



Lifting step gear  
PH  
Assembly instructions

Version 1.0  
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## Table of contents

|           |                                                              |           |
|-----------|--------------------------------------------------------------|-----------|
| <b>1</b>  | <b>About these instructions .....</b>                        | <b>3</b>  |
| 1.1       | Purpose .....                                                | 3         |
| 1.2       | Contact information .....                                    | 3         |
| 1.3       | Product designation .....                                    | 3         |
| 1.4       | Symbols .....                                                | 4         |
| <b>2</b>  | <b>Safety .....</b>                                          | <b>5</b>  |
| 2.1       | Safety instructions .....                                    | 5         |
| 2.2       | Warnings .....                                               | 5         |
| 2.3       | Requirements for personnel .....                             | 7         |
| 2.4       | Personal protective equipment .....                          | 7         |
| 2.5       | Requirements for incorporation into a complete machine ..... | 7         |
| <b>3</b>  | <b>Product description .....</b>                             | <b>8</b>  |
| 3.1       | Intended use .....                                           | 8         |
| 3.2       | Technical data .....                                         | 8         |
| 3.3       | Product overview .....                                       | 11        |
| <b>4</b>  | <b>Transport .....</b>                                       | <b>12</b> |
| 4.1       | Transport with slings .....                                  | 13        |
| <b>5</b>  | <b>Assembly .....</b>                                        | <b>14</b> |
| 5.1       | Attachment positions .....                                   | 14        |
| 5.2       | Drive attachment .....                                       | 15        |
| 5.3       | Setting the position cam .....                               | 16        |
| 5.4       | Installation .....                                           | 18        |
| <b>6</b>  | <b>Operation .....</b>                                       | <b>20</b> |
| 6.1       | Operating modes .....                                        | 20        |
| 6.2       | Cycle times .....                                            | 21        |
| <b>7</b>  | <b>Maintenance .....</b>                                     | <b>22</b> |
| 7.1       | Maintenance tasks .....                                      | 22        |
| 7.2       | Lubricating .....                                            | 22        |
| <b>8</b>  | <b>Troubleshooting .....</b>                                 | <b>24</b> |
| <b>9</b>  | <b>Disposal .....</b>                                        | <b>25</b> |
| <b>10</b> | <b>Spare and wear parts .....</b>                            | <b>26</b> |
| <b>11</b> | <b>Annexes .....</b>                                         | <b>27</b> |
| 11.1      | Content of the declaration of incorporation .....            | 27        |

## 1 About these instructions

### 1.1 Purpose

The aim of these assembly instructions is to provide the users with all the information necessary to be able to install the lifting step gear properly and safely in a complete machine.

### 1.2 Contact information

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### 1.3 Product designation

**Product designation:** Lifting step gear

**Product type:** PH

The following information relating to the machine can be found on the type plate:

- Type
- Code
- Serial number



Fig. 1: Example type plate

## 1.4 Symbols

The following symbols are used in these instructions:

### Instructions and directions

Requirements for performing an instruction are indicated by a check mark.

The action steps to be executed are numbered.

The results of individual action steps are indicated by a black arrow. The overall result of an instruction is marked by a white arrow in a black circle.

### Example

- ✓ Requirement
  - 1. Instruction (step 1)
  - 2. Instruction (step 2)
    - ⇒ Result or response of system to step 2
  - 3. Instruction (step 3)
- ➡ Overall result of the instruction

### Enumerations

Enumerations in no strict order are indicated as follows:

- Property A
  - Detail 1
  - Detail 2
- Property B
  - Detail 1
  - Detail 2

## 2 Safety

### 2.1 Safety instructions

#### General safety instructions

- Read the instructions in full
- Adhere to the information and instructions in this manual
- Keep unauthorised persons away from the working area
- Work on the electrical systems must only be carried out by qualified electricians
- Keep the manual safe in a place where it is accessible by all employees
- Adhere to the documentation for the externally supplied parts
- Wear the stipulated personal protective equipment

### 2.2 Warnings

#### 2.2.1 Structure of the warnings

All the warnings in these instructions have the following structure:

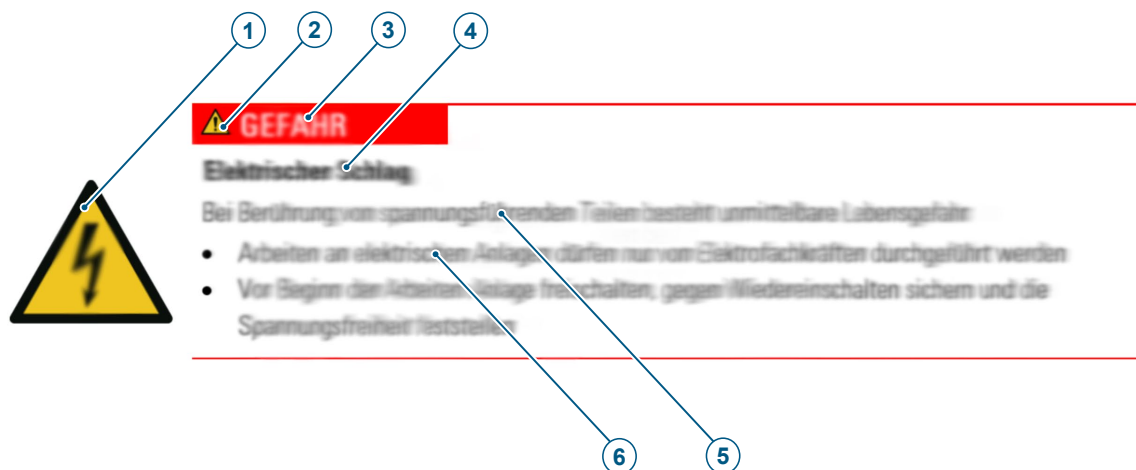


Fig. 2: Structure of the warnings

|   |                                         |   |                                 |
|---|-----------------------------------------|---|---------------------------------|
| 1 | Hazard-specific symbol                  | 2 | Hazard symbol                   |
| 3 | Signal word                             | 4 | Type and source of danger       |
| 5 | Possible consequences of non-observance | 6 | Procedure for hazard prevention |

## 2.2.2 Meanings of the signal words and symbols

The following signal words are used in this document:

| Signal word | Meaning                                                                                            |
|-------------|----------------------------------------------------------------------------------------------------|
| DANGER      | Indicates a hazardous situation which will result in death or serious injury.                      |
| WARNING     | Indicates a potentially hazardous situation which may result in death or serious injury.           |
| CAUTION     | Indicates a potentially hazardous situation which may result in minor or moderate injury.          |
| NOTICE      | Indicates a potentially hazardous situation which may result in property and environmental damage. |

The following symbols for dangers, warnings, mandatory requirements and prohibitions are used in this document:



General warning sign



Warning: Electrical voltage



Warning: Suspended load



Wear head protection



Wear eye protection



Wear foot protection



Wear hand protection

### **2.3 Requirements for personnel**

The activities described in these instructions may only be performed by qualified personnel.

Qualified personnel are persons who are able to carry out the work assigned to them due to their technical training, knowledge and experience. They are familiar with the relevant standards and regulations and are able to recognize potential hazards on their own.

### **2.4 Personal protective equipment**

Personal protective equipment is used to protect personnel from impairments to safety and health during work. Personnel must wear the personal protective equipment when performing all of the activities described in these instructions. The required personal protective equipment is indicated in the different chapters of these instructions.

### **2.5 Requirements for incorporation into a complete machine**

The lifting step gear is an incomplete machine. Operation of the lifting step gear is only permitted in a complete, CE-compliant machine or system.

The manufacturer of the complete machine or system is responsible for integrating the lifting step gear into the system in such a way that completely safe operation is guaranteed.

### 3 Product description

#### 3.1 Intended use

The machine is intended for installation in a surrounding structure in which the machine is integrated into an overall system. The machine is controlled by the overall system. The functions of the safety devices are also connected to the machine by the controller. The machine must only be operated within a CE-compliant system.

Intended use of the type PH lifting step gear is lifting and rotating loads.

Any types of use which differ from the intended use, are considered improper use. These include:

- Use outside of the permitted operating limits
- Use with food products
- Use of aggressive materials (e.g. acids)
- Transporting with fastening equipment and fastening points other than those recommended.

The manufacturer is not liable for any resultant damage. Intended use also includes adhering to all the specifications in these instructions.

#### 3.2 Technical data

##### 3.2.1 Operating conditions

|                        |                                   |
|------------------------|-----------------------------------|
| Area of application    | indoors                           |
| Temperature range [°C] | +10 to +40                        |
| Relative humidity [%]  | 40 to 70                          |
| Media                  | do not expose to aggressive media |

##### 3.2.2 Storage conditions

|                           |                                         |
|---------------------------|-----------------------------------------|
| Area of application       | indoors                                 |
| Lighting [Lux]            | Min. 300                                |
| Temperature range [°C]    | -22 to +50                              |
| Relative humidity [%]     | 40 to 70                                |
| Media                     | do not expose to aggressive media       |
| Storage period > 6 months | provide additional corrosion protection |

##### 3.2.3 Noise emission

The direct noise emission caused by the machine depends on the ambient conditions. Further sound pressure measurements derived from these conditions must be carried out at the location for installation of the machine.

Product description

3.2.4 Dimensions

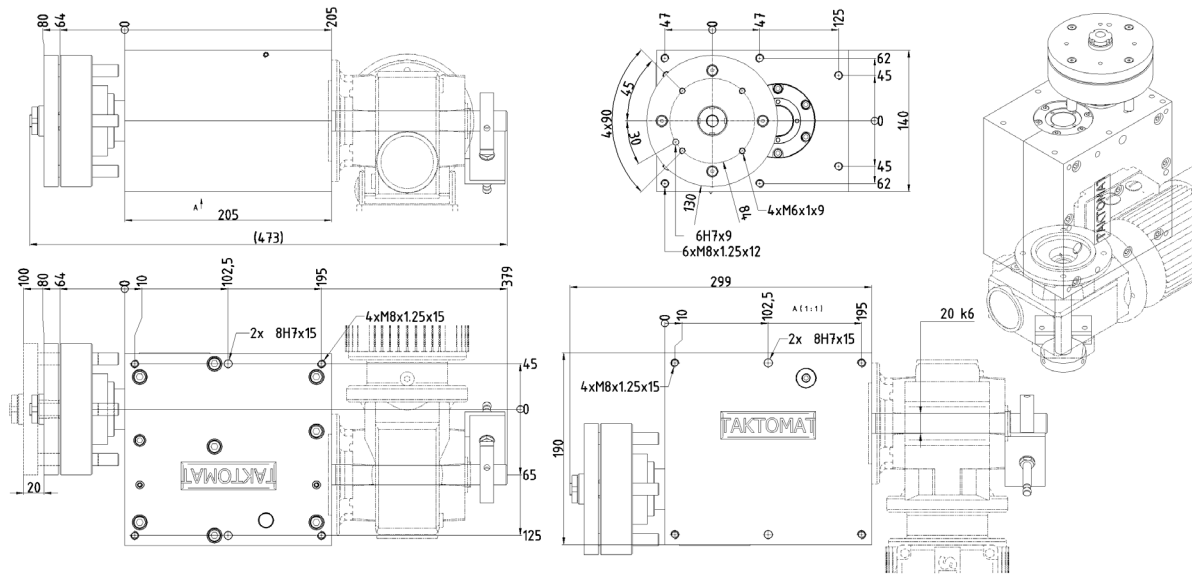


Fig. 3: Dimensional drawing of the PH 065 lifting step gear

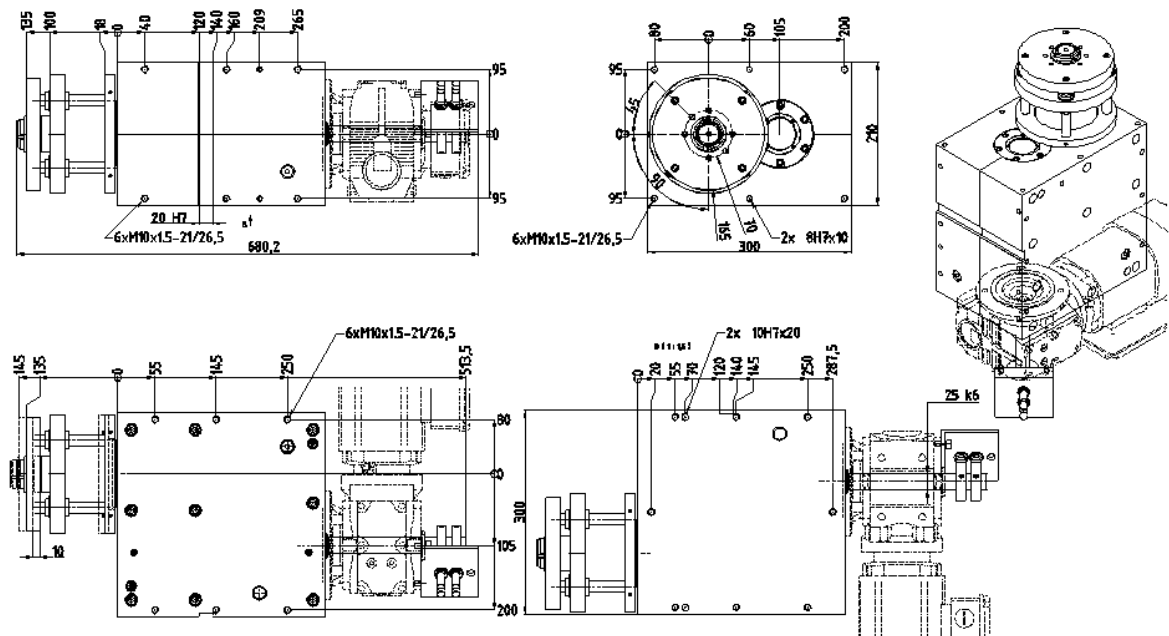


Fig. 4: Dimensional drawing of the PH 105 lifting step gear

| <b>Main dimensions</b>                   |             |                                |                                |
|------------------------------------------|-------------|--------------------------------|--------------------------------|
| <b>Model</b>                             |             | <b>PH065</b>                   | <b>PH105</b>                   |
| <b>Designation</b>                       | <b>Unit</b> | <b>Value</b>                   |                                |
| Length × Width × Height                  | [mm]        | 299 × 190 × 140                | 454 × 300 × 210                |
| Stroke min. – max., specific to device   |             | 0 – 40                         | 0 – 80                         |
| Index angle max.                         | [°]         | 180                            | 180                            |
| Oscillation angle max.                   | [°]         | 90                             | 90                             |
| Weight without drive and options approx. | [kg]        | ~17                            | ~65                            |
| <b>Default transmission</b>              |             |                                |                                |
| Direction of movement                    |             | CW, ACW, oscillating           | CW, ACW, oscillating           |
| Installation position                    |             | Vertical, horizontal, inverted | Vertical, horizontal, inverted |

| <b>Tolerances</b>                    |             |              |              |
|--------------------------------------|-------------|--------------|--------------|
| <b>Model</b>                         |             | <b>PH065</b> | <b>PH105</b> |
| <b>Designation</b>                   | <b>Unit</b> | <b>Value</b> |              |
| Axial run-out at output flange -Ø ±  | [mm]        | 0.15         | 0.15         |
| Radial run-out at output flange -Ø ± | [mm]        | 0.1          | 0.1          |

### 3.3 Product overview

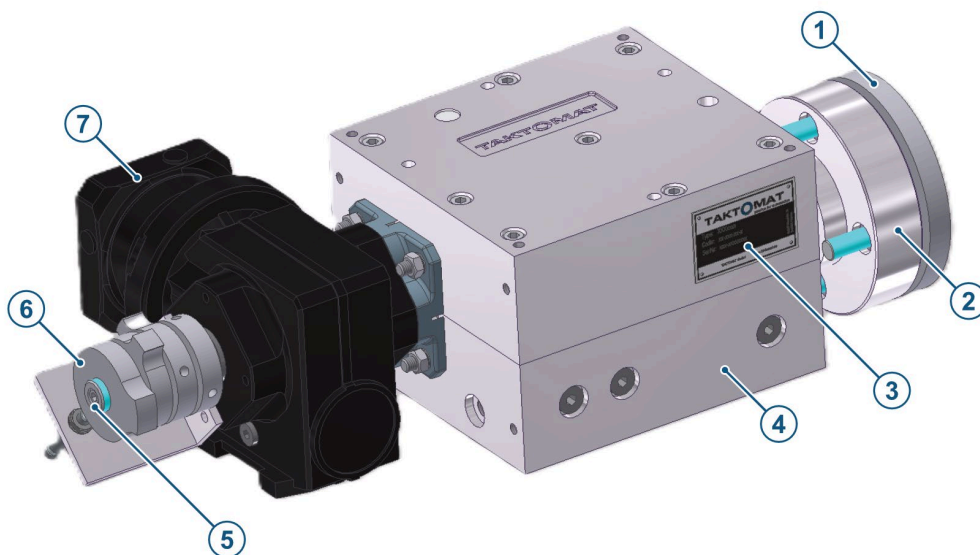


Fig. 5: Construction of the PH lifting step gear

|   |                     |   |               |
|---|---------------------|---|---------------|
| 1 | Output flange       | 2 | Bearing block |
| 3 | Type plate          | 4 | Housing       |
| 5 | Input shaft (drive) | 6 | Position cam  |
| 7 | Gear unit           |   |               |

#### Function

The power flow is transmitted to the input shaft either from a three-phase A.C. motor with brake via a worm gear, or from a chain wheel or belt pulley. The cylinder cam and the flat cam gear are positively (rigidly) mounted on the input shaft. A uniform radial movement is converted into an stepped and uniform output and lifting motion.

The duration and stroke of the lifting movement are controlled by the cylinder cam. The cylinder cam converts the radial movement into a linear movement via a cam follower onto the lifting lever.

The indexing condition is implemented via the flat cam set on the roller star, which is connected via the lifting shaft. The roller star is rigidly mounted with spindle bearings for zero clearance. Shaft seals corresponding to the respective size seal the PH lifting step gear internally and externally.

The bearing block supports the output flange and transmits the rotary movement onto the output flange. The attachments are fastened to the output flange.

The switching cam indicates the respective position of the cylinder cam and the flat cam. The zero position/initial position is the centre of the dwell on the switching cam.

The lifting step gear is installed in the housing. The type plate is attached to the housing. Several processes can be initiated via the wiring and the switching cams.

## 4 Transport

Required personal protective equipment



### **WARNING**

#### **Tipping or falling loads**



Suspended loads can tip or fall down. This can cause serious or fatal injuries to persons.

- Do not step under suspended loads
- Keep unauthorized persons out of the danger zone
- Observe the weight and centre of gravity
- Only use suitable, approved and undamaged load handling attachments

### **NOTICE**



#### **Damage to components**

Improper transport can cause material damage

- Carry out transport carefully and note the symbols on the packaging
- Align the lifting eyes in the direction of the load
- Follow the operating instructions for the lifting gear

Check the delivery immediately on receipt for completeness and transport damage.

In the event of externally visible transport damage, observe the following:

- Do not accept the delivery or accept it only with reservations
- Note the extent of the damage on the transport documents or on the transport delivery note
- Report material damage to the manufacturer immediately

## 4.1 Transport with slings

Attach the lifting equipment to the fastening points as shown below, and make sure they are functioning properly.

The angle between the perpendicular and the chain sling or sling strap must be between 0 and 45°.

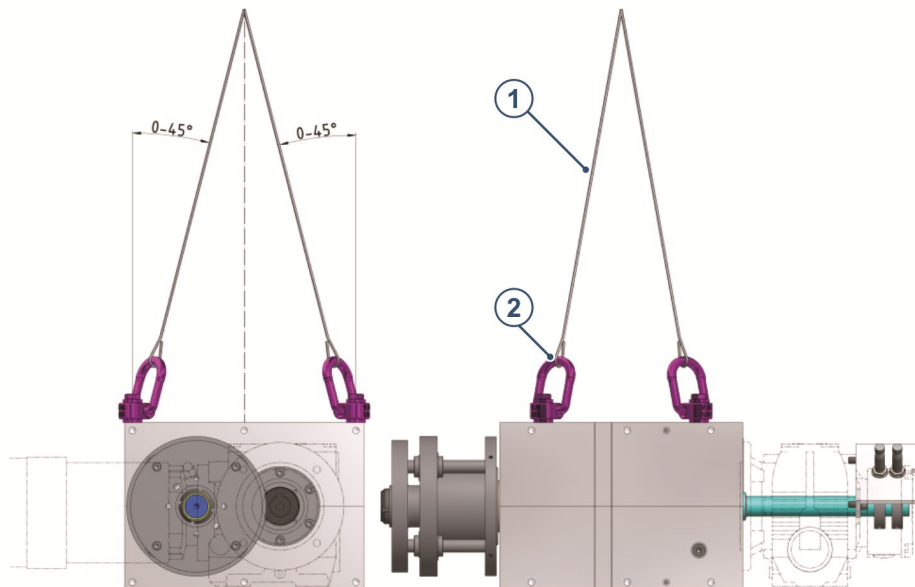


Fig. 6: Lifting instructions, fastening points and lifting equipment, PH 065 – PH 105

1 Sling chain

2 Lifting equipment

### Screw connection points thread table

For the type PH lifting step gear, the fastening equipment is equipped with the appropriate thread. Refer to the dimension sheet in the technical data for the thread size.

### Recommended lifting equipment

| Type   | Quantity | Lifting equipment | Screw size |
|--------|----------|-------------------|------------|
| PH 065 | 4        | VLBG              | M8         |
| PH 105 | 4        | VLBG              | M10        |

## 5 Assembly

Required personal protective equipment



### **DANGER**

#### **Electric shock**



Touching live parts poses an immediate danger to life

- Work on the electrical systems must only be carried out by qualified electricians
- In case of damage to the insulation, switch off the power supply immediately and have repairs carried out
- Before starting work, disconnect the system, secure it to prevent it from being switched back on, and make sure that it free from voltage

### **WARNING**



#### **Crushing during assembly and dismantling**

Persons within the work area of the rotary indexer can be crushed during assembly and dismantling.

- Wear suitable personal protective equipment.
- The assembly and dismantling may only be carried out by instructed skilled personnel.

### 5.1 Attachment positions

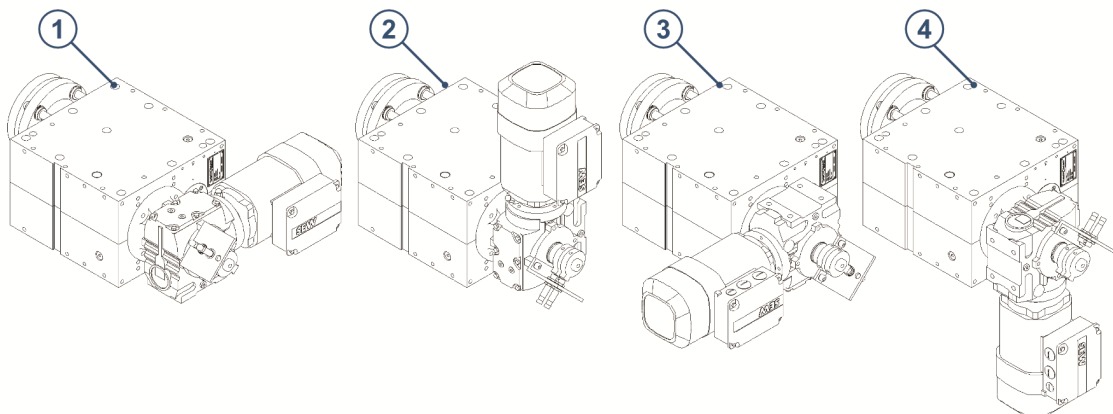


Fig. 7: Attachment positions, examples for complete drive for PH lifting step gear

|   |       |   |       |
|---|-------|---|-------|
| 1 | SLO   | 2 | SL90  |
| 3 | SL180 | 4 | SL270 |

The drive must be fastened using the designated screw connection points. The type of drive, e.g. a servomotor or three-phase A.C. motor, must be agreed with TAKTOMAT GmbH.

An intermediate flange between the drive and housing is available on request from TAKTOMAT GmbH.

The input shaft must not be reworked. The diameter and length of the hollow shaft of the drive are determined by the dimensions of the input shaft (refer to the dimension sheet for data).

## 5.2 Drive attachment

### NOTE

#### Damage to components



- Improper attachment of the drive can cause material damage.
- The type of drive, e.g. a servomotor or three-phase AC motor, must be agreed with TAKTOMAT.
- When attaching the drive, observe the manufacturer's operating instructions.
- The oil level check and drain plugs and the vent valves must be freely accessible.
- Observe the mounting positions of the drive.
- Fasten the drive at the designated mounting points.
- Tighten the screws to the specified torque.

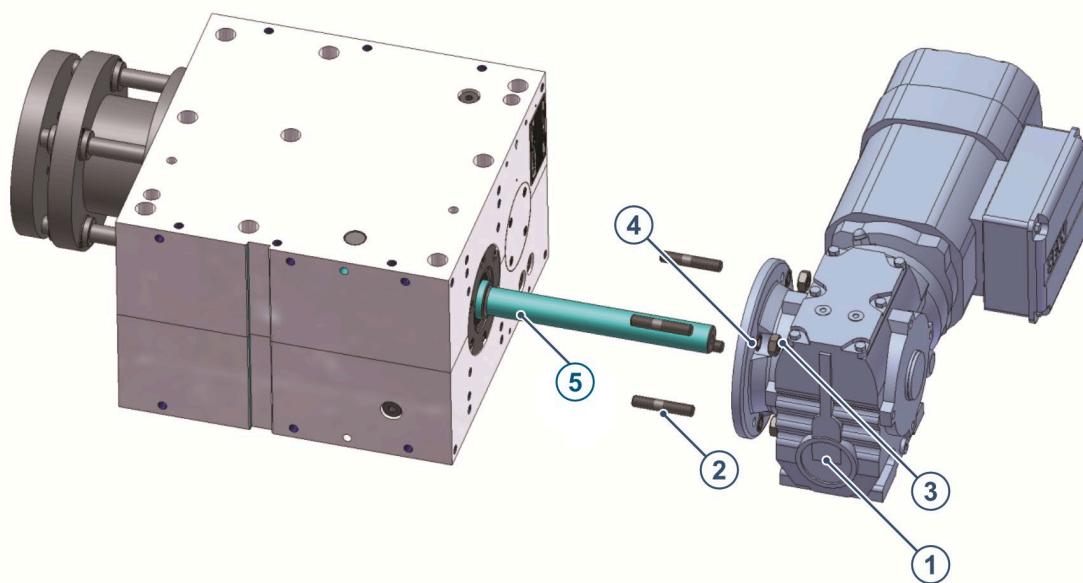


Fig. 8: Attachment of the complete drive with cast iron drive flange

|   |                                                    |   |                     |
|---|----------------------------------------------------|---|---------------------|
| 1 | Complete drive                                     | 2 | Stud                |
| 3 | Nut                                                | 4 | Schnorr lock washer |
| 5 | Input shaft, area to be coated with assembly fluid |   |                     |

Aids:

- Allen key
- Ring spanner
- Open-end spanner
- Torque wrench

1. Degrease the input shaft using a commercially solvent.
2. Apply a suitable assembly fluid (e.g., NOCO® Fluid) to the area marked (5).
3. Refer to the manufacturer's data for the mounting position of the complete drive (1). Push the complete drive with the drive flange in the specified mounting position onto the input shaft so that the drive flange rests flush against the housing.
4. Secure the drive flange in the housing with studs (2) using a torque wrench in accordance with the torque table.
5. Secure the drive flange on the studs (2) with nuts (3) and Schnorr washers (4) in a diagonal sequence using a torque wrench in accordance with the torque table.

### 5.3 Setting the position cam

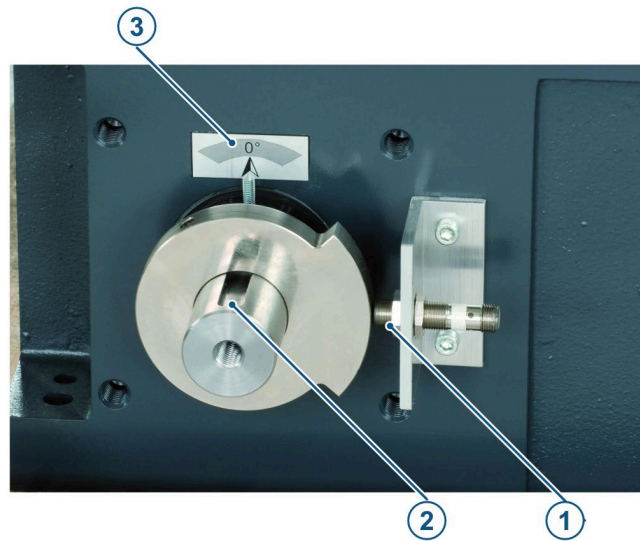


Fig. 9: Detail of the position cam

|   |                                                                                                                                             |   |                            |
|---|---------------------------------------------------------------------------------------------------------------------------------------------|---|----------------------------|
| 1 | Centre of the switching lug on the sensor                                                                                                   | 2 | Correctly set position cam |
| 3 | Sticker (The area with of the sticker with a grey background has symbolic meaning only and does not indicate the length of the dwell phase) |   |                            |

The position cam is secured on the drive shaft by two screws on the face. It is correctly set when the keyway of the drive shaft points to the zero mark of the sticker (2) and the centre of the switching lug is aligned with the sensor (1).

### 5.3.1 Minimising loss times

Depending on the speed of the machine, the dwell phase can range from a few hundredths to several tenths of a second.

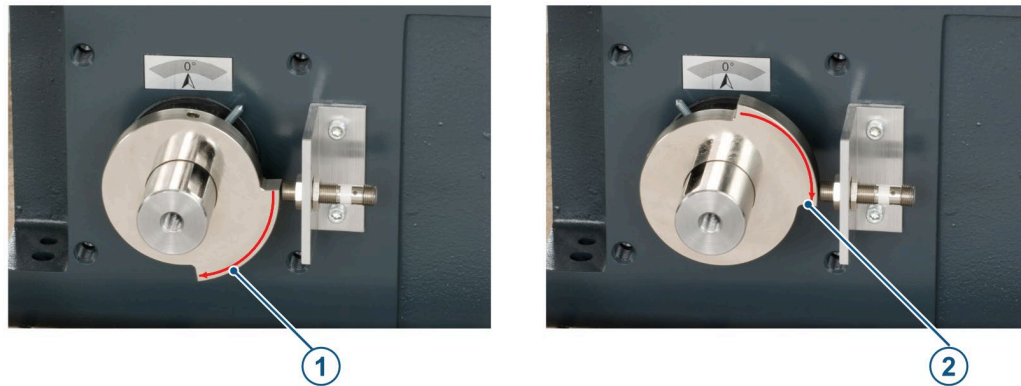


Fig. 10: Detail of time-delayed shut-off

- |                                                              |                                                                                       |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <p>1 Ideal stopping point at the end of the position cam</p> | <p>2 Immediate stop after detection of the rising edge on the position cam sensor</p> |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------|

Time-optimal machine control means starting the external processing operations immediately at the beginning of the dwell phase (rising edge on the position sensor) and allowing the motor run for a short time further so that it comes to a stop just before the end of the dwell phase (**1**). No time is required in the next cycle.

To do so, either a second switching cam or the TAKTOMAT TIC universal controller is required.

If the drive is stopped immediately at the beginning of the dwell phase, the time required for the drive to pass through the remaining dwell phase is lost in the subsequent cycle.

## 5.4 Installation

### **⚠ DANGER**

#### **Electric shock**



Touching live parts poses an immediate danger to life

- • Work on the electrical systems must only be carried out by qualified electricians
- • In case of damage to the insulation, switch off the power supply immediately and have repairs carried out
- • Before starting work, disconnect the system, secure it to prevent it from being switched back on, and make sure that it free from voltage

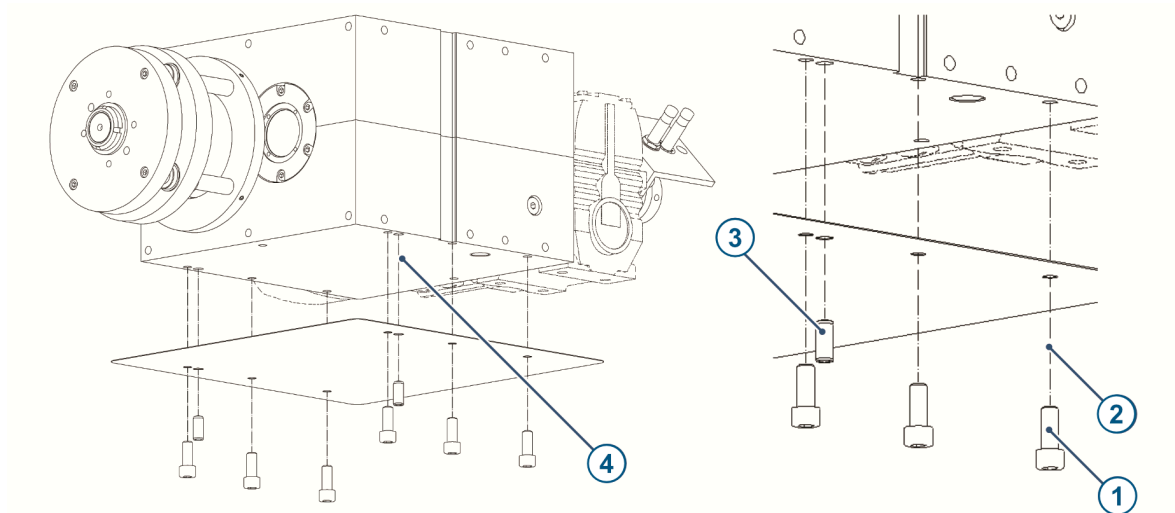


Fig. 11: Attachment side, side 6, PH 065 – PH 105 lifting step gear

|   |                             |   |                     |
|---|-----------------------------|---|---------------------|
| 1 | Cylinder head screw DIN 912 | 2 | Schnorr lock washer |
| 3 | Dowel pin ISO 8735          | 4 | Attachment side     |

#### **Screw connection points**

Holes with a suitable diameter are provided for fastening the lifting step gear. Refer to the table or dimension sheet in the technical data for the size of the fastening equipment.

| Type   | Item | Designation                 | Quantity | Size        |
|--------|------|-----------------------------|----------|-------------|
| PH 065 | 10   | Cylinder head screw DIN 912 | 4        | M8 × 40     |
|        | 20   | Schnorr lock washer         | 4        | 8           |
|        | 30   | Dowel pin ISO 8735          | 2        | 8 × 30 - A  |
| PH 105 | 10   | Cylinder head screw DIN 912 | 6        | M10 × 40    |
|        | 20   | Schnorr lock washer         | 6        | 10          |
|        | 30   | Dowel pin ISO 8735          | 2        | 10 × 30 - A |

- ✓ The mounting surface must be even.
- 1. Clean the mounting surface.
- 2. Place the lifting step gear on the mounting surface.
- 3. Fasten the lifting step gear in accordance with the requirements with dowel pins and screws using the torque spanner as per the tightening torque table.
- 4. Compare the supply voltage with the data on the rating plate.
- 5. Connect the drive unit.
- 6. Earth the housing of the lifting step gear with sufficient cross section.

**Tightening torque in aluminium for fastening screws**

| Thread/screw size | Unit | Tightening<br>±10% strength class 8.8 | torque | Tightening<br>±10% strength class 10.9 | torque |
|-------------------|------|---------------------------------------|--------|----------------------------------------|--------|
| M4                | [Nm] |                                       | 2.6    |                                        | —      |
| M5                | [Nm] |                                       | 5.0    |                                        | —      |
| M6                | [Nm] |                                       | 8.6    |                                        | —      |
| M8                | [Nm] |                                       | 21.0   |                                        | —      |
| M10               | [Nm] |                                       | 40.8   |                                        | —      |
| M12               | [Nm] |                                       | 71.4   |                                        | —      |

## 6 Operation

### NOTICE

**Improper activation can cause material damage**

- Inching mode is not permitted without a suitable universal controller (TIC)
- Use a suitable universal controller (TIC)

### General requirements for operation

Operation of the lifting step gear is only permitted in a complete, CE-compliant machine or system.

The lifting step gear must not be operated with defective or disabled safety equipment.

### 6.1 Operating modes

The lifting step gear is designed for different operating modes. These operating modes must be implemented using an external controller.

#### Normal mode

Normal mode is defined as indexing the roller star/output flange in one direction from one position to the next. The direction of rotation of the roller star/output flange is determined by the direction of rotation of the drive. It can be easily reversed with a three-phase A.C. motor by reversing two phases of the supply voltage.

#### Intermittent mode

The drive shaft stops in the dwell phase. The step time is fixed. The dwell time is variable. This operating mode is used in systems with significantly longer processing times than indexing times, and is the most common operating mode.

#### Continuous mode

The machine runs continuously without stopping the motor. Indexing and dwell times are fixed and processed evenly. The drive motor has only one direction of rotation. This operating mode is frequently used in high-speed systems with short processing times. The machine is synchronized mechanically to the rest of the system via the free drive shaft. The ratio of dwell to step time can be adjusted within certain limits by TAKTOMAT when the cam is manufactured.

#### Reversing mode (reciprocating mode)

The drive of the machine is reversed during the respective dwell phase. In this operating mode, the roller star/output flange oscillates continuously back and forth between two positions.

#### Inching mode

In inching mode, the roller star/output flange moves in small steps between two dwell positions. The cylinder cam is unable to accelerate or decelerate the accumulated load gently. This creates a stress situation for the hardware as the accelerations occurring during inching mode exceed those of normal operation many times over. Inching mode must not be initiated without a suitable universal controller which enables smooth acceleration and braking of the load outside the dwell phase which is gentle on the gear unit.

#### Emergency stop

The emergency stop is comparable with stopping in inching mode. In this case too, the attached load is stopped and restarted outside the dwell phase. Frequent emergency stop situations must be avoided.

## 6.2 Cycle times

A complete cycle of the lifting step gear consists of indexing the output shaft/roller star from one dwell position to the next. The cycle time is made up of the step time and the dwell time. The step time corresponds to the index angle of the cam, and the dwell time corresponds to the angle without any change in radius on the control cam.

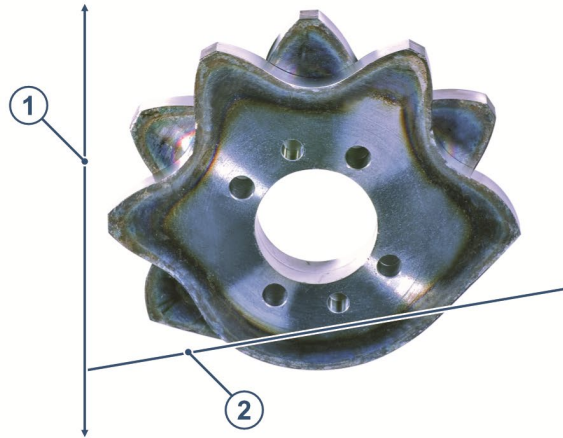


Fig. 12: Flat cam set (indexed rotary movement) dwell and step phase

1 Step phase

2 Dwell phase



Fig. 13: 0° cam pitch

1 0° cam pitch = dwell phase

## 7 Maintenance

Required personal protective equipment



### CAUTION

#### **Harmful substances**

Lubricants can cause health damage

- When using lubricants, note the information in the safety data sheets

### 7.1 Maintenance tasks

#### 7.1.1 Maintenance schedule

| Interval    | Activity                                                                                                                                                  | Personnel           |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| Daily       | General visual inspection and check for noises                                                                                                            | Operator            |
| Quarterly   | Check the PH lifting step gear for oil leaks                                                                                                              | Operator            |
| Half-yearly | Check for damage (visual inspection)<br>Remove dust deposits (especially on the ventilation grille of the drive unit)<br>Check electric cables for damage | Qualified personnel |
| Annually    | Check the PH lifting step gear for clearance in the dwell positions                                                                                       | Qualified personnel |

### 7.2 Lubricating

#### 7.2.1 Lubricant requirements

##### **General**

Careful lubrication is necessary to ensure operating reliability and a long service life of the incomplete machine. All lubricating points must be supplied with the specified oils and greases.

Clean soiled lubricating points carefully with petroleum or an appropriate means and then lubricate with new lubricant. After lubricating, the surplus lubricant must be removed and disposed of properly.

**NOTE****Component damage due to unsuitable lubricants**

Mixing greases with different bases leads to gumming and decomposition of the greases and cancels the lubricating effect.

- Use lithium-saponified grease only for relubricating

**Lubricating oils**

Only use lubricating oils to DIN 51 517 (ISO VG 460).

**Recommended gear oils**

| Manufacturer  | Designation             |
|---------------|-------------------------|
| Mobil         | Mobilgear 600 XP 460    |
| BP            | Energol GR-XP 460       |
| SHELL         | Omala 460               |
| LIQUI MOLY    | meguin CLP 460 gear oil |
| Zeller+Gmelin | Divinol ICL ISO 460     |
| Klüber        | Klüberoil GEM 1 N       |

**Lubricating greases**

Only use lubricating greases to DIN 51 825-KP 2K.

**Recommended grease**

| Manufacturer | Designation        | Specification |
|--------------|--------------------|---------------|
| Mobil        | Mobilux EP2        | KP2 K-30      |
| BP           | Energrease LS-EP 2 | KP2 K-20      |
| Aral         | Aralub HLP 2       | KP2 N-30      |
| Fuchs-DEA    | Renolit MP         | KP2 K-40      |
| Klüber       | Centoplex 2        | KP2 K-20      |
| SHELL        | Alvania G2         | KP2 K-20      |

**7.2.2 Overview of relubrication quantities**

| Product | Relubrication quantity |
|---------|------------------------|
| PH065   | Lifetime lubrication   |
| PH105   | Lifetime lubrication   |

## 8 Troubleshooting

### **DANGER**

#### **Electric shock**



Touching live parts poses an immediate danger to life

- Work on the electrical systems must only be carried out by qualified electricians
- In case of damage to the insulation, switch off the power supply immediately and have repairs carried out
- Before starting work, disconnect the system, secure it to prevent it from being switched back on, and make sure that it is free from voltage

### **WARNING**



#### **Risk of injury as a result of improper fault clearance**

Improper fault clearance can lead to severe personal injury or material damage.

- Before starting work, make sure there is sufficient installation space
- Make sure the installation site is clean and tidy

| Fault                                                                                                   | Possible cause                                                                                                                          | Remedy                                                                                                   |
|---------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| Motor not running                                                                                       | No supply voltage<br>Motor contactor faulty<br>Motor protection switch tripped<br>Brake not open<br>Brake connected incorrectly or worn | Check the voltage<br>Replace the motor contactor<br>Let the motor cool down and engage the switch        |
| The motor is running but the rotary indexer does not turn and the output flange has <u>no</u> clearance | External gear unit faulty<br>Safety clutch overload / disengaged                                                                        | Remove the external blockage/engage the safety clutch<br>Contact TAKTOMAT GmbH                           |
| The motor is running but the rotary indexer does not turn and the output flange has clearance           | Cam follower ripped off by major overload                                                                                               | Contact TAKTOMAT GmbH                                                                                    |
| The motor runs with loud humming noises                                                                 | Motor runs on 2 phases only                                                                                                             | Check fuses or drive contactor<br>Measure current in all 3 phases (voltage measurement is not enough)    |
| The PH lifting step gear does not perform a stroke                                                      | The clamping set slips<br>Cam follower broken due to overload<br>Lever broken due to overload                                           | Re-adjust the clamping set in accordance with the manufacturer's specifications<br>Contact TAKTOMAT GmbH |

## 9 Disposal

Required personal protective equipment



### DANGER

#### Electric shock



Touching live parts poses an immediate danger to life

- • Work on the electrical systems must only be carried out by qualified electricians
- • In case of damage to the insulation, switch off the power supply immediately and have repairs carried out
- • Before starting work, disconnect the system, secure it to prevent it from being switched back on, and make sure that it free from voltage

### NOTICE



#### Environmental damage

Improper disposal may result in environmental damage

- Dispose of components and operating materials in accordance with local regulations
- Observe the safety data sheets of the operating materials

### Materials used

The components are mainly made of the following materials:

- Copper (complete drive units, electrical cables)
- Steel and grey cast iron ( housings, attachments, shafts, bearings)
- Plastic (toothed belt, insulation, bearing)

### Preparation for disposal

1. Disconnect the system from all power supplies and secure it against being switched on again.
2. Wait 15 minutes until all live components are completely discharged.
3. Disassemble and dispose of assemblies and components in accordance with local environmental regulations.

## 10 Spare and wear parts



### NOTICE

**The use of unsuitable spare parts may result in material damage**

Spare parts must comply with the technical requirements specified by the manufacturer

- Only use original spare parts
- Check spare parts for faults or defects prior to installation

Spare and wear parts are always order-specific. A corresponding spare and wear parts list is available from TAKTOMAT on request. When ordering spare parts, always state the serial number. The serial number is located on the nameplate.

## 11 Annexes

### 11.1 Content of the declaration of incorporation

(The original declaration of incorporation is included in the documentation)

**Translation of the original declaration of incorporation  
(in German) for partly completed machinery  
(Machinery Directive 2006/42/EC, Annex II 1 B)**



**Manufacturer:**

TAKTOMAT GmbH  
 Rudolf-Diesel-Straße 14  
 D-86554 Pöttmes

**Description and identification of the partly completed machinery:**

Your order No.: -  
 Our order No.: -  
 Product: Lifting step gear  
 Type: PH  
 Serial number: -  
 Commercial name: Lifting step gear PH

**The manufacturer declares that the following essential requirements of the Machinery Directive 2006/42/EC have been applied and met:**

1.1.2, 1.1.3, 1.1.5, 1.3.2, 1.3.3, 1.3.4, 1.3.7, 1.5.3, 1.5.4, 1.6.1, 1.6.4, 1.7.1, 1.7.4

Reference of the applied harmonised standards according to Article 7 Section 2:

EN ISO 12100:2010 Safety of machinery — General principles for design — Risk assessment and risk reduction

Furthermore, it is declared that the relevant technical documentation for this partly completed machinery has been compiled according to Annex VII Part B. The manufacturer undertakes to transmit in electronic form relevant information on the partly completed machinery within a reasonable time in response to a reasoned request by the national authorities.

**The partly completed machinery must not be put into service until the final machinery into which it is to be incorporated has been declared to be in conformity with the provisions of the Machinery Directive.**

Responsible for the  
documentation:

TAKTOMAT GmbH

Address:

Rudolf-Diesel-Straße 14, D-86554 Pöttmes