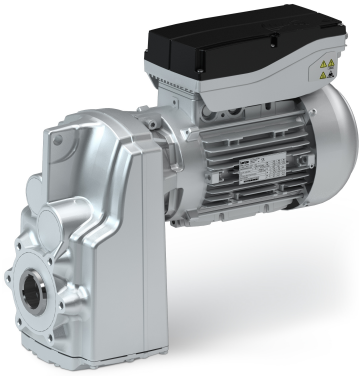




Mains-operated geared motors

g500-S shaft-mounted helical geared motor / Smart Motor m300-E

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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

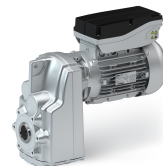


Information and tools with regard to the Lenze products can be found on the Internet:

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

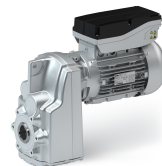
Basic safety instructions

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 is suitable for horizontal conveying only.
- The product may only be operated from the mains.
- 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 IEC 61800-5-1 / EN IEC 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 thermal detectors 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.
- Too high torques cause a fraction of the motor shaft.
 - Do not exceed the maximum torques according to the technical data on the nameplate.



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		15	
2		3		Hz	16.1
3		18		kW	16.2
4				V	16.4
5.1	5.2			45	19
5.3	5.4	30	A		16.5
6	7.1	7.2	r/min		16.3
8.1	8.3			cos φ	16.6
		44	Nm		16.10
10.2	10.3			27	
11				20.1	

Position	Contents	Position	Contents
1	Manufacturer / production location	16	Rated data for various frequencies
2	Type of motor / standard	16.1	Hz = frequency
3	Gearbox type	16.2	kW = motor power
4	Motor type	16.3	rpm = motor speed
5	Technical data	16.4	V = motor voltage
5.1	Gearbox ratio	16.5	A = motor current
5.2	Output torque M2	16.6	cos φ = motor power factor
5.3	Output speed n2	16.10	Nm = rated torque
5.4	-	17	-
6	Position: Shaft, flange, terminal box, mounting position	18	Year of manufacture / week of manufacture
7	Lubricant details	19	UL file number
7.1	Lubricant quantity	20	Customer data
7.2	Lubricant	20.1	Additional customer data
8	Brake data	27	Permissible ambient temperature (e.g. Ta < 40°C)
8.1	Brake	30	Weight (optional)
8.3	Braking torque	44	"Br-resistor" brake resistor (if a brake resistor is available)
10	Production data	45	UL type rating/NEMA enclosure type
10.2	Material number		
10.3	Serial number		
11	Bar code		
13	Information on operating mode		
14	Additional motor specifications		
14.1	Temperature class		
14.2	Protection class		
15	Applicable conformities, approvals and certificates		



Product information

Identification of the products
Product codes

Product codes

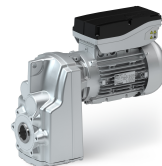
Gearbox product code

Example		G	50	B	S	113	M	H	D	R	2	C	1B
Product type	Gearbox	G											
Product family			50										
Version				B									
Gearbox type	Shaft-mounted helical gearbox				S								
Output torque	130 Nm					113							
	220 Nm					122							
	400 Nm					140							
	660 Nm					166							
	950 Nm					195							
	2100 Nm					221							
	3100 Nm					231							
	4500 Nm					245							
	8000 Nm					280							
	14000 Nm					314							
	19000 Nm					319							
Type of construction	Geared motor						M						
	Gearbox						N						
Shaft design	Solid shaft with featherkey							V					
	Hollow shaft with keyway							H					
	Hollow shaft with shrink disc							S					
Housing type	Foot mounting + centering								A				
	Foot mounting								B				
	With centering								C				
	Threaded pitch circle								D				
Flange mounting	Without flange									R			
	Flange with through holes									K			
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	
	Servo motor adapter with plug-in hollow shaft											S	
	Servo motor adapter with jaw coupling											E D G	
Drive size													1A ... □H 08 ... 82

Product information

Identification of the products

Product codes



Motor product code

Example		M	S	E	MA	XX	063	-	4	2	C1	C
Meaning	Variant	Product code										
Product family	Motor	M										
Product type	Smart Motor		S									
Cooling	Integral fan			E								
Internal key					MA							
Built-on accessories	Without built-on accessories					XX						
	Brake					BR						
Size							063 080					
Overall length								-	3 4			
Number of pole pairs	4-pole motors									2		
Design types	Internal key										C1	
Approval	CE; UKCA											C
	CE; UKCA; cULus											L
	CE; UKCA; CCC											3
	CE; UKCA; cULus; CCC											5



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)

Torque support

Output flange

Output shaft

Oil drain plug

(depending on the mounting position)

Housing type

X4 Brake resistor connection

External

Internal brake resistor

X1, X2 Control terminal

M12 connector

X3 Mains connection

In the terminal box
QUICKON V2 connector
M15 connector
PE

X5 Connection of spring-applied brake

(prewired upon delivery)

Cooling

Integral fan

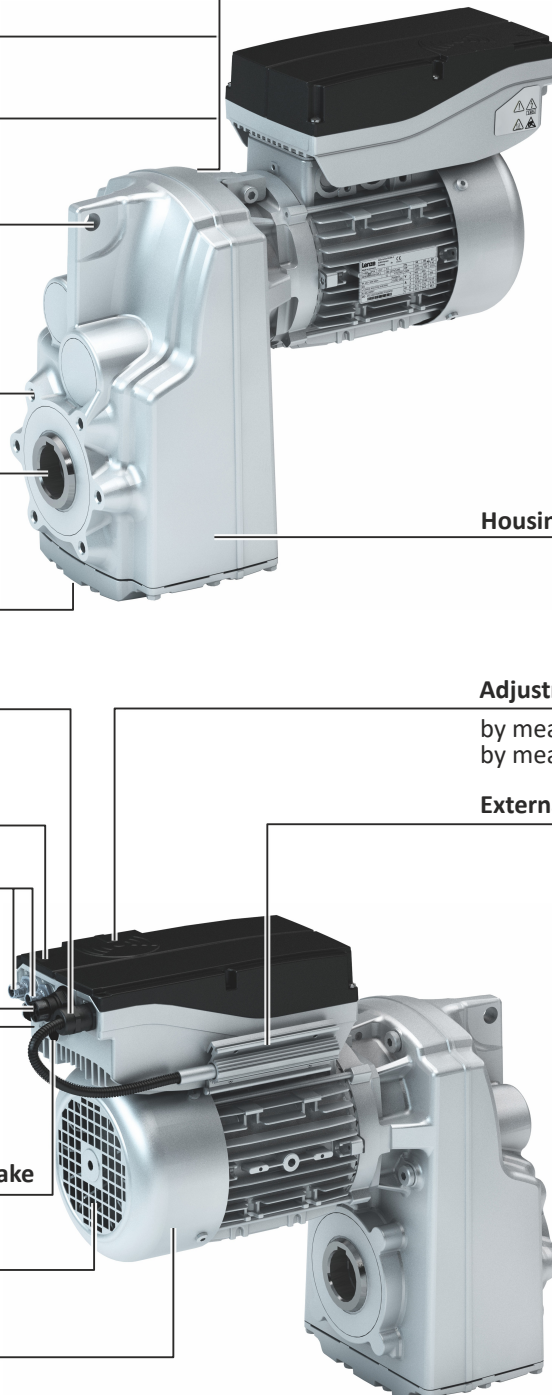
Spring-applied brake

Standard
LongLife
Manual release lever

Adjustment of speeds

by means of Android smartphone
by means of PC via NFC adapter

External brake resistor





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!

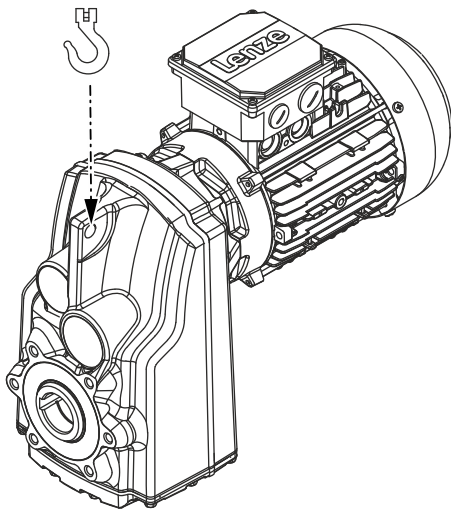
CAUTION!

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!

Position of the ring bolts





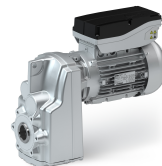
Storage

Storage up to one year:

- Observe the climatic conditions according to the technical data
 - ▶ [Environmental conditions](#) 61
- 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](#) 18



Mechanical installation

Important notes

- Install the product according to the information in the chapter "Standards and operating conditions".
 - ▶ [Standards and operating conditions](#) 59
- 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](#) 17

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.



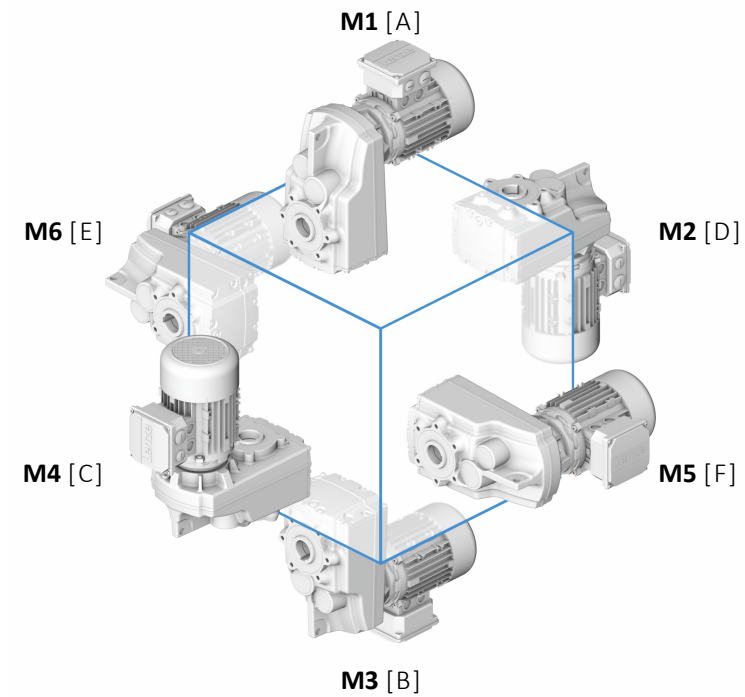
Mechanical installation

Installation
Mounting positions

Installation

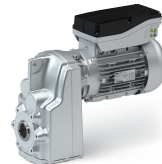
- The mounting surfaces must be plane, torsionally rigid and free from vibrations.
- The mounting areas must be suited to absorb the forces and torques generated during operation.
- Ensure an unhindered ventilation.
- For versions with a fan, keep a minimum distance of 10 % from the outside diameter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

Mounting positions



Mechanical installation

Installation
Ventilation



Ventilation



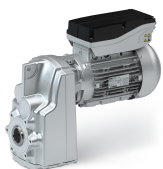
No venting measures are required for the G50BS113 ... BS122 gearboxes.
The G50BS122 gearbox can optionally be equipped with a breather element.
From G50BS140 onwards, the gearboxes are supplied with breather elements as standard.

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.

G50BS122 ... BS166

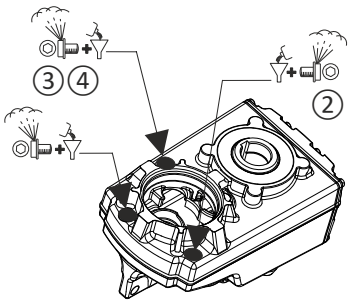
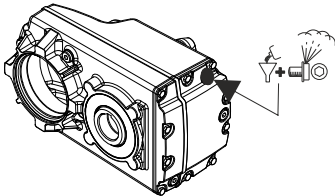
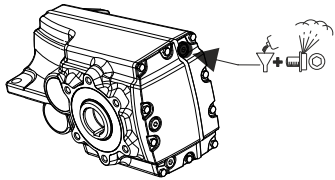
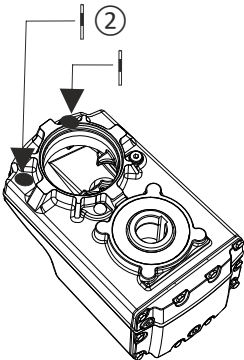
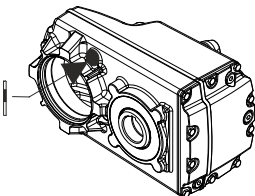
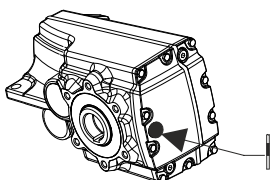
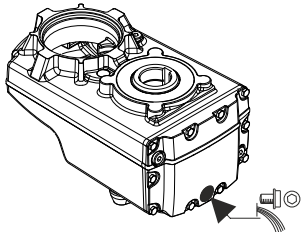
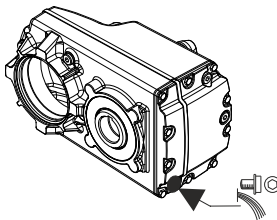
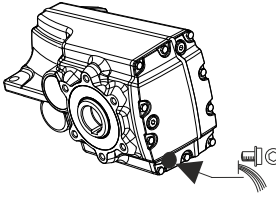
Mounting position M1 (A)	Mounting position M2 (D)	Mounting position M3 (B)
Filling and ventilation		
Check		
Drain		

- ② G50BS122
- ③ G50BS140



Mechanical installation

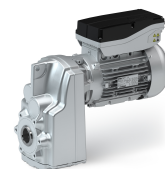
Installation
Ventilation

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

- ② G50BS122
- ③ G50BS140
- ④ G50BS166

Mechanical installation

Installation
Ventilation



G50BS195 ... BS245

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		
Check		
Drain		

⑤ G50BS231

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.

Mechanical installation

Dimensions



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

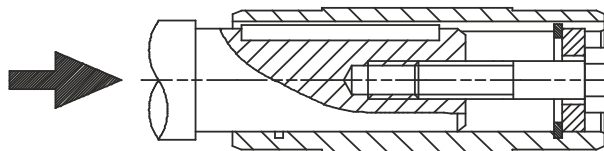
- Use screws with a minimum property class of 8.8.
- Observe prescribed tightening torques.
- Secure against unintended loosening.
- For alternating loads, we recommend applying anaerobic curing adhesive between flange and mounting surface.

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

Gearbox with hollow shaft and shrink disk

- Use fitting grease in the area of the contact surfaces of machine shaft and hollow shaft bore.
- Be sure to carry out mounting in a manner free from distortion.
- Lead forces only across the hollow shaft and not across the housing.
- For axial fastening, use the snap ring grooves in the hollow shaft.

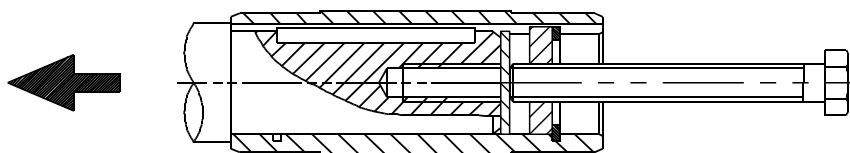
Proposed solution for axial fastening

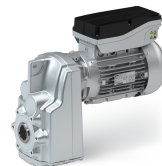


Dismounting

- Undo axial gearbox locking in the hollow shaft
- Extract the gearbox from the motor shaft using an appropriate auxiliary tool

Proposed solution for dismounting



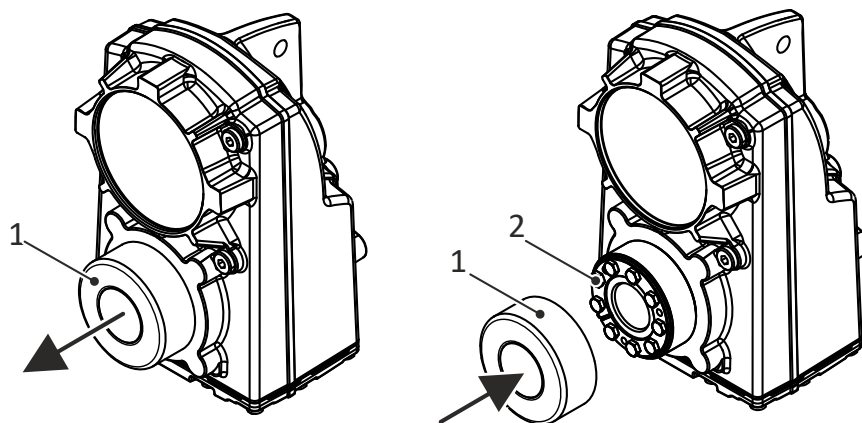


Gearbox with hollow shaft and shrink disc

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



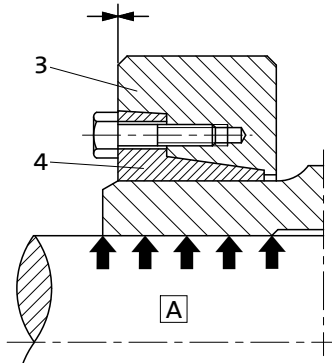
- 1 Rotating cover
- 2 Clamping screws

1. Check machine shaft
 - Diameter in fit tolerance h6
 - Material yield point $Re \geq 360$ MPa
 - E-module approx. 210000 MPa
 - Surface roughness $R_z \leq 15 \mu m$
 - Concentricity (to prevent unnecessary additional forces caused by tensioning)
2. Remove rotating cover (1) from the shrink disc
3. Thoroughly clean and degrease hollow shaft bore and machine shaft.
4. Slightly loosen clamping screws (2) one after the other, do not unscrew.
5. Push gearbox onto machine shaft.
6. Slightly tighten clamping screws manually.
7. 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.
8. Pull the co-rotating cover (1) over the shrink disc.



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

Hollow shaft bore	mm	20	25		30		35		40	
Thread	mm	M6	M5	M6	M6	M8	M6	M8	M6	M8
Key size	mm	10	8	10	10	13	10	13	10	13
Tightening torque	Nm	12	6	14	14	30	14	30	14	34

Hollow shaft bore	mm	50	65	75	80	85	105	125
Thread	mm	M8	M10	M10	M10	M12	M14	M14
Key size	mm	13	17	17	17	19	22	22
Tightening torque	Nm	34	70	70	70	121	193	193

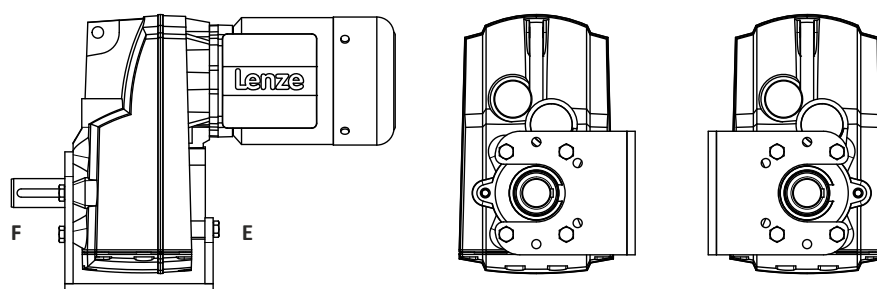
Gearbox foot mounting

NOTICE

- For gearboxes G50BS113 ... G50BS166, the foot is supplied loose and can be mounted to the gearbox in three positions. Depending on the installation situation and installation space, the foot can first be screwed to the machine housing and then to the gearbox or vice versa. Lenze recommends using studs when mounting the gearbox with the foot mounted on the machine housing.
- For gearboxes G50BS195 ... G50BS245, the foot is integrated in the housing.

Mechanical installation

Mounting



NOTICE

- Independent of the mounting order, the output shaft must be aligned with the machine shaft.

How to mount the foot to the gearbox:

1. Fasten foot to gearbox with 4 screws in "Position F" and 2 screws in "Position E"
2. Fasten gearbox with foot to machine housing with 4 screws

How to mount the foot to the machine housing:

1. Fasten foot to machine housing with 4 screws
2. Fasten foot to gearbox with 4 screws in "Position F" and 2 screws in "Position E"

How to align the gearbox shaft with the machine shaft:

1. Loosen fixing screws "foot on gearbox" and "foot on machine housing" until the foot can be moved on both the gearbox and the machine housing
2. Output shaft aligned with machine shaft
3. Tighten the fixing screws "foot on gearbox" and "foot on machine housing"
4. Check alignment of gearbox shaft to machine shaft, improve alignment if necessary and repeat steps 1 to 3

Tightening torques for mounting the foot to the gearbox

Product code	Tightening torque
	Nm
G50BS113 + G50BS122	10
G50BS140 + G50BS166	48



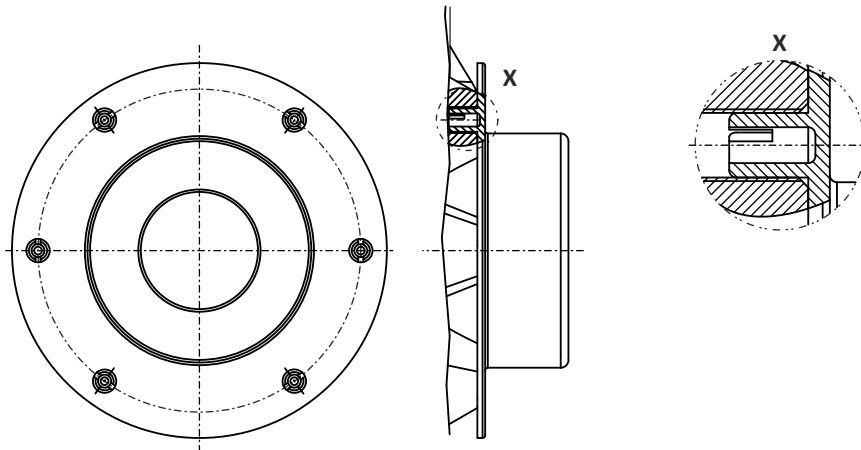
Product extensions

Mounting instructions for shrink disc cover

NOTICE

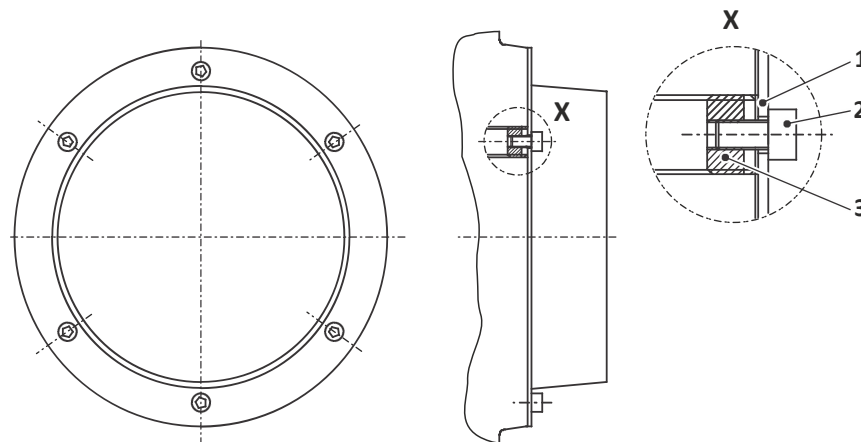
- The loosely enclosed cover is mounted as a protection against accidental contact with the shrink disc.

Gearboxes G50BS113 ... G50BS195



Press the cover with integrated mounting pins into the bore holes on the housing flange

Gearboxes G50BS221 ... G50BS245

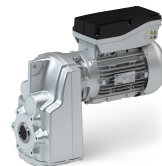


- 1 Shrink disc cover
- 2 Cheese head screw
- 3 Reducing bush

1. Screw reducing bushes (3) into the threaded holes on the housing flange so that they are flush using a screwdriver.
2. Fasten the cover over the reducing bushes (3) using cheese head screws (2).

Mechanical installation

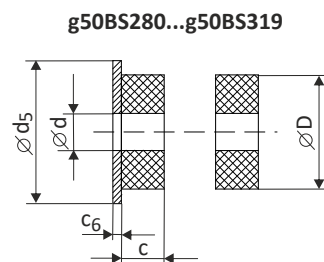
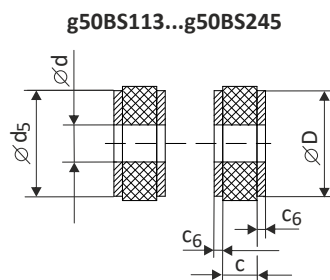
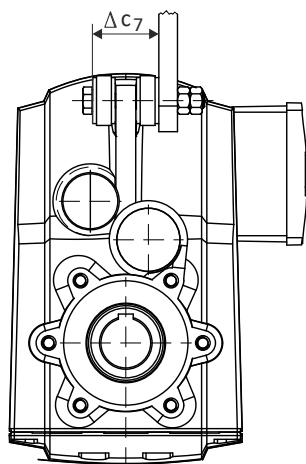
Mounting
Product extensions



Torque plate mounting

NOTICE

- Screw, nuts and the fixing strap on the machine are not included in the scope of supply.
- Use screws and nuts of property class 8.8.
- Use washers and fixing strap with a surface roughness of approx. $R_z = 25 \mu\text{m}$.
- Solvents, oils, greases and fuels damage the rubber elements. Avoid contact!



1. Install rubber buffers with washers on both sides of the gearbox torque arm and fixing strap of the machine as shown.
2. Tighten nuts until the rubber buffers are pretensioned by the Δc_7 dimension.
3. Counter the screw connection with a second nut.

Gearbox	Pretension	Rubber buffers			Washer	
	Δc_7	d	D	c	d ₅	min c ₆
	mm	mm	mm	mm	mm	mm
G50BS113	1	11	30	12	30	2.5
G50BS122	1	11	30	12	30	2.5
G50BS140	1	13	40	12	37	3
G50BS166	1	13	40	12	37	3
G50BS195	1	13	40	12	37	3
G50BS221	2	17	50	2x 12	50	3
G50BS231	2	21	60	2x 12	60	4
G50BS245	2	26	72	2x 12	72	5
G50BS280	7	25	80	40	100	10
G50BS314	5	31	120	50	140	12
G50BS319	7	31	120	50	140	12



Electrical installation

Important notes

DANGER!

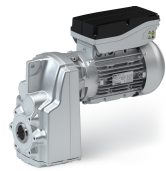
Risk of injury and risk of burns from dangerous voltage

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.

Electrical installation

Mains connection
Connection according to EN



Mains connection

Connection according to EN

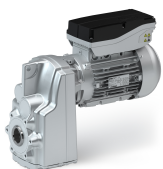


The following data is valid for a three-phase mains connection with 400 V.

Mains connection with QUICKON connector			
Motor		MSEMA□□063-42	MSEMA□□080-32
Connection		X3	
Laying system		B2	
Connection type		QUICKON connector	
Cable type		Flexible	
Cable cross-section			
Typ.	mm ²	1.5	2.5
Min.	mm ²	1.5	1.5
Max.	mm ²	2.5	2.5

Mains connection M15 connector			
Motor		MSEMA□□063-42	MSEMA□□080-32
Connection		X3	
Laying system		B2	
Connection type		M15 connector	
Cable type		Flexible	
Cable cross-section			
Typ.	mm ²	1.5	2.5
Min.	mm ²	1.5	1.5
Max.	mm ²	2.5	2.5

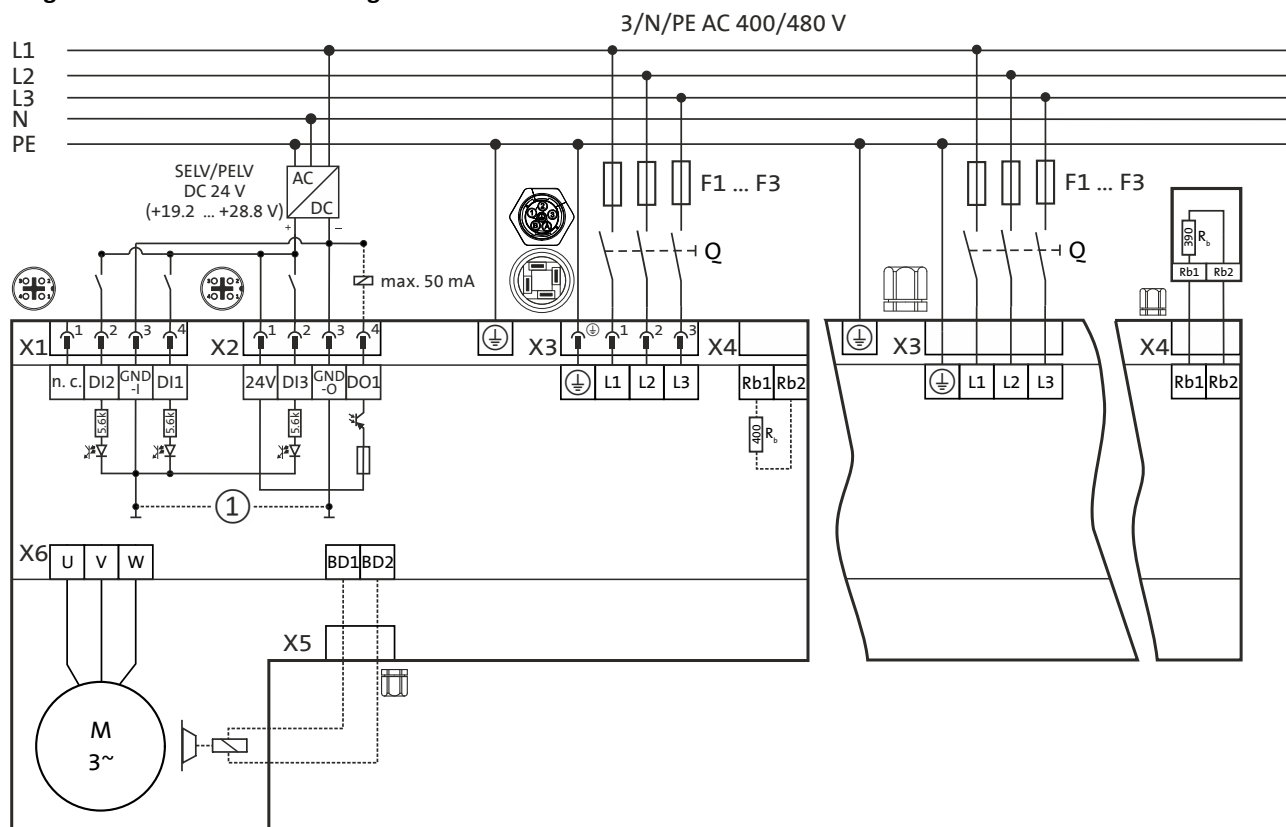
Mains connection cable L1, L2, L3, PE			
Motor		MSEMA□□063-42	MSEMA□□080-32
Connection		X3	
Installation method		B2	
Connection type		Cable	
Cable type		rigid/flexible	
Cable cross-section			
Typ.	mm ²	1.0	1.5
Min.	mm ²	0.75	0.75
Max.	mm ²	1.5	1.5
Stripping length	mm	10	10



Electrical installation

Mains connection
Connection according to EN

Single drive connection according to EN IEC 60204-1



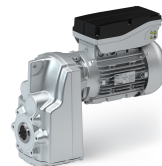
① GND is bridged if the "DI/DO-GND bridged" version is specified on the nameplate.

Fuse data (F1 ... F3)			
Motor		MSEMA□□063-42	MSEMA□□080-32
Cable installation in accordance with		EN IEC 60204-1	
Laying system		B2	
Fuse			
Characteristic		gG/gL	
Typ. Rated current	A	6	10
Max. rated current	A	16	16
Semiconductor fuse			
Characteristic		gRL	
Typ. Rated current	A	6	10
Max. rated current	A	16	16
Circuit breaker			
Characteristic		C	
Typ. Rated current		6	10
Max. rated current	A	16	16

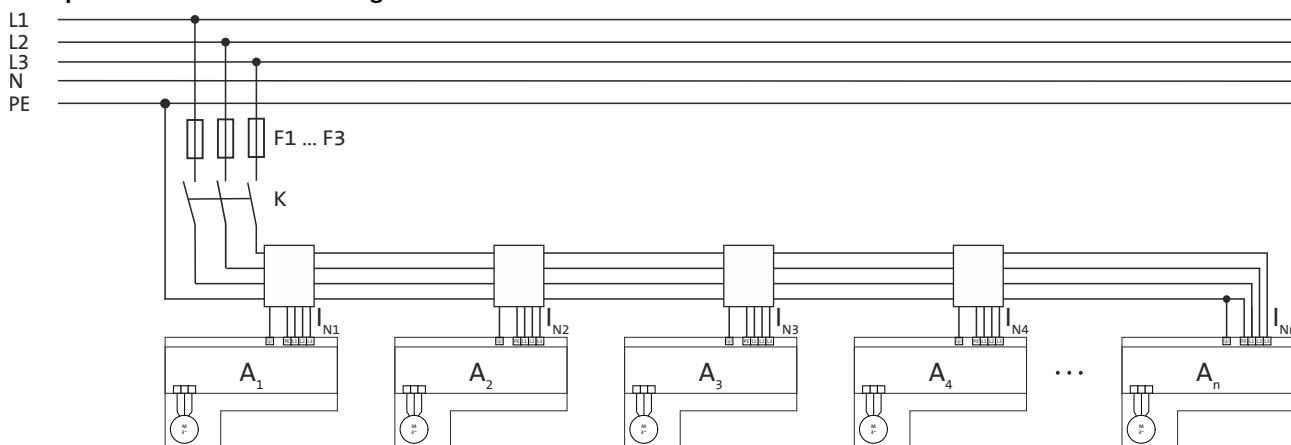
- Use of copper cables insulated with PVC
 - Conductor temperature < 70 °C, ambient temperature < 40 °C
- No bundling of cables or wires, three wires under load

Electrical installation

Mains connection
Connection according to EN



Group drive connection according to EN IEC 60204-1



Max. total rated mains currents at 40 °C for different cable cross-sections

Cable installation in accordance with		EN IEC 60204-1		
Main cable				
Laying system		B2		
Cable cross-section	mm ²	1.5	2.5	4.0
Stub				
Laying system		C		
Cable cross-section	mm ²	1.5	2.5	2.5
Max. current load of the cable	A	13.1	17.4	21.0
Fuse		gG/gL		
Characteristic				
Typ. Rated current	A	-	-	-
Max. rated current	A	10	16	20
Circuit breaker		gRL		
Characteristic				
Typ. Rated current	A	-	-	-
Max. rated current	A	10	16	20
$I_{\max} \geq I_{N1} + I_{N2} + I_{N3} + I_{N...}$	A	7.6	12.2	17.6

► Rated data [62](#)

- Use of copper cables insulated with PVC
 - Conductor temperature $\leq 70\text{ °C}$, ambient temperature $\leq 40\text{ °C}$
- No bundling of cables or wires, three wires under load
- Typical utilization 80 % of the respective cable cross-section taken into account

Group drive sizing

Example:

Verification of the maximum permissible rated mains current taking into account the specified data and a simultaneity factor of 100 %.

MSEMAXX063-42	7 drives	12 drives	17 drives
Mains voltage	400 V		
Rated current per motor	1 A		
Max. rated mains current	$I_{N1} + I_{N2} + I_{N3} + I_{N...} \leq I_{\max}$		
	$7 \times 1\text{ A} = 7\text{ A} \leq 7.6\text{ A}$	$12 \times 1\text{ A} = 12\text{ A} \leq 12.2\text{ A}$	$17 \times 1\text{ A} = 17\text{ A} \leq 17.6\text{ A}$



Electrical installation

Mains connection
Connection according to cULus

Connection according to cULus



The following data is valid for a three-phase mains connection with 480 V.

Mains connection with QUICKON connector			
Motor		MSEMA□□063-42	MSEMA□□080-32
Connection		X3	
Connection type		QUICKON connector	
Cable cross-section			
Typ.	AWG	16	14
Min.	AWG	16	16
Max.	AWG	14	14

Mains connection M15 connector			
Motor		MSEMA□□063-42	MSEMA□□080-32
Connection		X3	
Connection type		M15 connector	
Cable cross-section			
Typ.	AWG	16	14
Min.	AWG	16	16
Max.	AWG	14	14

Mains connection cable L1, L2, L3, PE			
Motor		MSEMA□□063-42	MSEMA□□080-32
Connection		X3	
Connection type		Cable	
Cable type		rigid/flexible	
Cable cross-section			
Typ.	AWG	18	16
Min.	AWG	18	18
Max.	AWG	16	16
Stripping length	mm	10	10

Mains connection
Connection according to cULus



- ▶ Use 75 °C copper wire only, except for control circuits.
- ▶ Maximum conductor size is AWG14.
- ▶ Cord connected drives are for use only in NFPA 79 applications.
- ▶ Overload protection: 125 % of rated FLA
- ▶ Integral solid state short circuit protection does not provide branch circuit protection. Branch circuit protection must be provided in accordance with the National Electrical Code and any additional local codes.
- ▶ CAUTION - Risk of electric shock. Do not disconnect under load.
- ▶ **Marquage UL**
- ▶ Utiliser exclusivement des conducteurs en cuivre 75 °C, sauf pour la partie commande.
- ▶ Taille de conducteur maximale : AWG14.
- ▶ Les entraînements avec câble d'alimentation sont destinés exclusivement à des applications conformes à la norme NFPA 79.
- ▶ Protection contre les surcharges : homologuée pour 125 % du courant assigné à pleine charge.
- ▶ La protection statique intégrée n'offre pas la même protection qu'un disjoncteur. Une protection par disjoncteur externe doit être fournie, conformément au National Electrical Code et aux réglementations locales applicables.
- ▶ ATTENTION ! Risque de choc électrique. Ne pas débrancher l'équipement sous charge.

The diagram shows a 3-phase motor control circuit. The main supply is 3/N/PE AC 400/480 V. The circuit includes a 3-pole circuit breaker (F1...F3) and a 3-pole contactor (Q). The motor (M 3~) is connected to the contactor. The control circuit is protected by a 5 A fuse (F4) and includes a thermal relay (Rb1, Rb2) and a stop button (S1). The control circuit is connected to the contactor's coil (C1) and the thermal relay's coil (Rb1, Rb2). The thermal relay is also connected to the contactor's coil (C1) and the stop button (S1). The thermal relay is also connected to the contactor's coil (C1) and the stop button (S1).

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Electrical installation

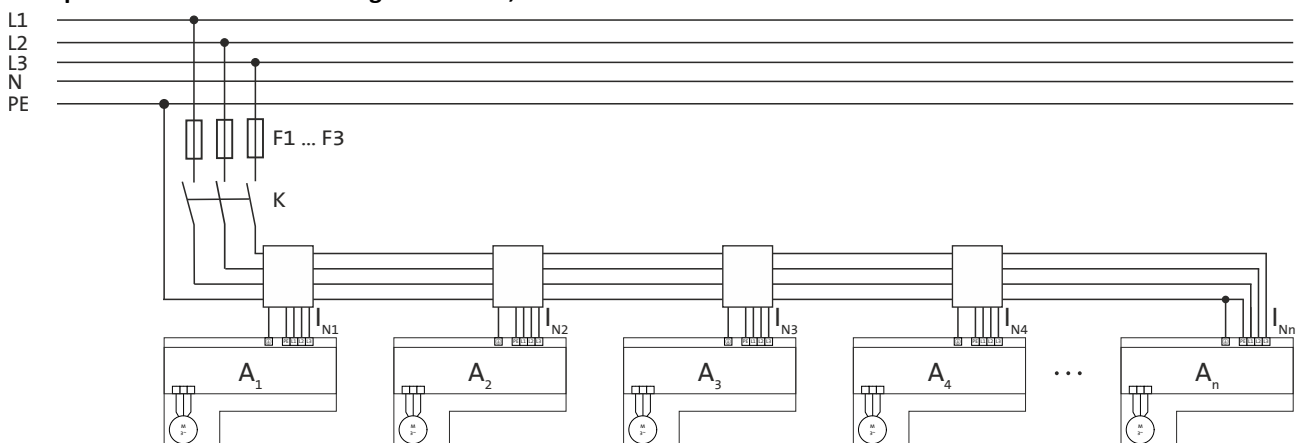
Mains connection
Connection according to cULus

Fuse data (F1 ... F3)				
Motor		MSEMA□□063-42		MSEMA□□080-32
Cable installation in accordance with		NFPA 70, NFPA 79		
Fuse				
Standard		UL 248		
Typ. Rated current	A	3		6
Max. rated current	A	3		10
Semiconductor fuse				
Standard		UL 248		
Typ. Rated current	A	3		6
Max. rated current	A	3		10
Circuit breaker				
Standard		UL 489		
Typ. Rated current	A	15		15
Max. rated current	A	15		15

⚠ WARNING!

- **UL marking**
- Suitable for use on a circuit capable of delivering not more than 5k rms symmetrical amperes, 480 V maximum.
- When protected by fuses rated, see table above.
- When protected by a circuit breaker having an interrupting rating not less than 5k rms symmetrical amperes, 480 Maximum, see table above.
- **Marquage UL**
- Convient à une utilisation sur un circuit non susceptible de délivrer plus de 5k ampères symétriques eff, maximum 480 V.
- Avec une protection par des fusibles du calibre indiqué dans le tableau ci-dessous,
- Avec une protection par un disjoncteur à courant de coupure assigné d'au moins 5k ampères symétriques eff, maximum 480 V, voir tableau ci-dessous.

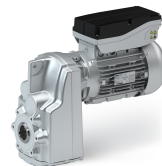
Group drive connection according to NFPA 70, NFPA 79



Electrical installation

Mains connection

Connection according to cULus



Max. total rated mains currents at 40 °C for different cable cross-sections			
Cable installation in accordance with		NFPA 70, NFPA 79	
Main cable			
Cable cross-section	AWG	16	14
Stub			
Cable cross-section	AWG	16	14
Fuse			
Typ. Rated current	A	---	---
Max. rated current	A	10	15
Circuit breaker			
Typ. Rated current	A	---	---
Max. rated current	A	10	15
$I_{\max} \geq I_{N1} + I_{N2} + I_{N3} + I_{N...}$	A	8.0	12.0

▶ Rated data 62

- Use of copper cables insulated with PVC
 - Conductor temperature $\leq 70\text{ °C}$, ambient temperature $\leq 40\text{ °C}$
- No bundling of cables or wires, three wires under load
- Typical utilization 80 % of the respective cable cross-section taken into account

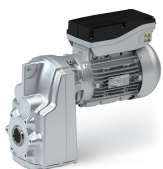
WARNING!

▶ UL marking

- ▶ Suitable for motor group installation on a circuit capable of delivering not more than 5k rms symmetrical amperes, 480 V maximum.
- ▶ When protected by fuses rated, see table above.
- ▶ When protected by a circuit breaker having an interrupting rating not less than 5k rms symmetrical amperes, 480/277 V Maximum, see table above.

▶ Marquage UL

- ▶ Convient aux circuits de groupes moteur non susceptibles de délivrer plus de 5k ampères symétriques eff, maximum 480 V.
- ▶ Avec une protection par des fusibles du calibre indiqué dans le tableau ci-dessous,
- ▶ Avec une protection par un disjoncteur à courant de coupure assigné d'au moins 5k ampères symétriques eff, maximum 480/277 V, voir tableau ci-dessous.



Electrical installation

Motor connection
Connection via terminal box

Motor connection

To connect the motor correctly, you must follow:

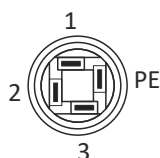
- The notes in the terminal box of the motor.
- The notes in the configuration document of the motor.
- The technical data on the motor nameplate.

Connection via terminal box

MSEMA terminal box		
Contact	Name	Meaning
1	L1	Mains connection phase L1
2	L2	Mains connection phase L2
3	L3	Mains connection phase L3
PE	PE	PE conductor

Connection via QUICKON V2 connector

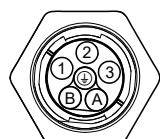
Mains connection X3



QUICKON V2		
Contact	Name	Meaning
1	L1	Mains connection phase L1
2	L2	Mains connection phase L2
3	L3	Mains connection phase L3
4	PE	PE conductor

Connection via M15 connector

Mains connection X3



M15 power without temperature sensor		
Contact	Name	Meaning
A		Not assigned
B		
1	L1	Mains connection phase L1
2	L2	Mains connection phase L2
3	L3	Mains connection phase L3
PE	PE	PE conductor

Electrical installation

Motor connection
Connection via M12 connector

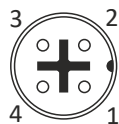


Connection via M12 connector

NOTICE

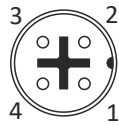
In the "DI/DO-GND bridged" version, the masses of the control terminal X1 and X2 (GND-I and GND-O) are connected to each other. If only one speed is used, the connection to X2 is sufficient.

Control connection X1



M12 A coded X1		
Contact	Name	Meaning
1	n.c.	
2	DI2	Digital input 2
3	GND-I	Ground of digital input
4	DI1	Digital input 1

Control connection X2



M12 A coded X2		
Contact	Name	Meaning
1	24V	24 V supply (DO1 supply)
2	DI3	Digital input 3 (reference X1;3 = GND-I)
4	DO1	Digital output 1
3	GND-O	Ground of digital output

Connection data - digital inputs for control connection X1/X2

Name	Supply voltage	Internal resistance
	V_{in}	R_i
	DC V	Ω
DI1	24 (19.2 ... 28.8)	5600
DI2		
DI3		



Commissioning

You have two options to adapt the Lenze Smart Motor to the applications:

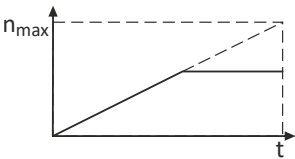
Preconditions		
NFC-capable smartphone or tablet		
- Android version from V3.0 - Lenze app "Lenze Smart Motor" - Download from www.Lenze.com or from the Google store - Deenergize motor - In order to ensure a trouble-free near field communication, find out first about the position of the NFC antenna on your mobile device - Possibly, this area is directly marked on your mobile device. - The standard smartphones are marked in the camera area. - Comply with the distance of < 2 cm when reading/writing		
PC		
- Engineering tool EASY Starter - Download from www.Lenze.com - Required licence: - EASY Advanced or Engineer HighLevel - EZAETF001 NFC adapter for communication between PC and the Lenze Smart Motor - Deenergize motor - Comply with the distance of < 2 cm when reading/writing		

Parameter set management

Parameter	Value		Comment
Designation	Delivery	Setting range	
PIN	---	[0000 ... 9999]	PIN for the protection against unauthorised alteration of the parameter set (0 = no protection). Alteration of "PIN" sets "new PIN" to the same value. The parameters can also be read without a PIN.
New PIN	---	[0000 ... 9999]	Future PIN for protection against unauthorised alteration of the parameter set.



Standard settings

Parameter	Value		Comment
Name	Delivery	Setting range	
Parameter set name	---	[text]	File name of the parameter set without file extension *.lsm
Output speed 1	depending on the order	[-2600/i ... -500/i] rpm [0] rpm [500/i ... 2600/i] rpm	CCW rotation: < 0 rpm STOP: 0 rpm CW rotation: > 0 rpm Lenze Smart Motor with gearbox: The ratio i is taken into account when calculating the output speed.
Output speed 2			
Output speed 3			
Output speed 4			
Output speed 5			
Acceleration time		[0.0 ... 20.0] s 	Acceleration time t_1 of the ramp generator from 0 rpm to n_{max} [2600/i] rpm
Deceleration time			Deceleration time t_2 of the ramp generator from n_{max} [2600/i] rpm to 0 rpm
Energy-saving function		[Off]	Optimized for: • High dynamic performance • Maximum starting torque and torque • High speed accuracy
		[On]	Reduced energy absorption in partial load operational range. Approx. 50 % of the maximum starting torque is available.

Diagnostics

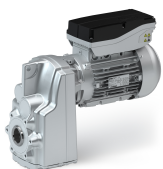
Parameter	Value		Comment
Designation	Delivery	Setting range	
Peak load of the drive	---	[0 ... 250] %	Last peak value of the medium thermal load (maximum value in the last mains switching cycle) From firmware version 03.00.00.00
Peak load of the brake resistor	---	[0 ... 250] %	Last peak value of the thermal utilisation of the brake resistor (maximum value in the last mains switching cycle) From firmware version 03.00.00.00

Meters

Parameter	Value		Comment
Designation	Delivery	Setting range	
Elapsed-hour meter	---	[0 ... 596523] h	Total time of "Motor rotating"
Operating-hour meter	---	[0 ... 596523] h	Total time of "mains ON"

Logbook

Parameter	Value		Comment
Designation	Delivery	Setting range	
Error message 1 (last)	---	[Text]	Meaning: See fault elimination table
Error message 2	---	[Text]	
Error message 3	---	[Text]	
Error message 4 (earliest)	---	[Text]	



Device data

Parameter	Value		Comment
Designation	Delivery	Setting range	
Material number	depending on the order	[number]	Drive identification
Device types		[Text]	
Firmware version		[Text]	
Hardware Version		[Text]	
Motor		[Text]	
Gearboxes		[Text]	
Ratio		[number]	
Brake		[Text]	
Serial number		[Text]	

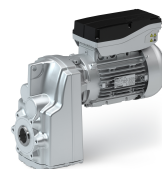
Activating speeds

Output speed						Activate output speed		
Parameter	Value		Direction of rotation			X1.4 (DI1)	X1.2 (DI2)	X2.2 (DI3)
Designation	Delivery	Setting range	CCW rotation	Stop	CW rotation			
1	---	[number]	< 0 rpm	0 rpm	> 0 rpm	LOW	LOW	LOW
2	---	[number]				HIGH	LOW	LOW
3	---	[number]				LOW	HIGH	LOW
4	---	[number]				HIGH	HIGH	LOW
5	---	[number]				LOW/HIGH	LOW/HIGH	HIGH

Status message	
X2.4 (DO1)	Status
LOW	Not ready for operation
HIGH	Ready for operation

Commissioning

Before initial switch-on



Advanced settings

Parameter	Value		Comment
Name	Delivery	Setting range	
$U_{\min}$ boost	0.0 %	[0.0 ... 100.0] %	Effective only if Energy saving function = On: - Boost of the motor voltage in the range of low speeds. - In the case of conveyor applications with an inclined proportion, a turn-back during start-up can be prevented. - Typical values approx. < 5 %.
$I_{\max}$ in motor mode	device-dependent	[0.00 ... I _{max}] A	Maximum motor current MSEMAxx063-42: 5.6 A (recommended 1.4 ... 5.6 A) MSEMAxx080-32: 13.2 A (recommended 3.3 ... 13.2 A) With gearbox, the maximum setting range may be limited. Reducing the $I_{\max}$ causes a lower maximum torque.
Drives coupled mechanically	No	No, yes	Reducing compensation processes in case of heavy and long conveyed loads which occupy several conveying elements at the same time. From firmware version 03.00.00.00
Motor overload setting ($I^2 \times t$)	100.00 %	[0.00 ... 250.00] %	Limit value for motor overload cut-off. Recommended setting: 100 %
Starting value of motor overload ($I^2 \times t$)	50.00 %	[0.00 ... 100.00] %	Recommended setting for operation according to UL: 50.00 %
Motor brake switching threshold	100/i rpm	[0 ... 499.9/i] rpm	Motor brake is switched if the value is exceeded or is too low. Higher value: In the case of conveyor applications with an inclined proportion, a turn-back during start-up can be prevented.
Brake resistor R	- ohms	[150.0 ... 500.0] Ohms	Enter data of a connected brake resistor correctly. If fitted in the factory:
Rated power of brake resistor	- W	[10 ... 65535] W	- If an internal brake resistor is used, the values of the brake resistor are preset. - If an external brake resistor is used, the values of the brake resistor are preset. Only the rated power can be increased from 20 W to max. 40 W if the mean speed is > 1000 rpm (mathematical mean of the process speeds in relation to the motor speed, without standstill).
Thermal capacity of brake resistor	- kW	[0 ... 6553.5] kW	
Reduction of brake chopper threshold	0 V	[0 ... 150] V	The threshold is reduced by the voltage value set here. The switching threshold is adapted to the different mains voltage ranges. Reduction by 20 ... 30 V can prevent overvoltage for operation in generator mode.
Impact of oscillation damping	5.00 %	[0.00 ... 250.00] %	For the suppression of no-load oscillations. Typically, the impact has to be increased for this purpose.
Oscillation damping filter time	50 ms	[2 ... 250] ms	

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 o.k.?
- 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 the free supply and removal of cooling air ensured?
- Has the PE conductor been connected correctly?
- Have the protective devices against overheating (e.g. temperature sensor evaluation) been activated?
- 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 ≤ 1 k Ω 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 k Ω 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
- Brake function

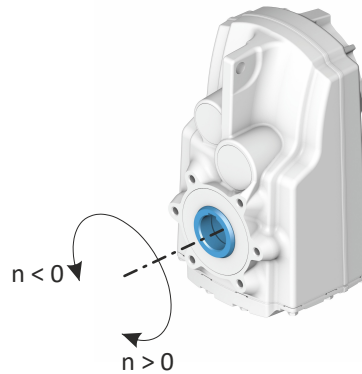
During operation, carry out inspections on a regular basis. Pay special attention to:

- 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

The direction of rotation of the output shaft is defined by the setpoint of the output speed.

The direction of rotation is changed when a positive ($n > 0$) or negative ($n < 0$) speed is specified.





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.



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:

- G50BS113

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).

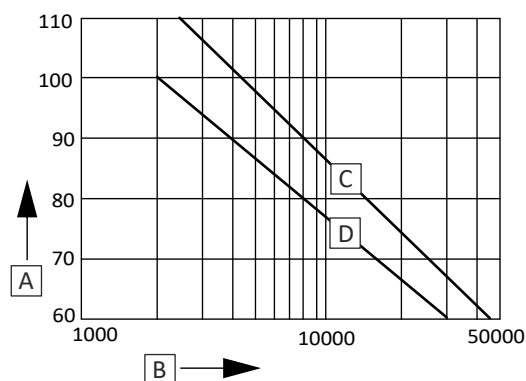
At higher oil temperatures, determine the change interval from the following lubricant diagram.



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](#) 18



A Oil sump temperature [°C]

B Change interval in operating hours [h]

C Synthetic oil: CLP HC/CLP PG

D Mineral oil: CLP

Spring-applied brake

NOTICE

- A maintenance concept adapted to the operating conditions and the stresses to which the brakes are subjected must be drawn up for every application.

Application brake	Holding brake with emergency stop	Description of the operations
• According to service life calculation • Otherwise every six months • After 4,000 operating hours at the latest	• At least every two years • Standard brake: After 1 million cycles at the latest • LongLife design: After 10 million cycles at the latest • Provide shorter intervals in the case of frequent emergency stops	• Remove contamination by oil and grease with brake cleaner, if necessary replace the brake after clarifying the cause. • Remove dirt and particles in the air gap between stator and armature plate. • Check ventilation function and activation/deactivation • Check air gap (if required, re-adjust it) • Measure rotor thickness (if required, replace rotor) • Check for thermal damage of the armature plate or flange (tarnished in dark blue)



Maintenance work

Check the oil level

NOTICE

► Check the oil level in cold condition!

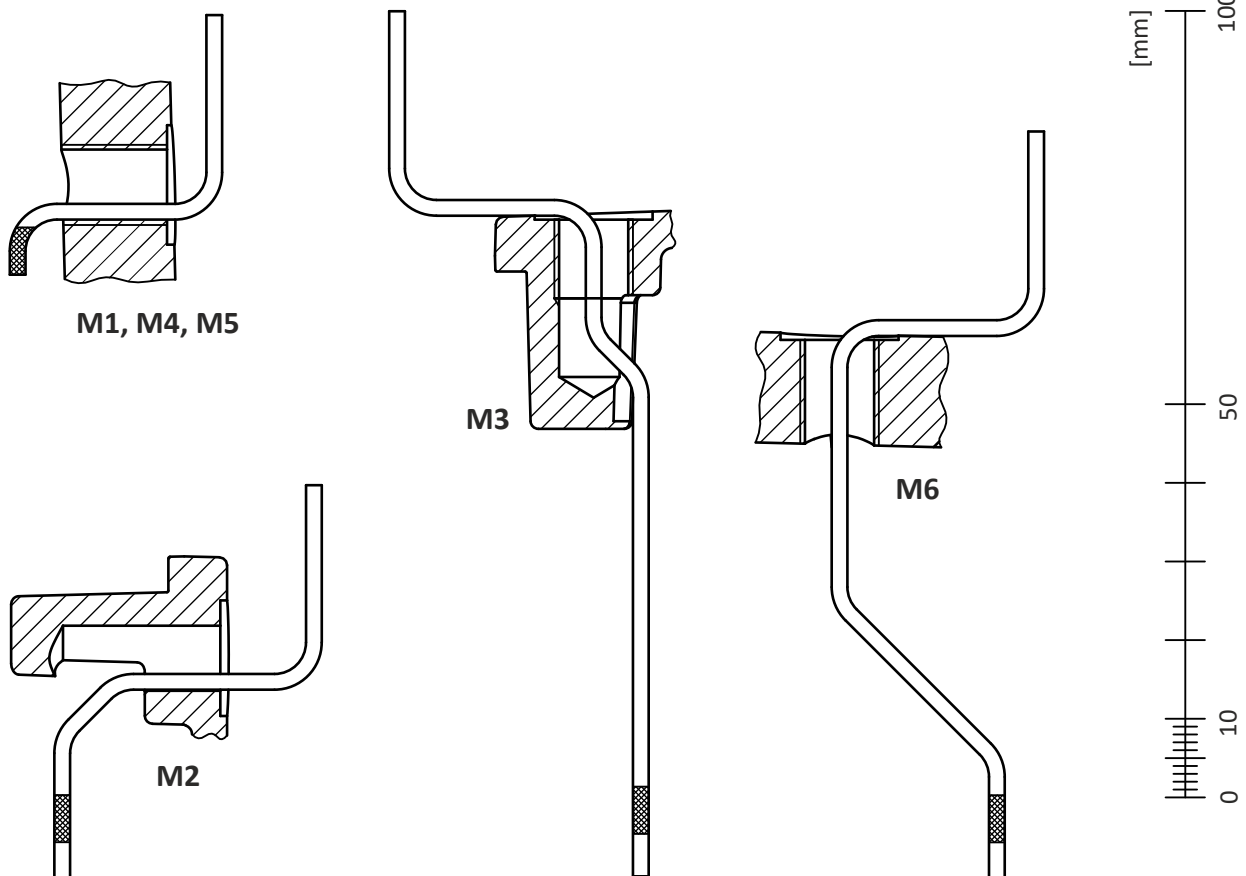
Check the oil level by means of the displayed dipsticks. Depending on the gearbox type and the mounting position (M1 ... M6), make these according to the following templates. The gearbox type and mounting position are indicated on the nameplate.

► [Nameplates](#) 10

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

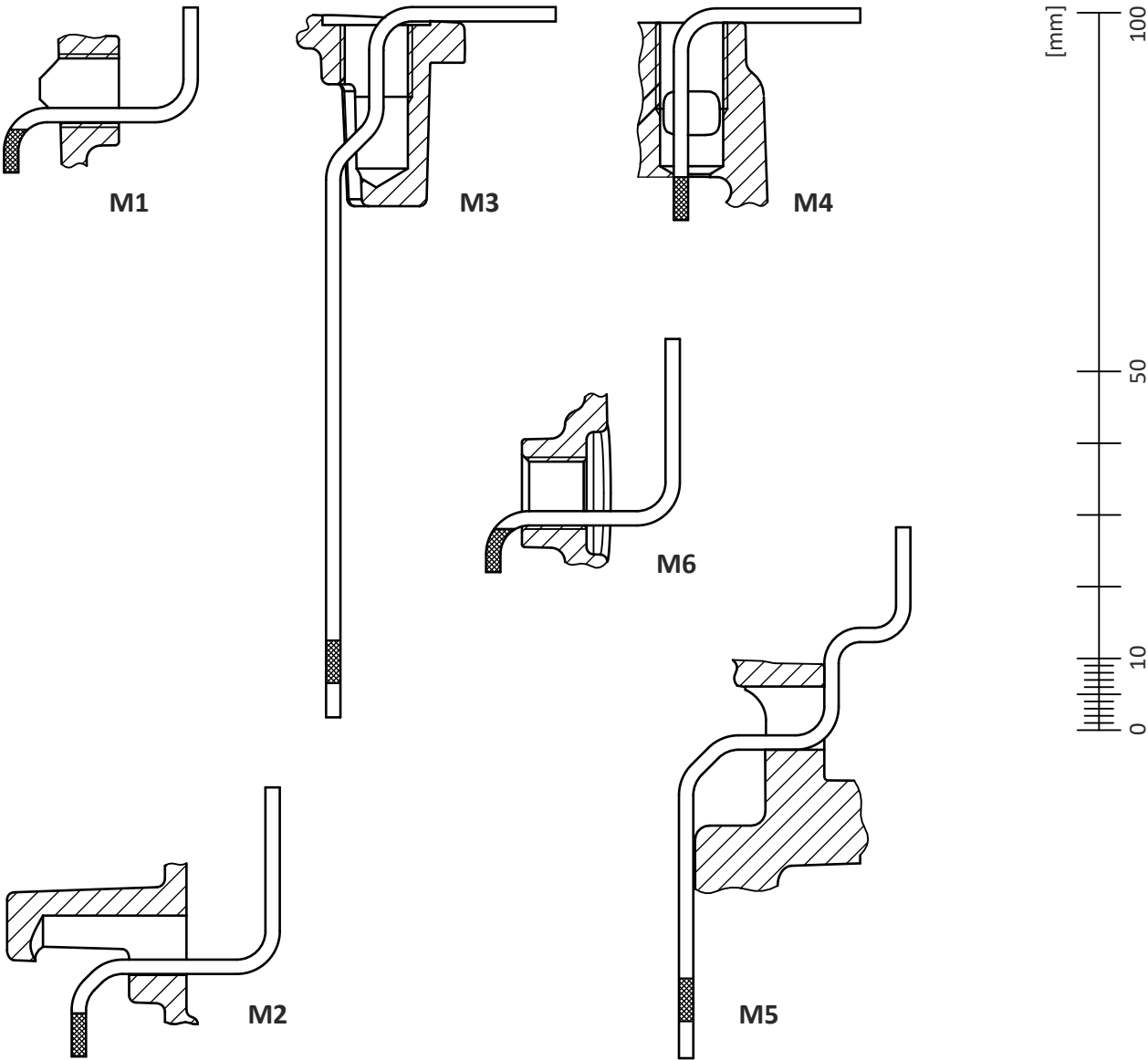
Gearbox G50BS113 ... S166

Template: Dipsticks for G50BS113



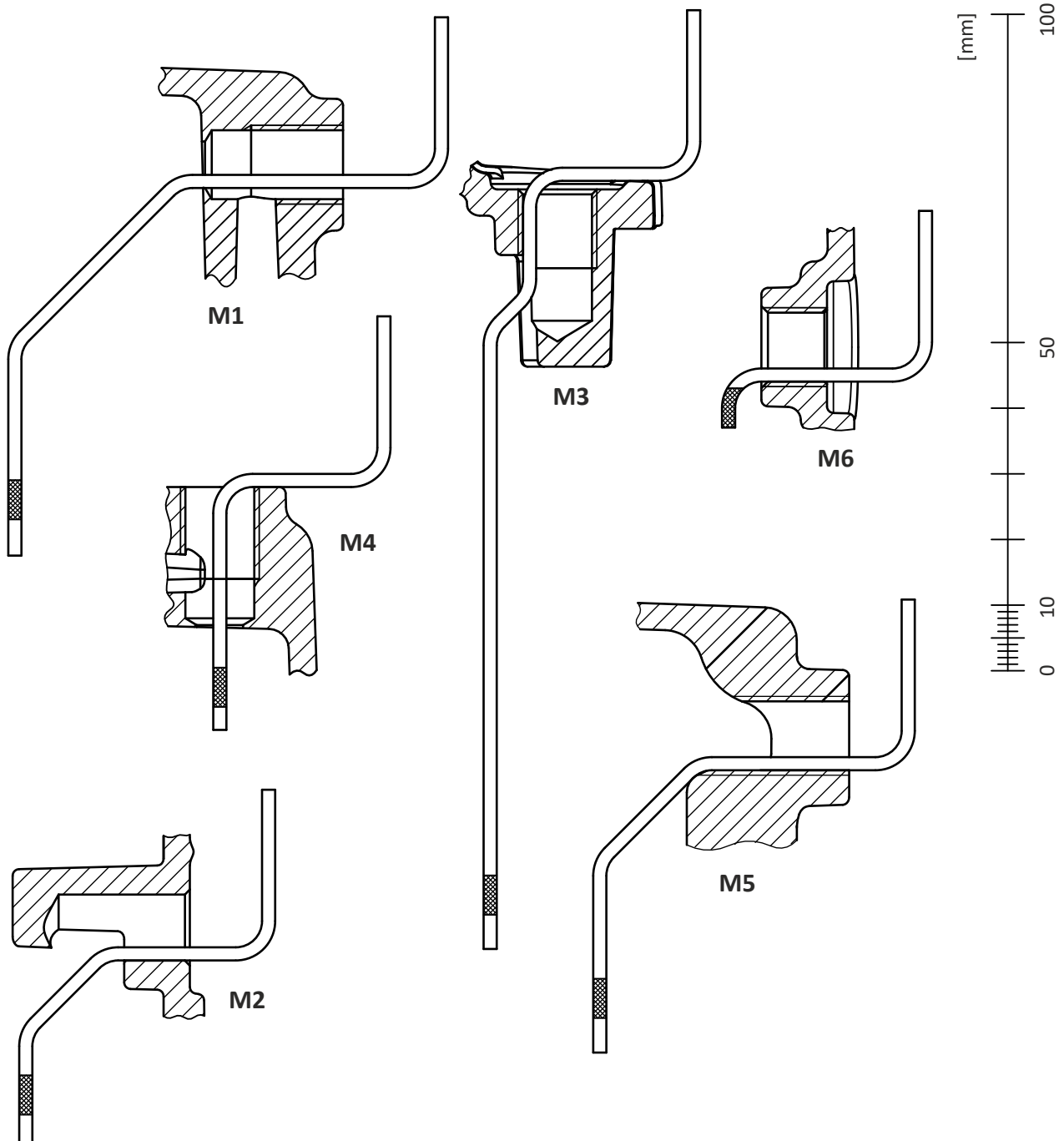


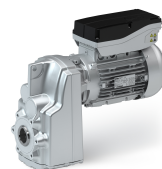
Template: Dipsticks for G50BS122



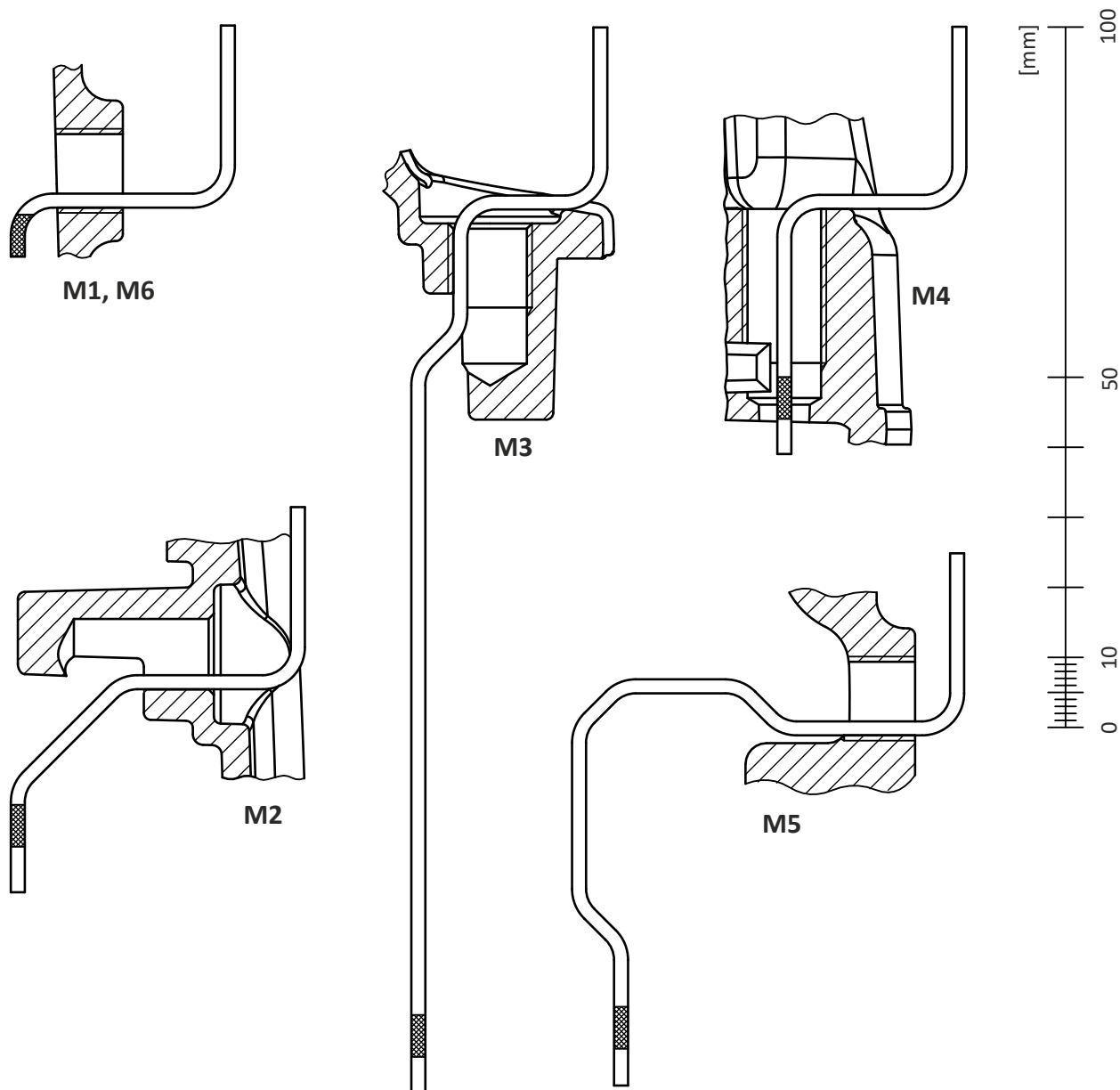


Template: Dipsticks for G50BS140





Template: Dipsticks for G50BS166



How to check the lubricant level:

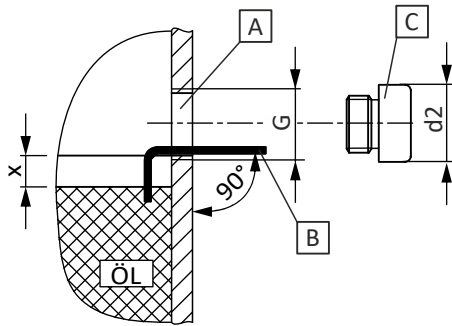
1. Remove the control screw at the marked position. ▶ [Ventilation](#) 18
2. Insert the dipstick through the threaded hole. Observe the position of the dipstick in the template!
3. Carefully pull out the dipstick and determine the lubricant level. The lubricant level must be within the marked range of 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 G50BS195 ... G50BS319

How to check the lubricant level:

1. Remove the control screw at the marked position. [▶ Ventilation 18](#)
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	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
G 1/8"	14	2.5
G 1/4"	18	3
G 3/8"	22	4
G 3/4"	32	7



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](#) 18
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	
G 1/8"	10	
G 1/4"	10	
G 3/8"	25	
G 3/4"	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.



Maintenance work at the spring-applied brake

NOTICE

- ▶ Brakes with defective armature plates, springs or flanges must be completely replaced.
- ▶ Before carrying out maintenance work, identify the brake and motor protection type from the nameplate.

▶ Nameplates 10



Before working on the brake, remove the integral fan cover or blower cover on the motor.

How to remove the fan cover:

1. Loosen and remove screws at the cover circumference.
2. If necessary, disconnect the connecting cable on the blower cover.
3. Remove fan cover.

Release brake and check voltage

DANGER!

Risk of injury due to rotary parts.

- ▶ Do not touch rotating components.

DANGER!

Risk of injury by electric shock.

- ▶ Do not touch live connections.

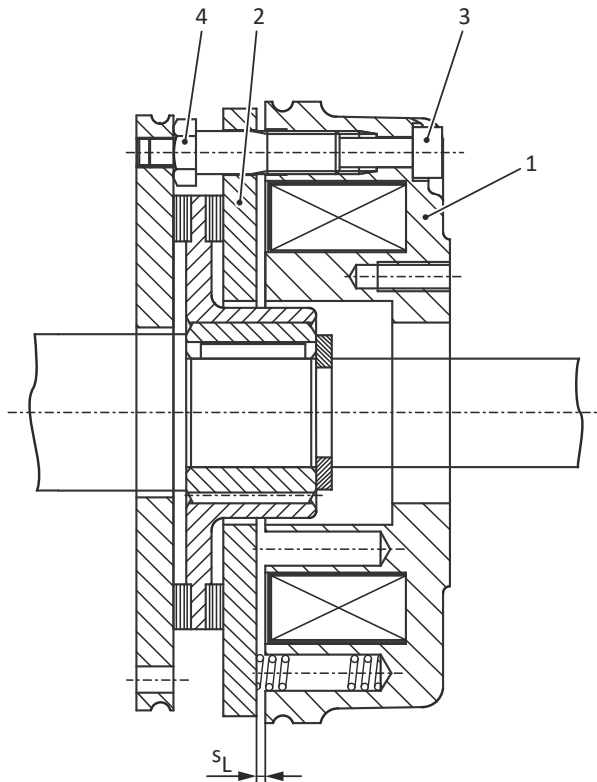
1. Check the function of the brake while the drive is running: The armature plate must be tightened and the rotor must move free of residual torque.
2. Measure the DC voltage on the brake.
 - Compare the measured DC voltage with the voltage specification on the nameplate. A deviation up to $\pm 10\%$ is permissible.
 - When using bridge/half-wave rectifiers: After switching over to one-way voltage, the measured DC voltage may drop to 45% of the voltage indicated on the nameplate.

Check and adjust air gap

DANGER!

Risk of injury due to rotary parts.

- ▶ The motor must not be running when checking the air gap.



1	Stator	4	Sleeve bolt with hexagon
2	Armature plate	s_L	Air gap
3	Cylinder screw		

How to check the air gap:

1. Do not energize the brake.
2. Measure the air gap s_L between stator (1) and armature plate (2) in the vicinity of the cylinder screws (3) using a surface feeler gauge.
3. Compare the air gap with the value for the maximum permissible air gap $s_{L,max}$.
4. Set air gap to $s_{L,N}$.

How to set the air gap for the brake

1. Loosen cylinder screws (3) with an Allen key.
2. Screw the sleeve bolts (4) further into the stator (1) using an open-end wrench.
1/6 revolution reduces the air gap by approx. 0.15 mm.
3. Tighten the cylinder screws (3) to the prescribed torque.
4. Measure the air gap s_L between stator (1) and armature plate (2) in the vicinity of the cylinder screws (3) using a surface feeler gauge.

Brake size	Tightening torque	Air gap	
		$s_{L,max}$	$s_{L,N}$
	Nm		mm
06	3.0	0.30	0.2 +0.10
08	5.9		-0.05



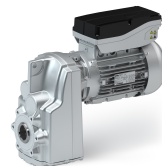
Repair

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](#)  56
- 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

Fault messages are stored in the logbook of the Lenze Smart Motor.

How to read out the fault messages:

1. Disconnect Lenze Smart motor from the mains.
2. Load parameter set onto the smartphone or the EASY Starter. Under "History", the last 4 messages are stored in the logbook.
 - a) Up to firmware version 02.00.00.00: Identical errors that occur successively are displayed as one entry.
 - b) From firmware version 02.01.00.00: Each error is displayed as an entry.

How to reset errors:

1. Eliminate the cause of malfunction.
2. The error is reset by mains switching.

The drive can be started again.



You can reset the fault without mains switching:

Select the input speed 0 rpm via the digital inputs.

Then select the desired speed again.

If the cause of malfunction is no longer active, the drive will restart.

Error types

Fault		Drive behaviour
Type	Meaning	
F	Fault	The digital output changes to LOW = not ready for operation. The fault is entered in the history buffer. • Lenze Smart Motor without brake: The motor is switched off and coasts down. • Lenze Smart motor with brake: The motor is switched off; the brake is applied.
W	Warning	The fault is entered in the history buffer. The Lenze Smart motor continues running.



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.

Fault		Possible causes	Remedy
Type	Message		
F	RFID read error (RFIR)	NFC communication interrupted	1. Connect and disconnect mains. 2. Repeat action. 3. If the error occurs again, please contact the Lenze Service.
F	RFID write error (RFIW)		
F	RFID data CRC invalid (PS02)	NFC communication interrupted	1. Load default setting. 2. Connect and disconnect mains. 3. Rewrite parameter set.
F	RFID data version invalid (PS04)	Incompatible software version	Update Lenze App or EASY Starter.
F	Missing mains phase (SU02)	A mains phase of a three-phase supply has failed. Reliable detection from an utilization > 50 % rated motor power.	• Check mains connection. • Check fuses.
F	DC bus overvoltage (OU)	DC-bus voltage too high	• Increase deceleration ramp. • Reduce speed for great regenerative loads. • Use brake resistor.
W	Electronics warning temperature (OH4)	Lacking or insufficient cooling.	• Check cooling. • Clean cooling ribs. Ambient temperature must be in the permissible range.
F	Electronics overtemperature (OH1)	Drive close to being disconnected due to overtemperature (OH1) Ambient temperature too high.	
F	Electronics overload (Ixt) (OC9)	The Ixt overload test has been triggered • Motor load too high. • Load cycles not complied with.	• Increase deceleration ramp. • Reduce I_{max}. • Check dimensioning.
F	Electronics overcurrent (OC11)	Overcurrent limitation active	• Reduce motor load. • Increase deceleration ramp.
F	Motor overcurrent (OC7)	The maximum current monitoring function has been triggered.	Reduce motor load.
F	Motor short circuit (OC1)	Short circuit in the motor phases	Reset error. If the error occurs again during restart, please contact the Lenze Service.
F	Motor earth fault (OC2)	A motor phase has earth contact	
F	Motor overload I2xt (OC6)	Motor thermally overloaded	• Reduce motor load. • Check setting of the I2xt monitoring function. • Increase acceleration and deceleration ramp.
F	Brake resistor overload I2xt (OC12)	Too frequent and too long braking processes	Increase deceleration ramp.
		Lenze Smart motor without brake resistor: DC-bus voltage too high	• Reduce regenerative load. • Use brake resistor. • Increase deceleration ramp.
F	Internal error (DH69)	Various	Reset error. If the error occurs again during restart, please contact the Lenze Service.
F	Internal error (DF01)		
F	... Internal error (DF13)		

Diagnostics and fault elimination

Malfunctions

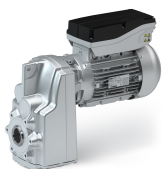


Error	Possible cause	Remedy
Drive is not running	Voltage supply interrupted	Check connection
	Faulty electrical connection	Check external voltage supply.
	Load too high	Reduce load Check assignment drive - machine
Motor runs, gearbox does not	Coupling components are missing or defective	Check mounting
	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. 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.	Specifications for assembly, dimensions and material must be observed
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



For resistance measurement, observe the data on the brake nameplate.

Trouble	Possible cause	Remedy
Brake does not release, Air gap is not zero	Coil is interrupted	Measure the resistance of the coil with a multimeter: • Compare measured resistance with rated resistance. • If resistance is too high, replace the spring-applied brake completely
	Coil has interturn fault or short circuit to ground	Measure the resistance of the coil with a multimeter: • Compare measured resistance with rated resistance. • If the resistance is too low, replace the stator completely. Check coil for short circuit to ground with a multimeter: • Replace the spring-applied brake completely in case of short circuit to ground.
	Air gap s_L too large	Readjust air gap
	Air gap s_L too small	Check air gap s_L and readjust if necessary.
Rotor cannot rotate freely	Air gap s_L too small	Check air gap s_L and readjust if necessary.
Rotor thickness too small	Rotor was not replaced in time	Replace rotor



Technical data

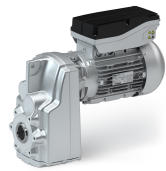
Standards and operating conditions

Conformity and approvals

Conformities		
CE	2009/125/EC	Ecodesign Directive
	2011/65/EU	RoHS Directive
	2014/30/EU	EMC Directive (reference: CE-typical drive system)
	2014/35/EU	Low-Voltage Directive
EAC	TP TC 020/2011	Eurasian conformity: Electromagnetic compatibility of technical means
	TR TC 004/2011	Eurasian conformity: Safety of low voltage equipment
UKCA	S.I. 2012/3032	The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012
	S.I. 2016/1091	The Electromagnetic Compatibility Regulations 2016
	S.I. 2016/1101	The Electrical Equipment (Safety) Regulations 2016
	S.I. 2021/745	The Ecodesign for Energy-Related Products and Energy Information Regulations 2021
Approvals		
CCC	-	GB Standard 12350-2009
cULus	UL 61800-5-1	For USA and Canada (requirements of the CSA 22.2 No.14) Industrial Control Equipment, Lenze File No. E132659

Technical data

Standards and operating conditions
Protection of persons and device protection



Protection of persons and device protection

Protection class			
EN	EN IEC 60529,EN IEC 60034-5	IP55	Information applies to the mounted and ready-for-use state
NEMA	NEMA 250	Type 12	
		Type 4 indoor only	Depending on the configuration
Insulation resistance			
Overvoltage category	EN IEC 61800-5-1	II	>2000 m amsl
		III	0 ... 2000 m amsl
Isolation of control circuits			
-	EN IEC 61800-5-1	Safe mains isolation	Double/reinforced insulation
		Connect overvoltage device upstream	Site altitude above 200 m amsl: Additional external separation measures are required to maintain safe separation.
Protective measures			
Earth fault strength	-	To a limited extent, error acknowledgement necessary	
Motor stalling protection		Yes	
Short-circuit strength		To a limited extent, error acknowledgement necessary	
Overvoltage resistance		Yes	
Motor overtemperature		I ² xt monitoring	
Leakage current			
AC	EN IEC 61800-5-1	> 3.5 mA	Please observe regulations and safety instructions!
Equipotential bonding	-	Additional M5 thread with terminal on the terminal box for connection of a 6mm² PE cable	
Total fault current			
Earth-leakage circuit breaker	-	In TN systems	
Cyclic mains switching			
3 times per minute, max. 20 times per hour	-	After switching the mains 3 times in one minute, there must be a switching pause of 9 minutes.	
Starting current			
-	-	5.6 A mains power-on current	

EMC data

Operation on public supply systems			
-	-	The machine or system manufacturer is responsible for compliance with the requirements for the machine/system!	
< 1 kW	EN IEC 61000-3-2	With mains choke	
> 1 kW, mains current ≤ 16 A		No additional measures	
Mains current > 16 A ... ≤ 75 A	EN IEC 61000-3-12	With mains choke or mains filter	When designed for rated power.
Noise emission			
Fulfills requirements according to	EN IEC 60034-1	A final overall assessment of the drive system is indispensable	
Category C2	EN IEC 61800-3	see rated data	
Noise immunity			
-	EN IEC 61800-3	Requirements for industrial environment are met	



Technical data

Standards and operating conditions

Environmental conditions

Environmental conditions

Climate			
Storage	EN 60721-3-1:1997	1K3 (-30 ... +60°C)	<3 months
		1K3 (-30 ... +40 °C)	>3 months
Transport	EN 60721-3-2:1997	2K3 (-30 ...+70 °C)	
Operation	EN 60721-3-3:1995 + A2:1997	3K3 (-30 ...+40 °C)	Operation
Site altitude			
0 ... 1000 m amsl	-	Without current derating	
1000 ... 4000 m amsl		Reduce rated output current by 5 %/1000 m	
Pollution			
-	EN IEC 61800-5-1	Degree of pollution 2	
Vibration resistance			
Operation	EN 60721-3-3:1995 + A2:1997	3M4	
Transport	EN 60721-3-2:1997	2M2	
Vibration severity			
A	EN IEC 60034-14	-	-

Electrical supply conditions

Possibility of connection to different types of mains power supply enables worldwide use.

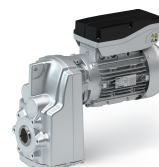
The following is supported:

- 3-phase mains connection 400 V
- 3-phase mains connection 480 V

Type of mains power supply		
TT		Mains power supplies with earthed start point Voltage against earth: max. 300 V
TN		

Technical data

Motor data
Rated data



Motor data

Rated data

Motor			MSEMA			
			063-42		080-32	
Rated mains voltage		V	400	480	400	480
Rated power	P _{rated}	kW	0.476		1.361	
Verstellbereich		rpm	-2600 ... -600 / 0/ 600 ... 2600			
Rated current	I _{rated}	A	1	0.8	2.8	2.3
Rated torque	M _{rated}	Nm	1.75		5.00	
Starting torque	M _a	Nm	7		20	
Power factor	cos φ		0.99			
Efficiency						
at 75 % P _{rated}		%	65		73	
at 100 % P _{rated}		%	66		74	
Moment of inertia	J	kgcm²	3.70		26.0	
Weight	m	kg	5.9		12.5	

Ecodesign Directive

Product information according to REGULATION (EU) 2019/1781 (ANNEX I, Section 4)

Rated efficiency at full load	η _{rated}	%	-	-
Efficiency at 75 % rated load	η	%	-	-
Efficiency at 50 % rated load	η	%	-	-
Efficiency level			-	
Manufacturer's name			Lenze SE · Hans-Lenze-Str. 1 · 31855 Aerzen · GERMANY	
Commercial register number			Hannover HRB 204803	
Product's model identifier			MSEMA□□063-42	MSEMA□□080-32
Number of poles of the motor			-	
Rated output power	P _{rated}	kW	-	
Rated input frequency	f _{rated}	Hz	-	-
Rated voltage	V _{rated}	V	-	-
Rated speed	n _{rated}	rpm	-	-
Number of motor phases			-	
Altitudes above sea level		m	...	
Ambient air temperature		°C	...	
Maximum operating temperature		°C	-	
Potentially explosive atmospheres			-	
LMT_EDD_EXCEP_REASON			Die Motoren sind mit einer integrierten Drehzahlregelung ausgestattet (Kompaktantriebe) und die Energieeffizienz der Motoren kann nicht unabhängig von der Drehzahlregelung geprüft werden.	



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.



Lenze products are not subject to EU Directive 2012/19/EU: Waste Electrical and Electronic Equipment (WEEE) Directive [UKCA: S.I. 2013/3113 - The Waste Electrical and Electronic Equipment Regulations 2013], but some 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]. The disposal route, which is separate from household waste, is indicated by corresponding labels with the "crossed-out trash can".

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: Packaging and Packaging Waste Directive [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"

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