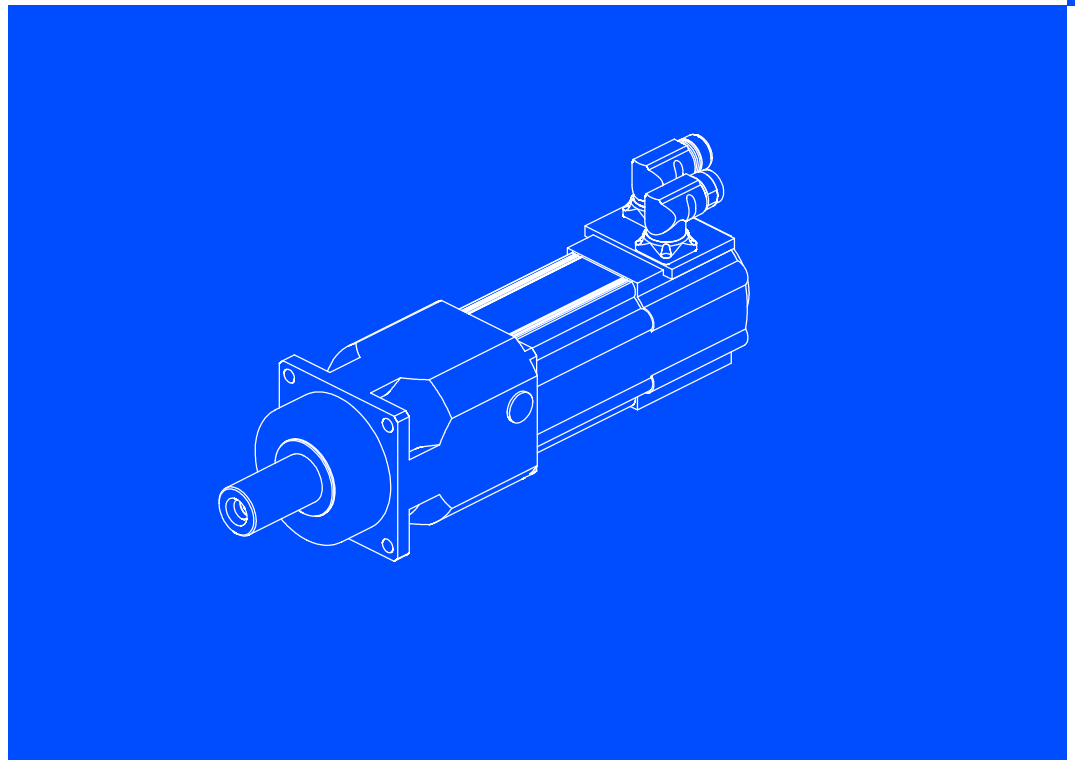


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Operating Instructions

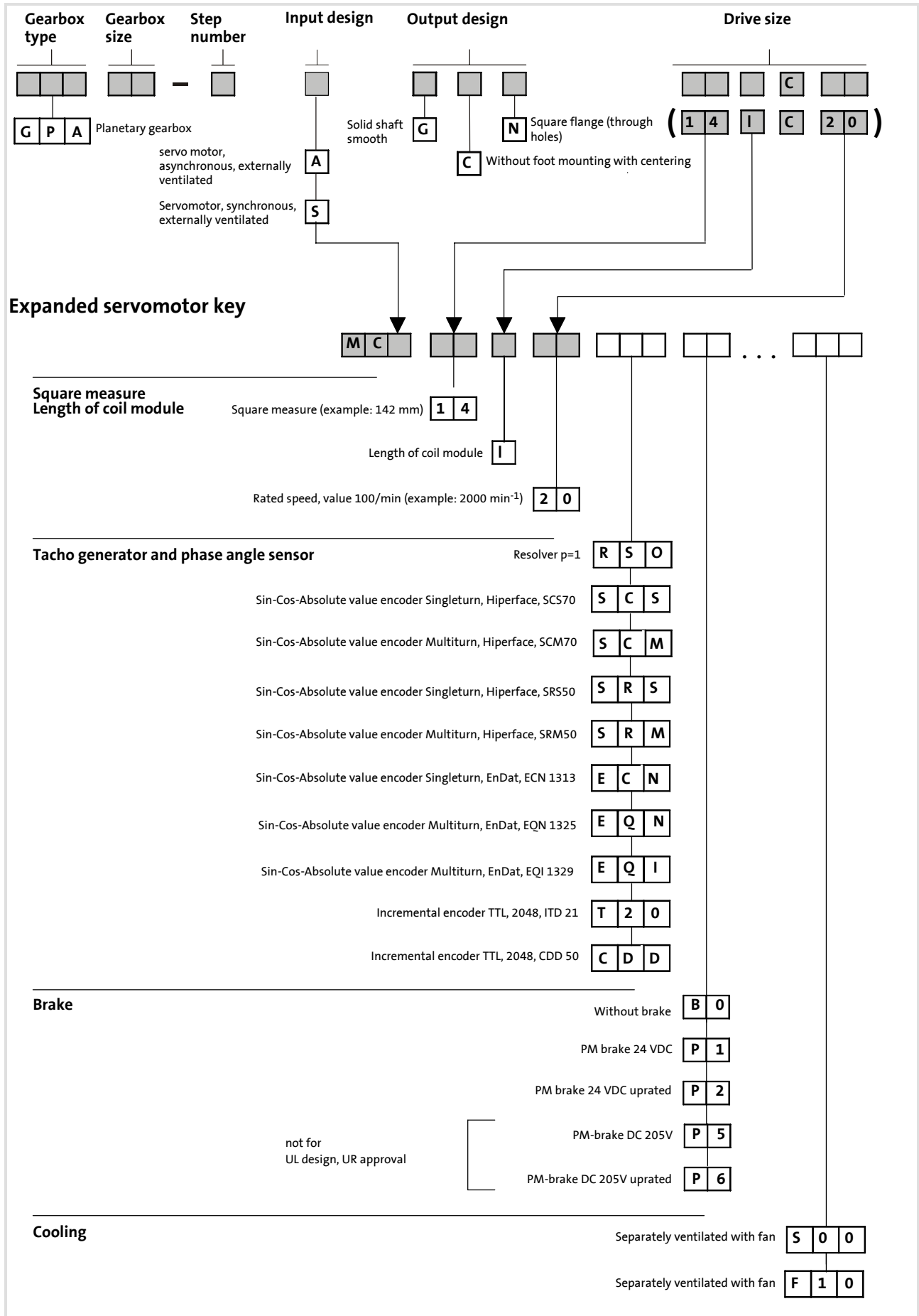
# G-motion



GPA servo planetary geared motors

**Lenze**

# Product key





## What is new?/ What has been changed in the Operating Instruction?

| Material number | Edition        | Important   | Contents   |
|-----------------|----------------|-------------|--|
| 00 491 027      | 1.0 05/04 TD09 | 1st edition | First printing   |
| 13 011 303      | 2.0 08/04 TD09 | 1st edition | Completion of the product key<br>Completion of the chart transport weights |

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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.

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# 1 Preface and general information

## About these Operating Instructions

# 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

### Labelling

Lenze drive systems are uniquely designated by the content of their nameplates.

#### Manufacturer

Lenze Drive Systems GmbH  
Hans-Lenze-Straße 1  
31855 Aerzen

### Application as directed

- ▶ 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 corresponding power limits.

**Any other use shall be deemed inappropriate!**

## 1.5 Legal regulations

### Liability

- ▶ The information, data, and notes in the Operating Instructions met on 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 faults,
  - 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

Personnel responsible for safety

## 2 Safety

### 2.1 Personnel responsible for safety

#### Operator

- ▶ An operator is any natural or legal person who uses the drive system or on behalf of whom 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 is not claimed 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 for their interaction with the complete plant.
- ▶ Make sure by appropriate measures that in case of failure of the drive system no material damage is caused.
- ▶ 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!**  
(characterises the type and severity of danger)  
**Note**  
(describes the danger and gives information about how to prevent dangerous situations)

| Pictograph and signal word   | Meaning  |
|--|--|
|  <b>Danger!</b>   | <b>Danger of personal injury through dangerous electrical voltage.</b><br>Reference to an imminent danger that may result in death or serious personal injury if the corresponding measures are not taken. |
|  <b>Danger!</b> | <b>Danger of personal injury through a general source of danger</b><br>Reference to an imminent danger that may result in death or serious personal injury if the corresponding measures are not taken.    |
|  <b>Stop!</b>   | <b>Danger of property damage.</b><br>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   |
|--|---|
|  <b>Note!</b> | Important note to ensure trouble-free operation |
|  <b>Tip!</b>  | Useful tip for simple handling                  |
|               | Reference to another documentation              |

**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**

**Design**

Drive systems have a modular design.

They consist of:

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

**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 servo motor<br>GPA □□ - □S GCN | Drive size (square measure) |      |      |      |       |       |
|---------------------------------------|-----------------------------|------|------|------|-------|-------|
|                                       | 06                          | 09   | 12   | 14   | 19    |       |
| GPA 00 - 1                            | < 6                         | < 10 |      |      |       |       |
| GPA 01 - 1                            | < 8                         | < 12 | < 19 |      |       |       |
| GPA 02 - 1                            |                             | < 15 | < 22 | < 37 |       |       |
| GPA 03 - 1                            |                             |      | < 30 | < 45 | < 59  |       |
| GPA 04 - 1                            |                             |      |      |      | < 75  |       |
| GPA 05 - 1                            |                             |      |      |      | < 90  |       |
|                                       |                             |      |      |      |       |       |
| GPA 00 - 2                            | < 7                         |      |      |      |       |       |
| GPA 01 - 2                            | < 9                         | < 13 |      |      |       |       |
| GPA 02 - 2                            |                             | < 17 | < 24 |      |       |       |
| GPA 03 - 2                            |                             |      | < 36 | < 51 |       |       |
| GPA 04 - 2                            |                             |      |      |      | < 84  |       |
| GPA 05 - 2                            |                             |      |      |      | < 112 |       |
|                                       |                             |      |      |      |       |       |
| Geared servo motor<br>GPA □□ - □A GCN | Drive size (square measure) |      |      |      |       |       |
|                                       | 10                          | 13   | 14   | 17   | 19    | 21    |
| GPA 00 - 1                            | < 10                        |      |      |      |       |       |
| GPA 01 - 1                            | < 11                        | < 17 |      |      |       |       |
| GPA 02 - 1                            | < 14                        | < 20 | < 25 | < 35 |       |       |
| GPA 03 - 1                            |                             | < 28 | < 33 | < 43 | < 68  | < 81  |
| GPA 04 - 1                            |                             |      |      |      | < 84  | < 96  |
| GPA 05 - 1                            |                             |      |      |      | < 99  | < 111 |
|                                       |                             |      |      |      |       |       |
| GPA 00 - 2                            | < 11                        |      |      |      |       |       |
| GPA 01 - 2                            | < 12                        | < 18 |      |      |       |       |
| GPA 02 - 2                            |                             | < 23 | < 28 | < 37 |       |       |
| GPA 03 - 2                            |                             |      |      |      | < 74  |       |
| GPA 04 - 2                            |                             |      |      |      | < 92  | < 105 |
| GPA 05 - 2                            |                             |      |      |      | < 120 | < 132 |

Tab. 1 Transport weight in [kg]

**3.3 General data/operating conditions****3.3.1 Temperatures**

The permissible temperature range is determined by the following:

- ▶ The lubricant specifications in connection with the expected oil temperatures in operation (see chapter 7.1 and nameplate).
- ▶ 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 Mechanische 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 Mounting

#### 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 damage 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



### **Danger!**

Electrical connections must only be made by skilled personnel!

### 5.1 Motor connection

To correctly connect the motor options, 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 the Lenze Service.



## 7 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 seals:
  - 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.

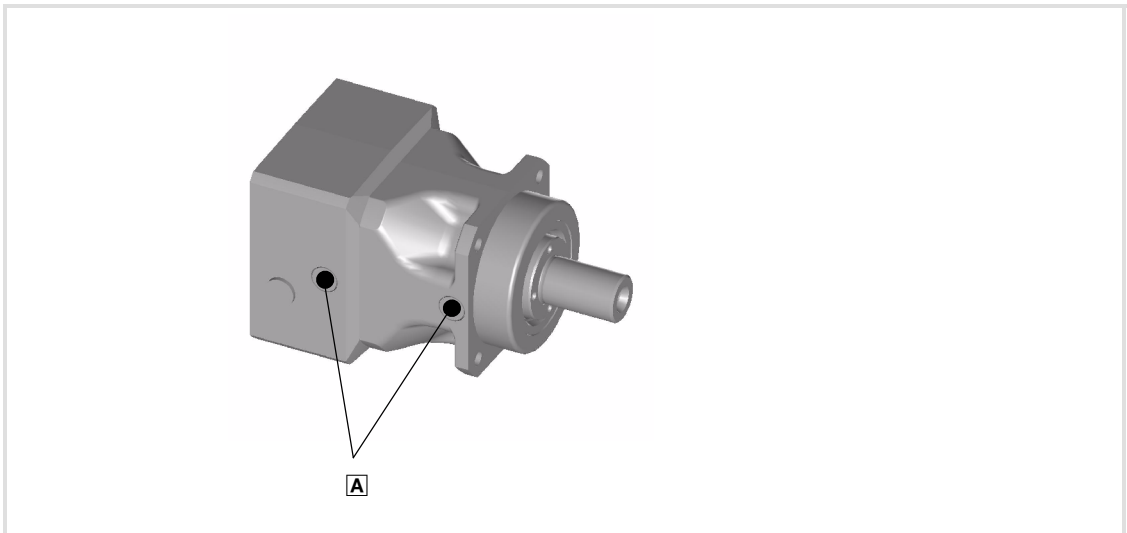


Fig. 1 Position of oil filler/drain plug  
A Oil filler/drain plug

**Recommended lubricant**

| Manufacturer | Mobil         | Optimol                  |
|--------------|---------------|--------------------------|
| Type         | Mobil SHC 629 | Optigear Synthetic A 150 |

**7.1.2 Lubricant quantity**

| Gearbox    | 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 the Lenze Service.

| Fault                                | Possible cause                           | Remedy  |
|--------------------------------------|--|---|
| Drive is at standstill               | Voltage supply interrupted               | Check connection                                    |
|                                      | Wrong electrical connection              | Check if nameplate matches voltage supply           |
|                                      | Excessive load                           | Reduce load<br>Check drive - machine combination    |
| Motor running, gearbox at standstill | Fixing elements are missing or defective | Check attachment                                    |
|                                      | Gearbox is defective                     | Contact Lenze Service                               |
| Unusual noise                        | Overload                                 | Reduce load<br>Check drive - machine combination    |
|                                      | Damage in the gearbox or motor           | Contact Lenze Service                               |
| Excessive temperature                | Overload                                 | Reduce load<br>Check drive - machine combination    |
|                                      | Insufficient heat dissipation            | Improve cooling air supply<br>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<br>Plastics to plastics recycling or residual waste<br>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 Manufacturer's Certification

## 10 Appendix

### 10.1 Manufacturer's Certification



Herewith we declare that the products stated below are determined for assembly in a machine or for assembling a machine with other components. The commissioning of the machine is prohibited as long as it has been ascertained that it meets the EC Directive 98/37/EC.

Lenze Drive Systems GmbH  
P.O. box 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                             |
| Bevel gear units and geared motors with coupling | GKK                             |
| Helical worm gearboxes and geared motors         | GSS, 52.1□□                     |
| Planetary geared motors                          | GPA                             |
| Variable speed belt drives and geared motors     | G□□-K<br>11.1□□, 11.2□□, 11.4□□ |
| Variable speed drives and geared motors          | G□□-D<br>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

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