Bevel Helical Gearbox

KS TWINGEAR

Installation and operating instructions

KS TWINGEAR KS10 to KS70

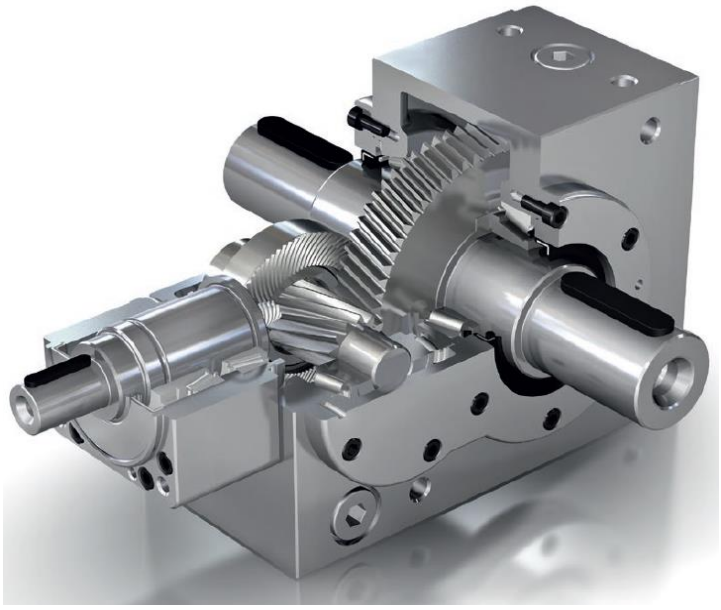

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Table of contents

1. General notes	4
1.1 Use of the operating instructions	4
1.2 Significance of the warning notes	4
1.3 Exclusion of liability	4
1.4 Copyright	4
2. Intended use of Nidec Graessner Gear Units	5
3. Conversions and alterations / Modifications of the product	5
4. Set-up of the gear unit / Technical data	6
4.1 Set-up of the gear unit	6
4.2 Type designations	6
4.3 Performance tables: KS TwinGear	7
4.4 Technical data: KS TwinGear	7
4.5 Typing plate and designations	7
5. Safety notes	9
5.1 Basic duties	9
5.2 Qualified personnel	9
5.3 Environmental protection	9
6. Transport, storage and long-term storage	10
6.1 Transport	10
6.2 Storage conditions	10
6.3 Long-term storage	10
6.4 Preparation of commissioning	10
7. Installation	11
7.1 General installation instructions	11
7.2 Gear unit installation in plant	11
7.3 Installation positions	11
7.4 Fitting of motors	12
7.5 Installation of the other fitted components	14
7.6 Finishing work	14
8. Commissioning	15
9. Operation of the KS TwinGear unit	15
9.1 General notes on operation	15
9.2 To be watched out for during operation	16
9.3 Irregularities	16

10. Faults, causes, remedies	17
10.1 General fault indications	17
10.2 Possible faults	17
11. Inspection and maintenance	18
11.1 General notes	18
11.2 Service intervals	18
11.3 Oil service life	18
11.4 Oil change	19
11.5 Checking of gear unit condition	19
12. Replacement parts, replacement parts stock, service department	19
12.1 Replacement parts	19
12.2 Replacement parts stock	19
12.3 Service department	19
13. Index (alphabetical)	20

1. General notes

1.1 Use of the operating instructions

These operating instructions are part of the product and must be read carefully before use and kept for future reference. It contains important information on the operation and servicing of the **KS TwinGear** gearbox range. These operating instructions are intended for all persons who carry out assembly, installation, commissioning, and service work on gear units from this gear unit series.

KS TwinGear gearboxes are components for installation in machines and are intended exclusively for the transmission, distribution, and multiplication of torque.

KS TwinGear are only designed for the application area described in chapter 2 "Technical Data".
Other operating conditions must be agreed with Nidec Graessner GmbH & Co.KG and regulated by contract.

The gearboxes are manufactured to the latest technical standards and are delivered in a safe and reliable condition. They correspond to the status of the description in these operating instructions. We reserve the right to make technical modifications to components, while maintaining the performance and safety of the gear units.

1.2 Significance of the warning notes

The warnings are mentioned in the context in which a hazard may occur and refer to it. They specify the hazards and the possible consequences if the hazards are not eliminated. The notes on personal safety are highlighted by warning triangles indicating the types of hazard. Depending on the hazard level, the warning notices are shown as follows:

	**Note** Useful note or information
	**Attention**: Material damage may occur on the drive system or the environment
	**Caution**: Risk of physical injury! *(Danger of burns*)
	**Warning**: Possible hazardous situation - death or serious injury may occur! *(Danger of crushing)*
	**Danger**: Imminent danger, death, or serious bodily injury as a consequence! *(Danger of bodily harm/crushing)*

1.3 Exclusion of liability

Nidec Graessner GmbH & Co. KG does not assume any liability for damage and operating malfunctions resulting from non-compliance with these instructions

1.4 Copyright

These instructions are available as a download on our website www.graessner.de

Regarding all technical queries, please contact our product management or our service department:

Nidec Graessner GmbH & Co. KG THE GEAR COMPANY Kuchenaecker 11 D-72135 Dettenhausen	**Service Department**	Tel.: +49 07157 123-0 Fax: +49 07157 123 220 Email: mail@graessner.de Website: www.graessner.de

	These operating instructions must be read carefully before use. Store in a safe place for future reference.
	If these operating instructions are not complied with, damage to the gear unit, operating faults, material damage and personal injury may occur. Nidec Graessner GmbH & Co. KG does not accept any liability for any resulting damages or faults.

2. Intended use of Nidec Graessner gear units

KS TwinGear gear units are components for installation in machines and are intended exclusively for the transmission, distribution, and multiplication of torque within the speed range up to 3500 min^{-1}.

They comply with the machine directives (EN 292) and EMC directives to the extent they are applicable.

KS TwinGear gear units may only be used for the applications specified in the catalogue and in the associated technical specifications.

Any other use and/or any use exceeding those cases described in the catalogue and/or associated technical specifications is deemed not compliant with the intended use. The manufacturer does not accept any liability whatsoever for any damage resulting therefrom. This risk shall be solely borne by users.

KS TwinGear gear units can be used in a wide range of different applications; therefore, the responsibility for the specific application is transferred to the user at the time of use.

3. Conversions and alterations / modifications of the product

KS TwinGear gear units may not be modified in terms of design or safety without our approval.
Any unauthorized modification within the meaning of this provision excludes any liability on our part

4. Set-up of gear unit / technical data

4.1 Set-up of gear unit

KS TwinGear are angular gear units with case-hardened bevel gear pairs with Gleason hypoid toothing, for installation in machines and systems. In terms of performance capability, **KS TwinGear** matches all common servo motors and can be adapted variably via flange and coupling. The gear units feature optimum centering and housings machined on all sides complete with mounting threads. The shafts are supported by taper roller bearings in cantilevered support (input) and forked mounting (output). The shaft seals are provided as shaft seal rings with dust lip, flange seals are provided as lamella seal disks. The ratios are mathematically exact from 15.0:1 to 75.00:1. Gearboxes in solid shaft or hollow shaft design, for clutch transmission or direct mounting of the motor. Hollow shafts also available with an extension for shrink discs.

KS TwinGear gear units are intended for the transmission, distribution, and multiplication of torque within the speed range up to 8000 min-1 (KS10, 15:1) and 3500 min-1 (KS70 75:1), see the current catalogue edition.

KS TwinGear gear units are in full compliance with the machine directives (EN 292) and EMC directives to the extent they are applicable.

4.2 Type designations

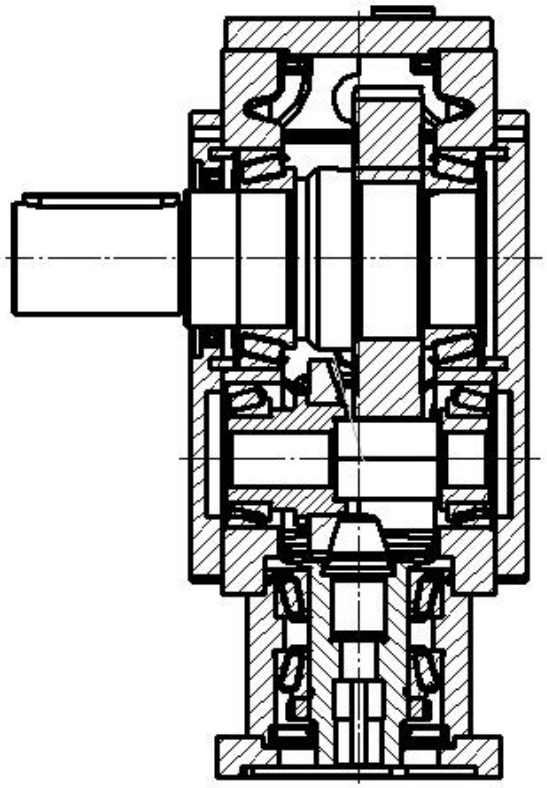
KS TwinGear KS10 to KS70

Version L — Drive and output with solid shaft on one or both sides, build types 1L, 3L, 13L

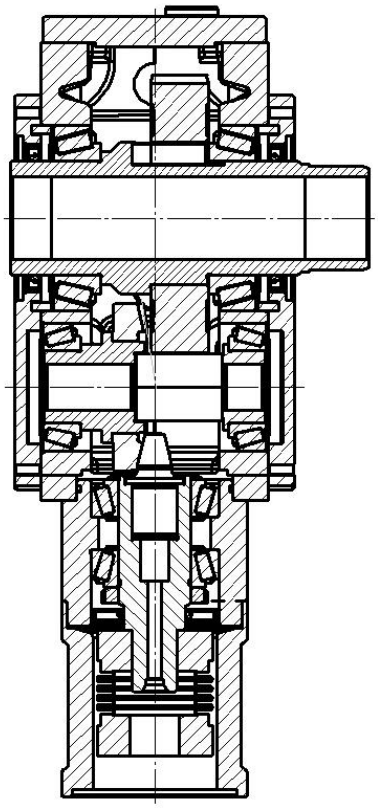
Version H — Drive with solid shaft, output with hollow shaft in build type 13L, with extended hollow shaft in build type 1LSV or 3LSV

Version K — Drive with coupling and lantern, output via solid shaft or hollow shaft (KL, KH) in the build types 1L, 3L, 13L, 1LSV and 3LSV

Version F — Drive with hollow shaft and drive flange for direct motor attachment, output via solid shaft or hollow shaft (FL, FH) in the build types 1L, 3L, 13L, 1LSV and 3LSV



Type: FL Series
Shown in ratio 20:1 and in build type 1L, with 1 output shaft on side 1, on the drive side complete with hollow shaft and motor flange.
Additional build types at the output are 3L and 13L



Type: KH Series
Shown in ratio 30:1 and build type 1LSV with shrink disk on side 3. Further build types are 3LSV and 13LSV.
The extension of the hollow shaft for the shrink disk is respectively situated opposite the attachment side.
Gear unit with coupling and motor lantern.

4.3 Performance table: KS TwinGear

Nominal torque on output T_{2N} (Nm) at	KS10	KS20	KS30	KS35	KS40	KS50	KS60	KS70
I = 15/20/25/30	**150**	**260**	**480**	**950**	**1750**	**3200**	**5000**	**7500**
I = 40/50	**110**	**200**	**360**	**700**	**1350**	**3200**	**5000**	**7500**
I = 60/75	**75**	**125**	**250**	**475**	**900**	**2550**	**4050**	**5100**

The braking as well as the emergency stop moment is shown in the performance table in the catalogue. Download at www.graessner.de.

4.4 Technical data: KS TwinGear

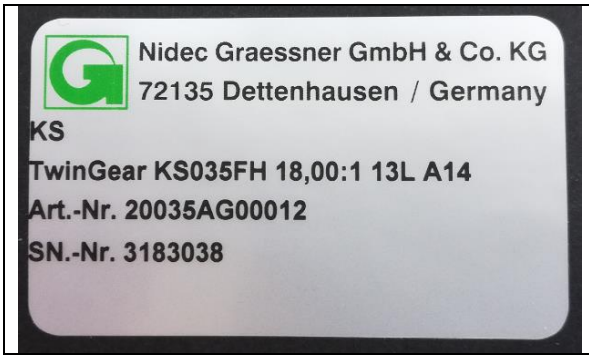
	KS10	KS20	KS30	KS35	KS40	KS50	KS60	KS70
Running noise*								
I= 15 – 50	<69	<69	<71	<71	<73	<73	<75	<75
I= 60 - 75	<67	<67	<69	<69	<71	<71	<73	<73
Weight (in kg)	10	16	27	52	75	115	190	300
Average oil quantity (in l)	0.3 0.4	0,6 0.75	1.0 1.5	1.9 2.7	3.0 4.5	5.0 6.5	9.5 13.5	21 32.5

***Running noise at n_1 = 1500 min^{-1} and partial load**

Lubrication:	As standard the gear units are supplied without any lubrication filling, we recommend synthetic gear oil on a POA basis, ISO –VG 150
Installation position:	any
Operating temperature:	-10°C to +90°C
Paint finish:	Grounding RAL 9005 – matt black
Ex protection:	Explosion-proof gearboxes available on request
Protection class:	IP 64

4.5 Typing plate and designations

The typing plate has the following information (example):



- Gear unit series
- Type designation: KS035FH
- Ratio: 18,00:1
- Shaft arrangement: 13L
- The article number: 20035AG00012
- The serial number: 3183038

Further technical data are available in the catalogue “KS TwinGear”
Downloadable version available at www.graessner.de
Printed version is also available.
Please consult our product management or service department.

5. Safety notes

5.1 Basic duties

The safety notes listed here are used to avoid personal injury and material damage and must always be complied with and observed. For this purpose, persons with responsibility for the plant as well as qualified personnel working on the gear unit under its own responsibility must have read and fully understood these operating instructions, in order to:

- prevent any hazards for life and limb of users and any third parties.
- provide for the operational safety of the gear unit.
- exclude downtime and environmental damage due to incorrect handling.

5.2 Qualified personnel

This refers to persons having relevant education and training and a professional qualification who can detect risks in the handling of these products and avoid possible hazards.
Specialists within the meaning of these operating instructions are persons who are familiar with the set-up, mechanical installation, fault removal and maintenance of the gear units and have the following qualifications:

- Training in the field of mechanics with successfully completed professional training (mechanic, machine fitter, mechatronics engineer, toolmaker)
- Knowledge of these operating instructions

All specialists must wear protective clothing appropriate to their activity.

5.3 Environmental protection

- All existing packaging material must be disposed of in accordance with regulations or recycled.
- When changing the oil, the used oil must be caught in suitable vessels. Any pooled oil spills must be removed immediately by means of a binding agent. Any pooled oil spills must be removed immediately by means of a binding agent.
- Used oil, oil binding agent or oil-contaminated cleaning cloths must be disposed of in accordance with the relevant environmental protection regulations.
- **Disposal of the gear unit following the end of its service life**:
- Drain oil and preservation agents completely from the gear unit and dispose of as waste oil in accordance with the applicable national regulations.
- Housing parts, shafts, roller bearings and geared parts must be disposed of or recycled in accordance with applicable national regulations, depending on the relevant provisions also separately.

	**Serious personal injury and material damage due to:** • Incorrect use of the gear unit • Incorrect installation or operation

	**Risks to life due to operational plant:** ▪ When working on the gear unit, the gear unit must always be shut down. ▪ The drive must have been secured against unintentional activation (key switch or removal of fuses). ▪ At the point of switch-on, an information sign must be affixed indicating the shutdown.

	**Serious personal injury and material damage due to:** non-permissible removal of the necessary protective covers

6. Transport, storage and long-term storage

6.1 Transport

Any work regarding transportation, storage, siting, installation, commissioning, operation, service, and maintenance must be carried out by qualified personnel only.

Any damage identified after delivery must be communicated immediately to the transport company, if appropriate, commissioning/ activation must be excluded. The transportation of the gear unit must be carried out in a manner where personal injury and damage to the gear unit are avoided.

	**Danger:** Imminent danger! May result to serious bodily injury. *(Danger of crushing bodies or body parts)*

Transport may only be carried out using suitable and designated means of transport.
When lifting eyebolts, they may only be attached to the intended holes with approved, adequately dimensioned lifting equipment. There must be no diagonal pull.
Installation-specific provisions and requirements must be complied with.
Relevant national and regional regulations for safety, accident prevention and environmental protection must be complied with.

6.2 Storage conditions

KS TwinGear gear units must only be stored in a closed condition, in a dry, dust-free, and low vibration (to avoid bearing damage) environment, without direct sunlight and at a temperature between -25 and +50°C.
Series gear units can be stored for up to one (1) year.
Always check the oil level before taking the gear unit into service.

6.3 Long-term storage

If storage is planned for more than 1 year, the "long-term storage" version is recommended.
These gear units can be stored for up to 5 years maximum.
The external preservation is carried out by applying a permanent preservative agent.
The internal preservation is carried out with a synthetic gear oil based on PAO.

It is advisable to rotate the gear unit at regular intervals to prevent the bearings from sticking (jamming), the rotation also counteracts standstill marks and the shaft seals do not stick or become brittle.

6.4 Preparation of commissioning

Drain the oil and replenish with fresh oil before commissioning. If taken into service before the 5 years have elapsed, its function is guaranteed.

If commissioned at a date later than 5 years after being put into storage, the roller bearings, sealing elements and gear oil must all be replaced. For this purpose, it is probably best if you return the gear unit to our service department.

7. Installation

7.1 General installation instructions

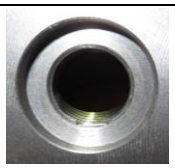
The installation must only be carried out by **qualified, authorized, and trained personnel**.
The safety instructions in Section 3 must be complied with.
When transporting the gear unit, the notes in Section 6 must be complied with.
Suitable crane harness and lifting gear must be provided.

Before commissioning

- Fill the gear unit to the correct oil level, unless the gear unit is provided with lifetime lubrication
- Check if the transmission parts are correctly fitted before commissioning
- Do not deactivate monitoring and protection devices, even in test operation

If an oil level indicator or sight glass is available, the markings on them or the centre of the oil inspection glass, are considered the minimum.

Oil inspection glass,
Oil level centre



Oil check screw:
The oil level affects the thread only in the housing bore

Oil quantities (dependent on ratio, speed, build type and installation position)

Build size	KS10	KS20	KS30	KS35	KS40	KS50	KS60	KS70
Average oil quantity	0.3	0.6	1.0	1.9	3.0	5.0	9.5	21.0
Maximum oil quantity	0.4	0.75	1.5	2.7	4.5	6.5	13.5	32.5

**quantity in litres*

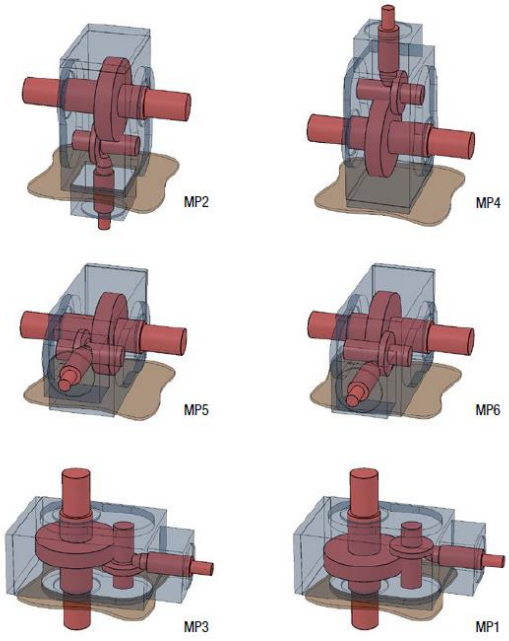
7.2 Gear unit installation in plant

During installation or assembly ensure the following:

- An even support on a level, vibration-dampened and torsion-free substructure, stress and strain in the housing must be avoided.
- Tension-free assembly with combined flange or insertion mount attachment
- Exact alignment of the gear unit for direct coupling, comply with manufacturer's details

7.3 Installation / mounting positions

- The installation positions are designated from MP1 to MP6
- MP is an abbreviation for **m**ounting **p**osition.
- The maximum oil filling is to be filled in at MP1 and MP4



7.4 Fitting of motors

7.4.1 Drive with lantern and coupling, type series K

a. Preparation
The surfaces of the coupling bores and the shaft ends must be free from dirt, especially from grease and oil.

b. Installation of the coupling
The radially located clamping screw of the coupling half to be mounted is turned to the left until the screw head rests against the cross pin mounted in the counterbore. By turning the screw further, the coupling bore is elastically widened so that the coupling can easily be pushed onto the shaft. Proceed in the same way for disassembly.

<table>
<tr>
<td>  </td>
<td>Clamp screw and cross pin.
Turn screw to the left until the screw head rests against the cross pin. Turning the screw further to the left expands the coupling.

ATTENTION: Only expand the coupling sufficiently to allow it to be mounted, otherwise there is a risk of breakage.</td>
<td>  </td>
<td>Coupling expanded for fitting.

Coupling bores must be free from dirt and grease.

After installation, the clamp screw must be tightened with the necessary tightening torque</td>
</tr>
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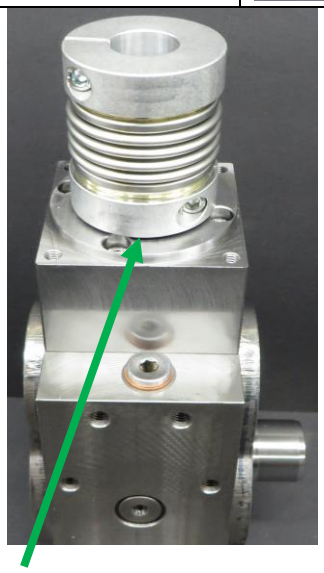
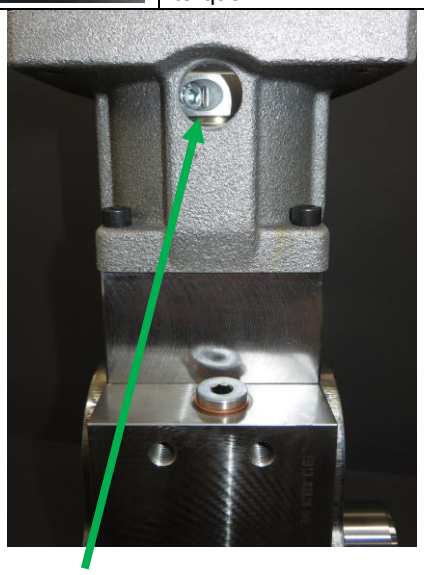
<td colspan="4">    </td>
</tr>
<tr>
<td>The drive shaft end must be free from dirt, oil, and grease. The same applies to the centring flange and the contact surface on the bearing flange.</td>
<td>Fit the coupling, prepare as described above. If prescribed, adjust the assembly dimension of the coupling according to the dimension sheet.
Tighten clamping screw.</td>
<td colspan="2">Install the lantern and tighten the screw(s). The coupling can be tightened on the motor side through the hole at the top.</td>
</tr>
</table>

The mounting dimension of the coupling to the gear unit is stated in the associated dimension sheet.
If nothing to the contrary has been stated there, push the coupling onto the shaft until it rests against the shaft shoulder.

After tightening the coupling, place motor lantern into position and screw on; ensure that the bores for tightening the clamp screws on the coupling are located on the same side as the terminal box on the motor.

Tightening torques of the clamp screws
Screws: DIN 912, 10.9, galvanized

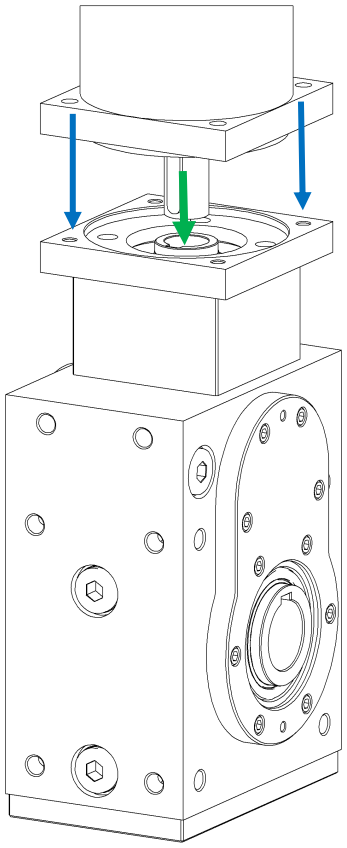
M4	M5	M6	M8	M10
5 Nm	10 Nm	14 Nm	35 Nm	65 Nm

c. Fit motor
Preferred mounting in vertical position. The metal bellows of the coupling must not be bent or axially offset during assembly.

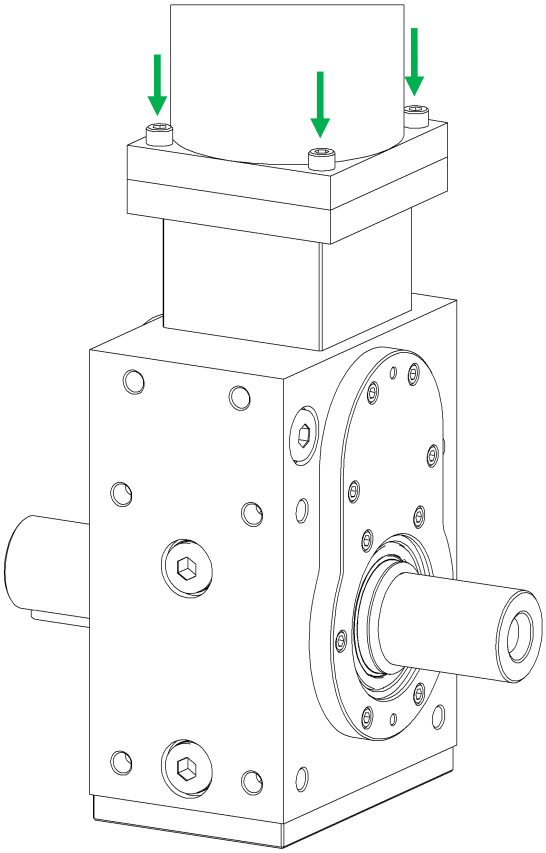
Do **not** drive the motor in with a hammer, but slide it into the centering seat via the suitable holes and threads on the gear unit and motor using mounting screws until the motor is tight, then tighten the coupling on the motor side. There must be no strain and stress on the bearings and the coupling.

7.4.2 Motor attachment for type series F directly above drive end hollow shaft and motor flange, key connection

Gearbox types FL and FH are equipped with a hollow shaft with keyway at the input side, the bore fitting is designed in quality H7. Always position the motor shaft aligned with the gear unit shaft. Coat the shafts with assembly paste to facilitate easier assembly and prevent fretting corrosion. It is possible to join the motor shaft without play, but with slight pushing, to avoid distortion of the bearings of the gear unit input shaft and the motor shaft.Do not drive in the motor with a hammer but use the suitable bores and threads on the gear unit and motor to tighten the flange surfaces with mounting screws until the motor rests on the counter flange. If there is any tension in the bearings, the motor springs back slightly, pull the motor off again and remove it after any pressure marks in the keyways. Repeat the assembly procedure until the motor and gear unit are in contact with the flanges without tension and the shafts can be turned easily. Screw in the screws for fastening the motor and tighten them to the appropriate tightening torque.



Motor mounting vertically from the top (pictured: KS FH), define position of the terminal box, then join up motor, with the key on the motor in alignment with the key groove in the shaft, then continue as described above.



Motor bolted on free from any stress and tension (pictured: KS FL)

	**Attention:** damage to gear unit Due to incorrect assembly, the coupling can be rammed or bent! Any stress and tension on the bearings may cause them to overheat and cause bearing damage with ensuing blockage. The shaft seal rings and the running surfaces of the shafts must not be damaged when fitting the coupling parts. Otherwise leakages may occur!

7.5 Installation of the other fitted components

The drive and output elements (gears, belt wheels, jointed shafts etc.):

- Must have been balanced with G 6.3
- Must only be fitted using suitable fitting and withdrawal devices
- Must be axially secured even if they have been shrunk on

When using suitable tensioning elements, the tightening torques must be considered

The components must be mounted onto the shaft as far as is specified in the article-related dimension sheet.

In the case of a belt drive the correct belt tension must be assured, comply with the manufacturer's instructions in this regard. The permissible transversal forces for the shaft must not be exceeded (see catalogue).

Drive and output elements must be covered by contact protection

7.6 Finishing work

- Before fitting protective covers check again the correct oil level in the gear unit.
- Check for even running free from strains, stresses, and any faults.
- Fit protective covers.
- Carefully clear away all tools as well as any parts not fitted.

	**Attention**: Due to **incorrect installation** the gear unit can be damaged and become unusable. Such damage may be caused by falling objects, dumping, welding work or insufficient attachment. **The operator must ensure:** ▪ The gear unit must be protected against any falling objects and dumping ▪ Welding work must not be carried out on any part of the drive ▪ The gear unit must not be used as a ground point for electric welding work ▪ All mounting options assigned to the build type must be used. ▪ Any screws that have become unusable during assembly and disassembly must be replaced by new ones featuring the same design and strength class.

8. Commissioning

The commissioning *(taking up operation in accordance with the intended use)* of the **KS TwinGear** gear unit is prohibited until it has been determined that the machine or plant complies with the provisions of the EU machine directive.

Before commissioning check the correct attachment of the transmission parts.

Check the oil level

Do not deactivate monitoring and protection devices, not even during test operation.

The use of an aeration and ventilation filter is not necessary for gear units up to KS20, for gear units from KS30 and bigger, we recommend its use, as soon as the gear units exceed an operating temperature of 60°C.

The first start-ups must be carried out without load and at low speeds, until it is ensured that all roller bearings, bevel gears and shaft seals are wetted with oil, then increase speed to approx. 500 min^{-1}
After approx. 30 min. slowly increase speeds until operational speed is reached, running in time at idle approximately 90 min.

During start-up and run-up pay attention to running noise and temperature development particularly at the bearing points. In the case of unusual running noise, shut down machine and identify fault.
See Section 10: "Faults, causes and remedies."

Apparent leakage at the shaft seal rings
Grease emerging from the lubrication in the shaft seal rings is not an oil leak.
This is an **apparent leakage**, until the remaining lubricant has become regulated.
Wipe off apparent leakage and continue to observe.

	**Attention against damage to gear unit:** If the new gear unit is started up too quickly, the bearings may overheat, and the tooth flanks may be insufficiently lubricated. It is necessary to allow the gear unit to run-in in stages!

	**Warning**: Risk of burns! Possibility of severe burns on hot surfaces (>55°C). Wear suitable gloves and protective clothing.

9. Operation of the KS TwinGear

9.1 General notes on operation

The instructions in Section 1 "General safety notes", Section 10 "Faults, causes and remedies", and Section 11 "Inspection and maintenance" must be complied with.

In order to achieve a perfect trouble-free operation of the gear unit, the operating factors defined in the "Technical Data" must be complied with.

9.2 During operation monitor the following:

Operating temperature
When using mineral gear oils (CLP) the operating temperature should not exceed 90°C or only exceed this limit for a short period. If synthetic gear oils (CLP) are used, an operating temperature must be set.
In combination with sealing rings made of FKM (fluororubber, Viton), a temperature of 110°C is permissible for a short time.

Changing gear unit noises, vibrations

Oil leakage on the housing and the shaft seal rings

Oil level - to check the oil level, the gearbox must be stopped.
Check oil levels only with the gear unit in a cooled down condition:

- If there is an oil sight glass, the oil level must be in the middle of the oil sight glass
- If without an oil sight glass, the check is carried out at the lower screw plug of a vertical housing surface. The oil level must touch the thread in the housing (see page 12, section 7.1)

	**Attention**: Insufficient lubrication due to a too low oil level can lead to damage to the gear parts and the bearings. Carry out a regular oil level check

	**Warning**: Possibility of severe burns on hot surfaces (>55°C). Wear suitable gloves and protective clothing.

9.3 Irregularities

In case of changes compared to standard operation, e.g. increased temperatures, noises, vibrations, in case of doubt the gearbox must be shut down to determine the cause. See section 10: "Faults, causes and remedies".

If necessary, consult our service department.

10. Faults, causes, remedies

10.1 General fault indications

The Sections 5 "Safety notes" and 11 "Service and Maintenance" must be observed.

Faults occurring during the warranty period which require repair of the gear unit may only be repaired by employees of the Nidec Graessner service department.

If, after the warranty period, faults occur whose causes cannot be clearly identified, the Nidec Graessner service department must be contacted.

10.2 Possible faults

Faults	Causes	Remedies
Changed operating noise	Damage to gearings Bearing play is increased. Bearing is defective	Check geared components; if necessary, replace any damaged components Adjust bearing play, Contact service department, Replace defective bearing, Contact service department,
Increased temperature at the bearing points	Oil level in the housing is too low or too high Oil is too old Bearing is defective	Check oil level at room temperature, if necessary, replenish or drain oil. Check when the last oil change has been carried out. If necessary, change the oil Check bearing condition; replace, if necessary; contact service department,
Gear unit is oily on the outside	Insufficient sealing of the bearing flanges and gear unit covers	Seal bearing flanges and gear unit covers
Oil leak at the ventilation filter	Oil foams Oil level in the gear unit is too high Incorrect execution of the ventilation	See fault "Oil foams in gear unit" Decrease oil level in gear unit to the pre-specified level Prevent any direct oil injection by attaching suitable extensions or angle pieces
Oil leaks from gear unit	Insufficient sealing of the bearing flanges and gear unit covers Radial shaft seal rings are defective	Check seals, replace if necessary Check radial shaft seal rings, replace if necessary.
Oil foams in gear unit	Water in oil Oil too old (De-foaming agent used up). Unsuitable oils mixed up	Examine oil condition for water ingress by means of a test tube sample. Have the oil sample analysed, change oil. Examine oil, change oil Examine oil, change oil
Water in oil	Water condensates in the gear unit by external climatic conditions, sun, wind, cold: Ambient temperatures change a great deal.	Protect gear unit against temperature influences
Increased operating temperature	Oil level in the gear unit is too high. Oil is too old Oil is highly contaminated	Check oil level Correct if necessary. Check when the most recent oil change was carried out, change oil Have the oil sample analysed, change oil.

11. Inspection and maintenance

11.1 General notes

All maintenance and service work may only be carried out by qualified personnel.
See "Safety Instructions 3.2"

The gear unit must always be shut down for maintenance and repair work.
The drive unit must be secured against unintentional start-up (key switch, lock) and an information sign must be attached indicating that work is being carried out on the gear unit.

	**Warning**: High risk of injury due to unintentional start-up of the drive! Before commencing any maintenance work, secure gear unit against any start-up!
	**Warning**: High risk of injury from dismantling transmission parts (couplings, jointed shafts, belts, etc.) while torsional forces are still acting on the gear shafts! Secure gear shafts against torsional forces and disassemble transmission elements.

11.2 Service intervals

Non-compliance with the maintenance intervals can cause severe damage to the gearbox and the plant.
Therefore, it must be ensured that these maintenance intervals are observed.

Measures	Service intervals	Remarks
Check running noise for any changes	daily	
Check gear unit for leakage	daily	
Check oil level	monthly	
Carry out first oil change	500 operating hours after commissioning	Chapter 11.3
Carry out additional oil changes (mineral oil filling)	Every 24 months or 10000 operating hours	Chapter 11.3
Carry out additional oil changes (synthetic oils)	Every 4 years or 20000 operating hours	Chapter 11.3
Check gear unit condition	Every 2 years	Chapter 11.4

11.3 Oil service life

The oil service life at 80°C average oil temperature in the gear unit without serious changes in the oil qualities is specified by the oil manufacturers as a minimum value:

- For mineral oils, biodegradable oils, and physiologically harmless oils: 2 years or 10,000 operating hours
- For synthetic oils (polyalphaolefins and polyglycols): 4 years or 20,000 operating hours

Note on oil service life
The actual oil service life may be longer, and at operating temperatures above 80°C also lower.
Here, the rule applies that a temperature increase of 10°C approximately halves the service life of the oil.

11.4 Oil change

Oil should be drained directly after shutdown whilst the oil is still warm.

	**Caution**: There is a **risk of burns** on the hot gear unit, and a **risk of scalding** when draining the oil! Provide for suitable protection measures!

- Unscrew the ventilation filter or remove the upper screw plug on one side of the housing, open the oil drain plug and collect the oil in a suitable container.
- Equip the drain plug with a new copper seal and screw it back into the housing.
- Fill gear unit with oil, see also section 8.
- Reinsert oil filler plug or breather filter.

	**Material damage** Possible damage to the gear unit due to insufficient lubrication caused by incorrect or mixed oils. When changing the oil, always refill with the same oil type previously used! It is not permitted to mix different makes or mineral and synthetic oils. Specifically, hydrocarbon oils must not be mixed with polyglycols. The mixtures may be resinous or clump together and settle in the gear unit.

11.5 Checking the gear unit condition

This check may only be carried out by qualified operating personnel or by the service department of Nidec Graessner. It must be possible to reliably assess what needs to be replaced on the gear unit or to determine that all gear unit parts are in good order.

12. Replacement parts, replacement parts stock, service

12.1 Replacement parts

Wear part packs and replacement parts complete with replacement or repair instructions are available from our service department. The designation and positioning of the individual parts are shown in the associated dimension sheets and replacement part drawings.

12.2 Replacement parts stock

We recommend to keep a stock of the most important replacement parts and wear parts in the vicinity of the place of use of the gear unit, so as to ensure the operational readiness of the gear unit in this way.
The parts are shown in the replacement part drawings

12.3 Service department

Should you require **help from our service department** (contact on Page 21),
please provide the following details:

- Gear unit type and size
- All data printed on the type plate
- If the type plate is missing, you will find the serial number stamped into the housing.
- Type and scope of the fault
- Suspected cause
- Photographs of any damage (digital)

13. Alphabetic index

Index keyword	Section	Page
Aeration and ventilation filter	8.	15
Attachment of motors	7.4	12
Basic duties	5.1.	9
Before commissioning	6.4	10
Checking gear unit condition	11.5.	19
Commissioning	8.	15
Conversions and alterations	3.	5
Copyright	1.4.	4
Disposal of the gear unit after use	3.4.	9
Downloads - Notes	1.4, 4.6.	4, 8
During operation monitor the following:	9.2.	16
Environmental protection	5.3	9
Exclusion of liability	1.3.	4
Faults, causes, remedy	10.	17
Final installation work	7.6	14
Fitted components - Notes	7.5.	14
Gear unit installation in plant	7.2.	11
General fault indications	10.1.	17
General installation instructions	7.1.	11
General notes on inspection and maintenance	11.1.	18
General notes on operation	9.1.	15
General notes on the operating instructions	1.	4
Inspection and maintenance	11.	18
Installation	7.	11
Installation position (see fitted positions)	7.3.	11
Installation positions:	7.3.	11
Intended use of MS-Graessner gear units	2.	5
Irregularities	9.3.	16
Long-term storage	6.3.	10
Maintenance	11.	18
Oil change	11.4.	19

Oil inspection glass	7.1.	11
Oil quantities	7.1.	11
Oil service life	11.3	18
Operating temperature	9.2.	16
Operation	9.	15
Performance table TwinGear	4.3.	7
Possible faults	10.2	17
Qualified personnel	5.2.	9
Replacement part stocks	12.2.	19
Replacement parts.	12.1.	19
Replacement parts. Service department	12.	19
Safety notes	5.	9
Service department	12.	19
Service department	12.3	19
Service intervals	11.2.	18
Set-up of gear unit	4.1.	6
Set-up of gear unit / Technical data	4.	6
Significance of the warning notes	1.2	4
Storage conditions	6.2.	10
Table of contents	0.	2
Technical data KS TwinGear	4.4.	7
Transport	6.1.	10
Transport, storage and long-term storage	6.	10
Type designations	4.2	6
Type plate	4.5.	7
Use of the operating instructions	1.1.	4
Warning notes	1.2	4

Note: How to contact our Service Department

NIDEC GRAESSNER GMBH & CO. KG
The Gear Company
Kuchenäcker 11, D-72135 Dettenhausen

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