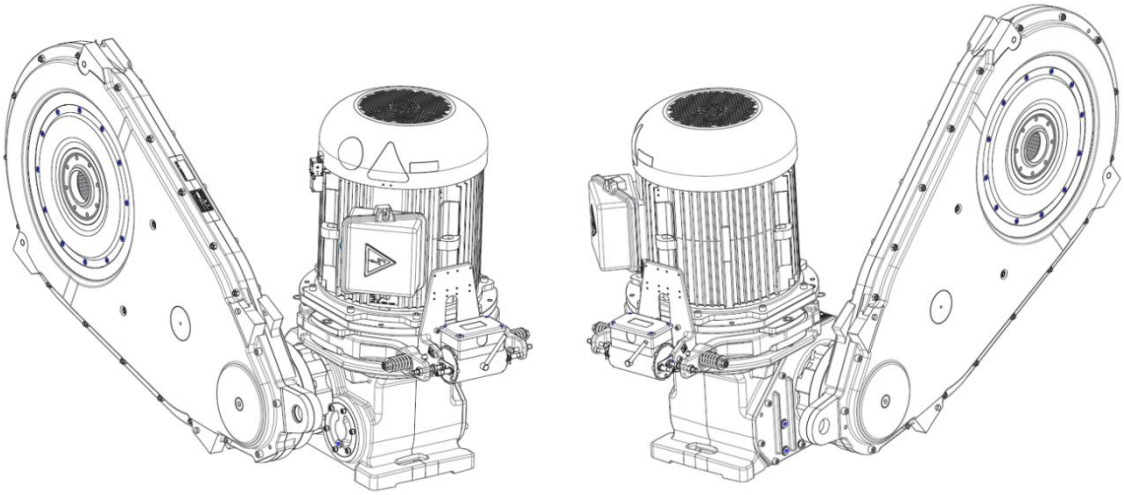
Installation instructions

Escalator drive omsHypo-Direct drive ECS 2-15.1-A + ZGS-A

Edition 1.0 / 2024-12



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Edition 1.0: 2024-12

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1. Declaration of incorporation

Declaration of incorporation of an incomplete machine

According to appendix II section 1.B of the machine directive 2006/42/EC

1. **Name of manufacturer**
   OMS Antriebstechnik
   Bahnhofstrasse 12
   D-36219 Cornberg

2. **Authorized person for managing the relevant technical documents**
   René Hering
   Bahnhofstrasse 12
   D-36219 Cornberg

3. **Information about the incomplete machine**

3.1 **Description**
- Intermediate gear box (spur gear chain) stage

3.2 **Identification**
Type plate at the gear box

3.3 **General designation**
Intermediate gear box for escalators and moving walkways according EN 115:2017

3.4 **Function**
Transmission of power from the drive unit to the escalator or moving walkway

3.5 **Type**
ZGS-A

3.6 **Serial number**
OMS-No.:

3.7 **Trade name**
ZGS-A

4. Explanations

4.1 Declaration about the basic requirements from the directive 2006/42/EC which have been employed:
Appendix I
1.1.2; 1.1.3; 1.1.5
1.3.1; 1.3.2; 1.3.4
1.5.4; 1.5.5; 1.5.6; 1.5.8; 1.5.9; 1.5.13
1.6.1; 1.7.1; 1.7.3

4.2 The relevant technical documents according to appendix VII part B are made.

4.3 The incomplete machine is also according to the directives listed in the official journals as follows:

Low voltage- directive 2014/35/EU – official journal L 96/357 from 29.03.2014
EMC- directive 2014/30/EU – official journal L 96/79 from 29.03.2014

5. Obligation to provide the relevant documents.

We hereby commit ourselves to provide the competent authorities of EU- Member States, upon reasoned request, with the relevant information on this incomplete machine.

The document will be sent by usually CD.

6. Annotation

The machine may only be operated, if it´s sure that the complete machine, which the incomplete machine is installed, is according to the machine directive 2006/42/EC.

Cornberg, December 6, 2024
(Place, date)

i.V. René Hering
(Signature of the authorized person)

Details of the person authorized to issue this declaration in the name of the manufacturer.
René Hering, Technical Director of OMS Antriebstechnik

Declaration of incorporation of an incomplete machine

According to appendix II section 1.B of the machine directive 2006/42/EC

1. **Name of manufacturer**
   OMS Antriebstechnik
   Bahnhofstrasse 12
   D-36219 Cornberg

2. **Authorized person for managing the relevant technical documents**
   René Hering
   Bahnhofstrasse 12
   D-36219 Cornberg

3. **Information about the incomplete machine**

3.1 **Description**
- Hypoid helical gear box in flange design
- Optional:
  - Motor (three-phase AC-motor, design IM V1, protection IP55, isolation class F)
  - Two-circuit-brake system: 1x double-acting spreader solenoid, 2x moveable brake lever + traction brake linings, 2x compression spring, rod)
  - monitoring (brake function, brake lining wear)

3.2 **Identification**
Type plate at the gear box

3.3 **General designation**
Escalator traction machine according to EN 115:2017

3.4 **Function**
Driving and slowing down escalators and moving walkways

3.5 **Type**
ECS 2-15.1-A

3.6 **Serial number**
OMS-no.:

3.7 **Trade name**
ECS 2-15.1-A

4. Explanations

4.1 Declaration about the basic requirements from the directive 2006/42/EC which have been employed:

Appendix I
1.1.2; 1.1.3; 1.1.5
1.3.1; 1.3.2; 1.3.4
1.5.1; 1.5.2; 1.5.4; 1.5.5; 1.5.6; 1.5.8; 1.5.9; 1.5.13
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5. Obligation to provide the relevant documents.

We hereby commit ourselves to provide the competent authorities of EU- Member States, upon reasoned request, with the relevant information on this incomplete machine.

The documents will be sent by usually CD.

6. Annotation

The machine may only be operated, if it's sure that the complete machine, in which the incomplete machine is installed, is according to the machine directive 2006/42/EC.

Cornberg, December 16, 2024
(Place, date)

i.V. René Hering
(Signature of the authorized person)

Details of the person authorized to issue this declaration in the name of the manufacturer.
René Hering, Technical Director of OMS Antriebstechnik

2. Basic information

2.1 Notes on the manual

This manual is to be understood as "installation instructions for an incomplete machine" within the meaning of Directive 2006/42/EC Annex VI. The manual refers to escalator drives of the "omsHypodrive" series for use in electrically operated escalators and moving walkways, hereinafter referred to as "drive".

These instructions have been prepared in accordance with the product-specific and application-related requirements of laws, ordinances, regulations, technical standards and directives. The declaration of incorporation serves as proof of this. In addition, the local accident prevention regulations and general safety regulations for the area of application of the system apply.

This installation instruction helps the operator to familiarize himself with the design and function of the drives. Figures and illustrations in this instruction are for basic understanding and may differ from the actual design of the plant.

Before the drive is integrated into a complete system, the following must be observed:

NOTE

The installation instructions must be read carefully before commissioning and must always be available at the plant!

The drive is only intended for the purpose specified in the documentation. Warranty claims resulting from improper operation and insufficient maintenance will not be accepted. Damage caused by improper operation will result in the loss of the warranty claim.

In addition to this documentation, all operating instructions and data sheets of the installed components (↗ applicable documents) apply. The instructions on safety, setup and installation, operation, maintenance, disassembly and disposal of the components contained in the above-mentioned manufacturer's documents must be followed without restriction by the operating personnel of the plant.

2.2 Design of the safety instructions

The safety instructions in this document are identified by safety symbols and are designed according to the SAFE principle. They contain information on the type and source of the danger, on possible consequences and on how to avert the danger.

DANGER

Warns of an accident that will occur if the instructions are not followed. The accident will result in serious, possibly life-threatening injuries or death,
e.g. by touching electrical units under high voltage.

WARNING

Warns of an accident that can occur if the instructions are not followed. The accident may result in serious, possibly life-threatening injuries or death,
e.g. by touching electrical units under high voltage.

CAUTION

Warns of an accident that may occur if the instructions are not followed. The accident may result in minor injuries,
e.g. burns, skin injuries or bruises.

CAUTION

Warns of possible damage to property.

NOTE

Important general note.

NOTE

Important note on environment protection.

2.3 Symbols used

Symbol	Meaning
	Warning of a general danger
	Warning of electric voltage; electric shock
	Hot surface warning
	Warning against hand injuries
	Warning against counter-rotating rolling
↗	Cross reference, see „xx“
*	Equipment is optionally available
	Assembly or component covered or located on the rear side

Tab. 1: Symbols used

2.4 Up-to-dateness at the time of printing

All technical data and dimensional or weight specifications apply to the date of release of these instructions. They may deviate in detail from the respective design of the device without fundamentally changing the factual information and losing their validity.

Any claims arising from this cannot be asserted. Possible deviations from text and image statements depend on the technical development, equipment and accessories of the product.

2.5 Intended purpose

The drive is used in electrically operated escalators and moving walks for passenger transportation. Depending on the equipment/design, the drive essentially consists of the following components:

- Hypoid helical gear box + intermediate gear box (flange version)
- motor (three-phase motor, type IM V1, protection class IP 55, isolation-cl. F)
- Brake unit:
  - dual circuit safety brake: 1x double-acting spreader solenoid, 2x brake lever with moveable brake shoes and friction lining, 2x compression spring, 2x rods

2.6 Intended use

The drive is intended exclusively for use in electrically operated escalators and moving walks in accordance with DIN EN 115. Any use beyond this is considered improper.

Furthermore, the intended use includes:

- The drive is designed exclusively for use inside enclosed spaces.
- The drive is intended for commercial use only.
- Work on the drive may only be carried out by authorized persons.
- The safety and operating instructions as well as the inspection and maintenance conditions of the installation instructions must be observed.

2.7 Reasonably foreseeable misuse

Any use that is not part of the intended use or the following applications/scenarios are considered misuse:

- Improper use with unsuitable parameters (technical data)
- Use of unsuitable frequency converters
- Outdoor use
- Use in damaged condition
- Use outside the defined limits
- Use in potentially explosive areas
- Failure to follow the installation instructions
- Use by insufficiently trained and instructed personnel
- Use of non-approved operating materials and supplies
- Insufficient or improper maintenance and servicing
- Unauthorized modifications
- Manipulation of protective equipment

2.8 Warranty and liability

- # The manufacturer of the drive guarantees proper, safe operation of the drive only within the scope of the design data enclosed with each drive and when the drive is properly assembled (installed), maintained, tested and operated in accordance with the installation instructions and the procedure prescribed herein.
- # If the permissible limit values are exceeded during operation, maintenance or testing activities, the warranty becomes void.
- # The person placing the complete system on the market (operator) is liable for the proper assembly (installation), maintenance, testing and operation of the drive and ensures that demonstrably trained and qualified personnel are available.
- # If defects are detected in the escalator or moving walk system, including the drive, the system must be taken out of operation immediately, otherwise the operator is solely liable for all personal injury and property damage, regardless of the legal grounds.
- # Incorrect installation or improper operation of the equipment, especially with improper procedures described above, will result in a complete exclusion of liability by the manufacturer of the drive, regardless of the legal reason.
- # The manufacturer will refuse any warranty and liability claims if the operator, installer and/or maintenance company cannot provide complete proof of the described permissible procedure/use of the system including the drive.

2.9 Customer service

The manufacturer's customer service is available for technical information.

In addition, the manufacturer's employees are constantly interested in new information and experience resulting from the application, which can be valuable for the improvement of the products.

Contact information:

OMS Antriebstechnik
Bahnhofstraße 12
D-36219 Cornberg

Phone: +49 5650 / 969-0
Fax: +49 5650 / 969-100

info@oms-antrieb.de
www.oms-antrieb.de

3. Safety

3.1 Standards and directives

Applied guidelines:

Document No.	Title
2006/42/EG	Directive 2006/42/EC of the European Parliament and of the Council of 17 May 2006 on machinery and amending Directive 95/16/EC (recast)
2014/30/EU	Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to electromagnetic compatibility (recast)

Tab. 2: Applied guidelines

Applied standards:

Type-C-standard	Title
EN 115-1:2017	Safety of escalators and moving walkway - Part 1: Design and installation
Type-B-standard	**Title**
EN ISO 13732-1:2008	Ergonomics of the thermal environment - Evaluation methods for human responses to contact with surfaces - Part 1: Hot surfaces (ISO 13732-1:2008)
EN 1032:2003+A1:2008	Mechanical vibration - Test methods for mobile machines for the purpose of determining the vibration emission value
EN ISO 13849-1:2015	Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design (ISO 13849-1:2015)
EN 60204-1:2018	Safety of machinery - Electrical equipment of machines. Part 1: General requirements (IEC 60204-1:2016, modified)

Type-A-standard	Title
EN ISO 12100:2010-11	Safety of machinery - General design principles General design principles - Risk assessment and risk reduction (ISO 12100:2010)
Standard	**Title**
EN 61000-6-2:2005/AC:2005	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity and industrial environments
EN 61000-6-4:2007/A1:2011	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards; Emission for Industrial areas
EN 60034-1:2010/AC:2010	Rotating electrical machines - Part 1: Rating and performance EN 60034-5/A1:2007-01 Rotating electrical machines - Part 5: Degrees of protection based on the overall design of rotating electrical machines (IP code) - Classification
EN 60034-6:1993-11	Rotating electrical machines - Part 6: Classification of cooling methods (IC code)
EN 60034-9/A1:2007-04	Rotating electrical machines - Part 9: Noise limits

Tab. 3: Applied standards

3.2 Labeling

The following labels are attached to the drive as well as the nameplate:

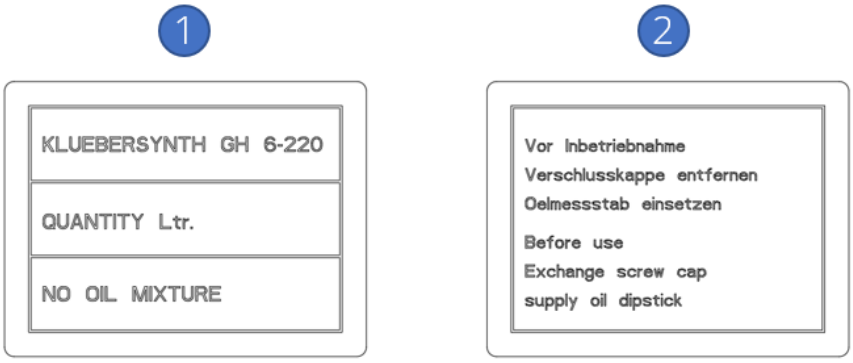

Fig. 1: Labels on the drive

1 Sticker: oil type, oil quantity

2 Sticker: sealing cap / oil dipstick

Nameplate:

The nameplate shows the most important key data of the drive supplied.

Fig. 2: Nameplate

3.3 General safety instructions

DANGER

Danger due to electric shock

- All work may only be carried out by qualified personnel in a disconnected condition and secured against reconnection.
- The regulations of the motor manufacturer must be observed.
- After completion of the work in the junction box, it must be closed again.
- Observe the safety rules for working on electrical equipment.
- Use insulated tools.

DANGER

Danger from contact with live parts due to fault conditions

- All work may only be carried out by qualified personnel in a disconnected condition and secured against reconnection.
- Observe the safety rules for working on electrical equipment.
- Fix loose connections, replace damaged cables immediately.
- Cables must not be pinched or crushed. Cables must be laid in such a way that they cannot trip over or be damaged.
- Periodically inspect electrical equipment in accordance with the applicable national regulations (e.g. DGUV regulation 3 in Germany).

WARNING

Danger when lifting the drive.

- The drive may only be lifted using suitable lifting devices.
- The gear box may only be lifted at the lifting points specified for this purpose.

WARNING

Danger due to loss of stability.

- The drive may only be put into operation if it has been correctly mounted as described in the installation instructions.

CAUTION

Danger during work on the drive.

- Depending on the size of the components, use load-bearing or auxiliary equipment if necessary.
- Assembly work may only be carried out by adequately qualified personnel.
- Ensure a healthy body posture during all work.

CAUTION

Danger of structural failure due to corrosion/vibration.

- Check the drive regularly for damage. Do not operate the drive if there is damage.
- Replace damaged corrosion protection immediately.
- Replace wear parts regularly.
- Use the drive only as intended.

NOTE

Special note on omsHypodrive-drive:

This drive has the lowest self-locking due to its high efficiency. This means that the escalator starts moving immediately (downward direction) when the brake is opened and the steps are loaded.

3.4 Personnel requirements

Commissioning, maintenance or carrying out repairs on parts of the machine may only be carried out by trained and qualified personnel.

Qualified personnel:

Qualified personnel are persons who, on the basis of their training, experience, instruction and knowledge of the relevant standards and regulations, accident prevention regulations and operating conditions, have been authorized by the person responsible for the safety of the plant to carry out the activities required in each case and are able to recognize and avoid possible dangers in the process (definition for skilled personnel according to IEC 364).

Usage Disclaimer:

The drive is not intended for use by consumers or physically or mentally impaired persons.

4. Technical description

4.1 Structure

The escalator drive is a drive unit consisting of the following assemblies:

- Gear box – ECS 2-15-1-A
- Motor (with handwheel, flywheel mass)
- Brake system, (brake drum, double-acting spreader solenoid, brake lever, brake shoes, compression springs, rods)
- Flange
- Intermediate gear box

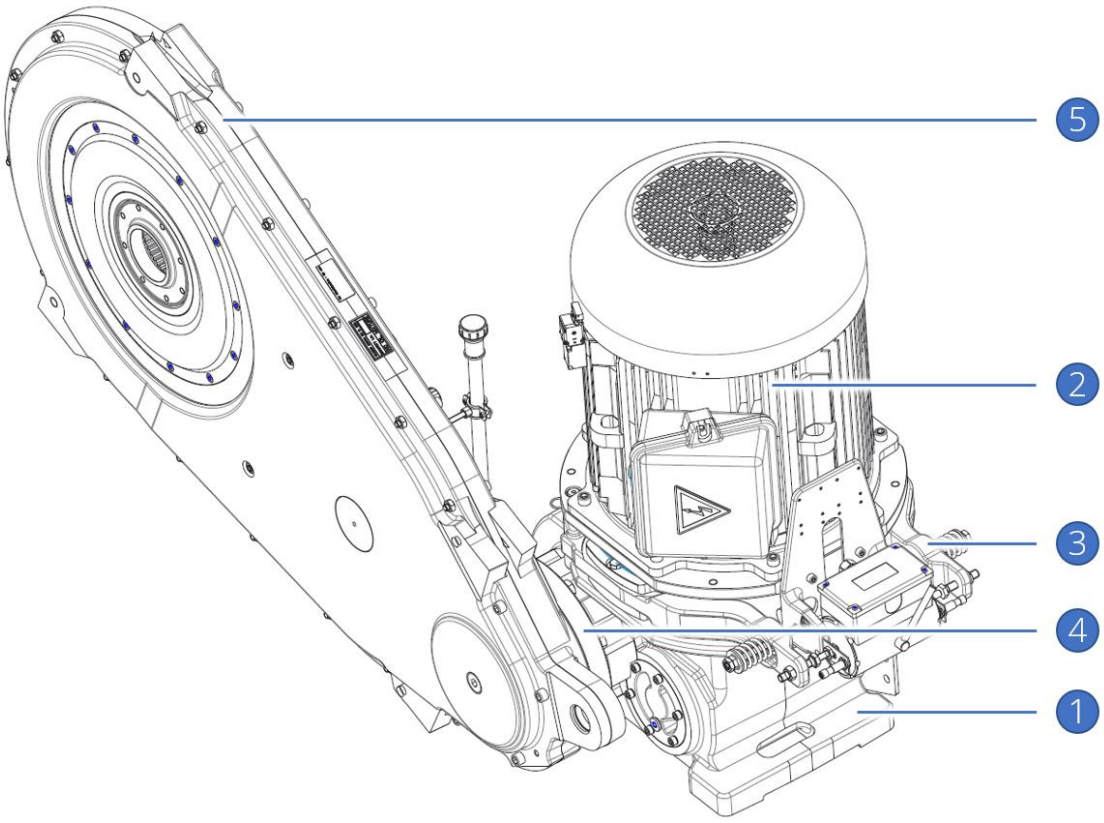

Fig. 3: General overview, version right

1	Gear box ECS 2-15.1-A	2	Motor
3	Brake system	4	Flange
5	Intermediate gear box ZGS-A		

Options:

The escalator drive is available in different versions:

- Version left
- Version right

Gear box ZGS-A:

The gearbox is available in different ratios:

- i=3,417:1
- i=3,846:1

Gear box ECS 2-15.1-A:

The gearbox is available in different ratios:

- i=31,578:1
- i=25,301:1
- i=19,963:1
- i=22,637:1
- i=26,882:1
- i=17,422:1

Motor:

Standard equipment:

- Operating mode S1, duty cycle 100%
- Energy efficiency class IE3
- Revolutions: 1.000min^{-1}, 1.200min^{-1}, 1.500min^{-1}
- Junction box with metric thread
- Color blue grey RAL 7031
- Protection class IP 55

Spare parts:

The following assemblies, components are replaceable:

- Gear box complete
- Motor complete
- Brake drum
- Claw coupling / coupling buffer (between motor/gearbox)
- Oil dipstick
- Gear oil
- Brake lever
- Brake shoe with brake lining
- Double-acting spreader solenoid
- Pivot pin, compression spring, rod
- Motor flange (for brake system)

Gearbox version and installation position:

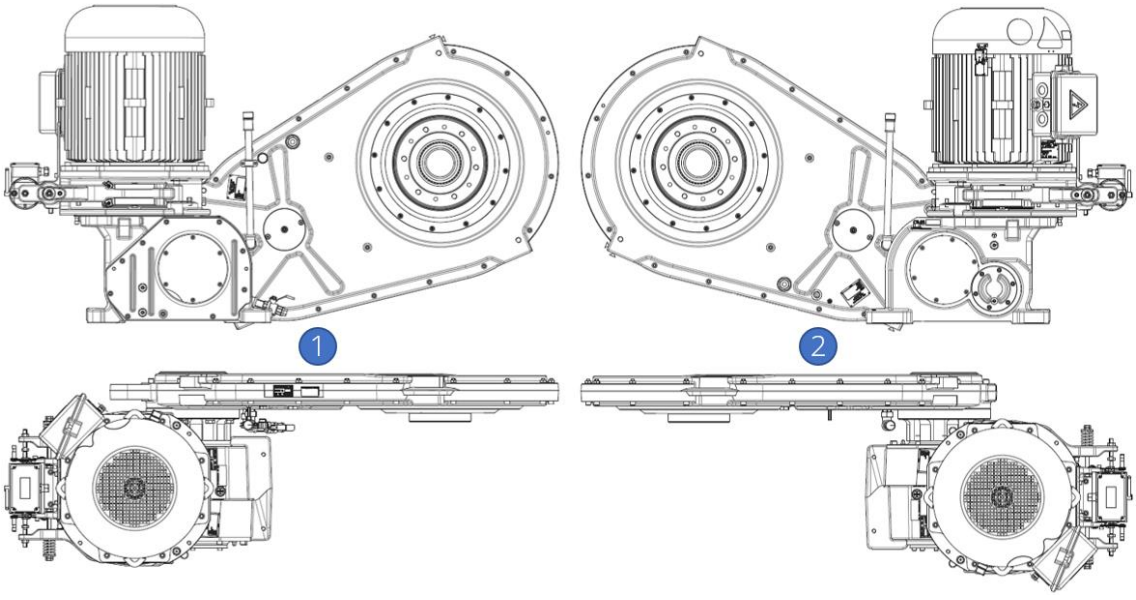

Fig. 4: Installation position

1 Version right,
with motor and brake system

2 Version left,
with motor and brake system

4.2 Technical Data

For technical data, please refer to the respective data sheets or dimension sheets (↗ applicable documents).

4.3 Noise emission

The A-weighted emission sound pressure level LpA in dB(A) according to DIN EN ISO 11200 is measured at a distance of 1m from the surface. The drive is operated directly on the mains on a load test bench in the sound measurement room.

At 25% partial load (referred to P_{nom}= xxkW), the drives meet the noise emission characteristics according to data sheet
(↗ applicable documents).

5. Transport/storage

5.1 Transport

Delivery:

All drives have left the factory in perfect condition after inspection. Please check the drive for external damage after delivery.

If you find any defects resulting from the transport, a damage report must be issued in the presence of the carrier. If necessary, the commissioning of this drive must be excluded.

Transport preparation:

The gear box ECS 2-15.1-A must be sealed oil-tight for transport. This has been done at the factory on delivery. The drive must be closed again for subsequent transportation.

⇨ To do this, remove the oil dipstick and replace it with the original sealing screw supplied. If this is no longer available, you can request a new sealing screw from the manufacturer.

The intermediate gear box ZGS-A is not filled with oil for transportation. The intermediate gear box ZGS-A is sealed dust-tight at the flange with a cover. For subsequent transportation, the oil must be drained and cover fitted. Transport the intermediate gear box ZGS-A horizontally with the flange side facing upwards.

⇨ Drain the oil completely via the exhaust valve. Mount the cover on the flange side of the housing.

⇨ Remove the oil dipstick and replace it with the original sealing screw supplied. Also replace the venting screw with the original sealing screw supplied. If these are no longer available, you can request a new sealing screw from the manufacturer.

Lifting the intermediate gear box:

WARNING

Danger when lifting the drive.

- The gear box may only be lifted at the 4 specified lifting points.
- The drive may only be lifted using suitable lifting gear.

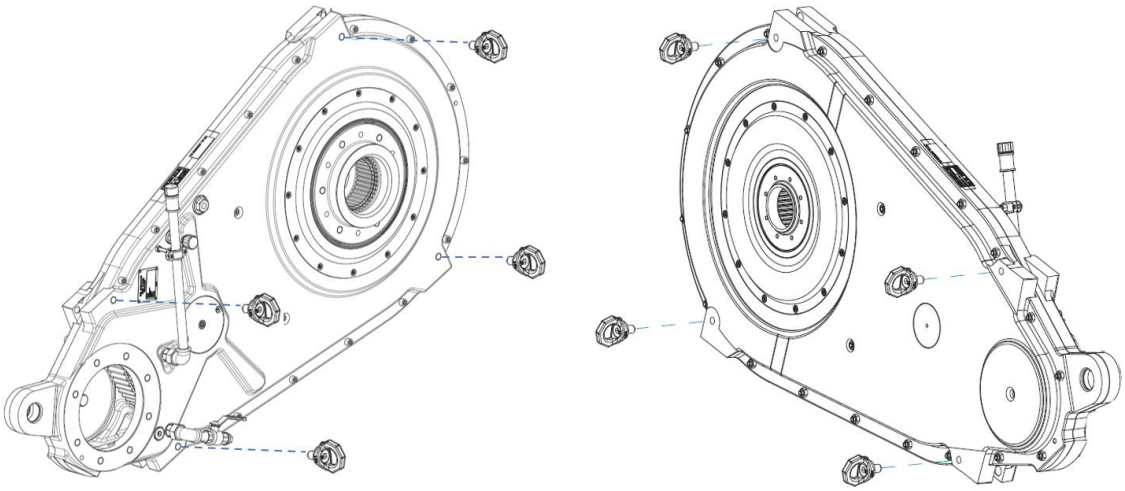

Fig. 5: Suspension points intermediate gear box ZGS-A

NOTE

When selecting lifting devices and slings, consider the total weight of the drive. Please refer to the relevant technical data sheet for the applicable total weight.

Lifting the drive:

WARNING

Danger when lifting the drive.

- The gear box may only be lifted at the 4 specified lifting points.
- The drive may only be lifted using suitable lifting gear.

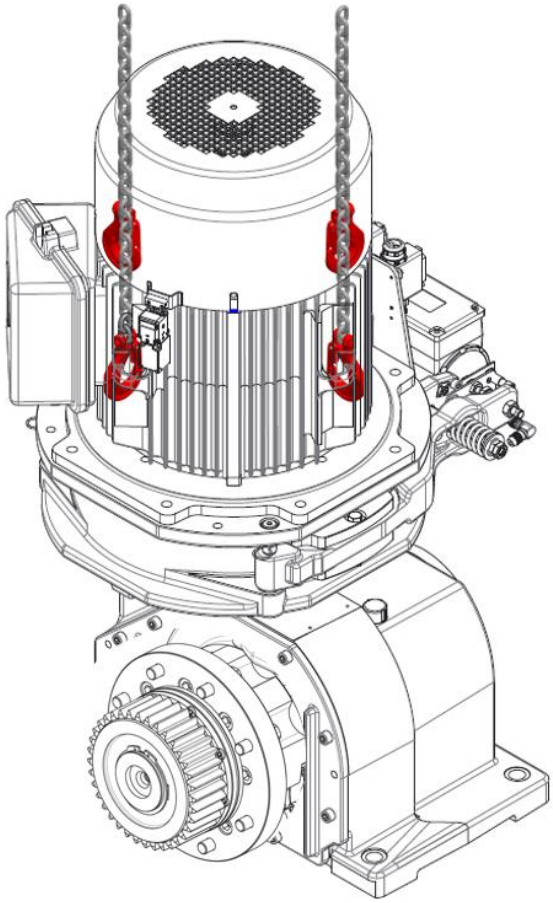

Fig. 6: Suspension points

NOTE

When selecting lifting devices and slings, consider the total weight of the drive. This depends on the motor power. Please refer to the relevant technical data sheet for the applicable total weight.

5.2 Storage

The drive must not be stored outdoors or exposed to the weather without protection.

Preservation measures are necessary if the drive is not used for a longer period of time or is put into operation at a later date. The extent of the preservation measures depends on the storage time.

Storage time <3 months:

No special preservation measures are required.

Observe the following notes before installing the drive:

⇨ Check all brake components (remove light rust on the brake drum by braking).

⇨ Turn the drive by hand (for even grease distribution in the motor bearings).

Storage time <18 months:

For a longer storage time from the beginning (option when ordering), the drive is preserved at the factory and packed in a moisture-repellent (yellow) foil.

If this is not the case, perform the following activities:

⇨ Fill the intermediate gear box ZGS-A (horizontally, flange side up) up to the lower edge of the flange surface of the housing after 6 months of storage at the latest. Close the flange surface with the cover.

⇨ Fill the gear box ECS 2-15.1-A with oil up to the upper screw plug after 6 months of storage at the latest.

ATTENTION

Only refill oil of the same type. The oil type can be found on the yellow sticker.

⇨ After filling, pack the drive in moisture-repellent foil (available from the manufacturer).

⇨ Store the drive in dry conditions.

Observe the following notes before installing the drive:

⇨ Drain the oil completely from intermediate gear box ZGS-A. After assembly with gear box ECS 2-15.1-A filling up to the specified oil level.

⇨ Reduce the oil level of gear box ECS 2-15.1-A. Drain the oil to the prescribed level.

⇨ Check all brake components (remove light rust on the brake drum by braking).

⇨ Turn the drive by hand (for even grease distribution in the motor bearings).

Storage time >18 months:

If the drive is not preserved at the factory, the same activities as described under "Storage time <18 months" must be performed.

⇨ Store the drive in dry conditions.

Observe the following notes before installing the drive:

⇨ Change the gear oil completely. Observe the oil type and fill level.

⇨ Check all brake components (remove light rust on the brake drum by braking).

⇨ Turn the drive by hand (for even grease distribution in the motor bearings).
If the drive can only be turned with stiffly by hand, the motor bearings may need to be replaced.

NOTE

If the drive is stored for a longer period of time, the manufacturer's warranty may be terminated. If further warranty is desired, the drive can be returned to the manufacturer for a fee required overhaul (possibly replacement of bearings, etc.) and for the above measures to be carried out.

Damage that has occurred due to improper handling is not subject to liability for defects.

6. Set up / assembly

6.1 Basics

Basically, it must be ensured that the escalator truss in which the drive is installed must be checked by calculations.

The escalator truss must have sufficient rigidity to counteract possible bending and torsional forces throughout the load range.

6.2 Installing of intermediate gear box

Assembly intermediate gear box with main shaft:

Slide the involute spline from the intermediate gear box onto the involute spline of the main shaft of the escalator. Grease the involute spline with high-temperature paste before sliding it on (recommendation: KLUEBER – UNIMOLY HTC METALLIC). Ensure exact alignment of the two involute splines with each other and exact alignment of the shaft axes to avoid damage when sliding on. Screw the main shaft to the intermediate gear box using the threaded holes provided. In addition, the intermediate gear box is pinned to the main shaft. The holes are predrilled to Ø12mm (6 pieces). Drill out these holes to Ø16mm and mount the corresponding dowel pins.

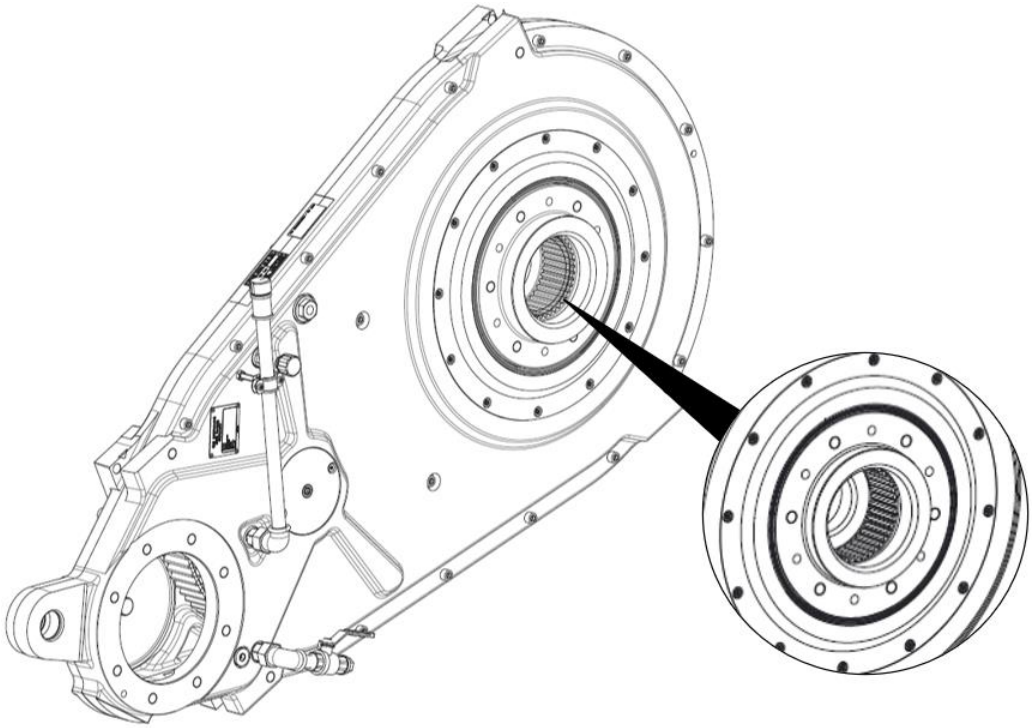

Fig. 7: Involute spline of the intermediate gear box

Assembly of the intermediate gear box with radial spherical plain bearing:

A radial spherical plain bearing must be mounted in the bore on the housing (GE 25). This bearing is used to absorb / support the torque and for axial movement compensation.

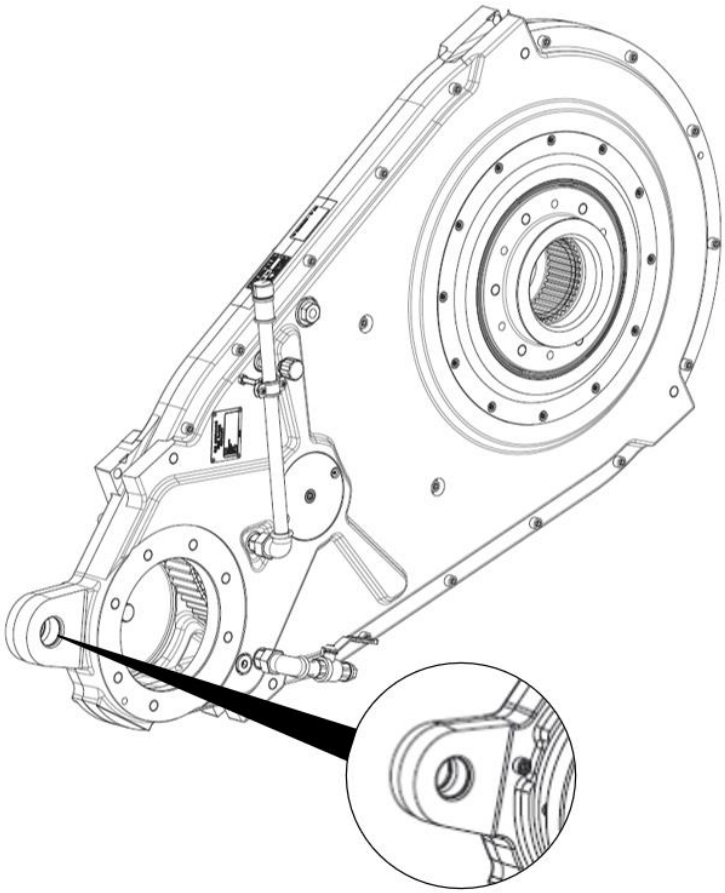

Fig. 8: Assembly radial spherical plain bearing

Replacing sealing screw with venting screw:

NOTE

With sealing screws the intermediate gear box is not vented. If it is put into operation sealed in this way, overpressure can occur in the housing, with the possible consequence of leakage and oil leakage at the radial shaft seals. The oil dipstick does not function as a seal for the intermediate gear box.

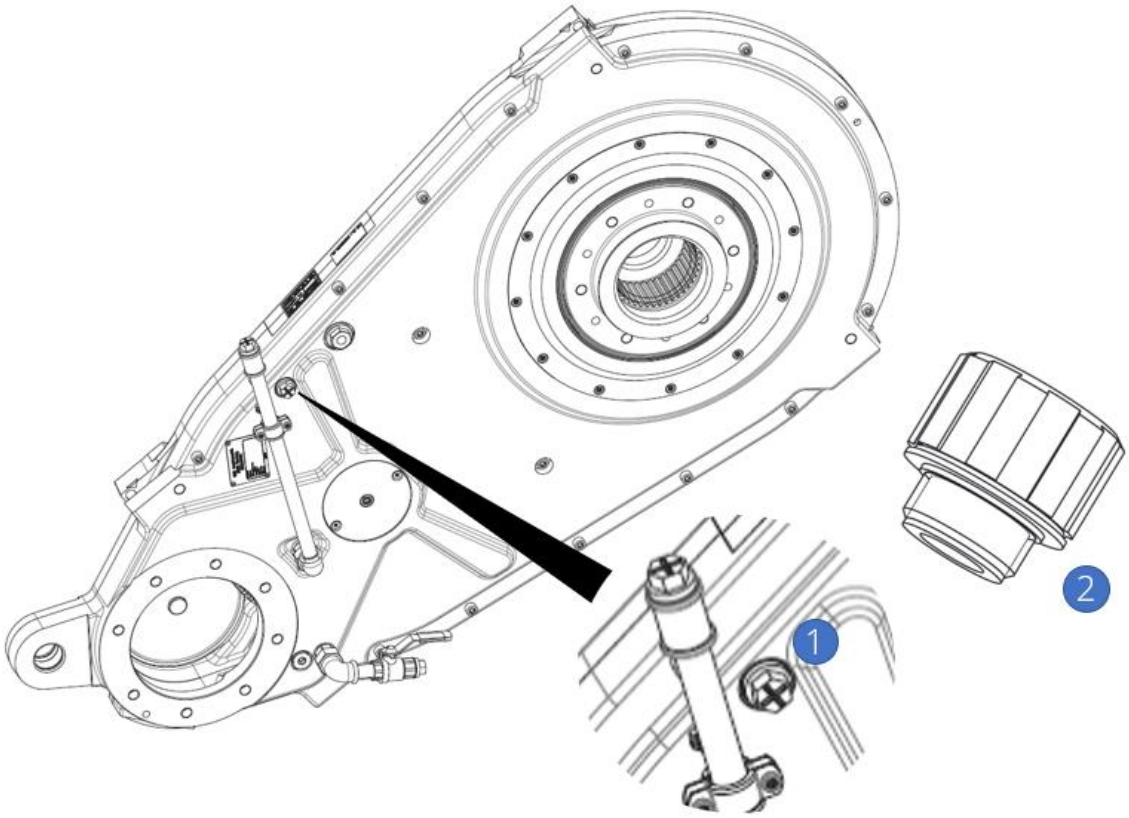

Fig. 9: Replacing sealing screw with venting screw

1 Sealing screw 2 Venting screw

⇨ Unscrew the sealing screw and screw in the venting screw hand-tight.

⇨ Keep the sealing screw for possible later transport.

NOTE

The intermediate gear box is not filled with oil for transportation. After assembly with the gear box ECS 2-15.1-A and before commissioning, oil must be added. The intermediate gear box must not be operated without gear oil.

Replacing sealing screw with oil dipstick:

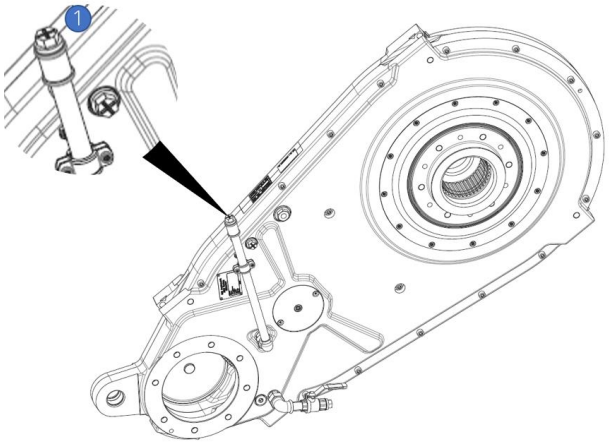

Fig. 10: Replacing sealing screw with oil dipstick

1 Sealing screw

⇨ Unscrew the sealing screw.

⇨ Assemble the oil dipstick, as described below.

⇨ Keep the sealing screw for possible later transport.

Assembly oil dipstick:

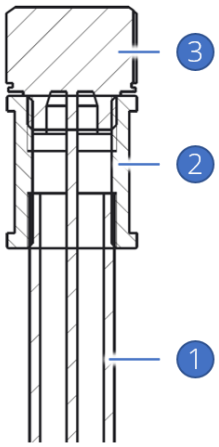

Fig. 11: Assembly oil dipstick

1 Oil pipe 2 Socket

3 Oil dipstick

⇨ Screw the oil dipstick hand-tight into the socket.

6.3 Installing and connecting the drive to the intermediate gear box

Assembly:

CAUTION

The drive may only be put into operation if it has been correctly mounted as described in the installation instructions.

NOTE

The drive may only be lifted using suitable lifting devices.

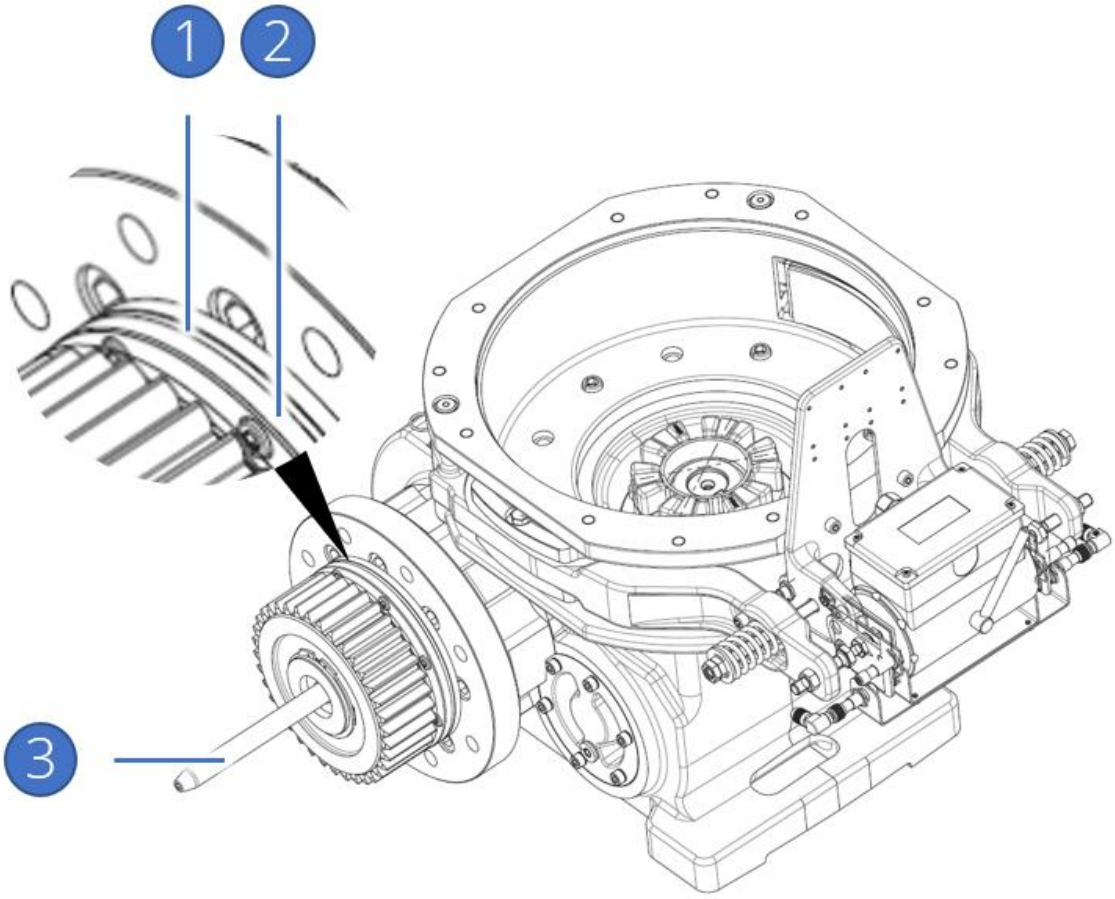

Fig. 12: Presence, greasing of sealing ring

- ⇨ The gear box will be assembled without the motor.
- ⇨ To remove the motor, proceed as described under “Replacing the motor”.
- ⇨ Check whether the O ring (1) is present.
- ⇨ Grease the centering collar (2) with O ring (1) for easier assembly.
- ⇨ Screw the guide bolt (3) hand-tight into the output shaft
  (guide bolt, article number: 29901781)

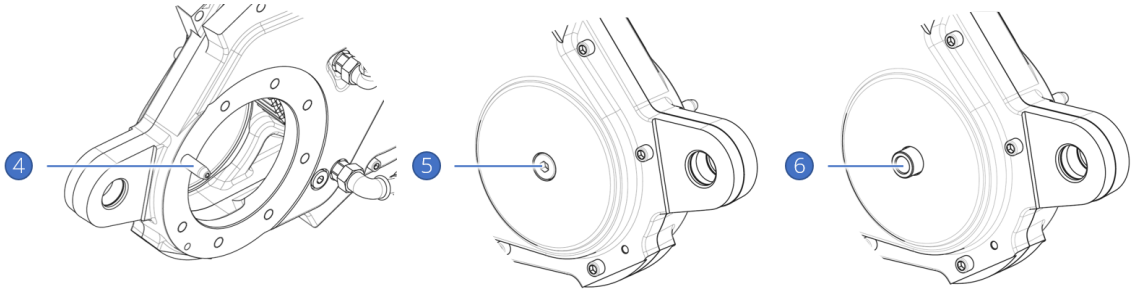

Fig. 13: mounting assembly devices

⇨ Screw the guide pin (4) hand-tight into the threaded hole on the housing of the intermediate gear box (guide pin, article number: 29901782)

⇨ Remove the sealing screw (5) on the back of the intermediate gear box housing.

⇨ Screw the guide bushing (6) hand-tight as far as it will go into the threaded hole on the intermediate gear box housing (guide bushing, article number 29901783).

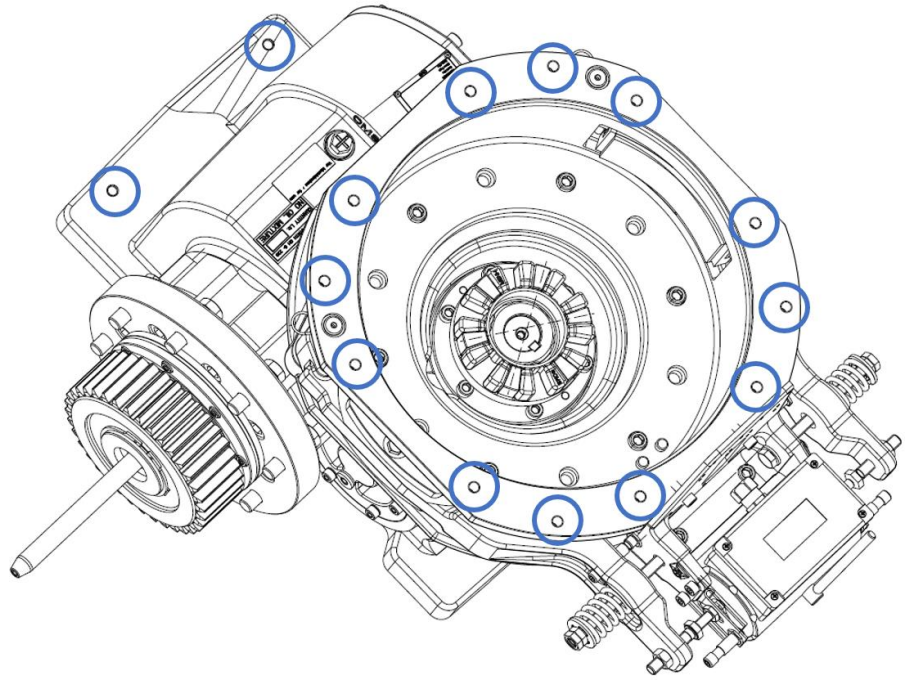

Fig. 14: Suspension points

⇨ Lift the gear box using at least 3 of the available lifting points.

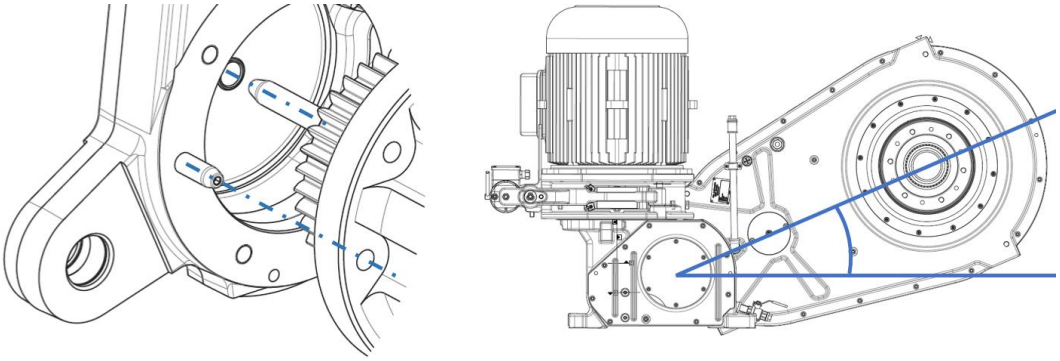

Fig. 15: Alignment of both gear boxes to each other

⇨ ATTENTION: It is essential to position the guide bolt in alignment with the guide bushing. The screw-on hole in the flange must be aligned with the guide pin.

⇨ ATTENTION: Select the correct holes for both gear boxes in relation to each other so that the motor axis is vertical after final assembly of the escalator. The position depends on the installation angle of the intermediate gear box.

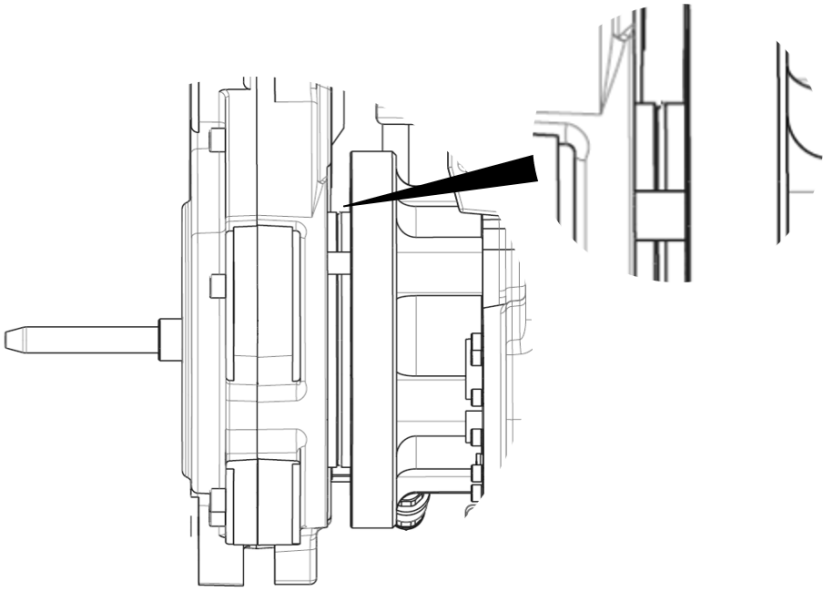

Fig. 16: Pre-assembly

⇨ Carefully push the gear box ECS 2-15.1-A to the intermediate gear box.

⇨ ATTENTION: Align the toothing of the output gear of the ECS 2-15.1-A with the toothing of the intermediate gear in the intermediate gear box (turn the coupling at the ECS 2-15.1-A input drive shaft). Make sure that the two gears do not hit against each other to avoid damage.

⇨ Push the ECS 2-15.1-A into the intermediate gear box until the centering collar of the ECS 2-15.1-A is seated on the hole of the intermediate gear box ZGS-A.

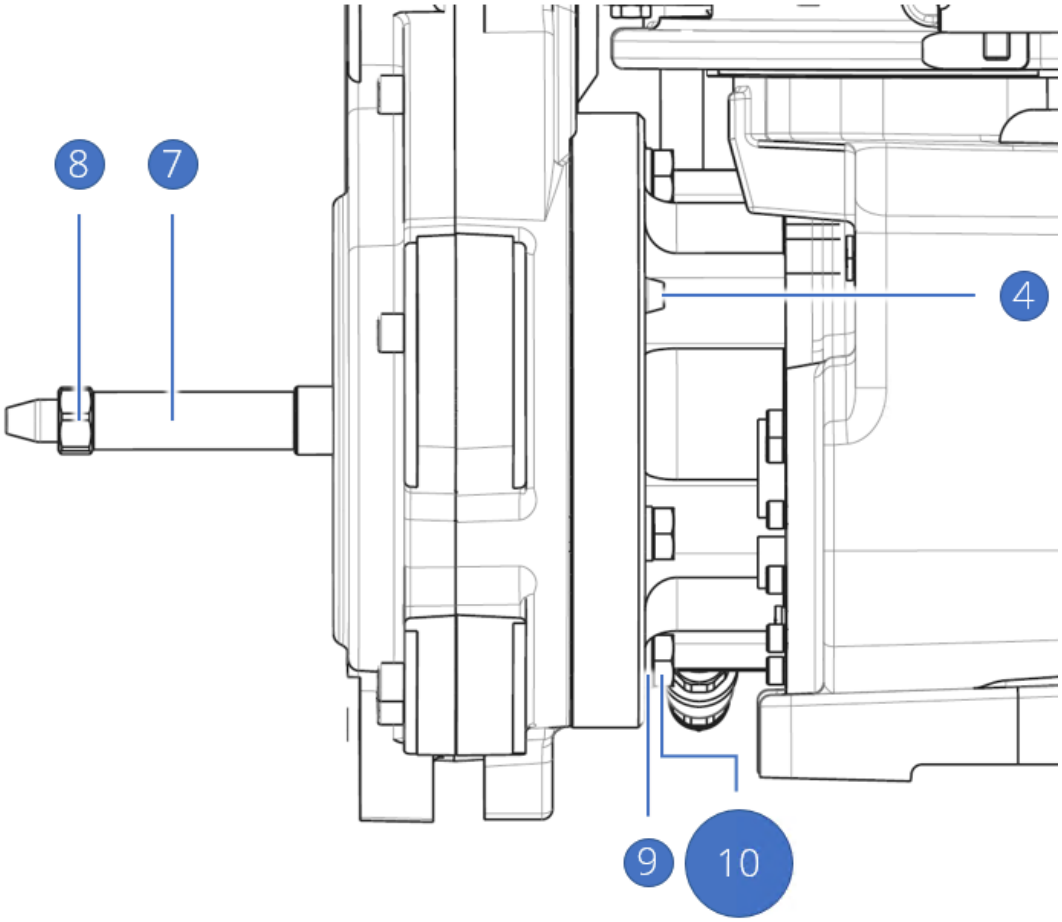

Fig. 17: Final assembly

- ⇨ Mount the bushing (7) onto the guide bolt and then the nut M20x1.5 (8) (bushing, article number: 29901786).
- ⇨ Screw the nut onto the guide bolt. Thus, the ECS 2-15.1-A will be pulled slowly into the intermediate gear box until the flange is in contact with the housing. Make sure that the O-ring is not damaged when pulling it on.
- ⇨ To fasten the ECS 2-15.1-A to the intermediate gear box use the supplied M16x1.5x55mm screws (9) + NORDLOCK washers (10). Apply LOCTITE 243 threadlocker to the thread of the screws.
- ⇨ Screw 7 of the supplied M16x1.5x55mm screws + NORDLOCK washers hand-tight into the holes in the flange.
- ⇨ Then remove the guide pin (4).
- ⇨ Screw the 8th screw + NORDLOCK washer hand-tight into the hole.
- ⇨ Tighten the screws crosswise with a tighten torque of 200 Nm.

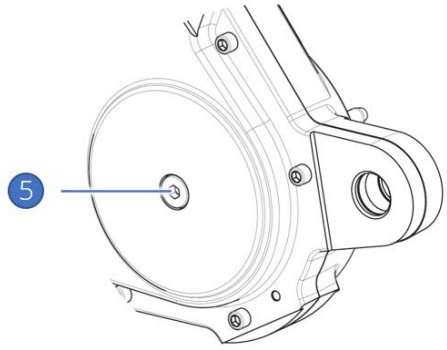

Fig. 18: Mounting sealing screw

- ⇨ The ECS 2-15.1-A can now be lowered from the crane.
- ⇨ Remove the nut M20x1.5mm, bushing and the guide bolt.
- ⇨ Close the intermediate gear box again with the sealing screw (5).
- ⇨ Mount the motor, proceed as described under “Replacing the motor”.

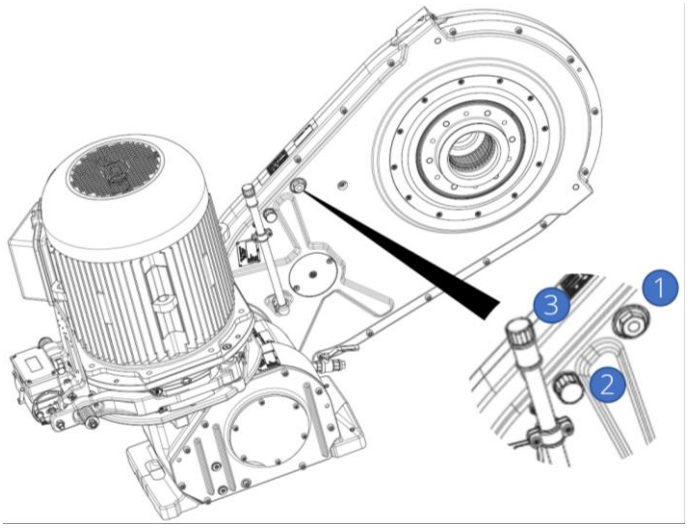

Fig. 19: Fill with gear oil

- ⇨ Fill the intermediate gear box with gear oil KLUEBERSYNTH GH6-220 (approx. 8.5 liters) via the filler opening.
- ⇨ To do this, unscrew the sealing screw (1) from the housing. Use a suitable filler neck for filling.
- ⇨ ATTENTION: Before filling with oil, the two sealing screws must be replaced by venting screw (2) and oil dipstick (3).
- ⇨ After filling, close the filler opening with the sealing screw (1).
- ⇨ Check the oil level.

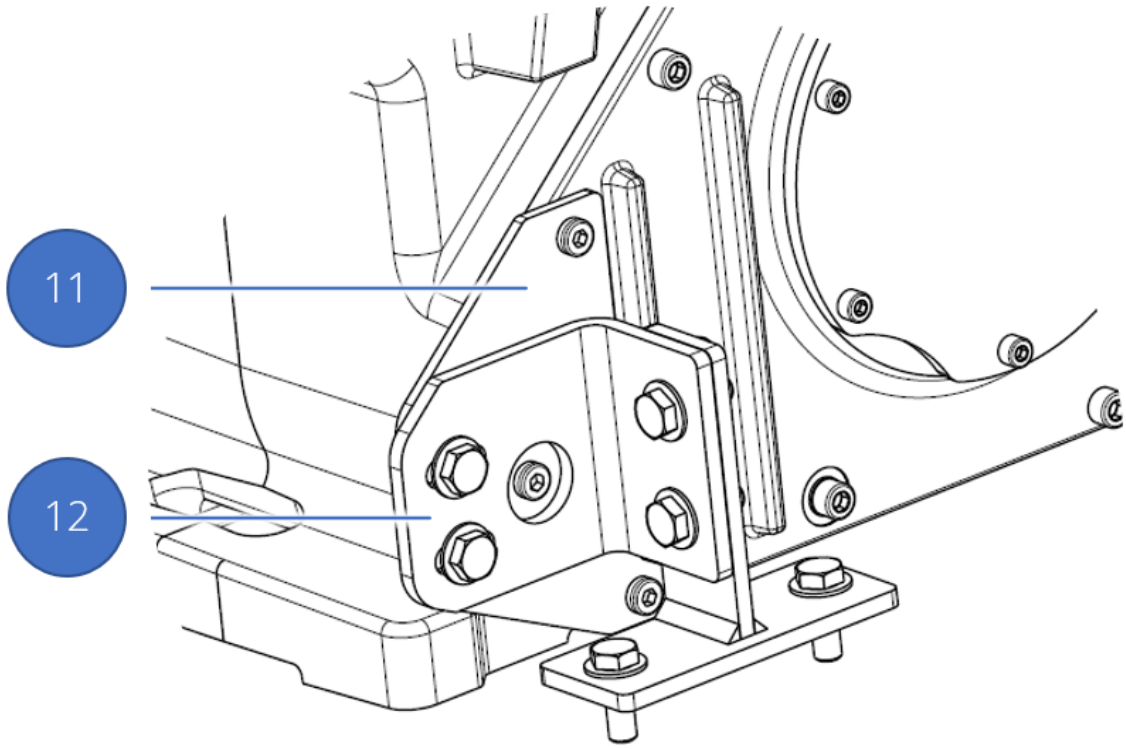

Fig. 20: Mounting support

⇨ After mounting the gear boxes together and filling the intermediate gear box with oil, the ECS 2-15.1-A must also be fixed to the frame of the escalator. This serves to absorb forces during operation.

⇨ To do this, connect the pre-assembled screw-on plate (11) on the ECS 2-15.1-A to the support (12) in the escalator frame using suitable screws.

⇨ ATTENTION: The ECS 2-15.1-A must not be placed under tension when screwing it together. The screwing together is only carried out once the motor has been mounted and the oil has been filled to the ZGS-A.

Install of oil dipstick:

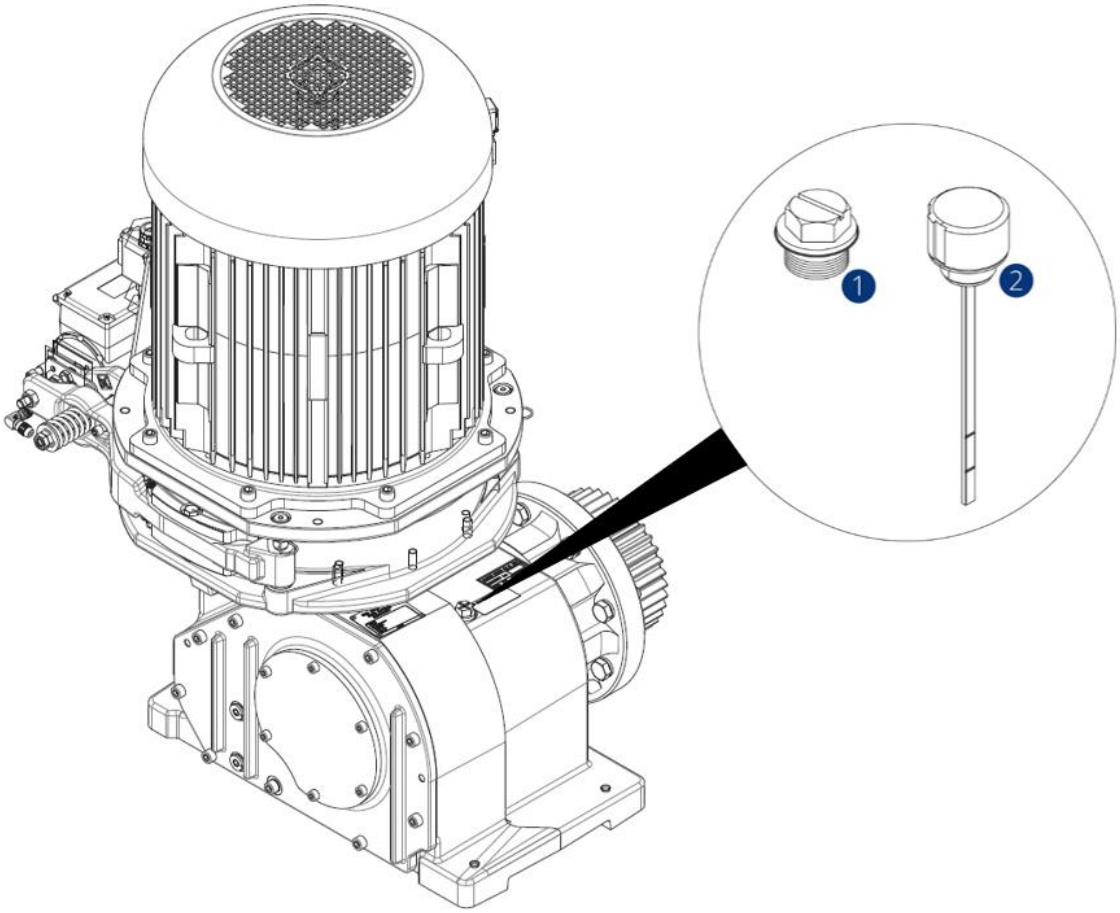

Fig. 21: Insert oil dipstick

1	Sealing screw	2	Oil dipstick

⇨ Replace the sealing cap on the gear housing with the supplied oil dipstick.

⇨ Keep the sealing screw in an easy-to-find location for possible later transport.

⇨ Check oil level.

NOTE

The gear box is sealed oil-tight for transport. The gear box is not vented when the sealing screw is fitted. If it is put into operation sealed in this way, overpressure can occur in the housing, with the possible consequence of leakage and oil leakage at the radial shaft seals. The oil dipstick does not function as a seal for the gear box.

Special climate conditions:

Observe the following notes when using the drive in particularly cold or warm environments:

If the ambient temperature around the drive falls below the dew point, motor heating is mandatory.
At an ambient temperature ≤ -20 °C, a gear box heater (oil) is mandatory.
At an ambient temperature ≥ 45 °C, fans must be provided to blow colder air from the step band into the machine room.

Electrical connection:

DANGER

Electrical hazard due to direct contact with live parts.

- All work may only be carried out by qualified personnel in the disconnected state and secured against reconnection.
- The regulations of the motor manufacturer must be observed.
- Observe the safety rules for working on electrical equipment.

Connecting motor:

⇨ The mains connection of the motor is made according to the circuit diagram in the junction box of the motor.

NOTE

It is recommended to operate the motors using a frequency inverter.

Sensors:

ATTENTION

Interference voltage from the motor connection can damage the sensors. Observe a minimum distance of 100 mm between motor and sensor cables.

The cables of the inductive proximity switches should be shielded. The maximum permissible rate of voltage rise must not exceed δU/δt≤500V/µs.

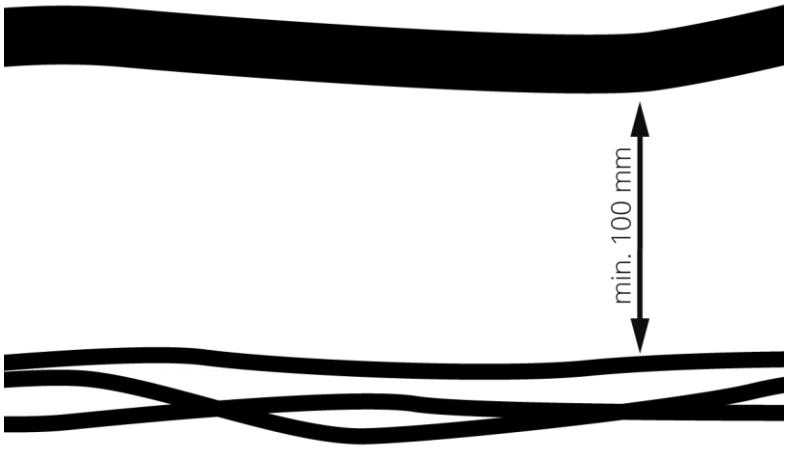

Fig. 22: Minimum distance motor and sensor cables

Double-acting spreader solenoid:

The supply voltage is generally 230 V AC (±10 % max.).

The respective electrical connections, either via WIELAND plug connection or junction box, are defined in a separate connection diagram.

7. Operation

WARNING

The regulations for operation, maintenance and inspection in accordance with the valid safety regulations for escalator construction, as well as other relevant regulations, must be strictly observed.

The correct operation of the drive in terms of safety is the sole responsibility of the escalator operator.

8. Servicing/maintenance

8.1 Overview maintenance work/troubleshooting

Maintenance work:

Activity	Interval
Check oil level	3 months
Oil change	up to 40.000 operating hours, but after 5 years at the latest
Checking the bearings (acoustic)	according to the maintenance interval of the escalator, but at least 1x per year
Checking the brake	according to the maintenance interval of the escalator, but at least 1x per year
Checking the electrical cables (tight fit, chafing points, etc.)	according to the maintenance interval of the escalator, but at least 1x per year
Cleaning the drive	as needed, but at least 1x per year
Checking the safety equipment (presence, function etc.)	according to the maintenance interval of the escalator, but at least 1x per year
Checking coupling buffer	every 2 years
Replacing coupling buffer	every 4 years

Tab. 4: Maintenance work

Malfunctions/Troubleshooting:

Malfunction	Possible cause	Solution
unusual, irregular running noises	# Noise rolling/grinding: → Bearing damage # Noise knocking: → Irregularities in the toothing	Contact customer service
Oil leaking	# Seal defective	Contact customer service
Brake does not switch	# Wiring not correct	Check electrical wiring

Tab. 5: Malfunctions

8.2 Gear box

Check oil level:

DANGER

Risk of burns from hot surfaces and hot oil.
The gear box and gear oil can cause severe burns if they come into contact with the skin at operating temperature.

Check the oil level at every service. To do this, proceed as follows:

⇨ Unscrew the oil dipstick and clean it.

⇨ Screw the clean dipstick into the gear box up to the stop.

⇨ Unscrew the oil dipstick.

⇨ Check the oil level. The oil level must be between the two marks. If the oil level is below the MIN mark, fill it up with oil.

Check oil condition:

Check the condition of the oil at regular intervals.

Inspection interval:

after 10.000 operating hours

after 20.000 operating hours

after that every 5.000 operating hours

To do this, proceed as follows:

⇨ Unscrew the oil dipstick and put a drop on a white paper.

⇨ Compare the color of the oil with the colors on the oil check card.

Fig. 23: Oil check card

ATTENTION

If the oil is discolored dark brown to black, the gear oil must be changed immediately.

Oil change intermediate gear box ZGS-A:

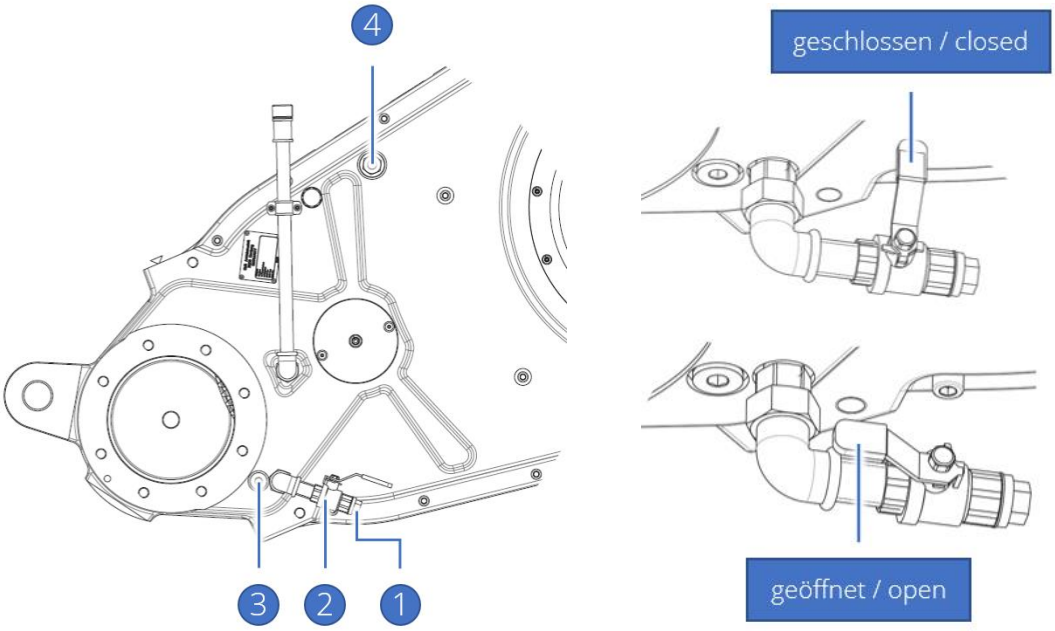

Fig. 24: Oil change intermediate gear box ZGS-A

1	Sealing screw (oil drain valve)	2	Oil drain valve
3	Magnetic screw	4	Sealing screw (filler opening)

Proceed as follows to change the oil:

- ⇨ Place a suitable, sufficiently large container under the oil drain valve (oil quantity is approx. 8.5 liters).
- ⇨ Remove the sealing screw from the drain valve.
- ⇨ Open the drain valve.
- ⇨ After all the oil has drained out, close the oil drain valve again.
- ⇨ Mount the sealing screw in the oil drain valve.
- ⇨ Remove the magnetic screw and clean it, then mount the magnetic screw again.
- ⇨ Fill the oil via the filler opening. To do this, remove the sealing screw (filler opening). Use a suitable filler neck for filling. Observe the fill level.
- ⇨ Filling quantity: approx. 8.5 liters.
- ⇨ Close the filler opening again with the sealing plug.

Oil type according to manufacturer's recommendation:

KLUEBERSYNTH GH 6-220

ATTENTION

Fill only with the specified type of oil. Other oils may only be used after consulting the manufacturer.
Do not mix different oils with each other.

NOTE

Waste oil must never be allowed to enter the ground or water. Remove leaked oil immediately.

Oil change ECS 2-15.1-A:

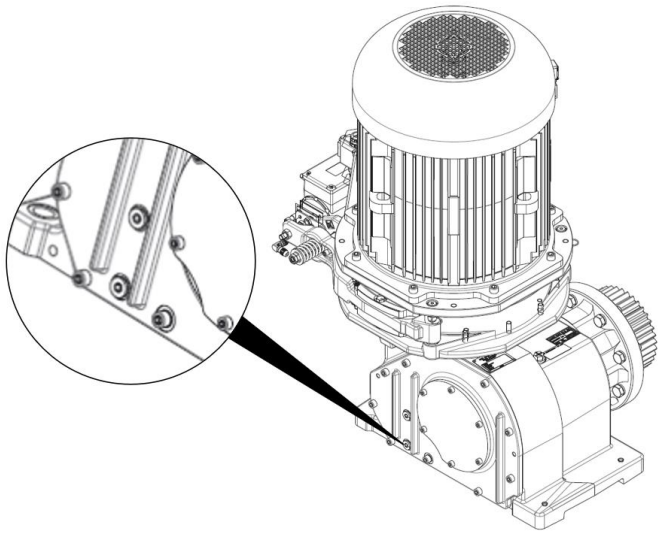

Fig. 25: Oil change ECS 2-15.1-A

Proceed as follows to change the oil:

- ⇨ Place a suitable, sufficiently large container under the oil drain screw (oil quantity is approx. 6 liters).
- ⇨ Carefully open the oil drain screw.
- ⇨ Clean the oil drain screw thoroughly.
- ⇨ After all the oil has drained, screw the oil drain plug firmly back into the drain hole.
- ⇨ Fill in the oil via the hole for the oil dipstick. Observe the fill level.
- ⇨ Filling quantity: approx. 6 liters
- ⇨ Close the filler hole with the oil dipstick.

Oil type according to manufacturer's recommendation:

KLUEBERSYNTH GH 6-220

ATTENTION

Fill only with the specified type of oil. Other oils may only be used after consulting the manufacturer.
Do not mix different oils with each other.

NOTE

Waste oil must never be allowed to enter the ground or water. Remove leaked oil immediately.

8.3 Brake

Checking the smoothness of the brake levers:

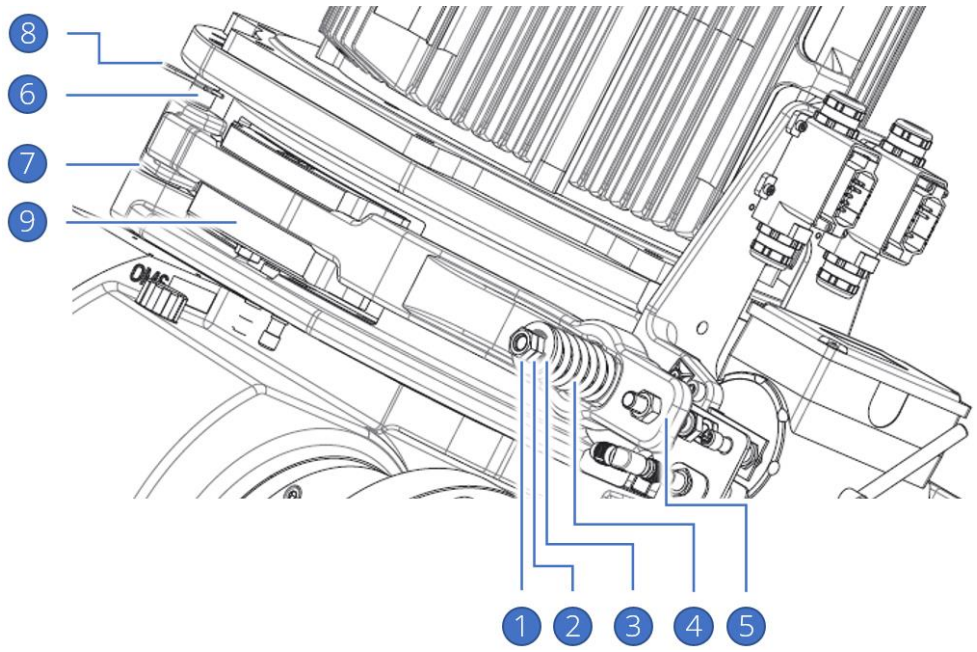

Fig. 26: Checking brake lever

1	Counter nut	2	Clamping nut
3	Spring seat	4	Compression spring
5	Brake lever	6	Pivot pin
7	Washer	8	Spring cotter pin
9	Brake shoe		

Within the usual maintenance intervals of the escalator, check the smooth operation of the brake levers and brake shoes, as follows:

⇨ Loosen the counter nut.

⇨ Unscrew the counter nut and the clamping nut from the threaded rod.

⇨ Remove the spring seat and the compression spring.

⇨ Open each brake lever beyond the threaded rod. The brake lever must open and close smoothly.

⇨ With the brake lever open, swivel the brake shoe. It must be possible to move the brake shoe smoothly.

If the brake lever is stiff:

- ⇨ Pull the spring cotter pin out of the pivot pin, then remove the pivot pin from the brake lever.
- ⇨ Pay attention to the washer.
- ⇨ Grease the pivot pin (MOLYKOTE Longtherm 2 Plus).
- ⇨ Mount in reverse order.
- ⇨ Adjust the braking torque again.

If the brake shoe is stiff:

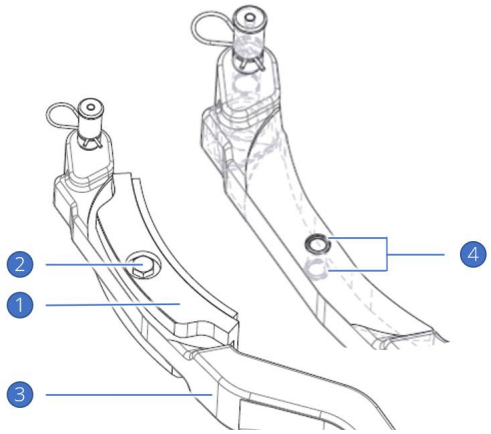

Fig. 27: Checking brake shoe

1	Brake shoe	2	Bolt
3	Brake lever	4	O- rings

- ⇨ Loosen the bolt and remove it from the brake shoe.
- ⇨ Carefully pull the brake shoe off the brake lever. Pay attention to the O- rings on both sides of the brake lever.
- ⇨ Remove the O- rings from the brake lever.
- ⇨ Grease both sides of the brake lever in the area of the brake shoe (MOLYKOTE Longtherm 2 Plus).
- ⇨ Mount the O- rings in the circular pockets provided in the brake lever.
- ⇨ Carefully push the brake shoe onto the brake lever. Take care not to crush the O- rings.
- ⇨ Mount the bolt, tightening torque 30 Nm.
- ⇨ Mount the brake lever in the reverse order like described under "If the brake lever is stiff".
- ⇨ Adjust the braking torque again.

Check brake lining thickness:

Fig. 28: Measure brake lining

Within the usual maintenance intervals of the escalator, check the brake lining thickness of the brake levers. Open the brake lever and measure the thickness of the brake lining. Thickness X: >1 mm.

NOTE

If the wear limit is reached on one brake shoe, both brake shoes must be replaced with brake shoes with new brake linings.

Checking the brake lever stroke:

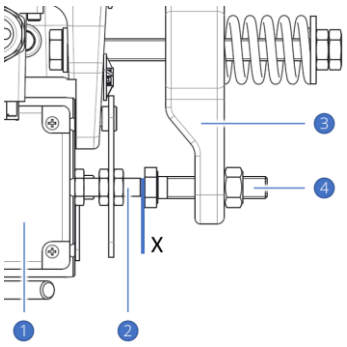

Fig. 29: Checking brake lever stroke

1	Double-acting spreader solenoid	2	Plunger
3	Brake lever	4	Adjustment bolt

Proceed as follows:

⇨ Press the plunger into the double-acting spreader solenoid.

⇨ Check the distance between adjustment bolt (head) and plunger using a feeler gauge (dimension X: 0.5 mm – 1,5 mm / basic setting 1.5 mm).

ATTENTION

The brake lever stroke must not be less than 0.5 mm.
At the latest when 0.5 mm stroke is reached, it must be readjusted to a maximum of 1,5 mm.

Adjustment of the brake lever stroke:

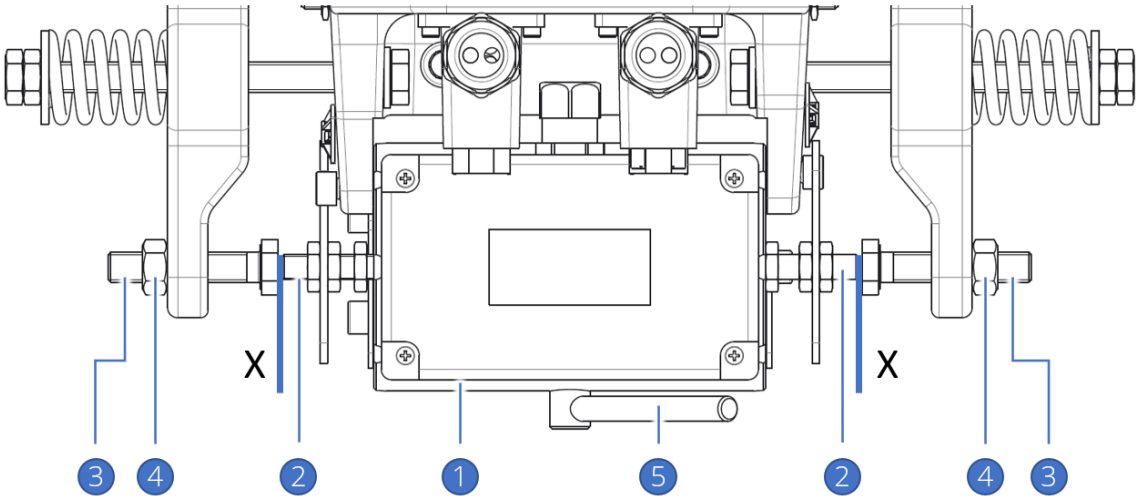

Fig. 30: Adjust brake lever stroke

1	Double-acting spreader solenoid	2	Plunger
3	Adjustment bolt	4	Counter nut
5	Release lever		

Proceed as follows:

- ⇨ Loosen the counter nut.
- ⇨ Press the plunger into the double-acting spreader solenoid.
- ⇨ Adjust the brake lever stroke using the adjustment bolt and feeler gauge.
- ⇨ Dimension X: 1,5 mm.
- ⇨ Tighten the counter nut.
- ⇨ After the setting procedure, control the opening of the brake mechanically by operating the release lever on the double-acting spreader solenoid and electrically via the system control.

ATTENTION

When turning the motor using the handwheel and simultaneously release of the double-acting spreader solenoid, no grinding noises must be heard.

Changing the brake levers:

WARNING

When the brake levers are removed, there is no longer any holding force given. The escalator starts to move. Shut down the escalator system and secure it. Observe the escalator manufacturer's instructions for this.

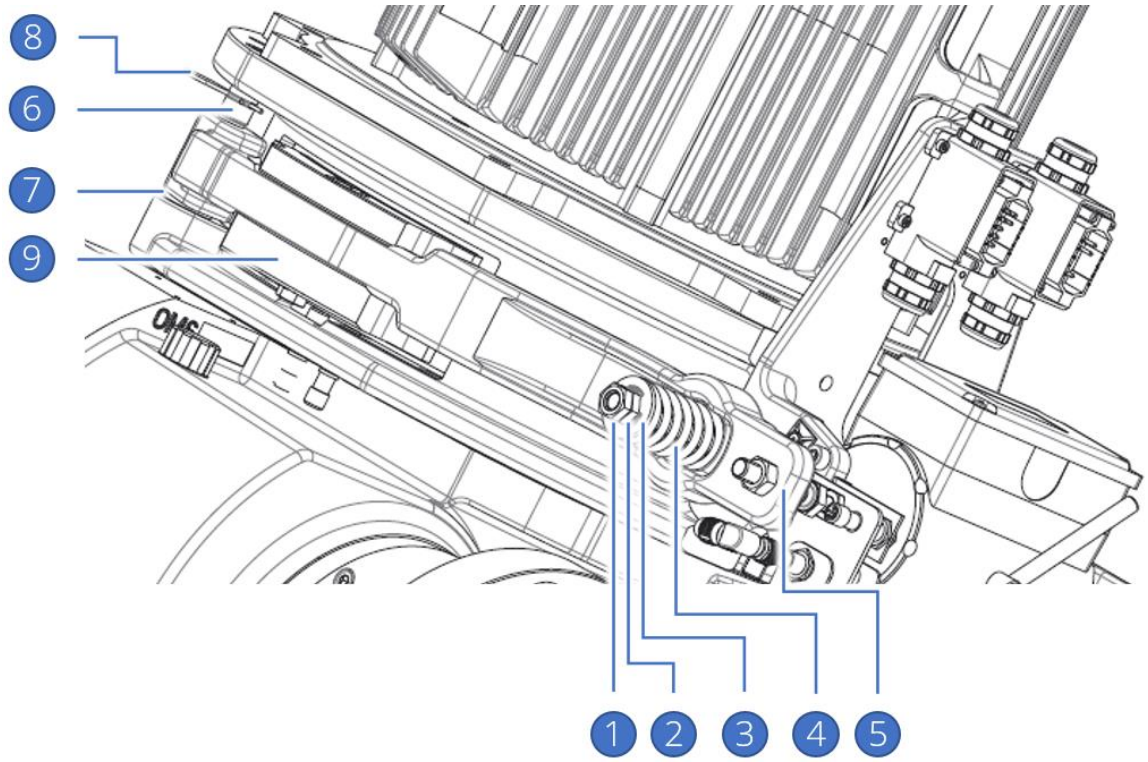

Fig. 31: Changing the brake levers

1	Counter nut	2	Clamping nut
3	Spring seat	4	Compression spring
5	Brake lever	6	Pivot pin
7	Washer	8	Spring cotter pin
9	Brake shoe		

Proceed as follows:

⇨ Loosen the counter nut.

⇨ Unscrew the counter nut and the clamping nut from the threaded rod.

⇨ Remove the spring seat and the compression spring.

⇨ Open the brake lever beyond the threaded rod.

⇨ Pull the spring cotter pin out of the pivot pin, then remove the pivot pin from the brake lever.

⇨ Pay attention to the washer.

⇨ Mount in reverse order.

⇨ Adjust the braking torque again.

Changing the brake shoes:

WARNING

When the brake levers are removed, there is no longer any holding force given. The escalator starts to move. Shut down the escalator system and secure it. Observe the escalator manufacturer's instructions for this.

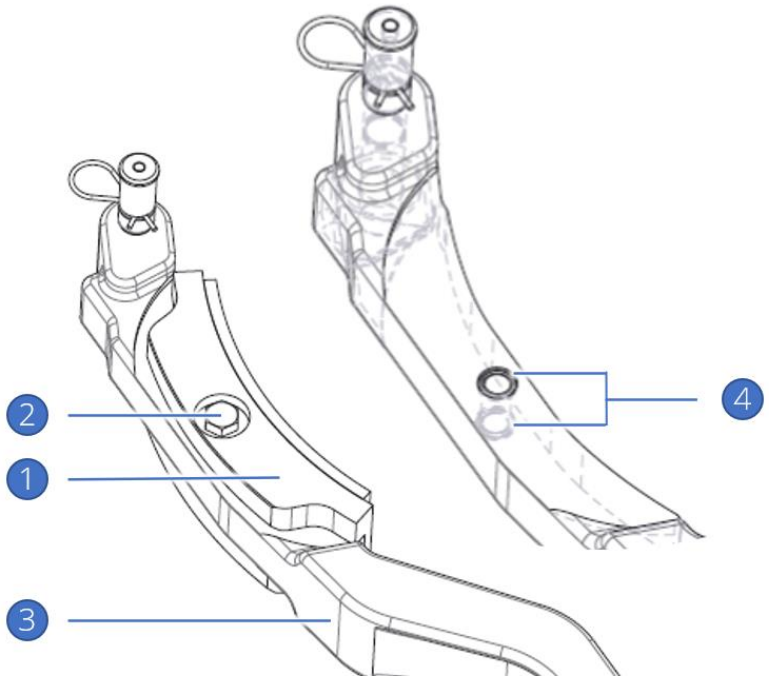

Fig. 32: Changing the brake shoes

1	Brake shoe	2	Bolt
3	Brake lever	4	O- rings

The brake shoes can only be disassembled when the brake lever is open, to this proceed as described under “Changing the brake levers”.

Proceed as follows for disassembly the brake shoes.

⇨ Loosen the bolt and remove it from the brake shoe.

⇨ Carefully pull the brake shoe off the brake lever. Pay attention to the O- rings on both sides of the brake lever.

⇨ Remove the O- rings from the brake lever.

⇨ Grease both sides of the brake lever in the area of the brake shoe (MOLYKOTE Longtherm 2 Plus).

⇨ Mount the new O- rings in the circular pockets provided in the brake lever.

⇨ Carefully push the new brake shoe onto the brake lever. Take care not to crush the O- rings.

⇨ Mount the bolt, tightening torque 30 Nm.

⇨ Mount the brake lever in the reverse order like described under "Changing the brake levers".

⇨ Adjust the braking torque again.

WARNING

With new brake linings, the required braking torque is only achieved after repeated short braking with the selected spring preload. Before this, the holding force is not fully given, slipping is possible.

NOTE

Always replace the brake levers in pairs.

Adjustment of the brake:

⇨ Check the functionality of the brake before commissioning the escalator. If the preset braking torque does not correspond to the operating conditions, you can adjust it.

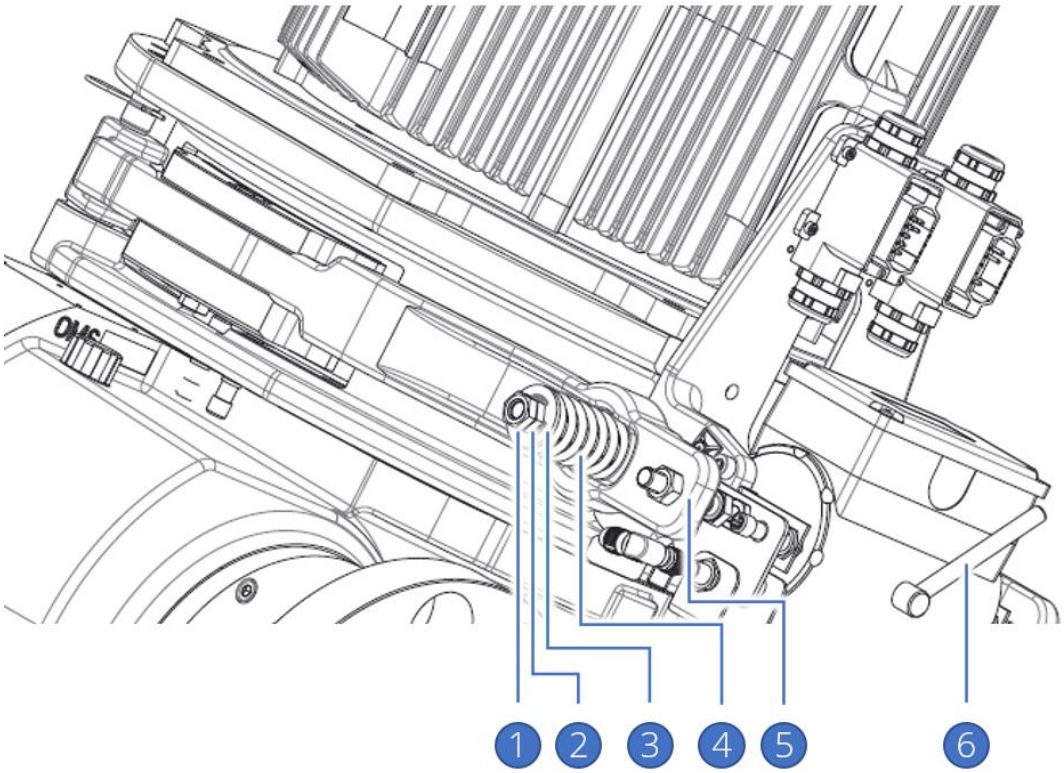

Fig. 33: Adjustment of the braking torque

1	Counter nut	2	Clamping nut
3	Spring seat	4	Compression spring
5	Brake lever	6	Pivot pin

Proceed as follows:

- ⇨ With closed brake, loosen the counter nut on the threaded rod.
- ⇨ Turning the clamping nut changes the preload of the compression spring.
  Clockwise rotation increases the preload.
  Counterclockwise rotation reduces the preload.
- ⇨ Always adjust the preload of the compression spring evenly on the respective opposite brake levers.
- ⇨ Tighten the counter nut again after adjusting the braking torque.
- ⇨ Control the opening of the brake mechanically by operating the release lever on the double-acting spreader solenoid and electrically via the system control.

ATTENTION

When turning the motor using the handwheel and simultaneously release of the double-acting spreader solenoid, no grinding noises must be heard.

Adjustment of the sensors – brake function:

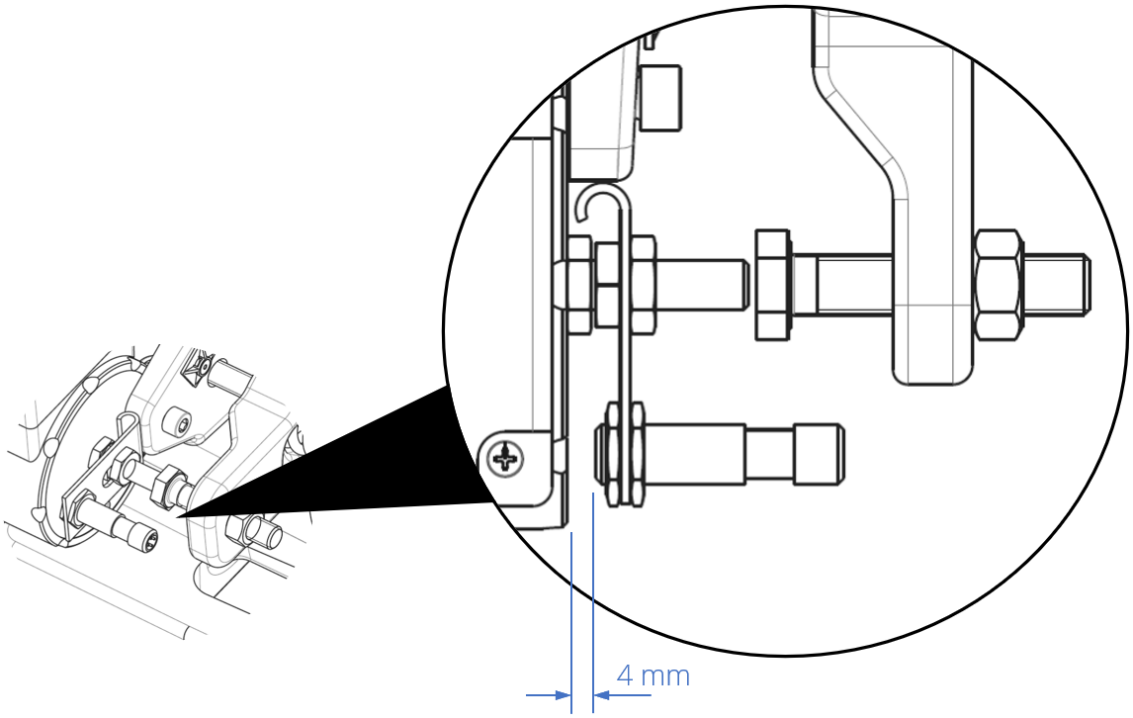

Fig. 34: Sensor brake function

⇨ The sensor is mounted on a bracket on the plunger. The sensor moves away from the double-acting spreader solenoid when the brake is opened.

⇨ The sensor must be mounted at a distance of 4 mm from the double-acting spreader solenoid. The sensors must be adjusted when the brake is closed (on both sides).

Adjustment of the sensors – speed monitoring:

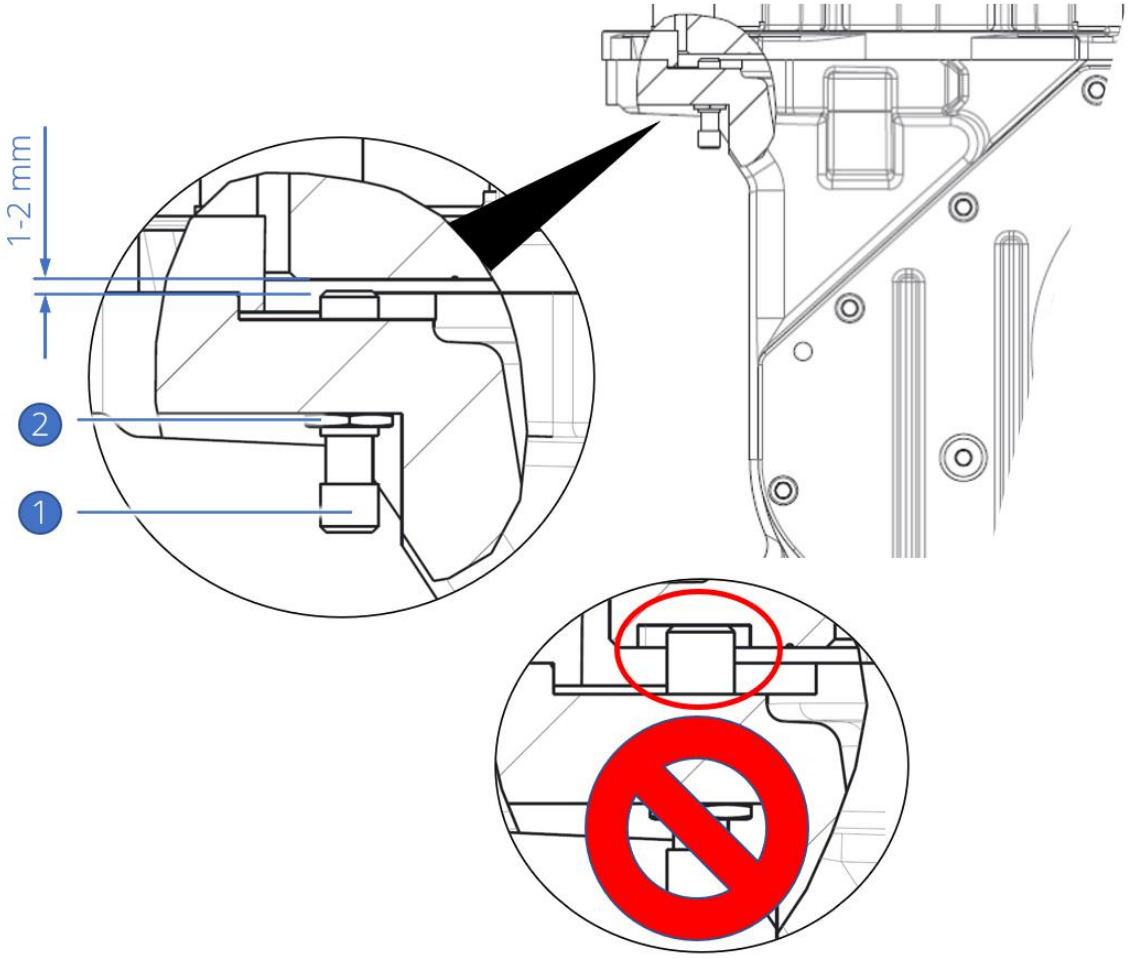

Fig. 35: Sensor speed monitoring

- ⇨ Carefully screw in the sensor as far as it will go by the brake drum.
- ⇨ Then unscrew the sensor again by at least one to two turns to adjust the distance from 1 to 2 mm.
- ⇨ CAUTION:
  When screwing in the sensor, make sure that the sensor is not screwed to one of the grooves. This will result in the sensor colliding with the brake drum after adjustment.
- ⇨ Tighten the counter nut, tightening torque max. 15Nm.

8.4 Motor

NOTE

It is recommended to operate the motors using a frequency inverter.

Motor replacement:

WARNING

When the brake levers are removed, there is no longer any holding force given. The escalator starts to move. Shut down the escalator system and secure it. Observe the escalator manufacturer's instructions for this.

WARNING

Danger when lifting the motor.

- The motor may only be lifted using the eyelets provided for this purpose.

CAUTION

Danger of burns on hot surfaces. Allow the motor to cool down before starting work.

NOTE

A coupling with flexible coupling buffer is arranged between the motor and the gear box.

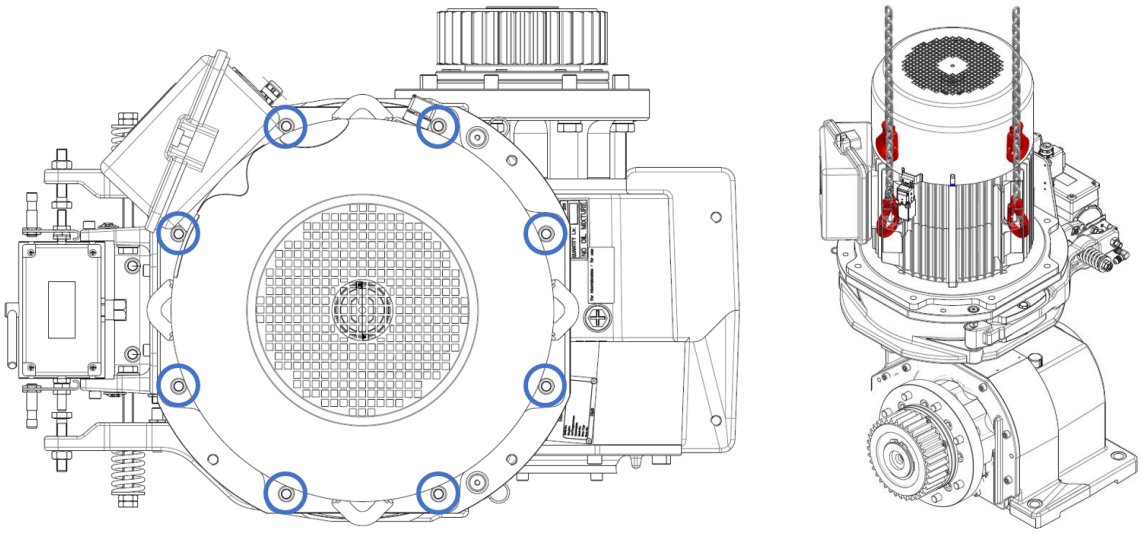

Fig. 36: Motor replacement

Proceed as follows:

- ⇨ Open the brake levers until the brake linings are no longer in contact with the brake drum.
- ⇨ Loosen and disassemble the motor mounting screws (8 screws around the motor flange).
- ⇨ Lift the motor using the lifting devices provided for this purpose.
- ⇨ Assembly of the components takes place in reverse order. When mounting the motor, ensure that the claw coupling in the brake drum is correctly positioned in relation to the claw clutch on the gear box. Risk of crushing the coupling buffer. Motor mounting bolts tightening torque 80Nm.
- ⇨ Electrical wiring of the motor as shown in the junction box.

Check and replacement of the coupling buffer:

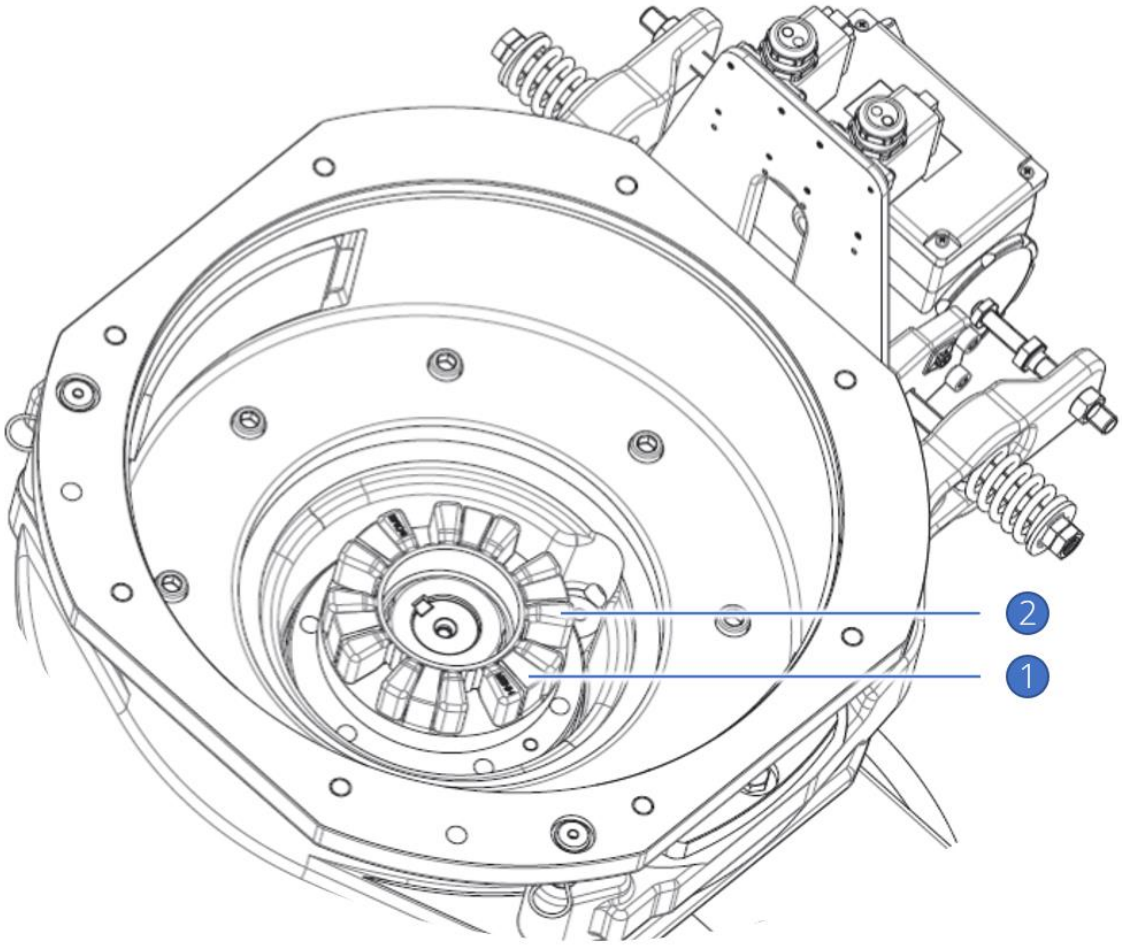

Fig. 37: Replacement coupling buffer

1	Claw coupling	2	Coupling buffer

Proceed as follows:

- ⇨ To check / replace the coupling buffer, it is necessary to lift the motor off the gear box.
- ⇨ To do this, proceed as described under “Motor replacement”.
- ⇨ Check the coupling buffer for wear and cracking.
  Replace the coupling buffer if is worn or cracked.

9. Disassembly/disposal

Disassembly of the drive:

- ⇨ Drain the oil from the intermediate gear box ZGS-A. Replace the oil dipstick and the venting screw with the supplied sealing screws.
- ⇨ Replace the oil dipstick of the ECS 2-15.1-A with the supplied sealing screw.
- ⇨ The gear boxes are not sealed oil-tight with oil dipsticks.
- ⇨ For disassembly, proceed in reverse order of assembly.
- ⇨ Mount the cover to the open flange side of the intermediate gear box ZGS-A.

Disposal:

Dispose of all components correctly. Observe the respective country-specific regulations for disposal.

NOTE

Waste oil must never be allowed to enter the ground or water.

Appendix

A1 Applicable documents

The following documents also apply to the drive considered in these installation instructions:

- Technical data sheets
- Safety data sheet KLUEBERSYNTH GH 6-220

Technical data sheet – ZGS-A

Technical changes reserved – Status 11/2024

Input torque, max.	$T_{max.}$=	3.550 Nm
Ratios	i =	3,417 / 3,846
Efficiency	η ≥	98%
Oil quantity:	V =	approx. 8.5 liters
Oil change intervals	t =	up to 40.000 operating hours
Lifetime gearing		Lifetime durability
Lifetime bearings with equivalent load factor	t = $p_{equiv.}$ =	> 200.000 operating hours 0,78 x nominal power
Sound pressure level	L_p =	63 dB (A) in total
Weight	m =	approx. 405 kg
Versions		Drive unit left or right Duplex drive unit (1x left and 1x right version) suitable for escalators and moving walks
Connection to main shaft		Involute spline DIN 5480 N130x3.0x30x42x9H

Technical data sheet – EC 2-15.1

Technical changes reserved – Status 03/2024

Input torque, max.	$T_{max.}$=	150 Nm
Ratios	i =	19,963 / 25,301 / 31,578 / 22,637 / 26,882 / 17,422
Input revolutions	n =	1.000, 1.200, 1.500 rpm
Maximum motor power operate with frequency inverter		9.5 – 15kW @ 1.000rpm 9.5 – 22.5kW @ 1.500rpm 9.5 – 18kW @ 1.200rpm
Efficiency	$\eta \geq$	96%
Oil quantity:	V =	approx. 6 liters
Oil change intervals	t =	up to 40.000 operating hours
Lifetime gearing		Lifetime durability
Lifetime bearings with equivalent load factor	t = $p_{equiv.}$ =	> 146.000 operating hours 0,78 x nominal power
Sound pressure level	L_p =	63 dB (A) @ 1.000 rpm in total
Weight	m =	approx. 635 kg in total gear box: approx. 330 kg motor: approx. 305 kg (depends on motor frame size)
Versions		Drive unit left or right Duplex drive unit (1x left and 1x right version) suitable for escalators and moving walks
Brake		2-circuit- brake system with moveable brake shoes
Monitoring function		Oil temperature, oil level sensor brake function

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Product name : Klübersynth GH 6-220

Article-No. : 012161

1.2 Relevant identified uses of the substance or mixture and uses advised against

Use of the Substance/Mixture : Lubricating oil

Recommended restrictions on use : Restricted to professional users.

1.3 Details of the supplier of the safety data sheet

Company : Klüber Lubrication München
Geisenhausenerstr. 7
81379 München
Deutschland
Tel: +49 (0) 89 7876 0
Fax: +49 (0) 89 7876 333
info@klueber.com

E-mail address of person responsible for the SDS : mcm@klueber.com
Material Compliance Management

National contact : Klüber Lubrication Deutschland
Geisenhausenerstraße 7
81379 München
Deutschland
Tel.: +49 89 7876 0
Fax: +49 89 7876 565
customer.service.de@klueber.com
www.klueber.com

1.4 Emergency telephone number

Emergency telephone number : +49 89 7876 700 (24 hrs)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

Not a hazardous substance or mixture.

2.2 Label elements

Labelling (REGULATION (EC) No 1272/2008)

Not a hazardous substance or mixture.

Additional Labelling

EUH210 Safety data sheet available on request.

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

Ecological information: The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

Toxicological information: The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Chemical nature : polyalkylene glycol oil

Components

Chemical name	CAS-No. EC-No. Index-No. Registration number	Classification	specific concentration limit M-Factor Notes Acute toxicity estimate	Concentration (% w/w)
Reaction mass of 3-methylphenyl diphenyl phosphate, 4-methylphenyl diphenyl phosphate, bis(3-methylphenyl) phenyl phosphate, 3-methylphenyl 4-methylphenyl phenyl phosphate and triphenyl phosphate	945-730-9 01-2119511174-52-XXXX	Aquatic Acute1; H400 Aquatic Chronic3; H412	M-Factor: 1/	>= 1 - < 2,5

For explanation of abbreviations see section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

If inhaled : Remove person to fresh air. If signs/symptoms continue, get medical attention.
Keep patient warm and at rest.
If unconscious, place in recovery position and seek medical advice.
Keep respiratory tract clear.
If breathing is irregular or stopped, administer artificial respiration.

In case of skin contact : Remove contaminated clothing. If irritation develops, get medical attention.
In case of contact, immediately flush skin with plenty of water.
Wash clothing before reuse.
Thoroughly clean shoes before reuse.

In case of eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 10 minutes.
If eye irritation persists, consult a specialist.

If swallowed : Move the victim to fresh air.
If unconscious, place in recovery position and seek medical advice.
Keep respiratory tract clear.
Do NOT induce vomiting.
Rinse mouth with water.
Never give anything by mouth to an unconscious person.

4.2 Most important symptoms and effects, both acute and delayed

Symptoms : No information available.

Risks : None known.

4.3 Indication of any immediate medical attention and special treatment needed

Treatment : No information available.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media : Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Unsuitable extinguishing : High volume water jet

media

5.2 Special hazards arising from the substance or mixture

Hazardous combustion products	:	Carbon oxides Nitrogen oxides (NOx)

5.3 Advice for firefighters

Special protective equipment for firefighters	:	In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment. Exposure to decomposition products may be a hazard to health.
Further information	:	Standard procedure for chemical fires. Collect contaminated fire extinguishing water separately. This must not be discharged into drains.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions	:	Evacuate personnel to safe areas. Use personal protective equipment. Ensure adequate ventilation. Refer to protective measures listed in sections 7 and 8.

6.2 Environmental precautions

Environmental precautions	:	Do not allow contact with soil, surface or ground water. Prevent further leakage or spillage if safe to do so. If the product contaminates rivers and lakes or drains inform respective authorities.

6.3 Methods and material for containment and cleaning up

Methods for cleaning up	:	Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

6.4 Reference to other sections

For personal protection see section 8.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling	:	Avoid inhalation of vapour or mist. Avoid contact with skin and eyes. For personal protection see section 8. Smoking, eating and drinking should be prohibited in the ap-

plication area.
Wash hands and face before breaks and immediately after handling the product.
Do not ingest.
Do not repack.
Do not re-use empty containers.
These safety instructions also apply to empty packaging which may still contain product residues.
Keep container closed when not in use.

Hygiene measures : Wash face, hands and any exposed skin thoroughly after handling.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers : Store in original container. Keep container closed when not in use. Keep in a dry, cool and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Store in accordance with the particular national regulations. Keep in properly labelled containers.

Storage class (TRGS 510) : 10, Combustible liquids

7.3 Specific end use(s)

Specific use(s) : Specific instructions for handling, not required.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Contains no substances with occupational exposure limit values.

Derived No Effect Level (DNEL) according to Regulation (EC) No. 1907/2006:

Substance name	End Use	Exposure routes	Potential health effects	Value
bis(4-(1,1,3,3-tetramethyl-butyl)phenyl)amine	Workers	Inhalation	Long-term systemic effects	4,11 mg/m3
	Workers	Skin contact	Long-term systemic effects	1,17 mg/kg bw/day
Reaction mass of 3-methylphenyl diphenyl phosphate, 4-methylphenyl diphenyl phosphate, bis(3-methylphenyl) phenyl phosphate, 3-methylphenyl 4-methylphenyl phenyl phosphate and triphenyl phosphate	Workers	Inhalation	Long-term systemic effects	3,5 mg/m3

	Workers	Inhalation	Acute systemic effects	28 mg/m3
	Workers	Dermal	Long-term systemic effects	0,5 mg/kg bw/day
	Workers	Dermal	Acute systemic effects	4 mg/kg bw/day
pentaerythritol tetrakis(3-(3,5-di-tert-butyl-4-hydroxy-phenyl)propionate)	Workers	Inhalation	Long-term systemic effects	9,5 mg/m3
	Workers	Skin contact	Long-term systemic effects	27 mg/kg

Predicted No Effect Concentration (PNEC) according to Regulation (EC) No. 1907/2006:

Substance name	Environmental Compartment	Value
bis(4-(1,1,3,3-tetramethylbutyl)phenyl)amine	Fresh water	0,00002 µg/l
	Marine water	0,000002 µg/l
	Fresh water sediment	0,00467 mg/kg
	Marine sediment	0,000467 mg/kg
	Soil	0,000934 mg/kg
Reaction mass of 3-methylphenyl diphenyl phosphate, 4-methylphenyl diphenyl phosphate, bis(3-methylphenyl) phenyl phosphate, 3-methylphenyl 4-methylphenyl phenyl phosphate and triphenyl phosphate	Fresh water	0,002 mg/l
	Marine water	0,0002 mg/l
	Fresh water sediment	3,43 mg/kg
	Marine sediment	0,343 mg/kg
pentaerythritol tetrakis(3-(3,5-di-tert-butyl-4-hydroxyphenyl)propionate)	Fresh water	0,086 mg/l
	Marine water	0,0086 mg/l

8.2 Exposure controls

Engineering measures

none

Personal protective equipment

Eye protection : Safety glasses with side-shields

Hand protection
- Material : Nitrile rubber
- Break through time : > 10 min
- Protective index : Class 1

Remarks	:	For prolonged or repeated contact use protective gloves. The break through time depends amongst other things on the material, the thickness and the type of glove and therefore has to be measured for each case. The selected protective gloves have to satisfy the specifications of Regulation (EU) 2016/425 and the standard EN 374 derived from it.
Respiratory protection	:	Not required; except in case of aerosol formation.
Filter type	:	Filter type A-P
Protective measures	:	The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace. Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Physical state	:	liquid
Colour	:	yellow
Odour	:	characteristic
Odour Threshold	:	No data available
Melting point/range	:	No data available
Boiling point/boiling range	:	No data available
Flammability (solid, gas)	:	Not applicable
Upper explosion limit / Upper flammability limit	:	No data available
Lower explosion limit / Lower flammability limit	:	No data available
Flash point	:	>= 250 °C Method: ISO 2592, open cup
Auto-ignition temperature	:	No data available

Decomposition temperature Decomposition temperature	:	No data available
pH	:	8,0 (20 °C) Concentration: 100 %
Viscosity Viscosity, dynamic	:	No data available
Viscosity, kinematic	:	220 mm2/s (40 °C)
Solubility(ies) Water solubility	:	partly soluble
Solubility in other solvents	:	No data available
Partition coefficient: n-octanol/water	:	No data available
Vapour pressure	:	< 0,001 hPa (20 °C)
Relative density	:	1,050 (20 °C) Reference substance: Water The value is calculated
Density	:	1,05 g/cm3 (20 °C)
Bulk density	:	No data available
Relative vapour density	:	No data available

9.2 Other information

Explosives	:	Not explosive
Oxidizing properties	:	No data available
Self-ignition	:	No data available
Evaporation rate	:	No data available
Sublimation point	:	No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

No hazards to be specially mentioned.

10.2 Chemical stability

Stable under normal conditions.

10.3 Possibility of hazardous reactions

Hazardous reactions : No dangerous reaction known under conditions of normal use.

10.4 Conditions to avoid

Conditions to avoid : No conditions to be specially mentioned.

10.5 Incompatible materials

Materials to avoid : No materials to be especially mentioned.

10.6 Hazardous decomposition products

No decomposition if stored and applied as directed.

SECTION 11: Toxicological information

11.1 Information on hazard classes as defined in Regulation (EC) No 1272/2008

Acute toxicity

Product:

Acute oral toxicity : Remarks: This information is not available.

Acute inhalation toxicity : Remarks: This information is not available.

Acute dermal toxicity : Remarks: This information is not available.

Components:

Reaction mass of 3-methylphenyl diphenyl phosphate, 4-methylphenyl diphenyl phosphate, bis(3-methylphenyl) phenyl phosphate, 3-methylphenyl 4-methylphenyl phenyl phosphate and triphenyl phosphate

:

Acute oral toxicity : LD50 (Rat): > 5.000 mg/kg

Acute dermal toxicity : LD50 (Rat): > 2.000 mg/kg
Method: OECD Test Guideline 402
GLP: yes
Assessment: The substance or mixture has no acute dermal

toxicity

Skin corrosion/irritation

Product:

Remarks : This information is not available.

Components:

Reaction mass of 3-methylphenyl diphenyl phosphate, 4-methylphenyl diphenyl phosphate, bis(3-methylphenyl) phenyl phosphate, 3-methylphenyl 4-methylphenyl phenyl phosphate and triphenyl phosphate

:

Species	:	Rabbit
Assessment	:	No skin irritation
Method	:	OECD Test Guideline 404
Result	:	No skin irritation

Serious eye damage/eye irritation

Product:

Remarks : This information is not available.

Components:

Reaction mass of 3-methylphenyl diphenyl phosphate, 4-methylphenyl diphenyl phosphate, bis(3-methylphenyl) phenyl phosphate, 3-methylphenyl 4-methylphenyl phenyl phosphate and triphenyl phosphate

:

Species	:	Rabbit
Assessment	:	No eye irritation
Method	:	OECD Test Guideline 405
Result	:	No eye irritation

Respiratory or skin sensitisation

Product:

Remarks : This information is not available.

Components:

Reaction mass of 3-methylphenyl diphenyl phosphate, 4-methylphenyl diphenyl phosphate, bis(3-methylphenyl) phenyl phosphate, 3-methylphenyl 4-methylphenyl phenyl phosphate and triphenyl phosphate

:

Assessment	:	Did not cause sensitisation on laboratory animals.
Result	:	Did not cause sensitisation on laboratory animals.

Germ cell mutagenicity

Product:

Genotoxicity in vitro	:	Remarks: No data available
Genotoxicity in vivo	:	Remarks: No data available

Components:

Reaction mass of 3-methylphenyl diphenyl phosphate, 4-methylphenyl diphenyl phosphate, bis(3-methylphenyl) phenyl phosphate, 3-methylphenyl 4-methylphenyl phenyl phosphate and triphenyl phosphate

:

Genotoxicity in vitro	:	Test Type: Ames test Test system: Salmonella typhimurium Metabolic activation: with and without metabolic activation Method: OECD Test Guideline 471 Result: negative GLP: yes

Carcinogenicity

Product:

Remarks	:	No data available

Reproductive toxicity

Product:

Effects on fertility	:	Remarks: No data available
Effects on foetal development	:	Remarks: No data available

Components:

Reaction mass of 3-methylphenyl diphenyl phosphate, 4-methylphenyl diphenyl phosphate, bis(3-methylphenyl) phenyl phosphate, 3-methylphenyl 4-methylphenyl phenyl phosphate and triphenyl phosphate

:

Reproductive toxicity - Assessment : - Fertility -
No evidence of adverse effects on sexual function and fertility, or on development, based on animal experiments.

Repeated dose toxicity

Product:
Remarks : This information is not available.

Aspiration toxicity

Product:
This information is not available.

11.2 Information on other hazards

Endocrine disrupting properties

Product:
Assessment : The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

Further information

Product:
Remarks : Information given is based on data on the components and the toxicology of similar products.

SECTION 12: Ecological information

12.1 Toxicity

Product:
Toxicity to fish : Remarks: Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Toxicity to daphnia and other aquatic invertebrates	:	Remarks: No data available
Toxicity to algae/aquatic plants	:	Remarks: No data available
Toxicity to microorganisms	:	Remarks: No data available

Components:

Reaction mass of 3-methylphenyl diphenyl phosphate, 4-methylphenyl diphenyl phosphate, bis(3-methylphenyl) phenyl phosphate, 3-methylphenyl 4-methylphenyl phenyl phosphate and triphenyl phosphate

:

Toxicity to fish	:	LC50 (Oryzias latipes (Japanese medaka)): 1,3 mg/l Exposure time: 96 h
Toxicity to algae/aquatic plants	:	EC50 (Desmodesmus subspicatus (green algae)): 0,55 mg/l Exposure time: 72 h
M-Factor (Acute aquatic toxicity)	:	1
Toxicity to microorganisms	:	EC50 (activated sludge): Exposure time: 3 h Method: OECD Test Guideline 209
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC: 0,12 mg/l Exposure time: 21 d Species: Daphnia magna (Water flea)

12.2 Persistence and degradability

Product:

Biodegradability	:	Remarks: No data available
Physico-chemical removability	:	Remarks: No data available

Components:

Reaction mass of 3-methylphenyl diphenyl phosphate, 4-methylphenyl diphenyl phosphate, bis(3-methylphenyl) phenyl phosphate, 3-methylphenyl 4-methylphenyl phenyl phosphate and triphenyl phosphate

:

Biodegradability	:	Result: rapidly biodegradable Biodegradation: 75 % Exposure time: 28 d Method: OECD Test Guideline 301C

12.3 Bioaccumulative potential

Product:

Bioaccumulation	:	Remarks: This mixture contains no substance considered to be persistent, bioaccumulating and toxic (PBT). This mixture contains no substance considered to be very persistent and very bioaccumulating (vPvB).

Components:

Reaction mass of 3-methylphenyl diphenyl phosphate, 4-methylphenyl diphenyl phosphate, bis(3-methylphenyl) phenyl phosphate, 3-methylphenyl 4-methylphenyl phenyl phosphate and triphenyl phosphate

:

Bioaccumulation	:	Bioconcentration factor (BCF): 220
Partition coefficient: n-octanol/water	:	log Pow: 4,5

12.4 Mobility in soil

Product:

Mobility	:	Remarks: No data available
Distribution among environmental compartments	:	Remarks: No data available

12.5 Results of PBT and vPvB assessment

Product:

Assessment	:	This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher..

12.6 Endocrine disrupting properties

Product:

Assessment	:	The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

12.7 Other adverse effects

Product:

Additional ecological information : Harmful to aquatic life with long lasting effects.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product : The product should not be allowed to enter drains, water courses or the soil.
Do not dispose of with domestic refuse.
Dispose of as hazardous waste in compliance with local and national regulations.

Waste codes should be assigned by the user based on the application for which the product was used.

Contaminated packaging : Packaging that is not properly emptied must be disposed of as the unused product.
Dispose of waste product or used containers according to local regulations.

The following Waste Codes are only suggestions:

Waste Code : unused product
13 02 06*, synthetic engine, gear and lubricating oils

uncleaned packagings
15 01 10, packaging containing residues of or contaminated by hazardous substances

SECTION 14: Transport information

14.1 UN number or ID number

Not regulated as a dangerous good

14.2 UN proper shipping name

Not regulated as a dangerous good

14.3 Transport hazard class(es)

Not regulated as a dangerous good

14.4 Packing group

Not regulated as a dangerous good

14.5 Environmental hazards

Not regulated as a dangerous good

14.6 Special precautions for user

Not applicable

14.7 Maritime transport in bulk according to IMO instruments

Remarks : Not applicable for product as supplied.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

REACH - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, preparations and articles (Annex XVII)	:	Not applicable
REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59).	:	This product does not contain substances of very high concern (Regulation (EC) No 1907/2006 (REACH), Article 57).
REACH - List of substances subject to authorisation (Annex XIV)	:	Not applicable
Regulation (EC) No 1005/2009 on substances that deplete the ozone layer	:	Not applicable
Regulation (EU) 2019/1021 on persistent organic pollutants (recast)	:	Not applicable
Regulation (EC) No 649/2012 of the European Parliament and the Council concerning the export and import of dangerous chemicals	:	Not applicable
Seveso III: Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances.	:	Not applicable
Water contaminating class (Germany)	:	WGK 2 obviously hazardous to water Classification according to AwSV, Annex 1 (5.2)
TA Luft List (Germany)	:	Total dust: others: 3,18 % Inorganic substances in powdered form: Not applicable Inorganic substances in vapour or gaseous form: Not applicable Organic Substances:

portion Class 1: < 0,01 %
others: 96,82 %

Carcinogenic substances:
Not applicable
Mutagenic:
Not applicable
Toxic to reproduction:
Not applicable

Volatile organic compounds : Directive 2010/75/EU of 24 November 2010 on industrial emissions (integrated pollution prevention and control)
Volatile organic compounds (VOC) content: 0,06 %

15.2 Chemical safety assessment
This information is not available.

SECTION 16: Other information

Full text of H-Statements

H400 : Very toxic to aquatic life.
H412 : Harmful to aquatic life with long lasting effects.

Full text of other abbreviations

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road; AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECHA - European Chemicals Agency; EC-Number - European Community number; ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office

of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RID - Regulations concerning the International Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; SVHC - Substance of Very High Concern; TCSI - Taiwan Chemical Substance Inventory; TRGS - Technical Rule for Hazardous Substances; TSCA - Toxic Substances Control Act (United States); UN - United Nations; vPvB - Very Persistent and Very Bioaccumulative

Further information

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