HEINZ
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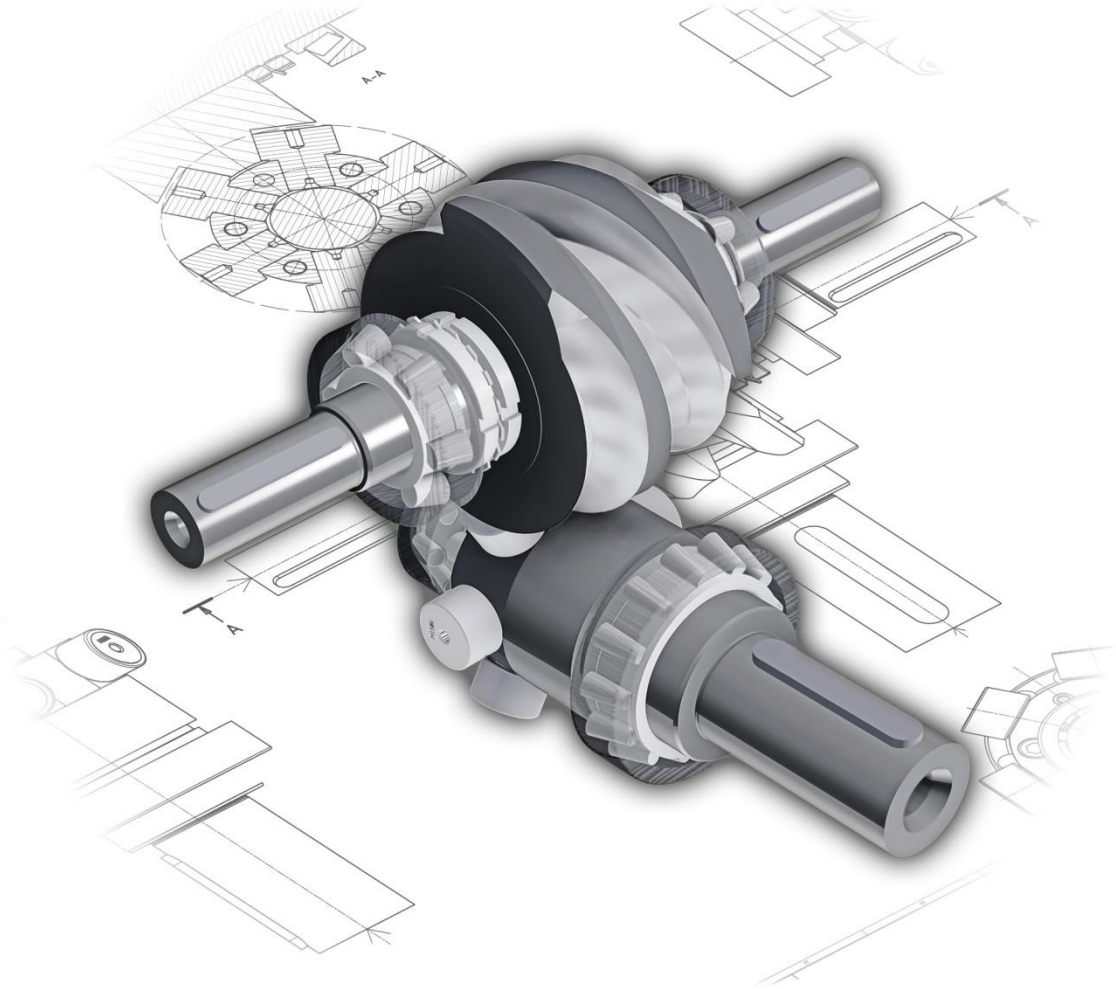
OPERATING & MAINTENANCE INSTRUCTIONS

Globoid cam gear HSG • HTSG



- Type of indexer:

- Fabrication Number:

1 Table of Contents

2 General

2.1 Scope

These operating instructions apply to > Globoidal cam gear – Type HSG and HTSG

Note

These operating instructions have to be read and used by every person who is responsible for the installation, commissioning, operation, maintenance or repair of this indexer in the user's company.

Please keep these operating instructions in a safe place for future reference.
In particular, make yourself familiar with the safety regulations first.

In the following text these „Globoid cam gears - Type HSG and HTSG“ will be named „Indexers“.

Each indexer is built according to the state of the art and recognized safety regulations.
The indexers are intended exclusively for intermittent movements of a load that cannot endanger people, property or the environment when moving.

Note

These indexers may only be used within the framework of the specifications agreed in the operating instructions or in the sales documents. Any other or additional use, e.g. higher speeds and / or larger loads or other installation positions are considered improper.

THE MANUFACTURER WILL NOT BE LIABLE FOR ANY DAMAGE.

THE RISK IS ALONE BEARED BY THE OPERATOR.

Intended use also includes reading the operating and maintenance instructions and observing the inspection and maintenance conditions.

Note

Maintenance work may only be carried out by qualified personnel who are familiar with the functional principle of the indexer.

2.2 Safety instructions

Note

Before commissioning the indexer, the operating and maintenance instructions have to be read carefully.

The indexer complies with the recognized safety rules.
When used as part of a machine or system, e.g. bolted levers, cogwheels with chains and the like can pose a risk to life and limb of the user or third parties. The indexer may only be put into operation if the entire machine complies with the Machinery Directive 2006/42 / EC.

Warning

Output shaft or flange with high torque!
Never reach into the work area of the output element and its superstructures and attachments!

Warning

Risk of crushing from parts attached to the output!
Never reach into the work area of the output element and its superstructures and attachments! In such a case, suitable protective measures have to be taken by the user on site.

Warning

E.g. Protective grids, covers or light grids have to be installed in such a way that the operating personnel is protected from injuries caused by these indexers.

Note

Relevant accident prevention regulations as well as all generally recognized safety and occupational health regulations must be observed. Inadmissible changes and the use of spare parts and additional devices that are not recommended by the manufacturer can lead to personal injury and property damage.

Warning

Before starting any maintenance or repair work, it must be ensured that the indexer cannot start up. All work on the indexer requires a certain amount of experience and should therefore be carried out by HEINZ fitters or trained specialists.

Warning

It is not possible to turn such indexers on the output side by hand into one of the end positions. The intermittent movement to the positions may only take place via the movement of the input shaft.

The indexers are intended exclusively for the generation of intermittent movements of a load which do not endanger persons, property or the environment during this movement. These indexers may only be used within the scope of the specifications specified in these operating instructions and in the special sales documents. Any other or additional use is considered improper and excludes any warranty from the manufacturer.

If the indexer is completed with an electric motor, this must always be protected from overload.

Before starting up the indexer, the plug of the oil inlet must be replaced with the vent screw.

2.3 Shipping

Every indexer was checked before dispatch and properly packed.
Nevertheless, we ask you to unpack the indexer immediately upon arrival at the installation site and to examine it for transport damage. Any complaints must be reported to the transport company immediately.

2.4 Transport regulations

Only transport the indexer with means of transport that are approved for the corresponding weight.
Eye bolts can be screwed into the existing mounting holes. Suspension ropes or chains may only be attached to these eye bolts.
The respective weight of the individual indexer types can be found in the weight table [see point 2.5].

2.5 Indexer weights

Globoidal cam gears – Basic series		
Indexer type	Housing	Weight [kg]
HSG | HTSG 63	Cast iron	20
HSG | HTSG 80	Cast iron	28
HSG | HTSG 110	Cast iron	57
HSG | HTSG 140	Cast iron	116
HSG | HTSG 180	Cast iron	200
HSG | HTSG 200	Cast iron	345
HSG | HTSG 254	Cast iron	400

Globoidal cam gears – modified series		
Indexer type	Housing	Weight [kg]
HSG 54	Cast iron	8,5
HSG 80 E	Cast iron	28
HSG 80 M	Cast iron	27
HSG | HTSG 82	Cast iron	27,5
HSG 100	Cast iron	55,5
HSG | HTSG 108	Cast iron	52
HSG | HTSG 108 M	Cast iron	52
HSG 125	Cast iron	95
HSG | HTSG 140 M	Cast iron	95
HTSG 152	Cast iron	132
HSG | HTSG 160	Cast iron	145
HSG | HTSG 171	Cast iron	190
HSG | HTSG 178	Cast iron	190
HSG | HTSG 220	Cast iron	350
HSG 250	Cast iron	665

3 Notes on using the indexer

3.1 Mounting position

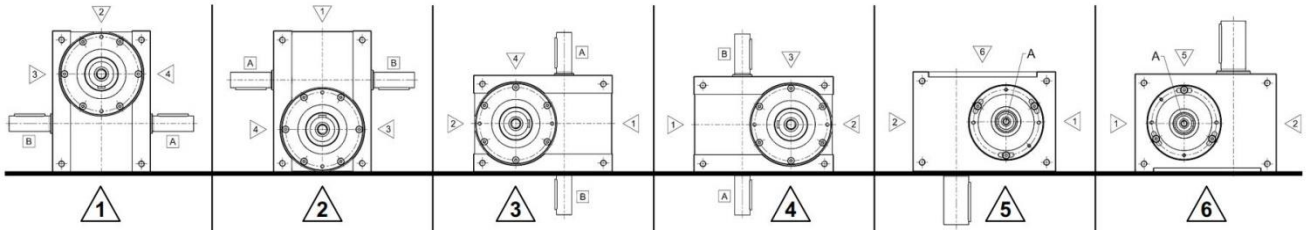
Due to the universal design, the indexers can be integrated into a machine or system in almost any position.

Note

When ordering, the customer must specify the installation position, the position of the mounting holes and, if applicable, the position of the oil holes.

Note

The specified installation position is decisive for the lubrication of the indexers components and must therefore not be changed in the system.



3.2 Indexer assembly

Due to the functional principle of the indexers, variable torques occur on the output flange or shaft as well as on the input shaft. Therefore:

- the indexer need to be mounted on a stable and machined base.
- the fastening screws need to be secured and if possible an additional fixation via dowel pins need to be done.
- the connection between the load and the output of the indexer need to be direct, backlash free and torsional rigid. This also applies to the drive of the indexer.

3.3 Indexer operation

The following points must be observed when operating the indexer:

Note

Elasticity and backlash in the driven masses can cause vibrations and must be avoided.

Note

Any overload protection installed should be mounted on the output flange.

4 Installation

4.1 Indexer functions

The indexers form a compact, robust unit and, through the use of precisely calculated cam profiles, enable a constant input speed to be converted into an optimal, precisely predetermined, smooth and shock free, intermittent output movement. The cam followers mounted in the turret are precisely guided in the cam by the hardened and ground cam track. This cam track is designed with a different gradient and divided into a dwell angle and index angle range.
During the rotation of the cam, the predetermined smooth and shock free movement of the output is generated via the cam track and the cam roller. Since the cam is designed symmetrically as standard, rotation in both directions is possible.
The dwell angle range has a slope of zero. As a result, the cam rollers achieve an exact, self-locking positioning of the output without additional locking.
When using a brake motor, the positioning of the output is independent of the braking accuracy of the motor, since the exact position is given by the position of the cam rollers in the dwell angle range. The entire dwell angle range is available for braking and start up. [see point 4.4]

4.2 Oil level

Note

The oil level has to be checked before commissioning. It is sufficient if the oil is visible in the sight glass. The average filling quantity can be found in the table of oil quantities [see point 4.3].

Warning

If the oil level is insufficient, the function and service life of the indexers are not sufficiently ensured.

4.3 Oil quantities of Indexers

Globoidal cam gears basic series	
Indexer type	Oil quantity [l]
HSG | HTSG 63	0,40
HSG | HTSG 80	0,75
HSG | HTSG 110	1,80
HSG | HTSG 140	3,30
HSG | HTSG 180	7,50
HSG | HTSG 200	10,50
HSG | HTSG 254	18,00

Globoidal cam gears modified series	
Indexer type	Oil quantity [l]
HSG 54	0,20
HSG 80 E	0,75
HSG 80 M	0,60
HSG | HTSG 82	0,75
HSG 100	1,50
HSG | HTSG 108	1,60
HSG | HTSG 108 M	1,50
HSG 125	3,80
HSG | HTSG 140 M	3,50
HTSG 152	2,30
HSG | HTSG 160	6,80
HSG | HTSG 171	5,50
HSG | HTSG 178	7,10
HSG | HTSG 220	10,50
HSG 250	22,00

4.4 Interruption operation

Note

If the dwell angle range of the cam is not sufficient for the production-related standstill, this time can be extended with the help of a brake motor.

The braking process is triggered by a limit switch that is actuated by a switching cam [flag] connected to the drive shaft. During installation and operation, it need to be ensured that after braking, the keyway of the drive shaft is always parallel to the housing side 6 and points to the axis of rotation of the output flange.

If the cam is double indexed, this position can also be rotated by 180 degrees.
The cam followers should be in the middle of the dwell angle range of the corresponding cam.

In the case of indexers with an additional pointer, make sure that the pointer is in the middle of the marking plate after each braking.

4.5 Important Note

Note

In the case of drives with two speeds, normal operation is always due to the higher speed. [HIGH SPEED]
The lower speed [SLOW SPEED] may only be used to set up the system or after an "emergency shutdown" to move to the dwell angle range of the next station.

Warning

During the movement range in automatic operation, it is not allowed to switch to slow speed. In the case of controls that only allow the high speed to be switched via slow speed, this may only take place within the dwell angle range, i.e. only within the marking plate or while the output shaft or the output flange is at a standstill.

Warning

If this information is not observed, the manufacturer will exclude any warranty in the event of damage.

5 Maintenance regulations

5.1 General remark

If you have any questions or if you want to order spare parts, please state the indexer type and the fabrication number of the indexer concerned.

5.2 Drive

The maintenance instructions for the geared brake motor or other drives can be found in the instructions supplied by the manufacturer of the drive.

5.3 Brake of motor

Note

Because of the wear and tear of the motor brake, the shutdown in the dwell angle range should be checked from time to time. If necessary, the brake must be readjusted or replaced [see Point 4.4].

5.4 Indexer lubrication

5.4.1 Oil lubrication

The following oils have been tested with our indexers and can be used for refilling.
Our indexers are lubricated for life, meaning an oil change is only necessary if the condition of the oil has significantly changed compared to its original state. The oil level should be checked at regular intervals. It is sufficient if oil is visible in the sight glass when the indexer is at a standstill – this ensures the lubrication of cam followers and the cam.

At speeds below 150 rpm	At speeds higher 150 rpm
Shell Omala S4 WE 460	Shell Omala S4 WE 150
Mobile Glygoyle HE 460 [ISO V6 460]	Mobile Glygoyle 22 [ISO V6 150]
Klübersynth GHE 6 – 460	Klübersynth GHE 6 – 100

Attention
Never mix different types of oil!

Attention
Only top up the lubricant mentioned above!

For oil fillings with an NSF H1-registered food-grade oil that complies with FDA 21 CFR § 178.3570, the indexer can be filled with one of the oils listed below.
Our indexers are lubricated for life, meaning an oil change is only necessary if the condition of the oil has significantly changed compared to its original state. The oil level should be checked at regular intervals. It is sufficient if oil is visible in the sight glass when the indexer is at a standstill – this ensures the lubrication of cam followers and the cam.

At speeds below 150 rpm	At speeds higher 150 rpm
Klübersynth UH1 6 – 460	Klübersynth UH1 6 – 150

Attention
Never mix different types of oil!

Attention
Only top up the lubricant mentioned above!

5.4.2 Grease lubrication

It is lubricated for life and, accordingly, a grease change should only be carried out if the condition of the grease changes significantly compared to the original condition.

usual grease lubrication	NSF H1 registered, conforms to FDA 21 CFR § 178.3570
TRIBOL GR00	Klüberfood NH1 94-6000
Microlube GB 00	Klübersynth UH1 14-1600

Attention
Never mix different types of grease!

Attention
Only top up the lubricant mentioned above!

6 Inspection notes

6.1 Inspection cycle

Note

To ensure mechanical functional reliability, the following checks are recommended at regular intervals, but at least after 8,000 operating hours:

- Oil condition check and, if necessary, oil change if there are significant changes in comparison to the original condition of the oil (e.g. discoloration).
- Oil level check and, if necessary, top up with lubricating oil.
- Check of housing and bearing cover for overheating and discoloration.
- Check indexer for unusual noises.
- Check indexer for functional reliability and freedom from backlash.
- Check of functional reliability of all sealing elements.

Note

The following measures are to be initiated for the relevant points if the current status no longer corresponds to the initial status:

- Change of lubricant. [see Point 4.2 and 5.4]
- Topping up the lubricant. [see Point 4.2 and 5.4]
- Change of bearings on input and output shaft. [see Point 7.2.2]
- Change of cam followers. [see Point 7.2.1.1]
- Change of turret. [see Point 7.2.1.2]
- Change of globoidal cam. [see Point 7.2.1.3]

After an estimated service life of approx. 30,000 operating hours, it is recommended that all rolling bearings and cam followers be replaced.

The sealing elements must be replaced in the same cycle in order to avoid damage to the indexers due to possible loss of lubricant.

7 Spare parts and assembly

7.1 General remark

Note

Before starting the following dismantling work, read the entire text carefully.

All components must be cleaned and checked for perfect condition before installation. The spare parts list is helpful for dismantling and assembling the individual parts.
When using solvents, make sure that they do not come into contact with the O-rings or the shaft sealing rings.
Please have the type and serial number ready for any queries and spare parts orders for faster processing.

Note

All repair work requires a certain amount of experience and should therefore be carried out by fitters from HEINZ AUTOMATIONS-SYSTEME GmbH.

7.2 Assembly instructions

7.2.1 Globoidal-mechanism

The mechanism is a sub-assembly and consists of a globoidal cam, cam followers and turret. Due to possible wear on cam followers and globoid cam, it is possible needed to replace the

- cam follower
- turret
- globoidal cam
- complete mechanism

7.2.1.1 Replacing the cam followers

- Drain the oil.
- Rotate the input shaft to the dwell angle range.
- Unsrew the bearing cover of the output shaft / flange.
- Lift output shaft / flange out of the indexer housing.
- Turn set screws out of the turret [are glued in] and remove the cam followers.
- Check cam roller shaft bores in roller spider for damage and possible enlargement.
- If damaged holes are present: [see Point 7.2.1.2].
- If the shaft bores are in good condition, press new cam follower into the turret.
- in the case of stud type cam follower without notch, drill a centring hole in each stud type cam follower shaft using a core hole drill; the centring depth is based on the centring point of the DIN914 grub screw.
- Secure cam followers with set screws (glue thread).
- Check globoid cam and replace with new one if necessary [see Point 7.2.1.3].
- Put the output shaft with turret back into the housing (pay attention to the position of the keyway of the output shaft).
- Apply a suitable permanently elastic sealant to the cleaned sealing surface and fit the bearing cover.
- Rotate the drive shaft and check the installation kit for smooth running.
- Fill up oil.

7.2.1.2 Replacing the turret

- Drain the oil.
- Rotate the input shaft to the dwell angle range.
- Unsrew the bearing cover of the output shaft / flange.
- Lift output shaft / flange out of the indexer housing.
- Pull off smaller taper roller bearing.
- Pull the locating pins out of the turret and remove the turret from the output shaft / flange.
- Screw the new turret back on with the cam follower fitted and re-pin it.
- Heat the taper roller bearing slightly (max. 80°C) and slide it over the output shaft / flange.

Note

Damaged bearings must be replaced with new ones!
[see Point 7.2.2.1]

- All other assembly work: [see Point 7.2.1.1].

7.2.1.3 Replacing the globoidal cam

- Drain the oil.
- Rotate the drive shaft to the dwell angle range.
- Unscrew the housing cover.
- Release the locking plates and loosen the lock nuts.
- Unscrew both eccentric covers.
- Press the inner rings of the taper roller bearings off the input shaft using the locknuts by max. 3 mm less than the width of the locknut.
- Pull off the tapered roller bearings with the help of a puller.
- Remove the locknuts and locking plates.
- Push the drive shaft out of the globoidal cam without applying much force on the cam followers.
- Remove the old globoidal cam from the housing.
- Place new globoidal cam with the dwell angle range between two cam followers. (pay attention to the position of the keyway of the output shaft).
- Push the input shaft into the cam, do not apply much force on the cam followers.
- Screw new locking plates and new locknuts onto the input shaft.
- Heat the taper roller bearings slightly (max. 80°C) and slide them over the drive shaft.

Note

Damaged bearings must be replaced with new ones!
[see Point 7.2.2.2]

- Screw on the eccentric cover. There must be no pre-tension between cam follower and cam, if necessary move cam with the help of the locknuts or turn eccentric cover.
- Check taper roller bearing preload in the dwell angle range, if necessary correct by adjusting the eccentric cover.
- Adjust the installation set to be backlash-free by turning the eccentric cover and/or moving the cam.

Note

The height deviation of the input shaft projection must not exceed max. 0.02mm over the entire projection length.
The cam follower and globoidal cam must have a uniform contact pattern at the dwell angle.

Note

A check with spotting paste must be carried out!

- Tighten and secure the groove nuts.
- Tighten the eccentric cover.
- Rotate drive shaft by hand and check for smooth running, repeat adjustment if necessary.
- Cover all openings.
- Pin the eccentric cover.
  If necessary, drill new pinholes with the same drilling depth on the same pitch circle. (Remove swarf)
- Unscrew eccentric cover, seal in, align over pin holes, tighten slightly, drive in pins and screw tight.
- Fit new shaft sealing rings, seal in housing cover and screw tight, fill with oil.

7.2.1.4 Replace mechanism completely

Disassembly and assembly of turret and globoidal cam: [see Point 7.2.1.1 to 7.2.1.3]

7.2.2 Roller bearing

Note

When fitting new rolling bearings, make sure that the bearings are adjusted to be free of backlash. Too much or too little bearing backlash can be corrected by adjusting the bearing covers or eccentric covers. Afterwards, check the proper running of all bearings by rotating the input shaft and adjust again if necessary.

7.2.2.1 Roller bearing output side

- Drain the oil.
- Rotate the input shaft to the dwell angle range.
- Unscrew the bearing cover of the output shaft.
- Lift output shaft out of indexer housing.
- Pull the inner rings of the bearings off the output shaft using a suitable tool.
- Dismantle outer rings from housing and bearing cover using suitable tool.
- Check fit quality of bearing seats and polish / clean if necessary.
- Mount new bearings (heat inner rings slightly, up to max. 80°C).
- Lift the output shaft into the indexer housing.
- Refill oil.

Note

When inserting the output shaft, make sure to thread the cam followers into the cam track without tilting them.
Cam followers and cam can be damaged by tilting.

- Mount the bearing cover of the output shaft.

7.2.2.2 Roller bearing input side

- Drain the oil.
- Rotate the input shaft to the dwell angle range.
- Unscrew both eccentric covers.
- Remove the outer rings from the eccentric covers using a suitable tool.
- Pull the inner rings of the bearings off the input shaft using a suitable tool.
- Check fit quality of bearing seats and polish / clean if necessary.
- Fit new bearings (heat inner rings slightly, up to max. 80°C).
- Mount input shaft together with eccentric cover.
- Refill oil.

7.3 Spare and wear parts

MECHANISM:
- Globoidal cam
- Turret
- Cam follower

BEARINGS:

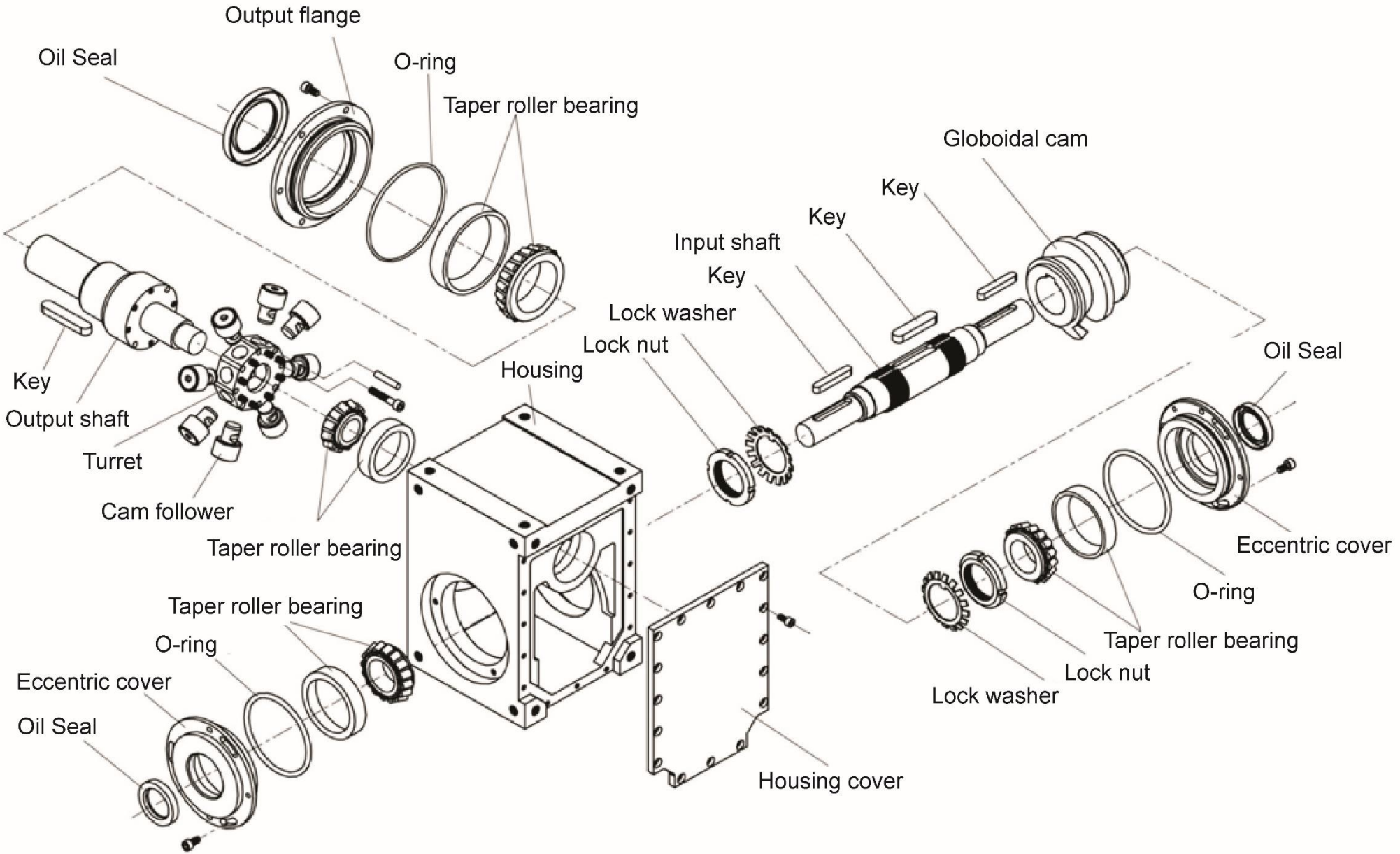
• Tapered roller bearing / deep groove ball bearing	Output 1
• Tapered roller bearing / deep groove ball bearing	Output 2
• Tapered roller bearing / deep groove ball bearing	Input

SEALINGS:

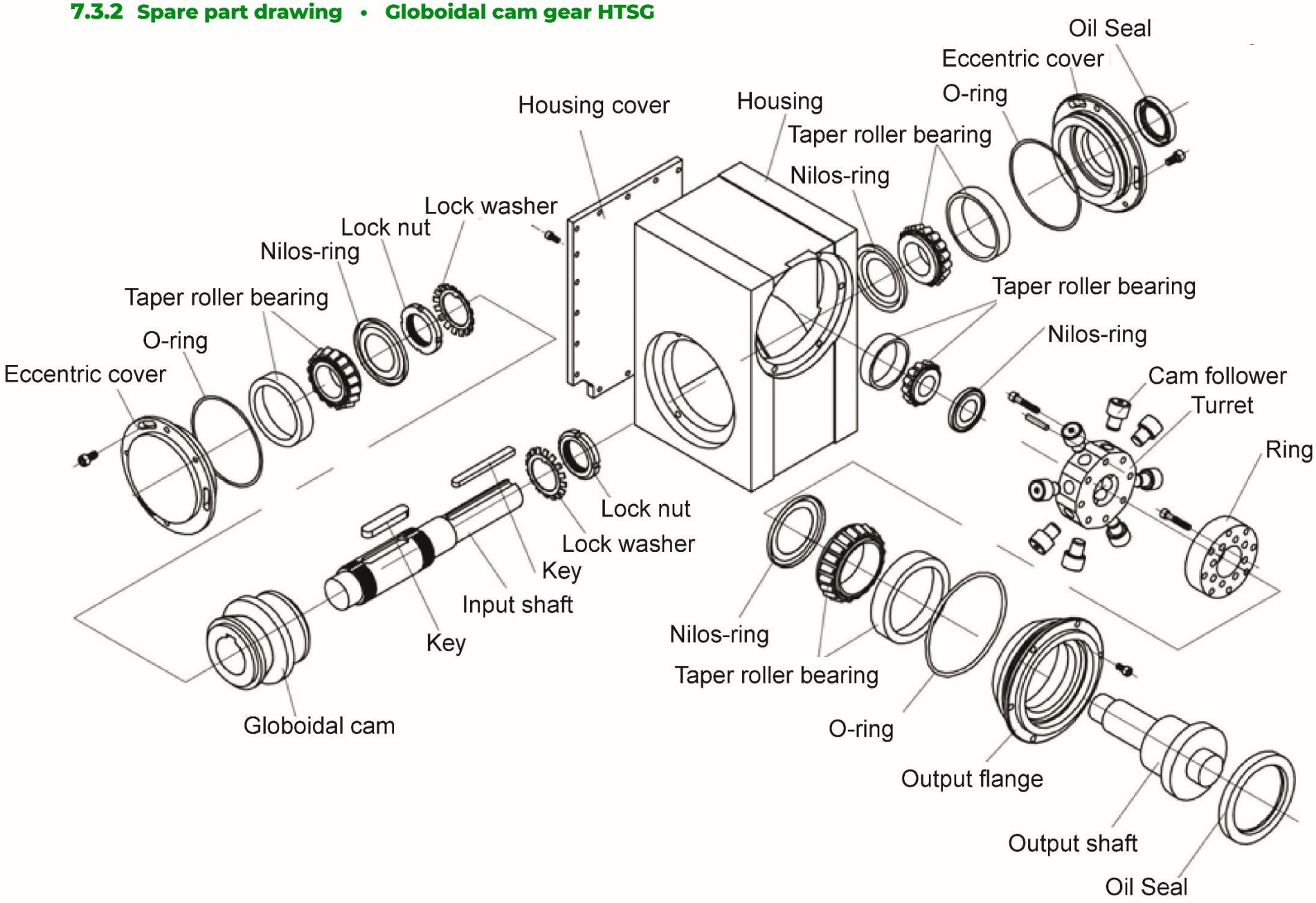
• Radial shaft seal	Outout
• Radial shaft seal	Input
• O-ring	Output
• O-ring	Input

INPUT SHAFT
OUTPUT SHAFT

7.3.1 Spare part drawing • Globoidal cam gear HSG



7.3.2 Spare part drawing • Globoidal cam gear HTSG



8 Contact

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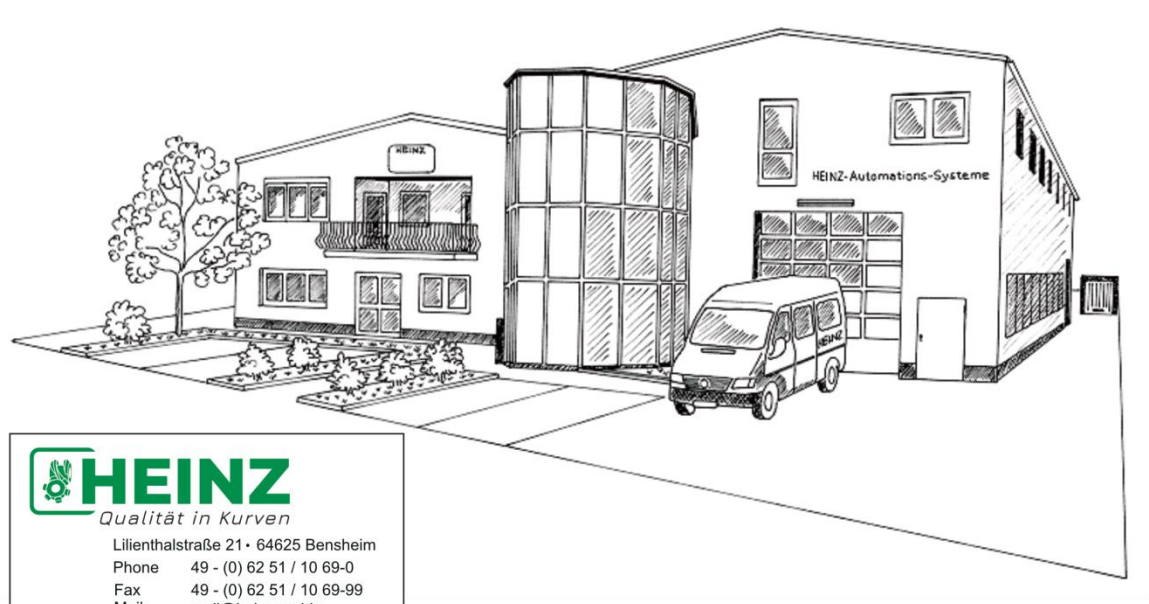

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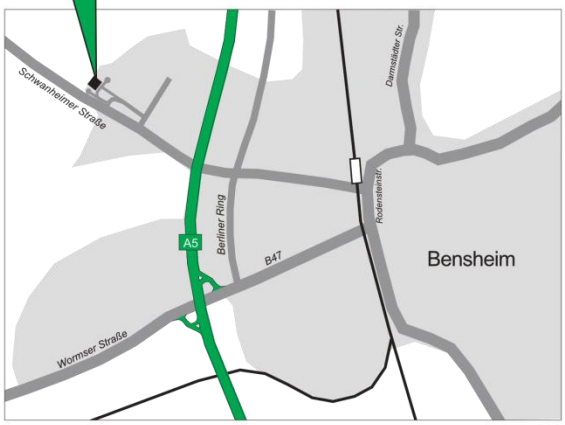

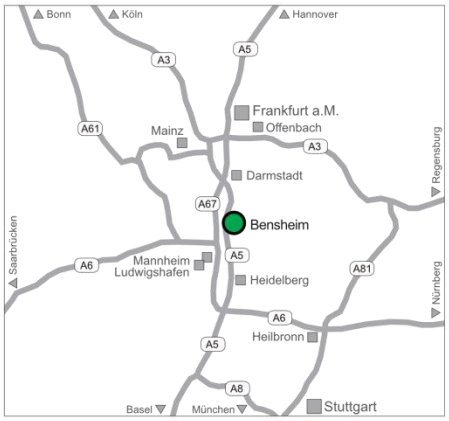

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