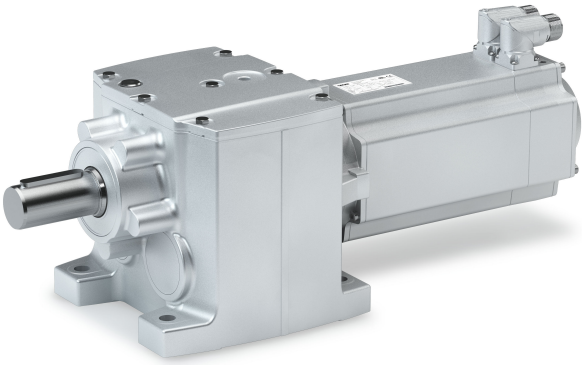




Geared servo motors

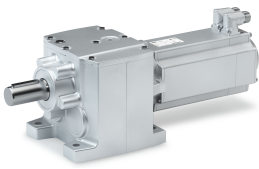
g500-H / m850 helical geared servo motor

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	10
Identification of the products.....	10
Nameplates.....	10
Product codes	11
Equipment.....	14
Transport	15
Storage	17
Mechanical installation	18
Important notes.....	18
Preparation.....	18
Installation.....	19
Mounting positions	19
Ventilation.....	20
Dimensions.....	24
Mounting.....	24
Electrical installation	25
Important notes.....	25
Preparation.....	25
Motor connection.....	26
Connection via ICN connector	26
Commissioning	32
Important notes.....	32
Before initial switch-on	32
Functional test.....	33
Maintenance	34
Maintenance intervals	35
Maintenance work.....	37
Repair	43
Diagnostics and fault elimination	44
Malfunctions.....	44

Contents

Technical data	45
Standards and operating conditions	45
Conformities and approvals	45
Protection of persons and device protection	45
EMC data	45
Environmental conditions	45
Motor data	46
Rated data	46
Inverter power supply 400 V, self-ventilated motors	46
Environmental notes and recycling	48



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

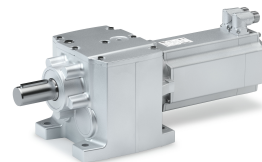


Information and tools with regard to the Lenze products can be found on the Internet:

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!

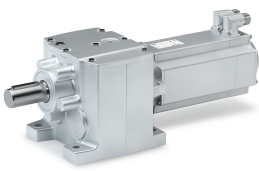
Indicates an extremely hazardous situation. Failure to comply with this instruction may result in severe irreparable injury and even death.

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

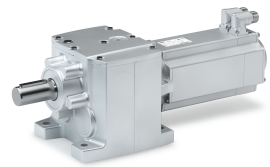
Basic safety instructions

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.



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:

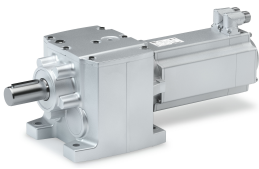
Use personal protective equipment or wait until the device has cooled down!

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.

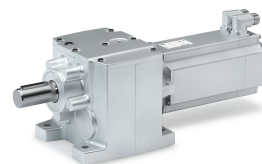


Gearbox protection

- Excessive vibration accelerations and resonances will damage the gearbox.
 - Do not operate the gearbox at vibration accelerations $> 2 \text{ g}$ (20 m/s^2) of the machine.
 - Do not operate the gearbox in the resonance range of the machine.
- 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.
 - Mount the gearbox only in the mounting position indicated on the nameplate.
 - When changing the lubricant, use the lubricant type and quantity specified on the nameplate.

Product information

Identification of the products
Nameplates



Product information

Identification of the products

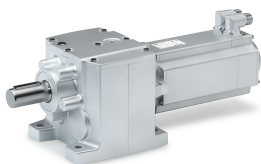
Nameplates



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		7.5					
9			14			7.2		18		7.8							
10		10.1		10.2		10.3		10.4		7.3		8.3		15			
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

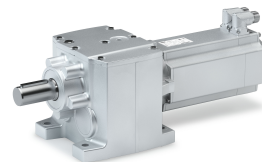
Gearbox product code

Example		G	50	A	H	045	M	V	C	R	2	C	1A
Product type	Gearboxes	G											
Product family			50										
Generation				A B									
Gearbox type	Helical gearbox				H								
Output torque	45 Nm					045							
	100 Nm					110							
	140 Nm					114							
	210 Nm					121							
	320 Nm					132							
	450 Nm					145							
	600 Nm					160							
	850 Nm					185							
	1500 Nm					215							
	3000 Nm					230							
	5000 Nm					250							
	8000 Nm					280							
	14000 Nm					314							
Type of construction	Geared motor						M						
	Gearboxes						N						
Shaft type	Solid shaft with featherkey							V					
	Solid shaft without featherkey							G					
Housing type	Foot mounting + centering								A				
	Foot mounting								B				
	With centering								C				
Flange mounting	Without flange									R			
	Flange with through holes									K			
	Reinforced flange with through holes									P			
Number of stages	2-stage										2		
	3-stage										3		
	4-stage										4		
Motor mounting	Integrated motor											C	
	IEC adapter with jaw coupling											N T	
	IEC adapter with plug-in hollow shaft											H	
	NEMA adapter with jaw coupling											A	
	NEMA adapter with plug-in hollow shaft											B	
	Servomotor adapter with plug-in hollow shaft											S	
	Servomotor adapter with jaw coupling											E D G	
Drive size													1A ... □H 08 ... 82

Product information

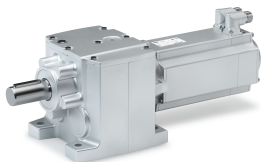
Identification of the products

Product codes



Product code of m850 synchronous servo motor

Example		M	8	5	A	S	120	S	25	5	S	0	R	C	C	0
Meaning	Variant	Product code														
Portfolio segment		M														
Product family	8		8													
Product level	5			5												
Product generation	1				A											
Product type	Synchronous servo motor					S										
Flange height	120						120									
	140						140									
	190						190									
Motor length	Short							S								
	Medium							M								
	Long							L								
Speed	25 x 100 rpm								25							
	30 x 100 rpm								30							
	32 x 100 rpm								32							
	40 x 100 rpm								40							
Degree of protection	IP5x								5							
	IP6x								6							
Cooling	No cooling									S						
Brake attachment	No brake											0				
	Spring-applied brake											F				
	Permanent magnet brake											P				
Encoder mounting	Resolver												R			
	Absolute value encoder												A			
	Digital absolute value encoder												D			
	Hiperface DSL®															
Product approval	CE													C		
	CE; cULus													L		
Manufacturer	Lenze														C	
Internal key																0

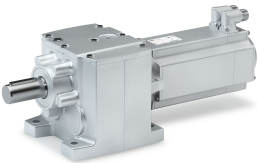


Product information

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	



Equipment

The following figure provides an overview of the elements and connections on the product. Their position, size and appearance may vary.

Ventilation

(depending on the mounting position)

Oil filler plug

(depending on the mounting position)

Remove oil control plug

(depending on the mounting position)

Temperature monitoring

Motor connection

Cooling

Feedback

Spring-applied brake

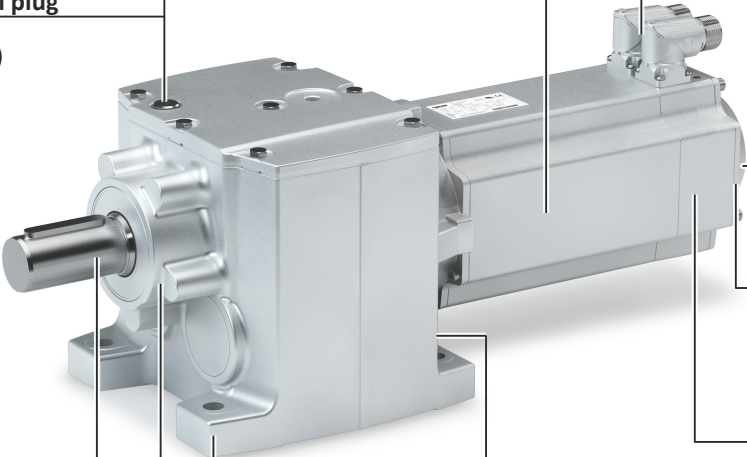
Oil drain plug

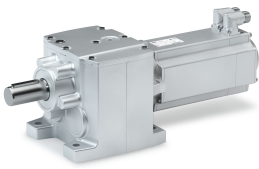
(depending on the mounting position)

Output shaft

Output flange

Housing type





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!

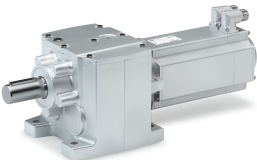
Danger from tipping or falling loads!

Standing beneath suspended loads is prohibited!

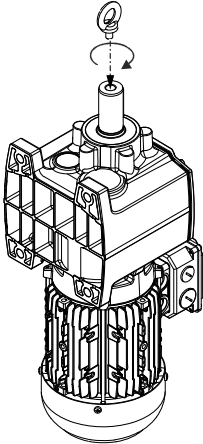
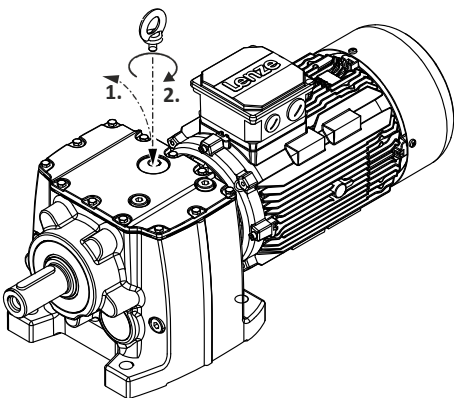
- ▶ Use additional appropriate lifting aids, if required, to achieve a direction of loading which is as vertical as possible (highest load carrying capacity). Secure lifting aids against shifting!
- ▶ Screw in the transport aids completely. They must have even and full-surface contact!
- ▶ Transport 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!

The thread in the output shaft can be used with smaller drives. Larger gearboxes have a transport thread for eye bolts in accordance with DIN 580 in the gearbox housing as standard. The eye bolt is not included in the scope of supply!

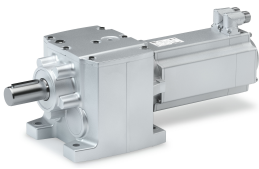
The position of the transport thread can be seen in the following representations.



Position of the eye bolt

G50AH045 ... G50BH114		G50BH121 ... G50BH230	
			

Thread		M6	M8	M10	M12	M16	M20	M24
Load carrying capacity	kg	80	140	230	340	700	1200	1800



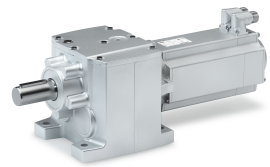
Storage

Storage up to one year:

- Observe the climatic conditions according to the technical data
 - ▶ [Environmental conditions](#) 45
- 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.
- Store gearboxes with a ventilation unit with the ventilation element on top.
- Do not activate ventilation unit, in order to prevent air exchange with the ambient air.
- 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.
- Do not activate ventilation element
- Install gearbox in mounting position M1 (A)
- Fill gearbox with the lubricant type filled in (see nameplate) up to the filling/venting bore for mounting position M1 (A)
 - ▶ [Nameplates](#) 10
 - ▶ [Ventilation](#) 20



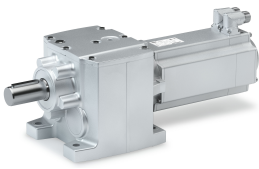
Mechanical installation

Important notes

- Install the product according to the information in the chapter "Standards and operating conditions".
 - ▶ [Standards and operating conditions](#)  45
- 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.
- Only install the gearbox in the mounting position shown.
 - ▶ [Mounting positions](#)  19

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.



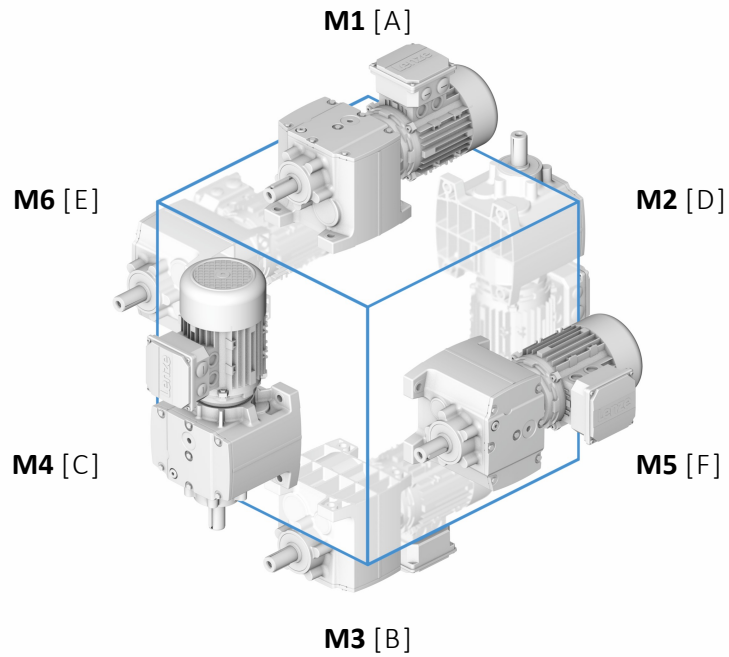
Mechanical installation

Installation
Mounting positions

Installation

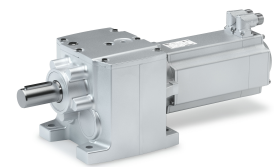
- The mounting surfaces must be plane, torsionally rigid and free from vibrations.
- The mounting areas must be suited to absorb the forces and torques generated during operation.
- Ensure an unhindered ventilation.
- For versions with a fan, keep a minimum distance of 10 % from the outside diameter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

Mounting positions



Mechanical installation

Installation
Ventilation



Ventilation



No ventilation is required for the gearboxes G50AH045 ...BH121.

The gearbox G50BH121 can optionally be fitted with ventilation units.

From G50BH132 onwards, the gearboxes are supplied with ventilation units as standard.

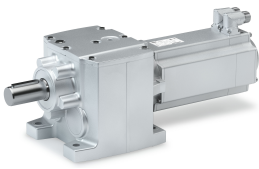
Gearboxes that are delivered with a ventilation unit are provided with a label.

Remove the transport locking device on the vent valve before initial commissioning.

Loosely enclosed vent valves must be mounted in accordance with the mounting position.

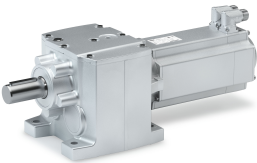
G50BH121 ... BH145

Mounting position M1 (A)	Mounting position M2 (D)	Mounting position M3 (B)
Filling and ventilation		
Control		
Drain		



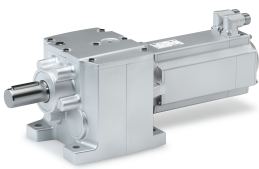
Mounting position M4 (C)	Mounting position M5 (F)	Mounting position M6 (E)
Filling and ventilation		
Control		
Drain		

- ① G50BH121
- ② G50BH132
G50BH145



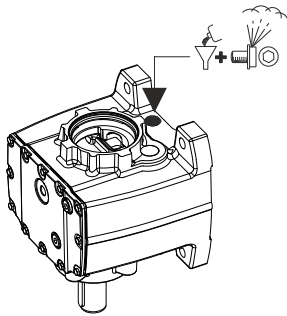
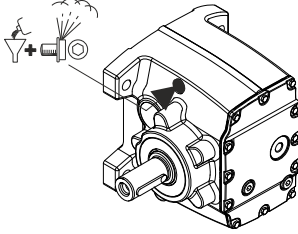
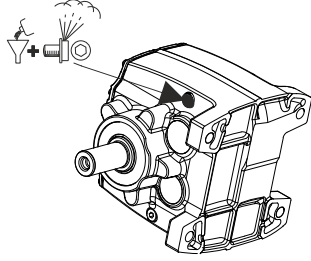
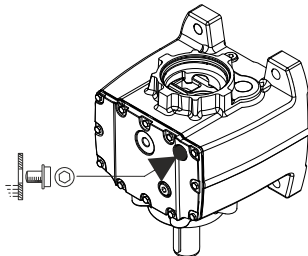
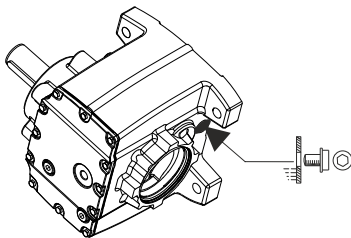
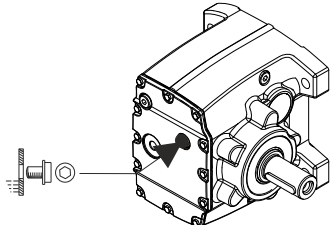
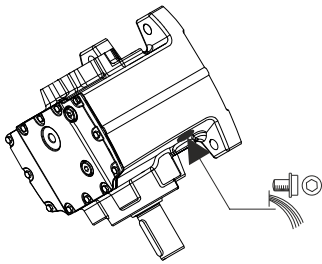
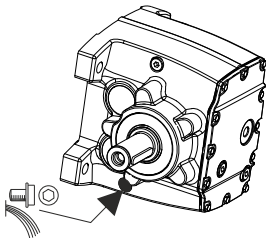
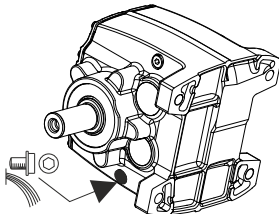
G50BH160 ... BH230

Mounting position M1 (A)	Mounting position M2 (D)	Mounting position M3 (B)
Filling and ventilation		
Check		
Drain		



Mechanical installation

Installation
Ventilation

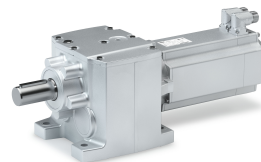
Mounting position M4 (C)	Mounting position M5 (F)	Mounting position M6 (E)
Filling and ventilation		
		
Control		
		
Drain		
		

Gearbox with oil compensation reservoir for mounting position M4 (C)

In order to guarantee a reliable lubrication of the toothed parts in mounting position M4 (C) (motor is on the gearbox vertical from the top), a high filling level is required in the gearbox. As a result of the reduced volume of air in the gearbox, this may lead to oil escaping from the ventilation at higher input speeds. The oil compensation reservoir increases the expansion space for the lubricant.

The oil compensation reservoir can be ordered as a mounting set for fastening to the gearbox.

If insufficient space is available, the oil compensation reservoir can also be mounted over the gearbox hose connection on nearby system parts.



Dimensions



Dimensions are contained in the configuration document.

Mounting

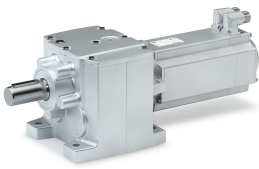
Transmission elements

- 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



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.

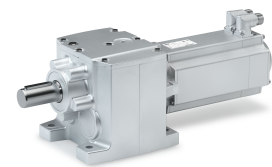
EMC-compliant wiring



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

Electrical installation

Motor connection
Connection via ICN connector

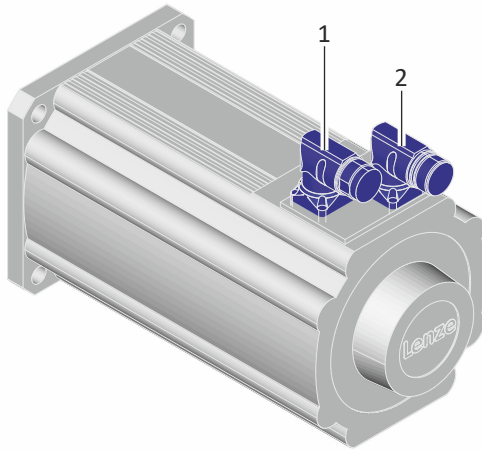


Motor connection

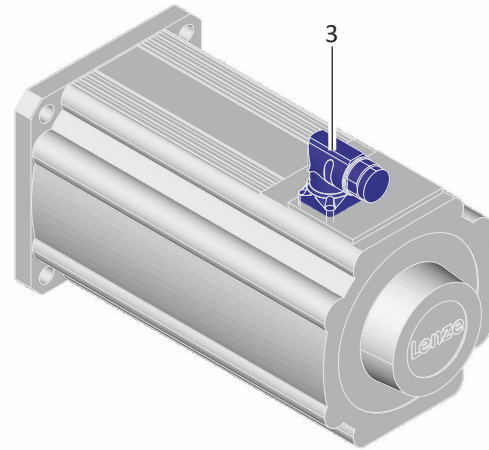
Connection via ICN connector

Position of the connections

Standard connection



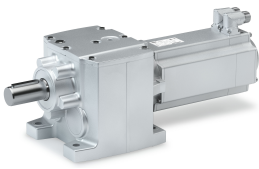
One Cable Technology (OCT)



Position	Meaning	Position	Meaning
1	ICN-M23 connector, 6-pole ICN-M40 connector, 8-pole • Power connection • Brake connection • PE connection	3	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		

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
m850-S120/S3960	ICN-M23	m850-S140/S3240	ICN-M23	m850-S190/S3000	ICN-M23
m850-S120/M3960	ICN-M23	m850-S140/M3240	ICN-M23	m850-S190/M3000	ICN-M40
m850-S120/L3960	ICN-M23	m850-S140/L3240	ICN-M40	m850-S190/L2520	ICN-M40



Electrical installation

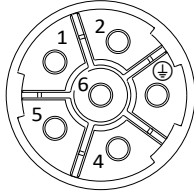
Motor connection
Connection via ICN connector

Standard connection

Connection of power and brake

ICN-M23 connector assignment

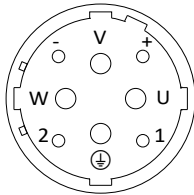
6-pole



ICN M23 6-pole		
Contact	Name	Meaning
PE	PE	PE conductor
1	BD1	Brake DC +/AC
2	BD2	Brake DC -/AC
4	U	Power phase U
5	V	Power phase V
6	W	Power phase W

ICN-M40 connector assignment

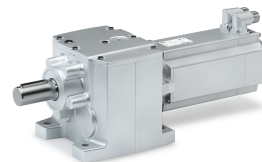
8-pole



ICN M40 8-pole		
Contact	Name	Meaning
+	BD1	Holding brake +
-	BD2	Holding brake -
PE	PE	PE conductor
U	U	Power phase U
V	V	Power phase V
W	W	Power phase W
1		Not assigned
2		Not assigned

Electrical installation

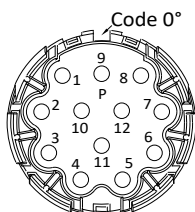
Motor connection
Connection via ICN connector



Feedback and temperature monitoring connection

ICN-M23 connector assignment

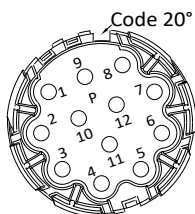
Resolver



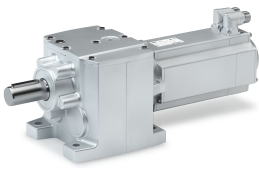
ICN M23 for resolvers		
Contact	Name	Meaning
1	+Ref	Transformer windings
2	-Ref	Transformer windings
3	+VCC ETS	Supply: Electronic nameplate (Only for motors and inverters that support this function)
4	+COS	Cosine stator windings
5	-COS	Cosine stator windings
6	+SIN	Sine stator windings
7	-SIN	Sine stator 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		
Contact	Name	Meaning
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

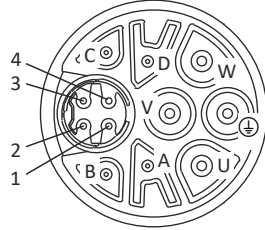
Motor connection
Connection via ICN connector

One Cable Technology (OCT)

Connection of power, brake, feedback and temperature monitoring

ICN-M23 connector assignment, hybrid

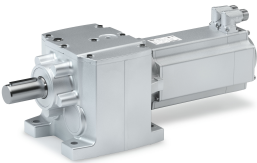
For One Cable Technology (OCT) with digital absolute value encoder



ICN M23 Hybrid for One Cable Technology (OCT) with digital absolute value encoder		
Contact	Name	Meaning
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

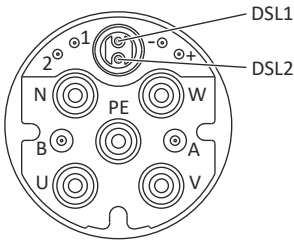
Electrical installation

Motor connection
Connection via ICN connector

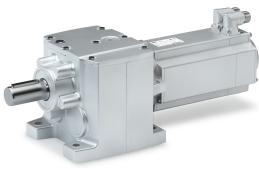


ICN-M40 connector assignment, hybrid

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



ICN M40 Hybrid for One Cable Technology (OCT) with digital absolute value encoder		
Contact	Name	Meaning
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.

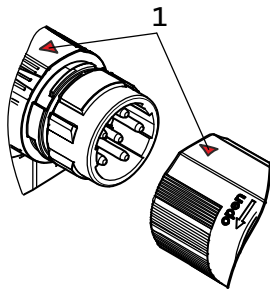
- ▶ Never remove connector when voltage is being applied!
 - ▶ Disable inverter before removing the connector!
-

NOTICE

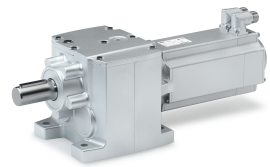
Loss of the protection class due to incorrect mounting!

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!



Commissioning

Important notes

NOTICE

Do not brake the motor by short-circuit operation.

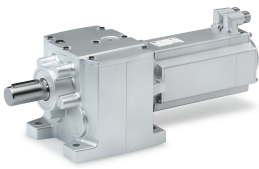
Short-circuit braking may damage the motor.

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

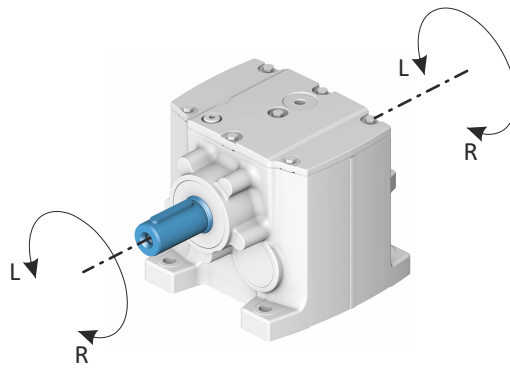
After commissioning, check all individual functions of the drive:

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

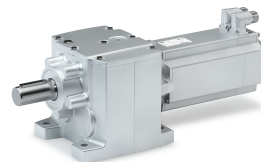
During operation, carry out inspections on a regular basis. Pay special attention to:

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

Direction of rotation of the output shaft



Motor rotating direction	L	R
Direction of gearbox rotation		
2-stage	L	R
3-stage	R	L
4-stage	L	R



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.
- Maintenance work of the brake must only be carried out by Lenze Service personnel.

Feedback

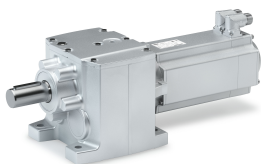
WARNING!

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.



Maintenance intervals

Geared motor/gearbox

Time interval	Measures	Description of the operations
After assembly and after 3 hours	, check fastening.	Check all fixing screws on the gearbox (foot, flange and shrink disc fixing ...) for tightness.
On the first day, then every month	General check	Pay attention to unusual operating noises, vibrations and impermissibly high temperatures
	Check tightness	In case of leakage, eliminate cause of leakage and check lubricant level.
Every 6 months	Clean geared motor/gearbox	Remove dirt and dust deposits. Clean more frequently in the case of heavy dirt accumulation
	Check rubber buffer	Check rubber buffer of the torque plate and replace it in the event of visible wear or damage
	Relubricate roller bearings	For gearboxes with adapter and grease nipple: Relubricate the roller bearings in the adapter using a grease gun. Grease: Klüber Microlube GLY 92, amount approx. 5 grams
Annually	Check vent valve	Check whether air can pass through the breather element. If it shows blockages, replace it
According to diagram; at the latest as specified in the lubricant table	Change lubricant	Change lubricant For type and amount of lubricant see nameplate ▶ Nameplates 10
	Replace roller bearing grease filling	Rolling bearing greases should also be renewed when changing the lubricant

The following gearboxes are lubricated for life:

- G50BH045
- G50BH110
- G50BH114

Lubricants

For gearboxes not lubricated for life, change the lubricant at regular intervals.

The type of lubricant is indicated on the nameplate. Only use the same type of lubricant.

[▶ Nameplates](#) [10](#)

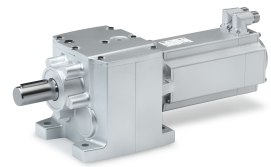
The change interval depends on the lubricant temperature during operation.

The replacement intervals listed in the lubricant table are reference values for normal ambient conditions. Shorter periods are required for more difficult operating conditions (e.g. aggressive ambient media).

At higher oil temperatures, determine the change interval from the following lubricant diagram.

Maintenance

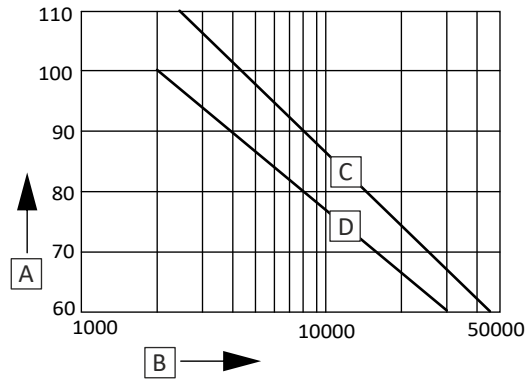
Maintenance intervals



Determine change intervals for lubricants

1. Measure the lubricant temperature at the drain plug
2. Add 10 °C
3. Determine the change interval from the diagram

Position Of the drain plug ► [Ventilation](#) 20

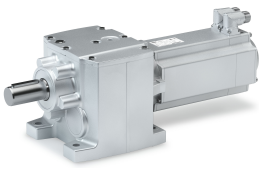


A Oil sump temperature [°C]

B Change interval in operating hours [h]

C Synthetic oil: CLP HC/CLP PG

D Mineral oil: CLP



Maintenance work

Check the oil level

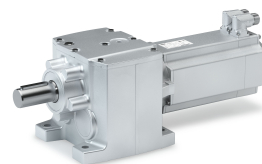
NOTICE

- Check the oil level in cold condition!

Check the oil level by means of the displayed dipsticks. Depending on the gearbox type and the mounting position (M1 ... M6), make these according to the following templates. The gearbox type and mounting position are indicated on the nameplate.

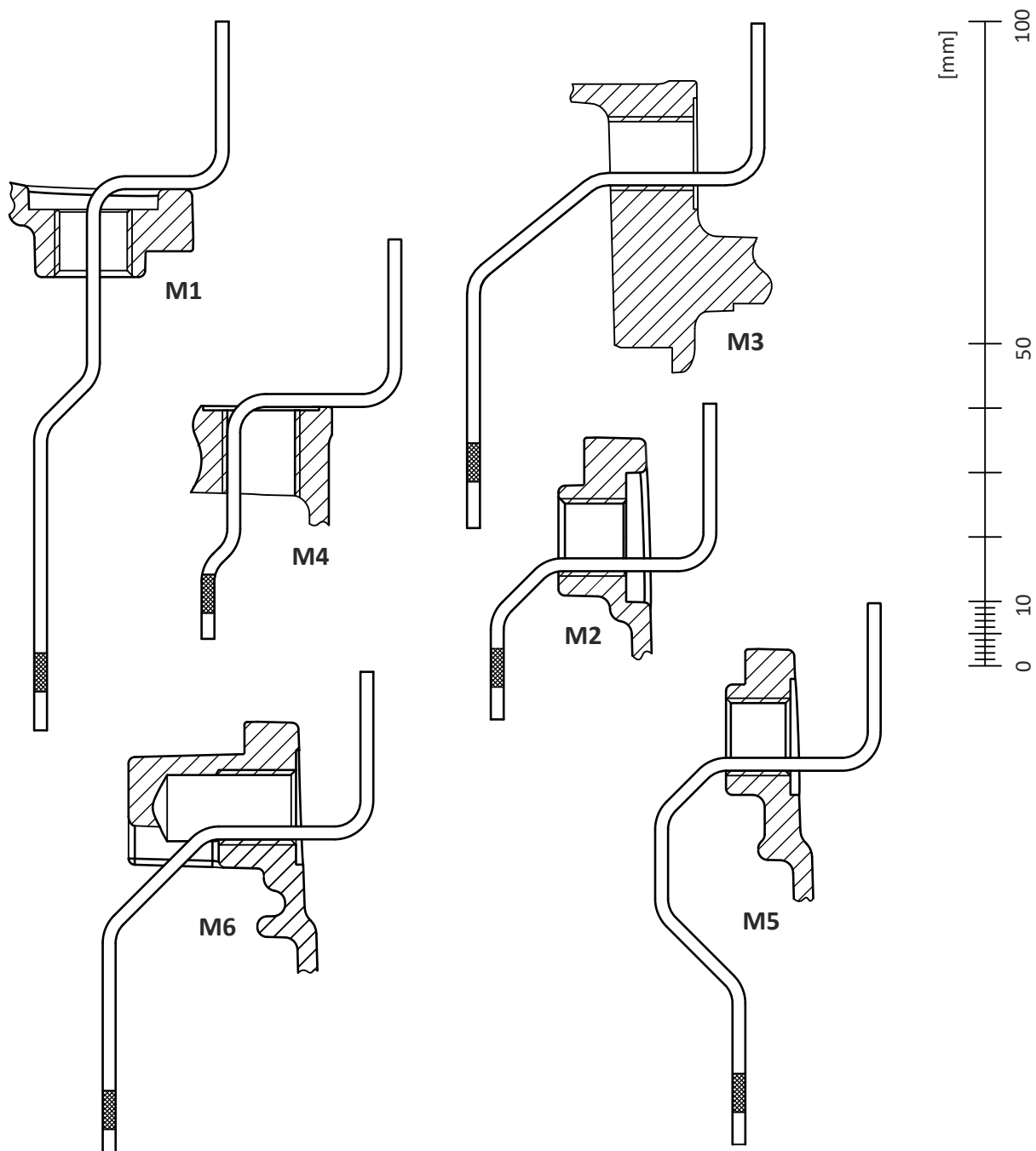
► [Nameplates](#)  10

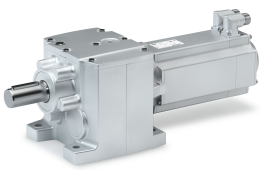
The oil level must be within the marked range of the dipstick.



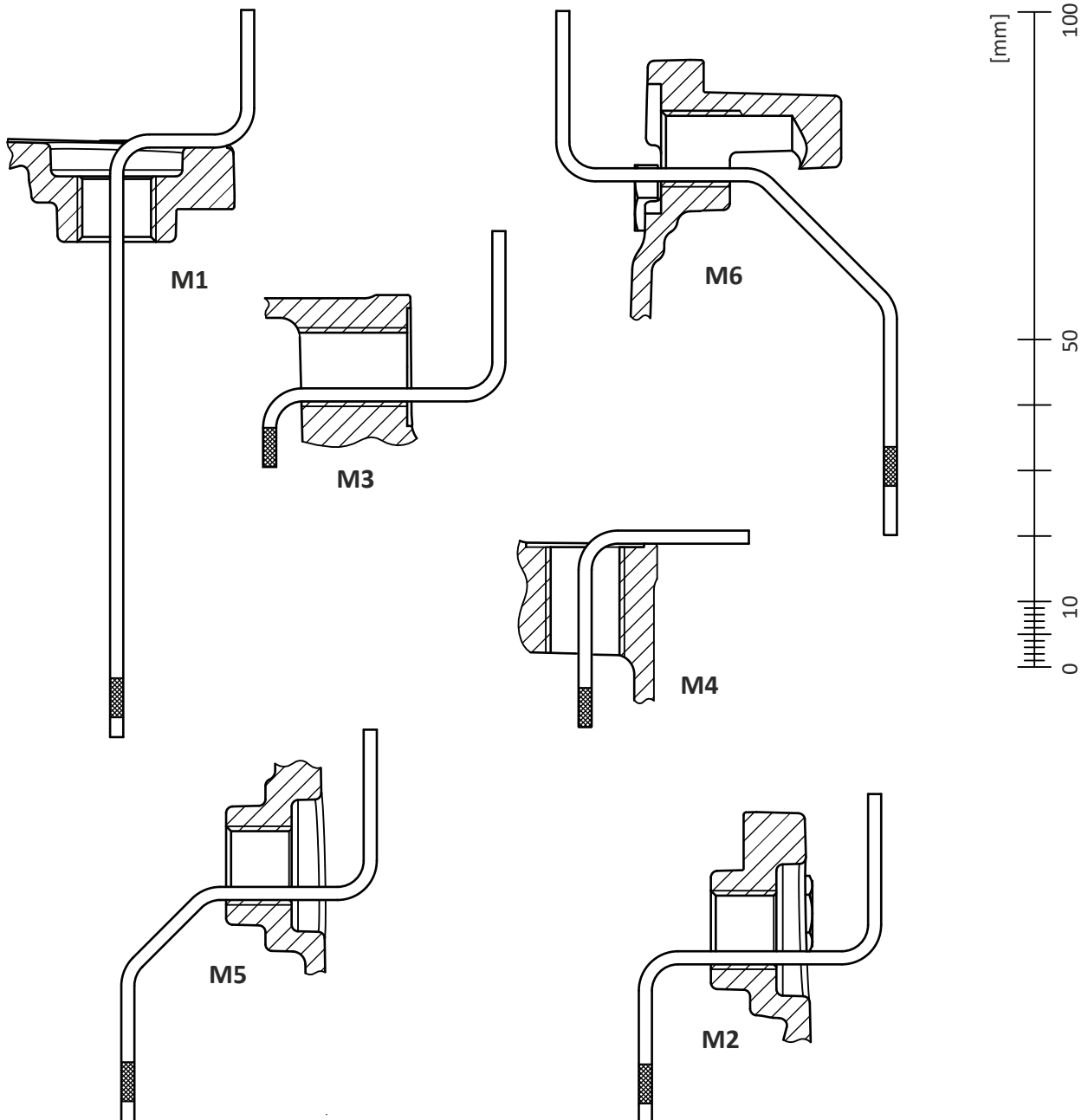
Gearbox G50BH121 ... H145

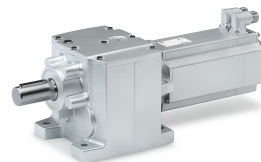
Template: Dipsticks for G50BH121



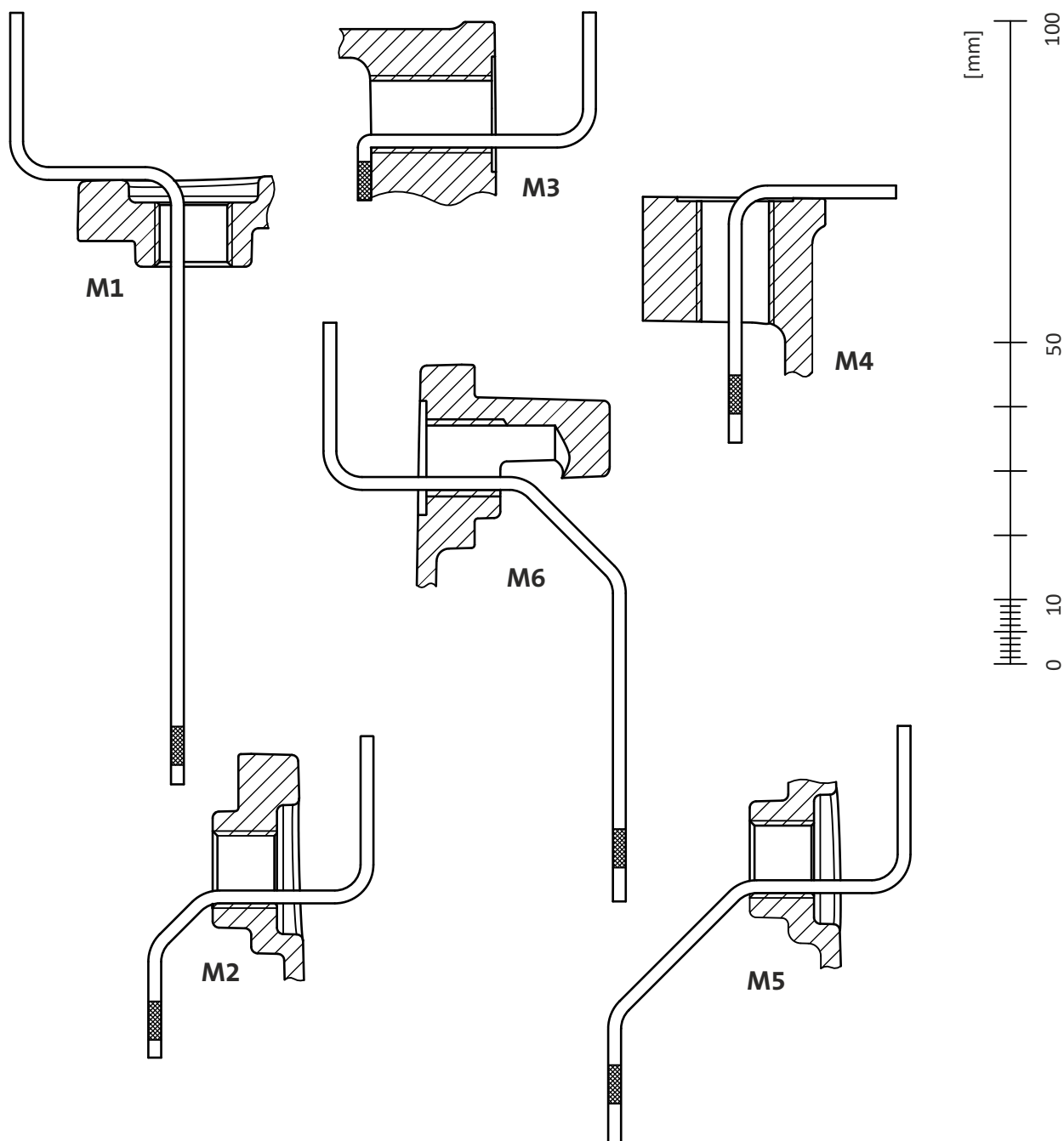


Template: Dipsticks for G50BH132



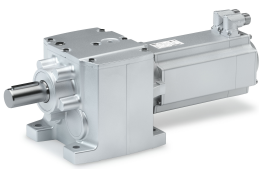


Template: Dipsticks for G50BH145



How to check the lubricant level:

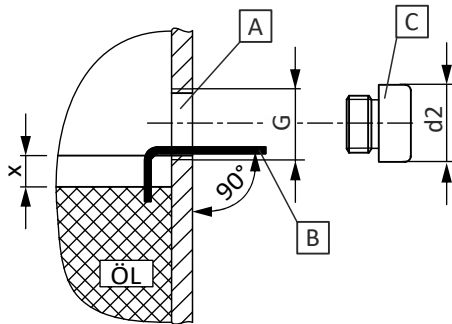
1. Remove the control screw at the marked position. ▶ [Ventilation](#) 20
2. Insert the dipstick through the threaded hole. Observe the position of the dipstick in the template!
3. Carefully pull out the dipstick and determine the lubricant level. The lubricant level must be within the marked range of the dipstick.
4. If the lubricant level is too low, top up lubricant until the lubricant level is in the marked area of the dipstick. If the loss is greater, determine the cause.
5. Insert the control screw and tighten it to the specified torque.



Gearbox G50BH160 ... G50BH314

How to check the lubricant level:

1. Remove the control screw at the marked position. ▶ [Ventilation](#) 20
2. Insert auxiliary tool through the threaded hole.
3. Carefully pull out the auxiliary tool and determine the lubricant level. The lubricant level may be between the threaded hole and dimension "x".
4. If the lubricant level is too low, top up lubricant until the lubricant level is in the marked area. If the loss is greater, determine the cause.
5. Insert the control screw and tighten it to the specified torque.



- A Check bore hole
B Auxiliary tool, e. g. angled wire (not included in the scope of supply)
C Control screw

Threaded hole G	Screw head d2	Filling height x
	mm	mm
M10 x 1	14	2
M12 x 1.5	17	3
M16 x 1.5	21	4
M20 x 1.5	25	5

Change lubricant

NOTICE

Change from standard lubricant CLP or CLP HC to food grade lubricant CLP ... USDA H1.

The drain holes do not always allow complete draining of the gearbox. A residual amount of the lubricant may remain in the gearbox.

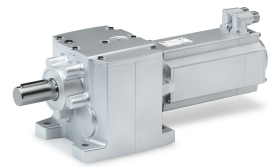
- ▶ Carefully flush the gearbox with the food grade lubricant before changing the lubricant.

NOTICE

- ▶ The gearbox should be lukewarm in order that the oil flows well but there is no risk of scalding.

How to change the lubricant:

1. Place a sufficiently large container (lubricant quantity indicated on the nameplate) under the drain plug. ▶ [Nameplates](#) 10
2. Remove filler and drain plug at the marked position and drain lubricant completely. ▶ [Ventilation](#) 20
3. Insert the drain plug with a new sealing ring and tighten to the prescribed torque.
4. Fill in defined amount of lubricant through the inlet.
5. Insert the filler plug and tighten it to the specified torque.
6. Dispose of waste oil according to the applicable regulations.



Tightening torques for venting elements and screw plugs

Threaded hole	Tightening torque
	Nm
M10 x 1	10
M12 x 1.5	20
M16 x 1.5	34
M20 x 1.5	50

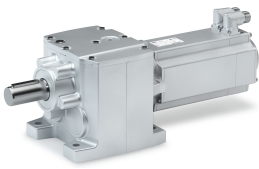
Change roller bearing lubricant

Recommended lubricants:

	Ambient temperature	Manufacturer	Type
Gearbox roller bearing	-30 °C ... +50 °C	Fuchs	Renolit H 443
	-30 °C ... +80 °C	Klüber	Petamo 133 N
	-40 °C ... +60 °C	Klüber	Microlube GLY 92
Motor roller bearing	-30 °C ... +70 °C	Lubcon	Thermoplex 2TML
	-40 °C ... +80 °C	Klüber	Asonic GHY 72
Biolubricant (lubricant for forestry, agriculture and water supply and distribution)	-40 °C ... +50 °C	Fuchs	Plantogel 0120S

How to change the lubricant:

- Clean rolling bearings before lubricating
- For fast-running bearings (gearbox drive end): Fill one third of the hollow spaces between the roller bearings with grease.
- For slow-running bearings (within gearbox and driven side of gearbox): fill two-thirds of the hollow spaces between roller bearings with grease.



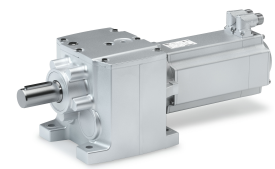
Repair

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](#)  44
- 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.

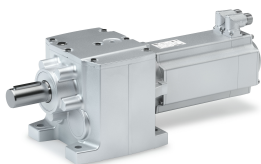


Diagnostics and fault elimination

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 cause	Remedy
Drive is not running	Voltage supply interrupted	Check connection
	Faulty electrical connection	Check external voltage supply.
	Load too high	Reduce load Check assignment drive - machine
Motor runs, gearbox does not	Coupling components are missing or defective	Check mounting
	Gearbox is defective	Inform Lenze Service
	Clutch disengaged	Engage the clutch
Unusual running noises	Overload	Reduce load Check assignment drive - machine
Excessive temperature	Overload	Reduce load
	Inadequate heat dissipation	Improve cooling air supply, clean gearbox / motor
	Lack of lubricant	Top up lubricant according to regulations
Vibrations, noise	Loose fixing elements	Tighten fixing elements
Shrink disc connection is spinning	Correct screw tightening torque has not been reached - Insufficient number of passes, not all screws are tightened correctly.	Specifications for assembly, dimensions and material must be observed
	Machine shaft and hollow shaft bore not sufficiently degreased	
	Wrong component part dimensions - Fits, roughnesses	
	Yield point of machine shaft material is too low - $R_e > 300 \text{ N/mm}^2$ required	
	Friction factors are too low - Surface roughness $R_z \leq 15 \mu\text{m}$ required	
	The shrink disc itself has been degreased so that the screws and the bevels are dry. Due to incorrect friction factors, the shrink disc cannot be tightened correctly.	
Oil is leaking	Wrong oil level for the applied mounting position	Check mounting position (see nameplate) and oil level
	Initially slight leakage at the shaft seal	Optimum sealing conditions only arise after the running-in phase
	Overpressure due to lacking ventilation	Install ventilation according to the mounting position
	Overpressure due to polluted ventilation	Clean ventilation
	Worn-out shaft sealing rings	Check condition of sealing lip contact area, repair if necessary.
	Cover / flange screws are loose	Check that the fixing screws are tightly fastened. Continue to monitor the gearbox
Oil discharge at the gearbox ventilation unit	Incorrect oil level for the mounting position applied and/or incorrect position of ventilation unit	Check mounting position (see nameplate) and oil level Check position of ventilation unit Use oil compensation reservoir



Technical data

Standards and operating conditions

Conformities and approvals

More information and certificates of approval can be found under

[g500 + m850 helical geared motors](#)

Europa		
Country	Conformity/approval	Product representation
European Union	CE	CE mark
Great Britain	UKCA	UKCA mark
America		
Country	Conformity/approval	Product representation
Canada	CSA	cULus mark
USA	UL	
Asia		
Country	Conformity/approval	Product representation
China	-	CEL mark
		EFUP mark

Protection of persons and device protection

Protection class			
-	EN IEC 60529, EN IEC 60034-5	IP54 IP65	Information applies to the mounted and ready-for-use state
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

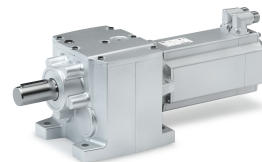
Environmental conditions

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 ... 2000 m. amsl		Reduce rated output current by 5 %/1000 m	
Air humidity			
-	-	Average relative humidity 85 %	Without condensation

Technical data

Motor data

Rated data

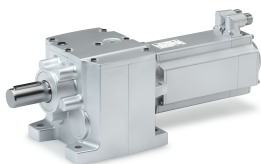


Motor data

Rated data

Inverter power supply 400 V, self-ventilated motors

Motor			M85AS120S40	M85AS120M40	M85AS120L40	M85AS140S32	M85AS140M32	M85AS140L32
Standstill torque	M_0	Nm	6.50	11.0	15.0	11.0	21.0	28.0
Rated torque	M_{rated}	Nm	4.80	7.40	9.00	8.50	14.0	17.4
Max. torque	M_{max}	Nm	14.5	29.0	44.0	26.0	53.5	80.0
Rated speed	n_{rated}	rpm	3960	3960	3960	3240	3240	3240
Max. speed	n_{max}	rpm	6000	6000	6000	6000	6000	6000
Rated power	P_{rated}	kW	2	3.1	3.7	2.9	4.8	5.9
Standstill current	I_0	A	5.50	8.80	12.1	7.40	14.0	18.0
Rated current	I_{rated}	A	4.30	6.40	7.80	6.30	10.0	12.2
Max. current	I_{max}	A	15.0	28.0	42.0	23.0	45.5	66.0
Rated voltage	V_{rated}	V	330	330	320	340	330	330
Rated frequency	f_{rated}	Hz	330	330	330	270	270	270
Moment of inertia	J	kgcm ²	6.50	12.4	18.2	15.7	30.1	44.6
Efficiency	η		0.902	0.914	0.914	0.879	0.915	0.926
Torque constant	K_{t0150}	Nm/A	1.18	1.25	1.24	1.49	1.50	1.56
Voltage constant	$K_{E_{LL150}}$	V/(1000/min)	68.99	73.1	72.93	86.81	88.36	90.67
Stator terminal resistance	R_{UV20}	Ω	2.24	1.02	0.63	1.436	0.562	0.366
Stator terminal resistance	R_{UV150}	Ω	3.376	1.537	0.949	2.164	0.847	0.552
Stator inductance	L	mH	11.5	6.73	4.58	9.90	5.22	3.76
Weight	m	kg	6.5	9.25	12.0	9.50	14.5	19.5

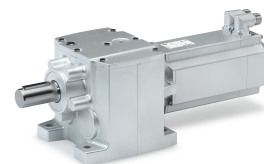


Technical data

Motor data

Rated data

Motor			M85AS190S30	M85AS190M30	M85AS190L25
Standstill torque	M_0	Nm	27.0	46.0	67.0
Rated torque	M_{rated}	Nm	16.0	24.0	35.0
Max. torque	M_{max}	Nm	71.0	120	200
Rated speed	n_{rated}	rpm	3000	3000	2520
Max. speed	n_{max}	rpm	4500	4500	4500
Rated power	P_{rated}	kW	5	7.5	9.2
Standstill current	I_0	A	16.0	26.8	30.8
Rated current	I_{rated}	A	10.3	15.4	17.7
Max. current	I_{max}	A	64.0	87.0	112
Rated voltage	V_{rated}	V	340	330	345
Rated frequency	f_{rated}	Hz	250	250	210
Moment of inertia	J	kgcm ²	60.8	117	193
Efficiency	η		0.905	0.919	0.929
Torque constant	$K_{t_{0\ 150}}$ °C	Nm/A	1.69	1.72	2.18
Voltage constant	$K_{E_{LL\ 150}}$ °C	V/ (1000/ min)	99.24	101.13	124.86
Stator terminal resistance	$R_{UV\ 20}$ °C	Ω	0.452	0.196	0.16
Stator terminal resistance	$R_{UV\ 150}$ °C	Ω	0.681	0.295	0.241
Stator inductance	L	mH	5.46	2.90	2.76
Weight	m	kg	19.8	28.5	41.0



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 → 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