OMS Antriebstechnik
Bahnhofstraße 12
36219 Cornberg
Deutschland
Telephone: +49 (0) 5650 / 969-0
Telefax: +49 (0) 5650 / 969-100

Installation instructions

according to Annex VI of the EC Directive 2006/42/EC Mechanical Equipment and further product details

Elevator machine

MODEL: *oms*Hypodrive EC 2-25 Lift

Please archive this document for future reference

OMS No.

Date of manufacture
Month / Year

Translation from german original

Contents

1 Introduction

Warning and safety information in these instructions is presented as pictographs indicating hazards and furnishing additional information.

Note on use:
Additional information and tips
No hazard

Warning: General hazard
Potential damage to system and injury to persons

Warning: Hazardous voltage levels
Potential hazard
Serious or fatal injury to persons

Warning: Hot surface
Potential hazard
Serious injury to persons or damage to equipment

Warning: Crush or pinch points
Potential hazard
Serious injury to persons

Warning: Entanglement and entrapment
Potential hazard
Serious injury to persons or damage to equipment

Warning: Extreme danger
Potential injury to persons and damage to equipment
Serious or fatal injury to persons

2 Safety instructions for OMS elevator drives

2.1 Intended use

OMS elevator machines EC 2-25 Lift are designed and intended exclusively for installation and use in electrically operated traction sheave elevators for the conveyance of persons or goods in accordance with EN 81-1.
Use for any other purpose that the intended use as specified above is considered improper use. OMS ANTRIEBSTECHNIK disclaims all liability for any damage or injury resulting from such improper use or from errors of procedure or method.

All planning, installation and maintenance work must without exception be carried out by qualified specialist personnel.
Qualified personnel is defined as persons who due to their education and training, special training, instruction and experience as well as their knowledge of all pertinent norms and standards and general and statutory specifications, requirements and regulations, accident prevention regulations and operating conditions as authorized by those responsible for the safety of the system to carry out the necessary work and thereby recognize and avoid potential hazards. (Qualified personnel as defined in IEC 364).

This OMS elevator drive falls within the scope of application of the 9th Directive of the Machine and Product Safety Law and the Machinery Directive 2006/42/EC and is a machine part to be subsequently installed for its intended use in an elevator system and is thus without the CE mark.
Commissioning is prohibited until the installer (see Machine Directive 95/16/EC) has properly installed the product in the designated elevator system and the CE mark has been affixed to the elevator system to show that the safety requirements for the product as supplied by the manufacturer are fulfilled.

All other applicable or pertinent regulations and legal requirements (e.g. on operation, maintenance and inspection) remain in force.

OMS does not accept any responsibility, liability or warranty whatsoever for any damage whatsoever caused by improper, unprofessional or other actions which do not comply with these installation and maintenance instructions and/or do not comply with the aforementioned norms and standards and are thus detrimental to the product properties and characteristics.

The motors are designed exclusively for use with frequency converters. Customer supplied frequency converters must be adjusted in accordance with the appropriate instruction sheets to comply with OMS elevator machine characteristics, properties and requirements. Adjust the frequency converter parameters to the motor output of the drive.

The drive is designed exclusively for use within an enclosed area (e.g. elevator shaft or machine room).

The storage, installation and/or operation areas for OMS drives must be closed and dry. The final customer and the user must ensure that appropriate protective measures are implemented to avoid any contamination whatsoever due to any building dust or dirt.

When running, the machine may only be stopped via the frequency converter and machine brake.

OMS elevator machines may only be operated when in technically perfect condition and when within the parameters as specified by OMS.

Intended use also includes:

- Compliance with the operating instructions
- Compliance with the statutory accident prevention and environmental regulations
- Compliance with and adherence to the elevator documentation / elevator regulations and specifications.

2.2 Improper use

OMS drives may not be operated in potentially explosive environments or corrosive atmospheres.

The shoe brake with double circuit double acting expansion solenoid is designed for only a limited number of emergency stops. Using it as a working brake is deemed improper use.

Exceeding the permissible limits for use constitutes improper use.

Permissible limits:

- Max. motor speed: see technical documentation.
- Max. static load on the traction sheave, see technical documentation.
- Max. number of journeys / hour = 240.
- Ambient temperatures during operation min.: 5° C, max.: 40° C.
- The technical data and specifications on the motor manufacturer's data plate are only valid for installation heights up to h ≤ 1000m above NN.
- Max. rel. humidity: 85% at 20°C (non-condensing)
- Operation under extreme climatic conditions must be clarified with OMS.

The following in particular also constitute improper use:

- Operation without oil or with oil other than that specified.
- Securing the drive with bolts that are weaker than the specified bolts.
- Opening the gear unit in situ after it has been installed.

Important:

- All work connected with the transport, electrical connections, commissioning and maintenance and servicing of the drive must only be carried out by qualified specialist personnel. Improper actions can cause serious injuries and equipment damage.

Caution! Important note on elevator machine EC 2-25 Lift:

- The high efficiency of the elevator machine means the self-locking capacity is negligible, i.e. the drive will start to move immediately as soon as the brake is released.

- When installing the safety catching device, the brake system must be fully functional and guarantee that the service brake is ready to be applied immediately at any times.

- Elevator machine operation without a fully functional safety catching device is prohibited. The operator has sole liability for all and any injuries and damage.

- Recurring checks and tests may not lead to excessive wear, stresses or strains which could impair the operational safety of the elevator.
  Periodic tests can be done with test weights and nominal speed.
  Alternatively the tests can be done with an empty car and nominal speed (up to $v = 2ms^{-1}$).

- Releasing the elevator car from the safety catching device may only be done by moving the elevator car in the opposite direction to the direction that caused the safety catching device to activate. Under all operating conditions, the elevator drive may only be operated with the max. permissible loads as specified by the elevator specifications. All and any procedures and applications causing additional static and dynamic loads (torque, force, vibration etc.) on the elevator drive e.g. on the traction sheave, motor, brake, housing, are prohibited. OMS refuses all and any warranty and/or liability claims if this is not complied with, irrespective of legal basis.

- Ensure the motor does not rest on or against the mounting frame. Take appropriate measures to ensure the above and check that this is done in each and every case. Record these measures in a protocol as documentary proof.

2.3 Warranty and liability for the drive

- The manufacturer of the drive only guarantees proper and safe functionality of the drive if the specifications provided with each drive are observed and if proper assembly (installation) maintenance, testing and operation of the drive is in accordance with the maintenance instructions and the procedures stipulated here.

- The warranty is void if the permissible limits are exceeded during operation, maintenance or testing.

- The customer is responsible and liable for the proper assembly (installation), maintenance, testing and operation of the drive and must furnish proof that only trained and qualified specialist personnel are employed.

- Should errors, defects or non-conformances be detected on the elevator system including the drive, the system must be disabled immediately, otherwise the operator is solely liable for all and any injuries to persons or damage to equipment irrespective of legal basis.

- Incorrect installation and/or improper operation of the system, in particular with respect to the aforementioned improper procedures or changes or modifications made to the drive or its components irrespective of legal basis always lead to the complete and absolute non-liability of the drive manufacturer and the invalidity of the guarantee and warranty.

- OMS refuses all and any warranty and/or liability claims when the installer, operator and/or maintenance company does not furnish complete and continuous documentary proof that the described permissible system and procedures and uses for the elevator system including drive have been complied with (e.g. elevator book etc.).

2.4 Hazards associated with the elevator drive

The elevator drives are state of the art and are safe to operate at delivery. Any changes or modifications, in particular when detrimental to operational safety, are prohibited.
The traction sheave and the handwheel of the elevator machine EC 2-25 Lift provided by OMS do not have safety covers and may only be used in a locked machine room. When persons are in the machine room, ensure adequate safety distance is kept to all moving and rotating parts (marked in yellow).
The elevator manufacturer must provide safety protection equipment on and for each moving or rotating part.

2.5 Instructions for safe use

Should changes be detected during the service life of the machine, e.g. due to wear, ageing etc., remedy these immediately in accordance with these installation and maintenance instructions.
The gear unit may only be opened by OMS in the OMS factory, otherwise the warranty/guarantee is invalid and OMS refuses all and any warranty and/or liability claims.

2.6 Installation and maintenance personnel requirements

Commissioning, maintenance and/or repairs on the electrical parts of the machine may **only** be carried out by trained and qualified personnel.
Qualified personnel:
Qualified personnel is defined as persons who due to their education and training, experience, special training and instruction as well as their knowledge of all pertinent norms and standards and general and statutory specifications, requirements and regulations, accident prevention regulations and operating conditions as authorized by those responsible for the safety of the system to carry out the necessary work and thereby recognize and avoid potential hazards. (Qualified personnel are defined in IEC 364)
Please read these provided installation and maintenance instructions thoroughly and carefully.
They will help you to avoid potential errors or problems at commissioning and during machine operation.

2.7 General information

Should damage occur during transport or should any errors, defects or non-conformances be detected during machine commissioning, contact OMS immediately and report the error, defect, non-conformance or damage.

In the case of water damage, contact OMS.

The decision as to whether repairs can be made on site and whether the elevator machine is still operable can only be made after contacting OMS and gaining their approval. If necessary, the machine must be returned to OMS in the original packaging.
The original packaging must therefore be kept until after commissioning.

OMS accepts no responsibility for any freedom from patent restrictions and/or patent securement and/or protection or similar regarding the arrangement and/or the correct installation and/or function of the elevator machine in the shaft.
The manufacturer and/or operator of the elevator has sole responsibility for freedom from patent restrictions and similar.

3 Commissioning

3.1 Installation

Prior to installation, the intended frame or foundation upon which the elevator machines are to be installed must always have been calculated and proved adequate.
The frame must be rigid enough to withstand all and any bending and torsional forces that may occur during operation.

3.1.1 Installation instructions

For installation in position B1, observe the following:

Rope running direction downwards:

Observe the following for this installation variant:
The housing has 5 contact areas.
Ensure that all 5 contact areas lie evenly. None of the contact areas 1-5 may have an air gap (max. permissible air gap between surface and contact area: 0.05mm).
Non-compliance can cause distortion of and damage to the elevator machine.

Rope running direction horizontal:

When the rope running direction is horizontal, the gear unit must be additionally horizontally supported using surfaces A-D.
The same as above applies to horizontal support; none of the contact areas A-D may have an air gap (max. permissible air gap between contact area and support: 0.05mm).

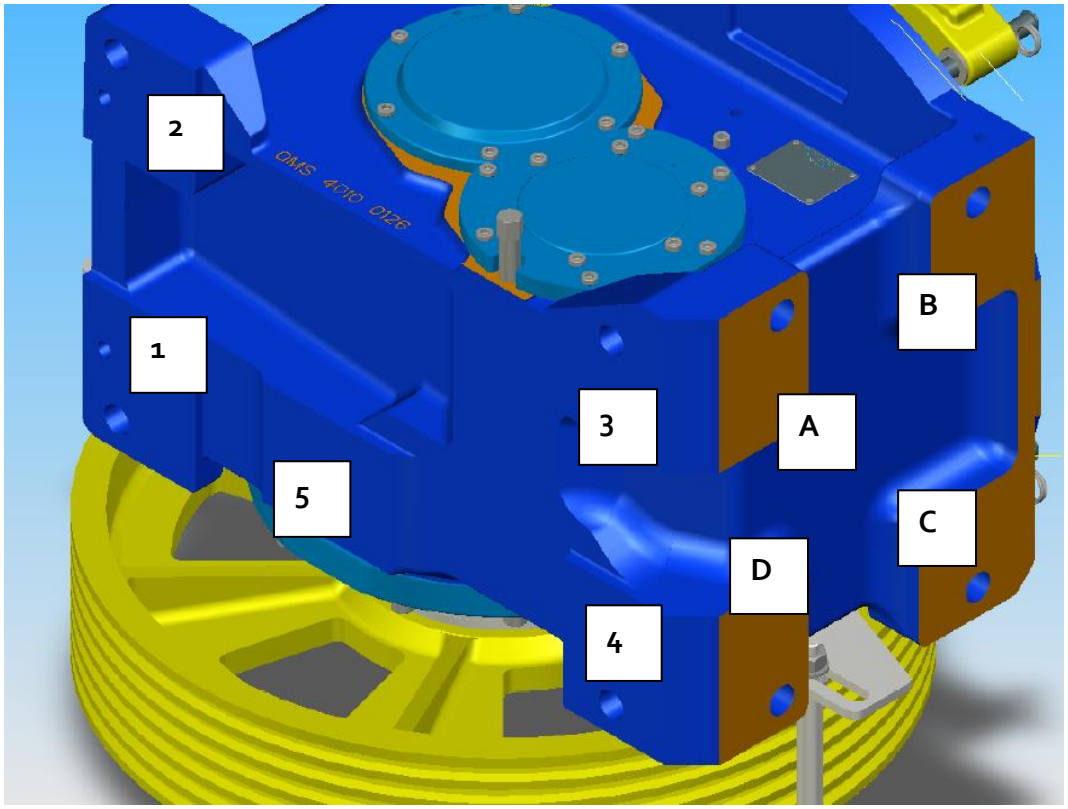


Fig. 1: Contact areas 1-5 and A-D

3.1.2 Mount and connect the complete elevator machine

Fix the machine in the position as in the order using the four mounting holes in the gear unit base. Using the through-holes in the support frame and bolts and nuts to ensure secure attachment is recommended.

Bolts: ***M 24 quality 12.9***
Torque: ***800 Nm***

On delivery, the traction sheave is not fitted to the elevator machine EC 2-25 Lift. The traction sheave must be fitted on the adapter flange as described under 6.4.

Prior to commissioning:

Replace the marked screw plug on the gear housing by the oil dipstick or bleeder valve included with the delivery.
Ensure that the gear unit is positioned correctly (see fig. 5a, b). Keep the screw plug in a safe place where it is easy to find in case the machine needs to be transported at a later date.

Note:
The gear unit is sealed oil-tight for transportation. With the screw plug or cap in place, the gear cannot vent air. Starting operation with the screw plug still in place can lead to overpressure in the housing and thus cause leakage and oil discharge at the shaft sealing rings.
The oil dipstick does not seal the gear.

Electrical connections

Only trained and qualified personnel may open the terminal box on the motor, connect the electrical supply and carry out maintenance and repair work on electrical parts of the elevator machine.
Disconnect the main switch beforehand and secure it against being inadvertently switched on!
In accordance with DIN - EN 81 – 1, the safely rules governing the construction and erection of elevator machines must at all times be complied with.

Note:
The elevator machine's electrical system is designed in accordance with the general technical specifications EN 60 204 – 1.

To ensure flawless and trouble-free machine functionality and to comply with the EMV regulations, all and any wiring must be shielded. Ensure that ground loops are avoided when grounding the shielding.

Procedure:

1. Motor:
Connection to the power supply must comply with the wiring diagram in the motor terminal box (see appendix for the motor wiring diagram).
Should an alternative wiring exit be required, unscrew the internal screws in order to turn the terminal box. Exercise due care when detaching and fastening the fine temperature monitoring wires.

2. Frequency converter:
Connection and setup to the OMS elevator machine must comply with the instructions supplied with the converter. Contact the frequency converter manufacturer should the need arise.

3. Incremental encoder:
The incremental encoder (between motor cover and handwheel) is normally supplied with a 5 m shielded cable and a 2-row 15-pin connector to be appropriately connected to the frequency converter. The shielding is wired to the plug housing, PIN 12 and the incremental encoder. Depending on the type of incremental encoder, the connector wiring can vary (see appendix for encoder electrical connections).
Adapters and extensions are optionally available if other connections (e.g. 3-row, 15-pin) to the frequency converter are required (see appendix).

4. Braking solenoid:
Connect the braking solenoids (double circuit double acting expansion solenoid) in compliance with the applicable requirements (see appendix for braking solenoid mains connection).

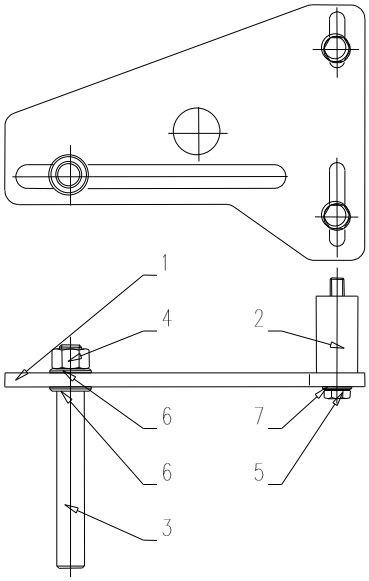
a) If the elevator machine is accessible in a machine room, then both magnet circuits may be connected to a single control unit.
b) If the elevator machine is inaccessible, then the magnet has two control modules, each of which must be individually wired (to check individual brake circuits, see 3.2.3- b1).

3.1.3 Mount and adjust the safety device to prevent rope jumping

Elevator machines must be fitted with safety devices to prevent rope jumping. After rope installation, the safety devices to prevent rope jumping must be adjusted to prevent friction and rubbing. The distance between the ropes and the safety device to prevent the rope jumping must be max. 1 – 2 mm.

Two safety devices to prevent rope jumping are provided and each consists of the following parts:

- 2 spacer tubes
- 1 bracket
- 2 hex bolts M10 x 75
- 1 safety bolt with hex nut M16



1. **Bracket 2**
2. **Spacer**
3. **Bolt**
4. **Hex nut – M16 – 8 galv.**
5. **Hex bolt – M10 x 75– 8.8 galv.**
6. **Washer A – 10.5 – pc.**

Fig. 2: Safety device to prevent rope jumping

Adjustment to the installation position and rope run-through direction:

1. Loosen the hex bolts M10 x 75 (2 per bracket).
2. Swing the safety device to prevent the rope jumping into the required position.
3. Bolt the bracket using the M10 x 75 bolts into the nearest bolt holes in the provided bolt circle on the gear housing.
4. Fix the bolts e.g. using Loctite. **Torque: 100Nm**

Adjustment to fit traction sheave diameter:

1. Loosen the M16 hex nut on the securing bolt.
2. Push the bolt along the slot into the desired position.
3. Retighten the M16 hex nut.

3.2 Installation and operation of the emergency release

The required ***emergency instructions***, that must be affixed and plainly visible in the vicinity of the emergency release, are not described here. Refer to and comply with all applicable regulations and requirements.

a) Accessible elevator machine
If the elevator machine is in a machine room and is easily accessible, the brake can be opened with the central release lever of the braking solenoid. If required, the elevator car can be moved by turning the handwheel on the motor.

b) Remote control of the elevator machine
If the machine is positioned in an inaccessible part of the elevator shaft, a separate electrical or mechanical remote control is required.

b1) Separate electrical remote control: If an ***emergency power source*** is available, then both coils of the braking solenoid and the motor must be connected in accordance with the accompanying instructions.

3.3 Install the rope clamp

To prevent rope slippage during installation or maintenance work, an optional rope clamp is available for the traction sheave.

Fit the rope clamp on the side of one of the traction sheave openings (see fig. 3). Ensure that the lug of the inside clamp bar snaps securely behind the frame of the opening. This prevents the rope clamp slipping after tightening the locking bolts.

Tighten both locking bolts until the outer and inner bars are approximately parallel to each other. The inner bar is supported by the frame, thus ensuring that the forces are equally distributed over all the ropes.

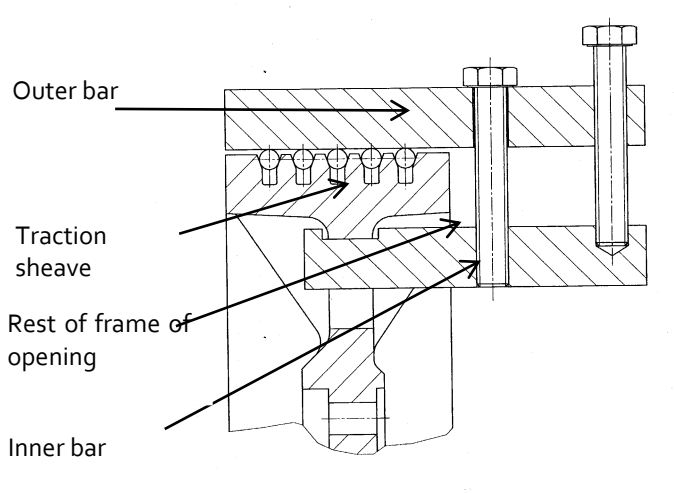


Fig. 3: Side-fitted rope clamp

When using a rope clamp, ensure that:

1. It does not collide with any other parts.
2. It does not get tangled in the upward / downward ropes.
3. It does not block anything.
4. The next safety device to prevent rope jumping is not obstructed by the rope clamp. If necessary, remove the bolt from the safety device to prevent rope jumping.

Pulling the elevator car out of the safety catching device using the rope clamp, additional „loose rope" ***and*** letting the balance weight fall is prohibited.

4 Construction and function

The OMS elevator machine is a high performance drive unit consisting of several components with various functions.
The extremely high efficiency of the gear unit of 96% means heat loss is so far reduced that attachments and surrounding mechanical and electronic components are only subjected to low heat loads. This has a favorable effect on component ageing induced by wear and temperature.

The gear oil filling is thus normally regarded as **lifetime lubrication**.
At medium ambient temperatures of approx. 35°C and continuous operation, the oil can be used for up to 40.000 operating hours. In addition to the routine checks, the lubricating properties of the oil should be checked every 2 – 3 years (see section 6).

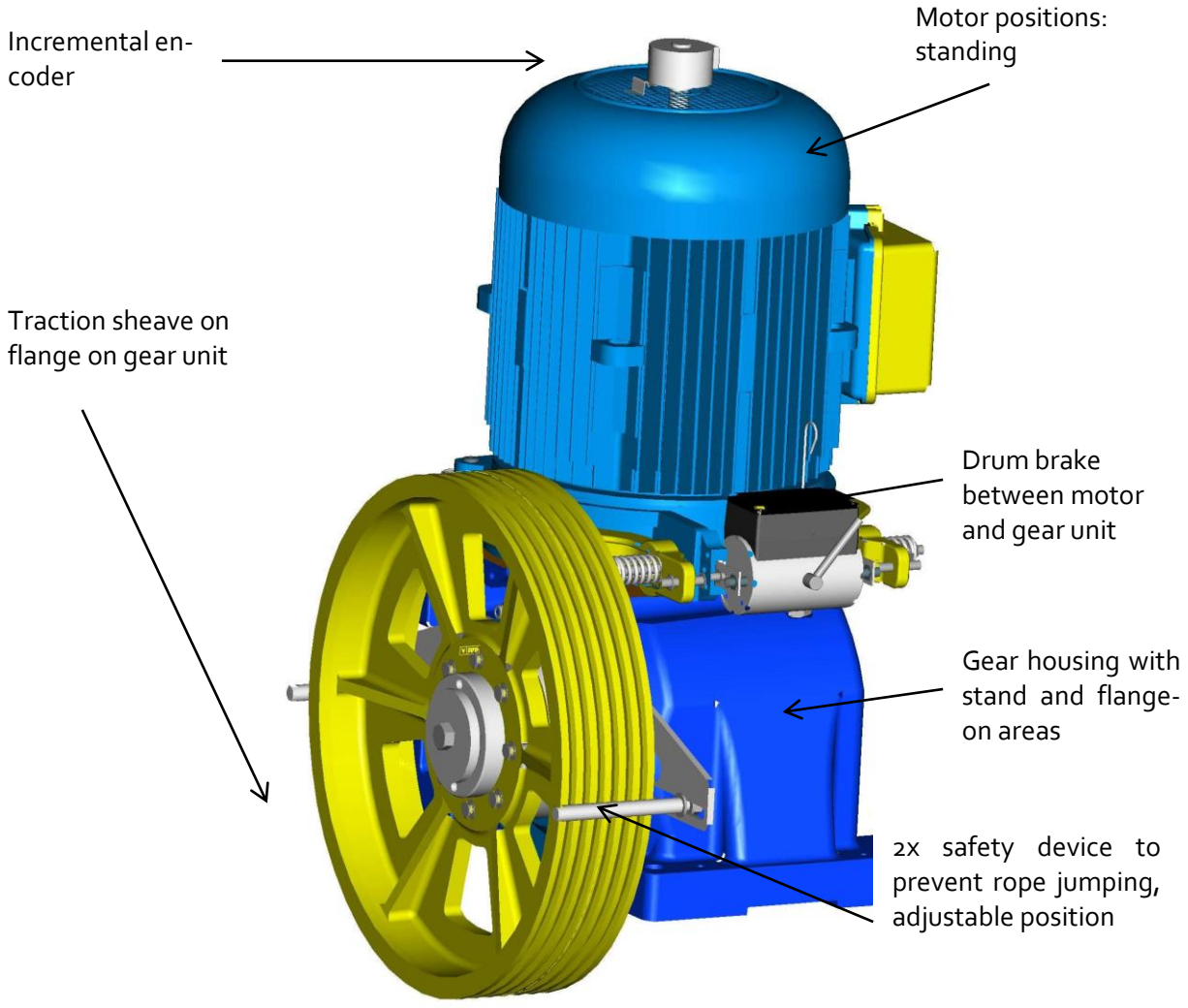


Fig. 4: OMS elevator machine EC 2-25 Lift components

4.1 Technical data

The OMS elevator machine efficiency, the relationship to the elevator car suspension (1:1 ; 2:1 or 4:1), and the available gear variants are detailed in the appendix under:
„Technical data - elevator machine EC 2-25 Lift"

All OMS elevator machine measurements and connection dimensions are detailed in the appendix under:
„Dimension drawing - elevator machine EC 2-25 Lift".

4.2 Noise emission information

OMS elevator machines undergo thorough noise emissions testing before leaving the factory. The A-weighted emission sound pressure level L_{pA} in dB(A) is measured at a distance of 1m from the machine surface in accordance with DIN EN ISO 11200.
Measurement procedure:
The machine is operated with frequency converters on a test rig in the sound measurement room, the load corresponds to the load and speed of the drive at constant travel speed.
Under the given operating conditions, the elevator machines meet the following noise emission requirements:

Machine type	Typical sound pressure level $L_{p,A}$
EC 2-25 Lift	65 dB(A) at speed n≤ 1.500 min^{-1} / 26.3kW

These values may vary depending on the system.

4.3 Manufacturer's data plate

The manufacturer's data plate displays the most important data on the delivered drive. For example:

OMS ANTRIEBSTECHIK
36219 CORNBERG
GERMANY

OMS NO.	XXXX
Deliv.D	Month Year
UNIT NO.	XXXXXXXXX
TYPE	EC 2-25 Lift
RATIO	I = XX

4.4 Components and add-on parts - spare parts

The OMS elevator machine EC 2-25 Lift consists of:

- Gear, complete
- Motor, complete (including coupling claw on motor, elastic coupling ring and incremental encoder)
- Brake system, complete (including brake drum and coupling)
- Traction sheave
- Safety device to prevent rope jumping (2-fold)

optional:

- Rope clamp

4.5 Alternative configurations

The following alternative components are also available for the elevator machines:

- Gear: ratios **i = 18.71 , i = 24.02**
- Suspension: 4:1 ; 2:1 ; 1:1
- Incremental encoder with various signal outputs: SINUS, HTL, TTL
- Traction sheaves: various diameters (400, 450, 500, 560, 650 mm, others optional)
- Safety device to prevent rope jumping: Various fitting lengths corresponding to the traction sheave diameter are available.

4.6 Gear variants and installation positions

The OMS elevator machine EC 2-25 Lift is designed for installation in only one position: Motor standing (B1).

The following figures show the output shaft and traction sheave represented by the dotted line.

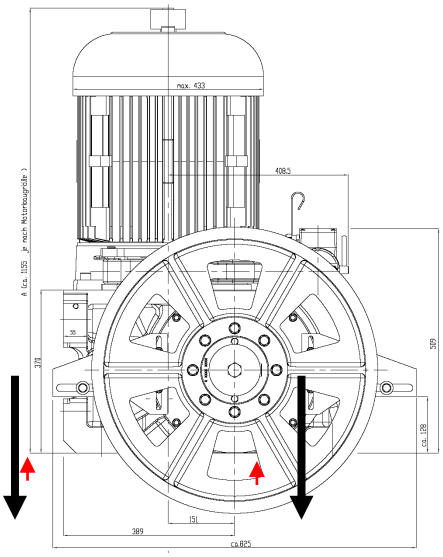


Fig. 5a :
Installation position B1, motor standing, rope running direction downwards, fixing below

Rope running direction

Support

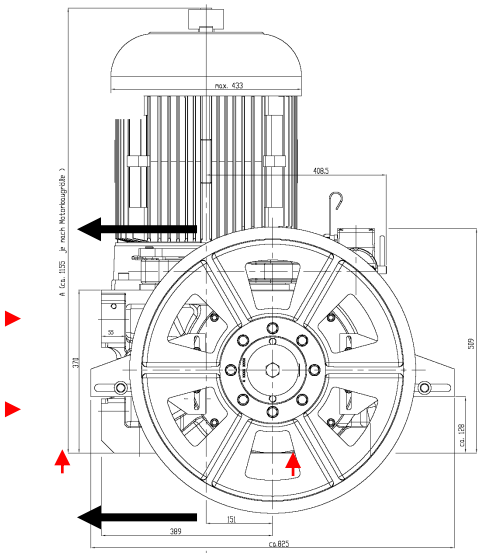


Fig. 5b:
Installation position B1, motor standing, rope running direction horizontal, fixing below with additional side support.

rope running direction

support

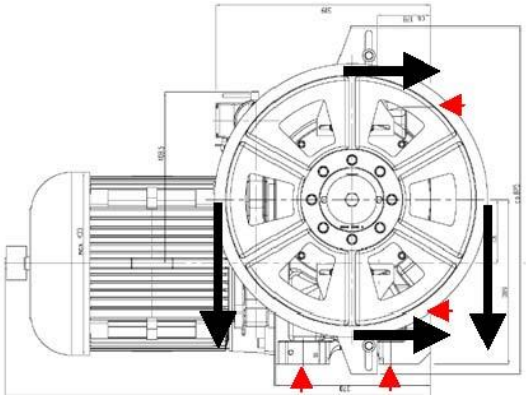


Fig. 5c:
Installation position B1, motor laid, rope running direction downwards, fixing below with additional side support (contact areas A-D and 1-4)
rope running direction horizontal, fixing below with additional side support (contact areas A-D and 1-5)

Adequate support must be provided for the machine in rope running direction!
The elevator machine may only be used for these rope running directions!

The elevator machine may only be mounted in the ordered installation position as the lubrication and gear have been designed exclusively for this position.

5 Transport and storage

5.1 Transport

All elevator machines are inspected prior to leaving the factory and thus leave the premises in perfect condition.
As soon as the elevator machine is delivered, please check for exterior damage. Should you find any damage resulting from transportation, this must be documented in the presence of the forwarding agent. Should the situation arise, the drive may not be commissioned.

Upon leaving the factory, the elevator machine is oil-tight for transportation or must be re-sealed, i.e. the dipstick removed and replaced by the originally provided screw plug. If this is no longer available, please order a new screw plug from OMS.

The weight of the drive (without traction sheave) is given in the table on page 37. This page also shows the weights of the different traction sheaves.

5.1.1 Lifting the machine

Always use the appropriate lifting tackle to lift the elevator machine, otherwise it may fall!
Only high strength eyebolts may be used to lift the gear unit!
The gear housing is equipped with threaded holes for eyebolts (6x M12).

Lifting the gear unit using the eyebolts on the motor is prohibited as these are ***only designed to carry the weight of the motor!***

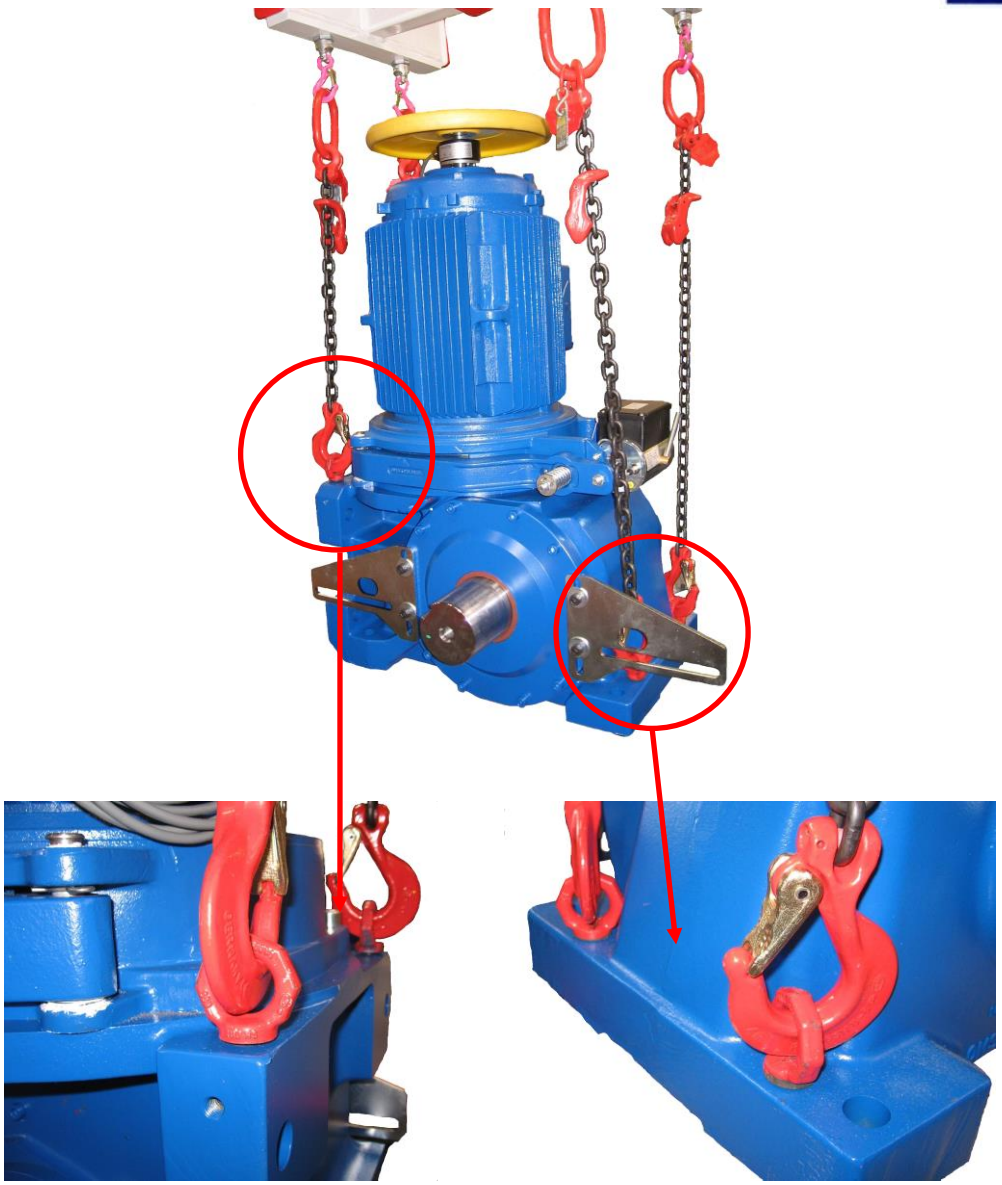


Fig. 6: EC 2-25 with lifting tackle

5.2 Storage

The elevator machine may not be stored outside or exposed to the effects of weather unless adequately protected. Should the machine be stored before usage, take measures to ensure the machine is appropriately conserved.

A) Up to 3 months storage:

No special storage measures required.

Observe the following prior to installing the elevator machine:

- Check all brake components (remove any light rust film on the brake drum by braking).
- Turn the machine by hand (to ensure the motor bearings are evenly lubricated).

B) Up to 18 months storage:

If specified in the order and if lengthy storage prior to installation is intended, the elevator machine can be conserved in the OMS factory and packed in a moisture proof (yellow) foil.
If this is not the case, then:

- Fill the gear with oil to the uppermost screw plug at the latest after 6 months storage.
- **Caution: Oil type: see yellow sticker; only use the same sort of oil.**

- After filling with oil, pack the machine in moisture-proof (yellow) foil.
  (This foil can be ordered from OMS)
- Otherwise: Store in a dry place

Observe the following before installing the elevator machine:

- **Reduce the oil level!** Drain the oil to the specified level (see 3.1.1).
- Check all brake components (remove any light rust film on the brake drum by braking).
- Turn the machine by hand (to ensure the motor bearings are evenly lubricated).
- Install the machine (see 3. Commissioning)

C) Longer than 18 months storage:

Optionally, the elevator machine can be conserved in the factory or such measures as taken under: **B) up to 18 months storage**
Otherwise: Store in a dry place

Observe the following before installing the elevator machine:

- Change the gear oil completely! Use the correct oil and ***observe the oil level*** (see 3.1.1 and 3.1.3)
- Check all brake components (remove any light rust film on the brake drum by braking).
- Turn the machine by hand (to ensure the motor bearings are evenly lubricated).
- If the machine is stiff and difficult to turn, the motor bearings may have to be replaced.
- Install the machine (see 5. Commissioning)

Following longer storage periods, the manufacturer's warranty/guarantee may have expired. If a further warranty/guarantee period is required, the elevator machine can be returned to the manufacturer for overhauling which will be charged to the customer (bearings etc. replaced if required) and for the above measures to be carried out at the customer's expense.

Our liability for defects does not cover damage due to improper or negligent handling.

6 Operation and maintenance

The regulations and instructions governing operation, maintenance and inspection in accordance with the valid safety regulations governing elevator construction, such as DIN EN 81: „Safety rules for the construction and installation of passenger and goods elevators and service elevators", Part 1: „Electrically operated passenger and goods elevators", „Technical rules for elevators" and any and all relevant rules, regulations and instructions must be observed at all times.

The operator is responsible for the safe installation, inspection and maintenance in accordance with the applicable elevator regulations and standards.

6.1 Recommended routine maintenance

Action	***Maintenance schedule***	***Source***
Check oil level	Every 3 months	See 6.3.1
Change oil	See 6.3.2	See 6.3.3
Check bearings (acoustic check)	In accordance with the elevator maintenance schedule, minimum 1 x per year	
Check brake	In accordance with the elevator maintenance schedule, minimum 1 x per year	See 6.5
Check traction sheave wear	In accordance with the elevator maintenance schedule, minimum 1 x per year	
Check electrical wiring, check for loose connections	In accordance with the elevator maintenance schedule, minimum 1 x per year	
Clean the machine surface	As required, minimum 1x per year	
Check that protective and safety equipment is installed and correctly adjusted	In accordance with the elevator maintenance schedule, minimum 1 x per year	
Check bolt connection traction sheave / flange	In accordance with the regular elevator maintenance schedule, at least annually.	Test torque: Fitting bolts (M16 / 8x): 200 Nm Centric bolt (M20): 230 Nm

6.2 Errors – Troubleshooting

Fault	*Potential cause*	*Action*
Unusual, irregular operating sounds	• Unrolling/grinding/scraping sounds: bearing damage • Knocking sound: Toothing irregularities • Controller adjustment	• Call customer service • Check the frequency converter parameters
Oil leakage	• Damaged seal	• Call customer service
Brake does not switch	• Faulty wiring	• Check electrical connections

6.3 Gear oil

6.3.1 Checking the oil level

Check the oil level every time servicing is performed. Use the oil dipstick to check the oil level.

- Oil level must be between the markings.

6.3.2 Checking the condition of the oil

Under normal conditions and an ambient temperature of approx. 35°C, lubrication is lifetime lubrication and an oil change is normally unnecessary.
However, it is always advisable to check the condition of the oil at regular intervals.

Check:

- Check the colour of the oil by pulling out the oil dipstick and letting a drop of oil fall on a white piece of paper. Compare the colour of the oil with the colours on the oil check card.

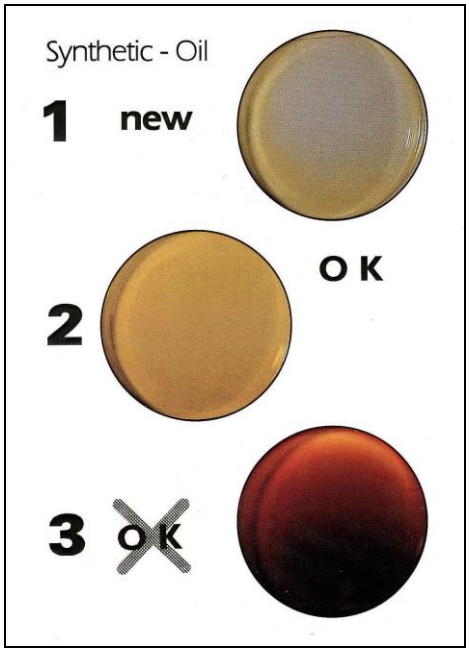


Fig. 7 Oil check card

- Oil colour light yellow to mid brown: Oil condition good to still usable.
- **Oil colour matches colour 3: Change oil immediately.**
- **Oil colour dark brown to black: Oil unusable → Change oil.**

6.3.3 Changing the oil

Should an oil change be necessary, follow this procedure:

1. Place a suitable container under the oil drain plug beneath the gear unit. The oil filling for installation in position B1 is approx. 13 litres.
2. Carefully open the oil drain plug.
3. After all the oil has drained, close the oil drain port tightly again.
4. Fill new oil in using the oil dipstick opening or the bleeder valve.
5. Observe the filling level (see 6.1.1).
6. **Only fill with the specified oil**:

   Klübersynth GH 6-220 Volume: Depends on installation position (Never mix with mineral oil!)
   (Other types of oil may only be used only if OMS have given their approval)

7. Close the filling port as appropriate with the oil dipstick or the bleeder valve.

Any oil escaping while changing the oil or due to leakage must be removed immediately.

Used synthetic oil is special waste!

6.4 Replacing the traction sheave

The traction sheave is, like the elevator ropes, prone to wear and must be changed according to the regulations governing elevators. The traction sheave is attached to an adapter flange on the output shaft.
The adapter flange and traction sheave are connected to each other by means of fitting screws and must be replaced together.

Procedure to replace the traction sheave:

1. Disable and secure the complete elevator system. (Observe the instructions of the elevator manufacturer).
2. Loosen and remove the ropes from the traction sheave. (Observe the instructions of the elevator manufacturer).
3. Should the safeguard device against rope jumping require adjustment, please consult chapter 3.1.2.
4. Secure the traction sheave against falling – use a rope loop.

5. Remove the fixing screw, the Nord-Lock-washer and the pressure plate.

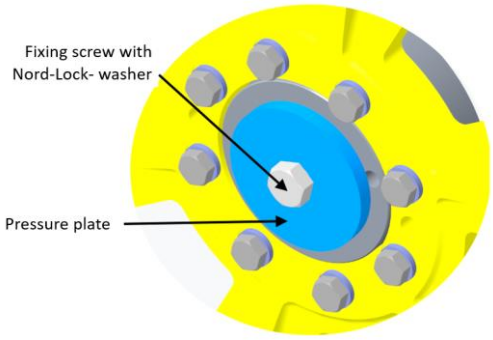


Fig. 8: disassembly traction sheave

6. Pull the traction sheave together with the adapter flange from the output shaft using the pull-off device (OMS-article-number: 19040020). To do this, use the two M16-threads in the adapter flange.

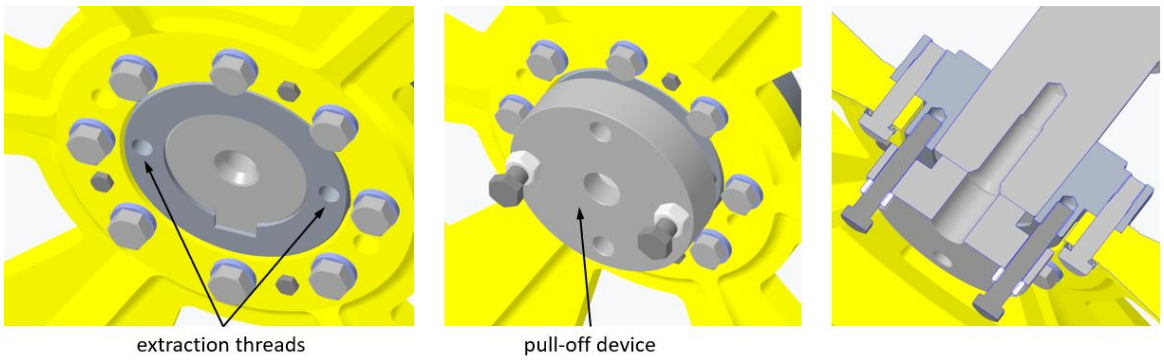


Fig. 9: disassembly traction sheave, pull-off device

7. Remove the feather key from the groove of the output shaft.
8. Clean the tapered seat of the output shaft.
9. Insert the new feather key into the groove of the output shaft (justified with the shaft end).

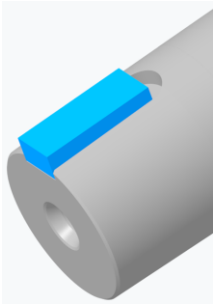


Fig. 10: assembly feather key

10. Align the groove of the new traction sheave with the feather key in the output shaft.
11. Push the traction sheave as far as possible onto the output shaft.

12. Mount the pull-on device (OMS-article-number: 19040021).

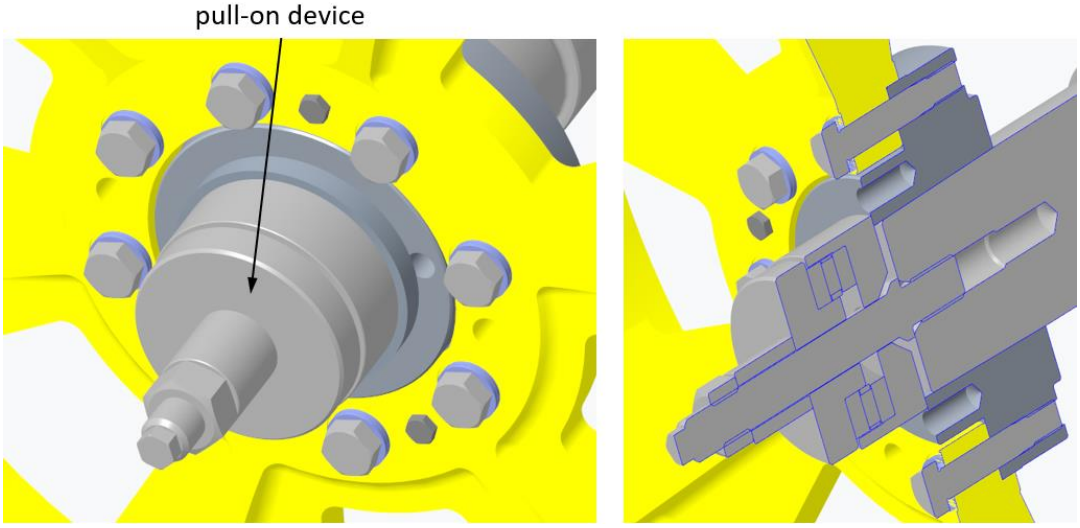


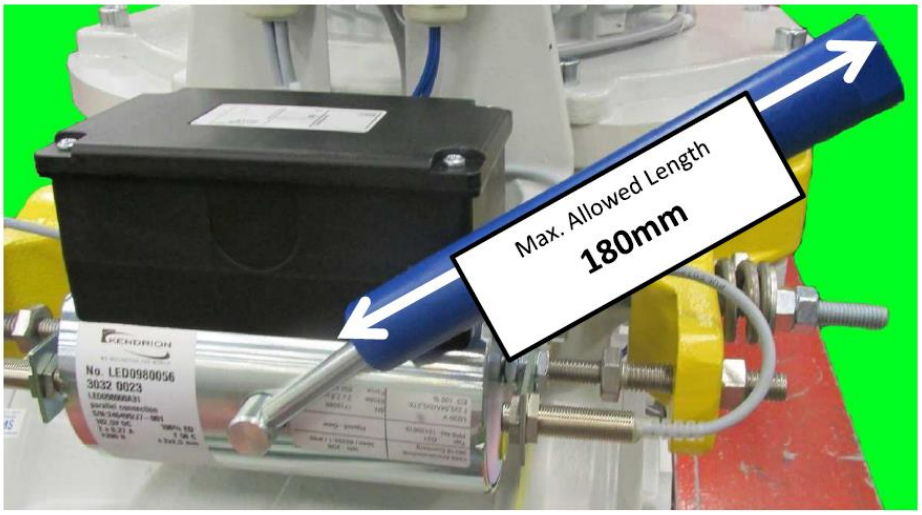
Fig. 11: pull-on device

- Screw the M24-threaded bolt of the device into the thread of the output shaft as far as it will go
- Use the nut on the M24- threaded bolt to pull the traction sheave onto the taper of the output shaft, maximum tightening torque of the nut 320 Nm
- Then loosen the nut again and remove the M24- threaded bolt of the device from the output shaft

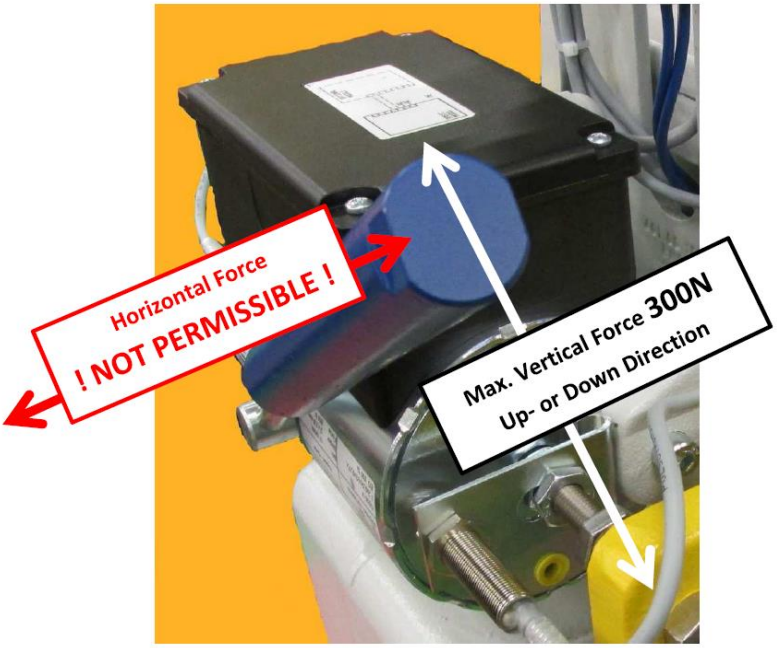
13. Slide the new Nord-Lock-washer onto the new fixing screw (M20x105).
14. Lubricate the thread of the new fixing screw with LOCTITE 243.
15. Mount the pressure plate, Nord-Lock-washer and the fixing screw. Maximum tightening torque of the fixing screw 250 Nm.

6.5 Brake maintenance

6.5.1 Manual release lever



To open the brake it´s allowed to put an extension tube onto the manual release lever.
The maximum allowed length of the extension tube is **180mm**.
The manual release lever is allowed to be actuated in **vertical direction**. **ONLY!**
The maximum allowed force for actuating the manual release lever with extension tube is **300N**.



6.5.2 Check: Ensure the brake lever moves easily

As part of and when performing routine elevator system maintenance, ensure the brake lever moves easily. Open each brake lever individually as described under 3.2.3 (Checking the two brake circuits). The brake lever must close again easily. If necessary, draw the brake lever joint pin out, (see 6.3.3) and re-lubricate before replacing it.

6.5.3 Check: Clearance and lining wear

Note: Because the brake in elevator systems is a holding brake and is only subjected to friction when the elevator car falls during safety testing, only a low amount of wear can be expected on the brake lining.
Despite this, check the clearance between the solenoid plungers and the corresponding thrust screws in the brake levers when performing routine elevator system maintenance.

a) Clearance:

Clearance must always be greater than 1.0 mm.
At the latest when clearance reaches 1 mm, readjust this immediately to max. 1.5 mm
(see 6.5.6 and fig.15).

Procedure:

1. Push the solenoid plunger back and measure the clearance between the plunger and thrust screw (fig. 15).
2. Unscrew the lock nut for adjustment, tighten the thrust screw and retighten the lock nut. Adjustment S=1.5 mm.
3. After adjustment, check the brake opens mechanically using the release lever on the solenoid and electrically using the system controls.
4.

If clearance can not be adjusted because the screw head contacts the brake lever, replace both brake levers by brake levers with new linings immediately!

b) Lining wear:

The amount of lining wear determines the position of the brake lever. The more lining wear there is, the closer the brake lever moves inwards to the solenoid.

Check lining wear:

If the brake lever has reached its minimum thickness due to wear, replace both brake levers by levers with new linings.

6.5.4 Replacing the brake lever

Shut down and secure the entire elevator system (see elevator manufacturer's instructions). When both brake levers are removed, there is no longer any brake holding load and the elevator car will start to move!

- Always replace both brake levers!

- Change the brake lever first on one side and then on the other.
- To replace the brake lever, remove the compression spring with the rotation protected thrust washer and remove the locking bolt.
- Pull the splint out.
- Push the joint pin up (with flat screw driver under the bolt head) and pull it out.
- Lift the lever out to the side and remove the washers at the same time.
- Install the lever with the new brake lining in reverse order to the above.
- Do not forget to replace the washers!
- Adjust the brake and check braking capacity as described under 6.5.6.

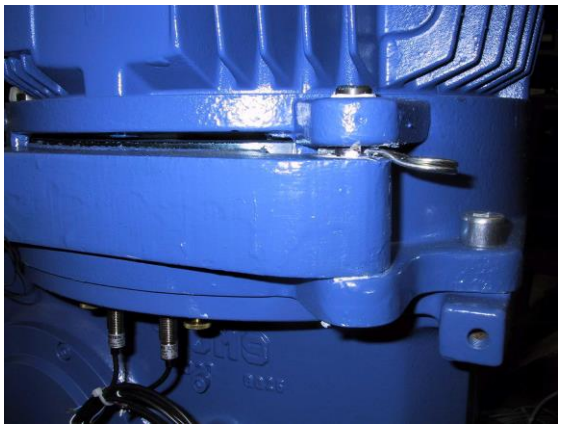


Fig. 12:

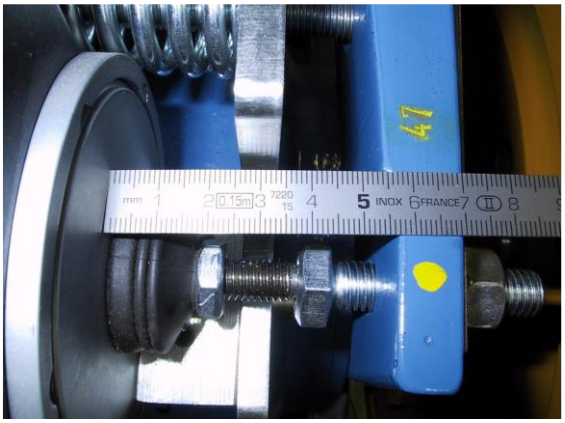


Fig. 13

Attention:

- Measure the distance between the inside edge of the brake lever and the top edge of the solenoid and mark this value minus 10 mm clearly and permanently on the brake lever to show the minimum clearance (e.g. stamp numbers, see fig. 13).

For new brake linings, the desired braking torque can only be achieved after breaking several times with the selected spring pre-tensioning! – if this is not done, there is no brake holding load and the elevator car can slip.

6.5.5 Adjusting the brake

Depending on the required nominal torque of the motor, the solenoid lifting force and compression spring stiffness is factory set. For the dual circuit brake, brief overexcitation controls the solenoid at opening, i.e. control with higher lifting force.

To compensate possible brake lining wear and to check wear safely, clearance is pre-set at 1.5 mm between the solenoid plungers and the corresponding thrust screws. See 6.5.6. on checking and adjusting clearance.

Check brake functionality before commissioning the elevator system. If the preset braking torque does not correspond to operating conditions, adjust it.

6.5.6 Adjusting the braking torque, dual circuit braking system:

- With the brake closed, loosen lock nut M12 on the threaded rod.
- Turn the spring tensioning screw to change the brake spring preload (clockwise rotation increases preloading).

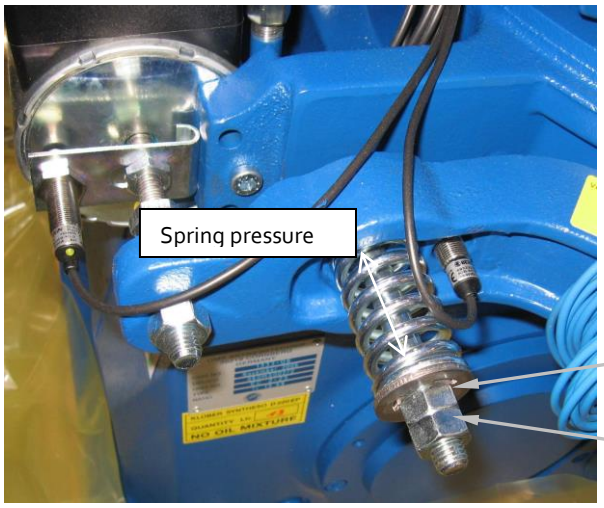


Fig. 14:

- Preset spring pressure (4mm) is adjusted during field testing.
- Tighten the hex nut M12 and check the solenoid plungers to ensure the required clearance (no load) is still there. If necessary, readjust to the required clearance of 1.5 mm using the thrust screw in the brake lever.

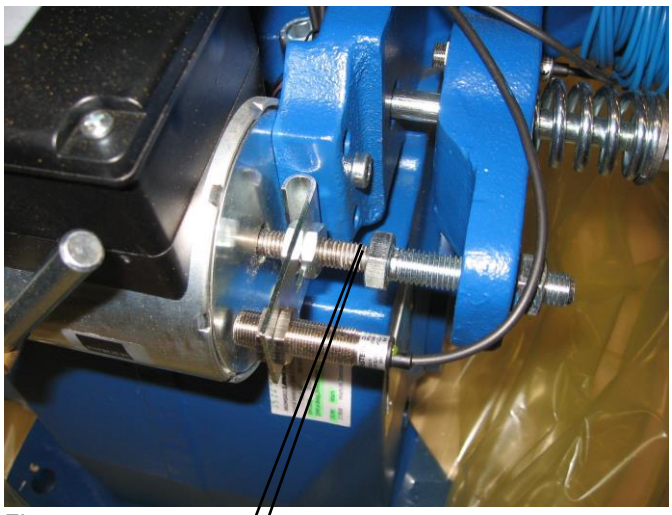


Fig. 15:

- Check whether the solenoid opens the brake completely, mechanically with the central release lever and electrically using the system controls.

Fig. 16: External spring

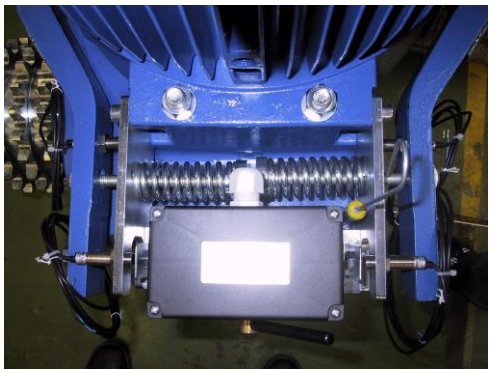


Fig. 17: Internal spring

6.6 Adjusting the braking function sensor

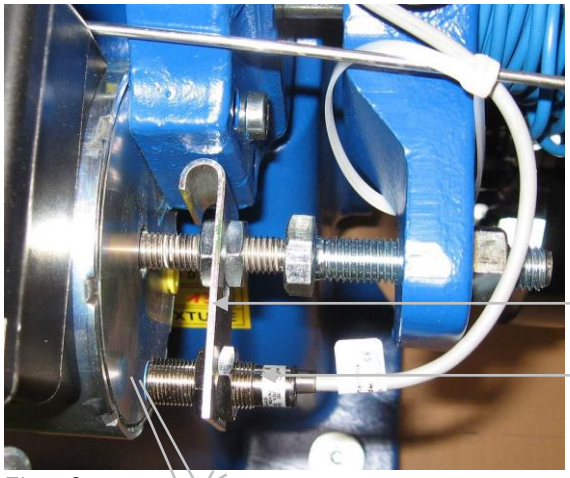


Fig. 18:

- The switching lug must be fitted onto the thread of the brake magnet tappet.
- The sensor must be installed in the front drill hole with an air clearance of 3,0mm between the sensor and brake solenoid. The sensors must be adjusted while the brakes are closed.

Inductive Brake Function Sensor Information:

Calculated switch clearance: 4,5mm
Standard Function – The electrical circuit is closed when the brake is open

6.7 Adjusting the break lining wear control

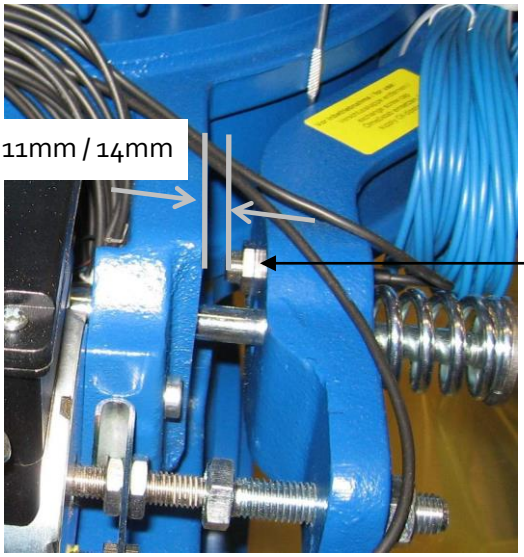


Fig. 19:

- The sensor for the brake lining wear is fitted in the external drill hole of the brake lever.
- A spacing of 11mm / (14mm) is set for new machines in the factory and should not be adjusted. The sensor responds, if the brake lining at the front edge of the brake lever has reached a thickness of 1mm. The machine can still be used. The levers must be replaced.
- If it is necessary to replace the two brake levers a distance of 11mm / (14mm) must be set for the new linings.

Information about the inductive brake lining wear sensor:

Calculated switch clearance: 4,5mm
Standard Function – electric circuit by worn brake lining closed

6.8 Replacing the incremental encoder

Fig. 20: Fixing the encoder

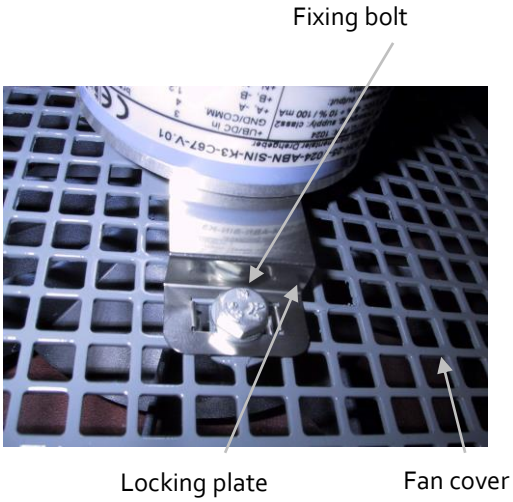


Fig. 21: Supporting the encoder

- Remove the handwheel together with the central fixing bolt and washer.
- Loosen the two radial fixing bolts under the incremental encoder (see fig. 20).
- Loosen the fixing bolt on the locking plate and carefully lift the encoder.
- Proceed in reverse order to reassemble.

6.9 Replacing the motor

Put the new motor within easy reach and check the technical data.

Note: The motor surface can be hot – danger of burns!

- Remove the 4 fixing bolts on the motor base above the brake lever.
- Lift the motor using the rope sling and eyebolts which can be screwed into the side of the motor.
- **Caution:** The motor can be damaged or fall during transportation if it is not suspended correctly. Never use the handwheel to lift the motor. Use a rope sling and eyebolts on the side of the motor.
- Replace the elastic coupling ring; at the same time clean the claw coupling e.g. by blowing out.
- To replace the motor, match a coupling claw on the motor with a recess on the gear coupling and carefully guide the coupling claws into each other while lowering.
- Tighten the fixing bolts in diametrically opposite sequence several times. (Torque **50 Nm**)

6.10 Replacing the elastic coupling ring

A claw coupling with an elastic coupling ring is located between the motor and the gear. The coupling ring consists of moisture and heat resistant polyurethane.

Lift the motor to replace the coupling ring.

- Remove the 4 fixing bolts on the motor base above the brake lever.
- Mark the position of the handwheel in relation to the motor cover.
- Lift the motor using a rope sling and eyebolts attached to the side of the motor until the claw coupling is visible.
- **Attention:Never use the handwheel to lift the motor!**
- Replace the elastic coupling ring; at the same time clean the claw coupling e.g. by blowing out.
- To replace the motor, put the handwheel in the marked position and carefully guide the coupling claws into each other while lowering.
- Tighten the fixing bolts in diametrically opposite sequence several times (Torque **50 Nm**)

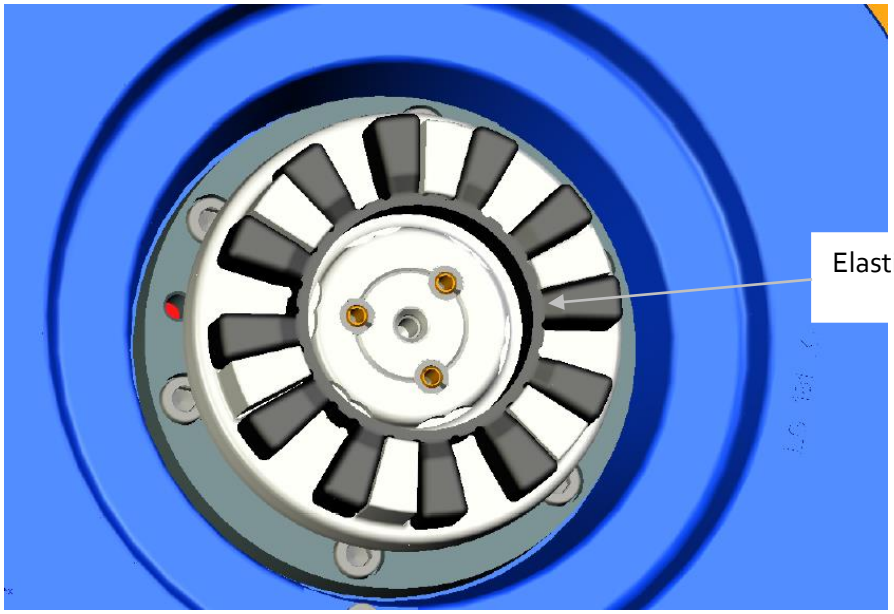


Fig. 22: Claw coupling between motor and gear

7 Disassembly

7.1 Drive unit disassembly

Replace the oil dipstick by the supplied screw plug. The gear unit is not oil-tight when fitted with the oil dipstick.
To disassemble the unit, proceed as for commissioning but in the reverse order.

7.2 Drive unit disposal

- Dispose of gear wheels, shafts and rolling contact bearings as steel waste.
- Dispose of cast iron parts as steel waste.
- The motor winding and brake unit mainly consist of non-ferrous metals such as brass and bronze and must be disposed of accordingly.
- Collect used oil and dispose of accordingly.

8 Appendix

Technical data OMS elevator machine EC 2-25 Lift

Dimension drawing OMS elevator machine EC 2-25 Lift
Motor positioning of version B1

Electrical connections

Technical releases
(Sheets 1 and 2)

Please contact us if you have any questions:

OMS Antriebstechnik
Bahnhofstraße 12
36219 Cornberg

Tel.: 05650 – 969 – 0
Fax: 05650 – 969 - 100

E-Mail: info@oms-antrieb.de

Homepage: www.oms-antrieb.de

Gear unit:

Input speed, max.: $n = 1800\ min^{-1}$ *)
Efficiency: $\eta,n \geq 96\ \%$
Typical backlash: 4 to 8 arc. minutes

Sound pressure level ($n \leq 1500 min^{-1}$ / 26kW): $L_{pA} = 65$ dB(A)

- typical, measured on an OMS test rig in a sound measurement room with frequency converter, load and speed correspond to constant travel speed. These values may vary depending on the system.

Gear ratio	I	18,71	24,01	
Output shaft: max. torque	T	4400 Nm	5400 Nm	
max. axle load		80 kN		
Elevator car load up to ca. / at suspension	Q	6000kg/ 4:1	2500kg/ 2:1	1600kg/ 1:1
Elevator car speed up to ca. / at suspension	v	0.6 m/s	1.6 m/s	2 m/s

Motor: (only for operation with frequency converter)
Three phase induction motor: 4-pole, IP 54, motor protection: PTC,
Type / Diameter: Type: 200 / B= 305
Motor nominal torque up to: T,nenn = 200 Nm

Brake: Shoe brake with double circuit double acting expansion solenoid
2 solenoid coils, controlled together or individually

Traction sheave:

Diameter: D = 400, 450, 500, 560, 650 mm *)
Weight, ca.: G = 37, 46, 52, 59, 86 kg *)
Width: C = 132mm
Rope diameter: D, s = 10, 11, 12, 13 mm *)
Number of ropes: n = 4 – 7 *)

*) Other options available upon request

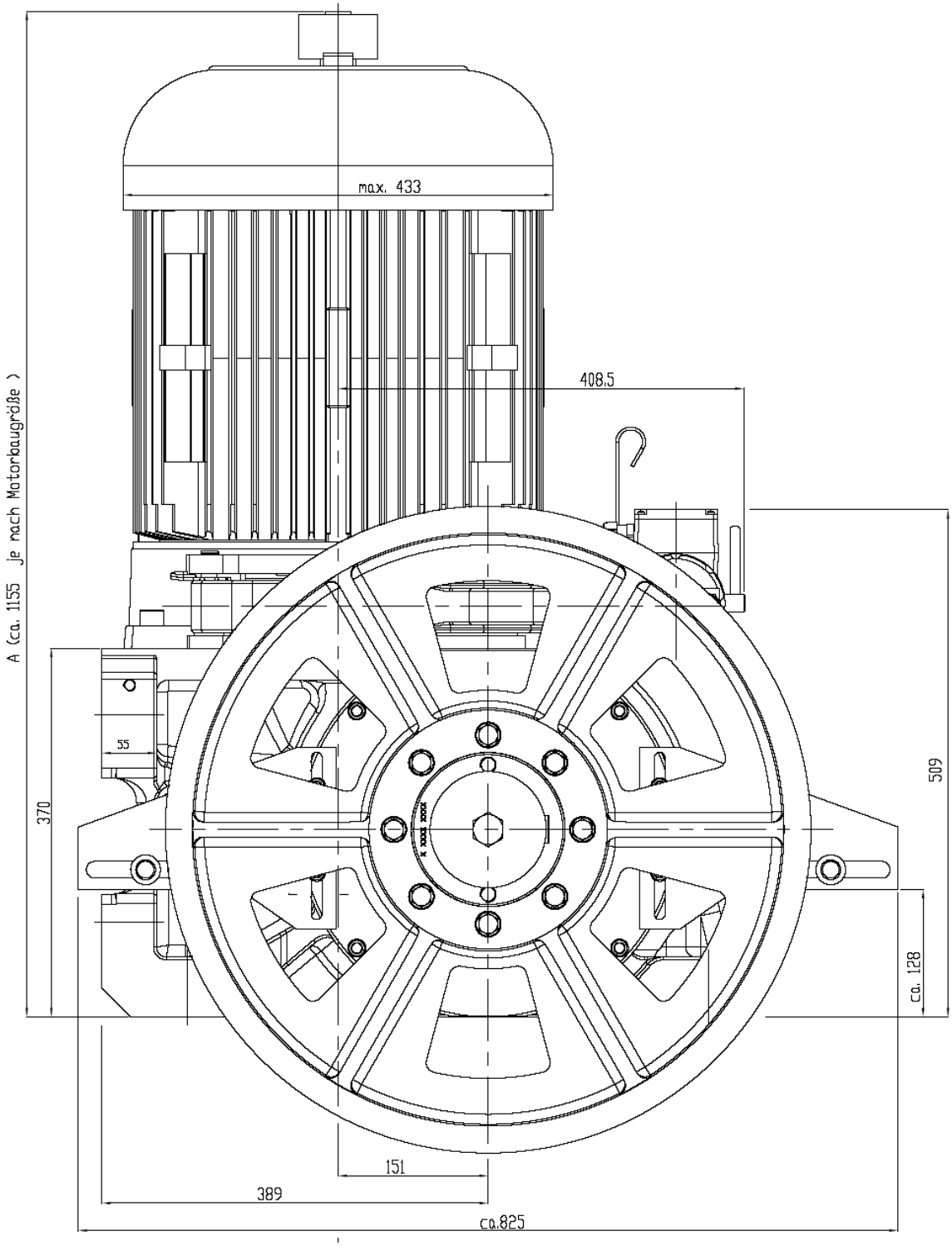
Dimensions:

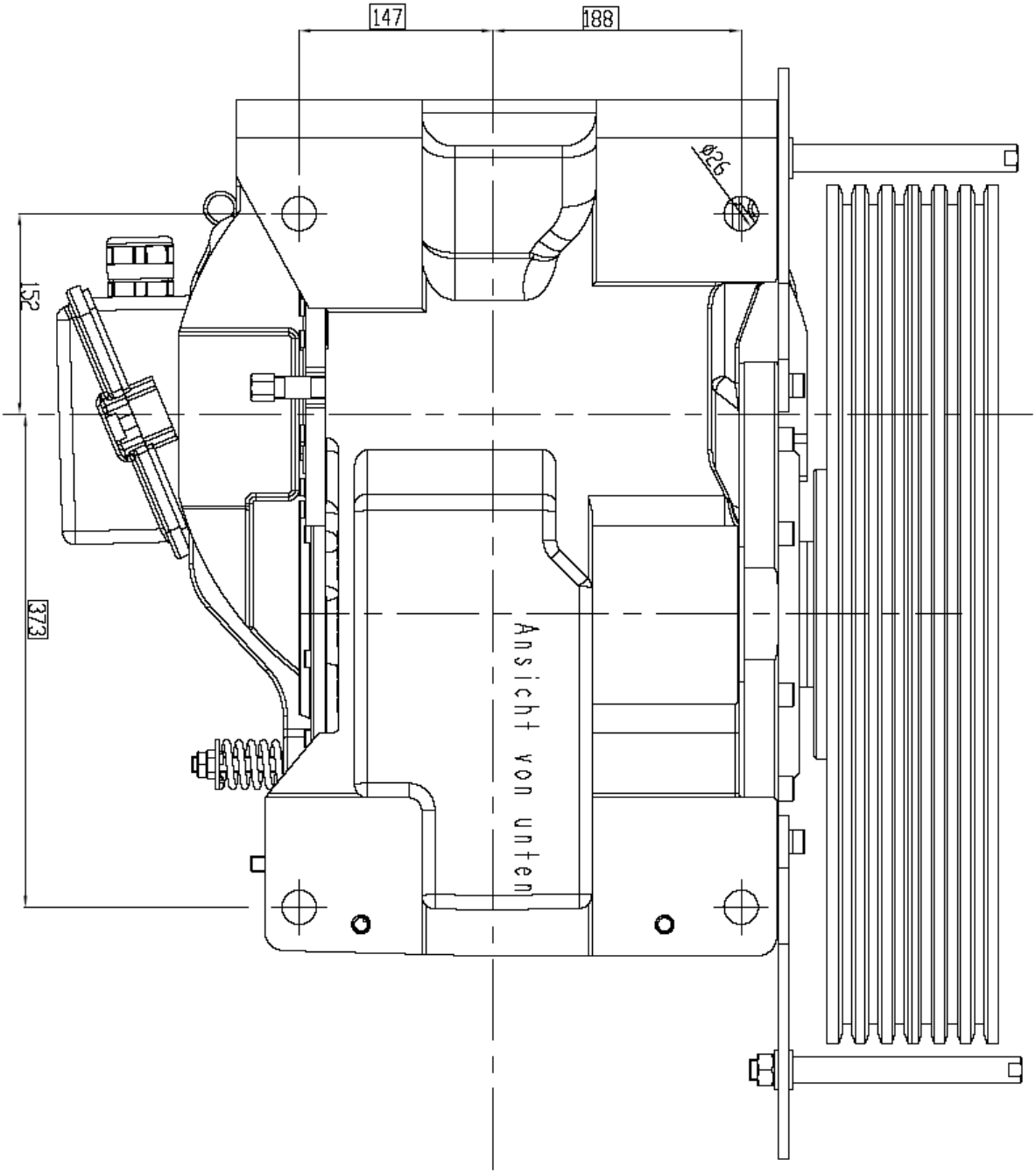
Motor Typ	P_{nenn} kW	T_{nenn} Nm	n_{nenn} min^{-1}	f Hz	A mm	G ca. kg
200	30	200	1470	50	1155	700*
200	36	200	1765	60	1155	700*
180L	26,3	170	1470	50	1144	700*

Only installation position B1 is possible! (see order data sheet)

*with traction sheave D=650mm, b=130mm

Dimension drawing EC 2-25 Lift

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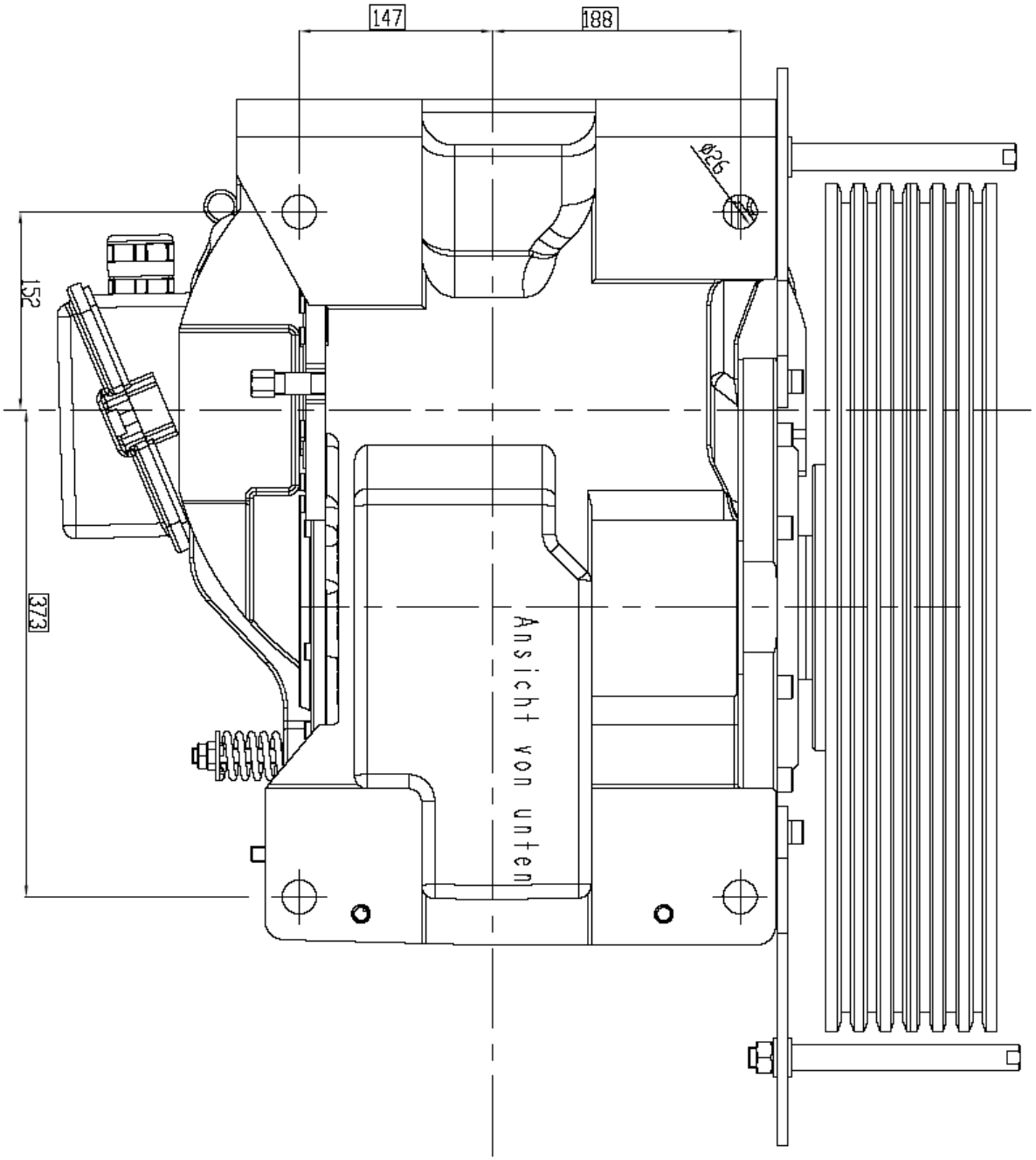
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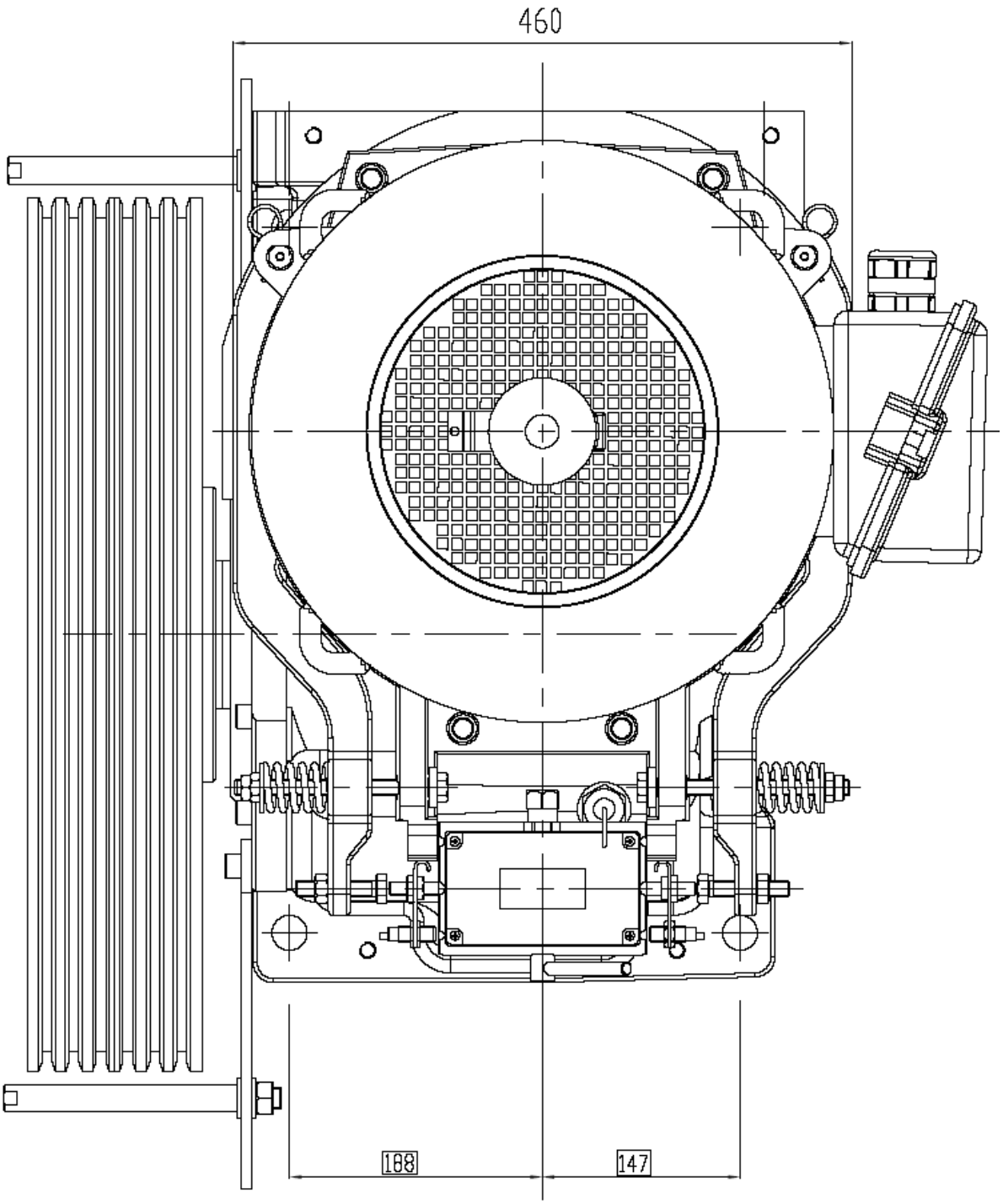
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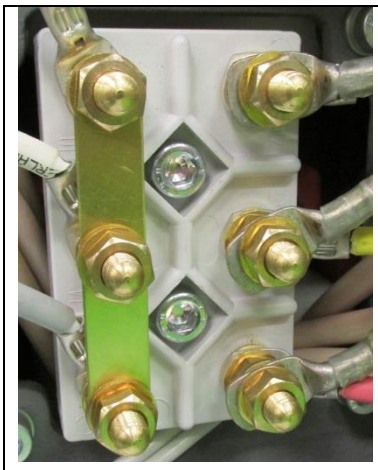
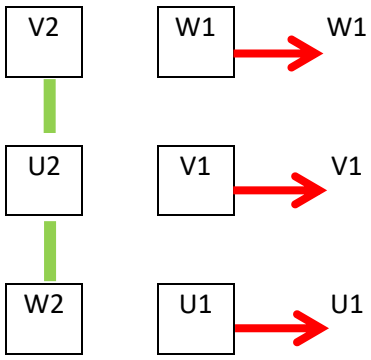
1. Wiring diagram for e - motor

Junction box:





Star- connection

Jumper between V2and U2 and U2 and W2!

Motor cable (consisting of U1 ; V1 ; LW1 and PE) connecting as follows :

U1 to U1 ; V1 to V1 ; W1 to W1 - PE(green-yellow) always first

Attention:

For Fi-operation the following must be observed:

You have to use a filter between the Fi and the motor, which is limiting the increase speed of the voltage from the Fi to the motor connecting points to a limit of $\delta U/\delta t \leq 500V/\mu s$.

Higher increasing speed of the voltage can damage the motor windings (short circuit is possible).

2. Wiring diagram for the encoder, extensions & adapter

Encoder output

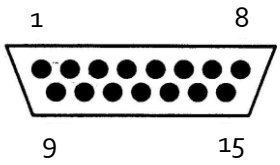
	Sinus	TTL	HTL
output	Sin. / cos.	Square	Square
supply	+ 5V	+ 5V	+ 8V to + 30V

2.1 Encoder connections (Sinus / TTL / HTL)

Output D-SUB 15 pol. plug

PIN no.	Signal		PIN no.	Signal
1	A+		9	-
2	A-		10	-
3	**Supply**		11	-
4	**GND**		12	Shield
5	B+		13	-
6	B-		14	-
7	N+		15	-
8	N-		**Case**	Shield

A ±: Channel 1, B ±: Channel 2, N ±: Reference



View from the plug side
(Note: Shield to PIN 12 only required for SIN/COS encoder to Dietz frequency converter)

2.2 Encoder extension cable, l = 5m

D-SUB 15 pol. socket to D-SUB 15 pol. plug
OMS Nr. 3034 0060

PIN no.	Signal		PIN no.	Signal
1	A+		9	-
2	A-		10	-
3	**Supply**		11	-
4	**GND**		12	Shield
5	B+		13	-
6	B-		14	-
7	N+		15	-
8	N-		**Case**	Shield

A ±: Channel 1, B ± : Channel 2, N ±: Reference

PIN no.	Signal		PIN no.	Signal
1	A+		9	-
2	A-		10	-
3	**Supply**		11	-
4	**GND**		12	Shield
5	B+		13	-
6	B-		14	-
7	N+		15	-
8	N-		**Case**	Shield

A ±: Channel 1, B ± : Channel 2, N ±: Reference

2.3 Adapter connections for KEB frequency converter, l = 0.25m

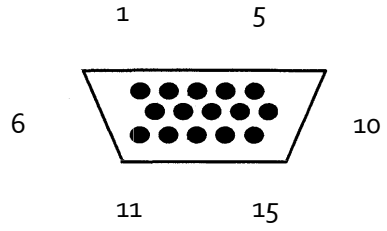
D-SUB 15 pol. socket to D-SUB 15 pol. plug, 3-row
OMS Nr. 3034 0061

PIN no.	Signal		PIN no.	Signal
1	A+		9	-
2	A-		10	-
3	**Supply**		11	-
4	**GND**		12	Shield
5	B+		13	-
6	B-		14	-
7	N+		15	-
8	N-		**Case**	Shield

A ±: Channel 1, B ±: Channel 2, N ±: Reference

PIN no.	Signal		PIN no.	Signal
1	-		9	B+
2	-		10	-
3	A-		11	-
4	B-		12	**Supply**
5	-		13	**GND**
6	-		14	R-
7	-		15	R+
8	A+		**Case**	Shield

A ±: Channel 1, B ±: Channel 2, R ±: Reference



View from plug side

2.4 Adapter connections for Ziehl-Abegg frequency converter, l = 0.25m

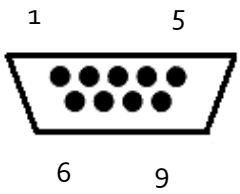
D-SUB 15 pol. socket to D-SUB 9 pol. plug
OMS Nr. 3034 0102

PIN no.	Signal		PIN no.	Signal
1	A+		9	-
2	A-		10	-
3	**Supply**		11	-
4	**GND**		12	Shield
5	B+		13	-
6	B-		14	-
7	N+		15	-
8	N-		**Case**	Shield

A ±: Channel 1, B ±: Channel 2, N ±: Reference

PIN no.	Signal
1	A+
2	B+
3	-
4	Supply
5	GND
6	A-
7	B-
8	-
9	GND
Case	Shield

A ±: Channel 1, B ±: Channel 2,



View from plug side

2.5 Adapter connections for Danfoss frequency converter, l = 0.25m

D-SUB 15 pol. socket to Phoenix socket, 8pol.
OMS Nr. 3034 0126

PIN no.	Signal		PIN no.	Signal
1	A+		9	-
2	A-		10	-
3	**Supply**		11	-
4	**GND**		12	Shield
5	B+		13	-
6	B-		14	-
7	N+		15	-
8	N-		**Case**	Shield

A ±: Channel 1, B ±: Channel 2, N ±: Reference

PIN no.	Signal
1	Supply
2	GND
3	A+
4	A-
5	B+
6	B-
7	N+
8	N-
	Shield

A ±: Channel 1, B ±: Channel 2, N ± Reference

Plug: Phoenix part number 1840421

2.6 Adapter connections to open end wires, l = 0.25m

D-SUB 15 pol. socket to 9 open wires
OMS Nr. 3034 0127

PIN no.	Signal		PIN no.	Signal
1	A+		9	-
2	A-		10	-
3	**Supply**		11	-
4	**GND**		12	Shield
5	B+		13	-
6	B-		14	-
7	N+		15	-
8	N-		**Case**	Shield

A ±: Channel 1, B ±: Channel 2, N ±: Reference

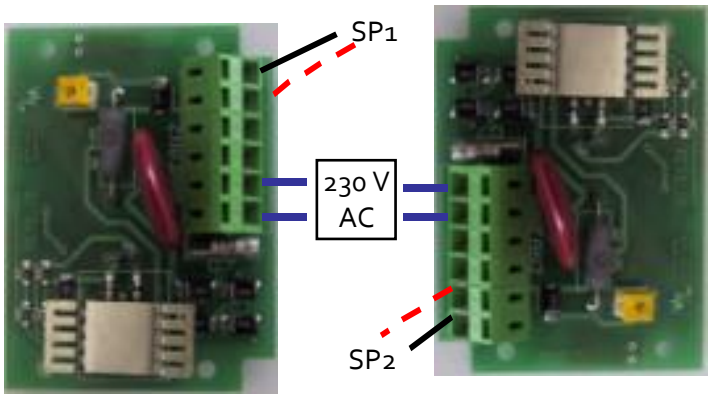
Cable no.	Cable Colour	Signal
1	brown	Supply
2	black	A+
3	red	A-
4	orange	B+
5	yellow	B-
6	blue	N+
7	grey	N-
8	white	GND
9	Litz	Shield

A ±: Channel 1, B ±: Channel 2, N ± Reference

5. OMS braking solenoid mains connection

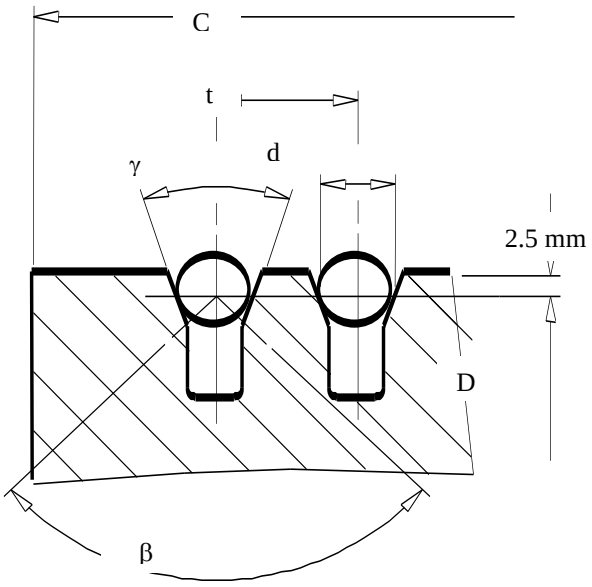
Connection voltage: 230V AC
Nominal current: 2 x 0.26A (Parallel)

Connection with two control modules.
Both solenoid circuits are independently controlled.

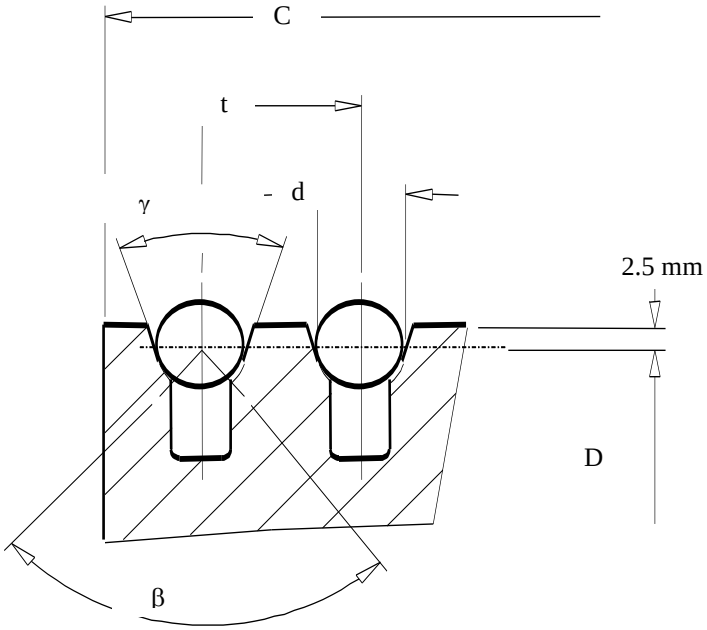


Two-piece traction sheave with flange connector, material: GG 25 (ca. 230HB)
Optional: hardened guides 50HRC.

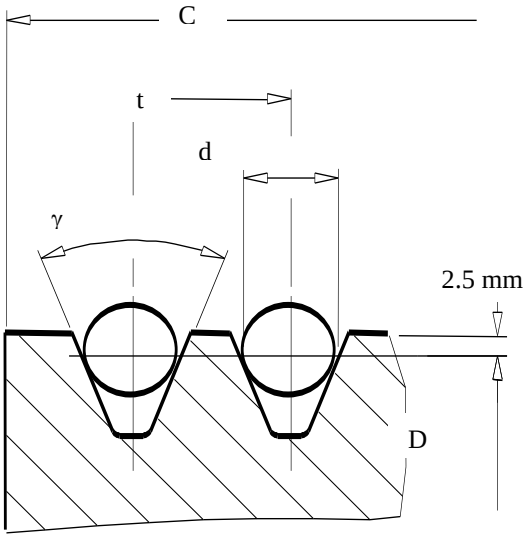
Standard traction sheave – undercut wedge guide



Special traction sheave – undercut semicircular guides



Special traction sheave –wedge guide without undercut



Available traction sheaves

Type	Traction sheave	Guides		Dimensions				Weight
	D in mm	Z	D	C	T	β°	γ°	kg
K3..	320	6-10	8	125	12-17	80-104	35-45	34
K4..	400	5-6	8-10	112	17	80-104	35-45	40
K4..	450	5-6	8-11	112	17	80-104	35-45	46
K5..	500	6	8-11	112	17	80-104	35-45	52
K5..	560	6	8-11	112	17-20	80-104	35-45	59
K5..	560	6-7	8-14	130	17-20	80-104	35-45	65
K6..	650	6	8-11	112	17-20	80-104	35-45	86
K6..	650	6-7	8-14	130	17-20	80-104	35-45	96
K7..	750	4-7	8-14	90+112+130	17-20	80-104	35-45	
Special traction sheaves								
	420-950	3-8	8-14	90-140	Any	80-104	35-45	-

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2.1	13.01.2022	Date of first issue: 16.06.2015	13.01.2022

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.

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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.

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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-tetramethylbutyl)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

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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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List of changes

No.	Description	Pages	Date
1	Replacing the traction sheave	31, 32	26.02.2024
2	Check bolt connection traction sheave / flange	27	22.07.2024