



Instruction Manual

Hygienic Design Planetary Gearbox

Series:

HLAE070 (1- & 2-stage)

HLAE090 (1- & 2-stage)

HLAE110 (1- & 2-stage)



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2 About this document




This instruction manual describe the installation and commissioning of the NEUGART Hygienic Design Planetary Gearbox with the designation HLAE. The instruction manual contain the chapters Technical data, instruction as well as information on intended use / maintenance and care of the product.

The machine operator must guarantee and ensure that these instructions are read and understood by any person who is entrusted or commissioned with the installation, operation or maintenance of the product. These instructions must be kept in an accessible place in the vicinity of the machine so that they can be immediately consulted as and when required.

Persons working in the machine surroundings must also be familiarised with the safety instructions.

2.1 Warnings

Warnings point out specific dangers and specify measures for avoiding the danger. Warnings are categorised in three levels:

Warning word	Meaning
<i>Danger</i> 	Immediately threatening danger for life and health
<i>Warning</i> 	Possibly threatening danger for life and health
<i>Caution</i> 	Possibly threatening danger of light injuries or damage to property

Warnings are structured as follows:



Danger

Type and source of the danger

⇒ *Action to avoid the danger*

2.2 Notes and accentuations

The following signs and icons are used in these instruction manual:



Warning icon. This icon points out dangers and warnings.



Information icon. Here you receive particularly important information you should heed for a correct and safe installation of the gearbox.



Action. Here an action is required from you.

3 Safety

This chapter describes the safety instructions you have to heed for a safe and hazard-free use of the Hygienic Design Planetary Gearbox. It points out possible sources of danger and necessary safety measures.

Observe the technical data!

Observe the technical data and the installation details (rating plate and documentation). If the permissible technical data are exceeded, permanent damage to the product may occur and the warranty claim will be forfeited.

Draw up risk assessment after installation into the machine!

The machine manufacturer must draw up a risk assessment for the machine and take suitable measures to prevent unexpected movements from causing personal injuries or damage to property. Additional requirements on specialised personnel may possibly arise from the risk assessment.

Secure feather key!

Remove or secure any shaft feather keys, if the gearbox is started up without coupled load to prevent the feather key from being flung out and the associated injury hazard.

Avoid contact between dissimilar metals!

The gearbox casing consists of stainless steel. Prevent the gearbox from coming into direct contact with more active metals such as aluminium or steel so as to prevent contact corrosion. Contact corrosion may cause damage to the gearbox surfaces, which in turn can lead to contamination of the end product.

Note: Please also select the corresponding tools for this.

3.1 Intended use

The gearboxes have been in particular designed for use in machines in food, cosmetic, pharmaceutical, medical and similar applications with highest demands on the cleanability of the machine (hygiene design).

Operation of the HLAE gearboxes is permitted in applications with indirect contact to foodstuffs.

You may only operate the gearboxes taking into consideration the ambient conditions defined in this documentation.

Operation of the HLAE gearboxes is permitted in environments with detergents taking into consideration the conditions defined in chapter 4.5.



Do not exceed permissible operating data.



Only start up the gearbox once the machine into which the gearbox is installed as a component complies with the provisions of the directives and statutory provisions to be applied (see Chapter 3.5).

Hygienic design uses

A hygienic design use comprises among others also the connection to the motor and to the application. It is therefore important that on the part of the customer the corresponding measures in terms of the hygienic design are taken into consideration. In order to achieve this, we propose the following measures:

Gearbox:

- The gearbox can be mounted in any position. There are no restrictions in this regard.

Connection to the motor:

- To seal the motor flange, an O-ring in the motor's A-bearing shield must be provided according to hygienic design.
- Use the sealing screws according to hygienic design provided by the motor manufacturer to fasten the motor.

Connection to the application:

- To seal the gearbox flange, the O-ring included in the supply must be inserted in the gearbox output flange.
- Depending on the application, the optionally available sealing kit can be used for sealing. Detailed installation instructions see Chapter 4.2 and 6.4.
- To meet the 3-A Sanitary Standard for General Requirements for your application, the gearbox must be located outside the product contact surface with at least 1 in. (25.4 mm) clearance between the gearbox and the nearest product contact surface with the clearance open for inspection.

3.2 Non-intended use

- It is forbidden to operate the HLAE gearboxes in explosive areas.
- HLAE gearboxes may not be used in clean room applications.
- It is forbidden to commission the gearbox if the machine into which it has been incorporated does not comply with the country-specific provisions (standards / directives) or laws.

3.3 Personnel qualification

Only qualified specialist staff may carry out work such as transport, installation, commissioning and maintenance. Qualified specialist staff designates persons who are acquainted with the transport, installation, assembly, commissioning and operation of gearboxes and who are in possession of the minimum qualifications corresponding to their occupation and have read and understood the instruction manual:

- **Transport:** only by personnel with corresponding qualification / training in handling the product.
- **Installation:** only by specialists who have undergone training in machine engineering.
- **Commissioning / maintenance:** only by specialists with extensive knowledge in the field of drive engineering. Specialist staff must also know and heed the national regulations for the prevention of accidents.
- **Use of the machine:** only by specialists with knowledge of the hygiene regulations valid in the area of application.
- **Hygienic cleaning:** only by instructed cleaning personnel, who are acquainted with the specified detergents and cleaning cycles and observe these according to protocol. Failure to observe these can lead to permanent damage to the product. Likewise, all cleaning instructions and specifications mentioned in this document must be heeded and observed.



Ensure that personnel has read and understood these instruction manual.

3.4 General safety instructions



Caution

Improper use, faulty installation and operation as well as inadequate maintenance may lead to serious damage to property and personal injuries.



Heed the following safety instructions before commissioning the gearbox:

- Do not carry out any modifications/conversions on the gearbox.
- Do not carry out any other work on the gearbox than the one described in these instruction manual.
- Before making use of the gearbox, ensure that all sealing elements and shafts have been correctly connected.
- Ensure that possible sources of danger are covered/secured (e.g. rotating parts).
- Observe the conditions for commissioning requested by the manufacturer.
- Never use the gearbox with damaged parts.
- Always provide for adequate convection at the gearbox during operation.
- The gearbox may get very hot during operation. Allow the gearbox to cool down before working on it. Pay attention to hot lubricants when opening the gearbox.
- Only work on the gearbox once it has come to a standstill and the driving motor has been switched off and secured against unintentional restart.
- Have repairs within the guarantee period only performed by NEUGART.

3.5 Standards/directives

The CE-mark of conformity and the EC declaration of conformity are not necessary, as these gearboxes are not considered to be a machine within the meaning of the EC Machinery Directive 2006/42/EC, but a component.

Commissioning the gearbox within the scope of application of the EC Machinery Directive is forbidden until it has been determined that the machine into which the gearbox has been installed as component complies with the EC machinery directive.

HYGIENIC DESIGN

The HLAE series has been designed in accordance with the stringent design specifications of the EHEDG (European Hygienic Engineering & Design Group) committee.

In addition, the HLAE series complies with the 3-A Sanitary Standard for General Requirements and is certified under the Replacement Parts and System Component Qualification Certificate Program (RPSCQC).

FDA (Food and Drug Administration)

Only FDA-compliant materials are used for the gearbox.

NSF (National Sanitation Foundation)

It goes without saying that attention is also paid to the inside of the HLAE series so that the lubricant is certified as suitable for use in foodstuffs.

4 Description

The HLAE is a planetary gearbox which has been developed with an optimised cleanability in mind. The gearbox is available in 3 design sizes (HLAE070, HLAE090, HLAE110) and a single- and double-stage design is offered for each. The drive flange is adapted to the respective "hygienic design" motor. A reducing bush is used between motor shaft and gearbox input shaft as necessary (this is then included in the scope of supply). It is recommended to use the optional sealing kit on the application side.

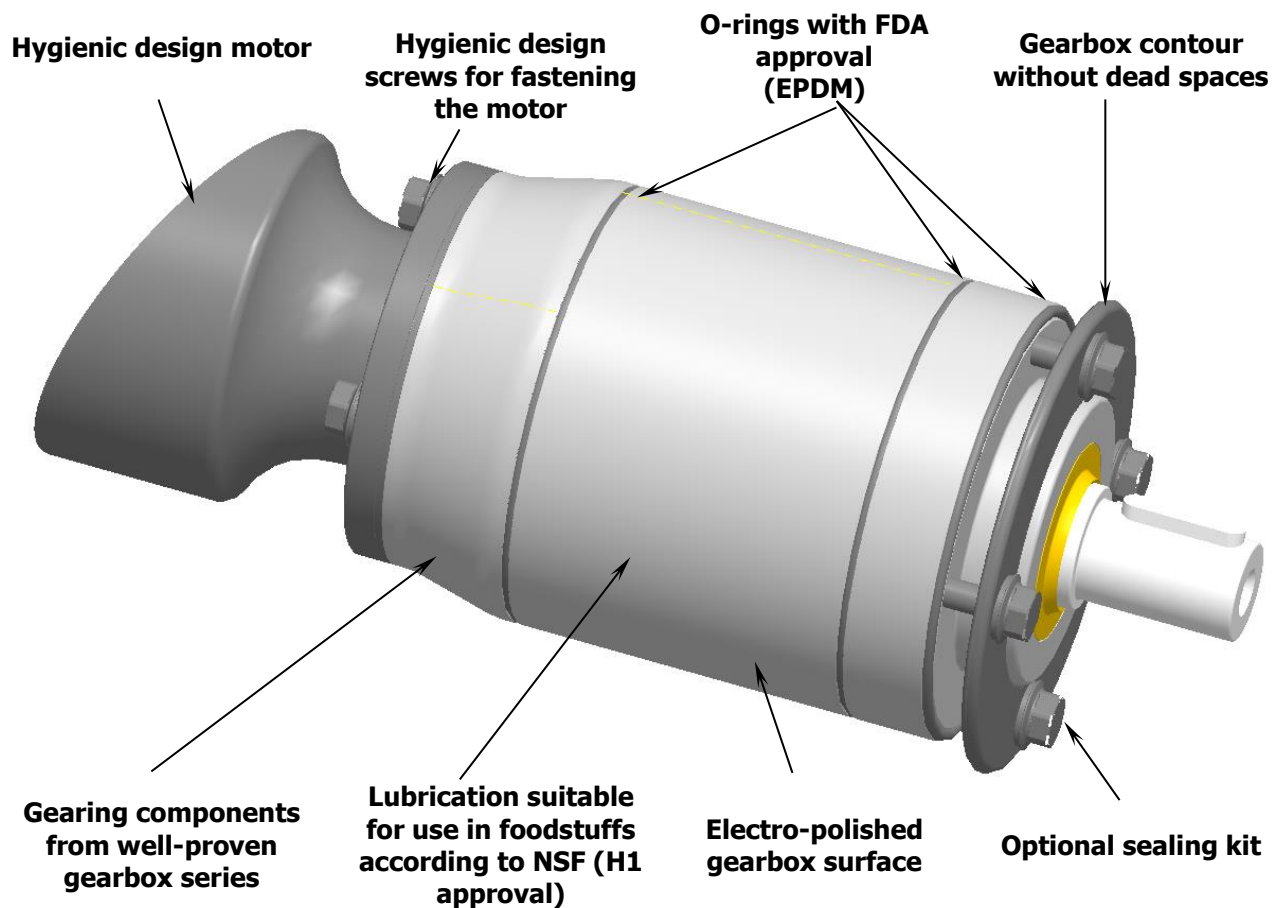


Fig. 1: HLAE090 completely assembled

4.1 Technical data

Gearbox series	HLAE070	HLAE090	HLAE110
Maximum permissible operating temperature	-25°C to +90°C		
Type of protection	IP69K		
Rotation shaft sealing O-rings	High-quality PTFE shaft sealing rings EPDM (standard) / FFKM (on request)		
Dimension sheet number	MB-4398 MB-4460	MB-4463 MB-4380	MB-4461 MB-4462

Additional technical data can be found on the Internet under www.neugart.com

4.2 Accessories

Sealing kit (output side)

For gearbox series	HLAE070	HLAE090	HLAE110
Item number	63911	63858	64130

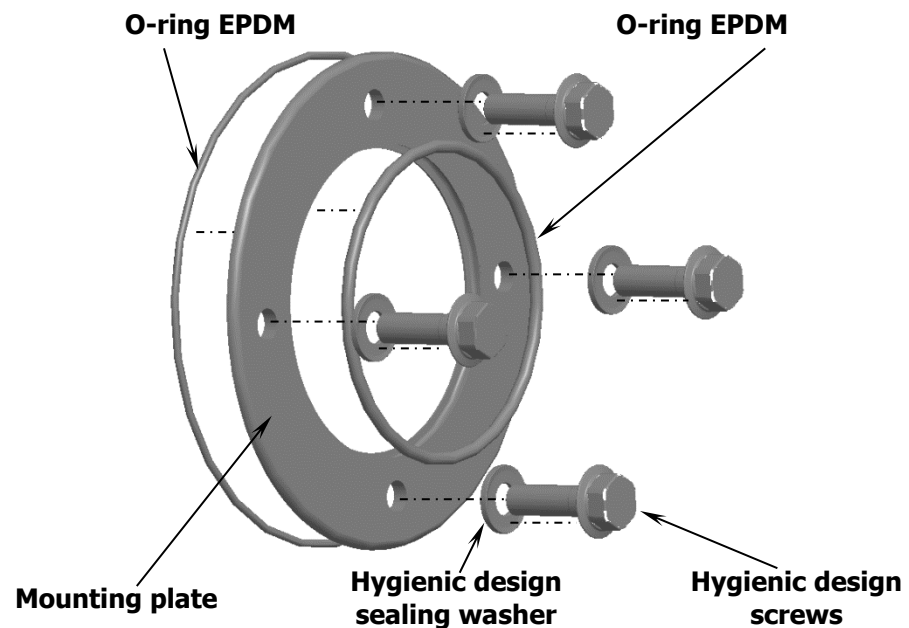


Fig. 2: Sealing kit

4.3 Lubrication

Only lubricants with H1 approval are used for the HLAE series. The amount of lubricant is dimensioned such that lifetime lubrication is achieved (see Chapter 9.1).

4.4 Rating plate

The rating plate serves the explicit identification of the gearbox and must be legible at all times (e.g. to allow the tracing of gearboxes by NEUGART).

The rating plate is laser-printed and must also be cleaned during the cleaning process.

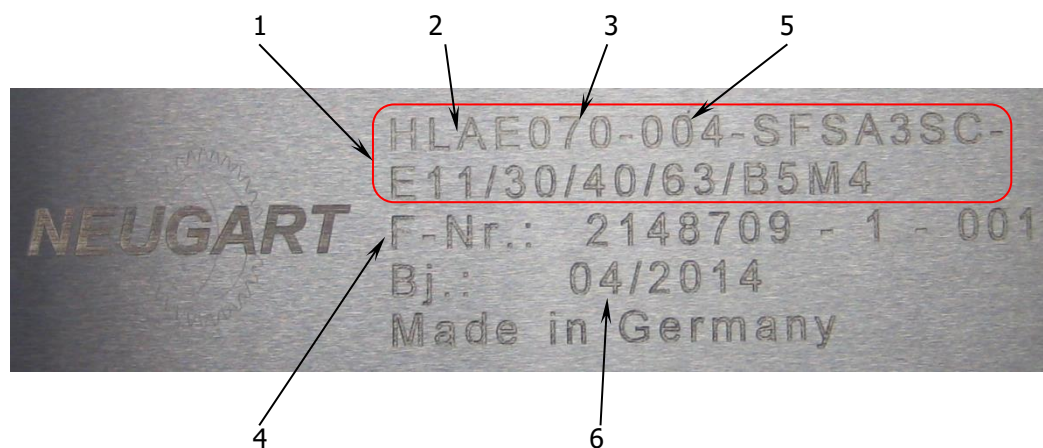


Fig. 3: Example rating plate

- | | | | |
|---|-------------|---|----------------------------|
| 1 | Product key | 4 | Serial number |
| 2 | Type | 5 | Transmission ratio |
| 3 | Design size | 6 | Month/year of construction |

4.5 Approved detergents

During several exacting test series, the HLAE's resistance against the following industrial detergents was tested under the toughest conditions:

Products by ECOLAB

P3-topax 19

P3-topax 12

P3-topax 52

P3-topax 56

P3-topax 66

P3-topax 990

P3- topactive OKTO

*P3-topactive DES **

* P3-topax 12, P3-topax 56, P3-topactive DES are usable according to the material suitability test carried out with the respectively more aggressive medium.

Test setup:

The material suitability test has been carried out by Ecolab in accordance with test method 40-1. During this test, the surfaces of the gearbox materials were placed into the respective detergent at a 3% concentration at a temperature of 21°C.

After successfully passed material suitability test, the compatibility with the detergents specified is given.

This should correspond to approx. 2500 cleaning cycles with respectively 15 minutes contact to the detergent or approx. 1500 cleaning cycles with cleaning and subsequent disinfection.

Neugart can only provide a guarantee for the gearbox service life if the tested detergents are used. Other detergents than the ones mentioned can be tested and where appropriate approved by Neugart on request.

5 Storage, transport

Storage Max. 2 years at -30°C to $+60^{\circ}\text{C}$, dry, inside the original packaging.



Please observe the guarantee period according to our general terms and conditions.



Restrict the storage time to a minimum.



The seals will age if you store the gearbox at temperatures $>60^{\circ}\text{C}$ or expose it to direct sunlight or ultraviolet light and ozone.

Storage temperatures up to 85°C are allowed for short periods (approx. 2 weeks). However, already during this short period, temperatures $>60^{\circ}\text{C}$ may lead to premature ageing of the seals. The seals should therefore be checked before using the gearbox.

Transport:



Caution

Gearbox damage due to improper transport

- ⇒ *Do not drop the gearbox.*
 - ⇒ *Only transport the gearbox inside its packaging.*
 - ⇒ *Protect packaging and contents from humidity.*
-

6 Installation

6.1 Conditions governing the location



Observe the following information for a smooth operation and an as long as possible service life of the gearbox:

- Provide adequate convection for the gearbox.
- Pay attention that the gearbox is able to adequately dissipate heat via the output flange.
- The motor and other external heat sources can heat up the gearbox. Obtain information about occurring motor temperatures from the respective manufacturer.
- Adhere to the restrictions demanded by the respective type of protection of the gearbox (see Chapter 4.1, Technical data).

6.2 Preparing the installation

So as to be able to use the gearbox without any restrictions, it is important to prevent any dents, scratches or other damages to the product while assembling and handling the product. Background: An increased formation of germs is to be expected inside the dent caused by a scratch.

Observe the information with regard to contact corrosion (Chapter 3)

Before installing or mounting the product, first check the enclosed accessories for completeness and check that the product does not exhibit any damages.

Before commissioning, the entire installation must be cleaned once according to cleaning specification to avoid contamination of the first production batch.

6.3 Installing the motor on the gearbox



Ensure that

- the motor does not exceed the maximum permissible motor weight for the gearbox,
- the concentricity and axial run-out tolerance "N" according to DIN 42955 is observed on the motor side.
- Motors with smooth shaft and B5-flange are to be preferred. During installation, the motor manufacturer's specifications with regard to safety and the use of screw locking varnish must be observed.

Installation

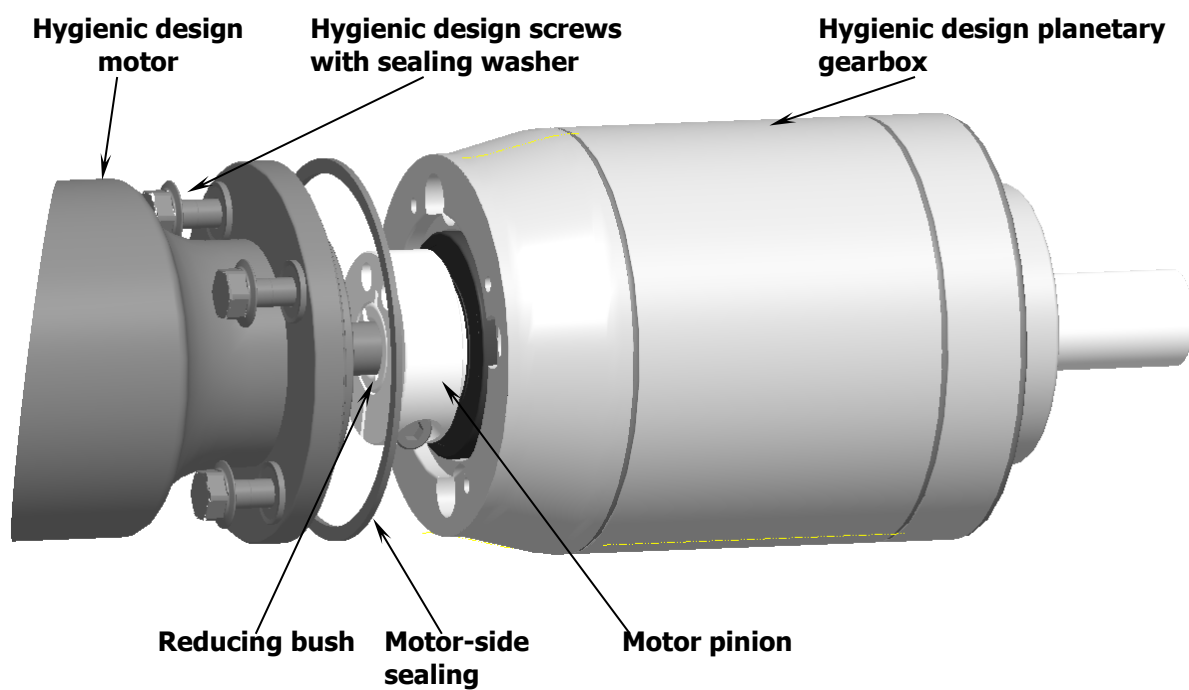
Install the motor according to the motor installation instructions enclosed in the gearbox packaging.

1. Check that it is geometrically possible to install motor and gearbox.
2. Install the motor pinion that is included in the supply (gearbox sun gear with deep groove ball bearing) on the cleaned motor shaft. Fix the clamping screw with the specified tightening torque.
Caution: The specified installation dimension MUST be observed as failure to do so will result in immediate damage to the components.
3. Place the sealing element enclosed by the motor manufacturer into the groove between motor flange and gearbox provided on the "Hygienic Design motor".
4. Introduce the motor pinion parallel to the axis in vertical position carefully into the gearing by means of slight turning movements.
Caution: Improper handling can damage the gearing.
5. Now fix the motor on the gearbox with the motor-side sealing screws. Fix the screws with the tightening torque specified by the motor manufacturer.



Caution

The work steps specified in the motor installation instructions must be observed. You can also download the motor installation instructions under www.neugart.com.



6.4 Installing the gearbox



The gearboxes can be used in any installation position. The thickness of the application plate may be varied within the specified limits.



Caution

Gearbox damage due to objects getting pressed or knocked against the shaft

⇒ Only fasten couplings, washers, gear wheels, chain wheels, etc. on the shaft with suitable clamping sets.



Caution

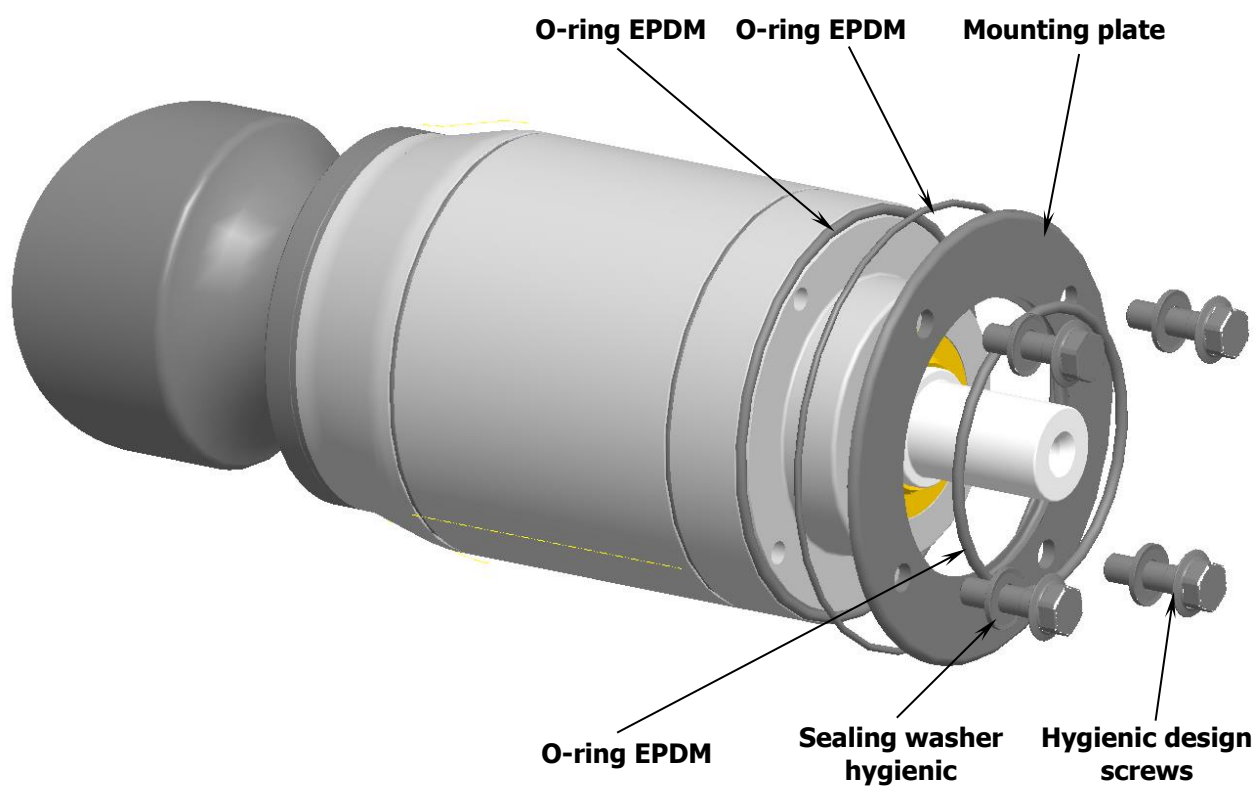
Gearbox damage due to sealing leak

⇒ Make sure that the seals on the gearbox do not get damaged or soiled during installation.

Assemble the motor according to the motor installation instructions enclosed in the gearbox packaging.

1. Check that it is geometrically possible to install the gearbox on the application.
2. Thoroughly clean / degrease the flange face and centring on the gearbox (no aggressive detergents)
3. Clamp the enclosed O-ring into the groove intended for this purpose between output flange and application plate.
Note: pull the O-ring onto the casing. Once the gearbox rests against the application plate (see item 4 and 5), carefully slide the O-ring into the groove.
4. Carefully introduce the gearbox parallel to the axis into the application centring.
Caution: the O-ring may not be crushed or pushed out of position in doing so.
5. Fix the gearbox on your application using suitable sealing screws. Observe the tightening torques intended for this purpose and use a suitable screw locking device.
Note: We recommend the optionally available sealing kit, which comprises the matching sealing screws (see Chapter 4.2).
6. When the sealing kit is used, the mounting plate (including matching O-rings) must be installed on the application side subsequent to point 4 using the sealing screws intended for this purpose (as described in point 5).
Note: Insert the O-ring in mounting plate and application in the groove intended for this purpose and if necessary, fix for installation with a suitable adhesive agent.

If due to the application, there are still gaps or dead spaces, these must be sealed accordingly.



7 Commissioning



Ensure that ...



all components are correctly interconnected.



the ambient temperature ranges within the specification.



all seals are free of dirt / ice to prevent these from being damaged when they are loosened.



none of the parameters specified for the gearbox are exceeded (e.g. limit torque, speed, etc. in the controller).



nobody is staying in the danger zone.

7.1 Measuring the surface temperature



Caution

Gearbox damage due to overheating

Exceeding the maximum permissible temperature of the gearbox will lead to gearbox damage.



Ensure that during operation the maximum permissible temperature of the gearbox is not exceeded.



Ensure that the equipment is switched off if the max. permissible temperature is exceeded and consult NEUGART. This can for instance be implemented by means of motor current monitoring.



Measure the temperature on the casing centre at maximum load. (preferably by means of contact measurement)

The gearbox has reached a stationary thermal state if the temperature increase does not exceed 2° C/h.



Danger

The surface temperature may reach up to 90°C

→ Risk of burns: Take corresponding precautions!



With the measured temperature you can determine the lubricant's pot life (see Chapter 9.1.1).

8 Cleaning



- Only clean the gearbox while it is at standstill
 - Risk of injury for the cleaning personnel
 - Liquid may get into the interior because of the gearbox's rotary motion.
- Only approved detergents may be used to ensure that the product does not corrode or get damaged.
- A high-pressure water jet (max. 26 bar) may be applied to the casing as such. The seals (especially the radial shaft seal ring) must however be omitted from cleaning with a high-pressure water jet to avoid damaging them.
- Remove any media in contact with the seals within 20 minutes to prevent them from getting sucked in.

Cleaning plan

Recommended cleaning plan with the tested detergents (see Chapter 4.5):

Rinsing with water (40°... 50°C)

Rinse at low pressure. From the top down in direction of the drain. Clean the drain.

Foam cleaning (cold up to 40°C)

Lathering from the top down.

- Alkaline: P3-topax 66 (2-5%, daily for 15 min)
- Acidic: P3-topax 52 (2%, 15 min when necessary)

Disinfection (40°... 50°C)

Spraying with water at low pressure. From the top down.

- Spray disinfection: P3-topax 990 (1-2%, 30-60 min when necessary)
- Foam disinfection: P3-topactiv OKTO (1-3%, 10-30 min when necessary)

Dry cleaning (compressed air)

It is not permitted to apply compressed air directly to the sealing elements.

9 Maintenance / repair

Visual inspection



After every cleaning operation, check the gearbox for external damage such as scratches or dents.



After every cleaning operation, check the gearbox for corrosion on the surface or cracks in the sealing elements.



After 1000h or every three months, check the seals of the gearbox for leakage.

9.1 Lubrication

At the factory, all HLAE gearboxes have been provided with grease that is suitable for use in foodstuffs. If operated within the nominal data, the products are lubricated for life, taking into consideration the average gearbox temperature.



Caution

Gearbox damage due to overheating

Inadequate lubrication of the gearbox will result in gearbox damage.

- ⇒ *Calculate the lubricant's pot life.*
- ⇒ *Have the lubricants exchanged if necessary.*

9.1.1 Determining the pot life of the lubricant



Measure the temperature as described in Chapter 7.1.



Add 10° C to the temperature you measured.



Use this value to determine the pot life of the lubricant from Fig. 4.

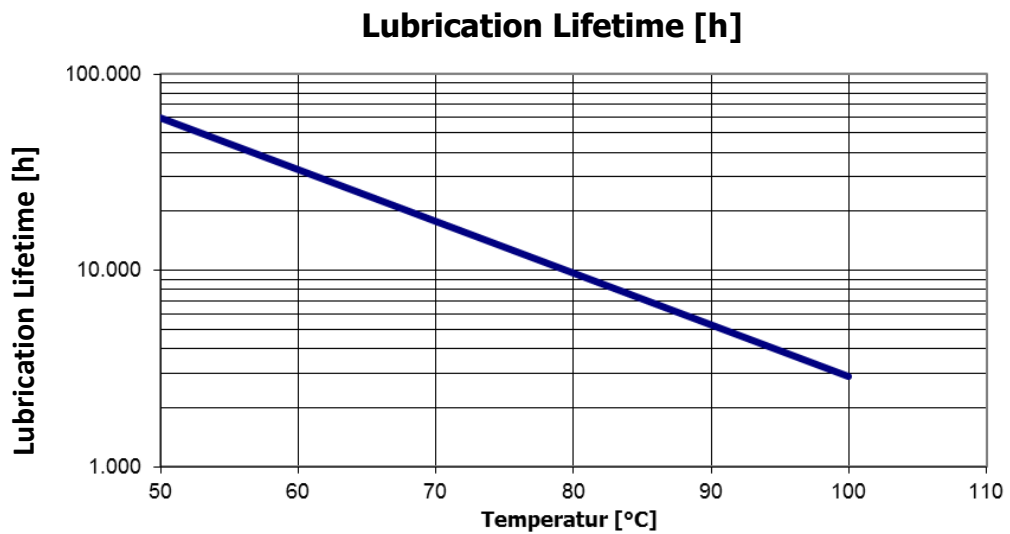



Fig. 4: Pot life of lubricant

t [h] Pot life of lubricant
 °C Operating temperature during continuous operation
 **HLAE (UH1 14 - 222 Klüberplex)**



After the service life can reach let the lubricant through NEUGART renew.

9.2 Seals



Let's change the seals if necessary by NEUGART.

In agreement with NEUGART, the seals can also be exchanged by the end customer. To guarantee a constant quality, the original part must be purchased from NEUGART.



The service life of the seals depends on the application and ambient conditions.

10 Troubleshooting



Contact NEUGART if any disruptions of operation occur:

- unusual running noise
- development of high temperature
- leakages



Keep the following information at hand for this purpose:

- Rating plate data (complete)
- Type and extent of the disruption
- Attendant circumstances of the disruption
- Application data (cycle of torque, speed, forces over time / ambient conditions)

11 Disposal

To avoid environmental damage:



Dispose of the lubricant at the disposal points intended for this purpose.



Dispose of gearboxes and packaging material in an appropriate and environmentally sound manner.



Heed the nationally applicable rules and regulations regarding the appropriate disposal.

12 Service



In case of queries and problems, please contact NEUGART:

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