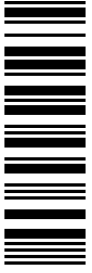
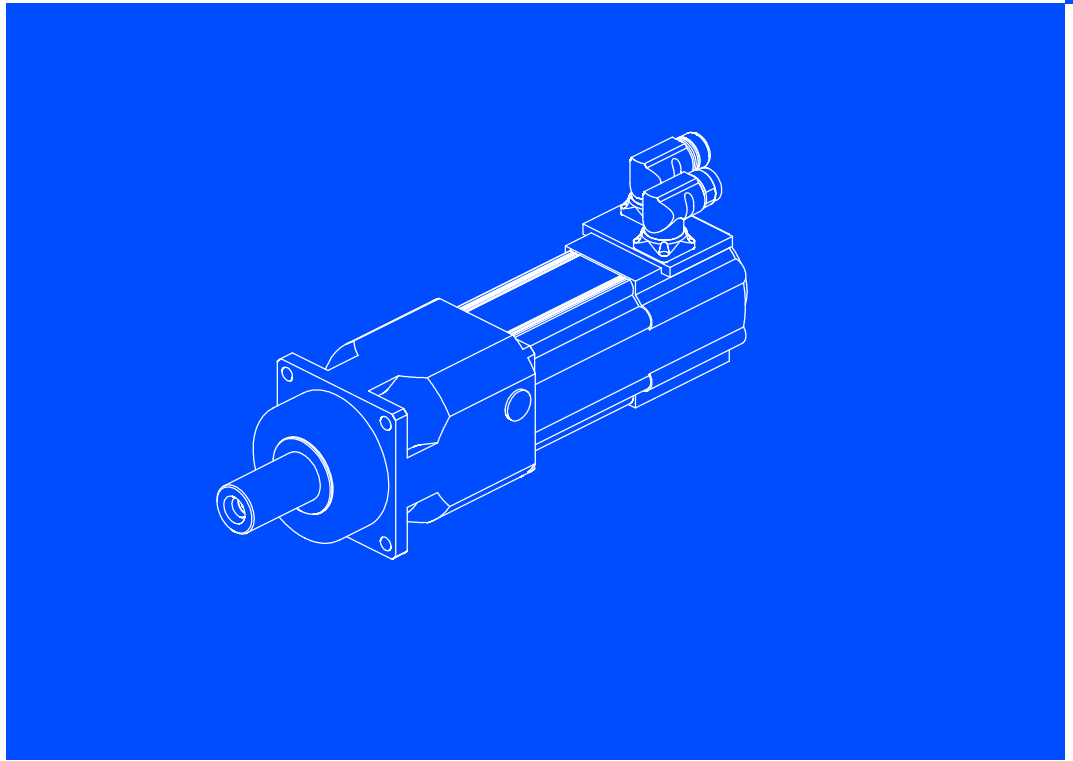


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Operating Instructions

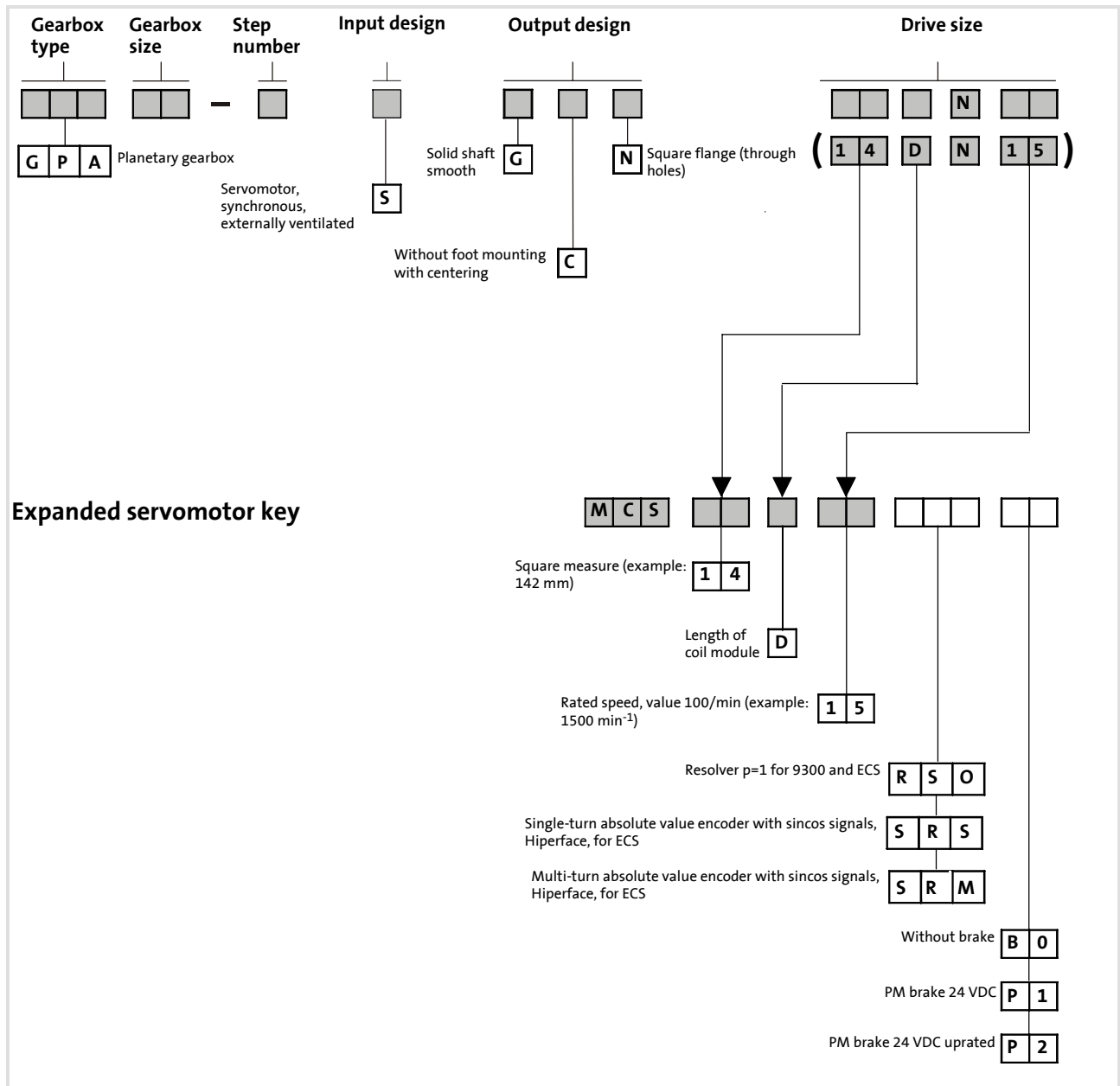
G-motion



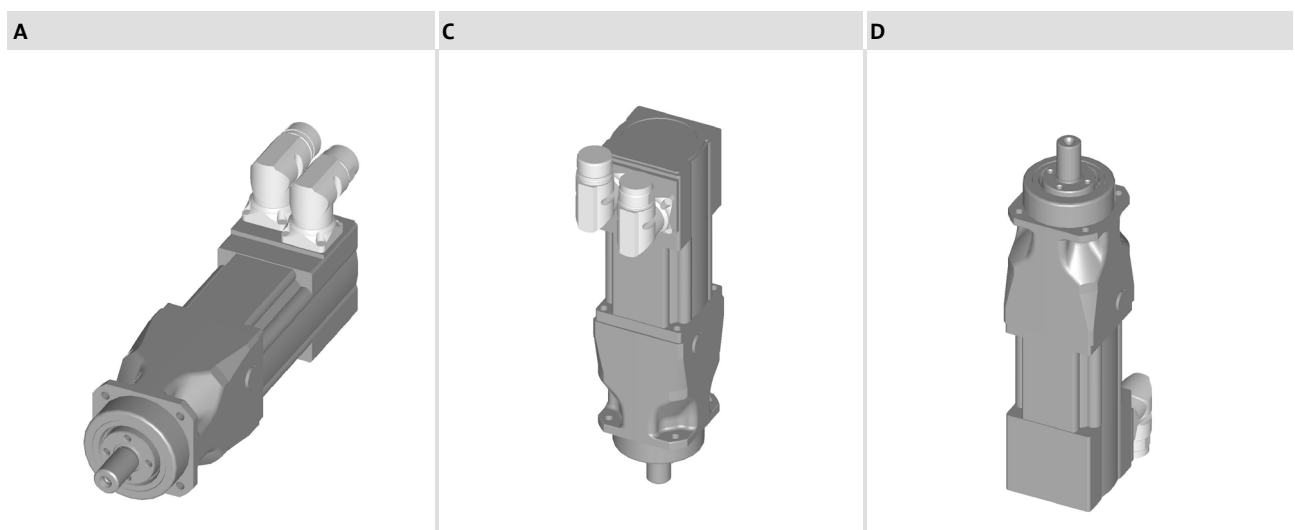
GPA servo planetary geared motors

Lenze


Product key



GPA mounting positions A, C, D



Nameplate (sample)

Lenze ^A		Hans-Lenze-Strasse 1 ^B D-31855 Aerzen http://www.Lenze.com		UL ^C File no.	CE	Made in ^D Germany
3~MOT ^E	GPA00-1SGCN-09FN38 ^F					
330 V ^G	1.2 kW ^H	n _{1eck} 3750 min ⁻¹ ^I		M ₂ 12 Nm ^J	n _{2eck} 938 min ⁻¹ ^K	
2.5 A ^L	1.6 HP ^M	c = 2.1 ^N		M _{2GN} 25 Nm ^O	i = 4 ^P	
max. 5.9 A ^Q	250 Hz ^R	Cooling type S00 ^S		CLP 150 ^{AA}	000A ^{BB}	
I.CLF ^{CC}	IP 55 ^{DD}	Fan data ^{EE}				
Ta 30 °C ^{FF}	C86:1314 ^{GG}	U _{in} ^{HH} V		Item 00452320 ^{II}		
Brake ^{JJ} Brake V A Nm				Encoder ^{KK} Feedback RS 0		
SN 15005432100065566 ^{LL}				 ^{MM}		

^A	Manufacturer	^{AA}	Lubricant type
^B	Assembly plant	^{BB}	Position of system modules / mounting position
^C	UL file no.	^{CC}	Insulation class
^D	CE designation	^{DD}	Enclosure
^E	Motor type	^{EE}	Fan data
^F	Gearbox type	^{FF}	Ambient operating temperature
^G	Rated voltage	^{GG}	Code for motor parameterisation
^H	Motor driving power	^{HH}	Induced voltage
^I	Input speed	^{II}	ID number
^J	Rated output torque of geared motor	^{JJ}	Brake data
^K	Output speed	^{KK}	Encoder data
^L	Rated current	^{LL}	Serial number
^M	Motor driving power	^{MM}	Bar code
^N	Load capacity		
^O	Rated output torque of gearbox		
^P	Ratio		
^Q	Maximum current		
^R	Rated frequency		
^S	Cooling type S00		

Additions / changes to the Operating Instructions

Material number	Edition	Important	Contents
00 494 260	1.0 05/04 TD09	1st edition	First printing

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All information given in this documentation has been selected carefully and complies with the hardware and software described. Nevertheless, deviations cannot be ruled out. We do not take any responsibility or liability for damages which might possibly occur. Necessary corrections will be included in subsequent editions.

1	Preface and general information	6
1.1	About these Operating Instructions	6
1.2	Terminology used	6
1.3	Scope of supply	6
1.4	Lenze drive systems	7
1.4.1	Labelling	7
1.5	Legal regulations	7
2	Safety	8
2.1	Personnel responsible for safety	8
2.2	General safety information	8
2.3	Definition of notes used	9
3	Technical data	10
3.1	Product features	10
3.1.1	Design	10
3.1.2	Mode of operation	10
3.2	Transport weights	11
3.3	General data/operating conditions	11
3.3.1	Temperatures	11
3.3.2	Ambient conditions	11
4	Mechanical installation	12
4.1	Storage	12
4.2	Installation	12
4.2.1	Preparation	12
4.2.2	General information about the assembly of drive systems	13
4.2.3	Assembly of transmission elements on solid shafts	13
5	Electrical installation	14
5.1	Motor connection	14
6	Commissioning and operation	15
6.1	Before switching on	15
6.2	During operation	15
7	Maintenance	16
7.1	Maintenance intervals	16
7.1.1	Replacing the lubricant	17

8	Troubleshooting and fault elimination	19
9	Disposal	20
10	Appendix	21
	10.1 Manufacturer's Certification	21

1 Preface and general information

Scope of supply

1 Preface and general information

1.1 About these Operating Instructions

- ▶ These Operating Instructions are intended for safety-relevant operations on and with the gearboxes G□□. They contain safety instructions which must be observed.
- ▶ All personnel working on and with the gearboxes G□□ must have the Operating Instructions available and observe the information and notes relevant for them.
- ▶ The Operating Instructions must always be complete and perfectly readable.

1.2 Terminology used

Term	In the following text used for
Gearboxes	Gearbox of product family G□□
Drive system	Drive system with gearboxes G□□ and other Lenze drive components

1.3 Scope of supply

- ▶ The drive systems are combined individually according to a modular design. The scope of supply can be obtained from the pertinent papers.
- ▶ After receipt of the supply, check immediately whether it corresponds with the accompanying papers. Lenze does not grant any warranty for subsequent claims. Claim for
 - visible transport damages immediately to the forwarder.
 - visible deficiencies / incompleteness immediately to the responsible Lenze subsidiary / agency.

1.4 Lenze drive systems

1.4.1 Labelling

- ▶ Lenze drive systems are uniquely designated by the content of their nameplates.
- ▶ Manufacturer:
Lenze Drive Systems GmbH
Postfach 10 13 52
D-31763 Hameln
- ▶ Lenze drive systems
 - are intended for use in machinery and plant.
 - must only be used for the purposes ordered and confirmed.
 - must only be operated under the ambient conditions prescribed in these operating instructions.
 - must not be operated beyond their respective power limits.

Any other use shall be deemed inappropriate!

1.5 Legal regulations

Liability

- ▶ The information, data, and notes in the operating instructions met the state of the art at the time of printing. Claims referring to drive systems which have already been supplied cannot be derived from the information, illustrations, and descriptions.
- ▶ We do not accept any liability for damage and operating interference caused by:
 - inappropriate use
 - unauthorised modifications to the drive system
 - improper working on and with the drive system
 - operating mistakes
 - disregarding the operating instructions

Warranty

- ▶ Conditions of warranty: see terms of sale and delivery of Lenze Drive Systems GmbH.
- ▶ Warranty claims must be made to Lenze immediately after detecting the deficiency or fault.
- ▶ The warranty is void where liability claims cannot be made.

2 **Safety**

2.1 **Personnel responsible for safety**

Operator

- ▶ An operator is any natural or legal person who uses the drive system or on whose behalf the drive system is used.
- ▶ The operator or his safety officer must ensure
 - that all relevant regulations, instructions and legislation are observed.
 - that only qualified personnel work with and on the drive system.
 - that the personnel have the operating instructions available for all corresponding operations.
 - that non-qualified personnel are prohibited from working with and on the drive system.

Skilled personnel

Skilled personnel are persons who - because of their education, experience, instructions, and knowledge about corresponding standards and regulations, rules for the prevention of accidents, and operating conditions - are authorised by the person responsible for the safety of the plant to perform the required actions and who are able to recognise potential hazards.

(See IEC 364, definition of skilled personnel)

2.2 **General safety information**


- ▶ This safety information does not claim to be complete. In case of questions and problems, please contact your Lenze representative.
- ▶ At the time of delivery the drive system meets the state of the art and ensures basically safe operation.
- ▶ The drive system is a source of danger for persons, for the drive system itself, and for other material assets of the operator, if
 - unqualified personnel works with and on the drive system.
 - the drive system is used inappropriately.
- ▶ The drive systems must be designed such that they perform their functions after proper installation and with application as directed in fault-free operation and that they do not cause hazards for persons. This also applies to their interaction with the complete system.
- ▶ Use appropriate measures to ensure that no material damage occurs in case of failure of the drive system.
- ▶ Operate the drive system only when it is in a proper state.
- ▶ Retrofittings, modifications, or redesigns of the drive system are basically prohibited. Lenze must be contacted in all cases.




2.3 Definition of notes used

The following signal words and symbols are used in this documentation to indicate dangers and important information:




Safety instructions

Structure of safety instructions:

	Danger! (identify the type and severity of the danger) Note (describes the danger and gives information about how to prevent dangerous situations)
---	---

Pictograph and signal word	Meaning
 Danger!	Danger of personal injury through dangerous electrical voltage. Reference to an imminent danger that may result death or serious personal injury if the corresponding measures are not taken.
 Danger!	Danger of personal injury through a general source of danger Reference to an imminent danger that may result in death or serious personal injury if the corresponding measures are not taken.
 Stop!	Danger of property damage. Reference to a possible danger that may result in property damage if the corresponding measures are not taken.

Application notes

Pictograph and signal word	Meaning
 Note!	Important note about trouble-free operation
 Tip!	Useful tip for simple handling
	Reference to another documentation

3 **Technical data** Product features Mode of operation

3 **Technical data**

- ▶ The most important technical data are indicated on the nameplate (for Design and Contents see page 3).
- ▶ Additional technical data are listed in the product catalogues.

3.1 **Product features**

3.1.1 **Design**

Drive systems have a modular design.

They consist of:

- ▶ Speed reduction gearboxes
 - Planetary gearbox
- ▶ Motors
 - Servomotor
- ▶ Frequency inverters

3.1.2 **Mode of operation**

- ▶ Torque and speed conversion
- ▶ The reaction torque must be supported by the flange mounting in a suitable way.

3.2 Transport weights

Geared servomotor	Motor size				
GPA □□ - □S GCN	06	09	12	14	19
GPA 00 - 1	< 6	< 9			
GPA 01 - 1	< 7	< 11	< 17		
GPA 02 - 1		< 14	< 21	< 35	
GPA 03 - 1			< 28	< 43	< 59
GPA 04 - 1					< 75
GPA 05 - 1					< 90
GPA 00 - 2	< 6	< 10			
GPA 01 - 2	< 8	< 12			
GPA 02 - 2	< 12	< 16	< 23		
GPA 03 - 2			< 34	< 48	
GPA 04 - 2					< 83
GPA 05 - 2					< 111

Tab. 1 Weights in kg

3.3 General data/operating conditions

3.3.1 Temperatures

The permissible temperature range is determined by the following:

- ▶ The specification of the lubricant considering the oil temperature expected during operation (see chapter 6.1 and nameplate page 3).
- ▶ The thermal class of the motor considering the motor temperature expected during operation (see nameplate and/or Operating Instructions of the motor).

The operating temperature is determined by the power loss, the ambient temperature and the cooling system!

3.3.2 Ambient conditions

- ▶ Gearboxes are protected against dust and spray water.
- ▶ Motors according to their enclosure (see nameplate and/or Operating Instructions of the motor).
- ▶ Ambient media - especially chemically aggressive - can destroy shaft seals and coatings (plastic). Abrasive media endanger shaft seals.

4 Mechanical installation

Installation
Preparation

4 Mechanical installation



Danger!

Only transport the drive with transport equipment or hoists which are suitable for this load (see transport weights, chapter 3.2). Ensure a safe fixing. Avoid shocks!

The motors attached to the gearbox are partially equipped with eyebolts. These are **exclusively** determined for motor/gearbox mounting and dismantling and must **not** be used for the complete geared motor!

4.1 Storage

If you do not install the gearbox immediately, ensure appropriate conditions of storage.

- ▶ Up to one year:
 - Without special measures in dry and dust-free rooms and protected from sunlight.
- ▶ Over a year:
 - Requires consultation with the plant.

4.2 Installation

4.2.1 Preparation



Stop!

Thoroughly remove anticorrosion agents from output shafts and flange faces.

4.2.2 General information about the assembly of drive systems

- ▶ Take safety measures prior to any operation:
 - Disconnect the machine from the mains, ensure standstill of the machine and avoid any machine movement.
 - Check the proper state of the drive system. Never install and set up damaged drive systems.
 - Check the combination of drive function and machine functions. Check the direction of rotation.
- ▶ The mounting surfaces must be even, without torsion, and free from vibration.
- ▶ Align the drive system on the mounting surfaces exactly with the machine shaft to be driven.
 - Ensure that the assembly is without torsion, to avoid additional load.
 - Compensate for minor misalignments by using suitable flexible couplings.
- ▶ Support the reaction torque appropriately.
- ▶ Fixings of accessories and attachments must be secured against loosening. We recommend that screw connections are glued.



Stop!

The lubricant fill quantity of the gearboxes is matched to the mounting position. The mounting position indicated on the nameplate must be observed to avoid damages to the gearbox.

4.2.3 Assembly of transmission elements on solid shafts

- ▶ Draw the transmission elements onto the output shaft only by using the centering thread.



Stop!

Shocks and blows to the shafts damage the roller bearings.

5 Electrical installation

Motor connection

5 Electrical installation



Danger!

Electrical connections must only be made by skilled personnel!

5.1 Motor connection

To correctly connect the motor options, e.g. Lenze spring-loaded brakes, please observe:

- ▶ the notes in the terminal box of the motor
- ▶ the notes in the operating instructions of the motor
- ▶ the technical data on the motor nameplate.

6 Commissioning and operation



Stop!

The drive may only be commissioned by skilled personnel!

6.1 Before switching on

Check:

- ▶ Is the mechanical fixing o.k.?
- ▶ Are the electrical connections o.k.?
- ▶ Are all rotating parts and surfaces, which may become hot, protected against contact?

6.2 During operation

- ▶ During operation, check the drive periodically and take special care of:
 - unusual noises or temperatures
 - leakages
 - Loose fixing elements
 - the condition of the electrical cables.
- ▶ If any interference should occur, proceed according to the troubleshooting list in chapter 8. If the interference cannot be eliminated, please contact Lenze Service.

Maintenance

Gearboxes and geared motors from Lenze are filled with a drive-specific and design-specific lubricant filling at delivery. The mounting position and design are decisive at ordering for the required lubricant quantity.



Note!

When changing the lubricant, Lenze recommends also changing the grease packing of the bearings and replacing the radial shaft seal rings!

7.1

Maintenance intervals

- ▶ The mechanical power transmission system is free of maintenance.
- ▶ Shaft seal rings:
 - The service life depends on the ambient conditions.
 - Replace seals in case of leakage to avoid consequential damage.
- ▶ Lubricating intervals:
 - Gearboxes of type GPA are lubricated for life and hermetically sealed. In normal operation, a lubricant change is not required.
 - With extremely severe operation, we recommend changing the lubricant every 10,000 operating hours.
 - The type of lubricant is indicated on the nameplate. Replace the lubricant only by the same type.



Stop!

For drive systems: Also observe the maintenance intervals for the other drive components!

Lubricants				Changing intervals
Type	Specification	Ambient temperature	Note	
CLP PAO 150	Oil on synthetic basis (polyglycol)	-20 °C...40 °C	Do not mix with mineral oils!	10,000 operating hours, no longer than three years (oil temperature 70...100 °C)

7.1.1 Replacing the lubricant



Stop!

- ▶ Gearbox should be warm.
- ▶ Secure drive system and machine from inadvertent movement and mains connection.

1. Drain lubricant by removing the oil drain/filler plug.
2. Fill recommended lubricant in the specified amount.
3. Insert oil drain/filler plug with new seal.
4. Dispose of waste oil according to applicable regulations.

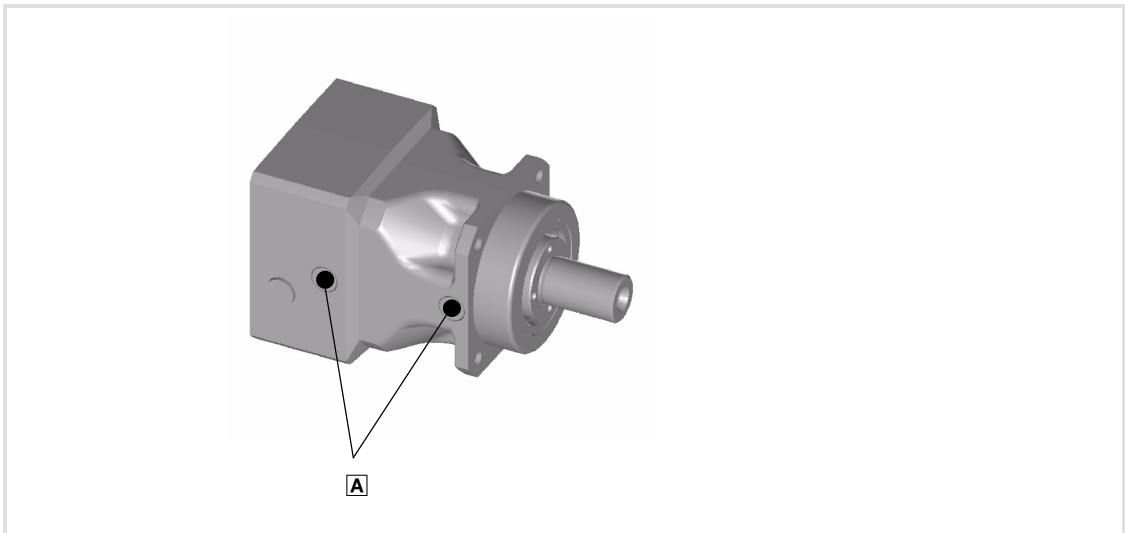


Fig. 1 Position of oil filler/drain plug
A Oil filler/drain plug

Recommended lubricant

Manufacturer	Mobil	Optimol
Type	Mobil SHC 629	Optigear Synthetic A 150

Lubricant quantity

Gearboxes	Mounting position		
	A	C	D
GPA 00 - 1	22	25	35
GPA 01 - 1	35	55	75
GPA 02 - 1	80	130	160
GPA 03 - 1	130	210	300
GPA 04 - 1	220	350	500
GPA 05 - 1	300	600	700
GPA 00 - 2	35	42	50
GPA 01 - 2	45	80	90
GPA 02 - 2	100	175	190
GPA 03 - 2	160	310	410
GPA 04 - 2	270	700	720
GPA 05 - 2	420	1200	1350

Tab. 2 Lubricant quantity in [ml]

8 Troubleshooting and fault elimination

If any malfunctions should occur during operation of the drive system, please check the possible causes using the following table. If the fault cannot be eliminated by one of the listed measures, please contact Lenze Service.

Fault	Possible cause	Remedy
Drive does not turn	Voltage supply interrupted	Check connection
	Wrong electrical connection	Check if nameplate matches voltage supply
	Excessive load	Reduce load Check drive-machine assignment
Motor running, gearbox at standstill	Fixing elements are missing or defective	Check attachment
	Gearbox is defective	Contact Lenze Service
Unusual running noises	Overload	Reduce load Check drive-machine assignment
	Damage in the gearbox or motor	Contact Lenze Service
Excessive temperature	Overload	Reduce load Check drive-machine assignment
	Insufficient heat dissipation	Improve cooling air supply Clean gearbox / motor
	Insufficient lubricant	Refill lubricant as specified
loose fixing elements	Vibrations	Avoid vibrations

9 Disposal

Protect the environment! Packaging material can be recycled.

What?		Where?
Transport material	Pallets	Return to the manufacturer or forwarder
	Packaging material	Cardboard box to waste paper Plastics to plastics recycling or residual waste Reuse or dispose of wood wool
Lubricants	Oil, grease	Dispose according to current regulations
Components	Housing: Grey cast	Separate valuable substances and dispose
	Bearings, gear wheel shafts: Steel	
	Seals: Hazardous waste	

10 Appendix

10.1 Manufacturer's Certification



We herewith certify that the products listed below are intended for assembly into a machine or for assembly with other elements to form a machine. Commissioning of the machine is prohibited until it is proven that it corresponds to the EC regulation 98/37/EC.

Lenze Drive Systems GmbH
 Postfach 10 13 52
 D-31763 Hameln
 Site: Bösingfeld
 Breslauer Straße 3
 D-32699 Extertal
 Phone (051 54) 82-0
 Fax (051 54) 82-1575

Product	Type designation
Low-profile gearboxes and geared motors	GFL
Helical gearboxes and geared motors	GST, 12.6□□
Helical bevel gearboxes and geared motors	GKS, 12.5□□
Bevel gearboxes and geared motors	GKR
Helical worm gearboxes and geared motors	GSS, 52.1□□
Planetary geared motors	GPA
Variable speed belt drives and geared motors	G□□-K 11.1□□, 11.2□□, 11.4□□
Variable speed drives and geared motors	G□□-D 11.7□□
Shaft-mounted gearboxes	12.4□□
Worm gearboxes and geared motors	52.3□□, 52.4□□, 52.5□□

Applied standards and regulations:

EN 292 part 1

EN 292 part 2

Hameln, March 30, 2004




(Dr.-Ing. Etienne Nitidem)

Head of Research and Development Department of Electromechanics



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