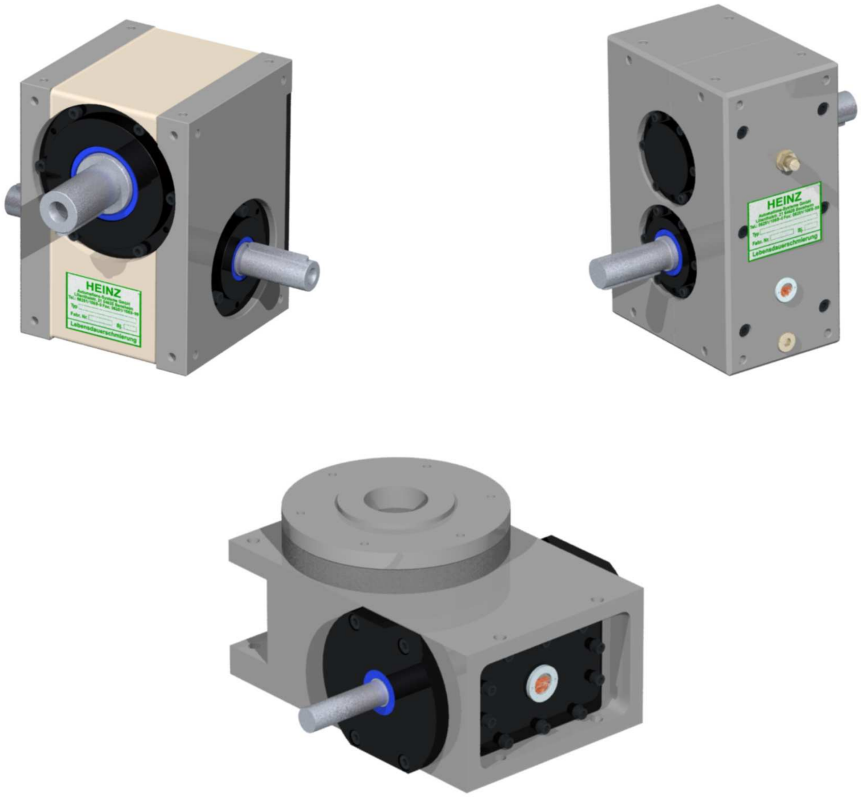
HEINZ AUTOMATIONS-SYSTEME GmbH

Operating Instructions

Globoidal indexing table



Type :

Serial No. :

Lilienthalstraße 21 - 64625 Bensheim - Telefon 06251/1069-0 - Fax 1069-99

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1. General

1.1 Scope of this Manual

This Operating Manual applies to a **H(T) Globoidal Indexing Table 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

Gear type	Housing	Weight with standard motor [kg]
H 700	Grey cast	44
H 1200	Grey cast	95
H 1300	Grey cast	120
H 1600	Grey cast	185
H 2000	Grey cast	240
HT 1500	Grey cast	173
HT 2400	Grey cast	420
HT 2500	Grey cast	420
HT 3000	Grey cast	800
SX 40	Grey cast	20
SX 60	Grey cast	40
SX 95	Grey cast	60

2. Information on the Use of the Indexers

2.1 Mounting Position

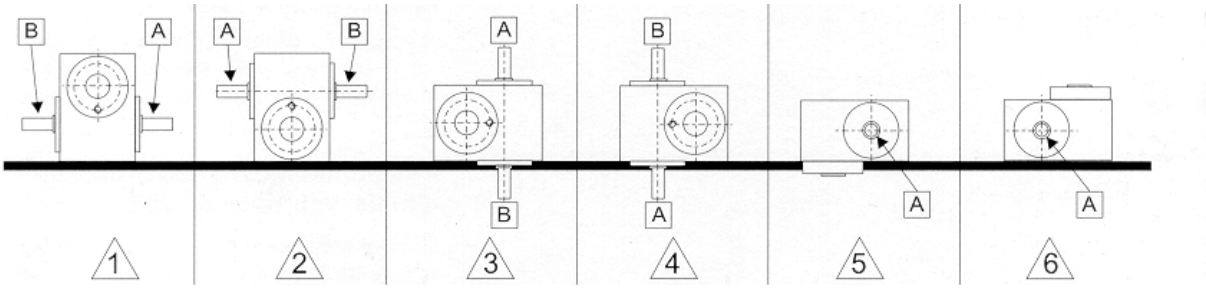
The universal design of these Indexers allows for virtually any mounting position on a machine or plant.

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.

Gear unit type	Oil qty. [L]	Gear unit type	Oil qty. [L]	Gear unit type	Oil qty. [L]
H 700	1,1	HT 1500	4,3	SX 40	0,5
H 1200	3,1	HT 2400	22,0	SX 60	1,8
H 1300	3,5	HT 2500	22,0	SX 95	3,0
H1600	5,5	HT 3000	35,0		
H 2000	8,0				

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.
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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
- 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 (replace defective bearings by 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

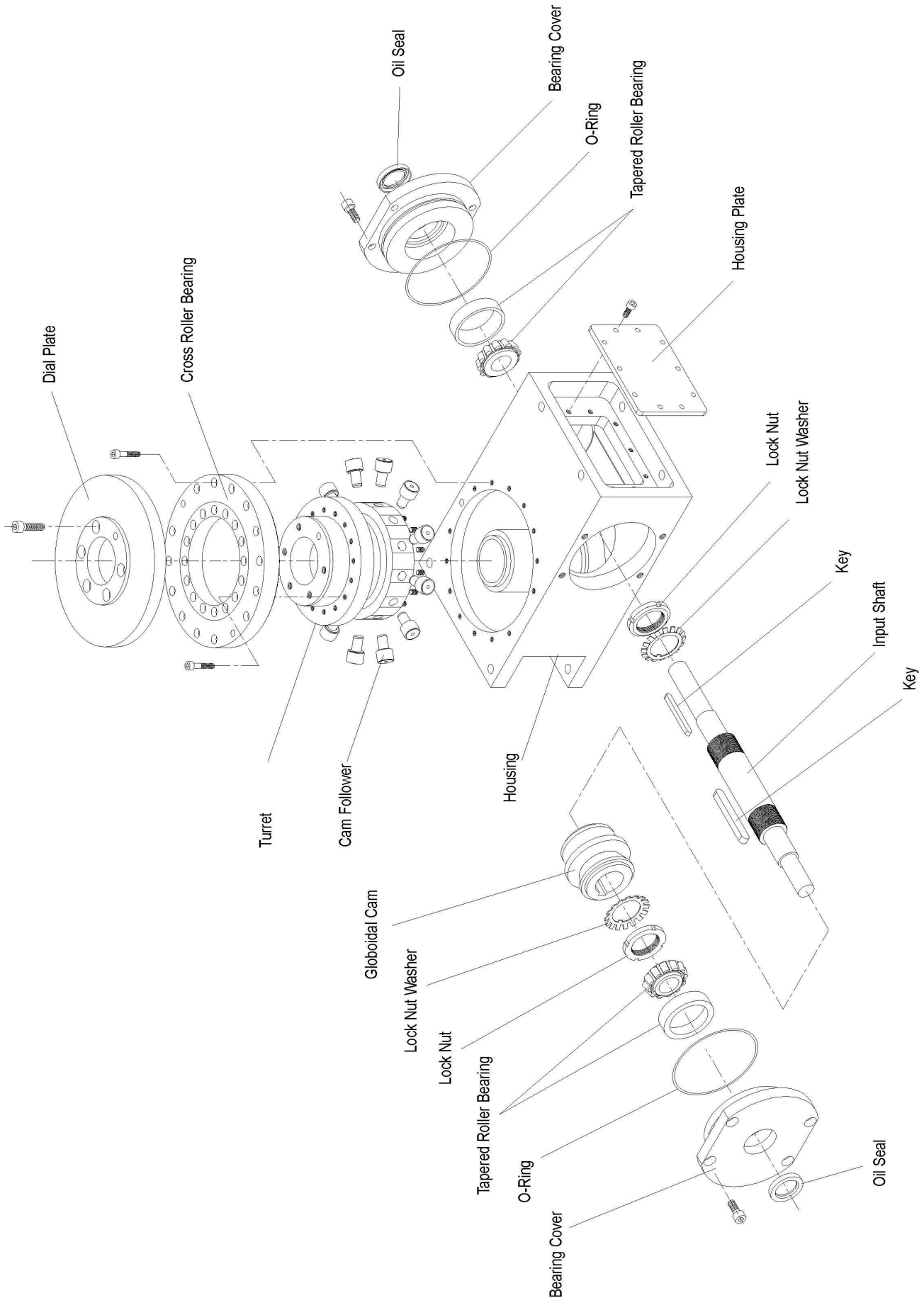
Please refer to chapter 6.2.1 to 6.2.3 for the instructions for disassembling and installation of the turret.

6.3 Tapered roller bearing

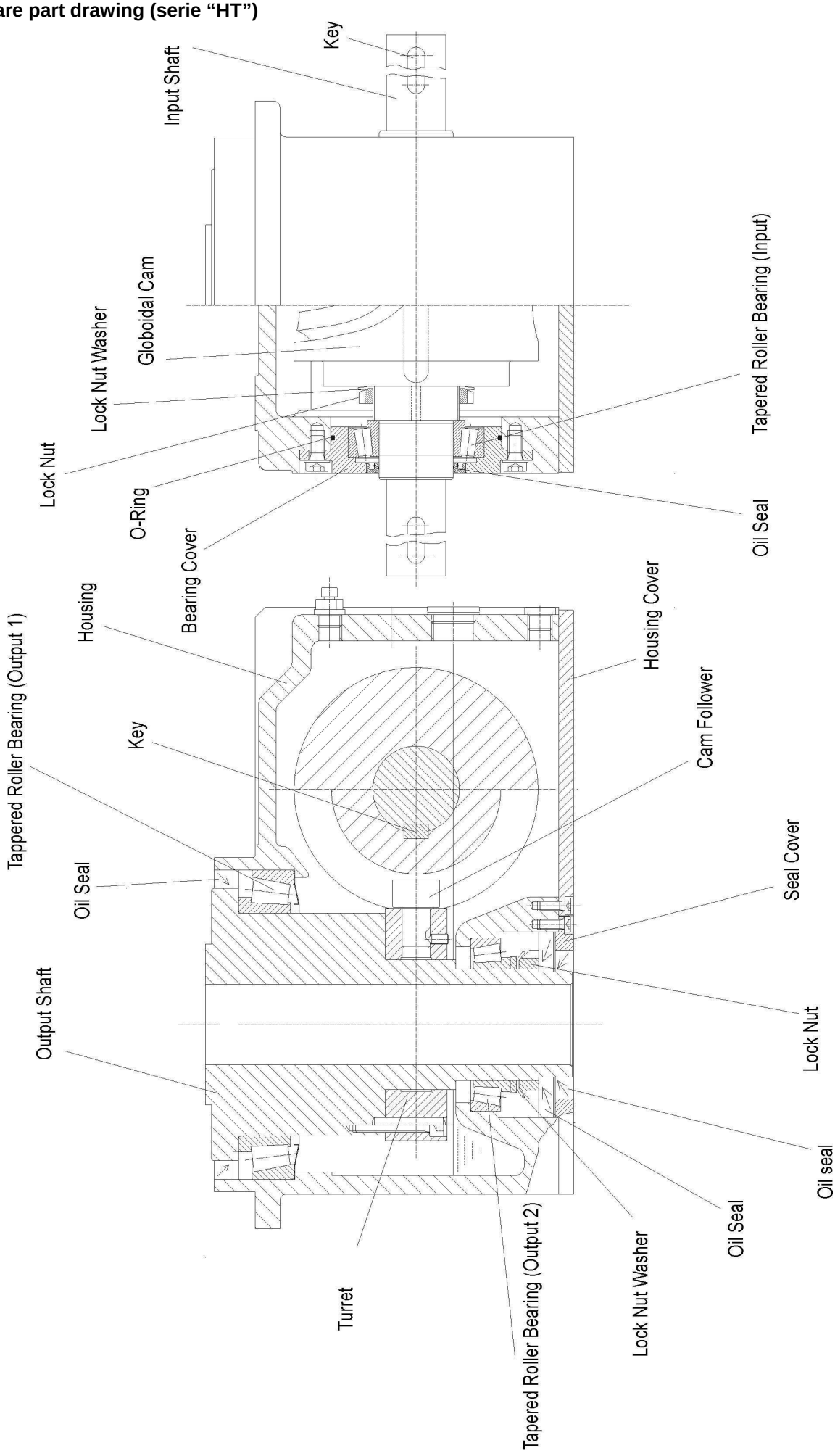
When installing new tapered roller bearings, it has to be observed that the bearings are adjusted free of play. If the backlash is to high or too low, this can be corrected by adjusting the housing cover or eccentric cover. Afterwards check the correct running of the mechanism by turning the input shaft,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

6.4 Spare part drawing

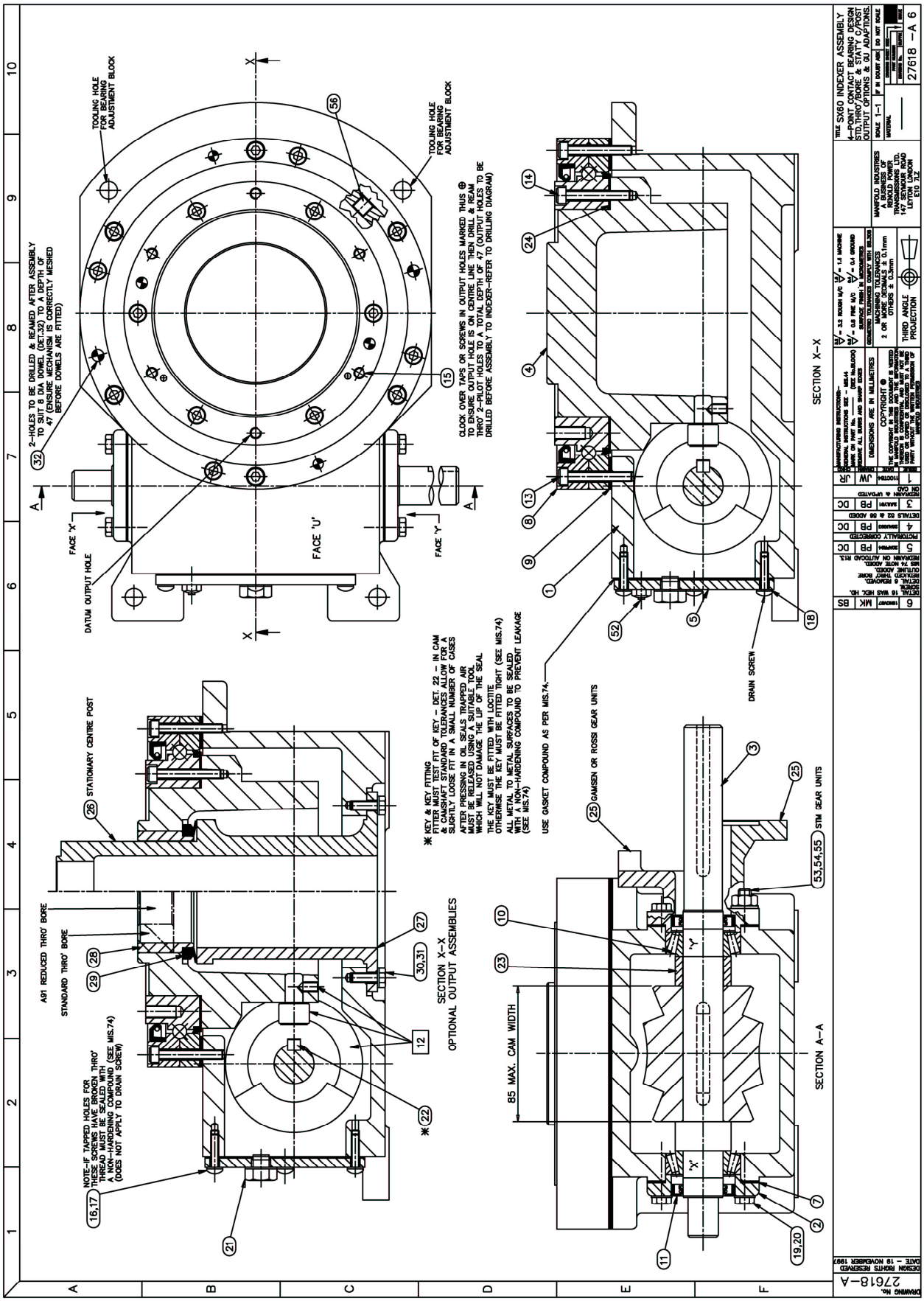
6.4.1 Spare part drawing (serie “H”)



6.4.2 Spare part drawing (serie “HT”)



6.4.3 Spare part drawing (serie “SX”)



6.5 Spare and wearing parts

6.5.1 Spare part drawing (serie “H”)

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

6.5.2 Spare part drawing (serie “HT”)

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

7. Final remark

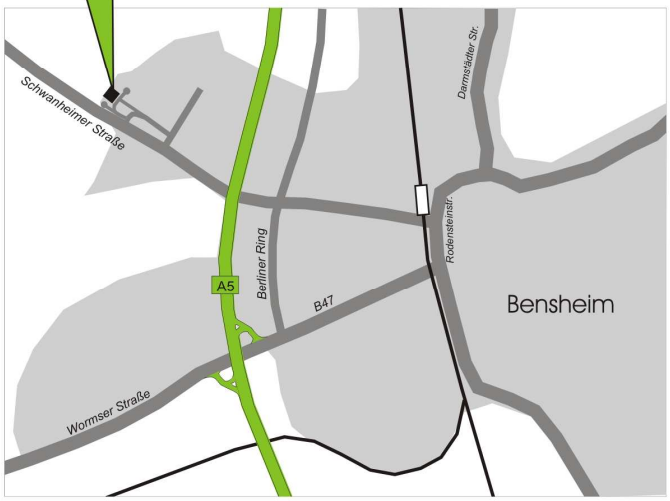
All repair work requires a certain amount of experience and should therefore be carried out by HEINZ fitters.

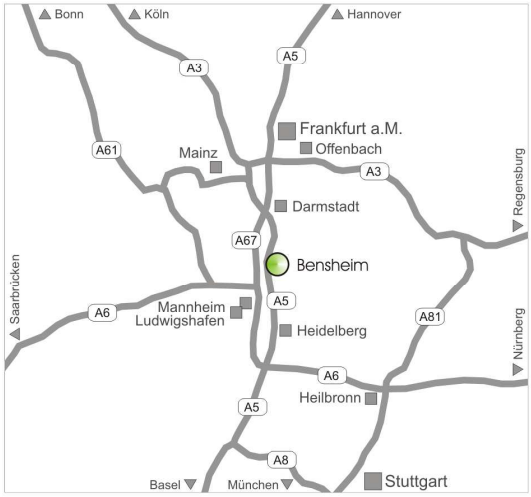
Address of HEINZ:

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
E-Mail: 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
www.heinz-automation.de





Lilienthalstrasse 21 - D-64625 Bensheim

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