STEINLEN
ELEKTRISCHE ANTRIEBSTECHNIK

MOTOX/MOTOX©-N

Operating Instructions

MOTOX

Gearboxes for overhead conveyors

BA 2515

Edition 3/2021

STEINLEN
ELEKTRISCHE ANTRIEBSTECHNIK

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Gearboxes for overhead conveyors BA 2515

Operating Instructions

Translation of the original instructions
03/2021
A5E38123453A/RS-AD-ST

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

⚠DANGER

indicates that death or severe personal injury **will** result if proper precautions are not taken.

⚠WARNING

indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠CAUTION

indicates that minor personal injury can result if proper precautions are not taken.

NOTICE

indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Steinlen products

Note the following:

⚠WARNING

Steinlen products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Steinlen. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

Trademarks

All names identified by ® are registered trademarks of Steinlen Elektromaschinenbau GmbH. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

S**teinlen Elektromaschinenbau GmbH**
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A5E38123453A/RS-AD-**ST**
℗ 0**3**/20**21** Subject to change

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General information and safety notes

1

1.1 General information

Note

Steinlen Elektromaschinenbau GmbH does not accept any liability for damage and failures that result from the non-observance of these operating instructions.

These operating instructions are part of the gearbox delivery. Store the operating instructions near the gearbox.

These operating instructions apply to the standard version of the MOTOX gearbox for overhead conveyors BHF38, BHB38, KHF48, KHF68, KHZ48, CHF28, CHF48, CHF68 and CHZ48.

Table 1- 1 Order number code

MOTOX gearbox	Structure of the order number position						Order code
	1	2	3	4	5	14	
Bevel Helical Gearbox B and K	S	T	3	1	5		
Helical Worm Gearbox C	S	T	3	1	6		
Overhead conveyor H							G00
Flange F						F	
Foot / flange-mounted design B						B	
Centering flange Z						Z	

Note

In addition to these operating instructions, special contractual agreements and technical documentation apply to special gearbox designs and the associated supplementary equipment.

Please refer to the other operating instructions supplied with the product.

The described gearboxes correspond to the state-of-the-art at the time these operating instructions were printed.

Steinlen Elektromaschinenbau GmbH reserves the right to change individual components and accessory parts in the interest of further development. The changes serve to improve the performance and safety. The significant features are retained. The operating instructions are updated regularly with new contents.

Valid operating instructions for MOTOX

- BA 2010 - operating instructions for MOTOX gearboxes
- BA 2011 - operating instructions for MOTOX worm gearbox SC
- BA 2019 - operating instructions for MOTOX input units
- BA 2310 - operating instructions for three-phase and single-phase AC motors and motors equipped with brake with accessories
- BA 2320 - operating instructions for LA/LG and LAI/LGI motors
- BA 2330 - operating instructions for LA/LE/LES motors
- BA 2510 - operating instructions for MOTOX optional add-on units
- BA 2515 - operating instructions for MOTOX gearboxes for overhead conveyors

1.2 Copyright

The copyright to these operating instructions is held by Steinlen Elektromaschinenbau GmbH.

These operating instructions must not be wholly or partly reproduced for competitive purposes, used in any unauthorized way or made available to third parties without agreement of Steinlen Elektromaschinenbau GmbH.

1.3 Intended use

The MOTOX gearboxes described in these operating instructions have been developed for use as travel drives in overhead conveyors.

Unless otherwise agreed, the gearboxes have been designed for use in machinery and plants in industrial environments.

The gearboxes have been built using state-of-the-art technology and are shipped in an operationally reliable condition. Changes made by users could affect this operational reliability and are forbidden.

Note

The data on the rating plate assumes an installation altitude of up to 1 000 m above sea level.

The permissible ambient temperature is stamped on the rating plate.

For different installation altitudes and ambient temperatures, contact Technical Support.

The gearboxes are designed only for the area of application described in Section Technical specifications (Page 57).
Do not operate the gearboxes outside the specified performance limits.
Any different operating conditions require new contractual agreements.

Do not climb on the gearbox. Do not place any objects on the gearbox.

1.4 Obligations of the user

The operator must ensure that all persons assigned to work on the geared motor have read and understood these operating instructions and that they follow them in all points in order to:

- Eliminate the risk to life and limb of users and other persons.
- Ensure the operational safety of the geared motor.
- Avoid disruptions and environmental damage through incorrect use.

Note the following safety information:

Shut down the geared motors and disconnect the power before you carry out any work on them.

Make sure that the drive unit cannot be turned on accidentally, e.g. lock the key-operated switch. Place a warning notice at the drive connection point which clearly indicates that work is in progress on the geared motor.

Carry out all work with great care and with due regard to "safety".

For all work, observe the relevant regulations for work safety and environment protection.

Read the instructions on the rating plates attached to the geared motor. The rating plates must be kept free from paint and dirt at all times. Replace any missing rating plates.

In the event of changes during operation, switch off the drive unit immediately.

Take appropriate protective measures to prevent accidental contact with rotating drive parts, such as couplings, gear wheels or belt drives.

Take appropriate protective measures to prevent accidental contact with parts and equipment that heat up to over +70 °C during operation.

When removing protective equipment, keep fasteners in a safe place. Re-attach removed protective equipment before commissioning.

Collect and dispose of used oil in accordance with regulations. Remove oil spillages immediately with an oil-binding agent in compliance with environmental requirements.

Do not carry out any welding work on the geared motor. Do not use the geared motor as a grounding point for welding operations.

Carry out equipotential bonding in accordance with applicable regulations and directives by electrotechnology specialists.

Do not use high-pressure cleaning equipment or sharp-edged tools to clean the geared motor.

Observe the permissible tightening torque of the fastening bolts.

Replace damaged bolts with new bolts of the same type and strength class.

Steinlen Elektromaschinenbau GmbH accepts the warranty only for original spare parts.

The manufacturer who installs the geared motors in a plant must include the regulations contained in the operating instructions in its own operating instructions.

1.5 The five safety rules

For your own personal safety and to prevent material damage when carrying out any work, always observe the safety-relevant instructions and the following five safety rules according to EN 50110-1 Working in a voltage-free state. Apply the five safety rules in the sequence stated before starting work.

Five safety rules

1. Disconnect.
   Also disconnect the auxiliary circuits, for example the anti-condensation heating.
2. Secure against reconnection.
3. Verify absence of operating voltage.
4. Ground and short circuit.
5. Cover or safeguard neighboring live parts.

After the work has been completed, undo the measures taken in the reverse order.

1.6 Particular types of hazards

⚠ WARNING

Extreme surface temperatures

Hot surfaces over +55 °C pose a burn risk.

Cold surfaces below 0 °C pose a risk of damage due to freezing.

Do not touch the gearbox without protection.

⚠ WARNING

Hot, escaping oil

Before starting any work wait until the oil has cooled down to below +30 °C.

⚠ WARNING

Poisonous vapors when working with solvents

Avoid breathing in vapors when working with solvents.

Ensure adequate ventilation.

⚠ WARNING

Risk of explosion when working with solvents

Ensure adequate ventilation.

Do not smoke!

⚠ WARNING

Risk of eye injury

Rotating parts can throw off small foreign particles such as sand or dust.

Wear protective eyewear!

In addition to the prescribed personal protection gear, also wear suitable protective gloves and safety glasses.

Technical description 2

2.1 General description

The gearbox is supplied as a helical worm gearbox CH., as a 2-stage bevel helical gearbox BH., or as a 3-stage bevel helical gearbox KH. It is equipped with a mechanical clutch.

The gearbox is suitable for use as an overhead conveyor drive in accordance with VDI guideline 3643. Gearbox types CHF28 and BH.38 correspond to VDI guideline 3643.

They are used to transport goods in roofed over industrial applications. They can be used outdoors if the necessary contractual arrangements are made.

The gearbox is suitable for various mounting positions. Observe the correct oil level.

Housing

The gearbox housing is made of gray cast iron.

Geared components

The geared components are hardened. For the helical worm gearbox, the worm is hardened and ground. The gear is manufactured from high-quality bronze. The bevel gear stage of the bevel helical gearbox is lapped in pairs.

Lubrication

The geared components are supplied with adequate lubricant by means of dip lubrication.

Shaft bearings

All shafts are mounted in roller bearings. The roller bearings are lubricated using splash lubrication or oil-spray lubrication. Bearings that are not supplied with lubricant are closed and grease-lubricated.

Shaft seals

The radial shaft sealing ring, combination shaft sealing ring, labyrinth seal, and slide ring seal at the shaft outlet prevent lubricant from escaping from the housing and impurities from entering it.

Cooling

NOTICE
Dust deposits prevent heat radiation.
Dust deposits prevent heat radiation and cause a high housing temperature.
Keep the gearbox free from dirt, dust, etc.

The gearbox does not normally require additional cooling. The generously dimensioned housing surface is sufficient for dissipating heat losses where there is free convection. If the housing temperature exceeds a value of +80° C, please contact the Technical Support.

Flexible coupling

NOTICE
Balancing the coupling
A coupling with a peripheral speed of up to 30 m/s at the outer diameter must be statically balanced.
A coupling with a peripheral speed at the outer diameter of more than 30 m/s requires dynamic balancing.

A flexible coupling is generally used for the gearbox input and output.

If a rigid coupling or other input or output elements are to be used that give rise to additional radial and / or axial forces (e.g. gear wheels, belt pulleys), this must be contractually agreed.

Please refer to the relevant operating instructions for details of how to use the coupling.

Clutch for overhead conveyors

Actuation of the operating lever interrupts the force flow in the positive claw coupling on the output shaft. The output shaft can then freely rotate while the motor is stopped or in no-load operation.

Rating plate

The rating plate on the gearbox or geared motor is of coated aluminum foil. The rating plate is glued using a special masking film. The film ensures permanent resistance to UV radiation and media of all kinds, such as oils, greases, salt water and cleaning agents.

The adhesive and the material ensure firm adhesion and long-term legibility within the operating temperature range from -40° C to +155° C.

The edges of the rating plate are paint-finished to match the color of the gearbox or motor to which it is affixed.

In special cases, riveted or bolted metal plates are used.

2.2 Surface treatment

2.2.1 General information on surface treatment

All paint finishes are sprayed on.

NOTICE
Failure of the exterior protection If the paint finish is damaged, the geared motor may corrode. Do not damage the paint finish.

Note

Information about the ability to be repainted does not guarantee the quality of the paint product supplied by your supplier.

Only the paint manufacturer is liable for quality and compatibility.

2.2.2 Painted version

The corrosion protection system is classified according to the corrosiveness categories in DIN EN ISO 12944-2.

Table 2- 1 Paint according to corrosiveness categories

Paint system	Description
Corrosiveness category C1, unpainted for gearbox and motor housings made of aluminum	
-	• Indoor installation • Heated buildings with neutral atmospheres • Resistance to greases and some resistance to mineral oils, aliphatic solvents • Standard
Corrosiveness category C1 for normal environmental stress	
1-component hydro paint, top coat	• Indoor installation • Heated buildings with neutral atmospheres • Resistance to greases and some resistance to mineral oils, aliphatic solvents • Standard paint for gearbox housings made of cast iron

Paint system	Description
Corrosiveness category C2 for low environmental stress	
2-component - polyurethane top coat	• Indoor and outdoor installation • Unheated buildings with condensation, production areas with low humidity, e.g. warehouses and sports facilities • Atmospheres with little contamination, mostly rural areas • Resistance to greases, mineral oils and sulfuric acid (10 %), caustic soda (10 %) and some resistance to aliphatic solvents
Corrosiveness category C3 for medium environmental stress	
2-component epoxy zinc phosphate base coat, 2-component polyurethane top coat	• Indoor and outdoor installation • Production areas with high humidity and some air contamination, e.g. food production areas, dairies, breweries and laundries • Urban and industrial atmospheres, moderate contamination from sulfur dioxide, coastal areas with low salt levels • Resistance to greases, mineral oils, aliphatic solvents, sulfuric acid (10 %), caustic soda (10 %)
Corrosiveness category C4 for high environmental stress	
2-component epoxy zinc phosphate base coat, 2-component polyurethane top coat	• Indoor and outdoor installation • Chemical plants, swimming pools, wastewater treatment plants, electroplating shops, and boathouses above seawater • Industrial areas and coastal areas with moderate salt levels • Resistance to greases, mineral oils, aliphatic solvents, sulfuric acid (10 %), caustic soda (10 %)

Paint system	Description
Corrosiveness category C5 for very high environmental stress	
2-component epoxy zinc phosphate base coat, 2-component polyurethane intermediate coat, 2-component polyurethane top coat	• Indoor and outdoor installation • Buildings and areas with almost constant condensation and high contamination, e.g. malt factories and aseptic areas • Industrial areas with high humidity and aggressive atmosphere, coastal areas and offshore environments with high salt levels • Resistance to greases, mineral oils, aliphatic solvents, sulfuric acid (10 %), caustic soda (20 %)

In case of corrosiveness category C1, overpainting with a 1-component hydrosystem after prior rubbing down is possible.

In case of corrosiveness categories C2 to C5, overpainting with 2-component polyurethane paint, 2-component epoxide paint and 2-component acrylic paint after prior rubbing down is possible.

2.2.3 Primed version

Table 2- 2 Primer according to corrosiveness categories

Paint system	Can be overpainted with
Unpainted (corrosiveness category C1 G)	
Cast iron parts immersion primed, steel parts primed or zinc-plated, aluminum and plastic parts untreated	• Synthetic paint, synthetic resin paint, oil paint • 2-component polyurethane paint • 2-component epoxy paint
Primer according to corrosiveness category C2 G	
2-component metal primer, desired coat thickness 60 µm	• 2-component polyurethane paint • 2-component epoxy paint, acid-hardening paint • 2-component acrylic paint
Primer according to corrosiveness category C4 G	
2-component epoxide zinc phosphate, desired coat thickness 120 µm	• 2-component polyurethane paint • 2-component epoxy paint, acid-hardening paint • 2-component acrylic paint

Incoming goods, transport, and storage 3

3.1 Incoming goods

NOTICE
Transport damage impairs correct functioning
Do not commission faulty gearboxes or geared motors.

Note

Do not open or damage parts of the packaging that preserve the product.

Note

Check that the technical specifications are in accordance with the purchase order.

Inspect the delivery immediately on arrival for completeness and any transport damage.

Notify the freight company of any damage caused during transport immediately (this is the only way to have damage rectified free of charge). Steinlen Elektromaschinenbau GmbH will any claims not accept relating to items missing from the delivery and which are submitted at a later date.

The gearbox or geared motor is delivered in a fully assembled condition. Additional items are sometimes delivered packaged separately.

The products supplied are listed in the dispatch papers.

3.2 Transportation

3.2.1 General information on transport

NOTICE
The use of force will damage the gearbox or geared motor
Transport the gearbox or geared motor carefully. Avoid knocks.
Before putting the drive into operation, remove any transport fixtures and keep them safe or render them ineffective. You can then use them again for transporting further items or you can apply them again.

Different forms of packaging may be used, depending on the size of the gearbox or geared motor and the method of transport. Unless contractually agreed otherwise, the seaworthy packaging complies with HPE Packaging Guidelines (Bundesverband Holzpackmittel Paletten Exportverpackungen e.V., the German Federal Association for wooden packaging, pallets, and export packaging).

Note the symbols which appear on the packaging. These have the following meanings:


This way up


Center of gravity


Fragile


Do not use hand hook


Keep dry


Attach here


Keep cool

3.2.2 Fastening for suspended transport

⚠ WARNING

Inadequately secured gearbox or geared motors

Observe the maximum load for the transport eye ③ of the bevel helical gearbox or the eyebolt axis ④.

Use only the transport eye ③ or eyebolt ④ of the gearbox to transport the gearbox or geared motor.

Do not use the integrally cast lifting eyes ① on the motor for transport because of the risk of breaking. Only use the eyebolt ② on the motor to transport the motor prior to mounting or following removal.

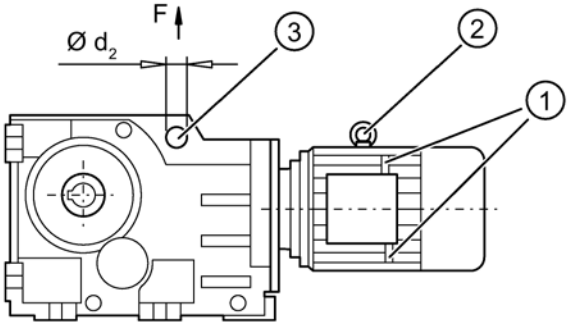
If necessary, use additional, suitable lifting accessories for transport or during installation.

When attaching by a number of chains and ropes just two strands must be sufficient to bear the entire load. Secure lifting accessories against slipping.

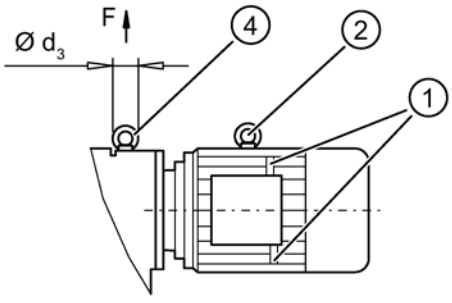
NOTICE

Do not rig eyebolts to the front threads at the shaft ends for transportation purposes

Transport eye on the bevel helical gearbox



Eyebolt on the helical worm gearbox



① Integrally cast eye on the motor
② Eyebolt on the motor
③ Transport eye on the bevel helical gearbox
④ Eyebolt on the helical worm gearbox

Figure 3-1 Fastening the gearbox or geared motor for suspended transport

The maximum load m in kg generated by the geared motor to be attached, with pull ↑ in direction F is listed in the following tables:

Table 3- 1 Maximum load of the transport eye on the bevel helical gearbox

Size	m	d_2	Size	m	d_2
	[kg]	[mm]		[kg]	[mm]
KH.48	250	22	KH.68	350	26

Table 3- 2 Maximum load of the eyebolt axis on helical worm gearbox CH68

Thread size	m	d_2
	[kg]	[mm]
M10	230	45

Procedure

1. Mount the geared motor on the transport device by the heaviest permissible weight to be attached. This will normally be on the main gearbox.
2. Check that the eyebolt is firmly seated.

The geared motor is slung for transport.

3.3 Bearings

3.3.1 General information for storage

⚠ WARNING
Danger of serious injuries caused by falling objects
Danger of damage to the gearbox when stacked
Do not stack gearboxes or geared motors on each other.

NOTICE
Failure of the external protection
Mechanical damage, chemical damage and thermal damage, such as scratches, acids, alkalis, sparks, welding beads and heat cause corrosion.
Do not damage the paint finish.

Unless contractually agreed otherwise, the guarantee period for the standard preservative lasts 6 months from the date of delivery.

In the case of storage in transit over 6 months, special arrangements must be made for preservation. Please contact Technical Support.

Store the gearbox or geared motor in dry, dust-free rooms that are maintained at a constant temperature.

The storage location must be vibration- and shock-free.

The free shaft ends, sealing elements and flange surfaces must have a protective coating.

3.3.2 Storage up to 36 months with long-term preservation (optional)

3.3.2.1 General notes for storage up to 36 months

Store the gearbox or geared motor in dry, dust-free rooms that are maintained at a constant temperature. Special packing is then not necessary.

If such premises are not available, pack the gearbox or the geared motor in plastic film or air-tight sealed film and materials. The films and materials must be able to accept moisture. Cover them to provide protection against heat, direct sunlight and rain.

The permissible ambient temperature is -25 °C to +50 °C.

The life of the corrosion protection is 36 months from delivery.

3.3.2.2 Gearbox filled with operating oil and anti-corrosive agent

NOTICE
Damage to the gearbox caused by incorrect oil quantities
Check the oil level before commissioning.
Observe the information and procedures for Checking the oil level (Page 41).

The gearbox is filled with oil corresponding to the mounting position so that it is ready for operation, and is sealed airtight using a screw plug or with a pressure breather valve with transport fixture.

For storage up to 36 months, a VCI anti-corrosion agent (**V**olatile **C**orrosion **I**nhibitor) is added.

3.3.2.3 Gearbox completely filled with oil

NOTICE
Damage to the gearbox caused by incorrect oil quantities
Prior to commissioning, remove excessive oil until it has the correct oil level.
Observe the information and procedures for Correcting the oil level (Page 41).

When biodegradable oils or oils for the food-processing sector are used, the gearbox is filled completely with operating oil. The gearbox is closed air-tight with a sealing plug or a pressure venting with transport fixture.

Do not lower the oil level during short-time commissioning for 10 minutes in no-load operation.

Installation 4

4.1 Unpacking

NOTICE
Transport damage impairs the correct function of the geared motor
Never commission faulty or defective motors.

Check the motor for completeness and damage. Report any missing parts or damage immediately.

Remove and dispose of the packaging material and transport equipment in compliance with regulations.

4.2 General information concerning the installation

⚠ WARNING
Assembly work with the system under load
Under load, the system can start or reverse in an uncontrolled fashion.
The entire system must be load-free so that there is no danger during this work.

NOTICE
Destruction caused by welding
Welding destroys the geared parts and bearings.
Do not weld on the gearbox. The gearbox must not be used as a grounding point for welding operations.

NOTICE
Overheating caused by solar radiation
Overheating of the gearbox due to exposure to direct sunlight.
Provide suitable protective equipment such as covers or roofs. Prevent heat accumulation.

NOTICE
Malfunction resulting from foreign objects
The operator must ensure that no foreign objects impair the function of the gearbox.

NOTICE
Damaged components impair the correct function of the gearbox
If any components are damaged, the correct function of the gearbox will no longer be ensured.
Do not install any damaged gearbox components.

NOTICE
Violation of the maximum permissible oil sump temperature
The oil sump temperature may be exceeded if the temperature monitoring equipment is incorrectly set.
A warning must be given when the maximum permissible oil sump temperature is reached. The geared motor must be switched off when the maximum permissible temperature is exceeded. If the geared motor is shut down, then this can cause the machine to come to a stop.

Exercise particular care during mounting and installation. The manufacturer cannot be held liable for damage caused by incorrect mounting and installation.

Make sure that there is sufficient space around the gearbox or geared motor for mounting, maintenance and repair.

On geared motors with a fan, leave sufficient free space for the entry of air. Observe the installation conditions for the geared motor.

Provide sufficient lifting gear at the start of mounting and fitting work.

Observe the mounting position specified on the rating plate. This ensures that it will be provided with the correct quantity of lubricant.

Use all the fastening means that have been assigned to the particular mounting position and mounting type.

Cap bolts cannot be used in some cases due to a lack of space. In such cases, please contact Technical Support quoting the type of gearbox.

4.3 Thread sizes and tightening torques for fastening bolts

The general tolerance for the tightening torque is 10 %. The tightening torque is based on a friction coefficient of μ = 0.14.

Table 4- 1 Tightening torques for fastening bolts

Thread size	Tightening torque for strength class		
	8.8	10.9	12.9
	[Nm]	[Nm]	[Nm]
M4	3	4	5
M5	6	9	10
M6	10	15	18
M8	25	35	41
M10	50	70	85
M12	90	120	145
M16	210	295	355
M20	450	580	690
M24	750	1 000	1 200
M30	1 500	2 000	2 400
M36	2 500	3 600	4 200

4.4 Fastening in the case of high shock loads

In the case of high shock loads provide additional suitable positive fastenings such as cylindrical taper pins or spring pins.

NOTICE
Do not use spring washers, serrated lock washers, spring or toothed lock washers, cup washers or conical spring washers as a substitute for the above positive connections
Do not subject the housing to excessive stress when tightening the fastening bolts.

4.5 Gearbox with foot mounting

NOTICE
Impermissible housing loadings when unevenness present
Do not subject the gearbox to excessive stress when tightening the fastening bolts.
The foundation must be level and free from dirt.
The levelness deviation of the gearbox support must not exceed the following values:
For gearboxes up to size 88: 0.1 mm
For gearboxes as of size 108: 0.2 mm

The foundation should be designed in such a way that no resonance vibrations are created and no vibrations are transmitted from adjacent foundations.

The foundation structure on which the gearbox is to be mounted must be torsionally rigid. It must be dimensioned according to the weight and torque, taking into account the forces acting on the gearbox. If the substructure is too weak, it will cause radial or axial displacement during operation that cannot be measured at a standstill.

If the gearbox is fastened to a concrete foundation, use foundation blocks for the appropriate recesses.

Align and grout the slide rails into the foundation.

Align the gearbox carefully with the units on the input and output side. Take into account the elastic deformation due to operating forces.

Prevent displacement from external forces due to lateral impacts.

Use stud bolts or headless screws of strength class 8.8 or higher for the foot mounting. Observe the tightening torque.

4.6 Gearboxes in foot or flange version

NOTICE
Impermissible housing loadings caused by incorrectly installed add-on elements
Do not subject the gearbox housing to excessive stress by adding add-on elements to the foot or flange.
Add-on elements must not transmit forces, torques, and vibrations to the gearbox.

To prevent strains on the housing, fasten the gearbox only on the flange or the foot fastening for force and torque transmission. Refer to Gearbox with foot mounting (Page 28).

The second mounting option (foot or flange) is intended for add-on elements, e.g. protection covers with an intrinsic weight of up to max. 30 % of the weight of the gearbox.

4.7 Mounting an input or output element on the gearbox shaft

⚠ WARNING

Risk of burns caused by hot parts

Do not touch the gearbox without protection.

NOTICE

Damage to shaft sealing rings caused by solvent

Avoid any contact of solvent or benzine with the shaft sealing rings.

NOTICE

Damage to shaft sealing rings caused by heating

Use thermal shields to protect shaft sealing rings from heating above 100 °C due to radiant heat.

NOTICE

Premature wear or material damage due to misalignment

Misalignment caused by excessive angular or axis displacement to the connecting shaft ends.

Ensure precise alignment of the individual components.

NOTICE

Damage caused by improper handling

Bearings, housing, shaft and locking rings are damaged due to improper handling.

Do not use impacts or knocks to force the input and output elements to be mounted onto the shaft.

Note

Deburr the parts of elements to be fitted in the area of the hole or keyways.

Recommendation: 0.2 x 45°

Where couplings are to be fitted in a heated condition, observe the specific operating instructions for the coupling. Unless otherwise specified, apply the heat inductively using a torch or in a furnace.

Use the center holes in the shaft end faces.

Use a fitting device to fit the input or output elements.

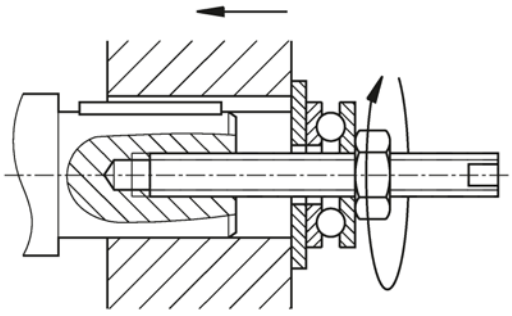
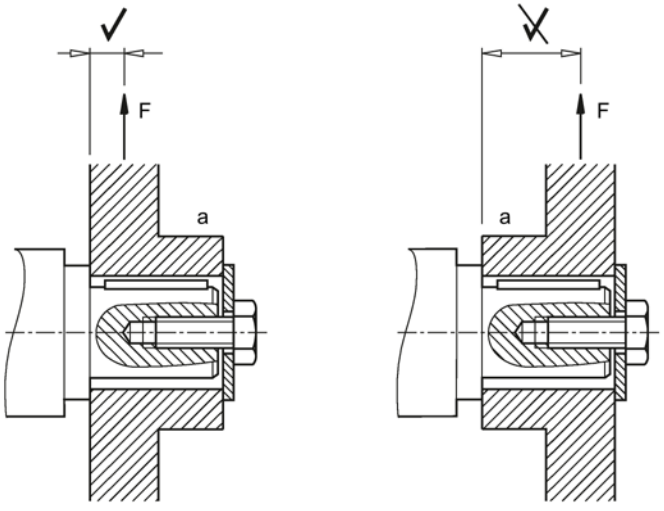


Figure 4-1 Example of a fitting device

Observe the correct mounting arrangement to minimize stress on shafts and bearings due to lateral forces.

Correct Incorrect



a Hub
F Force

Figure 4-2 Mounting arrangement for low stress on shafts and bearings

Procedure

1. Use either benzine or solvent to remove the anti-corrosion protection from the shaft ends and flanges or remove the applied protective skin.
2. Fit the drive input and output elements to the shafts. Fasten the elements when necessary.

You have now fitted the input or output element.

Commissioning 5

5.1 General information for commissioning

⚠ WARNING
Unintentional starting of the drive unit
Secure the drive unit to prevent it from being started up unintentionally.
Attach a warning notice to the start switch.

⚠ WARNING
Risk of slipping on oil
Remove any oil spillage immediately with an oil-binding agent.

NOTICE
Undershooting the minimum radial force can damage the bearings
On cylindrical-roller bearings in the input unit, undershooting the minimum radial force can damage the bearings.
Prolonged test runs when off-load must be kept to a minimum.

5.2 Checking the oil level prior to commissioning

Check the oil level before commissioning. Correct the oil quantity when required. Note Checking and changing lubricants (Page 41).

Steinlen Elektromaschinenbau GmbH recommends a complete oil change after a storage time longer than 24 months:

- For gearboxes with long-term preservation.
- For gearboxes supplied completely filled with oil.

Note Checking and changing lubricants (Page 41).

5.3 Vent filter

Vent filter without securing clip

In the case of gearboxes with housing ventilation, the necessary vent filter or pressure breather valve without a securing clip is delivered separately. They must be replaced with the appropriate vent plug before starting up the gearbox.

Observe the symbol in the type of construction diagrams, see Mounting positions (Page 61):

Ventilation

Procedure

1. Unscrew the vent plug.
2. Seal the gearbox with the vent filter or the pressure breather valve without securing clip.

You have now replaced the vent filter or pressure breather valve with the vent plug without the securing clip.

Pressure breather valve with securing clip

The pressure breather valve with securing clip ① is fitted to gearboxes which require housing ventilation.

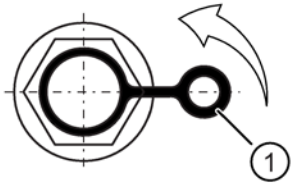


Figure 5-1 Pressure breather valve with securing clip

Remove the transport fixture by pulling the securing clip ① in the direction of the arrow.

Operation

6

CAUTION
Malfunctions can cause injuries or gearbox damage In the event of changes during operation, the drive unit must be switched off immediately. Determine the cause of the fault using the fault table (Page 35). Remedy faults or have faults remedied.

Check the gearbox during operation for:

- Excessive operating temperature
- Changes in gear noise
- Possible oil leakage at the housing and shaft seals

Operating the clutch

⚠ WARNING
Disengaging the motor brake
The motor brake will not work after it has been disengaged.

NOTICE
Damage to gearboxes caused by impact of acceleration
Avoid impact of acceleration when engaging clutch.
When setting off, use circuitry to ensure that the motor brake is vented.

The gearbox can be disengaged under load during operations.

The clutch can be engaged when:

- The motor and output shaft are stationary
- The output speed and weights are low
- Low speed differentials before and after shifting. e.g. when extending and retracting at low speed into a chain-pulled conveyor or similar material handling systems when the clutch is shifted via the shifting guides.

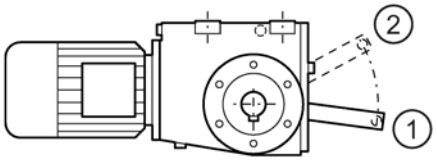


Figure 6-1 Clutch lever

Engaging: Move clutch lever towards ① until stop is reached.

Disengaging: Move clutch lever towards ② until stop is reached.

Shift force needed on clutch lever

The specified actuating forces F apply at standstill. The values provided in the following table are reference values. If torque is transferred to the output shaft during the connecting process, the forces required may increase by a multiple.

Gearbox type	CHF28	BH.38	CH.48	CHF68	KH.48	KHF68
F [N]	60	90	100	100	100	100

Faults, causes and remedies

7

Note

Faults and malfunctions that occur during the warranty period and requiring repair work on the gearbox must be remedied only by Technical Support. If faults occur without a clearly identifiable cause, Steinlen Elektromaschinenbau GmbH recommends the services of the Technical Support even after the warranty period has elapsed.

If you need the help from the Technical Support, please have the following information ready:

- Rating plate data
- Nature and extent of the fault
- Suspected cause

Table 7- 1 Faults, causes and remedies

Faults	Causes	Remedy
Unusual noise on the gearbox.	Oil level too low.	Check the oil level (Page 41).
	Foreign objects in the oil (irregular noise).	Checking the oil quality (Page 43). Cleaning the gearbox (Page 53). Change the oil (Page 41).
	Excessive bearing play and / or bearing defective.	Check the bearing and replace if necessary.
	Defective gearing.	Check the gearing and replace if necessary.
	Fastening bolts loose.	Checking the tightness of fastening bolts (Page 53).
	Excessive external load on the drive input and output.	Check the load against rated data (you might need to correct the belt tension, for example).
	Transport damage.	Check the gearbox for damage in transit.
	Damage due to blockage during commissioning.	Call Technical Support.

Faults	Causes	Remedy
Unusual noise from the drive unit.	Drive unit bearing not lubricated (motor size 160 and higher).	Regrease the bearing (Page 49).
	Excessive bearing play and / or bearing defective.	Check the bearing and replace if necessary.
	Fastening bolts loose.	Checking the tightness of fastening bolts (Page 53).
Unusual motor noise.	Excessive bearing play and / or bearing defective.	Check the bearing and replace if necessary.
	Motor brake is rubbing.	Check air gap and adjust if necessary.
	Inverter parameterization.	Correct the parameterization.
Oil escapes.	Incorrect oil level for the mounting position being used.	Check the mounting position (Page 61) and the oil level (Page 41).
	Gearbox leaks.	Checking the gearbox for leaks (Page 52).
	Overpressure due to lack of venting.	Mount the venting as appropriate for the mounting position (Page 61).
	Overpressure due to soiled venting.	Clean the venting (Page 53).
	Shaft sealing rings defective.	Replace the shaft sealing rings.
	Cover / flange bolts loose.	Checking the tightness of fastening bolts (Page 53). Continue to monitor the gearbox.
	Surface sealing defective (e.g. on cover, flange).	Reseal.
	Damage in transit (e.g. hairline cracks).	Check the gearbox for damage in transit.

Faults	Causes	Remedy
Oil leak at the gearbox vent.	Incorrect oil level for the mounting position used and / or incorrect venting position.	Check the venting position, the mounting position (Page 61) and the oil level (Page 41).
	Frequent cold starts during which the oil foams up.	Call Technical Support.
Gearbox overheats.	Motor fan cover and / or gearbox very dirty.	Clean the fan cover and surface of the geared motor (Page 53).
	Incorrect oil level for the mounting position being used.	Check the mounting position (Page 61) and the oil level (Page 41).
	Incorrect oil being used (e.g. incorrect viscosity).	Checking the oil quality (Page 43).
	Oil is too old.	Check the date of last oil change. If required, change the oil (Page 41).
	Excessive bearing play and / or bearing defective.	Check the bearing and replace if necessary.
	Backstop not running freely.	Replace the backstop.
Output shaft does not turn when the motor is running.	Force flow interrupted by breakage in gearbox.	Call Technical Support.

Faults	Causes	Remedy
Geared motor only starts with difficulty or not at all.	Incorrect oil level for the mounting position being used.	Check the mounting position (Page 61) and the oil level (Page 41).
	Incorrect oil being used (e.g. incorrect viscosity).	Checking the oil quality (Page 43).
	Excessive external load on the drive input and output.	Check the load against rated data (you might need to correct the belt tension, for example).
	Motor brake is not released.	Check circuit / connection of brake. Check brake for wear and readjust if necessary.
	Geared motor runs against backstop.	Change the direction of motor or backstop rotation.
	Gearbox is disengaged.	Engage the coupling.
Excessive play at drive input and output.	Flexible elements worn (e.g. on couplings).	Replace flexible elements.
	Positive connection disrupted by overload.	Call Technical Support.
Increased play at clutch lever.	Clutch lever has become loose.	Tighten fastening nut at clutch lever.
	After engagement, the clutch is out of mesh.	Turn the output shaft until the clutch engages.
After actuating the clutch lever, the clutch does not disengage / engage.	Clutch has been displaced.	Call Technical Support. Clutch must be readjusted or serviced.

Service and maintenance

8

8.1 General notes about maintenance work

⚠ WARNING
Unintentional starting of the drive unit
Secure the drive unit to prevent it from being started up unintentionally.
Attach a warning notice to the start switch.

NOTICE
Improper maintenance
Only authorized qualified personnel may perform the maintenance and servicing. Only original parts supplied by Steinlen Elektromaschinenbau GmbH may be installed.

Only qualified personnel may perform the inspection, maintenance and servicing work. Note the General information and safety instructions (Page 7).

Table 8- 1 Maintenance measures

Measure	Interval	Description of work
Monitor and check the gearbox for unusual noises, vibrations, and changes.	Daily; if possible, more frequently during operation.	Operation (Page 33)
Check the housing temperature.	After 3 hours, on the first day, thereafter monthly.	
Check the oil level.	After the first day, thereafter monthly.	Checking and changing lubricants (Page 41)
Check the oil quality.	Every 6 months.	Checking the oil quality (Page 43)

Measure	Interval	Description of work
First oil change after commissioning.	After approximately 10000 operating hours or at the latest after 2 years.	Checking and changing lubricants (Page 41)
Subsequent oil changes.	Every 2 years or 10000 operating hours [1].	
Visual inspection of the gearbox and shaft sealing ring for leaks.	After the first day, thereafter monthly.	Checking the gearbox for leaks (Page 52)
Clean the gearbox ventilation and replace if necessary.	Depending on the degree of pollution, at least every 6 months.	Cleaning the vent filter (Page 53)
Clean the gearbox.		Cleaning the gearbox (Page 53)
Check the coupling.	For the first time after 3 months.	Please refer to the separate operating instructions.
Complete inspection of the geared motor.	Every 12 months.	Inspecting the gearbox (Page 54)
Check that fastening bolts on gearboxes and add-on elements are securely tightened. Check that covers and plugs are securely fastened.	After 3 hours, regularly thereafter.	Checking the tightness of fastening bolts (Page 53)
Regrease the roller bearings in the drive units.	At least every 12 months or every 4000 operating hours.	Regreasing the roller bearing (Page 48)
Change the roller bearing grease.	When the oil is changed.	Change the roller bearing grease (Page 49)
Replace the bearing.	-	Replace bearings (Page 52)

[1] With synthetic oils, the intervals can be doubled. The data specified is valid for an oil temperature of +80° C. See the figure titled "Guide values for oil change intervals" for the intervals for other temperatures.

8.2 Checking and changing lubricants

8.2.1 General safety instructions

⚠ WARNING

Danger of scalding from escaping hot oil

Before starting any work wait until the oil has cooled down to below +30° C.

⚠ WARNING

Risk of slipping on oil

Remove any oil spillage immediately with an oil-binding agent in compliance with environmental requirements.

NOTICE

Damage to the gearbox caused by incorrect oil quantities

The oil quantity and the position of the sealing elements are determined by the mounting position.

After removing the oil level screw, up to and including gearbox size 128, the oil level may not be more than 3 mm and from gearbox size 148, not more than 5 mm below the recommended filling level.

NOTICE

Damage to the gearbox due to open oil holes

Dirt and damaging atmosphere can penetrate through open oil holes.

Close the gearbox immediately after checking the oil level or changing the oil.

Note

Oil specifications

Refer to the rating plate for the type of oil, oil viscosity and quantity of oil required.

For oil compatibility see Recommended lubricants (Page 50).

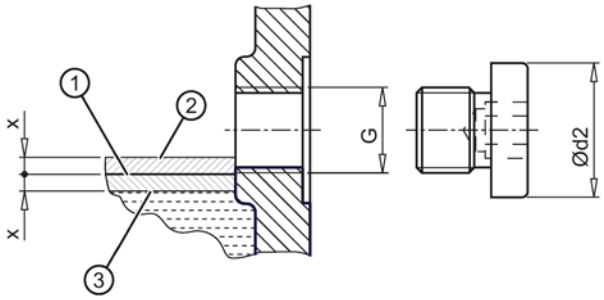
Note

Gearbox sizes 18 and 28

Gearbox sizes 18 and 28 are lubricated for life. An oil change is not required.

8.2.2 Checking the oil level

NOTICE
The volume of gearbox oil changes with temperature If the temperature rises, the volume increases. Where temperature differences and filling quantities are significant, the volume difference can amount to several liters. The oil level must therefore be checked while still slightly warm, approximately 30 minutes after switching off the drive unit.



① Specified oil level
② Maximum oil level
③ Minimum oil level

Figure 8-1 Oil level in the gearbox housing

Table 8- 2 Minimum and maximum fill levels x

Oil level hole	Ød2	Fill level x	Tightening torque
	[mm]	[mm]	[Nm]
G 1/8"	14	2.5	10
G 1/4"	18	3	10
G 3/8"	22	4	25
G 3/4"	32	7	50

Procedure

1. Switch off the power supply to the drive unit.
2. Unscrew the oil level screw, see Mounting positions (Page 61). Oil escapes if the maximum fill level is above the plug hole.
3. Check the oil level. Observe the fill level x.
4. Top up the oil level if necessary and check it again.
5. Check the state of the sealing ring on the sealing element. If the sealing ring is damaged, replace the sealing element with a new one.
6. After checking, seal the gearbox immediately using the sealing element.

You have now checked the oil level in the gearbox housing.

8.2.3 Checking the oil level using the oil sight glass (optional)

If there is an oil sight glass to check the oil level ①, the oil must be visible in the center of the sight glass when the oil is cool. When the oil is hot, the oil level ① is above the center of the sight glass. The oil level ① of cold oil is below the center of the sight glass.

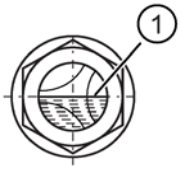


Figure 8-2 Oil level in the oil sight glass

Top up the oil level ① if necessary, and check it again.

8.2.4 Checking the oil level using the oil dipstick (optional)

To check the oil level, push the dipstick into the hole but do not screw it in.

The oil level must be between the lower and upper marks on the oil dipstick.

If you are using the electric oil level monitoring system, the oil must be level with the upper mark on the oil dipstick.

Rectify the oil level if necessary and check it again.

8.2.5 Checking the oil quality

Signs of changes in the oil can be seen with the naked eye. Fresh oil is clear to the eye and has a typical smell and a specific product color. Clouding or a flocculent appearance indicates water and / or contamination. A dark or black color indicates residue, serious thermal decomposition or contamination.

Observe the symbols in the type of construction diagrams, see Mounting positions (Page 61):

Ventilation

Oil filling

Oil level

Procedure

1. Allow the geared motor to run for a short time. Wear and contaminant particles are visible in the oil shortly after shutting down.
2. Switch off the power supply to the drive unit.
3. Remove the sealing element at one of the points marked with the symbols listed above.
4. Remove some oil, using a suction pump and a flexible hose, for example.
5. Check the condition of the sealing ring on the sealing element and replace the sealing ring if necessary.
6. Seal the gearbox with the sealing element.
7. Check the oil for abnormalities. If you detect any abnormalities, change the oil immediately.
8. Check the oil level.
9. Rectify the oil level if necessary and check it again.

You have now checked the oil quality.

8.2.6 Changing the oil

8.2.6.1 General safety notes for changing the oil

NOTICE
Impermissible mixing of oils leads to damage Impermissible mixing of oils leads to: • Darkening • Sediment • Foam formation • Change of the viscosity or reduced corrosion protection • Wear protection. When changing oil of the same type, the residual volume of oil in the gearbox should be kept as low as possible. Generally speaking, a small residual volume will cause no particular problems. Gear oils of different types and by different manufacturers must not be mixed. Have the manufacturer confirm that the new oil is compatible with the remaining volume of used oil. If very different types of oil or oils with very different additives are changed, always flush out the gearbox with the new oil. When changing from mineral oil to polyglycol oil (PG) or vice versa, it is vital to flush the gearbox twice. All traces of old oil must be completely removed from the gearbox.

NOTICE
Contaminations of the oil impair the lubricity Do not mix the gearbox oil with other substances. Do not flush with paraffin or other solvents, as traces of these substances will always remain inside the gearbox.

Note

The oil must be warm because insufficient viscosity caused by oil that is too cold impairs correct emptying.

If necessary, run the gearbox for 15 to 30 minutes to become warm.

8.2.6.2 Draining the oil

Observe the symbols in the type of construction diagrams, see Mounting positions (Page 61):


Ventilation


Oil filling


Oil level


Oil drain

Procedure

1. Switch off the power supply to the drive unit.
2. Unscrew the vent plug.
3. Unscrew the oil level screw.
4. Place a suitable and sufficiently large receptacle underneath the oil drain plug.
5. Remove the oil drain plug and drain all the oil into the receptacle.
6. Check the condition of the sealing ring on the sealing element and replace the sealing ring if necessary.
7. Seal the gearbox using the sealing elements.

You have now drained the oil from the gearbox.

8.2.6.3 Flushing the gearbox when changing between incompatible oils

WARNING

Impermissible mixing of oils results in damage

Residual quantities of original oil can impair the specific properties of the new oil.

A flushing process is required with biodegradable and physiologically safe oils.

The residual corrosion protection oil must amount to no more than 1% of the operating oil volume.

Note

Polyglycol oil has a higher density than mineral oil. Therefore, polyglycol oil sinks down towards the oil drain and the mineral oil floats on top.

This makes the required complete draining of mineral oil from the gearbox extremely difficult.

Note

We recommend that, after the second flush, the quality of the rinse is checked by an expert analyzer.

Observe the symbols in the diagrams of the mounting positions (Page 61).

Ventilation

Oil filling

Oil drain

Procedure

1. After the oil has been drained, wipe the gearbox clean of any remaining mineral oil using a cloth.
2. Unscrew the venting screw.
3. Fill the gearbox with a detergent oil, using a filter (filter mesh max. 25 µm). For the detergent oil, use either the new oil or one that is compatible with the new oil.
4. Allow the gearbox to run for 15 to 30 minutes under a low load.
5. Place a suitable and sufficiently large receptacle underneath the oil drain plug.
6. Unscrew the oil drain plug. Drain all the oil into the receptacle.

7. After flushing, immediately seal the gearbox using the sealing elements.
8. Repeat this step for the second rinse.

You have now flushed the gearbox twice and can pour in the new oil.

8.2.6.4 Filling in oil

NOTICE
Mixing different oils impairs the lubricating capability
When adding oil, use the same oil type and viscosity. When changing mutually incompatible oils, see Flushing the gearbox (Page 46).

Observe the symbols in the diagrams of the mounting positions (Page 61).

Ventilation

Oil filling

Procedure

1. Remove the vent plug or oil filler screw.
2. Fill the gearbox with fresh oil. Use a filler filter with mesh of max. 25 µm.
3. Check the oil level.
4. Rectify the oil level if necessary and check it again.
5. Check the state of the sealing ring on the sealing element. If the sealing ring is damaged, replace the sealing element with a new one.
6. After filling with oil, seal the gearbox immediately using the sealing element.

You have now filled up the gearbox with oil.

8.2.7 Topping up with oil

If the mounting position of the gearbox is changed or oil lost because of leakage, check the oil level. If you notice oil escaping, locate the leak and seal the affected area. Check and correct the oil level.

At the time of going to print, the following types of oil are being used for initial filing of the gearbox:

CLP ISO VG220: Fuchs Renolin CLP220

CLP ISO PG VG220: Fuchs Renolin PG220

CLP ISO PG VG460: Fuchs Renolin PG460

CLP ISO PAO VG68: Fuchs Renolin Unisyn CLP68

CLP ISO PAO VG220: Fuchs Renolin Unisyn XT220

CLP ISO E VG220: Fuchs Plantogear S220

CLP ISO H1 VG460: Castrol Optileb GT 1800/460

If, following agreement, the gearbox is filled at the factory with special lubricant for the special applications referred to above, the lubricant must be shown on the rating plate.

8.2.8 Regreasing the roller bearing

NOTICE
When regreasing do not mix greases with different soap bases

Drive units of motor size 160 and above need to be regreased for K2, A and P and drive units of motor size 225 and above need to be regreased for K4. The input units in these sizes are equipped with a grease nipple.

Regrease at least every 12 months or every 4 000 operating hours.

The bearings are supplied greased.

The standard lubricating grease used is a mineral-oil-based lithium-saponified grease of NLGI class 3/2.

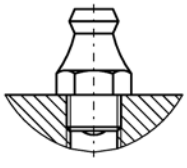


Figure 8-3 Grease nipple

Using a grease gun, inject the grease into the bearing point via the lubricating nipples provided. Inject 50 g grease per lubricating point, unless otherwise specified in the vicinity of the lubricating point.

8.2.9 Change the roller bearing grease

The roller bearings are lubricated in the factory with the greases listed in the table.

Renew the grease quantify for grease-lubricated bearings with each oil change.

Clean the bearing before filling it with fresh lubricant.

In the case of bearings on the output shaft or intermediate shafts, the grease quantity must fill 2/3, and in the case of bearings on the input side, 1/3 of the space between the rolling elements.

Table 8- 3 Roller-bearing and shaft-sealing-ring grease

Fields of application	Ambient temperature	Manufacturer	Type
Standard	-40 °C to +80 °C	Klüber	Petamo GHY 133 N
Foodstuff-compatible for the food industry	-30 °C to +40 °C	Castrol	Optileb GR UF 1 NSF H1
Biologically degradable, for agriculture, forestry and water industries	-35 °C to +40 °C	BP	Biogrease EP 2

8.2.10 Service life of the lubricants

Note

In case of ambient conditions deviating from normal conditions, e.g. high ambient temperatures, high relative humidity, aggressive ambient media, the intervals between changes should be shorter. In such cases, contact Technical Support for assistance in determining the individual lubricant change interval.

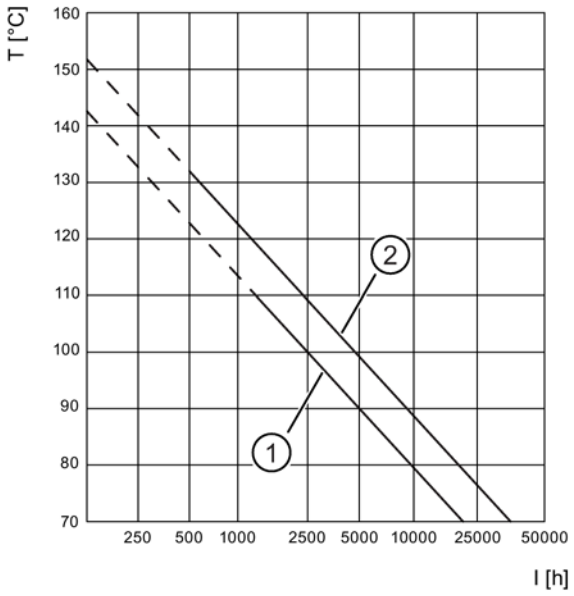
Note

Oil sump temperatures above +80 °C can reduce service life. A temperature increase by 10 K halves the service life by the amount as shown in the figure titled "Guide values for oil change intervals".

For a +80 °C oil sump temperature, the following service life can be expected when observing the properties specified by Steinlen Elektromaschinenbau GmbH:

Table 8- 4 Service life of the oils

Type of oil	Service life
Mineral oil	10 000 operating hours or 2 years
Biodegradable oil	
Physiologically safe oil according to USDA-H1/-H2	
Synthetic oil	20 000 operating hours or 4 years



① Mineral oil
② Synthetic oil
T Oil-bath steady-state temperature [°C]
I Oil change interval in operating hours [h]

Figure 8-4 Guide values for oil change intervals

Grease service life of roller bearing greases

Roller bearings and the clearance in front are filled with sufficient grease.

Under approved operating conditions and ambient temperatures, no regreasing is required.

We recommend that the grease in the bearings is also renewed when the oil or shaft sealing rings are replaced.

8.2.11 Recommended lubricants

The released and recommended lubricants are listed in the table NT 7300 (https://www.Steinlen.eu).

DANGER

Used lubricants only have conditional approval

The used lubricants are not or only conditionally approved for use in the foodstuff or pharmaceutical industry.

Use only lubricants with USDA (United States Department of Agriculture) H1 / H2 approval for deployment in the foodstuff or pharmaceutical industry.

NOTICE

Incorrect operating temperatures impair lubricity of the gearbox oil

Operating temperatures outside the permitted range impair the lubricating property of the gearbox oil.

Maximum permissible temperature for:

- Mineral oil +90 °C, for brief periods +100 °C
- Polyglycols and polyalphaolefins +100 °C, for brief periods +110 °C
- Synthetic esters +90 °C

The minimum permissible temperature for initial filling corresponds to the lowest ambient temperature specified on the rating plate.

The oil used must be approved for use in the ambient temperature range given on the rating plate.

When changing the oil, please observe the operating temperature range of the new oil as specified by the oil manufacturer.

Note

As standard, the lubricants and shaft seals are harmonized and coordinated with one another corresponding to the prevailing operating conditions.

Contact Technical Support for:

- Change of the operating conditions
- Change in oil grade
- Deployment of new shaft seals.

Note

The lubricants used are not at all or only conditionally biodegradable. If biologically degradable lubricants are required, use only gearbox lubricants with the appropriate classification listed in the NT 7300 table.

Note

These recommendations are not a guarantee of the lubricant quality provided by your supplier. All lubricant manufacturers are responsible for the quality of their own products.

The oil viscosity is decisive for the oil selection (ISO VG class). The viscosity is specified on the rating plate of the gearbox. The viscosity class indicated applies for the contractually agreed operating conditions.

In the case of different operating conditions, please contact Technical Support.

If, following agreement, the gearbox is filled at the factory with special lubricant for the special applications referred to above, the lubricant is shown on the rating plate.

The oil quality must meet the gearbox lubricant requirements specified in the NT 7300 table. The Steinlen warranty is otherwise null and void. We recommend the use of one of these gearbox lubricants. These gearbox oils are subject to constant testing and meet the specified requirements. It is possible that the recommended oils are removed or replaced by oils that have been further developed at a later point in time. We recommend that you regularly check as to whether the selected lubricating oil is still recommended by Steinlen. Otherwise change the product.

8.3 Replace bearings

The bearing service life depends greatly on the operating conditions and so cannot be calculated reliably. In the operating conditions specified by the operator, bearing life can be calculated and indicated on the rating plate. If no information is given, changes in vibration and noise pattern can serve as an indicator that an immediate bearing replacement is necessary.

8.4 Checking the gearbox for leaks

Note

Due to the inherent principle of operation, oil mist can escape from a breather valve or labyrinth seal.

Oil or grease escaping in small quantities from the shaft sealing ring should be regarded as normal during the running-in phase of 24 hours operating time.

If the quantities escaping are significant or leaking continues after the running-in phase, the shaft sealing ring must be replaced to prevent consequential damage.

Table 8- 5 Description and measures

Status	Description	Measures	Notes
Film of moisture on the shaft sealing ring	Film of moisture as a result of the inherent principle of operation (apparent leakage)	Remove using a clean cloth and continue to observe.	This does not represent a fault; frequently, in the course of operation, the sealing ring dries off.
Leakage at the shaft sealing ring	Identifiable small trickle, formation of drops, also after the running-in phase	Replace the sealing ring, determine the possible cause of the sealing ring failure and rectify.	During the run-in period, the shaft sealing ring beds into the shaft. A visible track can be seen on the shaft. Optimum preconditions for a perfect seal are obtained after the run-in period.

8.5 Cleaning the vent filter

Clean the vent filter at least every 6 months, or more regularly depending on the degree of soiling.

Procedure

1. Unscrew the vent filter.
2. Flush out the vent filter with benzine or a similar cleaning agent.
3. Blow the vent filter out with compressed air.
4. Seal the gearbox with the vent filter.

You have now cleaned the vent filter.

8.6 Cleaning the gearbox

NOTICE
Dust deposits cause higher housing temperatures
Dust deposits prevent heat radiation.
Keep the geared motor free from dirt and dust.

NOTICE
Cleaning with a high-pressure cleaning appliance
Water can penetrate into the geared motor. Seals can become damaged.
Do not use a high-pressure cleaning appliance to clean the geared motor.
Do not use tools with sharp edges.

Switch off the power supply to the drive unit before cleaning it.

8.7 Checking the tightness of fastening bolts

Note

Replace damaged headless bolts with new bolts of the same type and strength class.

Switch off the power supply to the drive unit. Check all fastening bolts for tightness using a torque wrench.

The general tolerance for the tightening torque is 10 %. The tightening torque is based on a friction coefficient of μ = 0.14.

Table 8- 6 Tightening torques for fastening bolts

Thread size	Tightening torque for strength class		
	8.8	10.9	12.9
	[Nm]	[Nm]	[Nm]
M4	3	4	5
M5	6	9	10
M6	10	15	18
M8	25	35	41
M10	50	70	85
M12	90	120	145
M16	210	295	355
M20	450	580	690
M24	750	1 000	1 200
M30	1 500	2 000	2 400
M36	2 500	3 600	4 200

8.8 Inspecting the gearbox

Carry out a scheduled inspection of the gearbox once a year in accordance with the possible criteria listed in General notes about maintenance work (Page 39).

Check the gearbox in accordance with the criteria set out in General information and safety notes (Page 7).

Touch up damaged paintwork carefully.

Disposal

9

Recycling and disposal of MOTOX geared motors

For environmentally friendly recycling and disposal of your old device, please contact a company certified for the disposal of old electrical and/or electronic devices and dispose of the device in accordance with the regulations in your country.

⚠WARNING

Incorrect used oil disposal

Incorrect disposal of used oil is a threat to the environment and health.

After use, oil must be taken to a used oil collection point. The addition of foreign substances such as solvents, brake and cooling fluid is prohibited.

Avoid prolonged contact with the skin.

Empty the used oil from the gearbox. The used oil must be collected, stored, transported and disposed of in accordance with regulations. Do not mix polyglycols with mineral oil. Dispose of polyglycols separately.

Please observe country-specific laws. Under German law, to allow optimal treatment of the oil (§4 VI Used Oil), oils with different disposal codes must not be mixed with one another.

Collect and dispose of used oil in accordance with regulations.

Remove oil spillages immediately with an oil-binding agent in compliance with environmental requirements.

Dispose of the housing parts, motor parts, gear wheels, shafts and roller bearings of the geared motor as scrap metal.

The worm wheels are made partly from non-ferrous metal. Dispose of them accordingly.

Dispose of packaging material in accordance with regulations.

Table 9- 1 Disposal codes for gear oils

Type of oil	Designation	Disposal code
Mineral oil	CLP ISO VG220	13 02 05
Polyglycols	CLP ISO PG VG220, CLP ISO PG VG460, CLP ISO H1 VG460	13 02 08
Polyalphaolefins	CLP ISO PAO VG68, CLP ISO PAO VG220	13 02 06
Biologically degradable oils	CLP ISO E VG220	13 02 07

Technical specifications

10

10.1 Type designation

Table 10- 1 Example of the type designation structure

	Main gearbox				Input unit	
Example:	**B**	**H**	**F**	**38 -**	**K4**	**(100)**
Gearbox type	B					
Monorail conveyor		H				
Mounting			F			
Size				38		
Input unit					K4	
(for motor size)						(100)

Table 10- 2 Type designation code

Gearbox type	
C	Helical worm gearbox
B	Bevel helical gearbox, two-stage
K	Bevel helical gearbox, three-stage
Mounting	
F	Flange version (A type)
B	Foot / flange-mounted version
Z	Housing flange (C type)
Input unit	
K4	Short lantern with clamp connection for connecting an IEC motor

10.2 General technical data

The most important technical data appears on the rating plate of the gearboxes and geared motors.

This data, together with the contractual agreements for the geared motors, determines the limits of intended use.

In the case of geared motors, a rating plate attached to the motor usually indicates the data for the entire drive.

In certain cases separate rating plates are mounted on the gearbox and the motor.

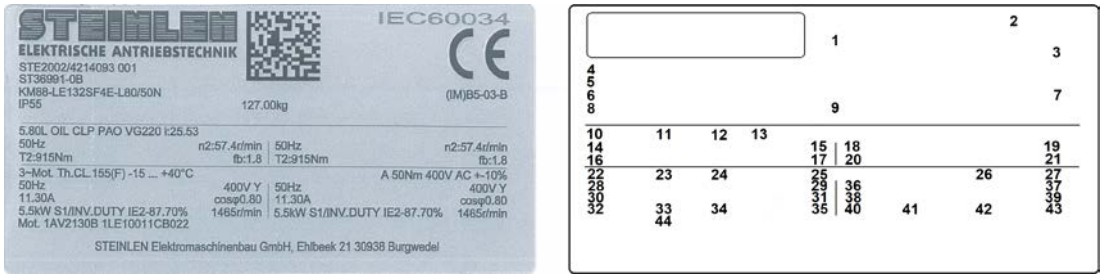


Figure 10-1 Rating plate example

1 Data matrix code
2 Applicable standard
3 CE marking or other marking, if required
4 Factory serial number
5 Article number
6 Type designation
7 Mounting position
8 Degree of protection acc. to IEC 60034-5
9 Weight m [kg]
10 Oil quantity [l] main gearbox / intermediate gearbox + extruder flange
11 Type of oil
12 Oil viscosity ISO VG class to DIN 51519 / ISO 3448
13 Total transmission ratio i

Frequency 1

14 Rated frequency f [Hz]
15 Gearbox output speed n_2 [rpm]

16 Geared motor output torque T_2 [Nm]
17 Service factor f_B

Frequency 2

18 Rated frequency f [Hz]
19 Gearbox output speed n_2 [rpm]
20 Geared motor output torque T_2 [Nm]
21 Service factor f_B

Motor and brake data

22 Phase number and type of current for the motor
23 Temperature class Th.Cl.
24 Ambient temperature
25 Motor protection
26 Rated braking torque T_{Br} [Nm]
27 Brake supply voltage U [V]

Frequency 1

28 Rated frequency f [Hz]
29 Rated voltage / range U [V]
Circuit, graphic symbols according to DIN EN 60617 Part 6 / IEC 60617-6
30 Rated current I_N [A]
31 Power factor cos φ
32 Rated output P_N [kW]
33 Duty type
34 Efficiency class marking according to IEC 60034-30
35 Rated speed n_N [rpm]

Frequency 2

36 Rated frequency f [Hz]
37 Rated voltage / range U [V]
Circuit, graphic symbols according to DIN EN 60617 Part 6 / IEC 60617-6
38 Rated current I_N [A]
39 Power factor cos φ
40 Rated output P_N [kW]
41 Duty type
42 Efficiency class marking according to IEC 60034-30
43 Rated speed n_N [rpm]
44 Motor designation

10.3 Weight

The weight of the entire geared motor is given in the shipping papers.

The weight is stated on the rating plate of the motor, gearbox or geared motor.

The weight specification refers only to the product in the delivery state.

10.4 Sound energy level

The A rated sound-pressure level L_{WA} of a selection of gearboxes in the following figure has been measured to DIN EN ISO 1680 with meters to DIN IEC 60651.

The noise depends mainly on speed, output, and transmission ratio.

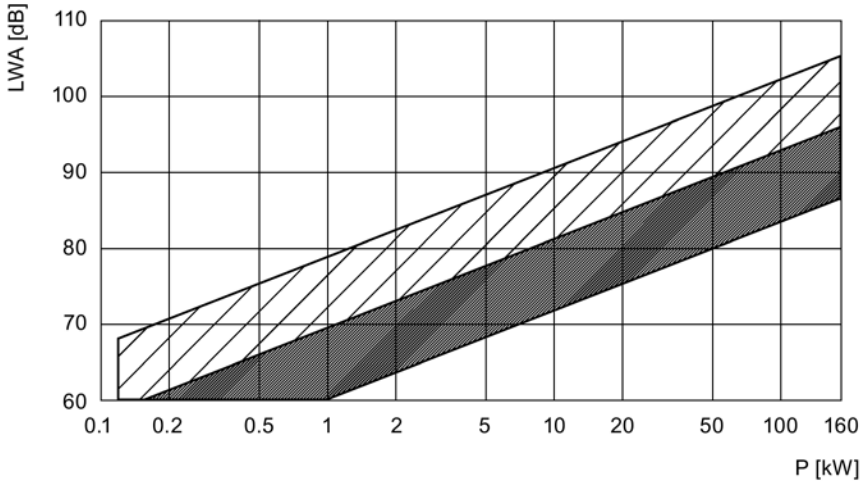


Figure 10-2 Sound energy level MOTOX geared motors

The sound-pressure levels of MOTOX geared motors fall mainly in the dark-colored part of the range. Gearboxes with very small transmission ratios, high output, and high input speed may fall into the cross-hatched part.

If repeat measurements on site do not produce conclusive results, which can be verified by measuring technology, the measurement obtained at Steinlen Elektromaschinenbau GmbH will apply.

External noises

Noises not generated by the gearbox but emitted from it are not taken into consideration here.

Similarly, noises emitted from the input and output machines and from the foundation are not taken into consideration here, even if transmitted to these by the gearbox.

10.5 Mounting positions

The type of construction designations are compliant with IEC 60034-7 (Code I).

The geared motors must be operated only in the type of construction specified on the rating plate. This ensures that the correct quantity of lubricant is provided.

Note

Depending on operating mode (e.g. travel on an incline), no ventilation is provided.

Explanation of symbols in type of design graphics:

Ventilation

Oil level

Oil drain

A, B	Position of output shaft
V	Gearboxes of size 38 are fitted as standard with a screw plug at point "V"; ventilation is not required.
*	On opposite side
①	Engaged
②	Disengaged

10.5.1 Helical worm gearbox CHF28

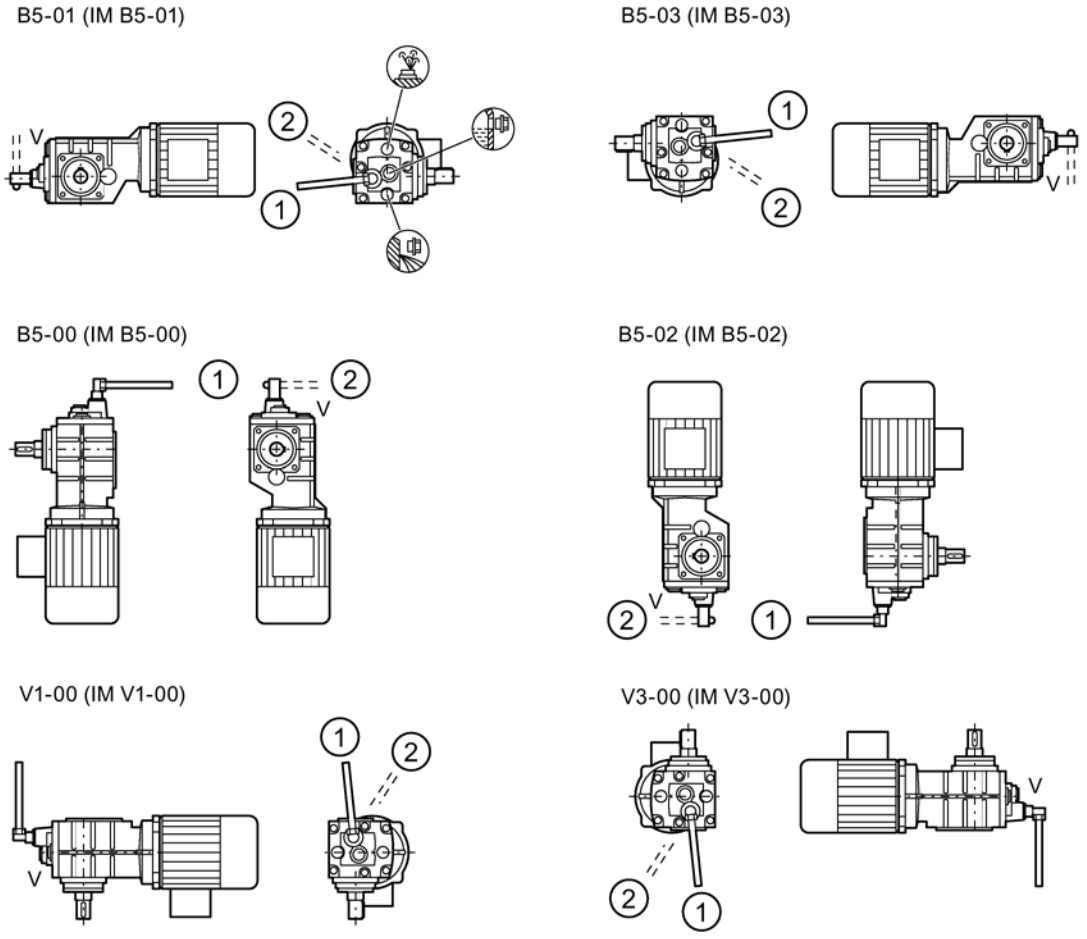


Figure 10-3 Designs for CHF28

10.5.2 Bevel helical gearboxes BHF38, BHB38

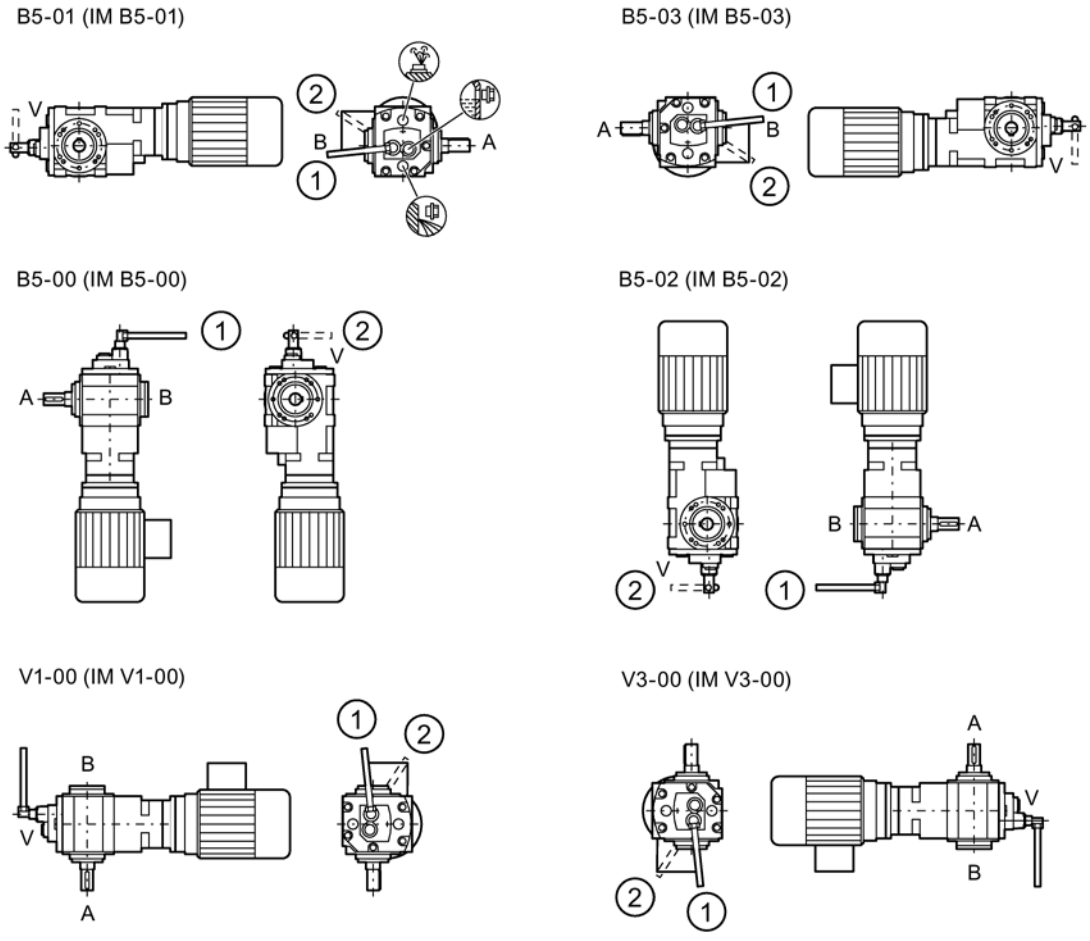


Figure 10-4 Designs for BHF38, BHB38

Figure 10-5 Position of output shaft

10.5.3 Helical worm gearboxes CHZ48, CHF48, CHF68

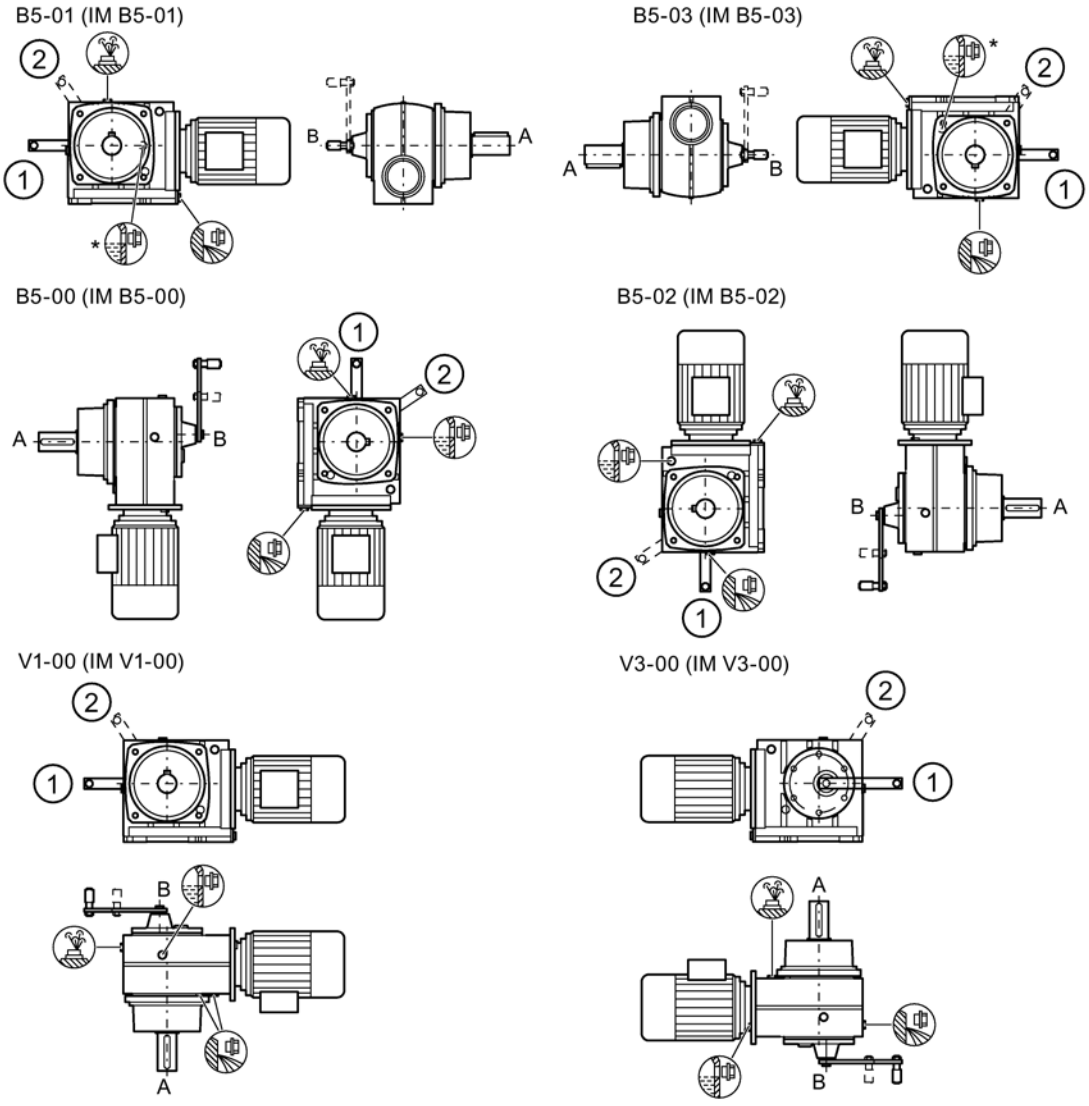


Figure 10-6 Designs for CHZ48, CHF48, CHF68

Figure 10-7 Position of output shaft

10.5.4 Bevel helical gearboxes KHZ48, KHF48, KHF68

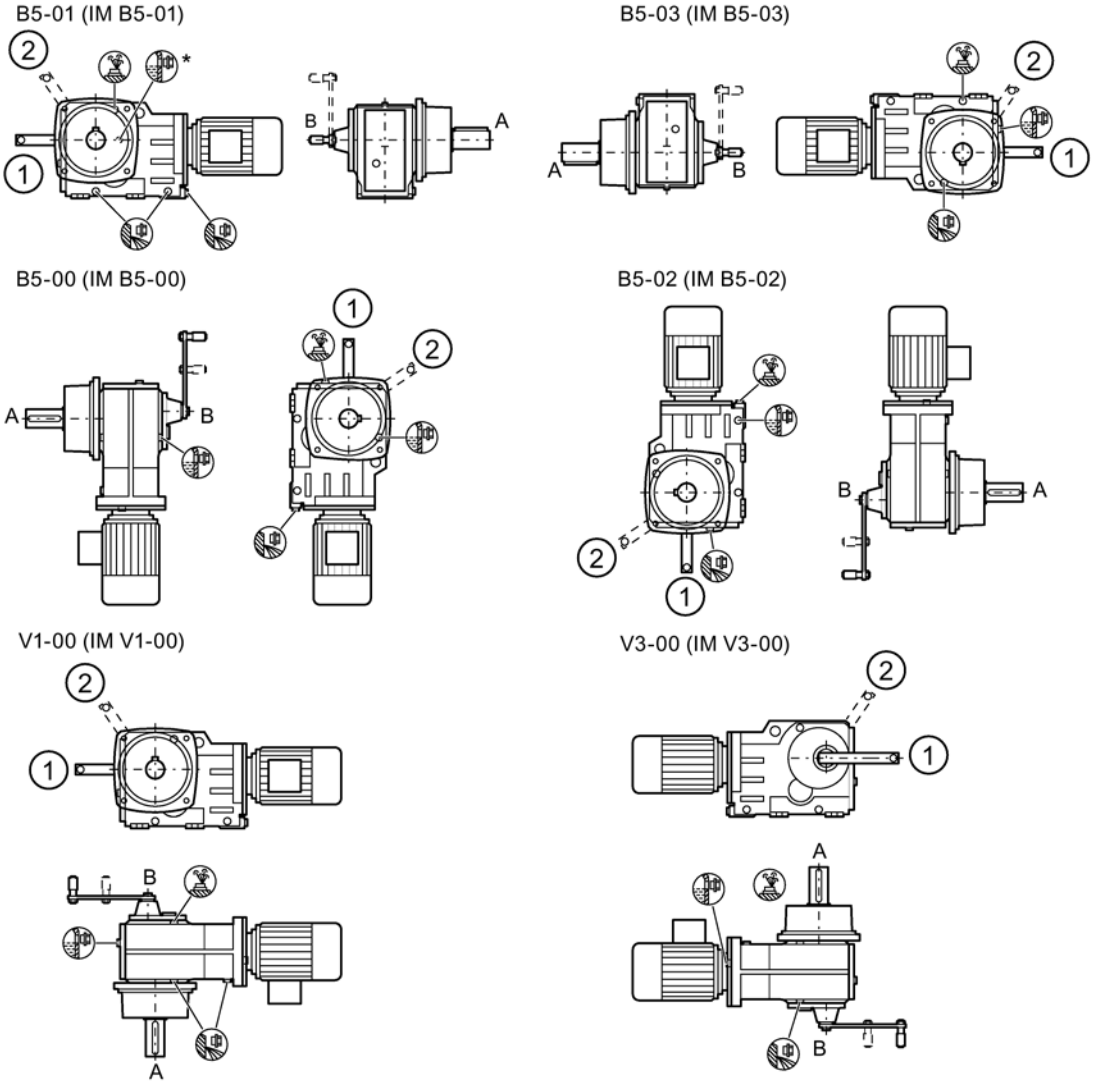


Figure 10-8 Designs for KHZ48, KHF48, KHF68

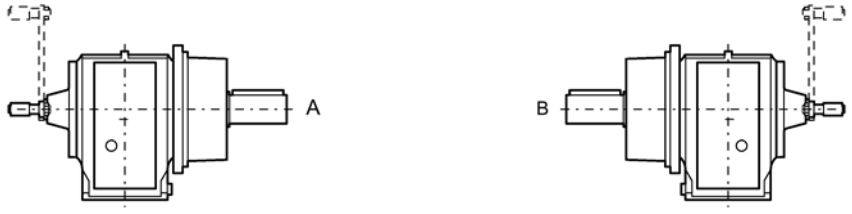


Figure 10-9 Position of output shaft

10.6 Oil quantities

NOTICE
Incorrect oil quantities damage the gearbox The oil quantities listed in the tables are guide values for changing the oil. They are used, for example, for lubricant storage and procurement. The precise values depend on the number of stages and transmission ratio of the gearbox. Check the oil level before commissioning.

Table 10- 3 Oil quantities [l] for monorail conveyor gearboxes

Type	Type of construction					
	B5-01	B5-03	B5-02	B5-00	V1-00	V3-00
CHF28	0.4	0.6	0.8	0.45	0.8	0.6
BHF38, BHB38	0.5	1.2	1.6	1.1	1.3	1.0
CHZ48, CHF48	1.4	2.0	2.1	1.9	1.5	1.8
CHF68	3.0	3.9	4.6	3.7	3.3	3.4
KHZ48, KHF48	1.4	2.3	2.4	1.8	2.0	2.2
KHF68	3,2	3,6	4,4	3,0	3,3	3,5

Spare parts

11

11.1 Stocking of spare parts

By stocking the most important spare and wearing parts on site, you can ensure that the gearbox or geared motor is ready for use at any time.

NOTICE
Safety impairment caused by inferior products The installation and/or use of inferior products can have a negative impact on the design characteristics of the geared motor and might consequently impair the active and/or passive safety features of the machine. Steinlen Elektromaschinenbau GmbH states explicitly that only spare parts and accessories supplied by Steinlen have been tested and approved by Steinlen Elektromaschinenbau GmbH. If you do not use original spare parts and original accessories, Steinlen Elektro-maschinenbau GmbH excludes every liability and warranty. Steinlen Elektromaschinenbau GmbH accepts the warranty only for original spare parts.

Note that special manufacturing and delivery specifications often apply to individual components. All spare parts offered by Steinlen Elektromaschinenbau GmbH are state-of-the-art and conform to the latest legal regulations.

Please supply the following data when ordering spare parts:

- Serial number shown on the rating plate ③④
- Type designation shown on the rating plate ⑥
- Part number
  - 3-digit position number from the spare parts list
  - 6-digit part number
  - 7-digit article number
  - 14-digit material number
- Quantity

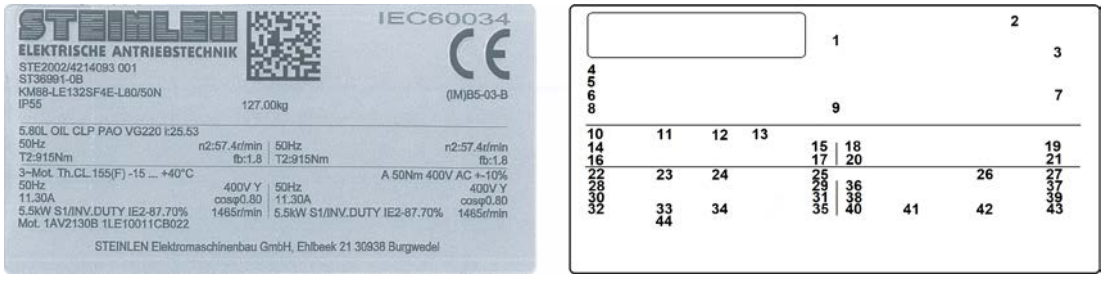


Figure 11-1 Example of a MOTOX rating plate

For motors with their own rating plate, the spare parts documentation in the original operating instructions applies.

11.2 Spare parts lists

11.2.1 Bevel helical gearboxes BHF38, BHB38, KHF48, KHF46, KHZ48

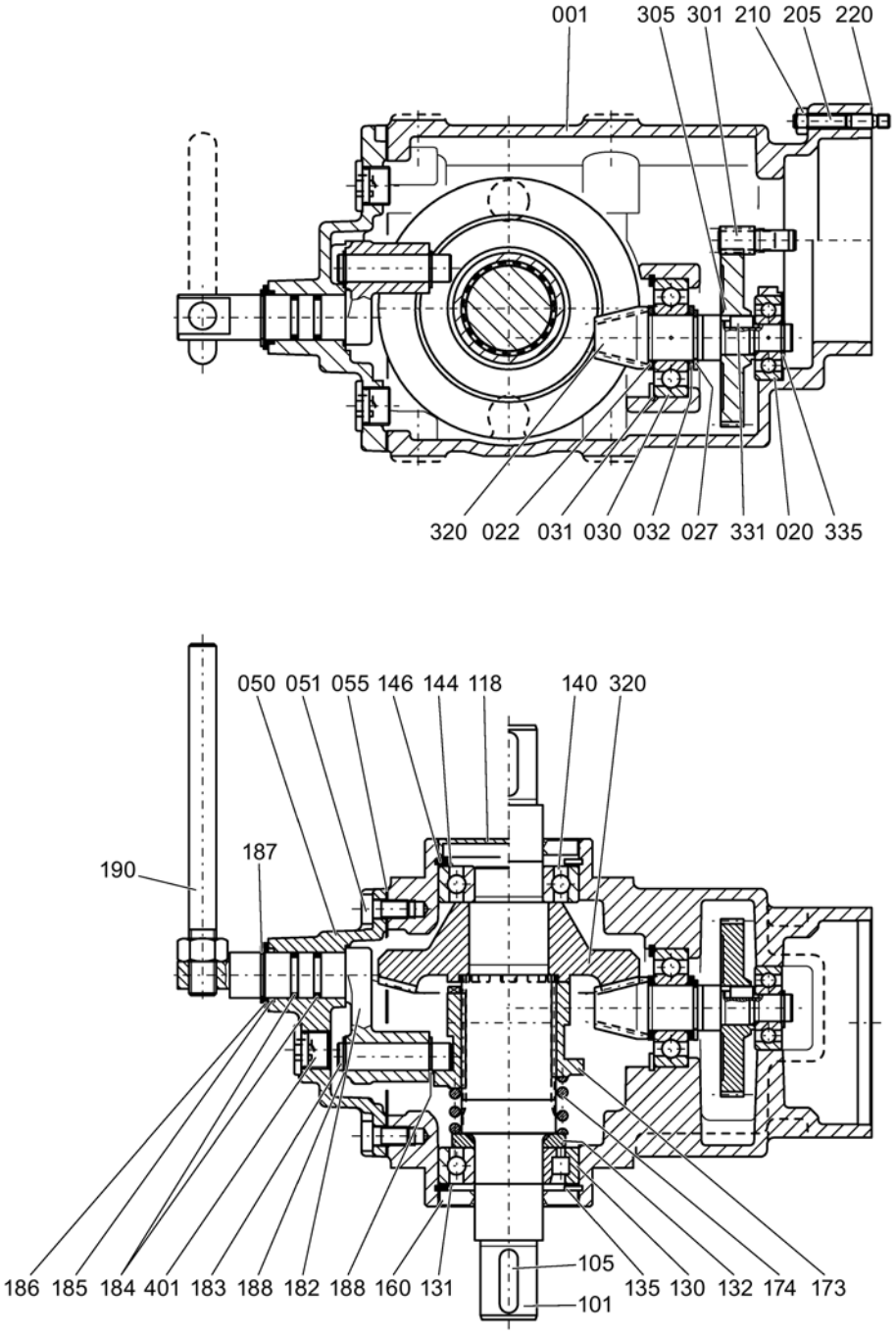


Figure 11-2 Bevel helical gearboxes BHF38, BHB38

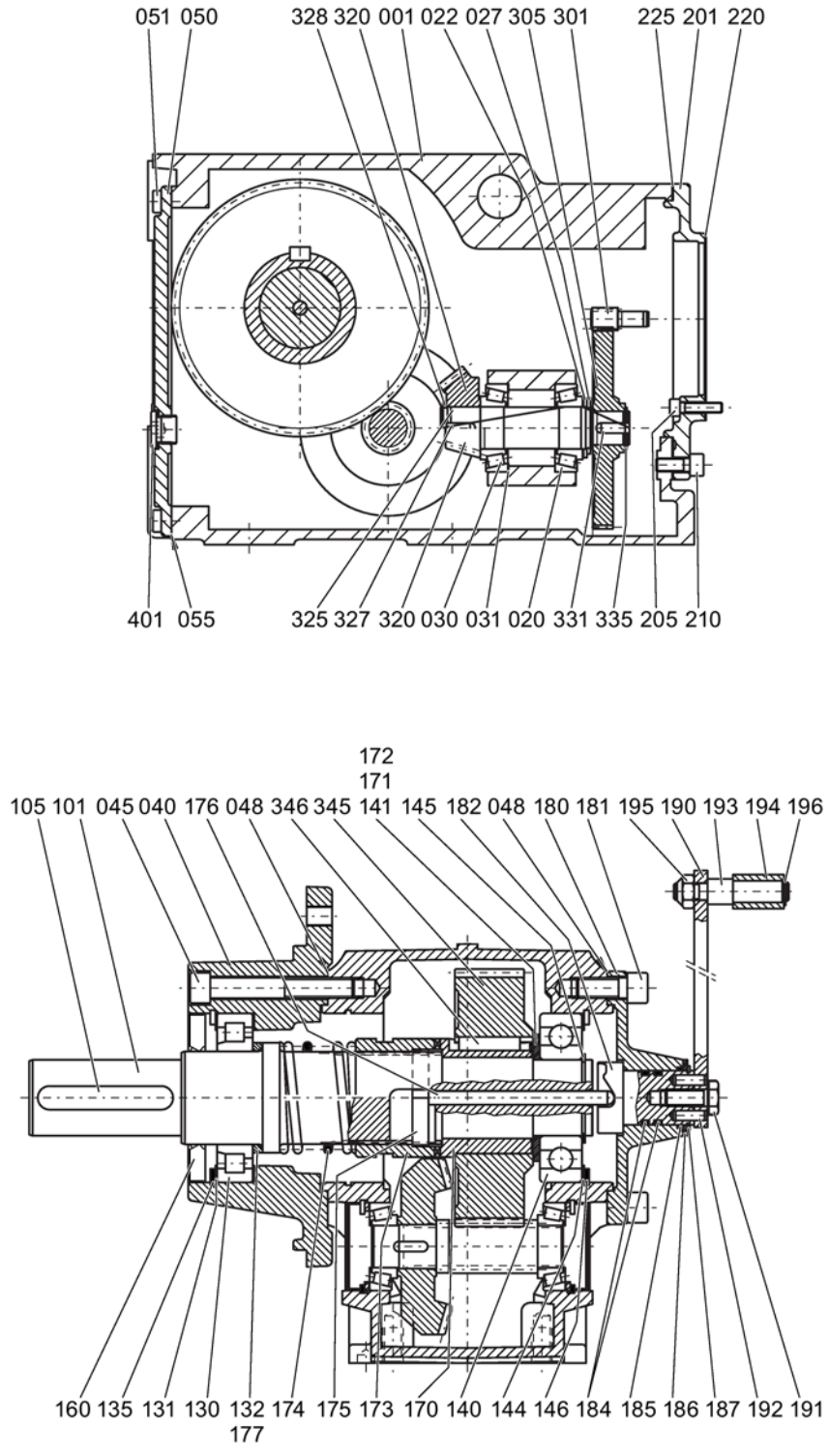
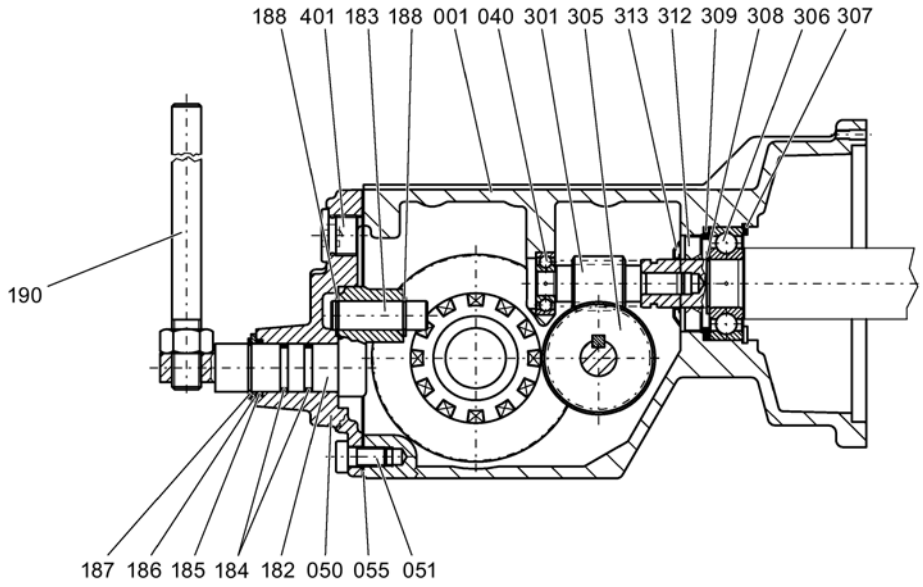


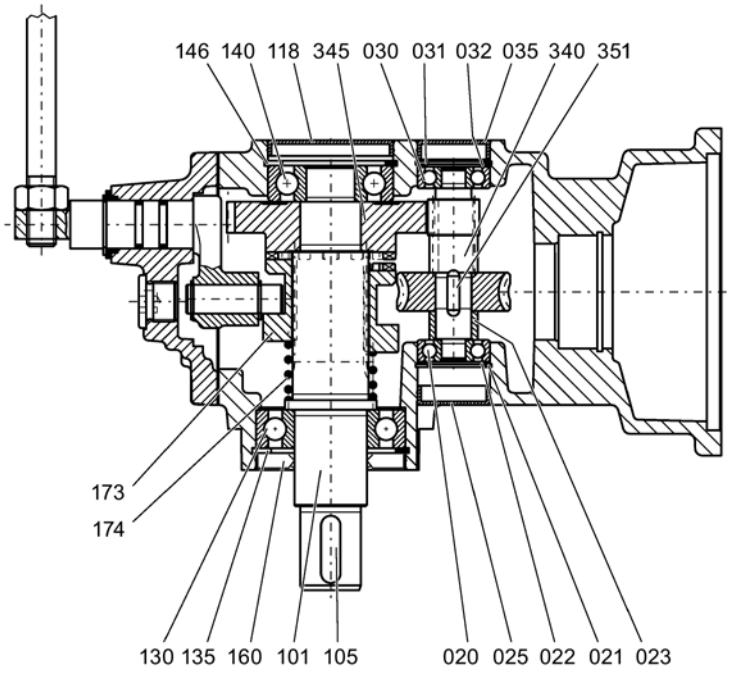
Figure 11-3 Bevel helical gearboxes KHF48, KHF68, KHZ48

Spare parts list for bevel helical gearbox BH.38, KH.48 - 68

001	Gearbox housing	186	Supporting disk / shim
020	Bearing	187	Locking ring
022	Supporting disk / shim	188	Snap ring
027	Locking ring	190	Threaded bolt
030	Bearing	205	Screw
031	Locking ring	210	Nut
032	Supporting disk / shim	220	Seal
050	Housing cover	301	Plug-in pinion
051	Screw	305	Helical gear wheel
055	Seal	320	Bevel gear pair
101	Output shaft	331	Parallel key
105	Parallel key	335	Locking ring
118	Plug / sealing cap	401	Screw plug
130	Bearing		
131	Shim		
132	Spacer ring		
135	Locking ring		
140	Bearing		
144	Shim		
146	Locking ring		
160	Shaft sealing ring		
173	Clutch element		
174	Compression spring		
182	Eccentric		
183	Cylindrical pin		
184	O-ring		
185	O-ring - optional spare part, not included in original equipment		

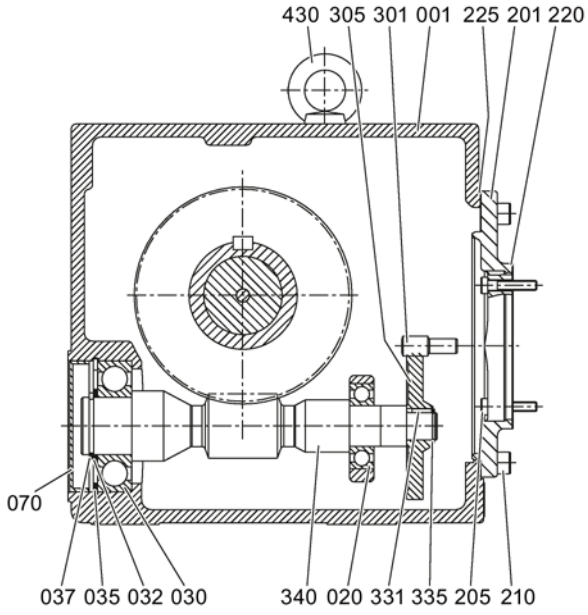
11.2.2 Helical worm gearboxes CHF28, CHF48, CHF68, CHZ48

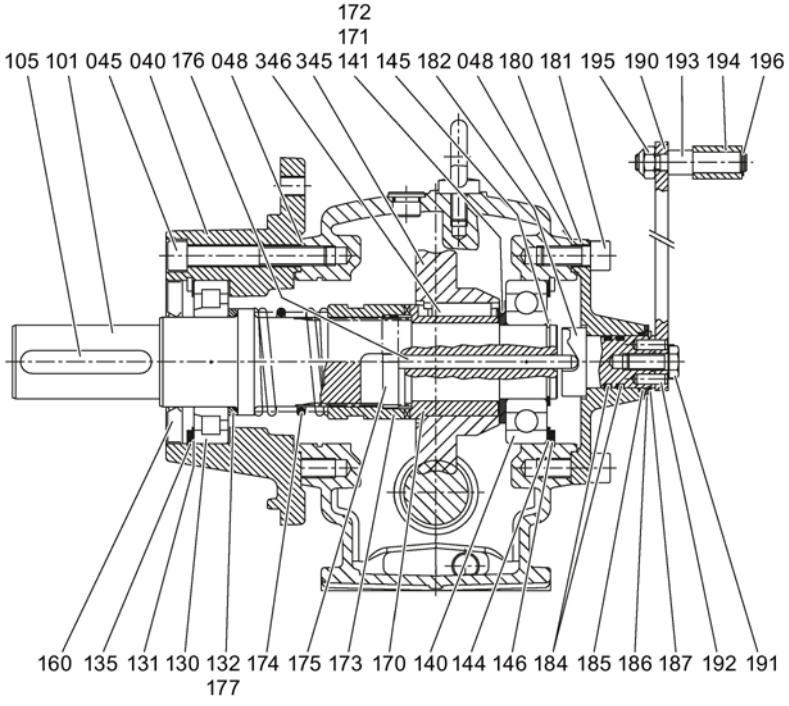




001 Gearbox housing
020 Bearing
021 Locking ring
022 Supporting disk / shim
023 Spacer ring
025 Sealing cap
030 Bearing
031 Locking ring
032 Supporting disk / shim
035 Sealing cap
040 Bearing
050 Housing cover
051 Screw
055 Seal
101 Output shaft
105 Parallel key
118 Sealing cap
130 Bearing
135 Locking ring
140 Bearing
146 Locking ring
160 Shaft sealing ring
173 Clutch element
174 Compression spring
182 Eccentric
183 Cylindrical pin
184 O-ring
185 O-ring - optional spare part, not included in original equipment
186 Supporting disk / shim
187 Locking ring
188 Snap ring
190 Threaded bolt
301 Worm shaft
305 Worm wheel
306 Deep-groove ball bearing
307 Locking ring
308 Locking ring
309 Supporting disk / shim
312 Shaft sealing ring
313 Oil splasher
340 Pinion shaft
345 Helical gear wheel
351 Shim
401 Screw plug

Figure 11-4 Helical worm gearbox CHF28


430 305 301 001 225 201 220
070
037 035 032 030
340 020 331 335 205 210


172
171
105 101 045 040 176 048 346 345 141 145 182 048 180 181 195 190 193 194 196
160 135 131 130 132 174 175 173 170 140 144 146 184 185 186 187 192 191
177

001	Gearbox housing	186	Supporting disk / shim
020	Bearing	187	Locking ring
030	Bearing	190	Operating lever
032	Supporting disk / shim	191	Screw
035	Locking ring	192	Dowel pin
037	Locking ring	193	Threaded bolt
040	Output flange	194	Spacer / bush
045	Screw	195	Nut
070	Sealing cap	196	Locking ring
101	Output shaft	201	Adapter plate
105	Parallel key	205	Screw
130	Cylindrical-roller bearing	210	Screw
131	Supporting disk / shim	220	Seal
132	Spacer ring	225	Seal
135	Locking ring	301	Plug-in pinion
140	Bearing	305	Helical gear wheel
141	Supporting disk / shim for CHF68	331	Parallel key
144	Supporting disk / shim	335	Locking ring
145	Locking ring	340	Worm shaft
146	Locking ring	345	Worm wheel
160	Shaft sealing ring	346	Parallel key
170	Clutch hub	430	Eyebolt
171	Supporting disk / shim for CH.48		
172	Locking ring for CH.48		
173	Clutch element		
174	Compression spring		
175	Parallel key		
176	Pressure pin		
177	Supporting disk / shim for CHZ48		
180	Cover		
181	Screw		
182	Curved element		
184	O-ring		
185	O-ring - optional spare part, not included in original equipment		

Figure 11-5 Helical worm gearboxes CHF48, CHF68, CHZ48

STEINLEN

12

Original Einbauerklärung für eine unvollständige Maschine
Original declaration of incorporation of partly completed machinery

Nr./*No. ST*337802169AE

Produktbezeichnung: Getriebe mit Adapter ST31 ..
Product identification: Gearbox with adapter ST31

A .. – B..

Getriebe: A .. = [A = E, Z, D, F, B, K, C, S]
Gearbox: B .. = [B = K, A, P]

Hersteller: Steinlen Elektromaschinenbau GmbH .....
Manufacturer .....

Anschrift: Ehlbeek 21 .....
Address DE-30938 Burgwedel .....
.....

Name, Anschrift bevollmächtigte Person für technische Unterlagen: Axel Brinkmann .....
Name, address of authorised person for technical file Steinlen Elektromaschinenbau GmbH
Ehlbeek 21, DE-30938 Burgwedel .....

Die alleinige Verantwortung für die Ausstellung dieser Einbauerklärung trägt der Hersteller.

Der oben beschriebene Gegenstand der Erklärung erfüllt die einschlägigen Harmonisierungsrechtsvorschriften der Union:

Maschinenrichtlinie:

2006/42/EG Richtlinie des Europäischen Parlaments und des Rates vom 17. Mai 2006 über Maschinen und zur Änderung der Richtlinie 95/16/EG

This declaration of incorporation is issued under the sole responsibility of the manufacturer.

The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:

Machinery Directive:

2006/42/EC *Directive of the European Parliament and of the Council of 17 May 2006 on machinery, and amending Directive 95/16/EC*

Weitere Angaben über die Einhaltung dieser Richtlinie(n) enthält Anhang MR2, der ein integraler Bestandteil dieser Erklärung ist.

Further information about the conformity to this Directive(s) is given in Annex MR2, which is an integral part of this declaration.

Harmonisierte Normen / *Harmonised standards*:

Referenznummer *Reference number*	Ausgabedatum *Date of issue*	Referenznummer *Reference number*	Ausgabedatum *Date of issue*
EN ISO 12100	2010	-	- .....

Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, ist jedoch keine Beschaffenheits- oder Haltbarkeitsgarantie. Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten.

This declaration is an attestation of conformity with the indicated Directive(s) but does not imply any guarantee of quality or durability. The safety instructions of the accompanying product documentation shall be observed.

Original Einbauerklärung für eine unvollständige Maschine
Original declaration of incorporation of partly completed machinery

Nr. / *No. ST337802169AE*

Das bezeichnete Produkt ist eine unvollständige Maschine im Sinne von Art. 2 g) der Richtlinie 2006/42/EG. Sie ist nur dazu bestimmt, in andere Maschinen oder in andere unvollständige Maschinen oder Ausrüstungen eingebaut oder mit ihnen zusammengefügt zu werden.
The designated product is a partly completed machinery in the sense of Art 2 g) of Directive 2006/42/EC. It is only intended to be incorporated into or assembled with other machinery or other partly completed machinery or equipment.

Die relevanten, angewendeten und eingehaltenen grundlegenden Anforderungen nach Anhang I der Richtlinie 2006/42/EG sind im Anhang MR2 zu dieser Erklärung aufgeführt.
The relevant, applied and fulfilled essential requirements of Annex I of Directive 2006/42/EC are listed in Annex MR2 of this declaration.

Die speziellen technischen Unterlagen nach Anhang VII, B der Richtlinie 2006/42/EG wurden erstellt und werden den Behörden auf begründete Anforderung in ☒ elektronischer / ☐ Papierform zur Verfügung gestellt.
The relevant technical documentation according to Annex VII, B of Directive 2006/42/EC has been compiled and will be provided to the authorities upon request in ☒ electronic / ☐ paper form.

Die unvollständige Maschine darf erst dann in Betrieb genommen werden, wenn gegebenenfalls festgestellt wurde, dass die Maschine, in die die unvollständige Maschine eingebaut werden soll, den Bestimmungen der Maschinenrichtlinie 2006/42/EG entspricht.
The partly completed machinery must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of Directive 2006/42/EC, where appropriate.

Unterzeichnet für und im Namen von:/ *Signed for and on behalf of:*

Steinlen Elektromaschinenbau GmbH

Burgwedel, 01.08.2021
Ort / *place* Datum der Ausstellung / *Date of issue*

Axel Brinkmann _____
Name / *name* Unterschrift / *signature*

Managing Director
Funktion / *function*

Barbara Reinke _____
Name / *name* Unterschrift / *signature*

Quality Manager
Funktion / *function*

Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, ist jedoch keine Beschaffenheits- oder Haltbarkeitsgarantie. Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten.

This declaration is an attestation of conformity with the indicated Directive(s) but does not imply any guarantee of quality or durability. The safety instructions of the accompanying product documentation shall be observed.

Anhang MR2

zur Original Einbauerklärung
Nr. / *No. ST337802169AE*

Produktbezeichnung: Getriebe mit Adapter ST31 ..

Die folgenden grundlegenden Sicherheits- und Gesundheitsschutzanforderungen der Richtlinie 2006/42/EG, Anh. I, sind für die oben genannte unvollständige Maschine relevant und wurden entsprechend der Angabe in Spalte 3 erfüllt bzw. zeigen noch Restgefahren, die vom Hersteller der Gesamtmaschine zu beachten sind. Die für das Produkt nicht relevanten Risiken sind nicht aufgeführt.

2006/42/EG Anh. I	Bezeichnung	Anforderung erfüllt	
		j/n	Weitere Hinweise
1	**Grundlegende Sicherheits- und Gesundheistsschutzanforderungen**		
1.1.2	Grundsätze für die Integration der Sicherheit	j	
1.1.3	Materialien und Produkte	j	
1.1.5	Konstruktion der Maschine im Hinblick auf die Handhabung	j	
1.3	**Schutzmaßnahmen gegen mechanische Gefährdungen**		
1.3.1	Risiko des Verlusts der Standsicherheit	j	
1.3.2	Bruchrisiko beim Betrieb	j	
1.3.3	Risiken durch herabfallende oder herausgeschleuderte Gegenstände	j	
1.3.4	Risiken durch Oberflächen, Kanten und Ecken	j	
1.3.8.1	Bewegliche Teile der Kraftübertragung	j	
1.4	**Anforderungen an Schutzeinrichtungen**		
1.4.1	Allgemeine Anforderungen	j	
1.4.2	Besondere Anforderungen an trennende Schutzeinrichtungen	j	
1.4.2.1	Feststehende trennende Schutzeinrichtungen	j	
1.5	**Risiken durch sonstige Gefährdungen**		
1.5.4	Montagefehler	j	
1.5.5	Extreme Temperaturen	j	
1.5.6	Brand	j	
1.5.8	Lärm	j	
1.5.9	Vibrationen	j	
1.5.13	Emission gefährlicher Werkstoffe und Substanzen	j	
1.6	**Instandhaltung**		
1.6.1	Wartung der Maschine	j	
1.6.2	Zugang zu den Bedienungsständen und den Eingriffspunkten für die Instandhaltung	j	
1.7	**Informationen**		

Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, ist jedoch keine Beschaffenheits- oder Haltbarkeitsgarantie. Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten.

This declaration is an attestation of conformity with the indicated Directive(s) but does not imply any guarantee of quality or durability. The safety instructions of the accompanying product documentation shall be observed.

2006/42/EG Anh. I	Bezeichnung	Anforderung erfüllt	
		j/n	Weitere Hinweise
1.7.1	Informationen und Warnhinweise an der Maschine	j	
1.7.2	Warnung vor Restrisiken	j	
1.7.3	Kennzeichnung der Maschinen	j	
1.7.4	Betriebsanleitung	j	
1.7.4.1	Allgemeine Grundsätze für die Abfassung der Betriebsanleitung	j	
1.7.4.2	Inhalt der Betriebsanleitung	j	
1.7.4.3	Verkaufsprospekte	j	

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Annex MR2

of the original declaration of incorporation
Nr. / *No. ST337802169AE*

Product identification: *Gearbox with adapter ST31 ..*

The following essential health and safety requirements of Directive 2006/42/EG, Annex I are relevant for the identified uncompleted machinery. According to the remarks in column 3 they have been solved respectively bear residual hazards which have to be covered by the manufacturer of the final machinery. Risks, not being relevant for the uncompleted machinery are not listed.

2006/42/EC Annex I	Denotation	Requirement fulfilled	
		y/n	Additional remark
1	**Essential health and safety requirements**		
1.1.2	Principles of safety integration	y	
1.1.3	Materials and products	y	
1.1.5	Design of machinery to facilitate its handling	y	
1.3	**Protection against mechanical hazards**		
1.3.1	Risk of loss of stability	y	
1.3.2	Risk of break-up during operation	y	
1.3.3	Risks due to falling or ejected objects	y	
1.3.4	Risks due to surfaces, edges or angles	y	
1.3.8.1	Moving transmission parts	y	
1.4	**Required characteristics of guards and protective devices**		
1.4.1	General requirements	y	
1.4.2	Special requirements for guards	y	
1.4.2.1	Fixed guards	y	
1.5	**Risks due to other hazards**		
1.5.4	Errors of fitting	y	
1.5.5	Extreme temperatures	y	
1.5.6	Fire	y	
1.5.8	Noise	y	
1.5.9	Vibrations	y	
1.5.13	Emissions of hazardous materials and substances	y	
1.6	**Maintenance**		
1.6.1	Machinery maintenance	y	
1.6.2	Access to operating positions and servicing points	y	

Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, ist jedoch keine Beschaffenheits- oder Haltbarkeitsgarantie. Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten.

This declaration is an attestation of conformity with the indicated Directive(s) but does not imply any guarantee of quality or durability. The safety instructions of the accompanying product documentation shall be observed.

1.7	***Information***		
1.7.1	*Information and warnings on the machinery*	*y*	
1.7.2	*Warning of residual risks*	*y*	
1.7.3	*Marking of machinery*	*y*	
1.7.4	*Instructions*	*y*	
1.7.4.1	*General principles for the drafting of instructions*	*y*	
1.7.4.2	*Contents of the instructions*	*y*	
1.7.4.3	*Sales literature*	*y*	

Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, ist jedoch keine Beschaffenheits- oder Haltbarkeitsgarantie. Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten.

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