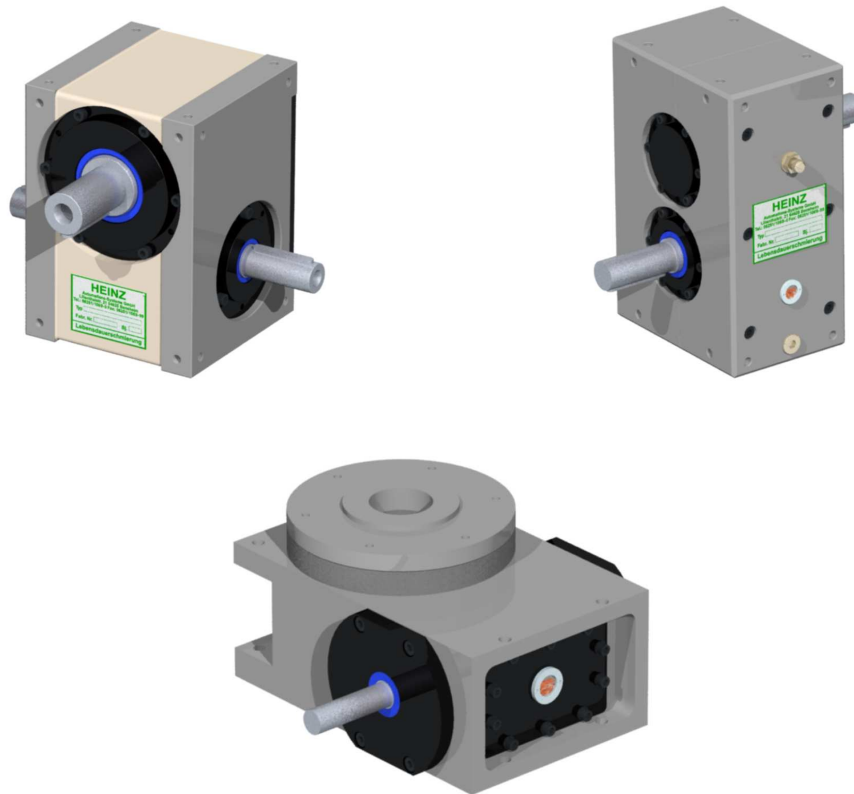




## Operating Instructions

### Globoidal cam gear



---

Type :

---

Serial No. :

---

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## 1. General

### 1.1 Scope of this Manual

This Operating Manual applies to a **H(T)SG Globoidal Cam Indexing Gear Unit**

#### NOTE



Anyone at the user's premises who sets up, puts into service, operates, maintains or repairs this Indexer must read the Operating Manual and observe its instructions.

Keep this Operating Manual for reference at a safe and easily accessible location. Make sure that you are familiar with the safety instructions first.

In this manual, the **Cylindrical Cam Indexing Gear Unit** is referred to as **Indexer**.

Each Indexer is designed and built according to the state-of-the-art and complies with generally accepted safety rules. The Indexers are designed exclusively for indexed movements of a payload that does not endanger people, equipment or the environment while moving.

#### NOTE



These Indexers must only be used within the scope of this Operating Manual or according to the specifications agreed to in the sales documents. Any other use or any use exceeding these specifications, such as higher rotational speeds and/or higher loads or other mounting positions, do not comply with the Indexers' intended use.

**The manufacturer cannot be held liable for any damage resulting from such a use.  
This risk is born solely by the user.**

Intended use includes reading the operating and maintenance instructions and complying with the servicing and maintenance requirements.

#### NOTE



Only qualified professionals who understand the functionality of the Indexers are permitted to carry out maintenance work.

## 1.2 Safety Notes

### NOTE



Before putting the Indexer into service, read the operating and maintenance instructions carefully.

The Indexer complies with generally accepted safety rules.

When installing the Indexer into a machine or plant, machine or plant attachments such as levers, toothed gear wheels with chains or similar can cause severe injuries to or death of the user or bystanders. Indexers must not be put into service, if the machine or plant in its entirety does not comply with the machine directive 2006/42/EC.



#### **WARNING**

Output shaft or flange with high torque! Do not reach into the operating range of the output shaft and its attachments!



#### **WARNING**

Crushing hazard by attachments mounted on the output shaft. Do not reach into the operating range of the output shaft and its attachments!

For such a case, the user must implement all necessary protective measures on site.



#### **WARNING**

To protect operators from injuries that can be caused by the Indexer, install protective grating, covers or light curtains suitably.

### NOTE



Always adhere to the relevant regulations for prevention of accidents as well as generally accepted health and safety regulations. Improper modifications and the use of replacement parts and additional equipment not recommended by the manufacturer can result in injuries to personnel or damage to property.



#### **WARNING**

Before starting any maintenance work, make sure that the Indexer is locked out and cannot be started. Any work on the Indexer requires specific technical knowledge. Preferably have HEINZ technicians or specifically trained professionals carry out this work.



#### **WARNING**

You cannot turn Indexers manually into one of their end positions. If position indexing is required, carry out this action by moving the input shaft only.

The Indexers are designed exclusively for indexing a payload that cannot endanger persons, equipment or the environment while moving. The Indexers must only be used within the scope of this Operating Manual and according to the specifications agreed to within the sales documents. Any other use or any use exceeding these specifications does not comply with the Indexers' intended use and voids any warranty by the manufacturer.

**WARNING**

When the Indexer is completed with an electric motor, this motor must be protected against overload.

**WARNING**

Before putting the Indexer into service, always replace the plug at the oil inlet with a vent plug.

### 1.3 Shipping

Each Indexer is checked thoroughly and packaged properly before shipment. After unpacking the Indexer upon receipt at its destination, please inspect the Indexer for any damage sustained during transport. Should you note discrepancies, please report these to the carrier immediately.

### 1.4 Transport Instructions

**WARNING**

To move the Indexers, only use handling equipment approved to carry their weight. For weight specifications, refer to section 1.5. We have provided mounting holes for lifting screws. Attach suspension ropes or chains only to these lifting screws. To determine the weight of Indexers, refer to section 1.5 and the respective Indexer-type tables.

## 1.5 Indexer Weights

Basic series			modified series		
Gear type	Housing	Weight [kg]	Gear type	Housing	Weight [kg]
H(T)SG 63	GG	20	HSG 54	GG	8,5
H(T)SG 80	GG	28	HSG 80 E	GG	28
H(T)SG 110	GG	57	HSG 80 M	GG	27
H(T)SG 140	GG	116	H(T)SG 82	GG	27,5
H(T)SG 180	GG	200	HSG 100	GG	55,5
H(T)SG 200	GG	345	H(T)SG 108	GG	52
H(T)SG 254	GG	400	H(T)SG 108 M	GG	52
			HSG 125	GG	95
			HTSG 140 M	GG	95
			HTSG 152	GG	132
			H(T)SG 160	GG	145
			H(T)SG 171	GG	190
			H(T)SG 178	GG	190
			H(T)SG 220	GG	350
			HSG 250	GG	665

## 2. Information on the Use of the Indexers

### 2.1 Mounting Position

The universal design of these Indexers allows for virtually any mounting position on a machine or plant.

#### NOTE

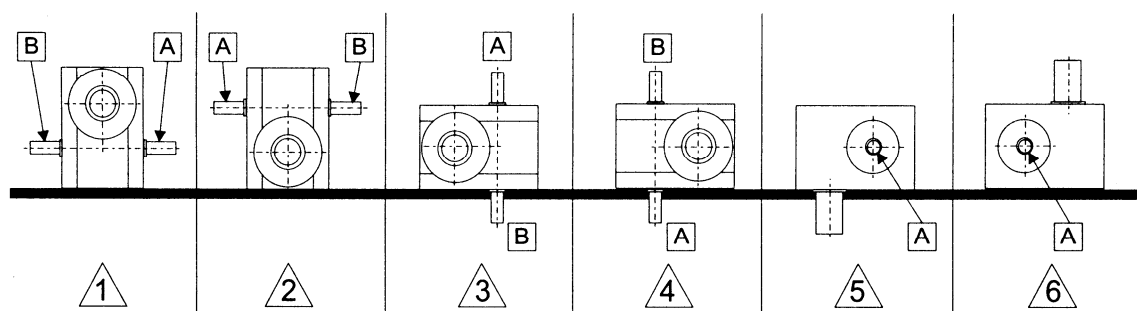


When ordering an Indexer, please state mounting position, location of mounting holes and, if necessary, location of oil holes.

#### NOTE



The specified mounting position is crucial for proper lubrication of the Indexer components. Do not change this position in the machine or plant.



### 2.2 Indexer Installation

The output shaft or flange and the input shaft are subjected to variable torques as a result of the Indexer's working principle. Therefore:

- Always install the Indexers on a stable machined base.
- Always secure the mounting bolts and fix the assembly additionally with dowel pins, if possible.
- Always connect the Indexer to the driven payload directly, backlash-free and torsionally rigid.

This also applies to the Indexer input shaft.

### 2.3 Indexer Operation

When operating the Indexer, always observe the following instructions:

#### NOTE



Elasticity and play in the driven masses can result in vibration excitation and must be avoided.

#### NOTE



Any overload protection should be mounted to the output flange, if possible.

### 3. Putting into Service

#### 3.1 How the Indexer Works

The Indexer is a compact, robust unit that uses exactly calculated cams to transform a constant input speed into a predefined optimum output movement that is smooth and intermittent.

The cam rollers running in the cam followers are precision guided along the cam by the hardened and polished cam track. This cam track has various leads and is divided into a dwell angle range and an indexing angle range.

When rotating the cam, the cam track and the cam rollers generate a predefined smooth movement of the output shaft. As the cam is usually shaped symmetrically, rotations to the left and to the right are equally possible.

The dwell angle range has a lead of zero. This causes a precisely defined self-locking positioning of the output shaft through the cam rollers without an additional locking device.

When using a brake motor, the exact positioning of the output shaft is determined by the position of the cam rollers in the dwell angle range and not by the motor braking accuracy. The full dwell angle range is available for braking (refer to 3.3).

#### 3.2 Oil Level

##### NOTE



Before putting the Indexer into service, always check the oil level.

The oil level is sufficient if oil is visible in the sight glass.

The following table lists the average filling quantity.



##### WARNING

An insufficient oil level adversely affects the functioning and service life of the Indexers.

##### Basic series

##### modified series

Gear type	Oil qty. [ L ]	Gear type	Oil qty. [ L ]	Gear type	Oil qty. [ L ]
H(T)SG 63	0,40	HSG 54	0,20	HTSG 140 M	3,50
H(T)SG 80	0,75	HSG 80 E	0,75	HTSG 152	2,30
H(T)SG 110	1,80	HSG 80 M	0,60	H(T)SG 160	6,80
H(T)SG 140	3,30	H(T)SG 82	0,75	H(T)SG 171	5,5
H(T)SG 180	7,50	HSG 100	1,50	H(T)SG 178	7,10
H(T)SG 200	10,5	H(T)SG 108	1,60	H(T)SG 220	10,5
H(T)SG 254	18,0	H(T)SG 108 M	1,50	HSG 250	22,0
		HSG 125	3,80		
		H(T)SG 133	4,00		



### 3.3 Intermittent Service

#### NOTE



If the dwell angle range of the cam is not sufficient for a production-related standstill, you can extend the hold time using a brake motor.

Braking is triggered by a limit switch activated by a cam connected to the input shaft. When putting the Indexer into service and during operation, make sure that after a braking action, the keyway of the input shaft always points to the casing side 6 and to the rotary axis of the output flange.

In case of double indexing, this position can also be shifted by 180°. The cam rollers must be in the middle of the dwell angle range of the respective cam.

For Indexers with an additional index hand, this index hand must be within the middle range of the marking label after braking.

### 3.4 Important Information

#### NOTE



For input drives with two rotational speeds, normal operation is always at the higher speed (fast traverse speed).

Only use the lower speed (creep speed) for setting up equipment or following an Emergency Stop to return to the dwell angle range.



#### WARNING

Do not activate creep speed for automatic operation while in the movement phase.

For controls that only enable switching to fast traverse speed via creep speed, this switch must take place within the dwell angle range, i.e. only within the marking label range or when the output shaft is at standstill.



#### WARNING

If these warnings are disregarded, any damage caused will not be covered by the warranty of the manufacturer.

## **4. Maintenance Instructions**

### **4.1 General Information**

In case of queries or when ordering replacements parts, please indicate Indexer type and serial number.

### **4.2 Input Drive**

For maintenance work on Indexer brake motor or other input drives, refer to the manufacturer's maintenance instructions provided.

### **4.3 Engine Brake**

#### **NOTE**



Due to wear and tear of the motor brake, we recommend that you check the stopping action in the dwell angle range regularly as described in 3.3. Adjust or replace the brake as necessary.

## 4.4 Lubrication of Indexer

### 4.4.1. Oil Lubrication

In Standard the gear unit is delivered with the synthetic lubricating oil “**Klübersynth GHE 6 – 460**”

It is lubricated for life, i.e. no oil changes are necessary at all. The oil level should be checked at regular intervals. Sufficient oil is present if when the gear unit is stationary the oil can be seen in the sightglass. The lubrication of the cam rollers and the came is thus guaranteed.

For rotating speed < 150 rpm	For rotating speed > 150 rpm
Klübersynth GHE 6 - 460	Klübersynth GHE 6 - 100
Mobil Glygoyle HE 460 (ISO V6 460)	Mobil Glygoyle 22 (ISO V6 150)
Shell Omala S4 WE 460	Shell Omala S4 WE 150



#### **WARNING**

Warning: Never mix different oil sorts!



#### **WARNING**

Only top up with the lubricant described above!

If used for the food industry, the gear unit is delivered with NSF H1 registered, conform to FDA 21 CFR § 178.3570 oil “**Klübersynth UH1 6 - 460**”

It is lubricated for life, i.e. no oil changes are necessary at all. The oil level should be checked at regular intervals. Sufficient oil is present if when the gear unit is stationary the oil can be seen in the sightglass. The lubrication of the cam rollers and the came is thus guaranteed.

For rotating speed < 150 rpm	For rotating speed > 150 rpm
Klübersynth UH1 6 – 460	Klübersynth UH1 6 – 150



#### **WARNING**

Warning: Never mix different oil sorts!



#### **WARNING**

Only top up with the lubricant described above!

### 4.4.2. Grease Lubrication

It is lubricated for life, i.e. no grease are necessary at all. The grease level should be checked at regular intervals.

Normal Grease Lubrication	NSF H1 registered, conform to FDA 21 CFR § 178.3570
Castrol Olit 00	Cassida RLS 00
Microlube GB 00	Klübersynth UH1 14-1600



#### **WARNING**

Warning: Never mix different oil sorts!



#### **WARNING**

Only top up with the lubricant described above!

## 5. Information on Preventative Maintenance

### 5.1 Preventative Maintenance Schedule

#### NOTE



To ensure mechanical reliability, we recommend the following checks at regular intervals but at least every 8000 hours of operation:

1. Check oil level and top-up as necessary
2. Check casing and bearing covers for overheating, discolouring and unusual noises.
3. Check Indexer for overheating, unusual noises, functional reliability and play.
4. Check functional reliability of all seals

#### NOTE



Do the following, if the condition of the items described does not correspond to their original state any longer:

- |   |                                 |
|---|---------------------------------|
| 1. Top-up lubricant                                 | (refer to sections 3.2 and 4.4) |
| 2. Replace roller bearing at input and output shaft | (refer to section 6.2)          |
| 3. Replace cam rollers                              | (refer to section 6.2)          |
| 4. Replace seals                                    | (refer to section 6.2)          |

After approximately 30,000 hours of operation, we recommend that you replace all roller bearings and cam rollers.

At the same time, also replace all seals to avoid any damage to the Indexer caused by a possible loss of lubricant.

## 6. Replacement Parts – Assembly

### NOTE



Before starting any disassembly works, carefully read the entire text.

Always clean and check all components for perfect condition before installing them. For disassembly and re-assembly of component parts, refer to the replacement parts list.

When using solvents, make sure that they do not get into contact with O-rings or sealing rings of the shafts.

In case of queries or when ordering replacement parts, please have type number and serial number ready for faster processing.

### NOTE



Any repair work requires specific technical knowledge.

Preferably have technicians of **HEINZ AUTOMATIONS-SYSTEME GmbH** carry out this work.

### 6.1 Tapered Roller Bearings / Deep Groove Ball Bearings

#### NOTE



When installing tapered roller bearings and deep groove ball bearings, make sure to adjust the bearings free from backlash. You can correct a bearing clearance, which is too large or too small, by adapting the bearing cover or the eccentric cover. Then check the unit for smooth running by turning the input shaft. Readjust, if necessary.

## 6.2 Globoidal mechanism

The mechanism is a unit consisting of globoidal cam, cam followers and turret.

Due to a possible wear of the cam followers or the globoidal cam, it may be necessary to replace the following parts:

- Cam followers
- Turret
- Globoidal cam
- Complete mechanism

### 6.2.1 Replacing cam followers (globoidal cam stays built in)

- Drain oil
- Move input shaft into dwell angle area
- Unscrew end cap of output shaft
- Lift output shaft out of globoidal housing
- Unscrew stud bolts off turret (are glued in) and remove cam followers
- Check shaft bore of cam followers in the turret if they are damaged and possibly widened
- In case of defective bores: see 6.2.2
- In case of perfect condition of bores, push in new cam followers into turret
- In case of cam followers without key way, bore with core hole drill a centralisation in every cam followers shaft. The depth of centralisation depends on the centralisation point of the stud bolts according to DIN914 (German Industrial Standard)
- Secure cam followers with stud bolts (glue thread in)
- Check globoidal cam and replace by a new one if necessary (see chapter 6.2.3)
- Put output shaft with turret back into housing (observe the position of the shaft key groove of the output shaft)
- Apply appropriate permanently elastic sealing material upon cleaned sealing surface and install end cap
- Move input shaft and check regular movement of mechanism
- Fill in oil

### 6.2.2 Replacing turret (globoidal cam stays built in)

- In the case of a defective cam followers shaft bore remove (smaller) tapered roller bearing
- Remove stud bolts off turret and disassemble turret off output shaft
- Screw tight new turret with installed cam followers again and put in new studs
- Heat tapered roller bearing slightly (max. 80°C) and push over output shaft

#### NOTE



Replace defective bearings with new ones!

- Put output shaft with turret back into housing (observe position of shaft key groove of output shaft)
- Proceed with assembly as describe in chapter 6.2.1

### 6.2.3 Replacing globoidal cam (turret stays built in)

- Drain oil
- Move input shaft into dwell angle area
- Screw off housing cover
- Release safety catch of securing steel sheets and unscrew lock nut
- Unscrew both eccentric covers
- Push inner ring of tapered roller bearing (maximum 3 mm less than width of lock nut) off input shaft by using lock nuts
- Pull off tapered roller bearing by using an extractor
- Remove lock nut and securing steel sheets
- Drive input shaft out of globoidal cam without using too much power on the cam followers
- Take old globoidal cam out of housing
- Put new globoidal cam with dwell angle area between two cam followers
- (Observe position of shaft key groove of output shaft)
- Drive input shaft into cam without using too much power on the cam followers
- Screw new securing steel sheets and new lock nuts on input shaft
- Heat tapered roller bearing (max. 80°C) and push over input shaft

#### NOTE



Replace defective bearings with new ones!

- Screw off eccentric cover. While doing so, make sure no preloading is produced between cam follower and cam, possibly move cam by using the lock nut or turn eccentric cover
- Check preloading of tapered roller bearing in dwell angle area, possibly by adjusting the eccentric cover
- Adjust mechanism without backlash by turning eccentric cover and/or by moving the cam

The height tolerance of the input shaft pivot may not exceed maximum 0,02 mm on the total length of the pivot. An even contact reflection of the cam follower and globoidal cam is absolutely required

**- check with inking past! –**

- Screw lock nuts tightly and secure
- Screw eccentric cover tightly
- Turn input shaft with hand and check its even running, possibly repeat adjustment
- Cover all openings
- Put pins into eccentric cover (possibly earmark pin holes on same pc-diameter with same depth of bores, remove chips)
- Screw off eccentric cover, seal, bring into line above pin bore, tighten slightly, push pins and screw tightly
- Install new oil seals – seal housing cover and screw tightly
- Fill in oil

### 6.2.4 Replacing mechanism completely

Please refer to chapter 6.2.1 to 6.2.3 for the instructions for disassembling and installation of the turret.

## 6.3 Tapered roller bearing

When installing new tapered roller bearings, it has to be observed that the bearings are adjusted free of play. If the backlash is too high or too low, this can be corrected by adjusting the housing cover or eccentric cover. Afterwards check the correct running of the mechanism by turning the input shaft, readjust if necessary.

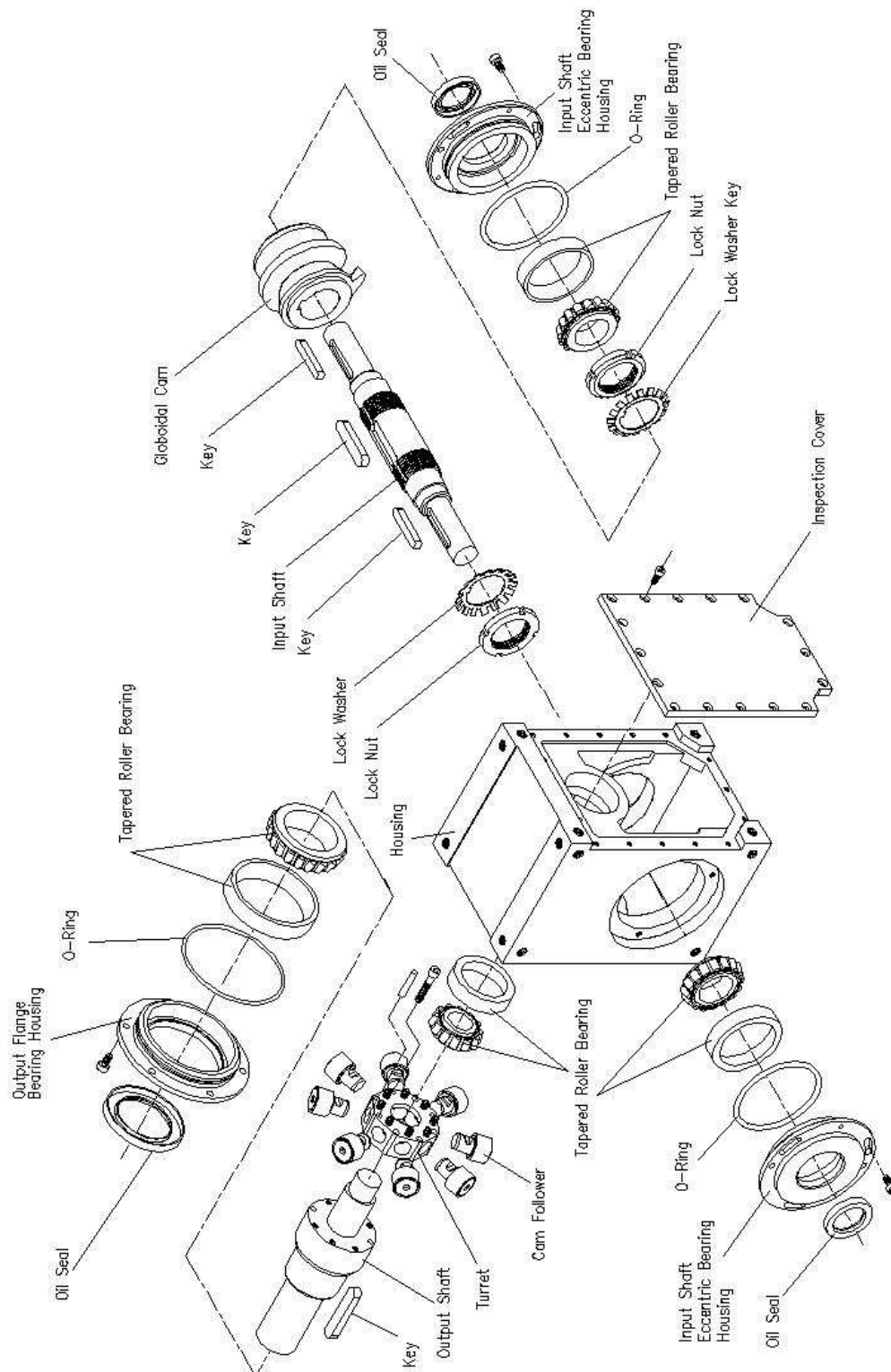
## 6.4 Spare and wearing parts

1. Mechanism
  - 1.1 Globoidal cam
  - 1.2 Turret
  - 1.3 Cam followers
2. Bearing set
  - 2.1 Tapered roller bearing output 1
  - 2.2 Tapered roller bearing output 2
  - 2.3 Tapered roller bearing output
3. Sealing set
  - 3.1 Oil seal output
  - 3.2 Oil seal input
  - 3.3 O-Ring output
  - 3.4 O-Ring input
4. Input shaft
5. Output shaft

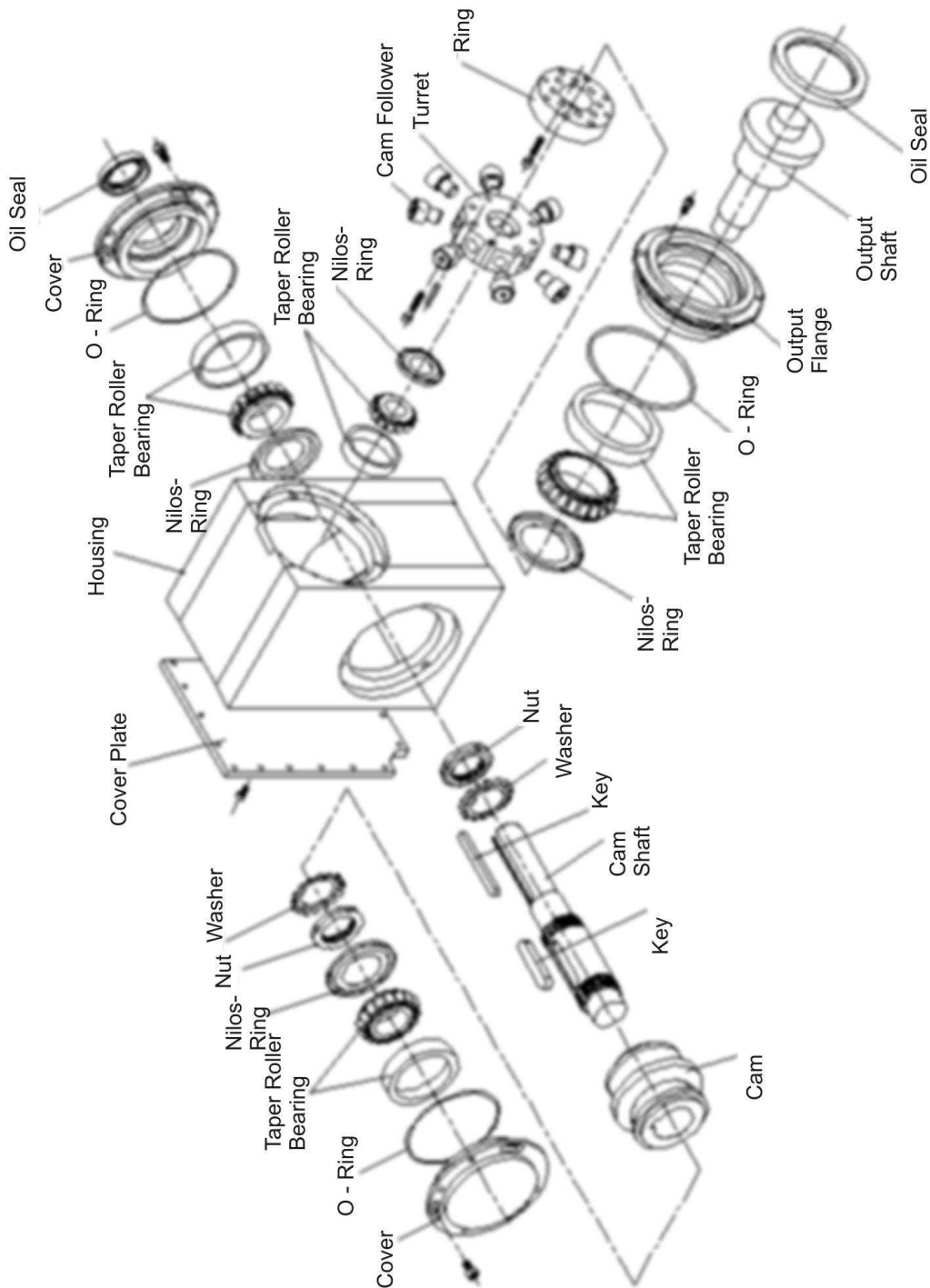


## 6.5 Spare part drawing (HSG / HTSG)

### HSG



## HTSG



## 7. Final remark

All repair work requires a certain amount of experience and should therefore be carried out by HEINZ fitters.

Address of HEINZ:

**HEINZ AUTOMATIONS-SYSTEME GmbH**  
Lilienthalstr. 21  
D-64625 Bensheim  
Tel.: 0049 (0)6251 / 1069-0  
Fax: 0049 (0)6251 / 1069-99  
[http://: www.heinz-automation.de](http://www.heinz-automation.de)  
E-Mail: [mail@heinz-automation.de](mailto:mail@heinz-automation.de)

**HEINZ GmbH**  
Kochhorstweg 33  
D-04910 Elsterwerda



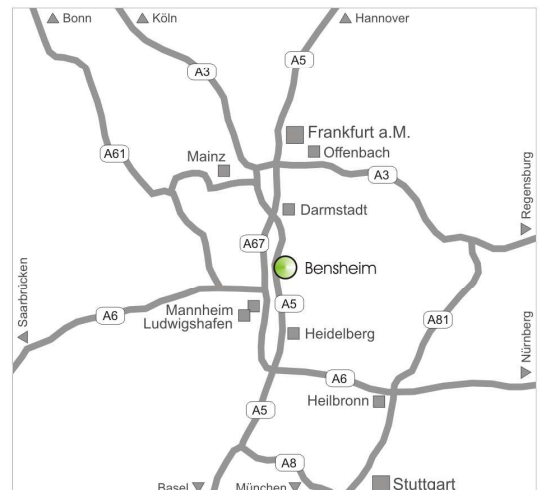
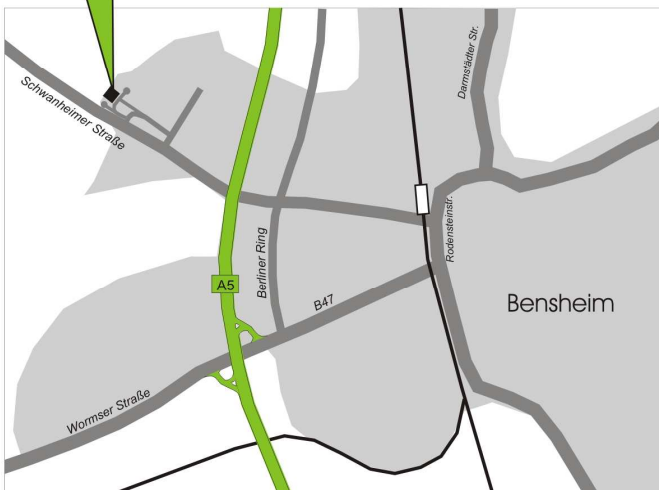
**HEINZ** QUALITÄT IN KURVEN  
AUTOMATIONS-SYSTEME GMBH

Lilienthalstraße 21 • D-64625 Bensheim

Telefon 49 - (0) 62 51 / 10 69-0

Telefax 49 - (0) 62 51 / 10 69-99

E-mail [mail@heinz-automation.de](mailto:mail@heinz-automation.de)  
[www.heinz-automation.de](http://www.heinz-automation.de)



**Lilienthalstrasse 21 - D-64625 Bensheim**

**Telefon +49(0)6251/1069-0 - Fax +49(0)6251/1069-99**