3.10	3.80
Max. Drehmoment	M_{max}	Nm	9.50	9.50	15.0	20.0	15.0	20.0
Bemessungs Drehzahl	n_N	rpm	6000	4050	6000	6000	3750	4050
Max. Drehzahl	n_{max}	rpm	7000	7000	7000	7000	7000	7000
Bemessungsleistung	P_N	kW	1.1	1	1.5	1.9	1.2	1.6
Stillstandsstrom	I_0	A	10.3	5.30	10.5	12.0	6.00	8.50
Bemessungsstrom	I_N	A	7.00	4.60	7.90	8.00	5.00	6.80
Max. Strom	I_{max}	A	39.0	20.0	52.5	57.0	30.0	40.0
Bemessungsspannung	U_N	V	110	165	125	145	160	160
Bemessungsfrequenz	f_N	Hz	400	270	400	400	250	270
Massenträgheitsmoment	J	kgcm ²	1.10	1.10	1.50	1.90	1.50	1.90
Wirkungsgrad	η		0.87	0.87	0.9	0.91	0.9	0.91
Drehmomentkonstante	$K_{t_{0.150}}$ °C	Nm/A	0.320	0.623	0.400	0.458	0.700	0.647
Spannungskonstante	$K_{E_{LL 150}}$ °C	V/ (1000/ min)	17.89	34.81	22.29	26.01	39.01	36.96
Ständerklemmenwiderstand	$R_{UV 20}$ °C	Ω	0.45	1.75	0.415	0.356	1.333	0.889
Ständerklemmenwiderstand	$R_{UV 150}$ °C	Ω	0.678	2.637	0.625	0.536	2.009	1.34
Ständerinduktivität	L	mH	1.70	6.30	2.00	2.00	6.20	4.00
Gewicht	m	kg	4.90	4.90	5.80	6.70	5.80	6.70

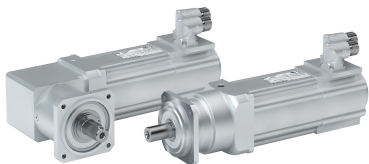
Technical data

Motor data

Rated data



Motor			MCS09L41L	MCS12H15L	MCS12L20L	MCS12D41L	MCS12D20L	MCS12H30L
Stillstands Drehmoment	M_0	Nm	7.50	11.4	15.0	6.40	6.40	11.4
Bemessungs Drehmoment	M_N	Nm	4.50	10.0	13.5	4.30	5.50	8.00
Max. Drehmoment	M_{max}	Nm	32.0	29.0	56.0	18.0	18.0	29.0
Bemessungs Drehzahl	n_N	rpm	4050	1500	1950	4050	1950	3000
Max. Drehzahl	n_{max}	rpm	7000	6000	6000	6000	6000	6000
Bemessungsleistung	P_N	kW	1.9	1.6	2.8	1.8	1.1	2.5
Stillstandsstrom	I_0	A	12.4	8.20	12.4	10.7	5.50	13.5
Bemessungsstrom	I_N	A	8.40	7.60	11.8	8.80	5.20	10.5
Max. Strom	I_{max}	A	64.0	24.0	57.0	40.0	20.0	39.0
Bemessungsspannung	U_N	V	145	158	165	155	175	165
Bemessungsfrequenz	f_N	Hz	270	100	130	270	130	200
Massenträgheitsmoment	J	kgcm ²	2.80	7.30	10.6	4.00	4.00	7.30
Wirkungsgrad	η		0.91	0.86	0.9	0.84	0.85	0.87
Drehmomentkonstante	$K_{t_{0.150}}$ °C	Nm/A	0.605	1.39	1.21	0.598	1.16	0.844
Spannungskonstante	$K_{E_{LL.150}}$ °C	V/ (1000/ min)	35.1	84.58	75.19	34.22	67.07	51.82
Ständerklemmenwiderstand	$R_{UV.20}$ °C	Ω	0.44	1.41	0.548	0.55	2.2	0.489
Ständerklemmenwiderstand	$R_{UV.150}$ °C	Ω	0.663	2.125	0.826	0.829	3.315	0.737
Ständerinduktivität	L	mH	2.50	10.5	5.50	3.40	13.0	4.00
Gewicht	m	kg	8.50	10.2	13.3	7.10	7.10	10.2



Environmental notes and recycling

Lenze has been certified to the worldwide environmental management standard for many years (DIN EN ISO 14001). As part of our environmental policy and the associated climate responsibility, please note the following information on hazardous ingredients and the recycling of Lenze products and their packaging:



Lenze products are partly subject to the EU Directive on the restriction of certain hazardous substances in electrical and electronic equipment 2011/65/EU: RoHS Directive [UKCA: S.I. 2012/3032 - The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012] . This is documented accordingly in the EU declaration of conformity and with the CE mark.



The crossed-out wheeled bin symbol is located on the equipment. This information indicates that used electrical and electronic products must not be disposed of with normal household waste.

The EU Directive 2012/19/EU: Directive on waste electrical and electronic equipment (WEEE) [UKCA: S.I. 2013/3113 - The Waste Electrical and Electronic Equipment Regulations 2013] , which has been transposed into national law by the respective EU member states, applies to the disposal of equipment. As a customer, you have the option of disposing of the electrical and electronic equipment that you have purchased from us and that is subject to WEEE via the Lenze branch in your country.

Lenze addresses in Europe: <https://www.lenze.com/en-de/company/global-presence>

Some Lenze products contain batteries/rechargeable batteries in accordance with EU Directive 2006/66/EC: Battery Directive [UKCA: S.I. 2009/890 - The Waste Batteries and Accumulators Regulations 2009] . Any batteries/rechargeable batteries included are designed to last the life of the product and do not need to be replaced or otherwise removed by the end user.



Lenze products are usually sold with cardboard or plastic packaging. This packaging complies with EU Directive 94/62/EC: Directive on packaging and packaging waste [UKCA: S.I. 1997/648 - The Producer Responsibility Obligations (Packaging Waste) Regulations 1997] . The required disposal route is indicated by material-specific labels with the "recycling triangle". Example: "21 - other cardboard"

REACH

Lenze products are subject to REGULATION (EC) No 1907/2006: REACH Regulation [UKCA: S.I. 2008/2852 - The REACH Enforcement Regulations 2008] . When used as intended, exposure of substances to humans, animals and the environment is excluded.

Lenze products are industrial electrical and electronic products and are disposed of professionally. Both the mechanical and electrical components such as electric motors, gearboxes or inverters contain valuable raw materials that can be recycled and reused. Proper recycling and thus maintaining the highest possible level of recyclability is therefore important and sensible from an economic and ecological point of view.

- Coordinate professional disposal with your waste disposal company.
- Separate mechanical and electrical components, packaging, hazardous waste (e.g. gear oils) and batteries/rechargeable batteries wherever possible.
- Dispose of the separated waste in an environmentally sound and proper manner (no household waste or municipal bulky waste).

What?	Material	Disposal instructions
Pallets	Wood	Return to manufacturers, freight forwarders or reusable materials collection system
Packaging material	Paper, cardboard, pasteboard, plastics	Collect and dispose of separately
Products		
Electronic devices	Metal, plastics, circuit boards, heatsinks	As electronic waste give to professional disposer for recycling
Gearbox	Oil	Drain oil and dispose of separately
	Casting, steel, aluminium	Dispose as metal scrap
Motors	Casting, copper, rotors, magnets, potting compound	As engine scrap give to professional disposer for recycling
Dry-cell batteries/rechargeable batteries		As used batteries give to professional disposer for recycling



Further information on Lenze's environmental and climate responsibility and on the topic of energy efficiency can be found on the Internet:

[www.Lenze.com](https://www.lenze.com) → search word: "Sustainability"

Lenze SE
Postfach 101352 · 31763 Hameln
Hans-Lenze-Straße 1 · 31855 Aerzen
GERMANY
Hannover HRB 204803
Phone +49 5154 82-0
Fax +49 5154 82-2800
sales.de@lenze.com
www.Lenze.com