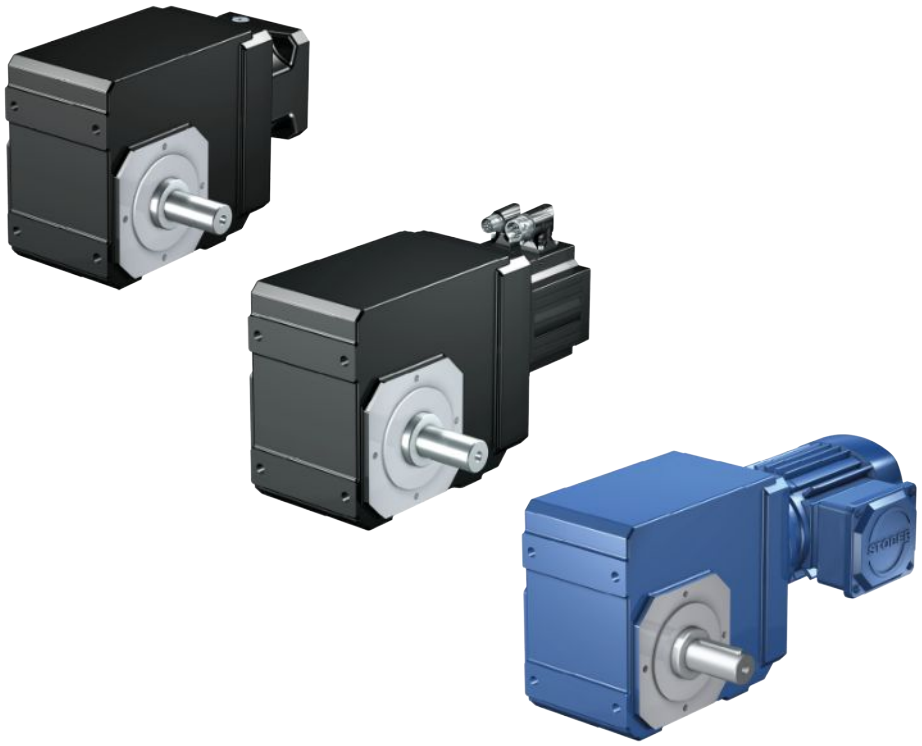

K1 – K10 gear units, geared motors
Operating manual

en-US
01/2026
ID 443364_en.02

STÖBER

Table of contents

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1 User information

This documentation is a part of the product. It applies to products in the standard design according to the corresponding STOBER catalog.

1.1 Storage and transfer

As this documentation contains important information for handling the product safely and efficiently, it must be stored in the immediate vicinity of the product until product disposal and be accessible to qualified personnel at all times.

Also pass on this documentation if the product is transferred or sold to a third party.

1.2 Original language

The original language of this documentation is German; all other language versions are derived from the original language.

1.3 Formatting conventions

Orientation guides in the form of signal words are used to emphasize specific information so that you are able identify it in this documentation quickly.

1.4 Definition of the term

This documentation refers to STOBER gearboxes and STOBER geared motors. For better readability, the superordinate term **"drives"** is used.

If necessary for reasons of clarity or due to technical circumstances, a distinction is made between gearboxes and geared motors.

1.5 Supporting documents

Separate documents apply to the drive components which can be attached to STOBER gearboxes, depending on the design. These documents can be found by entering the serial number of the drive at https://id.stober.com or by scanning the QR code on the nameplate of the drive.

Alternatively, you can find supporting documents at http://www.stoeber.de/en/downloads/. Enter the ID of the documentation in the Search... field:

Drive components	Operating manual ID
LM Lean motor	443048_en
EZ synchronous servo motor	443032_en
MB motor adapter with brake	443287_en
Asynchronous motors	442577_en

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1.6 Limitation of liability

This documentation was created taking into account the applicable standards and regulations as well as the current state of technology.

No warranty or liability claims for damage shall result from failure to comply with the documentation or from use that deviates from the intended use of the product. This is especially true for damage caused by individual technical modifications to the product or the project configuration and operation of the product by unqualified personnel.

1.7 Note on trademark and property rights

Product names protected by trademark law are not marked separately in this documentation.

All applicable property rights (patents, trademarks, utility models, etc.) remain unaffected and must be observed.

1.8 Copyright notice

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2 Safety notes

There are risks associated with the product described in this documentation that can be prevented by complying with the following basic safety notes as well as the included technical rules and regulations.

2.1 Intended use

The drives described in this documentation are intended for installation in industrial machines or systems.

The following situations are considered improper use:

- Overloading of the drives.
- Operation under ambient conditions that deviate from the defined values or value ranges.
- Modifying or converting the drives.
- Use of the drives for purposes other than those specified in the project configuration.

Commissioning of the machine in which the drives are installed is prohibited, unless it is ensured that it complies with the applicable local laws and regulations. Pay particular attention to the (Machinery) Directive 2006/42/EC in the respective valid scope of application.

Operation of the drives in potentially explosive atmospheres is prohibited, unless they are expressly designed for this.

2.2 Requirements for personnel

All mechanical tasks that arise during the assembly, commissioning, maintenance and removal of the product may be performed only by specialized personnel who hold a corresponding qualification in the field of metal technology.

All electrical tasks that arise during the assembly, commissioning, maintenance and removal of the product may be performed only by electrically skilled persons who hold a corresponding qualification in the field of electrical engineering.

Tasks that arise during transport, storage and disposal may be performed by personnel who have been instructed in the suitable method for doing so.

Furthermore, personnel who handle the product must carefully read, understand and observe the valid regulations, legal requirements and applicable basic rules as well as this documentation and the safety notes it contains.

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2.3 Prevention of personal injury

2.3.1 Mechanical hazards

⚠ WARNING!

Dangerous movements of machine parts!

Moving machine parts can cause serious injuries or even death!

✓ Before starting the drive:

- Install all protective devices necessary for operation.
- Make sure that no one is standing in the danger area or able to enter it unchecked.
- Leave the danger area.

⚠ WARNING!

Sinking or falling of gravity-loaded axes or vertical axes after switching off the motor due to gravity!

Falling gravity-loaded axes or vertical axes can cause serious injuries or even death!

- Be aware that the holding brake of the motor does not offer sufficient safety for persons that are in the hazard area of gravity-loaded axes or vertical axes.
- Move gravity-loaded axes or vertical axes to their lowest position and lock or brace them mechanically before allowing people to enter the danger area.

⚠ WARNING!

Unsecured feather keys or drive elements can be thrown due to the rotation of the input shaft!

Flying metal parts can cause serious injuries!

- Mount the provided drive elements properly or remove them before a test run.

2.3.2 Thermal hazards

⚠ CAUTION!

The surface of the drive can reach temperatures over 65 °C during operation!

Touching the hot surface of the drive can cause severe skin burns!

- Do not touch the drive during operation or immediately afterward.
- Allow the drive to cool sufficiently before carrying out work on the drive.
- Wear protective gloves when working on the drive.

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2.4 Prevention of property damage

ATTENTION!

Damage to the bearing and shaft due to improper assembly!

Always avoid using force when installing drive elements with fits. Striking power transmission elements, shafts or the motor or gear housing with a hammer can cause considerable damage.

- Only install the gearboxes in accordance with the installation instructions.

ATTENTION!

Damage to shaft seal rings due to solvents!

Prevent shaft seal rings from coming into contact with solvents when cleaning and degreasing unpainted surfaces.

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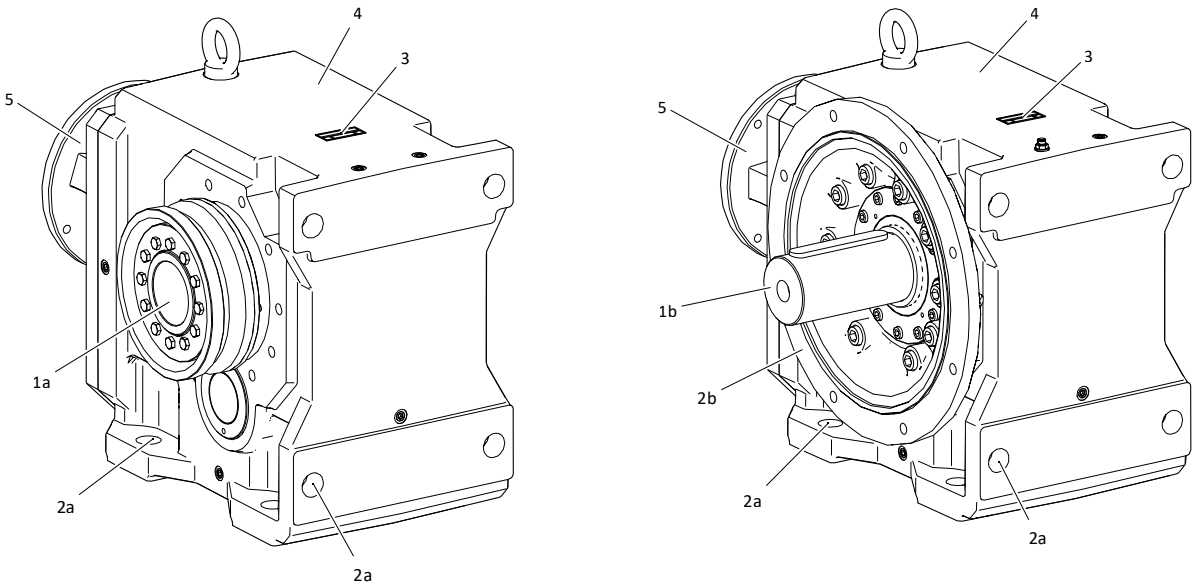
3 Gearbox design and technical features

For technical data on your drive, please refer to the corresponding order confirmation. The specifications in the relevant technical documentation apply to attached motors.

See also

Additional documentation [▶ 16]

3.1 Basic structure



Tab. 1: Basic structure of a K1013SG gearbox (left) and K1013VNF gearbox (right)

1a	Hollow shaft with shrink ring	1b	Solid shaft with feather key
2a	Foot mount	2b	Round flange
3	Nameplate	4	Gear housing
5	MR motor adapter		

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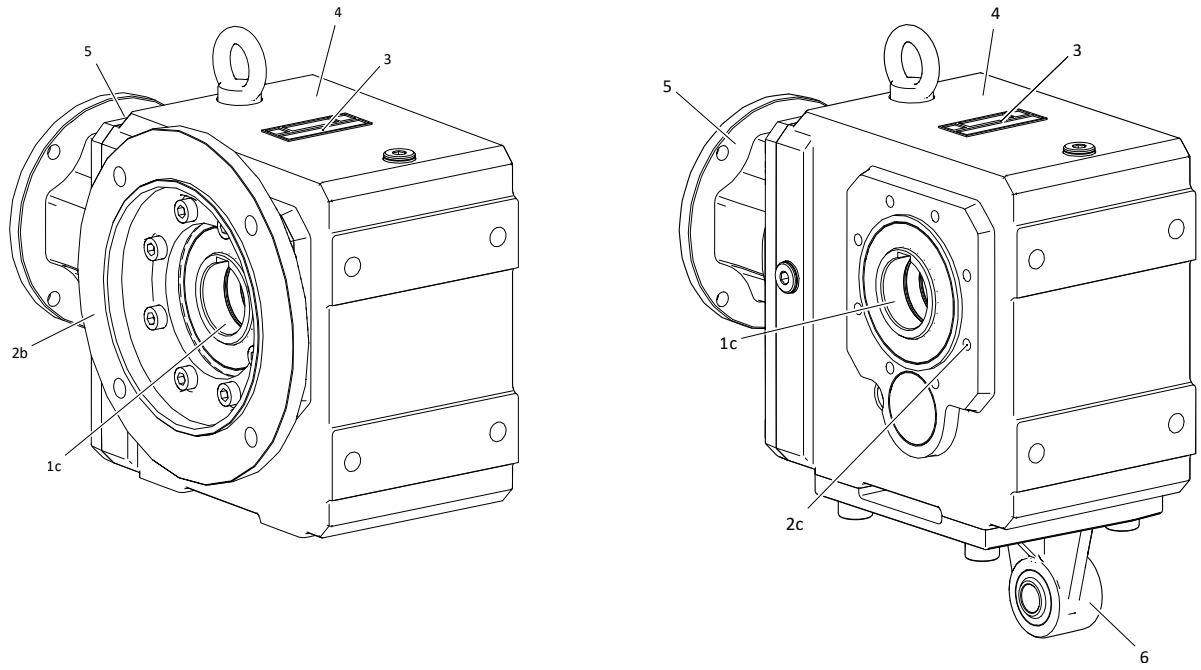

Tab. 2: Basic structure of a K513AF gearbox (left) and K513AGD gearbox (right)

1c	Hollow shaft	2b	Round flange
2c	Pitch circle diameter	3	Nameplate
4	Gear housing	5	MR motor adapter
6	Torque arm bracket		

3.2 Type designation

In this chapter, you will find an explanation of the type designation with the associated options.

Example code

K	**4**	**0**	**2**	**A**	**G**	**0560**	**ME20**

Explanation

Code	Designation	Design
K	Type	Helical bevel gearbox
4	Size	4 (example)
0	Generation	Generation 0
1		Generation 1
2	Stages	Two-stage
3		Three-stage
4		Four-stage
A	Shaft	Hollow shaft with keyway
S		Hollow shaft with shrink ring
V		Solid shaft

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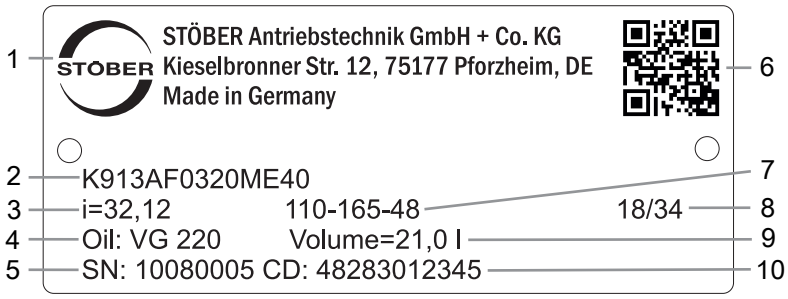
Code	Designation	Design
G	Housing	Pitch circle diameter
F		Round flange
NG		Foot + pitch circle diameter
NF		Foot + round flange
GD		Pitch circle diameter + torque arm bracket
NGD		Foot + pitch circle diameter + torque arm bracket
0560	Transmission ratio (i x 10 rounded)	i = 55.71 (example)
ME20	Motor adapter	ME20 motor adapter (example) with EasyAdapt coupling
MQ		Square motor adapter with curved tooth or plug-in coupling
MR		Round motor adapter with curved tooth or plug-in coupling
MB		ServoStop motor adapter with brake
EZ LM IE3D	Motor	EZ synchronous servo motor LM Lean motor IE3D asynchronous motor

3.3 Nameplate

The following figure illustrates and explains the nameplate of a gearbox.



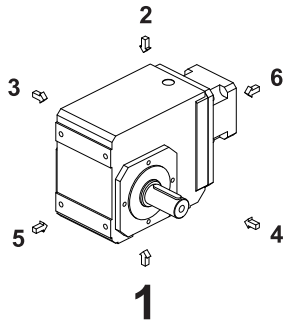
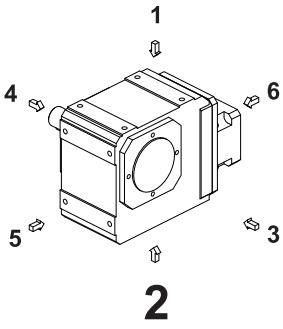
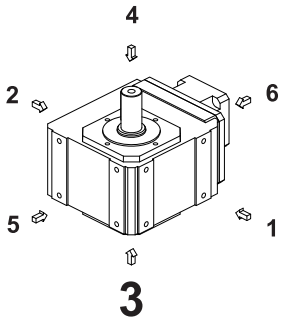
Code	Designation
1	Name of manufacturer
2	Type designation
3	Gear ratio of the gearbox
4	Lubricant specification
5	Serial number of the gearbox
6	QR code (link to product information)
7	Dimensions of the motor adapter (pilot/bolt circle/motor shaft diameter)
8	Date of manufacture (year/calendar week)
9	Lubricant fill volume
10	Customer-specific data

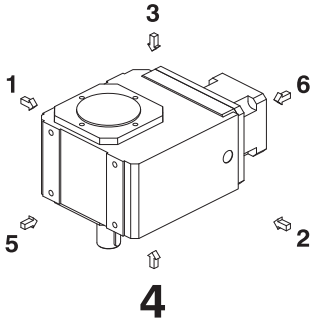
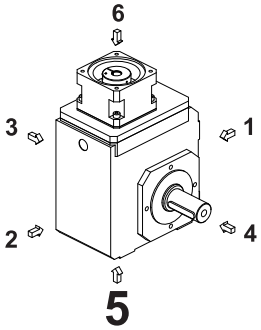
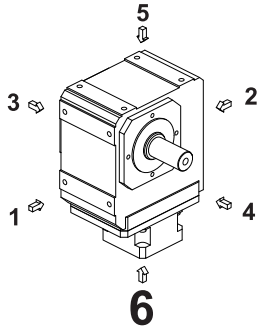
3.4 Mounting positions

The following table shows the standard mounting positions.

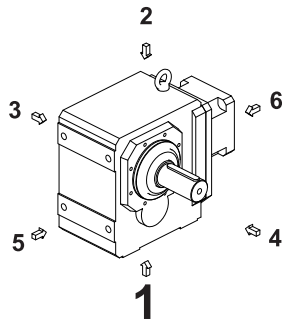
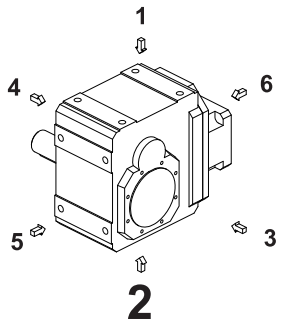
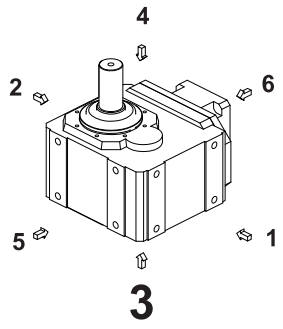
The numbers identify the gearbox sides. The mounting position is defined by the gearbox side facing downwards.

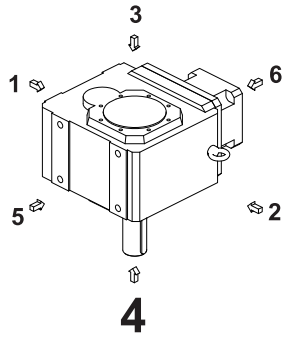
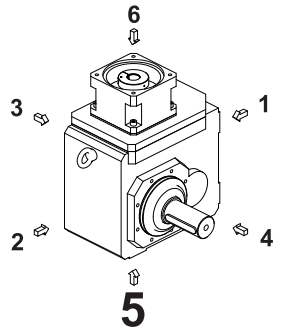
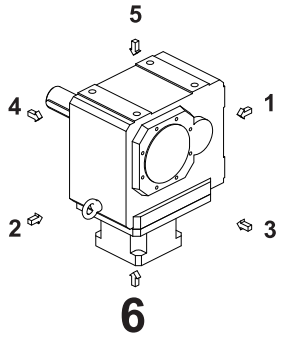
Installation positionf for gearbox sizes K1 – K4

EL1	EL2	EL3
		

EL4	EL5	EL6
		

Mounting positions for gearbox sizes K5 – K10

EL1	EL2	EL3
		

EL4	EL5	EL6
		

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An adhesive label on the gearbox marks the intended mounting position. The arrow shows the side that needs to be mounted downwards.

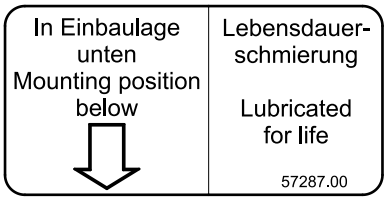
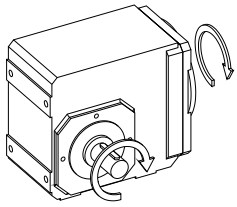
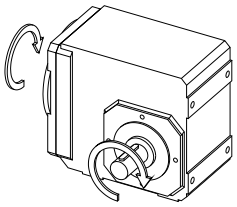
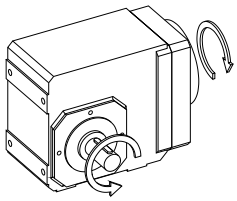
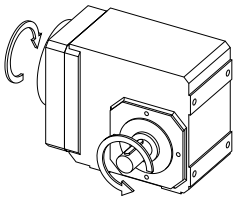
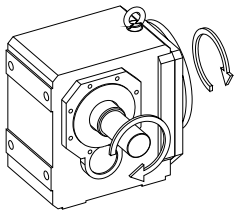
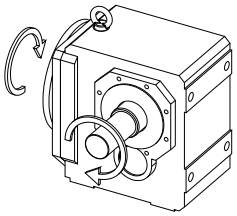
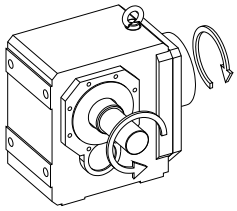
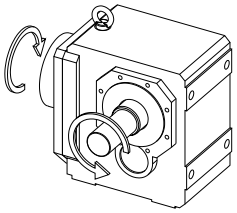


Fig. 1: Adhesive label – Mounting position

3.5 Direction of rotation

Solid shaft (V), solid shaft on both sides (V), hollow shaft with keyway (A)

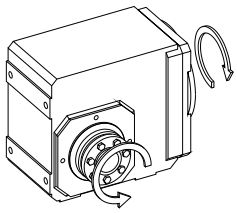
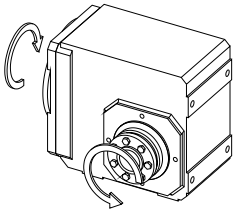
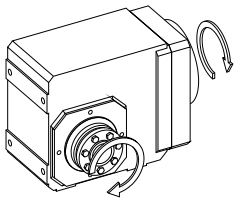
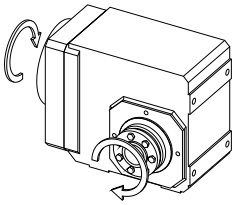
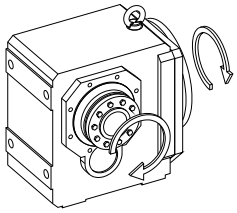
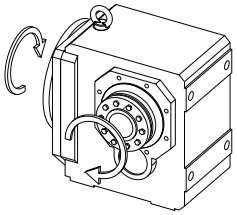
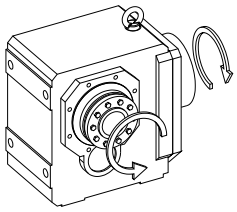
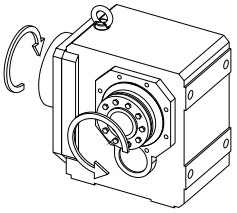
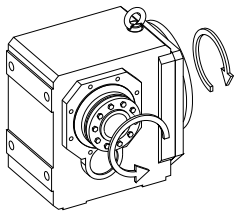
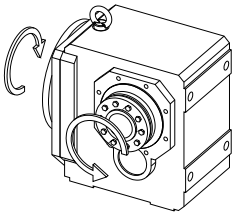
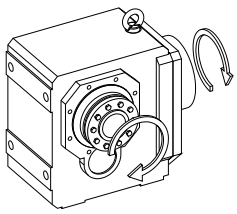
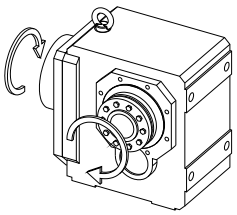
Type	Output side 4	Output side 3
K102 – K402		
K203 – K403		
K513 – K1013		
K514 – K1014		

The specified directions of rotation also apply to gearboxes with hollow shaft (A) if the entry side of the machine shaft corresponds to the side of the solid shaft that is shown.

The direction of rotation for the shaft design of a solid shaft on both sides corresponds to the direction of rotation for output side 4.

The pictures show mounting position EL1.

Hollow shaft with shrink ring (S)

Type	Shrink ring side 4	Shrink ring side 3
K102 – K402		
K203 – K403		
K513 – K813		
K514 – K814		
K913 – K1013		
K914 – K1014		

The pictures show mounting position EL1.

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3.6 Ambient conditions

Please refer to the corresponding order confirmations for environmental conditions that deviate from the standard for special versions. The conditions in the respective technical documentation apply to attached motors

Feature	Description
Surrounding temperature – transport/storage	−10 °C to +50 °C
Surrounding temperature – operation	0 °C to +40 °C
Installation altitude	≤ 1000 m above sea level

In order to prevent corrosion damage and damage to the shaft seal rings, protect the drive from the following influences:

- Environments with harmful oils, acids, gases, vapors, dust or radiation
- Extreme temperature fluctuations with high humidity
- Condensation or icing
- Strong UV radiation (e.g. direct sunlight)
- Presence of salt spray
- Sparks

Information

In potentially explosive atmospheres, only gearboxes in an explosion-proof design in accordance with (ATEX) Directive 2014/34/EU may be used. The associated documentation is available separately.

3.7 Other product features

Other features of gearboxes in the standard design can be found in the following table.

Feature	Description
Maximum permitted gearbox temperature (on the surface of the gearbox)	≤ 80 °C
Paint	Black RAL 9005
Lubricant	Synthetic; for specification and quantity, see nameplate
Ventilation	K1 – K4: No ventilation K5 – K10: Air release valves installed according to the mounting position
Weight	See order documents
Protection class: [1]	IP65

3.8 Additional documentation

You will find more information about the product at http://www.stoeber.de/en/downloads/. Enter the ID of the documentation in the Search... field.

Product combination	Catalog title	ID
Gearbox + ME/MEL/MF/MFL motor adapter	Servo gearboxes	443054_en
Gearbox + MB motor adapter with brake	ServoStop servo gearboxes with brake	443234_en
Gearbox + MQ/MR motor adapter	Power transmission gearboxes	441834
Gearbox + EZ synchronous servo motor	EZ synchronous servo geared motors	442437_en
Gearbox + LM Lean motor	Lean motors	443016_en
Gearbox + IE3D asynchronous motor	Asynchronous geared motors	443136_en
Gearbox	Lubricant filling quantities for gearboxes	441871

If you have questions about your drive that are not answered by this documentation, please contact STOBER Service (Service [▶ 45]).

[1] Observe the protection class of all the components.

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4 Transport and storage

STOBER products are packaged carefully and delivered ready for installation. The type of packaging depends on the product size and the transport method.

Observe the following information during transport and storage:

- Inspect the delivery for any transport damage immediately upon receiving it and report any transport damage immediately. Do not put damaged products into operation.
- Check your delivery for completeness using the delivery note and report any missing parts to the supplier.
- Transport and store the product in the original packaging in order to protect it from damage. Remove the original packaging and transport safety devices shortly before assembly.

Ambient conditions

The ambient conditions for transport and storage can be found in the chapter .

4.1 Transport

⚠ WARNING!

Suspended loads!

Loads that become loose and fall during the lifting process can cause serious injuries or even death!

- Observe the following instructions.
- Cordon off the danger zone and ensure that no one stands under the suspended loads.
- Wear safety shoes.

Lifting and transporting the drive may require lifting gear (e.g. a crane), depending on the weight. The weight of your drive is specified in the accompanying delivery documents.

Lift and transport the drive as follows:

- Use lifting gear with a sufficient lifting capacity for the weight of the drive.
- Run hoist slings directly around the drive housing and secure the hoist slings from slipping.

To prevent the drive from falling or being damaged during transportation, observe the following instructions:

- Do not lift or attach the drive to the output shaft or attached components.
- Additionally secure the motor with suitable fastening elements and ensure that the pulling direction is straight.

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4.2 Storage

Store the drive in a dry, dust-free environment in the original packaging at a storage temperature between −10 °C and +50 °C.

4.2.1 Long-term storage

If you would like to store the drive for longer than six months, then take the following steps to prevent corrosion damage:

1. Apply a suitable corrosion protection agent to unpainted surfaces, such as shaft ends or flange contact surfaces.
2. Completely fill the gearbox with lubricant. You can obtain a specific lubricant recommendation by entering the serial number of the gearbox under https://id.stober.com or scan the respective QR code on the nameplate.

Information

Reduce the lubricant quantity to the value specified on the nameplate before commissioning.

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5 Installation

This chapter contains instructions for the professional installation of STOBER drives in a standard design and to prevent personal injury and damage to property. Deviations in customized designs are documented in the respective order documents.

The specifications in the relevant technical documentation apply to the installation and electrical connection of attached motors.

Inspect the drive for transport or storage damage. If you notice any damage, do not install the drive. Instead, contact STOBER.

5.1 Cleaning agent and solvent

Upon delivery, unpainted surfaces of the drive are protected by a corrosion protection agent. The corrosion protection agent must be removed from contact surfaces such as shaft ends and flange contact surfaces before assembly.
We recommend using a suitable cold cleaner for cleaning (e.g. Carlofon Autocleaner), which, unlike highly volatile solvents, is virtually odorless and does not attack the seal lips of the shaft seal rings. Alternatively, commercially available solvents can be used.

To ensure perfect torque transmission, all contact surfaces of the clamp connection must be thoroughly degreased with a cold cleaner or suitable solvent.

ATTENTION!

Damage to shaft seal rings due to solvents!

Prevent shaft seal rings from coming into contact with solvents when cleaning and degreasing unpainted surfaces.

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5.2 Mounting the motor on a gearbox

Information

This chapter is not relevant when using a geared motor fromSTOBER .

This chapter applies to attaching motor to a gearbox from STOBER using a motor adapter. As a rule, this applies to motors from third-party manufacturers.

For the best smooth operation, we recommend using motor shafts without feather keys, as keyways can have a negative effect on smooth operation.

Information

To make it easier to fit the motor to the gearbox, first fit the motor to the gearbox and then the geared motor to the machine.

5.2.1 Permitted tilting torques at the gearbox input

If you mount a STOBER gearbox on a machine in a horizontal mounting position, check that the permitted breakdown torque is not exceeded on the gearbox input before mounting the corresponding motor.

Type	M_{1k}
	[Nm]
KS311_MF	20
KS312_ME	10
KS313_ME	10
KS411_MF	40
KS412_ME	20
KS413_ME	10
KS511_MF	80
KS512_ME	40
KS513_ME	20
KS711_MF	200
KS712_ME	80
KS713_ME	40

The values for the ME motor adapter also apply to the MEL adapter.

See also

Additional documentation [▶ 16]

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5.2.2 Tolerances of the motor

For safe installation of the motor via a motor adapter, the tolerances of the motor must meet certain requirements.

Tolerances for solid shafts in accordance with DIN 748-1

Diameter [mm]	Tolerance
≤ 50	ISO k6
> 50	ISO m6

Tab. 3: Tolerances – Solid shafts

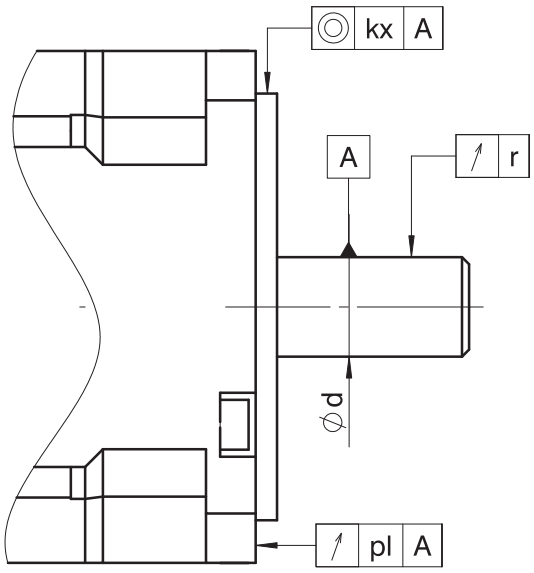
Tolerances for the centering diameter on the motor flange in accordance with EN 50347

Centering diameter [mm]	Flange size [mm]	Tolerance
≤ 230	65 – 300	ISO j6
> 230	350 – 500	ISO h6

Tab. 4: Tolerances – Motor flange

Tolerances for radial runout, axial runout and concentricity in accordance with IEC 60072-1 (normal class)

Symbol	Unit	Explanation
kx	µm	Concentricity of the flange centering in relation to the shaft
pl	µm	Axial runout of the flange mounting surface in relation to the shaft
r	µm	Radial runout of the shaft end



⌀d [mm]	r [µm]
d ≤ 10	30
10 < d ≤ 18	35
18 < d ≤ 30	40
30 < d ≤ 50	50
50 < d ≤ 80	60

Tab. 5: Tolerances – Radial runout of shaft end

Centering diameter [mm]	Flange size	kx [µm]	pl [µm]
50 – 95	65 – 115	80	80
110 – 130	130 – 165	100	100
250 – 450	300 – 500	125	125

Tab. 6: Tolerances – Axial runout, concentricity

See also

Additional documentation [▶ 16]

5.2.3 Mounting the motor on a gearbox with ME adapter

This chapter describes the assembly of a motor on a STOBER gearbox with an ME motor adapter.

Prerequisites

- Dimensional tolerances of the motor correspond to the requirements in the chapter
- The permitted tilting torque on the gearbox input is not exceeded (see)
- Four screws of strength class 8.8 are available for mounting the motor on a gearbox. The minimum screw depth for these screws is 1.6x the nominal diameter of the screw
- The necessary tools and aids are available (see)
- The information in the chapter Cleaning agent and solvent [▶ 19] is observed

Procedure

In order to prevent unfavorable shifting or tilting of the motor shaft, STOBER recommends mounting the motor on the gearbox with the motor shaft pointing down vertically.

1. Position the gearbox (5), if necessary with the aid of lifting gear, so that the motor can be mounted in a vertical position.
2. Remove the transport cover of the motor adapter.
3. If a feather key is installed on the motor shaft, remove it.
4. Remove all corrosion protection from the motor shaft and contact surfaces of the motor and motor adapter.
5. Carefully remove any lubricant from the inner hole of the clamping hub (15) and, if available, the inner and outer surface of the adapter bushing (6) for the motor shaft.
6. Unscrew the screw plug (13).
7. Turn the clamping hub so that the locking screw (11) can be turned over the bore for the screw plug (13), guide the hexagon insert (3) through the bore and insert it into the hexagon socket of the locking screw.
8. If an adapter bushing (6) is necessary, insert the adapter bushing into the inner hole of the clamping hub (15) as far as it will go and turn the adapter bushing so that the slot of the adapter bushing coincides with the slot of the clamping hub (10).
9. If necessary, use two suitable attachment points to secure the motor with the lifting gear so that the motor shaft is pointing down vertically.
10. Turn the motor in an axial position to the gearbox so that the nameplates are on the same side, if possible, and can also be read after installation in the machine.
11. If the motor shaft has a keyway, position the motor shaft so that the keyway is opposite the slot of the clamping hub (10).

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12. An elastic bellow coupling is installed in the MF/MFL motor adapter that can assume a slightly tilted position, as long as the clamping hub is not connected with the motor shaft. Correct any existing tilt of the clamping hub before inserting the motor shaft.
13. Carefully place the motor on the motor adapter (4) and make sure that the motor shaft is inserted (7) in the clamping hub (15) so that it is centered and not at an angle.
14. If the motor shaft cannot be inserted into the clamping hub, do not use force and instead turn the locking screw (11) counterclockwise one quarter rotation with the hexagon insert (3) (in this process, the clamping hub widens because the grooved pin (12) locks against the cylinder head of the locking screw). The size of the hexagon insert can be found on the adhesive label (14) as well as in the following tables.
15. If necessary, repeat the previous step.
16. The contact surfaces of the motor flange and motor adapter flange must fit together without a gap. If this is not the case, do not use force and instead check the dimensions of the motor.
17. Mount the motor on the motor adapter with screws (9). Tighten the screws evenly, with increasing torque and alternating diagonally. The tightening torque can be found in the chapter Tightening torques [▶ 39].
18. Insert the torque wrench (2) in the hexagon insert (3) and tighten the locking screw (11). The corresponding tightening torque can be found in the following table and on the adhesive label on the motor adapter.
19. If the motor flange does not fully cover the bores or openings of the motor adapter, seal off the openings with a suitable sealant. This maintains the protection class of the gearbox so that dust and water cannot get into the interior of the motor adapter.
20. Plug the access hole with the screw plug (13) by screwing it in until it is flush with the surface of the motor adapter.

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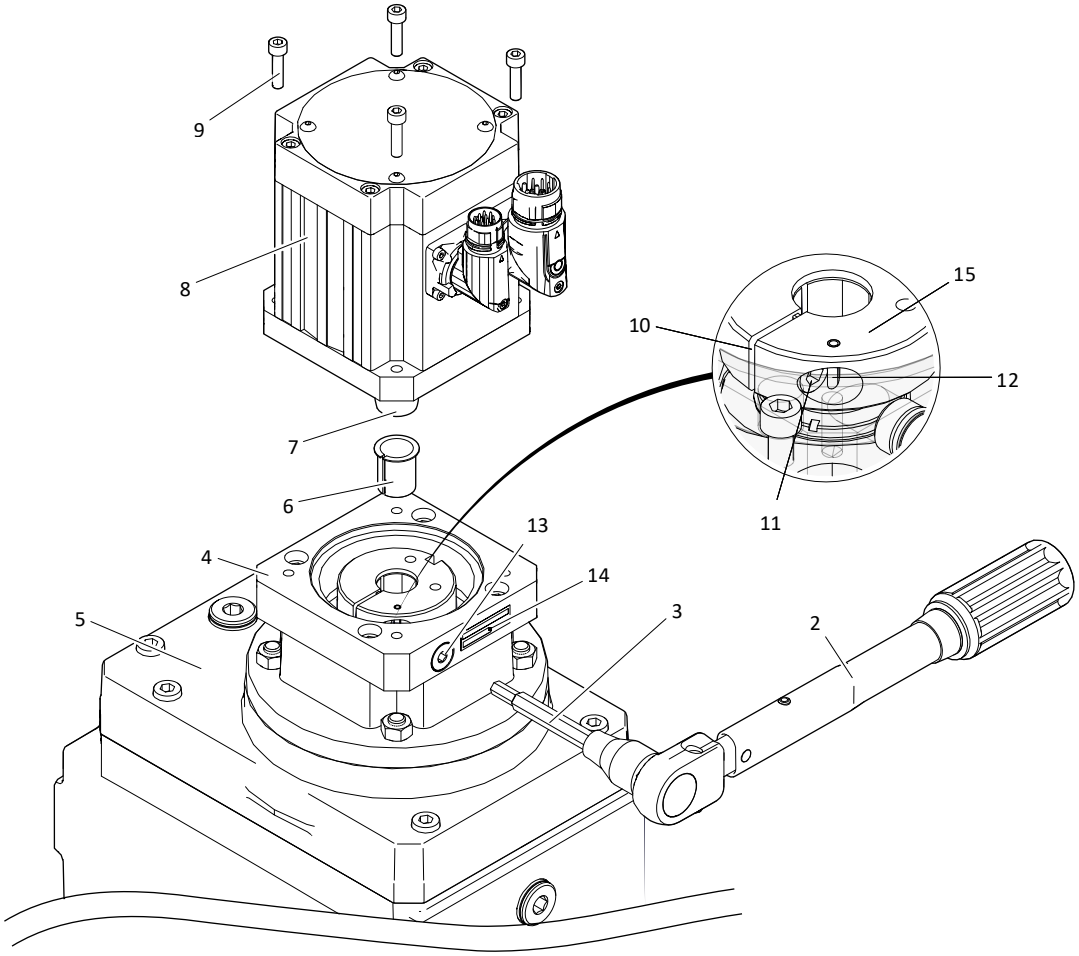

Fig. 2: Mounting a motor on a K gearbox with ME motor adapter (example)

2	Torque wrench	3	Hexagon insert
4	Motor adapter	5	Gearbox
6	Adapter bushing (if present)	7	Motor shaft
8	Motor	9	Screw
10	Slot of the clamping hub	11	Locking screw
12	Grooved pin	13	Screw plug
14	Adhesive label	15	Clamping hub

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Tightening torques for the locking screw (11)

The tightening torques for the locking screw are in line with the size of the ME adapter on the gearbox input and the diameter of the motor shaft.

Type	d2	KS	s	M_A
	[mm]		[mm]	[Nm]
_ME10	d2≤14	M5	4	5.9
_ME10	14<d2≤19	M6	5	10
_ME20	d2≤19	M6	5	10
_ME20	19<d2≤24	M8	6	25
_ME30	d2≤24	M8	6	25
_ME20	24<d2≤32	M10	8	49
_ME30	24<d2≤38	M10	8	49
_ME40	d2≤38	M10	8	49
_ME40	38<d2≤48	M12	10	85
_ME50	55<d2≤60	M16	14	210

Abbreviations used:

- KS = Nominal diameter of the locking screw (11)
- M_A = Tightening torque for the locking screw (11)
- s = Size of the hexagon insert (3)
- d2 = Motor shaft diameter

5.2.4 Mounting the motor on a gearbox with MQ/MR adapter with curved tooth coupling

This chapter describes the attachment of a motor with a solid shaft with feather key to a STOBER gearbox with an MQ (for a square motor flange) or MR (for a round motor flange) motor adapter with a curved tooth coupling. Since the assembly steps for the MQ or MR motor adapter are identical, only one motor adapter type is shown in the figures.

Prerequisites

- Dimensional tolerances of the motor correspond to the requirements in the chapter
- The feather key corresponds to DIN 6885-1;
- The shaft shoulder and flange contact surface of the motor are on one plane (see the following sectional drawing);
- The shaft length of the motor is not longer than defined in IEC 60072-1 (see the following table and sectional drawing);
- The permitted tilting torque on the gearbox input is not exceeded (see)
- The necessary tools and aids are available (see)
- The information in the chapter Cleaning agent and solvent [▶ 19] is observed

Procedure

1. Remove all corrosion protection from the motor shaft and contact surfaces of the motor and motor adapter.
2. Carefully degrease the inner hole of the motor-side coupling hub (3).
3. Pull the motor-side coupling hub (3) onto the motor shaft up to the shaft shoulder. You can find more details on this in the chapter Mounting drive elements on a solid shaft [▶ 30].
4. If you heated the coupling hub to pull it on, allow it to cool.
5. Secure the coupling hub (3) with the set screw (9) and tighten it with the tightening torque according to the following table.
6. Position the gearbox (5), if necessary with the aid of lifting gear, so that the motor can be mounted in a vertical position.
7. Connect the coupling sleeve (8) to the gearbox-side coupling hub (7).
8. If necessary, use two suitable attachment points to secure the motor with the lifting gear so that the motor shaft is pointing down vertically.
9. Turn the motor in an axial position to the gearbox so that the nameplates are on the same side, if possible, and can also be read after installation in the machine.
10. Carefully place the motor on the motor adapter such that the motor-side coupling hub (3) is inserted into the coupling sleeve (8) centered and the curved teeth of the coupling hub easily mesh with the internal teeth of the coupling sleeve.
11. The contact surfaces of the motor flange and motor adapter flange must fit together without a gap. If this is not the case, do not use force and instead check the dimensions of the motor.
12. Mount the motor on the motor adapter using the corresponding fastening screws (1) in **strength class 8.8**. If the fastening bores of the motor adapter are unthreaded, use nuts (5) in strength class 8.
13. Tighten the fastening screws with the corresponding tightening torque (see chapter Tightening torques).

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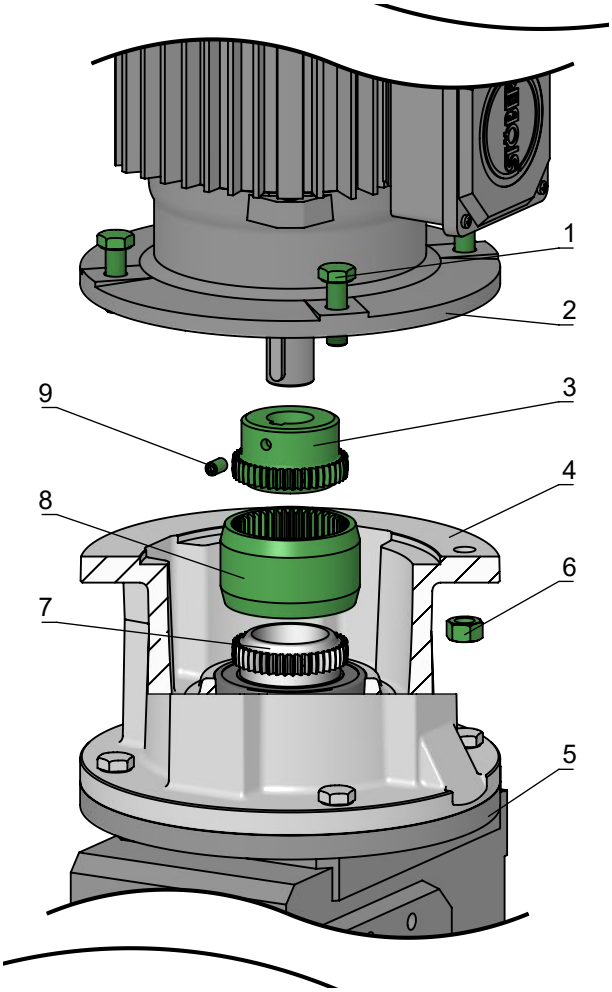

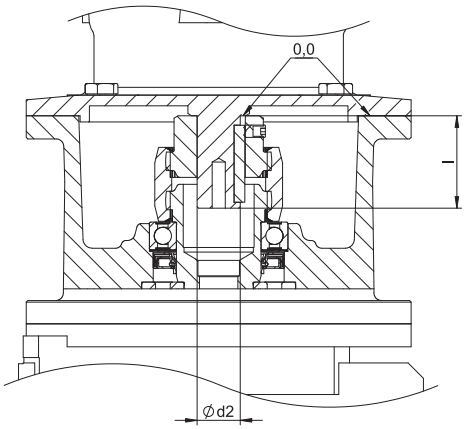

1	Screw	2	Motor
3	Coupling hub (motor side)	4	Motor adapter
5	Nut	6	Gearbox
7	Coupling hub (gearbox side)	8	Coupling sleeve
9	Set screw		

Nominal sizes of the shaft end according to IEC 60072-1

Diameter d2 [mm]	11	14	19	24	28	38	42	48	55	60
Length l [mm]	23	30	40	50	60	80	110	110	110	140

Tightening torques for set screw (9)

Size of hexagon insert [mm]	2.5	4
Tightening torque [Nm]	2	10

5.2.5 Mounting the motor on a gearbox with MQ/MR adapter with plug-in coupling

This chapter describes the attachment of a motor with a solid shaft without feather key to a STOBER gearbox with an MQ (for a square motor flange) or MR (for a round motor flange) motor adapter with a plug-in coupling. Since the assembly steps for the MQ or MR motor adapter are identical, only one motor adapter type is shown in the figures.

Prerequisites

- The motor has a smooth shaft;
- Dimensional tolerances of the motor correspond to the requirements in the chapter
- The offset between the shaft shoulder and flange surface of the motor is ≤ 0.4 mm; otherwise, the gear rim is tensioned axially and the plug-in coupling can be damaged (see the following sectional drawing);
- No motor parts (e.g. screws) protrude over the flange surface in the flange area;
- The permitted tilting torque on the gearbox input is not exceeded (see)
- The necessary tools and aids are available (see)
- The information in the chapter Cleaning agent and solvent [▶ 19] is observed

Procedure

1. Remove all corrosion protection from the motor shaft and contact surfaces of the motor and motor adapter.
2. Carefully degrease the inner hole of the clampring hub (10).
3. Connect the clampring hub (10) to the motor shaft up to the shaft shoulder. If the clampring hub is difficult to fit in place, do not use force and instead heat the clampring hub to about 70 °C before fitting.
4. If you heated the clampring hub to connect it, allow it to cool.
5. Tighten the clamping screws (3) gradually in a crisscross pattern to the tightening torque specified in the following table. Depending on the size, a gap may remain between the clamping ring and the clamping hub, or the gap may completely close.
6. Position the gearbox, if necessary with the aid of lifting gear, such that the motor can be mounted in a vertical position. As needed, use suitable equipment, such as appropriate wood blocks or pipe pieces, to support the gear housing. Make sure that the gearbox is not tilted and that the motor adapter is precisely aligned upwards.
7. Grease the gear rim (8) and connect it to the gearbox-side coupling hub (7).
8. If necessary, use two suitable attachment points to secure the motor with the lifting gear so that the motor shaft is pointing down vertically.
9. Turn the motor in an axial position to the gearbox so that the nameplates are on the same side, if possible, and can also be read after installation in the machine.
10. Carefully place the motor on the motor adapter and make sure that the claws of the motor-side clampring (9) are positioned between the claws of the gearbox-side coupling hub (7) and the teeth of the gear rim (8).
11. Make sure that the gear rim is not tensioned axially when mounting the motor. Otherwise, the plug-in coupling can be damaged.
12. The contact surfaces of the motor flange and motor adapter flange must fit together without a gap. If this is not the case, do not use force and instead check the dimensions of the motor.
13. Mount the motor on the motor adapter using the corresponding fastening screws (1) in **strength class 8.8**. If the fastening bores of the motor adapter are unthreaded, use nuts (5) in strength class 8.
14. Tighten the fastening screws with the corresponding tightening torque (see chapter Tightening torques).

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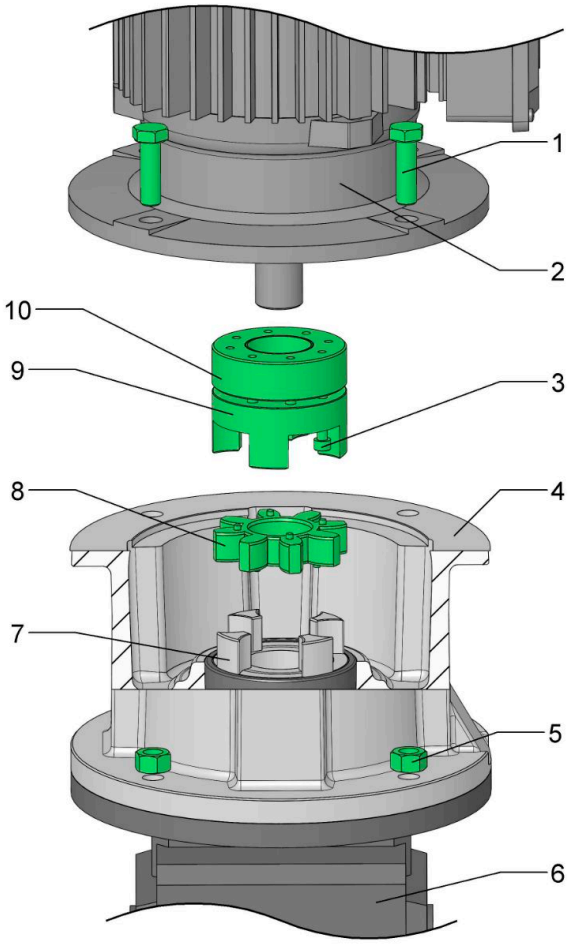

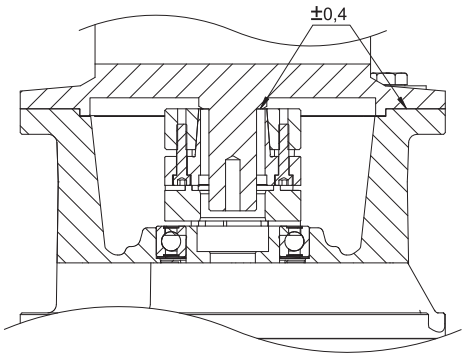

1	Fastening screw	2	Motor
3	Clamping screw	4	Motor adapter
5	Nut	6	Gearbox
7	Coupling hub (gearbox side)	8	Gear rim
9	Clampring	10	Clampring hub

Tightening torques for clamping screws (3)

Size of clamping screw [mm]	M4	M5	M6	M8
Tightening torque [Nm]	3	5.9	10	36

5.2.6 Mounting the motor on a gearbox with MB adapter

The assembly of a motor on a gearbox with an MB motor adapter with brake is described in a separate document (see Supporting documents [▶ 4]).

5.3 Mounting the output shaft

This chapter contains information on how to correctly connect the different designs of the gearbox output shaft with the machine so that the torque can be transmitted properly.

5.3.1 Mounting drive elements on a solid shaft

This chapter describes the assembly of drive elements, such as hubs, belt drives, couplings, pinions or sprockets, on the output of a gearbox with a solid shaft and feather key.

When mounting drive elements on a solid shaft without a feather key, observe the technical documentation of the drive element in question.

ATTENTION! Damage to encoders, bearings and shafts due to improper assembly! Never use force when mounting drive elements with fittings, e.g. hitting drive elements, shafts or the motor or gear housing with a hammer, and instead install them in accordance with the instructions in the documentation.

Prerequisites

- The drive element does not cause any impermissible shaft loads (e.g. tensioning the belt on a belt drive). Information on permissible shaft loads can be found in the corresponding catalog (see Additional documentation [▶ 16]);
- The drive element is balanced;
- The tolerance of the inner hole of the drive element is ISO H7;
- The keyway of the drive element corresponds to DIN 6885-1 (if not otherwise specified);
- The information in the chapter Cleaning agent and solvent [▶ 19] is observed
- A mounting device suitable for the drive element is available (not included in the scope of delivery of the gearbox).

Procedure

1. Remove the corrosion protection from the solid shaft.
2. Degrease the inner hole of the drive element.
3. Mount the drive element on the solid shaft with the aid of a mounting device positioned on the centering hole of the solid shaft. Details can be found in the following figure and table.
4. If the drive element is difficult to hoist, do not use force and instead heat it to about 80 °C beforehand.
5. If the length of the solid shaft is greater than the length of the drive element, use an appropriate spacer bushing that you position between the plate (1) and drive element (5).

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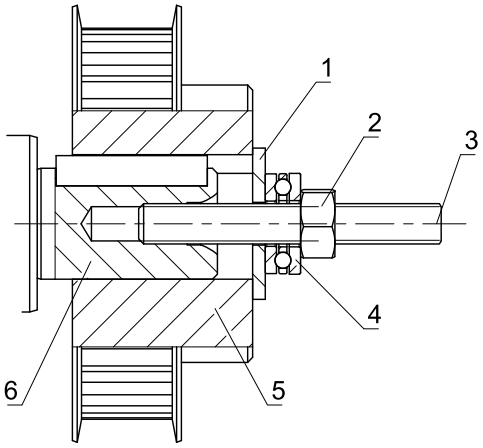


Fig. 3: Mounting device for a belt drive (example)

1	Washer	2	Nut
3	Set screw	4	Axial bearing
5	Belt drive (example)	6	Solid shaft

5.3.2 Mounting a hollow shaft with keyway

This chapter describes how to mount gearboxes with a hollow shaft and keyway on a machine shaft. A keeper plate with internal thread is integrated in the hollow shaft. It is used to remove the hollow shaft from the machine shaft again.

The inner hole of the hollow shaft has a spiral-shaped groove. This helps distribute the grease in the inner hole of the hollow shaft and makes mounting and removing the hollow shaft easier.

Tools

- Cylinder screw for pulling on the hollow shaft (thread size according to the following table)
- Flat washer
- Machine grease

Prerequisites

- The information in the chapter Cleaning agent and solvent [▶ 19] is observed
- The dimensions of the machine shaft and feather key correspond to the following specifications.

Ødh [mm]	16^{H7}	20^{H7}	25^{H7}	30^{H7}	35^{H7}	40^{H7}	50^{H7}	60^{H7}	70^{H7}	90^{H7}	100^{H7}
dm_{tol}	ISO k6	ISO k6	ISO k6	ISO k6	ISO k6	ISO k6	ISO k6	ISO m6	ISO m6	ISO m6	ISO m6
sm	M5	M6	M10	M10	M12	M16	M16	M20	M20	M24	M24
lm_{min} [mm]	35.2	44	55	66	77	88	110	132	154	176	220
lpm_{min}[mm]	32	40	50	60	70	80	100	120	140	180	200
pm_{norm}	DIN 6885-1	DIN 6885-1	DIN 6885-1	DIN 6885-1[2]	DIN 6885-1	DIN 6885-1	DIN 6885-1	DIN 6885-1	DIN 6885-1	DIN 6885-1	DIN 6885-1

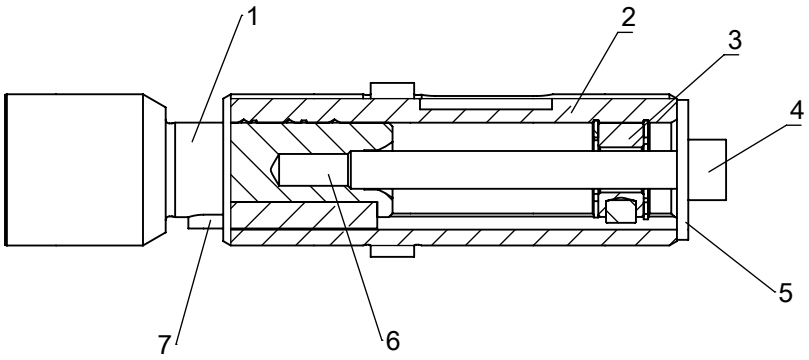
Tab. 7: Specifications for the machine shaft and feather key

[2] (for K1 DIN 6885-3)

Dimension name	Explanation
∅dh	Inner diameter of the hollow shaft
sm	Diameter of the threaded hole in the machine shaft
lm_{min}	Minimum length of the machine shaft
lpm_{min}	Minimum length of the feather key on the machine shaft
dm_{tol}	Diameter tolerance of the machine shaft in accordance with DIN 748-1
pm_{norm}	Standard to which the feather key must correspond

Procedure

1. Remove any covers from the hollow shaft.
2. Remove the corrosion protection from the machine shaft, inner hole of the hollow shaft and other contact surfaces.
3. Apply grease to the machine shaft (1) and distribute it evenly.
4. Pull the gearbox onto the machine shaft with the help of the cylinder screw (4) and washer (5) up to the stop, which is determined by the shoulder of the machine shaft, the keeper plate or the gearbox flange.
5. Remove the cylinder screw (4) and washer (5).
6. If the torque of the gearbox is absorbed by a torque arm bracket, secure the shaft connection axially using an appropriate screw.



1	Machine shaft	2	Hollow shaft
3	Keeper plate	4	Cylinder screw
5	Washer	6	Threaded hole
7	Feather key		

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5.3.3 Mounting a hollow shaft with shrink ring

This chapter describes how to mount gearboxes with a hollow shaft and shrink ring on a machine shaft.

Prerequisites

- Material of the machine shaft has a permitted surface pressure p ≥ 325 N/mm². This specification applies to solid shafts. If the machine shaft is a hollow shaft, consult STOBER in order to avoid deformation of the machine shaft due to the shrink ring.
- The information in the chapter Cleaning agent and solvent [▶ 19] is observed
- The fit tolerance of the machine shaft corresponds to the following table.

Fit tolerance of the machine shaft

∅ds [mm]	Tolerance
ds ≤ 50	ISO h9
ds > 50	ISO h6

Procedure

ATTENTION! Property damage! Only tighten the clamping screws of the shrink ring after you have inserted the gearbox onto the machine shaft. Otherwise, the hollow shaft can be plastically deformed.

1. Remove the closing und cover caps from the hollow shaft and shrink ring.
2. Remove the corrosion protection from the machine shaft (2), the bore of the hollow shaft (3) and shrink ring (4) and other contact surfaces.
3. Carefully degrease the machine shaft in the press area of the shrink ring 7 and the hollow shaft, inside and out, in the press area 8 such that the torque can be transferred completely.
4. Apply grease to the machine shaft in the contact area 6 with the bush.
5. Insert the gearbox with the hollow shaft onto the machine shaft.
6. If the hollow shaft is slitted in the press area, position the shrink ring at a distance fs from the end of the hollow shaft (see the following figure and table). Otherwise, position the shrink ring at the stop on the collar of the hollow shaft.
7. Tighten the clamping screws of the shrink ring evenly in several cycles by one quarter rotation each in turn (not alternating diagonally) up to the specified tightening torque (see the following table). When tightening the clamping screws, make sure that the clamping plates of the shrink ring remain plane-parallel to each other and do not touch.

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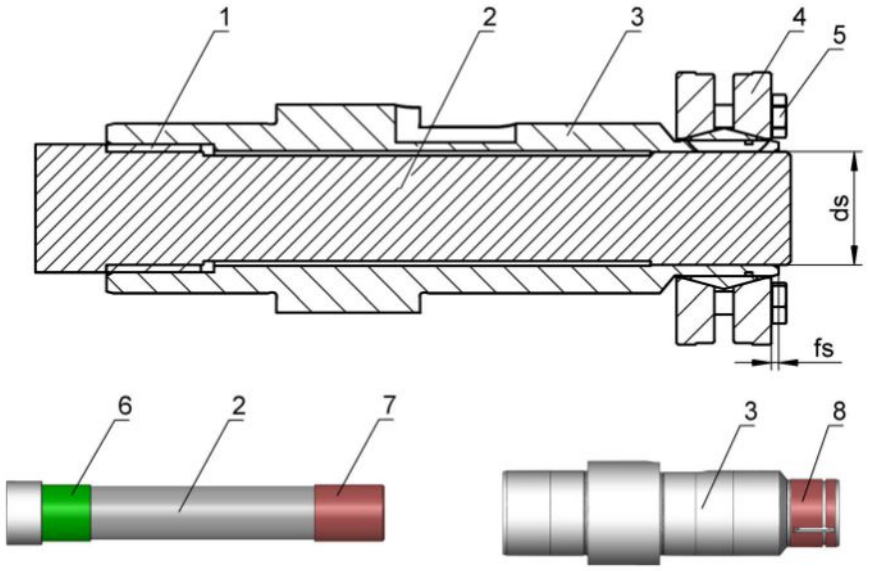

Fig. 4: Assembly – Machine shaft on hollow shaft with shrink ring

1	Bush	2	Machine shaft
3	Hollow shaft	4	Shrink ring
5	Clamping screw	6	Surface, greased
7	Surface, free of grease	8	Inner an outer surface, free of grease

Information on mounting the shrink ring

Gearbox type	ds [mm]	fs	M_A [Nm]	Width across flats [mm]
K1	25	3	5	8
K2	30	3	12	10
K3	35	3	12	10
K4	40	3	12	10
K5	50	4	12	10
K6	50	4	12	10
K7	60	–	30	13
K8	70	–	35	13
K9	90	–	59	16
K10	100	–	69	16

Abbreviations used:

- ds = Inner diameter of the shrink ring
- fs = Distance between end of hollow shaft and shrink ring
- M_A = Tightening torque of the clamping screws

The table contains tightening torques for standard hollow shafts. For customer-specific designs, the applicable tightening torques are those applied to the shrink ring used.

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5.4 Mounting the gearbox on the machine

Depending on the design, the K gearbox is mounted on the machine using the pitch circle diameter, output flange or foot plates. In applications where the gearbox is attached to the machine shaft using a hollow shaft, the reaction torque can be absorbed by a torque arm bracket. The installation of the torque arm bracket is described in a separate chapter.

Prerequisites

- The connecting structure for the drive in the machine is dimensioned according to the weight and torque and takes forces that act on the drive into account;
- The connecting structure is flat, vibration-reducing and torsion-resistant;
  The perpendicularity deviation of the flange contact surface of the connecting structure to the gearbox shaft axis does not exceed 0.03 mm per 100 mm;
- The gear housing is grounded via the connecting structure or attached motor;
- The tolerance of the centering diameter of the connecting structure is ISO H7;
- Sufficient ventilation for the mounted drive is ensured.

Procedure

1. Remove the corrosion protection from the contact surfaces of the pitch circle diameter/output flange/foot plates and from the connecting structure.
2. For a gearbox with a solid shaft, mount the defined drive elements on the solid shaft (see Mounting drive elements on a solid shaft [▶ 30]).
3. Position the gearbox in the mounting position in the machine, using lifting gear if necessary.
4. Position the gearbox in the specified mounting position.
5. For a gearbox with a hollow shaft and keyway, mount the hollow shaft on the machine shaft (see Mounting a hollow shaft with keyway [▶ 31]).
6. For a gearbox with a hollow shaft and shrink ring, mount the hollow shaft to the machine shaft (see Mounting a hollow shaft with shrink ring [▶ 33]), but do not yet tighten the clamping screws of the shrink ring.
7. Center the gearbox in the connecting structure using the pilot of the gear housing or output flange.
8. Mount the gearbox on the connecting structure using screws. Details on the screws can be found in the following table.
9. If the gearbox is also mounted using the foot plates, make sure that the foot plates are not tensioned against the housing mounting surface or output flange.
10. Tighten the screws evenly in multiple passes with increasing torque and alternating diagonally. The tightening torques can be found in the chapter Tightening torques [▶ 39].
11. Tighten the clamping screws for the gearbox with hollow shaft and shrink ring (see Mounting a hollow shaft with shrink ring [▶ 33]).

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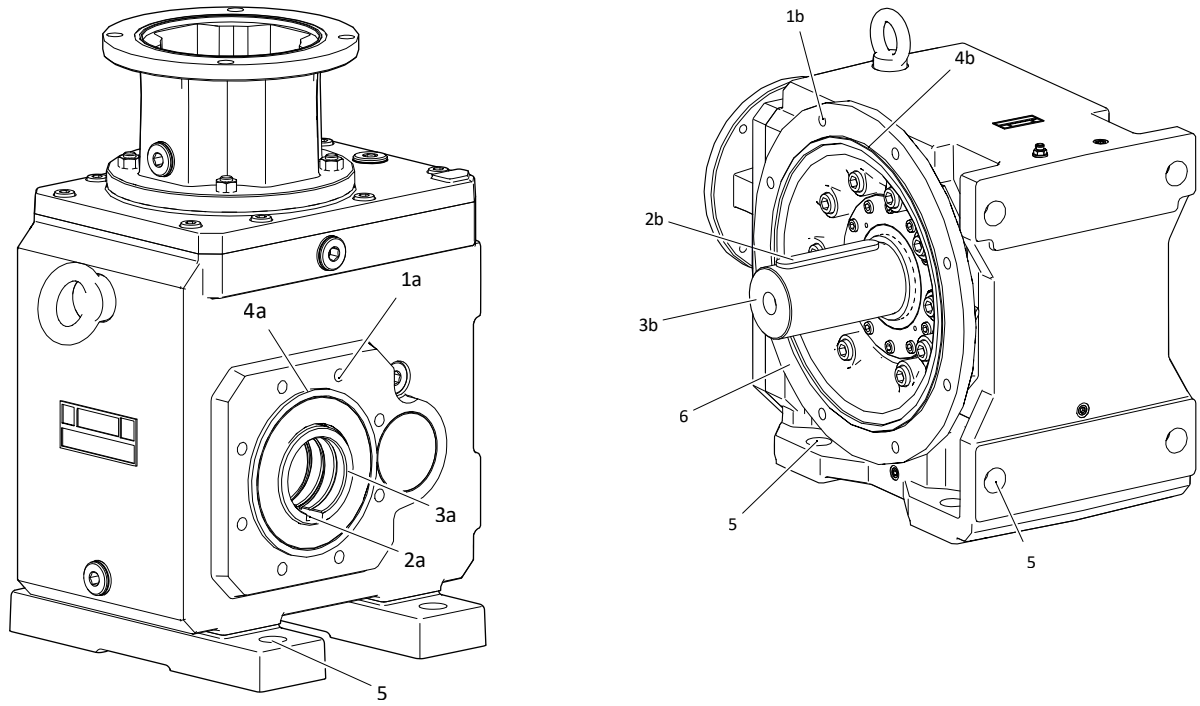

Tab. 8: Mounting the gearbox to the machine, using K513_AF (left) and a K 1013_VNF gearbox (right) as an example

1a	Threaded hole in the housing	1b	Output flange bore
2a	Keyway of the hollow shaft	2b	Feather key
3a	Hollow shaft	3b	Solid shaft
4a	Housing pilot	4b	Output flange pilot
5	Foot plate bore	6	Output flange

Gearbox type	Number of screws	Screw size	Min. screw-in depth [mm]	Strength class
K1_G	4	M8	12	10.9
K2_G	4	M8	12	10.9
K3_G	4	M8	12	10.9
K4_G	4	M10	15	10.9
K5_G	8	M10	15	10.9
K6_G	8	M10	15	10.9
K7_G	8	M12	18	10.9
K8_G	12	M12	18	10.9
K9_G	8	M16	24	10.9
K10_G	10	M20	30	10.9
K1_D	4	M8	–	8.8
K2_D	4	M8	–	8.8
K3_D	4	M8	–	8.8
K4_D	4	M8	–	8.8
K5_D	4	M12	–	8.8
K6_D	4	M12	–	8.8
K7_D	4	M16	–	8.8

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Gearbox type	Number of screws	Screw size	Min. screw-in depth [mm]	Strength class
K8_D	4	M16	–	8.8
K9_D	8	M16	–	8.8
K10_D	8	M16	–	8.8
K1_N	4	M8	–	8.8
K2_N	4	M10	–	8.8
K3_N	4	M10	–	8.8
K4_N	4	M12	–	8.8
K5_N	4	M16	–	8.8
K6_N	4	M16	–	8.8
K7_N	4	M20	–	8.8
K8_N	4	M24	–	8.8
K9_N	4	M30	–	8.8
K10_N	4	M36	–	8.8

Tab. 9: Information on screws for mounting the gear housing on the machine

5.4.1 Mounting the torque arm bracket

For gearboxes with a hollow shaft attached to the machine shaft, the torque arm bracket absorbs the reaction torque. The torque arm bracket can be mounted on different gearbox sides and different positions.

Prerequisites

- The hollow shaft has been properly mounted on the machine shaft.

Procedure

Observe the following when mounting the torque arm bracket:

- Mount the torque arm bracket so that the bush (13) of the torque arm bracket is positioned on the side where the machine shaft (7) is connected. This prevents additional bending stress.
- Support the bush of the torque arm bracket from both sides; otherwise, too much load is put on it during operation.
- Mount the torque arm bracket without tension to ensure that the gearbox is not under additional load.
- Prevent the bushes from making contact with solvents, oils and greases, as otherwise they may be damaged.

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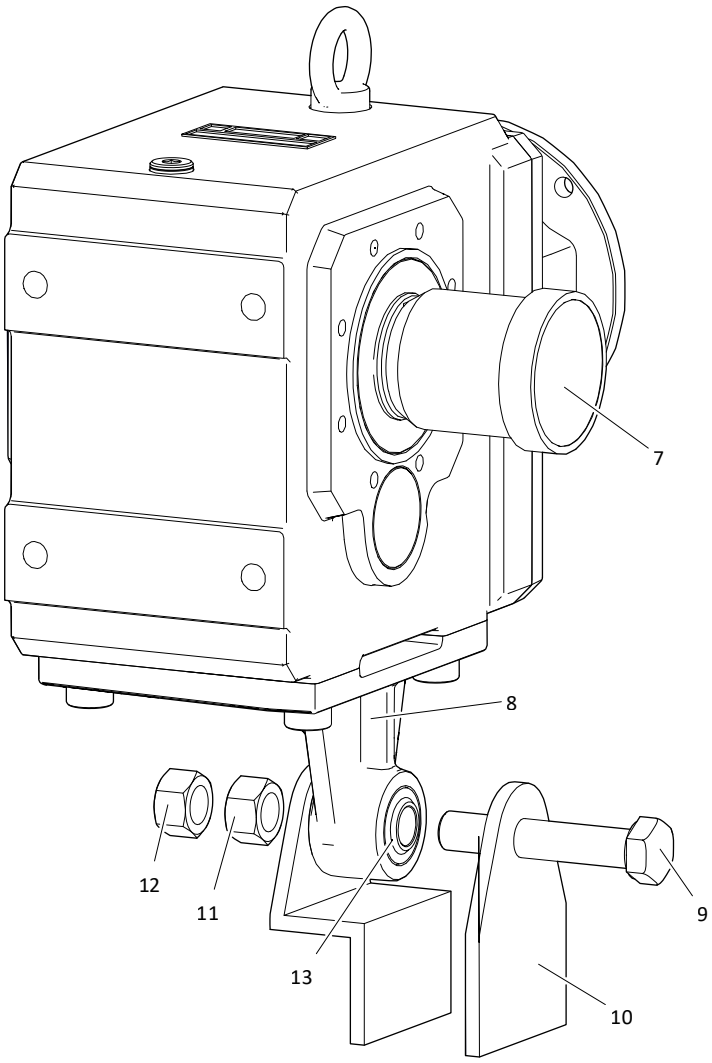

Fig. 5: Mounting a K513_AGD gearbox (example)

7	Machine shaft[1]	8	Torque arm bracket
9	Hex head screw[1]	10	Bearing[1]
11	Hex nut[1]	12	Locking nut[1]
13	Bush		

[1] These mounting elements are not included in the scope of delivery of the gearbox.

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5.5 Tightening torques

Note that the following tightening torques apply to screws that are used for mounting the motor on the gearbox or the gearbox on the machine. For clamp couplings, clamping screws of shrink rings and other connection elements, other tightening torques apply that are specified in the specific context.

	Tightening torque M_A [Nm]		
Thread	Strength class 8.8	Strength class 10.9	Strength class 12.9
M4	3.3	4.8	5.6
M5	6.5	9.5	11.2
M6	11.3	16.5	19.3
M8	27.3	40.1	46.9
M10	54	79	93
M12	93	137	160
M14	148	218	255
M16	230	338	395
M18	329	469	549
M20	464	661	773
M22	634	904	1057
M24	798	1136	1329
M27	1176	1674	1959
M30	1597	2274	2662
M36	2778	3957	4631

Tab. 10: Tightening torques for screws with metric standard thread in accordance with DIN 13-1 (coefficient of friction μ_{ges} = 0.14)

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6 Commissioning

Observe the following measures before and during commissioning of the drive.

6.1 Before commissioning

WARNING! Moving machine parts can cause serious injuries or even death! Before performing work, switch off the machine with the main switch and secure the switch from being turned on again.

Before commissioning the drive, make sure that the following prerequisites are met:

- The drive is undamaged
- The mechanical assembly and electrical connection of the drive has been completed
- The drive is not blocked
- Any present feather keys are secured against being thrown for a test run with drive elements
- All protective devices have been properly mounted
- All monitoring equipment is activated
- The drive controller is adjusted so that an overload of the gearbox in relation to the permitted torque is prevented by the motor
- The ambient conditions are observed (see)

6.2 During commissioning

WARNING! Moving machine parts can cause serious injuries or even death! Make sure that no one is standing in the danger area or able to enter it unchecked.

WARNING! Falling gravity-loaded axes or vertical axes can cause serious injuries or even death! Move gravity-loaded axes or vertical axes to their lowest position and lock or brace them mechanically before entering the danger area.

WARNING! If the motor is in operation while plug connectors are being disconnected, electric arcs can cause severe injury or even death. Do not connect or disconnect the plug connectors until after the motor is de-energized.

WARNING! Flying metal parts can cause serious injuries! Assemble the provided power transmission elements properly or remove the feather key before a test run.

CAUTION! The surface of the drive can reach temperatures over 65 °C during operation! Allow the drive to cool sufficiently before working on it. Wear gloves.

During commissioning, check the following:

- After the any existing brakes released before starting the drive?
- Is the direction of rotation of the drive correct?
- When the drive is running, do any overloading, unwanted speed fluctuations, unusual noises or vibrations occur?

In case of faults, observe the chapter .

Measurement of the surface temperature

For safe operation, it must be ensured that the surface temperature of the gearbox does not exceed the maximum permitted value. For this purpose, perform measurements with a commercially available temperature measuring device. Determine the surface temperature at the transition between gearbox and motor adapter or between gearbox and motor.

The maximum surface temperature occurs in approx. 3 hours, depending on the utilization of the drive, and must not exceed the maximum value of 90 °C in the event of a maximum surrounding temperature. Immediately shutdown the drive if the maximum value is exceeded and contact STOBER Service.

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7 Servicing

7.1 Cleaning

If the surface of the drive is dirty, heat dissipation through the ambient air is no longer sufficient. As a result, impermissibly high operating temperatures that reduce the lubricating effect of the lubricant and accelerate its aging could occur. This has a negative effect on the service life of the drive. Furthermore, the thermal winding protection may force the drive to shut down the drive has reached its nominal values.

Determine the cleaning interval according to the expected operating conditions, but it should be every 12 months at the latest. Clean the drive according to the following instructions.

WARNING! Moving machine parts can cause serious injuries or even death! Before performing work, switch off the machine with the main switch and secure the switch from being turned on again.

WARNING! Falling gravity-loaded axes or vertical axes can cause serious injuries or even death! Move gravity-loaded axes or vertical axes to their lowest position and lock or brace them mechanically before entering the danger area.

CAUTION! The surface of the drive can reach temperatures over 65 °C during operation! Allow the drive to cool sufficiently before working on it. Wear gloves.

ATTENTION! Improper cleaning can cause damage to the gearbox/geared motor! Do not use steam jet cleaners, high-pressure cleaners or compressed air to clean the gearbox/geared motor, as this can result in water and dirt entering the interior of the gearbox/geared motor through the seals and can damage it. In addition, do not use solvents, as these can damage the seals and the nameplate. Comply with the following instructions.

- Remove dust and chips with a suitable industrial vacuum.
- Remove contamination from the surface of the drive with a suitable industrial cleaner.

7.2 Inspection

Perform regular inspections on the gearbox in accordance with the following specifications. Inspect the attached motor in accordance with the documentation of the motor manufacturer.

WARNING! Moving machine parts can cause serious injuries or even death! Before performing work, switch off the machine with the main switch and secure the switch from being turned on again.

WARNING! Falling gravity-loaded axes or vertical axes can cause serious injuries or even death! Move gravity-loaded axes or vertical axes to their lowest position and lock or brace them mechanically before entering the danger area.

CAUTION! The surface of the drive can reach temperatures over 65 °C during operation! Allow the drive to cool sufficiently before working on it. Wear gloves.

Interval	Task
Every 3000 operating hours or every 6 months	Check shaft seal rings for external damage and leaks
Annually	Check paint for damage and touch up if necessary
	Check tightening torques of the screw connections between gearbox/machine and between gear shaft/drive elements (see chapter Tightening torques [▶ 39])
Every 10000 operating hours	Change the oil for the K5 – K10 gearbox (see chapter Changing the oil [▶ 42])

7.2.1 Changing the oil

You can find information on the oil change for K5 – K10 gearboxes in this chapter. K1 – K4 gearboxes are lubricated for their entire service life and do not require an oil change.

The gearboxes are filled with synthetic gearbox oil at the factory. The oil fill volume depends on the mounting position of the gearbox.

The specification and fill volume of the gearbox oil is specified on the nameplate of the gearbox and in the documentation (see chapter Additional documentation [▶ 16])

Depending on the mounting position of the gearbox, the filling and draining connections are on different gearbox sides. Details on this can be found in the following figures.

The following equipment is required for the oil change:

- A sufficiently large collection container for the used oil
- Rubber gloves and safety glasses with side protection
- Hex key
- Open-end wrench

Proceed as follows for the oil change:

1. If the gearbox was in operation immediately beforehand, allow it to cool.
2. De-energize the machine drives and secure them from unintentional activation.
3. Wear rubber gloves and safety glasses with side protection.
4. Ensure access to the filling and draining connections of the gearbox (see the following figures).
5. Place the collection container under the draining connection.
6. Slowly unscrew the screw plug on the draining connection using a hex key.
7. Use an open-ended wrench to unscrew the air release valve on the filling connection and wait until the used oil has completely drained from the gearbox.
8. Close the draining connection and remove the collection container.
9. Use the filling connection to fill the gearbox with the oil volume and oil specification indicated on the nameplate.
10. Close the filling connection.
11. Dispose of the used oil properly.

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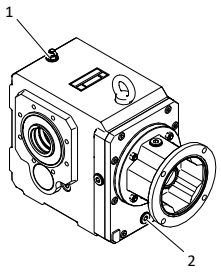
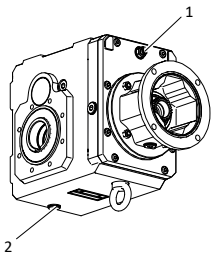
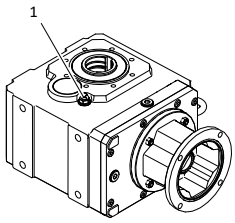
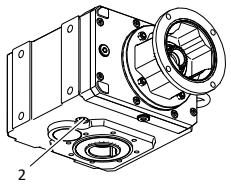
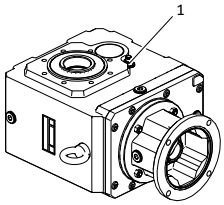
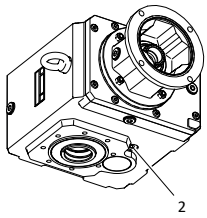
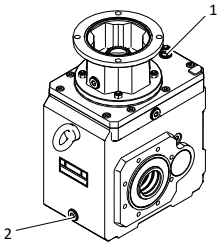
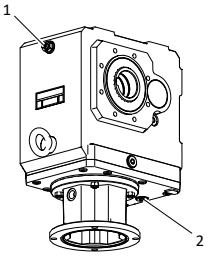
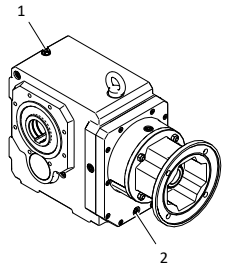
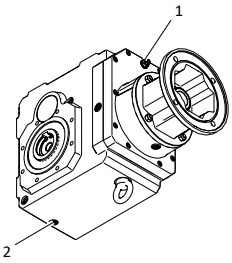
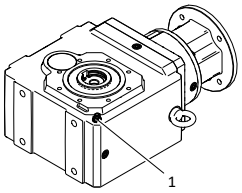
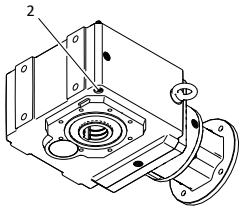
Filling and draining connections for K513 – K1013 gearboxes

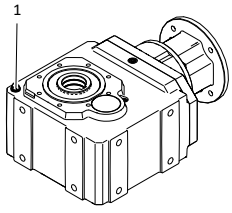
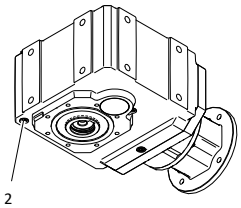
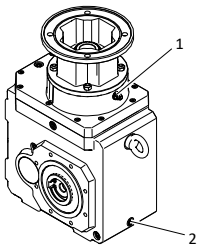
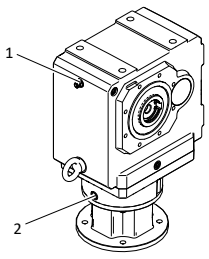
EL1	EL2	EL3	
			

EL4		EL5	EL6
			

1 Air release valve (filling connection) 2 Screw plug (draining connection)

Filling and draining connections for K514 – K1014 gearboxes

EL1	EL2	EL3	
			

EL4		EL5	EL6
			

1 Air release valve (filling connection) 2 Screw plug (draining connection)

For K514 gearboxes in the EL5 and EL6 mounting positions, the filling and draining connections are arranged as they are for K513 gearboxes in EL5 and EL6.

7.3 Remedying faults

WARNING! Moving machine parts can cause serious injuries or even death! Before performing work, switch off the machine with the main switch and secure the switch from being turned on again.

Notify all personnel working on the machine or the drive of deviations from normal operation. These deviations indicate that the function of the drive is impaired. These include:

- Higher operating temperatures or increased vibrations
- Unusual noises or smells
- Triggering of monitoring systems
- Leaks on the housing of the gearbox

In such an event, shut down the drive and notify the responsible service personnel immediately.

7.3.1 Troubleshooting faults

The following table contains faults that can occur during the operation of the gearbox. Read through the table from top to bottom when troubleshooting faults.

Faults	Possible causes	Actions
Operating temperature is higher or exceeds the permitted temperature of the gearbox	Speed or torque is too high	Check the design of the gearbox
	Motor heats the gearbox (too much)	Cool the motor sufficiently
		Check the wiring of the motor
		Replace the motor
	Surrounding temperature is too high	Provide sufficient cooling for the gearbox
	Bearing damage	Contact STOBER Service
Increased or different noises or vibrations in operation	Motor is mounted with too much tension	Check the motor mounting
	Gearbox is mounted incorrectly or with too much tension	Check the gearbox mounting
	Bearing damage	Contact STOBER Service
	Gear damage	Contact STOBER Service
Leaks	Radial shaft seal ring leaks	Contact STOBER Service
	Output shaft damaged at the sealing point	Contact STOBER Service
	Increased inner pressure due to operating temperature that is too high	See actions in the event of a fault "Operating temperature is higher or exceeds the permitted temperature of the gearbox"
	Gear housing leaks	Contact STOBER Service
Output shaft does not turn although motor is running	Clamp coupling is defective or tightened incorrectly	Check the clamp coupling

Tab. 11: Faults – Possible causes

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7.4 Servicing

Have any necessary repair work on the drive unit carried out by the STOBER Service or from STOBER service partners. Be aware that improper servicing may cause material damage and may void the manufacturer's warranty.

Use only replacement parts supplied by STOBER . Specify the type designation and serial number of the drive when ordering replacement parts. These can be found on the nameplate of the drive.

Have any necessary repair work on the drive unit carried out exclusively by the STOBER Service or authorized service partners. Be aware that improper servicing may cause material damage and may void the manufacturer's warranty.

Only use original replacement parts from STOBER. Specify the type designation and serial number of the drive when ordering replacement parts. This information can be found on the nameplate.

7.5 Service

If you contact STOBER Service, have the following information ready:

- Serial number and type designation of the drive according to the nameplate
- Type of fault and surrounding circumstances
- Presumed cause
- If possible, digital photo of the drive or a video recording of the drive in the context of the fault

Contact data of parent company in Germany

STÖBER Antriebstechnik GmbH + Co. KG

Kieselbronner Strasse 12

75177 Pforzheim

Germany

Service hotline: +49 7231 582-3000

mail@stoeber.de

Contact data of subsidiary in US

STOBER Drives Inc.
1781 Downing Drive
Maysville, KY 41056
Service Hotline +1 606 563-6035
service@stober.com

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8 Removal and disposal

8.1 Removal

Removal

Perform the following steps in the specified order.

1. If the drive had been in operation immediately beforehand, allow it to cool.
2. Disconnect the connection cable and the grounding conductor from the motor.
3. For gearboxes with a solid shaft: If necessary, remove drive elements connected to the solid shaft, such as belts, chains or couplings, with suitable removal devices.
4. Unscrew the screws used to mount the drive to the machine.
5. For gearboxes with a hollow shaft and shrink ring: Unscrew the clamping screws of the shrink ring in multiple cycles by one quarter rotation each in turn, but do not completely remove the clamping screws from the thread. Remove the gearbox from the machine shaft.
6. For gearboxes with a hollow shaft and keyway: Remove the hollow shaft from the machine shaft (see chapter Removing a hollow shaft with keyway [▶ 46]).
7. Detach the gearbox from the machine.
8. If necessary, remove the motor from the gearbox. To do so, unscrew the screws of the motor used to mount the motor to the gearbox and detach the motor from the gearbox.

8.1.1 Removing a hollow shaft with keyway

This chapter contains instructions for removing a gearbox with a hollow shaft and keyway from the machine shaft.

Tools

The following tools, not included in the scope of delivery of the gearbox, are required for removal:

- Keeper plate
- Set screw for removing the hollow shaft
- Hex wrench that fits the set screw

Ødh [mm]	20^{H7}	25^{H7}	30^{H7}	35^{H7}	40^{H7}	50^{H7}	60^{H7}	70^{H7}	90^{H7}	100^{H7}
sas	M8	M12	M12	M16	M20	M20	M24	M24	M30	M30

Tab. 12: Specifications for the set screw

Dimension name	Explanation
Ødh	Inner diameter of the hollow shaft
sas	Thread diameter in the keeper plate

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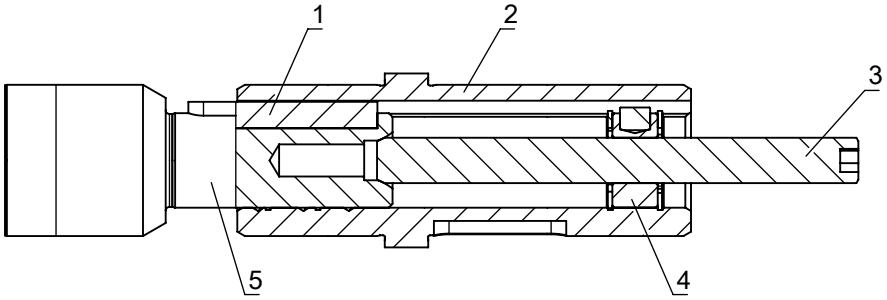
Procedure

1. Use the hex wrench to screw the set screw (3) into the threaded hole of the keeper plate (4) until the set screw presses against the machine shaft (5).
2. Tighten the set screw until the hollow shaft (2) releases from the machine shaft.
3. Remove the gearbox from the machine.
4. Unscrew the set screw from the threaded hole of the keeper plate.



1	Feather key	2	Hollow shaft
3	Set screw	4	Keeper plate
5	Machine shaft		

8.2 Disposing of gearbox

Information

The gearbox is filled with a lubricant (oil, grease). Incorrect disposal can pose a risk to the environment.

- Have lubricants and other auxiliary materials disposed of by authorized special waste disposal companies.
- If in doubt, contact the local authority for information about environmentally responsible disposal or employ special waste disposal companies.

This chapter describes how to dismantle and dispose of the gearbox in an environmentally responsible manner.

✓ The gearbox is dismantled.

1. Remove the used oil or grease from the gearbox.
2. Collect the used oil and grease without mixing them and dispose of them properly.
3. Dismantle the gearbox into its main component parts made of steel or cast iron, aluminum and plastic.
4. Sort the main component parts by waste group.
5. Dispose of the main component parts properly and in an environmentally responsible manner.

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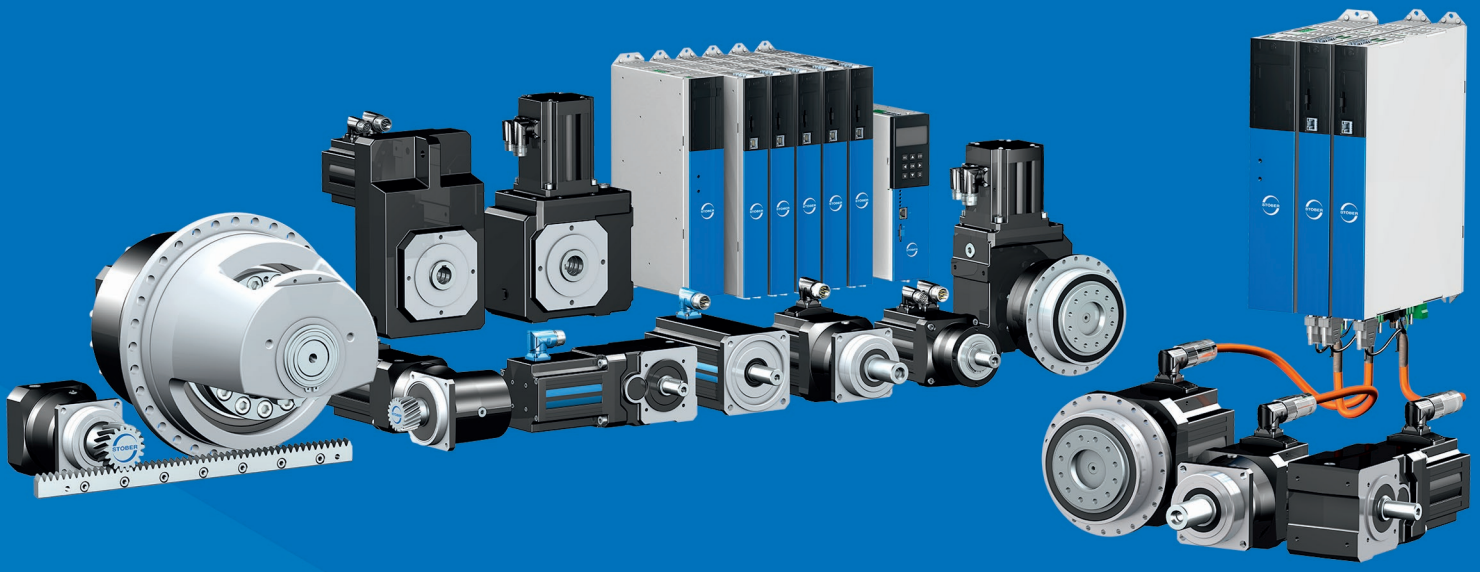

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01/2026

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