

# DE 5

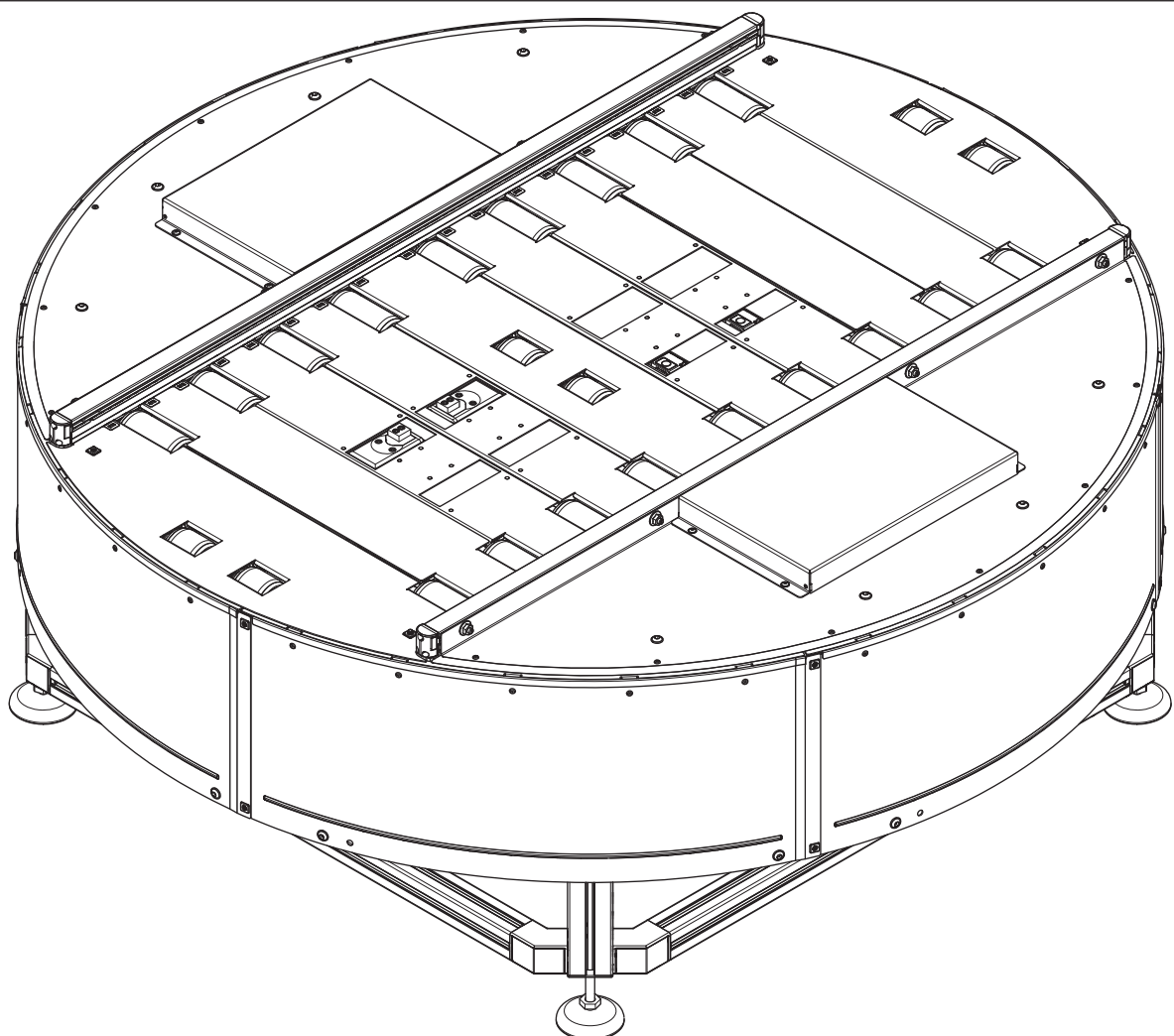
Rotate unit

3 842 998 862  
3 842 998 863  
3 842 998 864

**Assembly instructions**  
**3 842 559 196/2019-12**

Replaces: –  
ENGLISH

ENGLISH



The information in this manual is for product description purposes only. Any information in this manual on how to use the product only constitute examples and recommendations. Catalog information is not binding. The information given does not exempt the user from the obligation of own judgment and verification. Our products are subject to natural wear and aging.

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An example configuration is shown on the title page. The delivered product may thus vary from the illustration.

The original assembly instructions are in German.

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- |           |                      |                            |           |
|-----------|----------------------|----------------------------|-----------|
| <b>DE</b> | <b>3 842 559 195</b> | DE 5 Dreheinheit           | Deutsch   |
| <b>EN</b> | <b>3 842 559 196</b> | DE 5 Rotate unit           | English   |
| <b>FR</b> | <b>3 842 559 197</b> | DE 5 Unité de rotation     | Français  |
| <b>IT</b> | <b>3 842 559 198</b> | DE 5 Unità girevole        | Italiano  |
| <b>ES</b> | <b>3 842 559 199</b> | DE 5 Dispositivo de giro   | Español   |
| <b>PT</b> | <b>3 842 559 200</b> | DE 5 Unidade giratória     | Português |
| <b>ZH</b> | <b>3 842 559 201</b> | DE 5 旋转单元                  | 中文        |
| <b>CS</b> | <b>MTCS 559 195</b>  | 1) DE 5 Otočná jednotka    | Česky     |
| <b>PL</b> | <b>MTPL 559 195</b>  | 1) DE 5 Jednostka obrotowa | Polski    |
| <b>HU</b> | <b>MTHU 559 195</b>  | 1) DE 5 Forgatóegység      | Magyar    |
| <b>RO</b> | <b>MTRO 559 195</b>  | 1) DE 5 Unitate de rotire  | Română    |
- 1) Only as PDF / Not available in print.



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# 1 About this documentation

## 1.1 Validity of the documentation

This documentation applies to the following products:

- 3 842 998 863, DE 5 rotate unit
- 3 842 998 862, DE 5/FR rotate unit
- 3 842 998 864, DE 5/OC rotate unit

This documentation is intended for fitters, operators, service engineers and system owners.

This documentation contains important information relating to the safe and proper assembly, transportation, commissioning, operation, use, maintenance and disassembly of the product, and on how to rectify simple faults yourself.

- Read this documentation in full prior to working with the product, particularly section 2 "Safety instructions" and section 3 "General notes on property and product damage".

## 1.2 Required and supplementary documentation

- Only commission the product if the documentation marked with the book symbol  is available and you have understood and followed the instructions in it.

**Table 1: Required and supplementary documentation**

| Title                                                                                                                                  | Document number | Document type            |
|----------------------------------------------------------------------------------------------------------------------------------------|-----------------|--------------------------|
|  Employee safety training <sup>2)</sup>             | 3 842 527 147   |                          |
|  Declaration of incorporation                       | 3 842 562 615   |                          |
|  Transfer system TS 5 – Modular units <sup>2)</sup> | 3 842 540 375   | Assembly instructions    |
| MTpro <sup>1)</sup>                                                                                                                    | 3 842 539 057   | With list of spare parts |

<sup>1)</sup> Download at: [www.boschrexroth.com/mtpro](http://www.boschrexroth.com/mtpro)

<sup>2)</sup> If not included in the scope of delivery, download from the media directory:  
[www.boschrexroth.com/medienverzeichnis](http://www.boschrexroth.com/medienverzeichnis)

## 1.3 Presentation of information

Standardized safety instructions, symbols, terms and abbreviations are used so that you can use this documentation to work quickly and safely with your product. These are explained in the following sections to help you understand them better.

### 1.3.1 Safety instructions

This document contains safety instructions in section 2.6 "Product-specific safety instructions" and section 3 "General notes on property and product damage", as well as before any sequence of actions or any required action which involves a risk of personal injury or property damage. Be sure to observe all safety precautions.

Safety instructions are set out as follows:

|  <b>SIGNAL WORD</b>         |
|--------------------------------------------------------------------------------------------------------------|
| <b>Type and source of danger!</b><br>Consequences of non-compliance<br>► Measures to prevent danger<br>► ... |

- **Warning sign:** points out the danger
- **Signal word:** indicates the severity of the danger
- **Type and source of danger:** indicates the type and source of the danger
- **Consequences:** describes the consequences of non-compliance
- **Prevention:** states how the danger can be avoided

**Table 2: Risk classes according to ANSI Z535.6-2006**

| Warning sign, signal word                                                                        | Meaning                                                                                     |
|--------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
|  <b>DANGER</b>  | Indicates a hazardous situation that will result in severe injury or death if not avoided.  |
|  <b>WARNING</b> | Indicates a hazardous situation that may result in severe injury or death if not avoided.   |
|  <b>CAUTION</b> | Indicates a hazardous situation that may result in minor to moderate injury if not avoided. |
| <b>NOTICE</b>                                                                                    | Property damage: The product or the surrounding area could get damaged.                     |

### 1.3.2 Symbols

The following symbols indicate important information that is not safety-relevant but increases the comprehensibility of the documentation.

**Table 3: Meaning of the symbols**

| Symbol                                                                              | Meaning                                                                                      |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
|  | If this information is not observed, the product cannot be used and/or operated as designed. |
| ►                                                                                   | Single, independent action                                                                   |
| 1.<br>2.<br>3.                                                                      | Numbered steps:<br>The numbers indicate that the steps must be performed in order.           |

### 1.3.3 Designations

This document uses the following designations:

**Table 4: Designations**

| Designation | Meaning                                                                          |
|-------------|----------------------------------------------------------------------------------|
| AS 5        | Drive unit from the Rexroth TS 5 transfer system                                 |
| BG          | Size                                                                             |
| DE 5        | Rotate unit from the Rexroth TS 5 transfer system                                |
| ST 5        | Section unit from the Rexroth TS 5 transfer system                               |
| VE 2/...    | Stop gate for workpiece pallet from the Rexroth TS <i>2plus</i> transfer system. |
| WT 5        | Workpiece pallet from the Rexroth TS 5 transfer system                           |
| UZ          | In clockwise direction                                                           |
| GUZ         | In counter-clockwise direction                                                   |

## 2 Safety instructions

### 2.1 About this section

The product has been manufactured in accordance with the generally accepted rules of current technology. Nevertheless, there is a risk of personal injury and property damage if you do not read this section and follow the safety instructions in this document.

- ▶ Read this documentation carefully and completely before you start working with the product.
- ▶ Keep the documentation accessible to all users at all times.
- ▶ Always include them when giving the product to a third party.

### 2.2 Intended use

The product is a partly completed machinery.

You may use the product as follows:

- For installation in a Rexroth TS 5 transfer system
- For rotation of WT 5 Rexroth workpiece pallets
- Maximum load/section load: See technical data on page 66.
- For ambient conditions, see page 66.

The DE 5 rotate unit is not intended for direct use in the work area (for definition, see DIN EN 619, Safety and EMC requirements for equipment for mechanical handling of unit loads).

If the DE 5 rotate unit is used in the work area or in direct vicinity of the work area, user-side measures for safe operation must be taken.

The product is strictly intended for professional use and not for private use.

The intended use also includes having read and understood these instructions, especially section 2 "Safety instructions".

### 2.3 Improper use

Any use other than that described in the section "Intended use" is considered improper and is not permitted.

Bosch Rexroth AG is not liable for any damage resulting from improper use. The user alone bears any risks associated with improper use.

The following foreseeable misuses also constitute improper use:

- Transporting goods other than those specified.
- Using the product without protective case.
- Using the product in accumulation operation.
- Transporting people on the product or transported material.
- Climbing onto the product.
  - the product is not accessible.
- Private use.

### 2.4 Personnel qualifications

The activities described in this document require basic knowledge of mechanical, electrical and pneumatic systems, as well as familiarity with the corresponding technical terms. Additional knowledge regarding the use of lifting gear and corresponding slings is required for transporting and handling the product.

To ensure safe use, these activities should therefore only be performed by qualified personnel or by an instructed person acting under the direction of such a person. "Qualified personnel" refers to those who can recognize potential hazards and take appropriate safety measures based on their technical training, knowledge, experience, and understanding of the relevant regulations pertaining to the work being performed. Qualified personnel must comply with the relevant technical regulations and have the necessary expertise.



Bosch Rexroth offers training support for specialized fields. You can find an overview of the training content online at: <http://www.boschrexroth.de/didactic>

### 2.5 General safety instructions

- As owner, please note the following: before the initial commissioning of the product, carry out a risk assessment in accordance with the national regulations in your country (in Germany: according to the Occupational Health and Safety Act).
- As distributing company/manufacturer of the machine, observe the following: Before the initial commissioning of a conveyor system, conduct a risk assessment in accordance with DIN EN ISO 12100.
- Observe the applicable accident prevention and environmental protection regulations.
- Observe the safety rules and regulations of the country in which the product is being used.
- Only use Rexroth products that are in proper working order.
- Heed all the notices on the product.
- Persons who assemble, operate, disassemble or maintain Rexroth products should not be under the influence of alcohol, drugs or medication that may affect their ability to respond.
- Use only original accessories and spare parts from Rexroth in order to prevent hazards to people due to unsuitable spare parts.
- Observe the technical data and ambient conditions specified in the product documentation.
- Only commission the product if it has been determined that the end product (for example, a machine or system) into which the Rexroth products have been installed complies with national provisions, safety regulations and application standards.

## 2.6 Product-specific safety instructions

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>General</b>                     | <ul style="list-style-type: none"> <li>• Do not attempt to modify the product.</li> <li>• Do not expose the product to any mechanical loads under any circumstances. Never use the product as a handhold or step. Do not place any objects on the product.</li> <li>• Always secure the product against tipping over.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>During transport</b>            | <ul style="list-style-type: none"> <li>• Observe the transport instructions on the packaging.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>During assembly</b>             | <ul style="list-style-type: none"> <li>• Inspect the product for obvious transport damage.</li> <li>• Route the cables and lines adequately protected to prevent mechanical damage and ensure that no one can trip over them.</li> <li>• Make sure the system component you are working on is depressurized and de-energized before assembling the product or inserting or removing plugs.</li> <li>• Ensure that the system component cannot be switched back on.</li> <li>• Before commissioning, make sure that all seals and plugs for the screwed connections are correctly installed and undamaged to prevent liquids and foreign bodies from entering the product.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>During commissioning</b>        | <ul style="list-style-type: none"> <li>• Allow the product to acclimatize for a few hours prior to commissioning in order to prevent water condensation from forming in the housing.</li> <li>• Make sure that all electrical and pneumatic connections are either in use or covered.</li> <li>• Check the safety requirements according to DIN EN 619.</li> <li>• Only commission a product that has been completely installed.</li> <li>• Make sure that all the safety equipment which forms part of the product is present, has been properly installed, and is fully functional. Do not move, bypass or disable any safety equipment.</li> <li>• Do not reach into moving parts.</li> <li>• Check the product for malfunctions.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>During operation</b>            | <ul style="list-style-type: none"> <li>• Make sure that only authorized personnel perform the following tasks within the scope of the product's intended use: <ul style="list-style-type: none"> <li>– starting or operating the system, or interfering with its normal operation.</li> <li>– Operating component or part adjusters.</li> </ul> </li> <li>• Only allow people to be in the immediate vicinity of the product when it is operating if they are authorized by the owner to be there. This also applies when the product is idle.</li> <li>• Make sure that: <ul style="list-style-type: none"> <li>– There are no obstacles preventing access to the EMERGENCY STOP controls.</li> <li>– All delivery points, workstations and passages are kept clear.</li> </ul> </li> <li>• Do not use EMERGENCY STOP controls for routine stopping.</li> <li>• Regularly check the EMERGENCY STOP controls to ensure that they are functioning properly.</li> <li>• Following an EMERGENCY STOP or in the event of a fault or other irregularity, turn the product off and secure it against being switched back on.</li> <li>• Do not reach into moving parts.</li> <li>• An idle system is not necessarily a safe system, as stored energy can be released unintentionally or through improper maintenance procedures.</li> </ul> |
| <b>EMERGENCY STOP, malfunction</b> | <ul style="list-style-type: none"> <li>• After an EMERGENCY STOP or a malfunction, only switch the system back on once you have established and rectified the cause of the fault.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>During servicing and repair</b> | <ul style="list-style-type: none"> <li>• Make sure that access to maintenance and inspection points is kept unobstructed.</li> <li>• Perform the prescribed maintenance work at the intervals specified in section 10.3 "Maintenance".</li> <li>• Make sure that no line connectors, connections or components are disconnected as long as the system is supplied with pressure and voltage. Secure the system against being switched back on.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>During disposal</b>             | <ul style="list-style-type: none"> <li>• Dispose of the product in accordance with the regulations in your country.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

## 2.7 Personal protective equipment

- Appropriate protective clothing should be worn when handling/using the product (e.g. safety shoes, close-fitting clothing, a hair net for long, loose hair).  
As the system owner or operator, you are personally responsible for ensuring the use of appropriate protective equipment when the product is being used.  
All component parts of the personal protective equipment must be free of damage.

## 2.8 Owner responsibilities

- Before the initial commissioning or re-commissioning of a conveyor system, carry out a risk assessment in accordance with DIN EN ISO 12100.
- Before initial commissioning, make sure there are no protruding or sharp-edged parts that may be a hazard to personnel working or moving in the area.
- Provide safety-related instructions to the operating personnel before initial commissioning or re-commissioning, and then at regular intervals.

# 3 General notes on property and product damage

The warranty only applies to the delivered configuration.

### During cleaning

- The warranty is void in the event of incorrect assembly, commissioning and operation, as well as improper use and/or improper handling.
- Prevent cleaning agents from getting into the system.
- Do not use solvents or aggressive detergents.
- Do not use a pressure washer for cleaning.

# 4 Scope of delivery

The scope of delivery includes the following:

- 1x DE 5 rotate unit
- 1x Assembly instructions "DE 5, rotate unit".

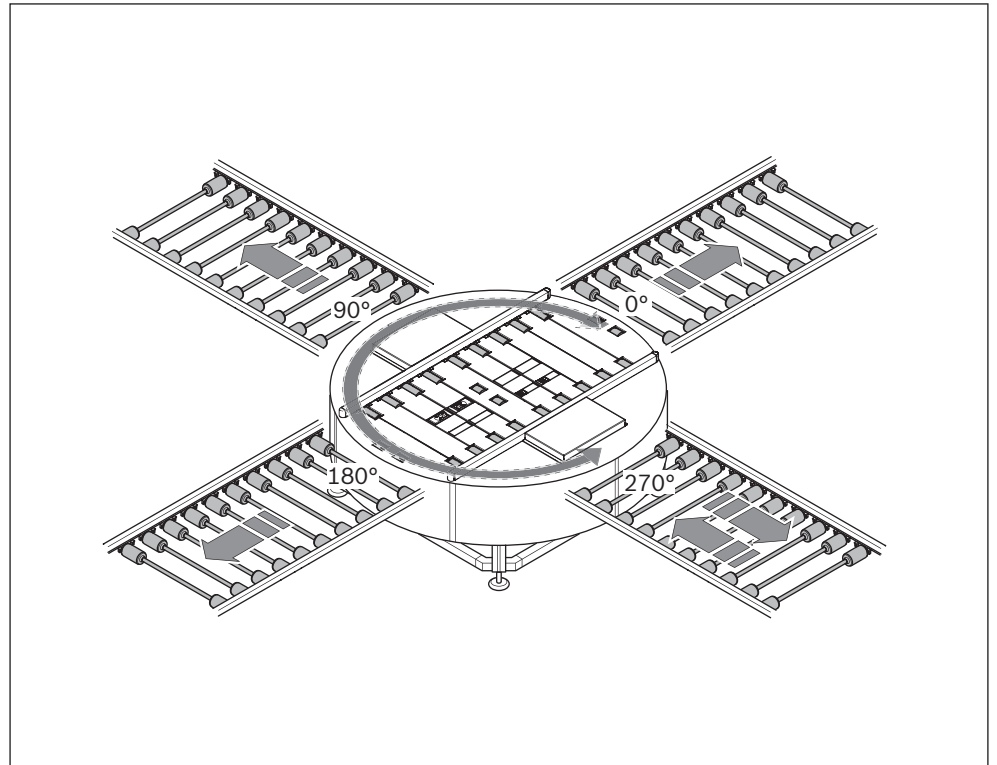
## 4.1 Condition on delivery

- DE 5 rotate unit mounted on pallet.
- In condition on delivery, stop gates face towards 180°. Rotation by 270° in counter-clockwise direction possible.



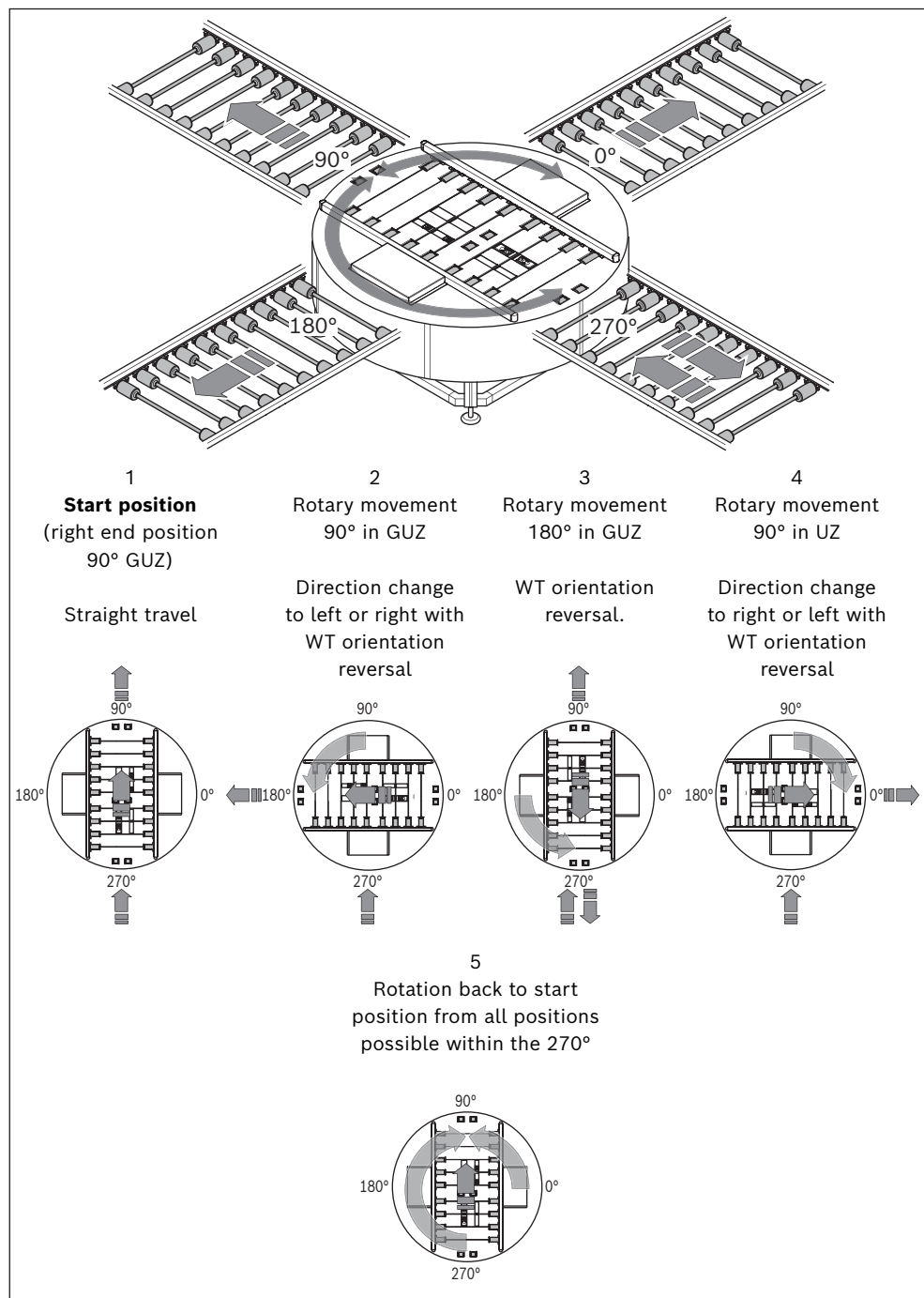
## 5 About this product

### 5.1 Specifications



559 195-01

**Fig. 1: Condition on delivery: Right end position, 270° can be rotated in counter-clockwise direction**



559 195-44

**Fig. 2: Application example: Start position rotated by 90°C in counter-clockwise direction from right end position (condition on delivery), can be rotated by 90° in clockwise direction and by 180° in counter-clockwise direction**

**5.1.1 Applications of the DE 5 rotate unit**

- Installation between 2, 3 or 4 ST 5 conveyor units or AS 5 drive units
- Horizontal rotation of WT 5... workpiece pallets by 90°, 180° or 270°
- Reversal of the orientation of the WT 5 workpiece pallet including the workpiece.
- Possible rotation angle of up to 270°. Due to the structure, the rotate unit must then be rotated back.

**5.1.2 Version of the DE 5 rotate unit**

- Conveyor medium: Split rollers, full rollers or OpenCenter rollers.
- Sections suitable for reversible operation.
- Motor connection with cable/plug.

- X: Version with protective covers
Y: Version without protective covers
- A: DE 5 rotate unit, lower part (standing)
B: DE 5 rotate unit, upper part (rotating by 90°, 180° or 270°)
C: AS 5/H-DE5 drive unit
D: Sensor option for WT 5 for control of the deceleration and WT end position (sensors not included in the scope of delivery)
E: Stop gate (locking of WT 5 during rotation)
F: Sensor option for DE 5 for control of the rotary movement and running to rotary bearings (sensors not included in the scope of delivery)
G: Stop gate (stopping and locking of the rotary movement)
H: Sensor option for rotary movement end position (scope of delivery)
I: Sensor option for stop gate (sensors not included in the scope of delivery)
J: Mechanical rotary movement end stop

| w [mm] | l <sub>T</sub> [mm] | BG <sup>1)</sup> |
|--------|---------------------|------------------|
| 455    | 455                 | 3                |
| 455    | 650                 | 3                |
| 650    | 650                 | 4                |
| 650    | 845                 | 4                |
| 845    | 845                 | 4                |
| 845    | 1040                | 4                |

<sup>1)</sup> Size

5.2 Product description

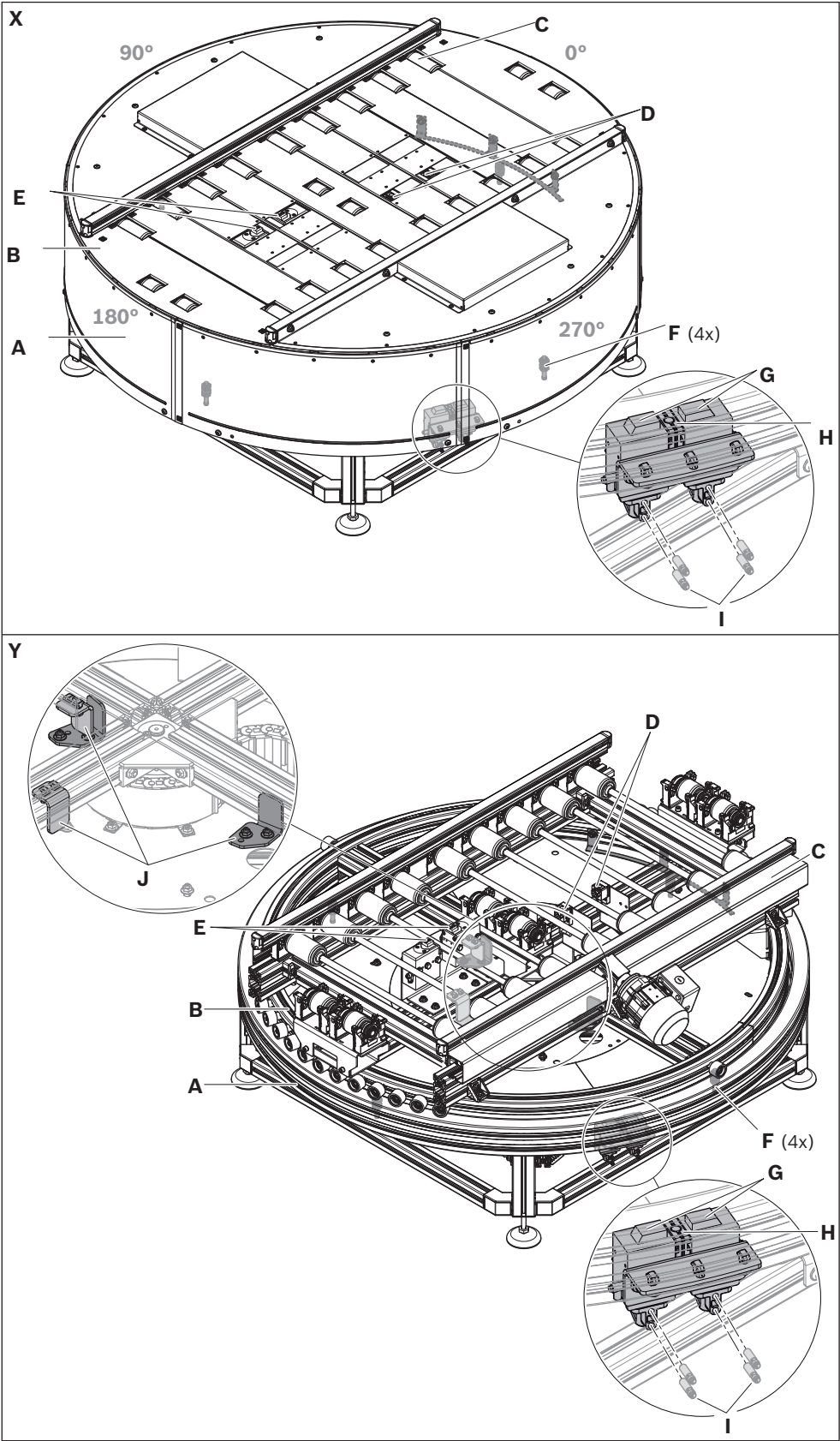


Fig. 3: DE 5 rotate unit (with split rollers)

- X:** Version with protective covers
- Y:** Version without protective covers
- A:** DE 5/FR rotate unit, lower part (standing)
- B:** DE 5/FR rotate unit, upper part (rotating by 90°, 180° or 270°)
- C:** AS 5/H-FR-DE5 drive unit
- F:** Sensor option for DE 5 for control of the rotary movement and running to rotary bearings (sensors not included in the scope of delivery)
- G:** Stop gate (stopping and locking of the rotary movement)
- H:** Sensor option for rotary movement end position (scope of delivery)
- I:** Sensor option for stop gate (sensors not included in the scope of delivery)
- J:** Mechanical rotary movement end stop

| w [mm] | L <sub>r</sub> [mm] | BG 1) |
|--------|---------------------|-------|
| 455    | 455                 | 3     |
| 455    | 650                 | 3     |
| 650    | 650                 | 4     |
| 650    | 845                 | 4     |
| 845    | 845                 | 4     |
| 845    | 1040                | 4     |

1) Size

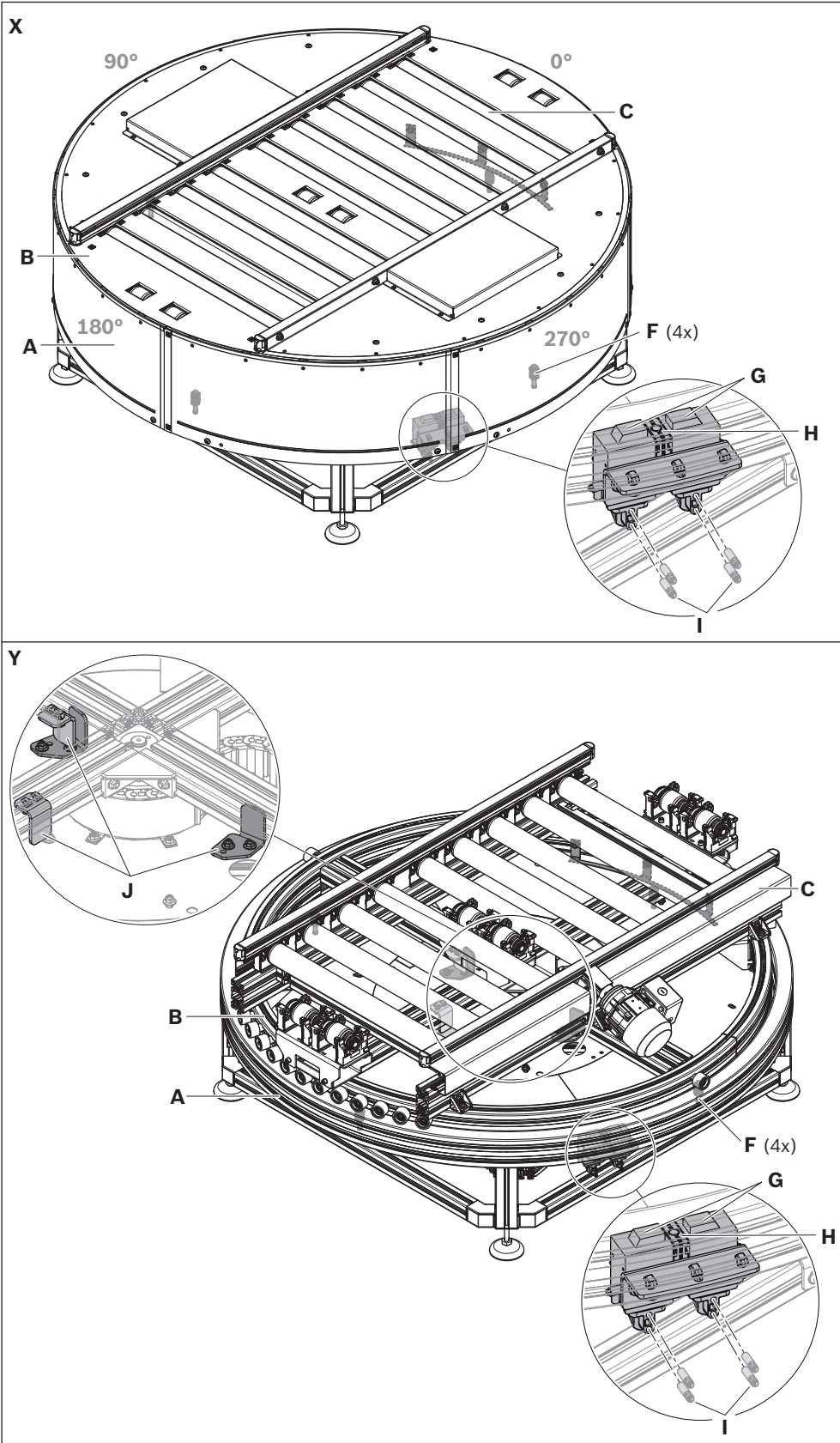


Fig. 4: DE 5/FR rotate unit (with full rollers)

559 195-03



- X: Version with protective covers
Y: Version without protective covers
- A: DE 5/OC rotate unit, lower part (standing)
B: DE 5/OC rotate unit, upper part (rotating by 90°, 180° or 270°)
C: AS 5/H-OC-DE5 drive unit
D: Sensor option for WT 5 for control of the deceleration and WT end position (sensors not included in the scope of delivery)
E: Stop gate and locking during rotation.
F: Sensor option for DE 5 for control of the rotary movement and running to rotary bearings (sensors not included in the scope of delivery)
G: Stop gate (stopping and locking of the rotary movement)
H: Sensor option for rotary movement end position (scope of delivery)
I: Sensor option for stop gate (sensors not included in the scope of delivery)
J: Mechanical rotary movement end stop

| w [mm] | l <sub>T</sub> [mm] | BG <sup>1)</sup> |
|--------|---------------------|------------------|
| 455    | 455                 | 3                |
| 455    | 650                 | 3                |
| 650    | 650                 | 4                |
| 650    | 845                 | 4                |
| 845    | 845                 | 4                |
| 845    | 1040                | 4                |

<sup>1)</sup> Size

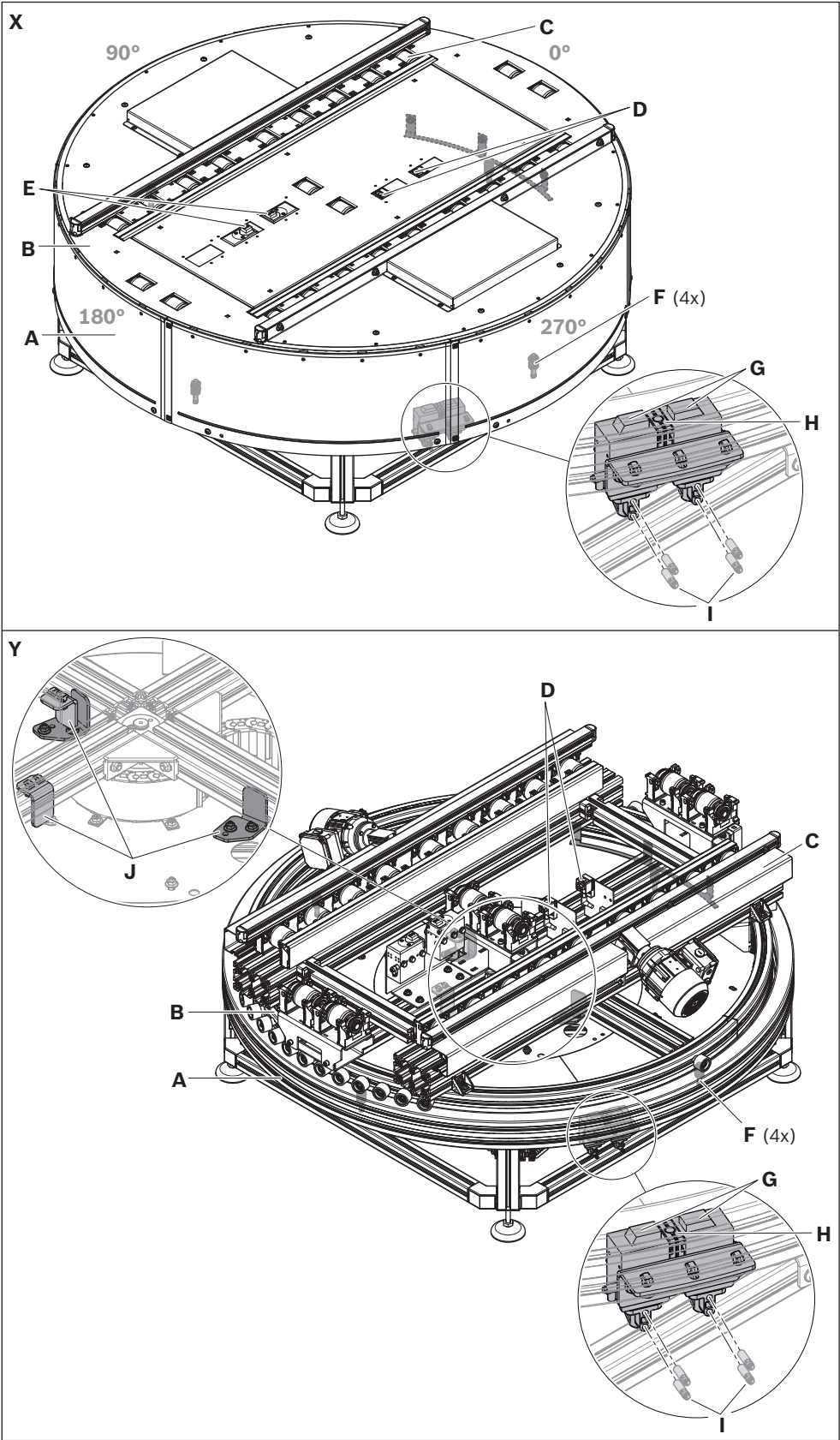
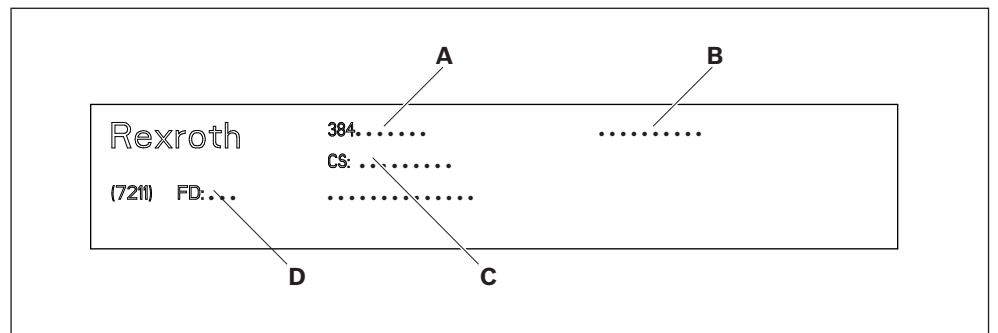


Fig. 5: Rotate unit DE 5/OC (Open Center)

- A:** Material number  
(order number)
- B:** Designation
- C:** Information on the version  
and dimensions
- D:** Production date

### 5.3 Identification of the product



**Fig. 6: Nameplate**

Typschild

## 6 Transport and storage

- Observe the transport instructions on the packaging.
- Transport weight: see delivery documents.
- Secure the product against tipping over!
- Always maintain ambient conditions during loading and transport, see page 66.

### 6.1 Transporting the product

#### **! WARNING**

##### **Suspended loads can fall!**

Falling objects can result in severe injury (or even death).

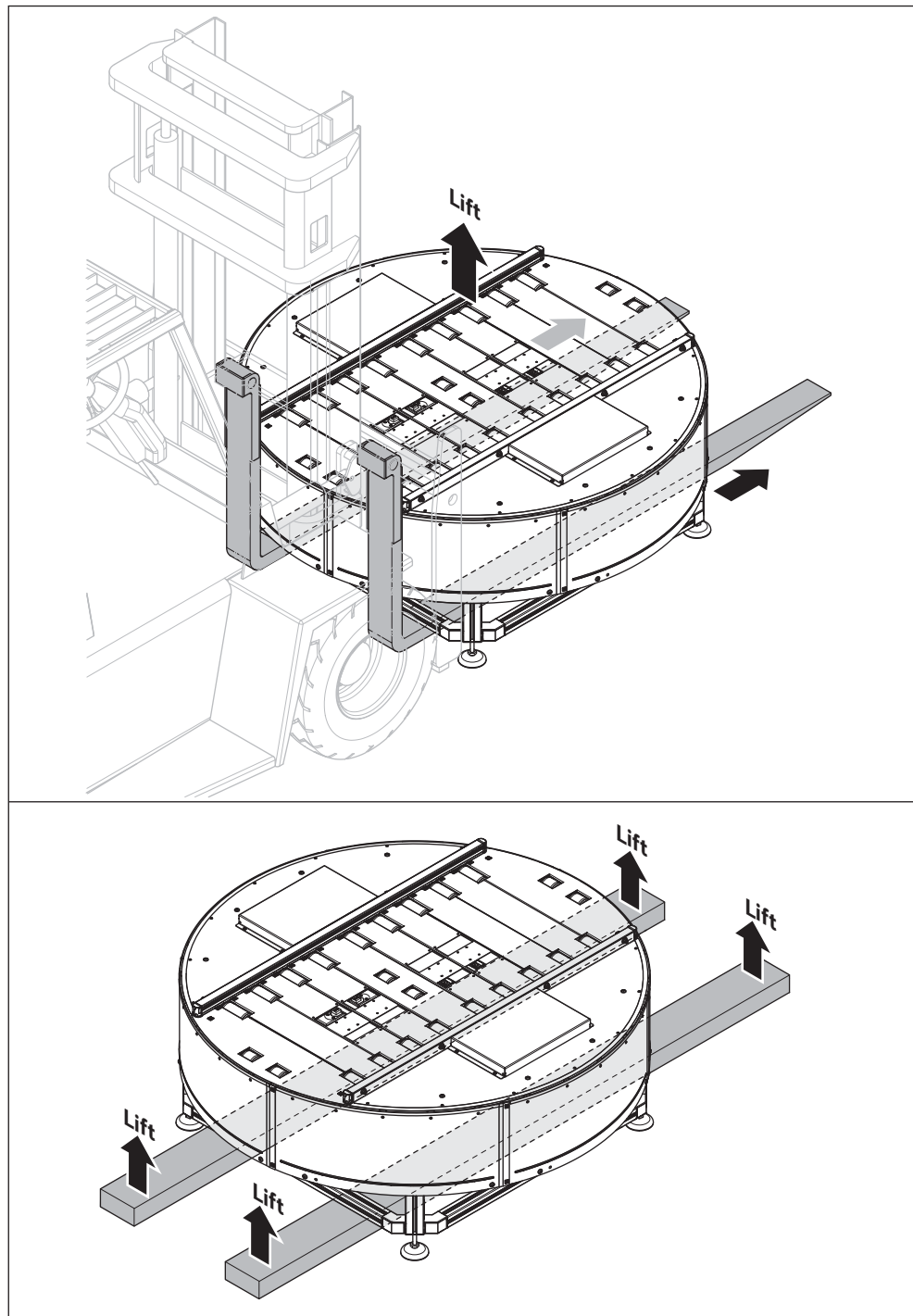
- Use only slings with sufficiently high bearing loads (for product weight, see delivery documents).
- Make sure the lifting straps are correctly fastened before lifting the product!
- Secure the product against tipping over when lifting!
- Make sure that no one but the operator is in the danger zone during lifting and lowering!

#### **NOTICE**

##### **Risk of damage to the rotate unit due to incorrect transport**

Incorrect transport and use of unsuitable lifting and suspension gear leads to a risk of damage to the rotate unit.

- The rotate unit may only be lifted with suitable industrial trucks or other suitable lifting gear and suspension gear as illustrated in Fig. 7.



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**Fig. 7: Lifting and transport of the rotate unit**

## 6.2 Storing the product

- Only set the product down on a flat surface.
- Protect the product from mechanical stress.
- Protect the product from environmental influences, such as dirt and moisture.
- Observe the ambient conditions, see page 66.
- Support the product so that suspended motors/actuators/cylinders will not be strained.



## 7 Assembly

### 7.1 Unpacking

- ▶ Lift the product out of its packaging.
- ▶ Dispose of the packaging material in accordance with the applicable regulations in your country.

### 7.2 Installation requirements

- ▶ During installation, be sure to maintain the ambient conditions specified in the Technical Data (see page 66).

#### 7.2.1 Installation position

- ▶ Install the product level and plumb to connected upstream/downstream conveyor sections, at right angles, and axially parallel. This ensures proper functioning and prevents premature wear.

### 7.3 Required tools

- Hex wrench (open-end) SW13.
- Hex socket wrenches SW3, SW4, SW5, SW6.
- Hex socket wrench (Torx™) T30, T50
- Posidriv screwdriver PZ2
- Hammer
- Level
- Combination pliers
- Flat smooth file

## 7.4 Required accessories

### 7.4.1 Anchoring of the rotate unit at the floor.

For each connection, you will need:

|    |                      |                    |
|----|----------------------|--------------------|
| 1x | <b>3 842 146 815</b> | Foundation bracket |
| 1x | <b>3 842 526 560</b> | Dowel              |
| 2x | <b>3 842 528 718</b> | T-bolt             |
| 2x | <b>3 842 345 081</b> | Flange nut         |

### 7.4.2 Sensors

(not included in the scope of delivery)

| Location                                                                        | No. | Diameter<br>with connector                                 | Sensor               |
|---------------------------------------------------------------------------------|-----|------------------------------------------------------------|----------------------|
| End position of rotary movement <sup>1)</sup>                                   | 1x  | M12 with M8,<br>S <sub>N</sub> = 4 mm, flush <sup>1)</sup> | <b>3 842 549 811</b> |
| Position control<br>(0 ° / 90 ° / 180 ° / 270 °)                                | 4x  | M12 with M8,<br>S <sub>N</sub> = 4 mm, flush               | <b>3 842 549 812</b> |
| Or alternatively:                                                               | 4x  | M12 with M12,<br>S <sub>N</sub> = 4 mm, flush              | <b>3 842 549 814</b> |
| Stopping and locking of the rotary<br>movement (VE)                             | 4x  | M8 with M8,<br>S <sub>N</sub> = 2 mm, flush                | <b>3 842 551 761</b> |
| WT end position and running in of<br>workpiece pallets with deceleration (ramp) | 2x  | M12 with M12,<br>S <sub>N</sub> = 8 mm, not flush          | <b>3 842 557 633</b> |
| Or alternatively:                                                               | 2x  | M12 with M8,<br>S <sub>N</sub> = 8 mm, not flush           | <b>3 842 549 813</b> |

<sup>1)</sup> Included in the scope of delivery, already assembled

### 7.4.3 Frequency converters

(not included in the scope of delivery)

- 1 x for motor for rotary movement
- 1 x for motor (motors) of drive unit (deceleration and start-up of the workpiece pallet)

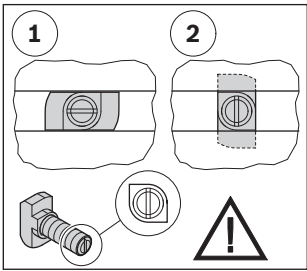
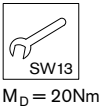
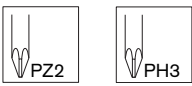
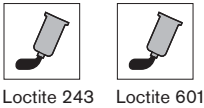
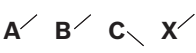
### 7.4.4 I/O modules

(PROFIBUS® or Ethernet, not included in the scope of delivery)

- For connection of proximity switches for control of the workpiece pallet
- For connection of necessary solenoid valves for control of the stop gates

7.5 Symbols used

Table 5: Symbols used

|                                                                                     |                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <p>Connection with T-bolt and flange nut.<br/>Make sure the T-bolt is in the correct position when inserting it into the slot and tightening it. The notch at the head of the screw indicates the orientation of the T-bolt.<br/>1 = T-bolt insertion position in the slot.<br/>2 = T-bolt clamping position in the slot.<br/>Tightening torque: 25 Nm</p> |
|    | <p>Hex wrench<br/>SW = wrench size ... mm<br/><math>M_D</math> = required tightening torque ... Nm</p>                                                                                                                                                                                                                                                     |
|    | <p>Hex socket wrench<br/>SW = wrench size ... mm<br/><math>M_D</math> = required tightening torque ... Nm</p>                                                                                                                                                                                                                                              |
|    | <p>Screwdrivers for cross-head screws<br/>PZ ... = Pozidriv screw drive, size ...<br/>PH ... = Phillips screw drive, size ...</p>                                                                                                                                                                                                                          |
|   | <p>Lubricate/lubricate with specific grease lubricant:<br/>• Gleitmo 585 K: gleitmo 585 K, <a href="http://www.fuchs-lubritech.com">www.fuchs-lubritech.com</a><br/>• Anti-Seize: Food Grade Anti-Seize/Loctite 8014, <a href="http://www.henkel.com">www.henkel.com</a></p>                                                                               |
|  | <p>Lubricate/lubricate with specific mineral oil:<br/>• GHD: Structovis GHD, <a href="http://www.klueber.com">www.klueber.com</a><br/>• V 68: mineral oil with a viscosity of 68</p>                                                                                                                                                                       |
|  | <p>Secure the screws with:<br/>• Loctite 243: medium strength (detachable), <a href="http://www.loctite.de">www.loctite.de</a><br/>• Loctite 601: high-strength screw retention (non-detachable), <a href="http://www.loctite.de">www.loctite.de</a></p>                                                                                                   |
|  | <p>The marked parts are not required for the described assembly. Dispose of the parts or use them for other purposes.</p>                                                                                                                                                                                                                                  |
|  | <p>Graphical depiction of the assembly steps.<br/>The numbers correspond to the sequence of assembly steps in accordance with the instructions in the accompanying text.</p>                                                                                                                                                                               |
|  | <p>Graphical depiction of the designation of components.<br/>The letters denote the components mentioned in the accompanying text.</p>                                                                                                                                                                                                                     |
|  | <p>Detail view from a different direction,<br/>for example, the back or the bottom side of the product.</p>                                                                                                                                                                                                                                                |

## 7.6 Assembling the product

### 7.6.1 Setting up the DE 5 rotate unit



#### Please note:

- The height difference  $\Delta$  between the section of the rotate unit and the connected section must not exceed  $\pm 1$  mm (see detail X).
- If anchoring to the floor is not possible, connect the frame of the rotate unit to the section supports/frame of connected sections.

1. Align the rotate unit.
  - horizontal
  - flush and at the height of upstream/downstream conveyor units.
2. Screw the rotate unit to the floor.
 

For each connection, you will need:

  - 1x foundation bracket, **3 842 146 815**
  - 1x dowel, **3 842 526 560**
  - 2x T-bolt, **3 842 528 718**
  - 2x flange nut, **3 842 345 081**

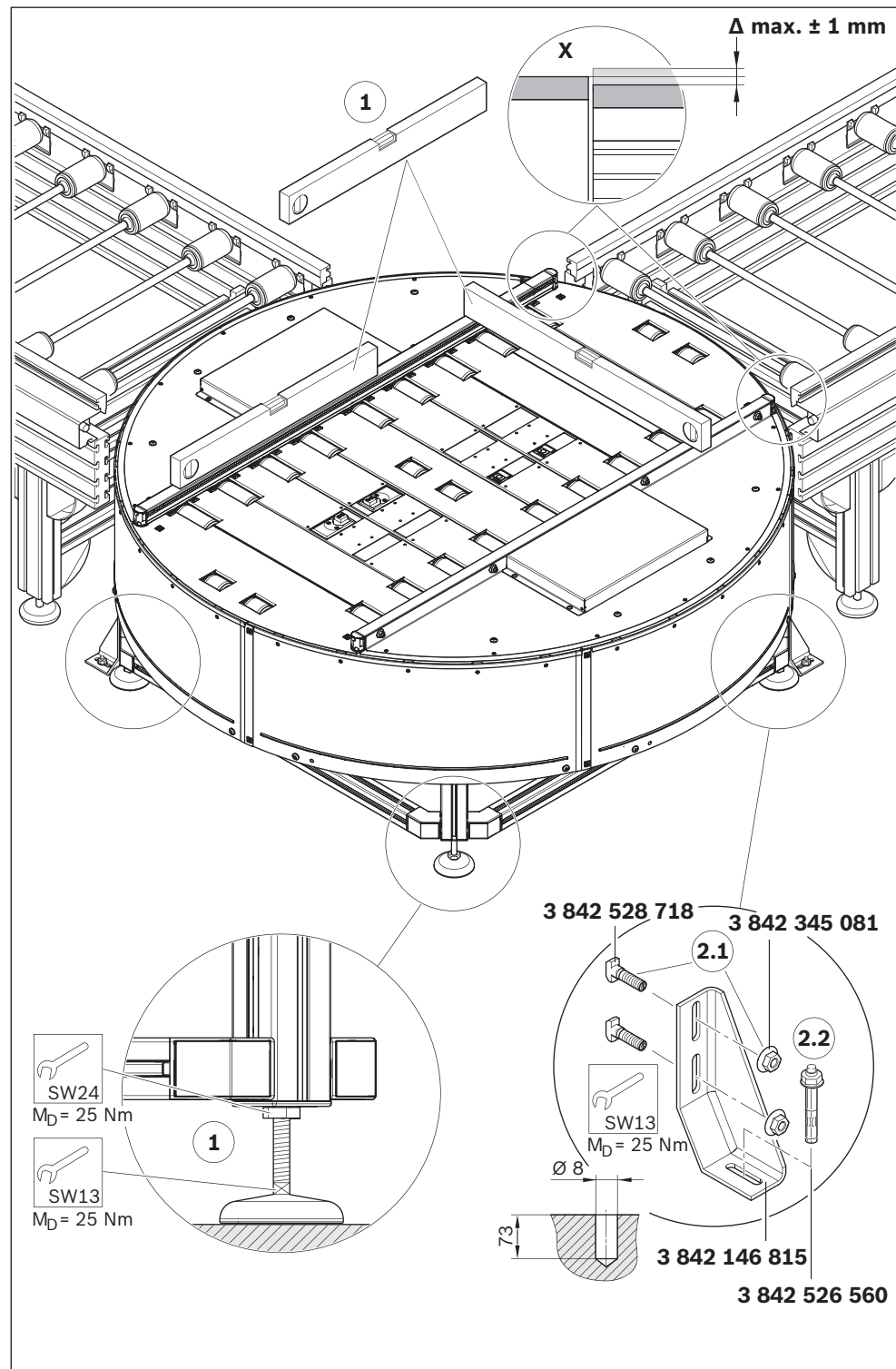
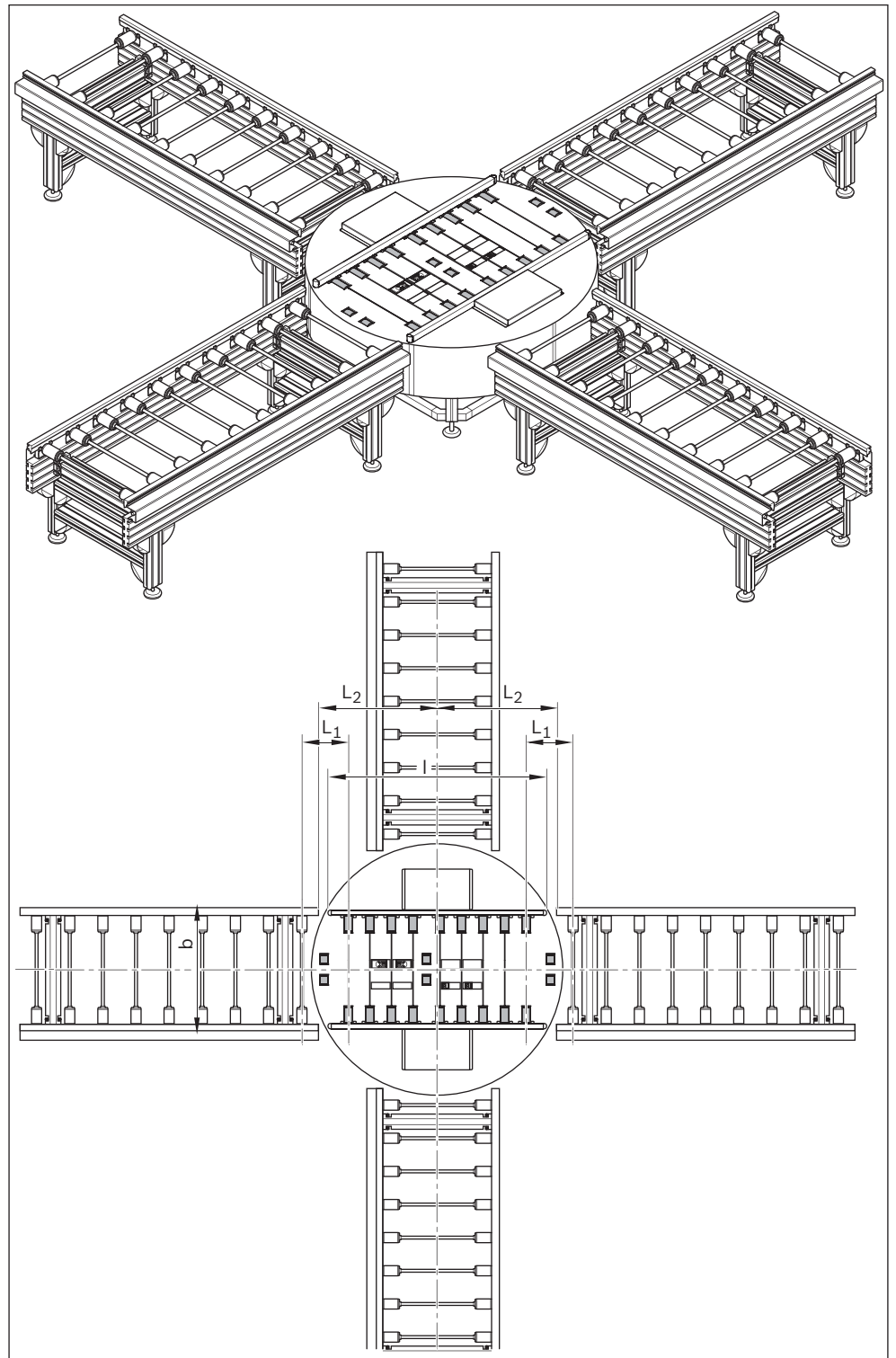


Fig. 8: Setting up the DE 5 rotate unit (illustrated: DE 5 with split rollers)

559 195-05

- DE 5 with ST 5 / AS 5:  
see Table 6 on page 24

### Distance of connecting ST 5 conveyor units / AS 5 drive units



**Fig. 9: Distance of connecting ST 5 conveyor units / drive**

559 195-06

**Table 6: Distance to connecting ST 5 conveyor units / AS 5 drive units**

| <b>w [mm]</b> | <b>l<sub>T</sub> [mm]</b> | <b>WT 5 <sup>1)</sup></b> |                             |                           |                           |
|---------------|---------------------------|---------------------------|-----------------------------|---------------------------|---------------------------|
|               |                           | <b>BG <sup>2)</sup></b>   | <b>l <sup>3)</sup> [mm]</b> | <b>L<sub>1</sub> [mm]</b> | <b>L<sub>2</sub> [mm]</b> |
| 455           | 455                       | 3                         | 1000                        | 224.3 <sup>4)</sup> / 244 | 581.5                     |
| 455           | 650                       | 3                         | 1000                        | 224.3 <sup>4)</sup> / 244 | 581.5                     |
| 650           | 650                       | 4                         | 1310                        | 308.75                    | 780                       |
| 650           | 845                       | 4                         | 1310                        | 308.75                    | 780                       |
| 845           | 845                       | 4                         | 1180                        | 373.5                     | 780                       |
| 845           | 1040                      | 4                         | 1180                        | 373.5                     | 780                       |

<sup>1)</sup> WT 5 workpiece pallet with central separation

<sup>2)</sup> Size

<sup>3)</sup> Length of the drive unit assembled at the DE 5

<sup>4)</sup> For a layout with curves, the connection bridges **3 842 998 604** and **3 842 998 605** must be used as section connected to the rotate unit.



### Please note:

- For commissioning and maintenance, various covers may need to be removed. This is respectively indicated in the respective chapters.
- Some screws of the covers are securely connected with the cover by lock washers (A) (see detail X).
- The lock washers must not be removed.

1. Remove the motor covers.
2. Remove the top protective covers.

## 7.6.2 Assembling/disassembling the protective covers of the rotate unit

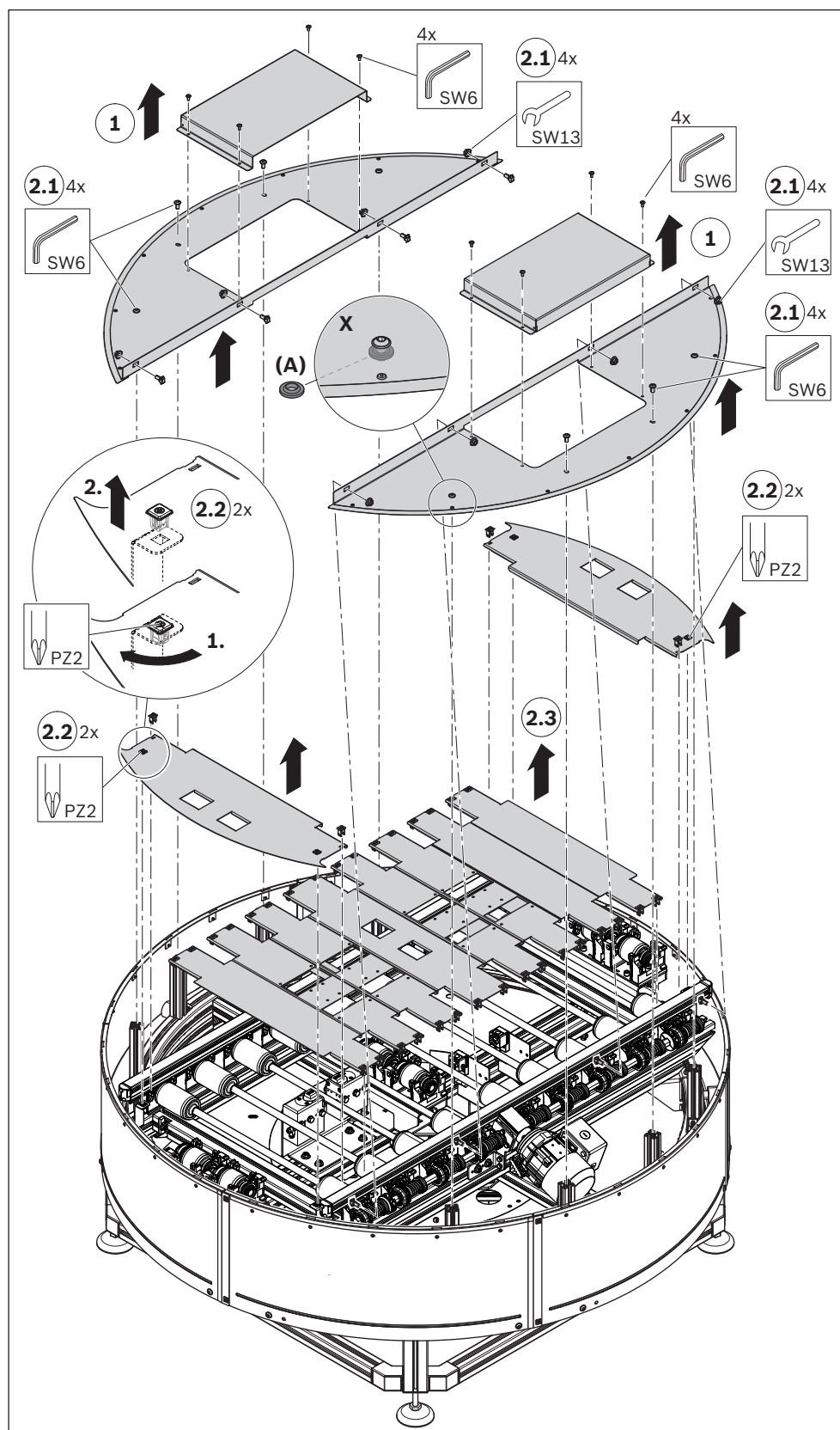


Fig. 10: Disassembling/assembling the DE 5 protective covers with split rollers and full rollers (1/2)

3. Remove the lateral protective covers.
- Install the protective covers in reverse order.

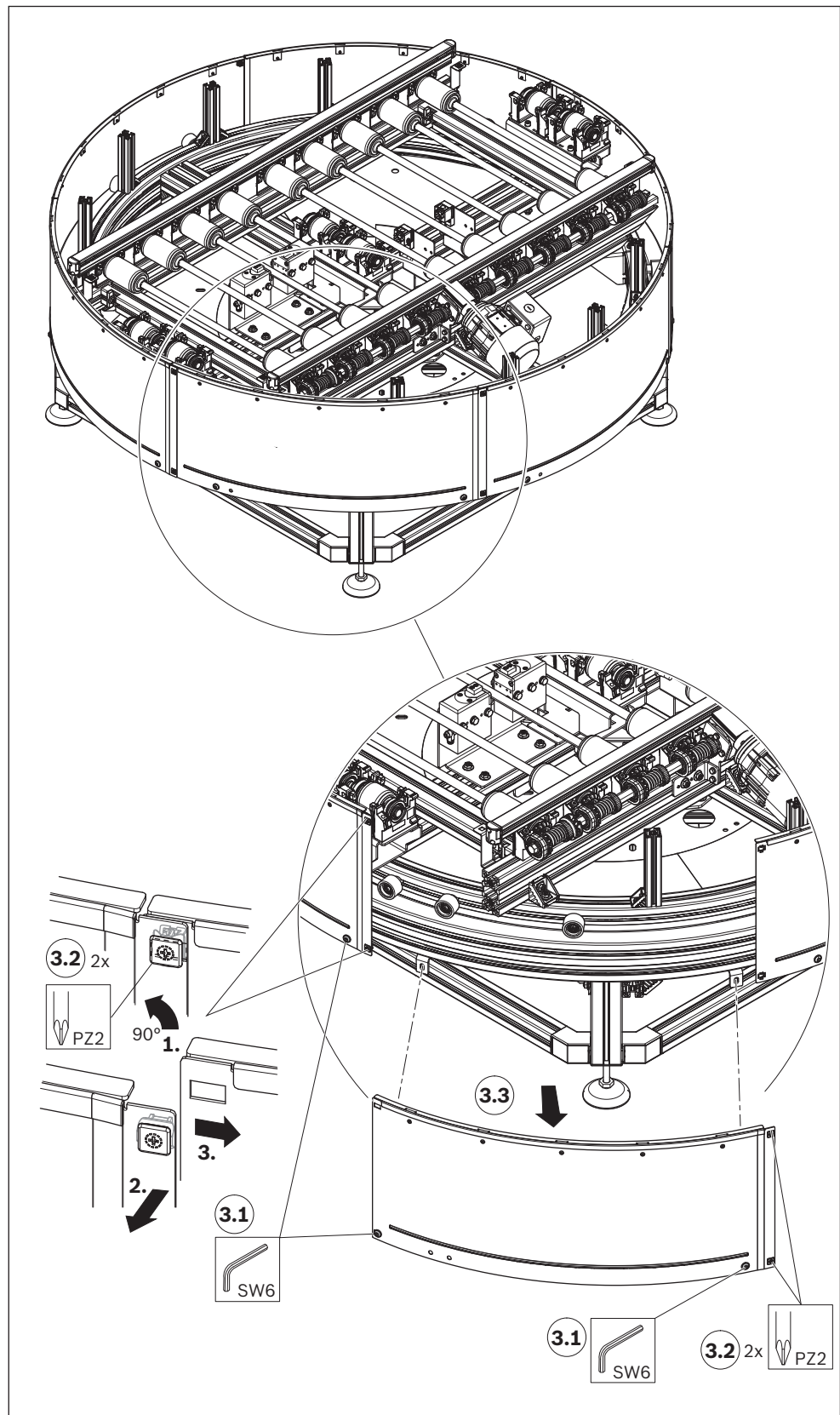


Fig. 11: Disassembling/assembling the DE 5 protective covers with split rollers and full rollers (2/2)





### Please note:

For commissioning and maintenance, various covers may need to be removed. This is respectively indicated in the respective chapters.

1. Remove the motor covers.
2. Remove the top protective covers.

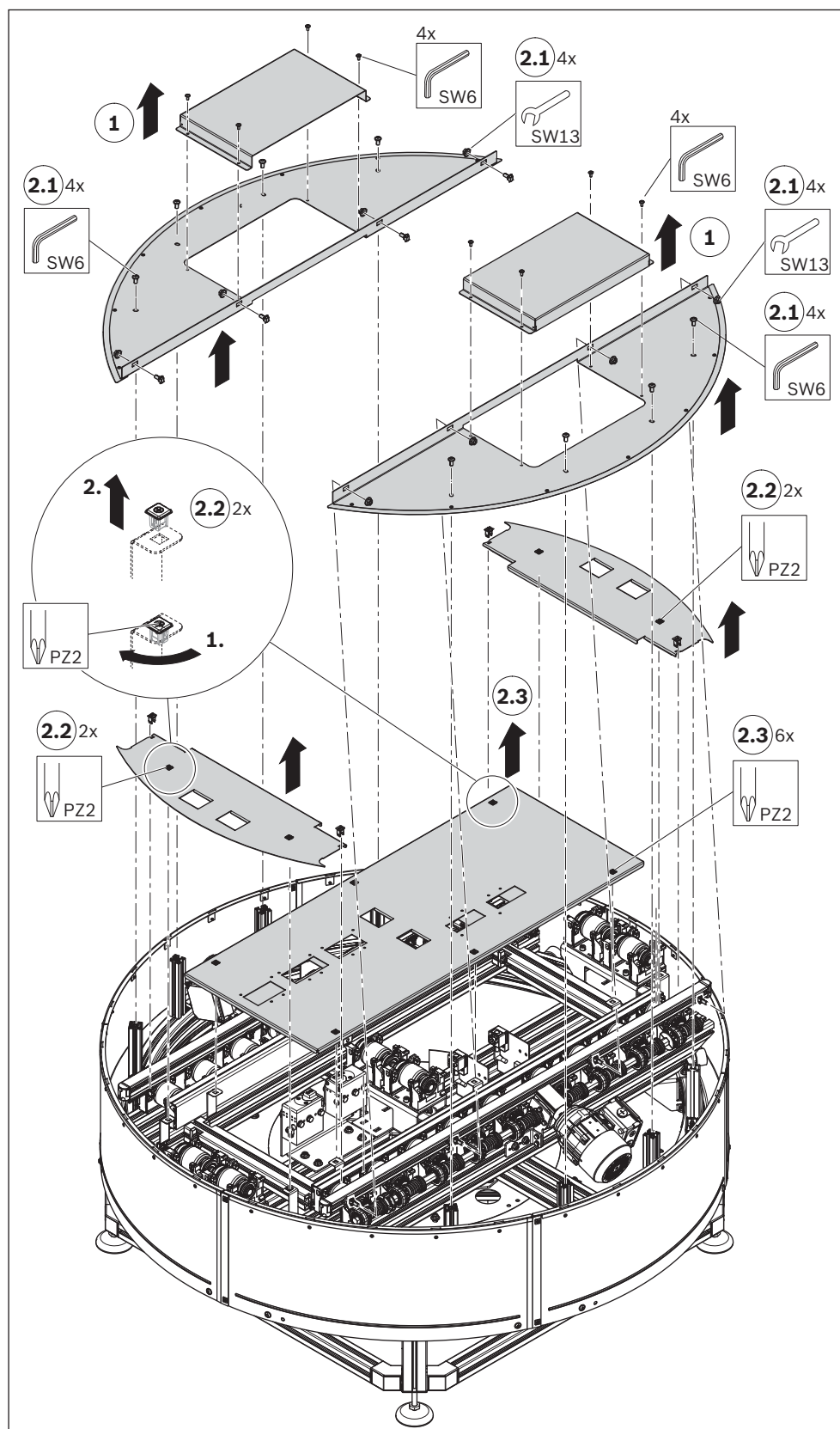
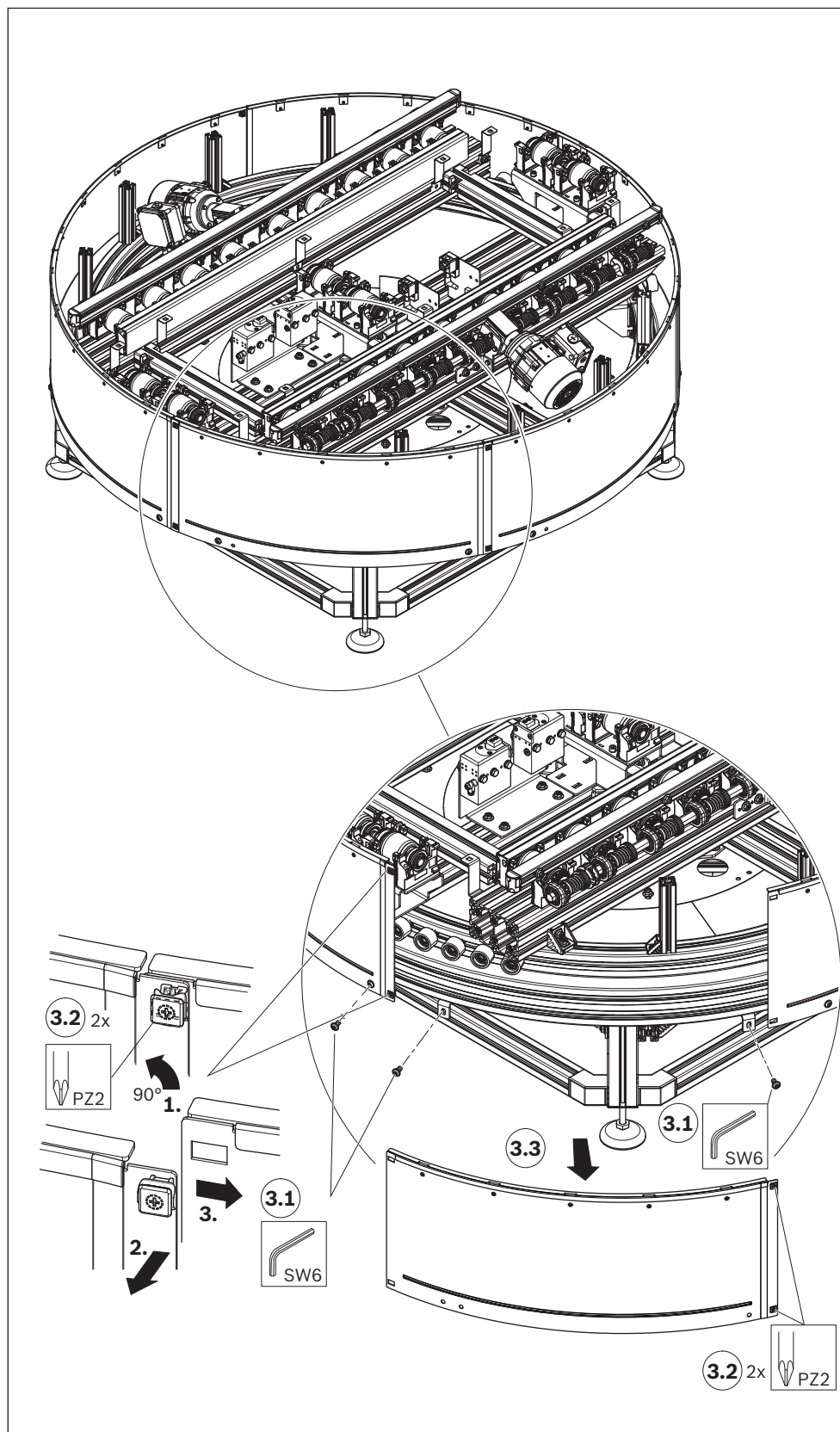


Fig. 12: Disassembling/assembling the DE 5-OC Open Center protective covers (1/2)

559 195-15

3. Remove the lateral protective covers.
- Install the protective covers in reverse order.



559 195-16

Fig. 13: Disassembling/assembling the DE 5-OC Open Center protective covers (2/2)

### 7.6.3 Purpose and function of sensors and actuators

#### Sensors and actuators of rotary movement

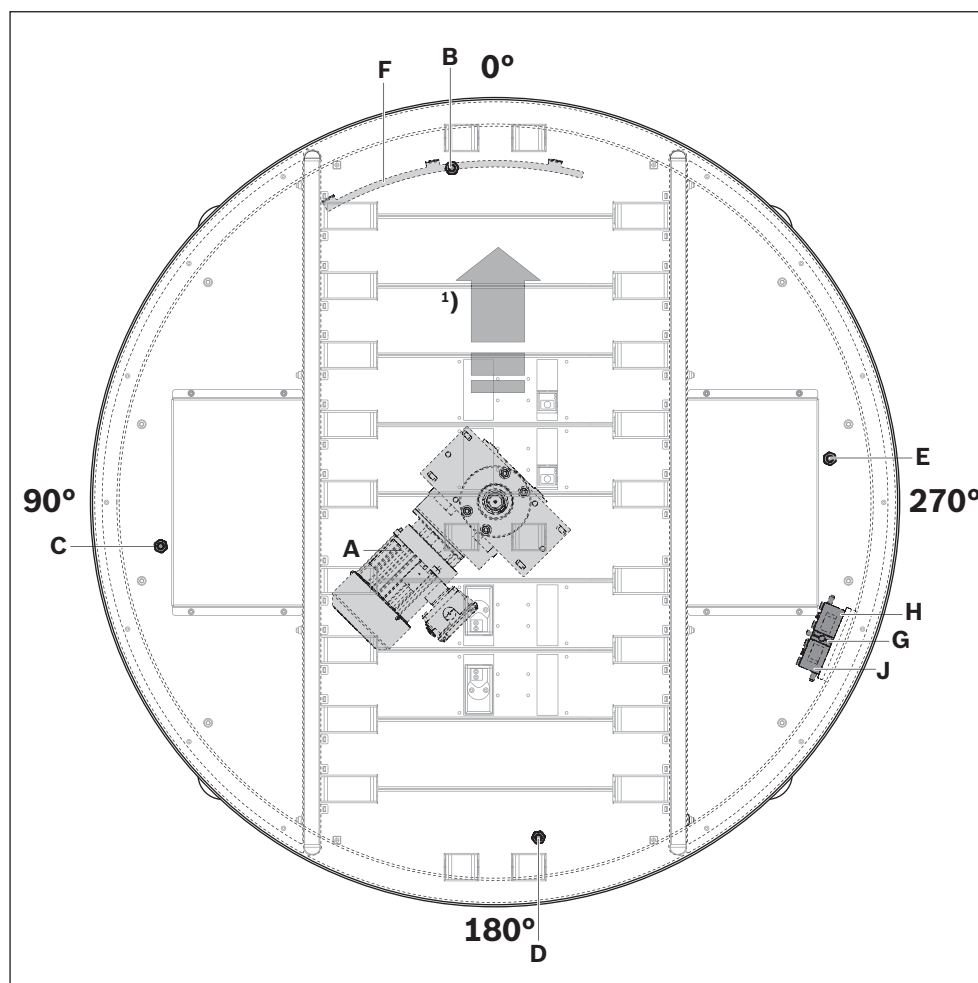
- The rotate unit can be set to 4 positions (0°, 90°, 180°, 270°).  
The total rotation angle of 0° to 270° in counter-clockwise direction is mechanically limited.

The workpiece pallet can run in or out in all positions.

- Drive (A) moves the rotary table with the AS 5 drive unit.
- The sensors (B, C, D, E) localize the position of the rotary table.  
Via the switching element (F), the deceleration is initiated with the frequency converter and the rotary table is slowly set to the desired position.
- The sensor (G) indicates reaching of the desired position of the rotary table, the motor can be switched off.
- The stop gates (H, J) stop and lock the rotary table in the desired position.
  - Stop gate (H) in counter-clockwise rotational direction (GUZ)
  - Stop gate (J) in clockwise rotational direction (UZ)

- A:** Rotate unit drive  
**B:** Sensor to position 0°  
 (iStopprampe Pos0)  
**C:** Sensor to position 90°  
 (iStopprampe Pos90)  
**D:** Sensor to position 180°  
 (iStopprampe Pos180)  
**E:** Sensor to position 270°  
 (iStopprampe Pos270)  
**F:** Switching element for deceleration ramp  
**G:** Sensor end position  
 (iDE in Pos)  
**H:** VE, Stop GUZ  
 (DE Stopper GUZ)  
**J:** VE, Stop UZ  
 (DE Stopper UZ)

<sup>1)</sup> Travel direction



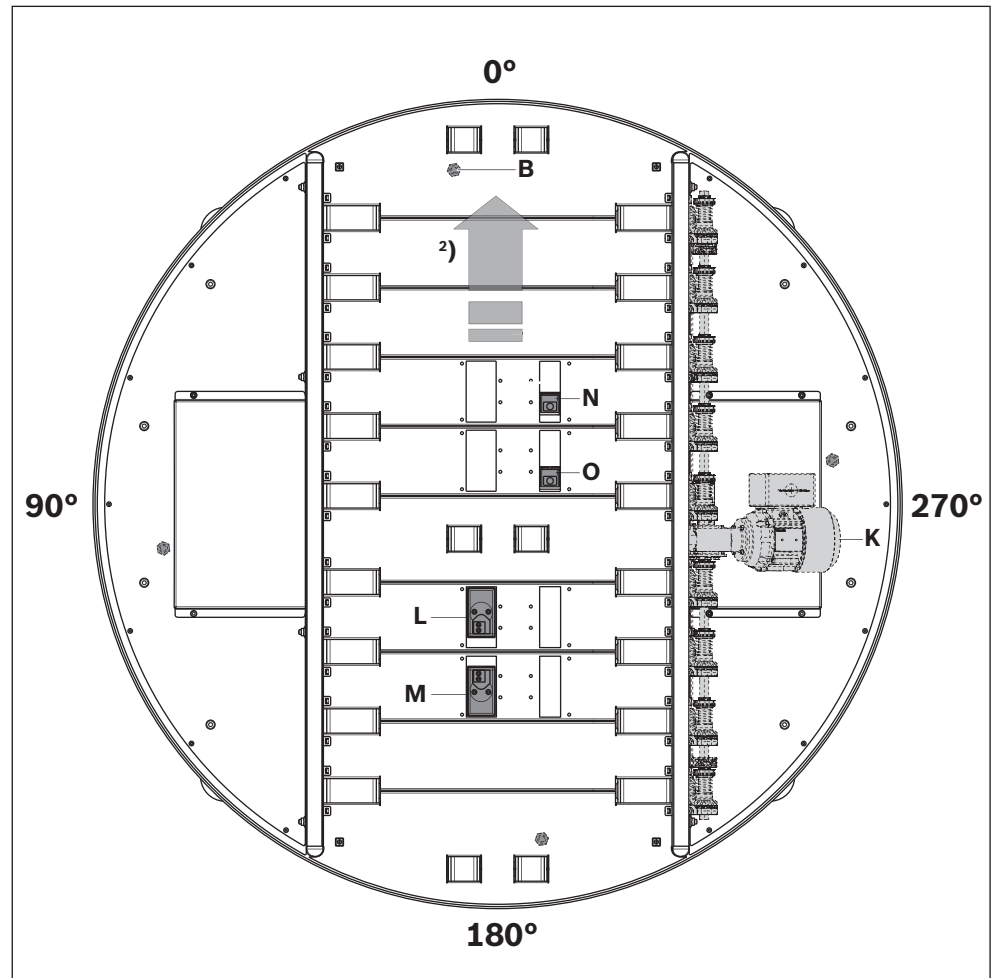
**Fig. 14: Sensors and actuators of rotary movement (illustrated: DE 5 with split rollers in condition on delivery)**

559 195-11

### Sensors and actuators of AS 5 drive unit

- The drive (K) moves the workpiece pallet on the AS 5 drive unit.
  - The sensors (O, P) localize the position of the workpiece pallet.
  - The sensors (N, O) indicate reaching of the end position of the workpiece pallet:
    - Sensor (N) in travel direction
    - Sensor (O) in reversing direction
  - The workpiece pallet is stopped by the stop gates (L, M) in end position.
    - Stop gate (L) in travel direction
    - Stop gate (M) in reversing direction
- With the stop gate against travel direction, the workpiece pallet can be secured during the rotary movement.

- B:** Sensor to position 0°  
(iStopprampe Pos0)
- K:** Drive of the AS 5 drive unit
- L:** Stop gate,  
Stop in travel  
direction/locking <sup>1)</sup> in  
reversing direction  
(WT Stopper Links)
- M:** Stop gate,  
Stop in reversing  
direction/locking <sup>1)</sup> in  
travel direction  
(WT Stopper Rechts)
- N:** Sensor end position  
(iWT in Pos) and sensor  
(iWT Rampe Links)
- O:** Sensor  
(iWT Rampe Rechts)
- <sup>1)</sup> Securing of the position of the  
workpiece pallet during rotary  
movement.
- <sup>2)</sup> Travel direction



559 195-12

**Fig. 15: Sensors and actuators of AS 5 drive unit (illustrated: DE 5 with split rollers in condition on delivery)**

**Fig. 16: Assembling the sensors**
**Required sensors:**

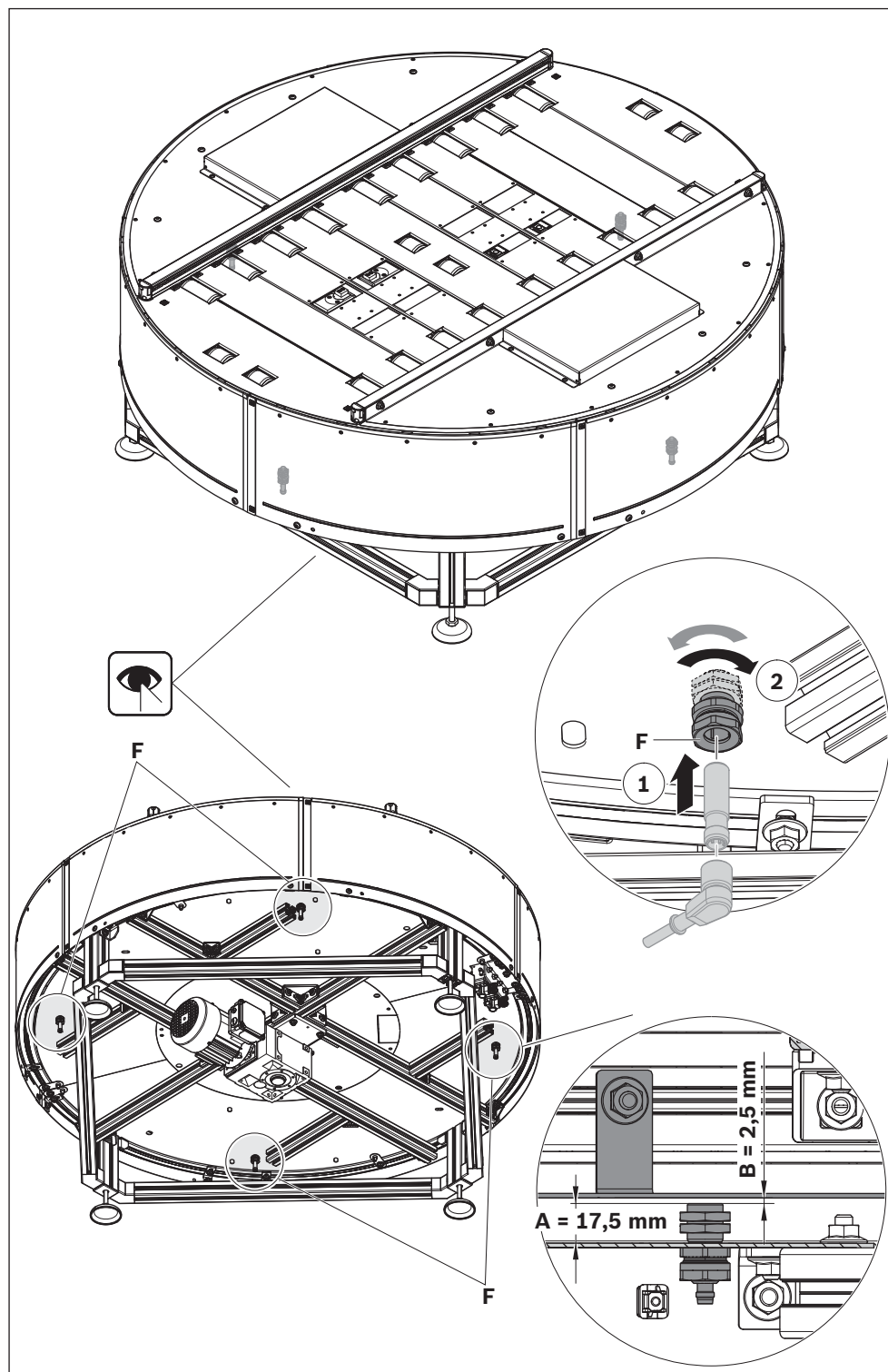
(not included in the scope of delivery)

- 4x M12,  $S_N = 4$  mm,  
flush, **3 842 549 812**  
or alternatively  
**3 842 549 814**

**A:** Screw-in depth max.  
17.5 mm

**B:** Distance of sensor  
to exciter surface  
2.5 mm

1. Fully slide the sensor  
into the clamp sleeve (F).
2. Tighten the clamp  
sleeve (F).

**For rotary movement control**

**Fig. 17: Assembling the sensors for rotary movement control (illustrated: DE 5 with split rollers)**



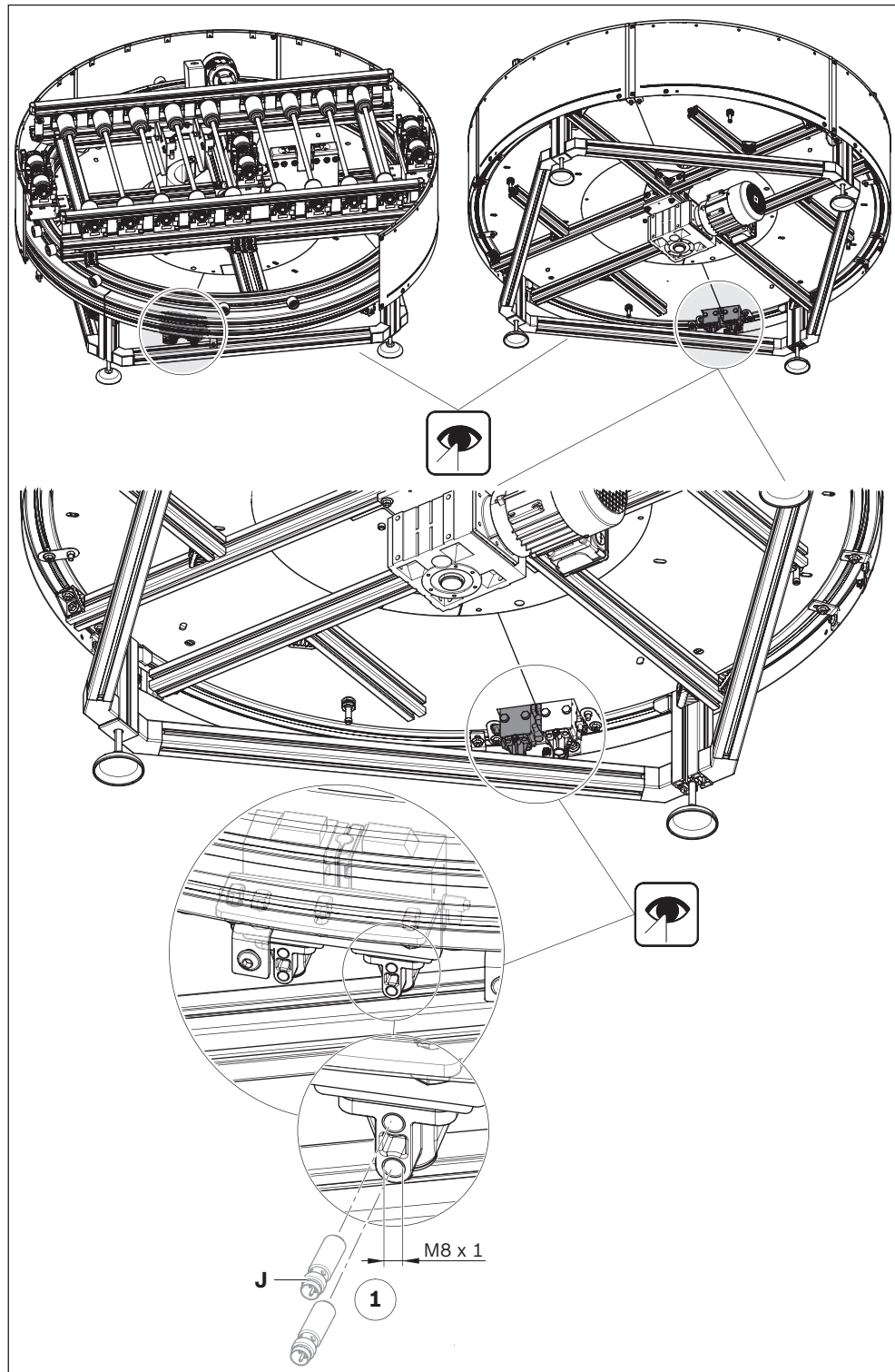
### Stopping and locking of the rotary movement

#### Stopping and locking of the rotary movement, required sensors for each VE 2/...:

(J, not included in the scope of delivery)

– 4x M8,  $S_N = 2$  mm, flush,  
**3 842 551 761**

1. Install the required position sensors in the stop gate housing.



**Fig. 18: Assembling the sensors for stopping and locking of the rotary movement**  
(illustrated: DE 5 with split rollers)

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### Workpiece pallet end position and deceleration control, required sensors:

(D, not included in the scope of delivery)

– 2x M12,  $S_N = 4$  mm,  
flush,

**3 842 549 812**

or alternatively

**3 842 549 814**

### Required accessories:

2x SH 2/U-H switch bracket  
**3 842 537 289**

1. If applicable, disassemble the protective cover in the sensor area (see page 25).
2. Install the switch bracket and the sensor.

► Install the protective covers in reverse order.

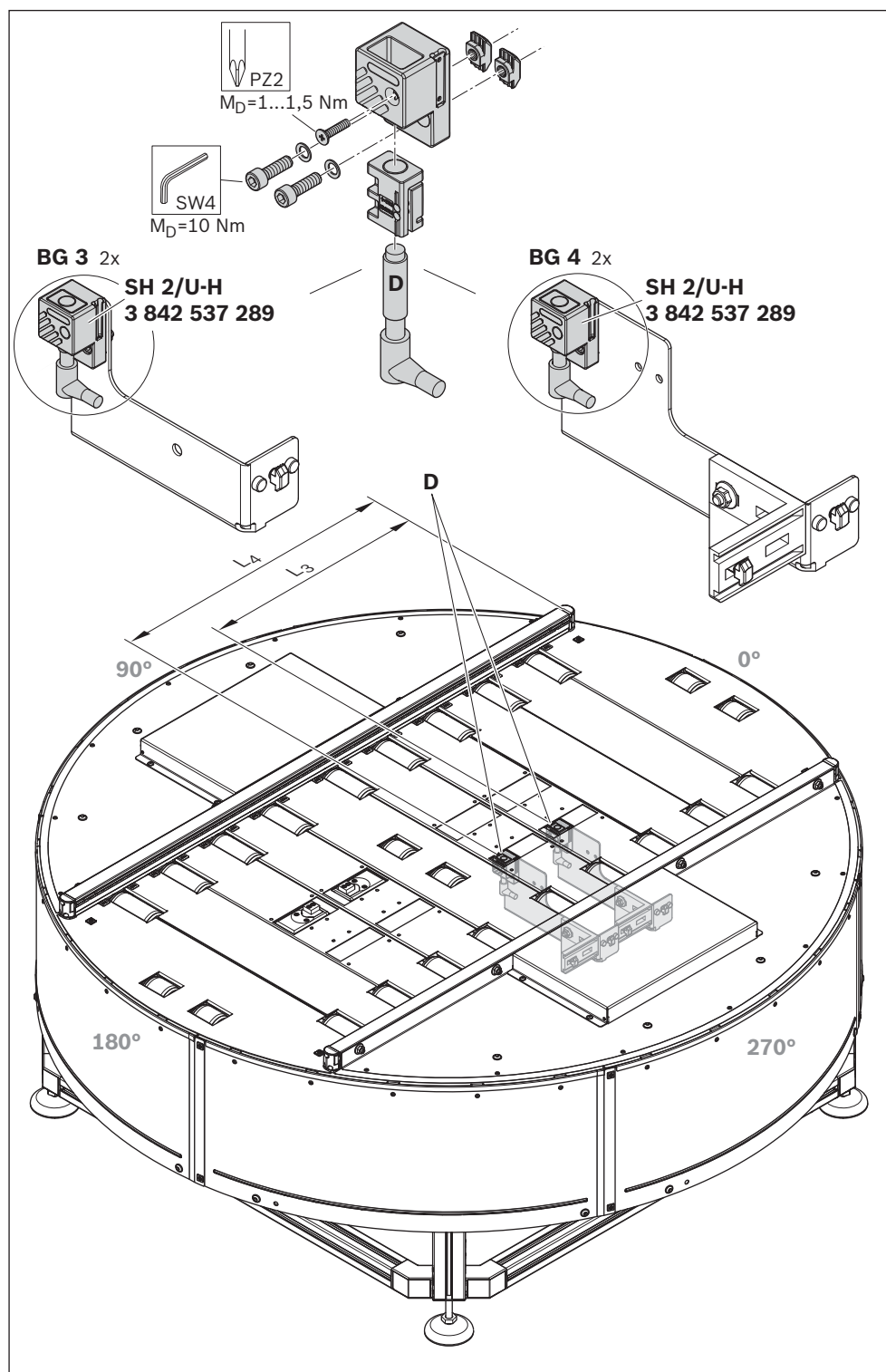
**Table 7: Position of sensors, measured from section start**

| w [mm] | $l_T$ [mm] | $l_3$ [mm] | $l_4$ [mm] |
|--------|------------|------------|------------|
| 455    | 455        | 371        | 501        |
| 455    | 650        | 534        | 664        |
| 650    | 650        | 684        | 823        |
| 650    | 845        | 706        | 845        |
| 845    | 845        | 772        | 845        |
| 845    | 1040       | 814        | 953        |

| w [mm] | $l_T$ [mm] | BG <sup>1)</sup> |
|--------|------------|------------------|
| 455    | 455        | 3                |
| 455    | 650        | 3                |
| 650    | 650        | 4                |
| 650    | 845        | 4                |
| 845    | 845        | 4                |
| 845    | 1040       | 4                |

<sup>1)</sup> Size

### WT5 end position and WT 5 deceleration control



**Fig. 19: Assembling the sensors for WT 5 end position, stopping and WT 5 locking (illustrated: DE 5 with BG 4 split rollers)**

7.6.4    Assembling the stop gates for end position and WT 5 workpiece pallet locking

- 1. If applicable, disassemble the cover (A) of the stop gate (E) to be replaced (see page 25).
- 2. Remove the stop gate.
- Install the new stop gate in reverse order.

Table 8: Position of stop gates, measured from section start

| w<br>[mm] | l <sub>T</sub><br>[mm] | L <sub>5</sub><br>[mm] | L <sub>6</sub><br>[mm] |
|-----------|------------------------|------------------------|------------------------|
| 455       | 455                    | 727                    | 796                    |
| 455       | 650                    | 727                    | 796                    |
| 650       | 650                    | 882                    | 951                    |
| 650       | 845                    | 1012                   | 1081                   |
| 845       | 845                    | 882                    | 951                    |
| 845       | 1040                   | 1012                   | 1081                   |

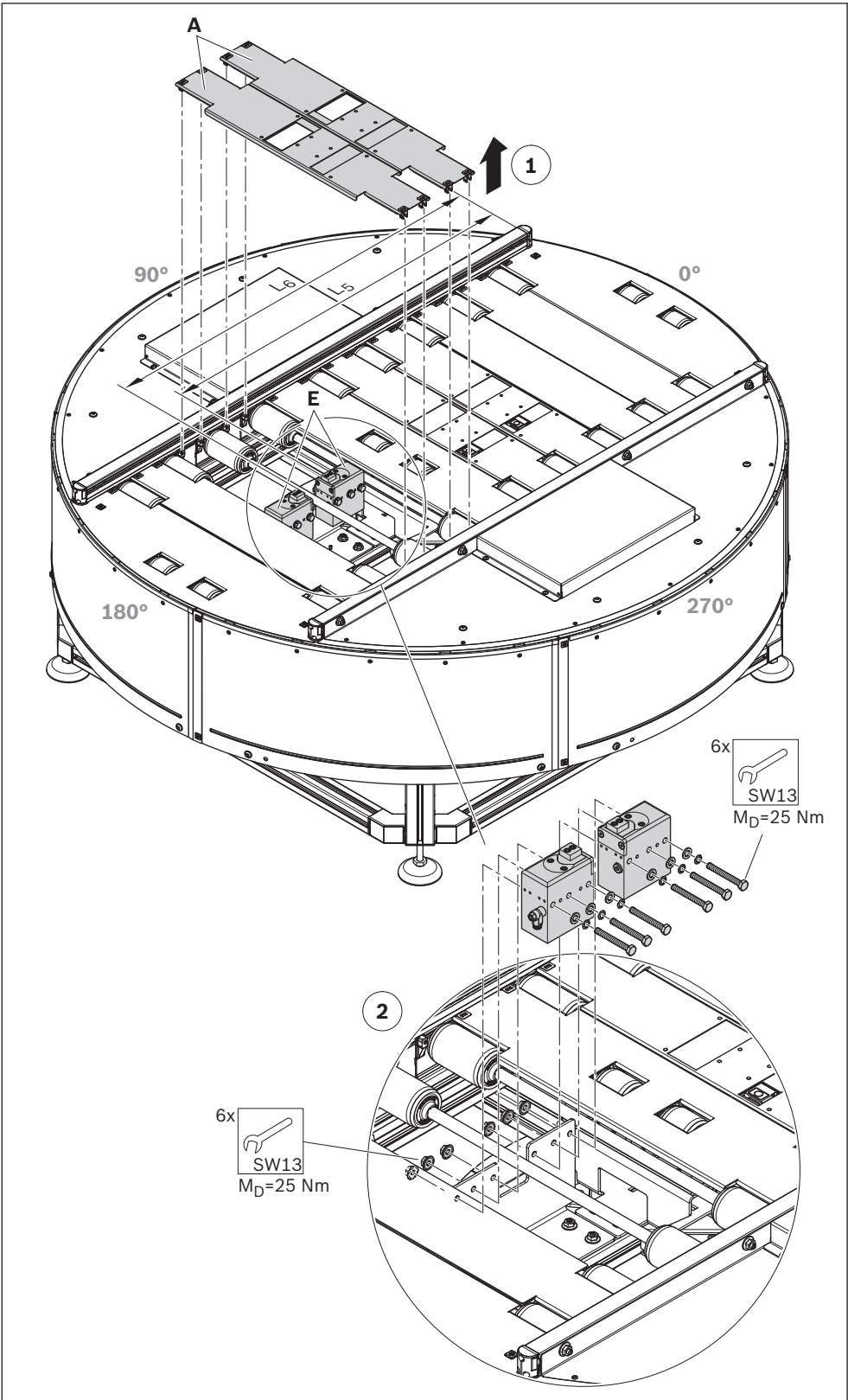


Fig. 20: Assembling the stop gates for end position and WT 5 workpiece pallet locking (illustrated: DE 5 with split rollers)



**Required accessories:**

- 2x I/O module (PROFIBUS® or Ethernet, not included in the scope of delivery)
  - For connection of proximity switches for control of the workpiece pallet
  - For connection of necessary solenoid valves for control of the stop gates
- Solenoid valves for control of the stop gates

**7.6.5 Connecting lines in cable drag chain of the rotate unit**

**WARNING**
**High electrical voltage!**

Risk of severe injury or death from electric shock.

- ▶ Disconnect the relevant system component before performing any maintenance or repair work.
- ▶ Secure the system against being switched back on unintentionally.

- Choose control and sensor elements in accordance with EN ISO 13849. Factor in the load being transported and the transport speed.
- Electrical work may only be carried out by qualified personnel! (e.g. connecting the motor)
- Comply with the standard DIN EN 60204 (previously: VDE regulation VDE 0100) for Germany, or the corresponding regulations in the country of use.
- The motors **must always be** operated at frequency converters as only stop gates without damping are used for rotary movement control and control of the deceleration of WT 5.

The lines routed in the condition on delivery in the cable drag are required for connection of the motor/motors of the drive unit and for control of the workpiece pallet.

Wiring/connection is to be realized by the customer.

- The motor cable with plug is directly connected to the motor (motors) of the drive unit (see chapter 7.6.7 Electrical connection of the product).
- Connection
  - of proximity switches for control of the workpiece pallet and
  - of necessary solenoid valves for control of the stop gates
 is realized via a customer-side I/O module.
- Voltage supply of customer-side I/O module (24 V DC) is realized via a supply line in the cable drag.
- PE conductor connection to the top rotary table is also realized via an electrical line in the cable drag.
- For compressed air supply of the stop gates (via customer-side solenoid valves), a compressed air hose is included in the cable drag (see chapter 7.6.6 Pneumatic connection of the product).
- Communication with the PLC is realized in the cable drag via
  - Ethernet cables
  - PROFIBUS® cables
  - Bus cables (e.g. Rexroth S-Bus)

## NOTICE

### **Risk of damage to the rotate unit and malfunctions due to incorrect cable routing!**

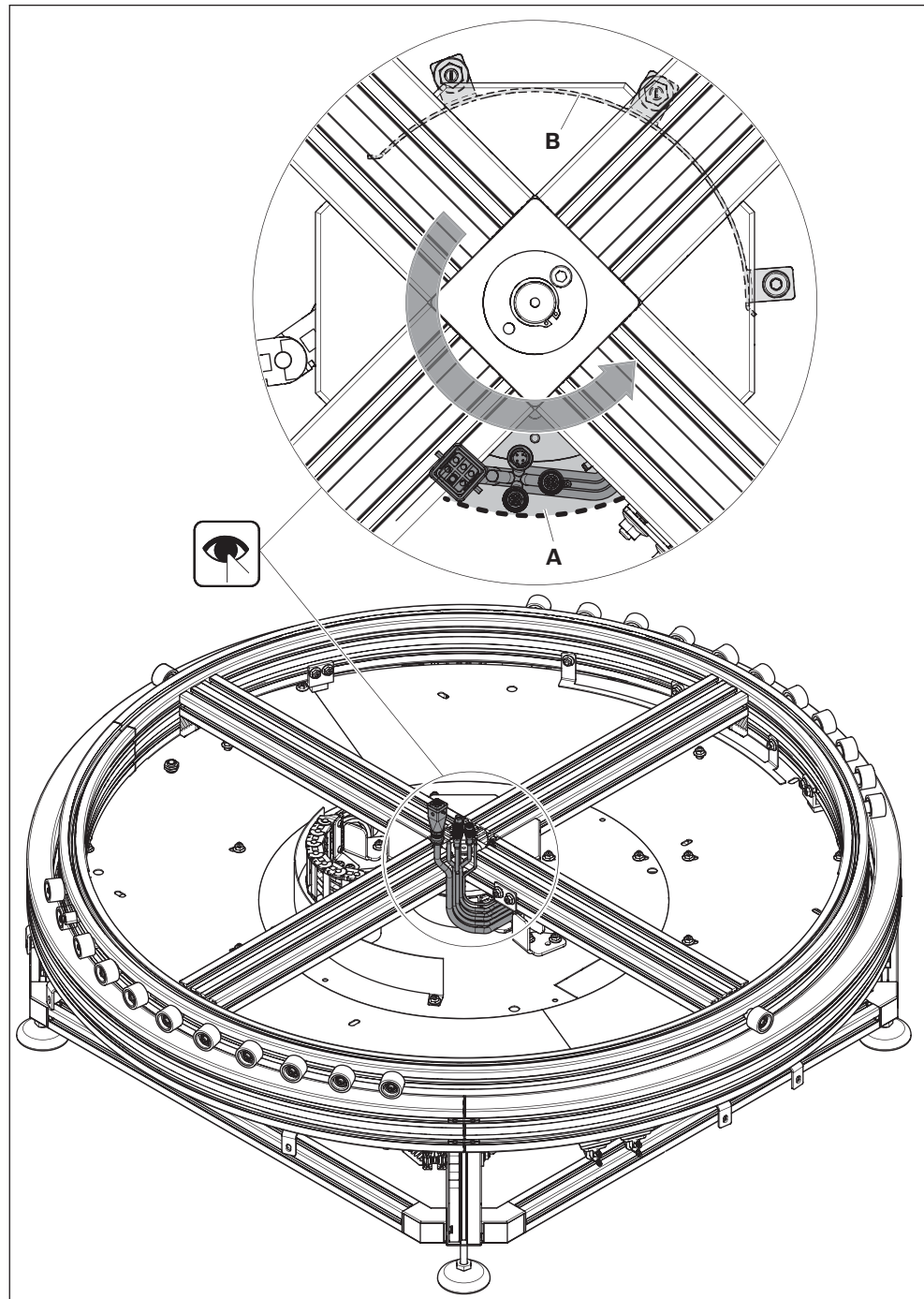
In case of incorrect routing of the lines in the cable drag, damage and possible malfunctions may occur.

- Route the lines in the cable drag in the marked area in such a way that there is no contact between lines and the fixed baffle during rotary movement.

- Route the lines in the cable drag in the permissible area (A) in such a way that there is no contact between lines and the fixed baffle (B) during rotary movement.

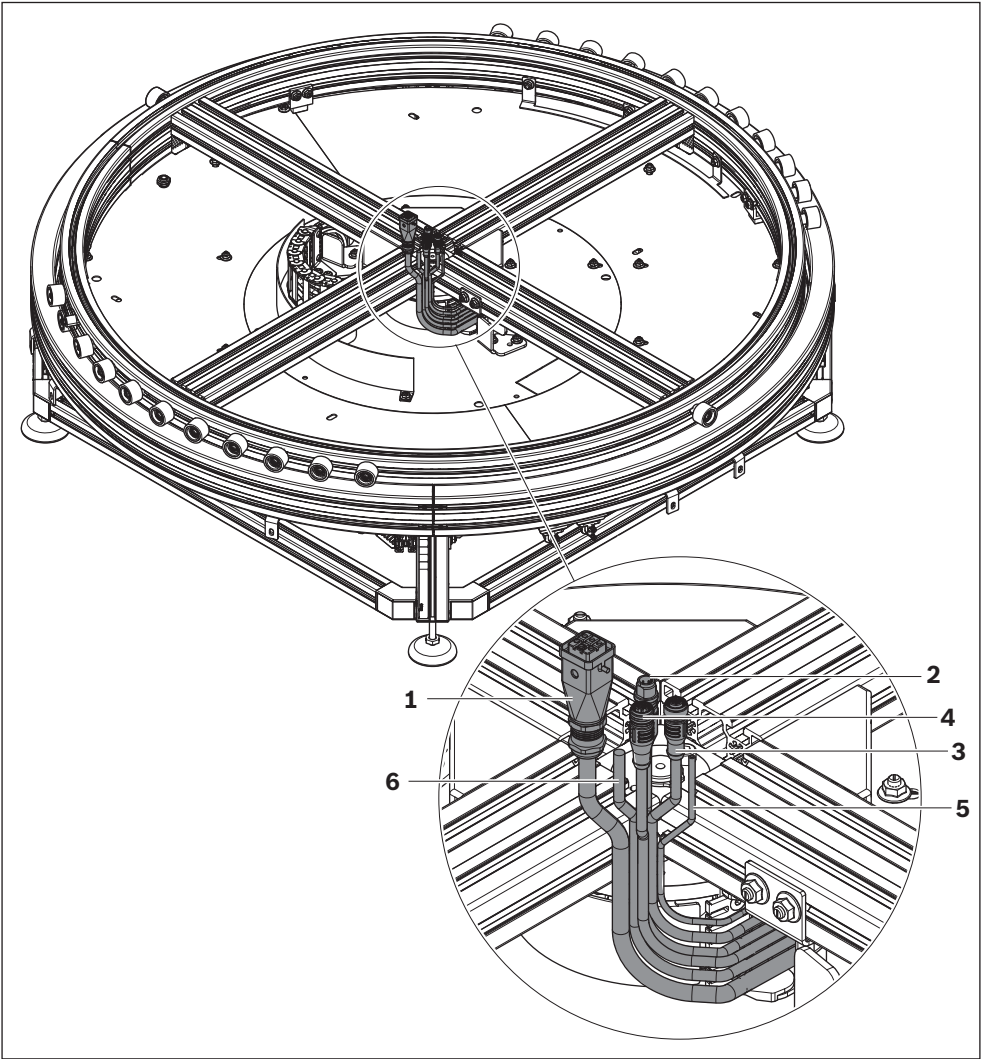
**A:** Permissible area for cable routing

**B:** Baffle



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**Fig. 21: Routing of lines in cable drag; top view of the rotate unit**



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Fig. 22: Top outlet at cable drag, top view

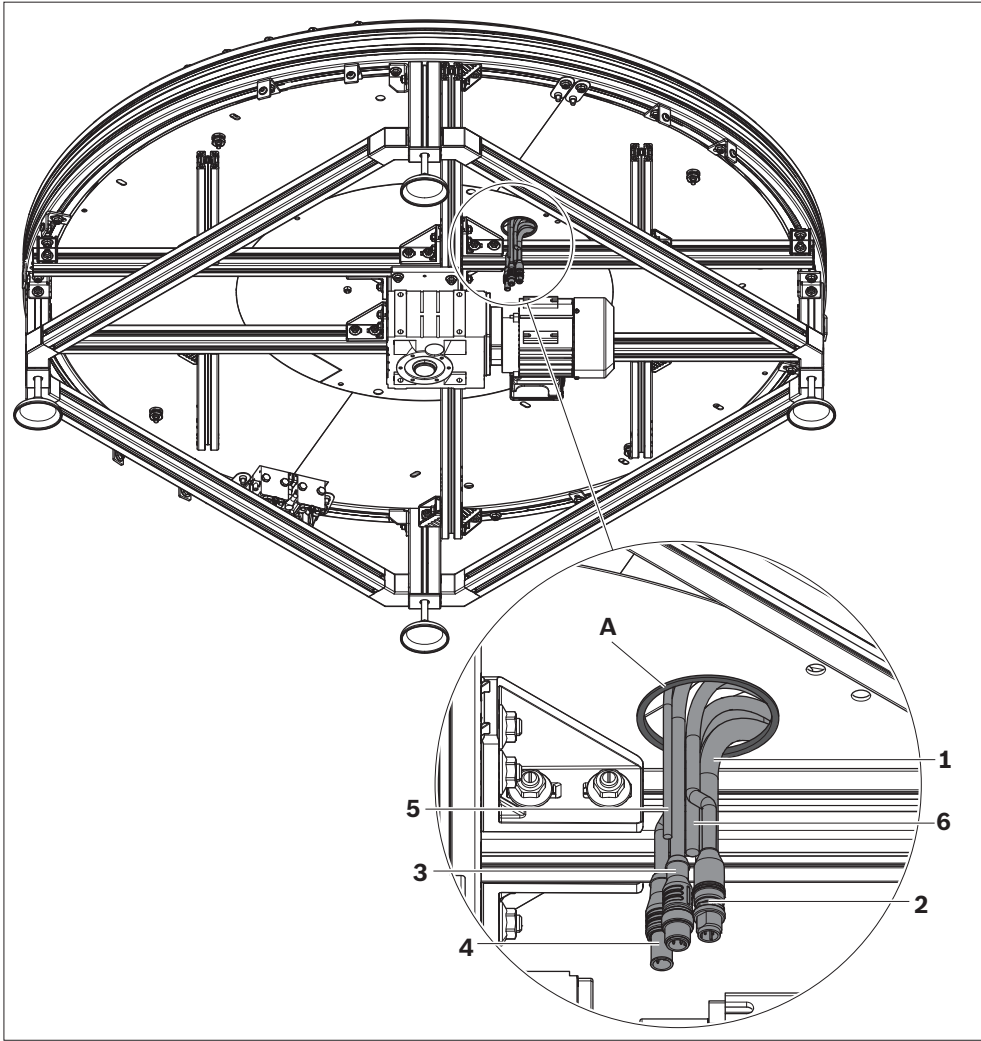
| Position          | Designation                                                            | Socket labeling | Description                                                               |
|-------------------|------------------------------------------------------------------------|-----------------|---------------------------------------------------------------------------|
| 1                 | Motor cable for drive unit motor                                       | =RU+CB-X2M1     | 4 x 1.5 mm <sup>2</sup> + 2 x 0.75 mm <sup>2</sup> with connection socket |
| 1.1 <sup>1)</sup> | Motor cable for 2nd motor drive unit                                   | =RU+CB-X2M2     | 4 x 1.5 mm <sup>2</sup> + 2 x 0.75 mm <sup>2</sup> with connection socket |
| 2                 | Supply line 24 V DC for I/O module (customer-side)                     | =RU+RU-X2PDC    | Socket M12 x 1, 4-pin, A-coded                                            |
| 3                 | PROFIBUS® cables                                                       | =RU+RU-X2DP     | Socket M12 0°, shielded, B-coded                                          |
| 4                 | Ethernet cables                                                        | =RU+RU-X2ETH    | Plug M12 0°, CAT 5, D-coded                                               |
| 5                 | Compressed air hose for stop gates (via customer-side solenoid valves) | –               | Compressed air hose Ø 6 mm, wall thickness 1.05 mm                        |
| 6                 | PE conductor for top rotary table                                      | –               | PE conductor 1 x 6 mm <sup>2</sup>                                        |

<sup>1)</sup> Second motor cable only with DE 5/OC with two drives (DD = 3)



**Please note:**

- Make sure that the edge protector (A) is attached.
- Do not operate the rotate unit without edge protector. This may lead to damage at lines and potential malfunctions.



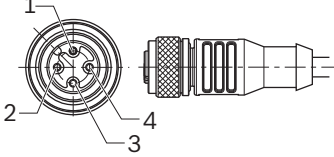
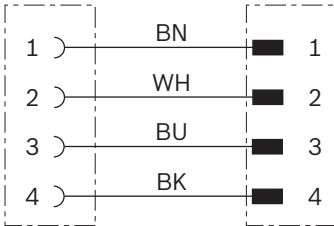
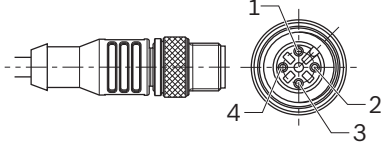
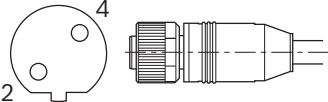
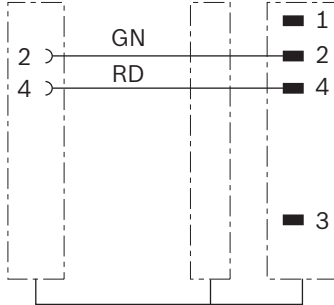
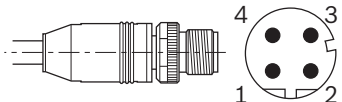
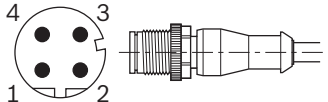
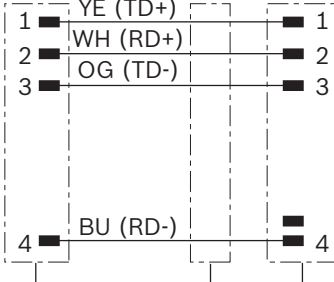
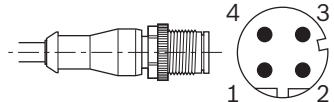
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**Fig. 23: Bottom outlet at cable drag, bottom view**

| Position          | Designation                                                            | Plug labeling | Line labeling | Description                                        |
|-------------------|------------------------------------------------------------------------|---------------|---------------|----------------------------------------------------|
| 1                 | Motor cable for drive unit motor                                       | =RU+CB-X1M1   | =RU+CB-W2M1   | 4 x 1.5 mm <sup>2</sup> + 2 x 0.75 mm <sup>2</sup> |
| 1.1 <sup>1)</sup> | Motor cable for 2nd motor drive unit                                   | =RU+CB-X1M2   | =RU+CB-W2M2   | open cable end                                     |
| 2                 | Supply line for I/O module (customer-side)                             | =RU+RU-X1PDC  | =RU+RU-W2PDC  | Plug M12 x 1, 4-pin, A-coded                       |
| 3                 | PROFIBUS® cables                                                       | =RU+RU-X1DP   | =RU+RU-W2DP   | Plug M12 0°, shielded, B-coded                     |
| 4                 | Ethernet cables                                                        | =RU+RU-X1ETH  | =RU+RU-W2ETH  | Plug M12 0°, CAT 5, D-coded                        |
| 5                 | Compressed air hose for stop gates (via customer-side solenoid valves) | –             | –             | Compressed air hose Ø 6 mm, wall thickness 1.05 mm |
| 6                 | PE conductor for top rotary table                                      | –             | –             | PE conductor 1 x 6 mm <sup>2</sup>                 |

<sup>1)</sup> Second motor cable only with DE 5/OC with two drives (DD = 3)

Connection lines in cable drag (pos. 2 to 4)

| Position/<br>Designation                                      | Top outlet<br>Cable drag                                                            | Connection diagram                                                                   | Bottom outlet<br>Cable drag                                                           |
|---------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 2<br>Supply line 24 V DC<br>for I/O module<br>(customer-side) |    |    |    |
| 3<br>PROFIBUS® cables                                         |    |    |    |
| 4<br>Ethernet cables                                          |  |  |  |

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### 7.6.6 Pneumatic connection of the product



## WARNING

#### High pneumatic pressure!

Risk of severe injury or death.

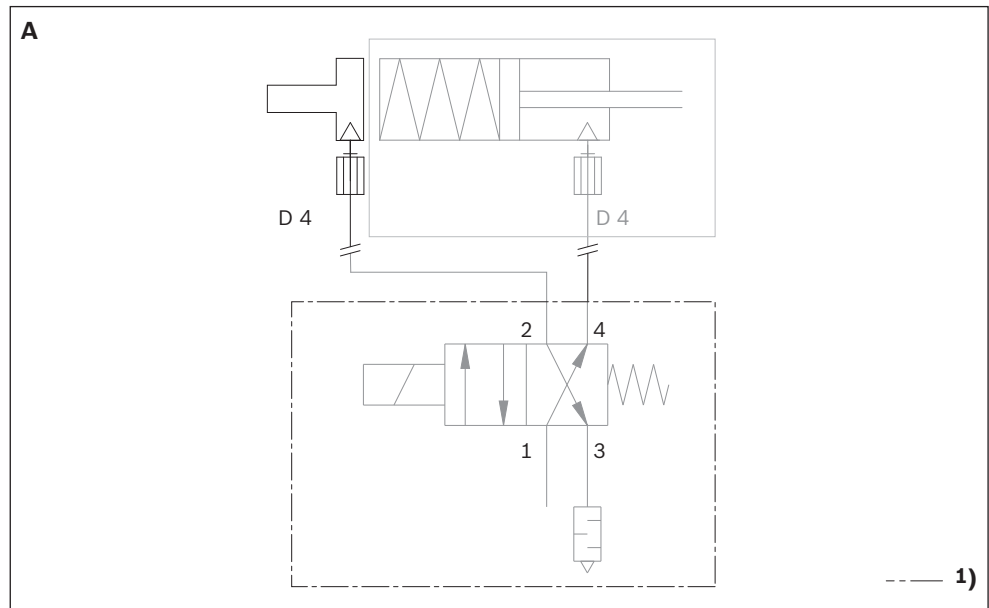
- ▶ Switch off the compressed air supply to the relevant system component before assembling, disassembling or connecting the product to the pneumatic system.
- ▶ Secure the system against being switched back on unintentionally.

- For the compressed air and operating pressure specifications, see page 67.

Connect the DE 5 to the compressed air supply.

**A:** Stop gate with position sensor and active running in

**1)** Not included in the scope of delivery



**Fig. 24: Pneumatic diagram**

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### Required accessories:

2x frequency converters  
(not included in the scope of delivery)

- 1 x for motor for rotary movement
- 1 x for motor (motors) of drive unit (deceleration and start-up of the workpiece pallet)

## 7.6.7 Electrical connection of the product



### WARNING

#### High electrical voltage!

Risk of severe injury or death from electric shock.

- ▶ Disconnect the relevant system component before performing any maintenance or repair work.
- ▶ Secure the system against being switched back on unintentionally.

- Choose control and sensor elements in accordance with EN ISO 13849. Factor in the load being transported and the transport speed.
- Electrical work may only be carried out by qualified personnel! (e.g. connecting the motor)
- Comply with the standard DIN EN 60204 (previously: VDE regulation VDE 0100) for Germany, or the corresponding regulations in the country of use.
- The motors **must always be** operated at frequency converters as only stop gates without damping are used for rotary movement control and control of the deceleration of WT 5.

#### Motor connection

- Observe the available supply voltage!
- Observe the electrical power requirement shown on the motor nameplate, see Fig. 25 on page 42.
- Connect the motor in either a wye or a delta configuration in accordance with the connection diagrams, see Fig. 26 on page 42.
- The motor is fitted with a bimetal temperature monitoring switch (potential-free thermal contact, 230 V AC, 300 mA). Wire the motor so that it is de-energized when the switch is triggered.
- Insert the cable so that it cannot get damaged during operation.
- Motor connection with plug (AT = S), see Fig. 27 on page 42. Observe the pre-fuse!

#### Checking the frequency converter parameters

(Frequency converter not included in the scope of delivery)

- Compare the preset parameters of the frequency converter with the motor nameplate.
- Parameterize the frequency converter according to the motor nameplate.

#### Checking the rotational direction of the motor

- Let the system run for no more than 2 secs., then ensure the correct rotational direction of the motor.
- Switch any two wires (U1, V1 or W1, see Fig. 26 on page 42) to change the motor's rotational direction.



#### Please note:

For motors that come with a fitted plug, correct the rotational direction in the control cabinet or at the socket contact (socket side). This makes replacement easier.

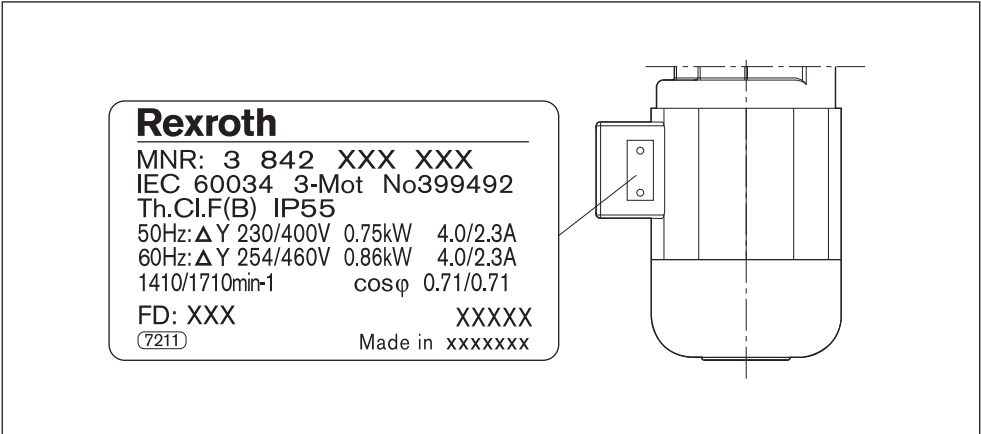


Fig. 25: Motor nameplate (example)

Installation\_A

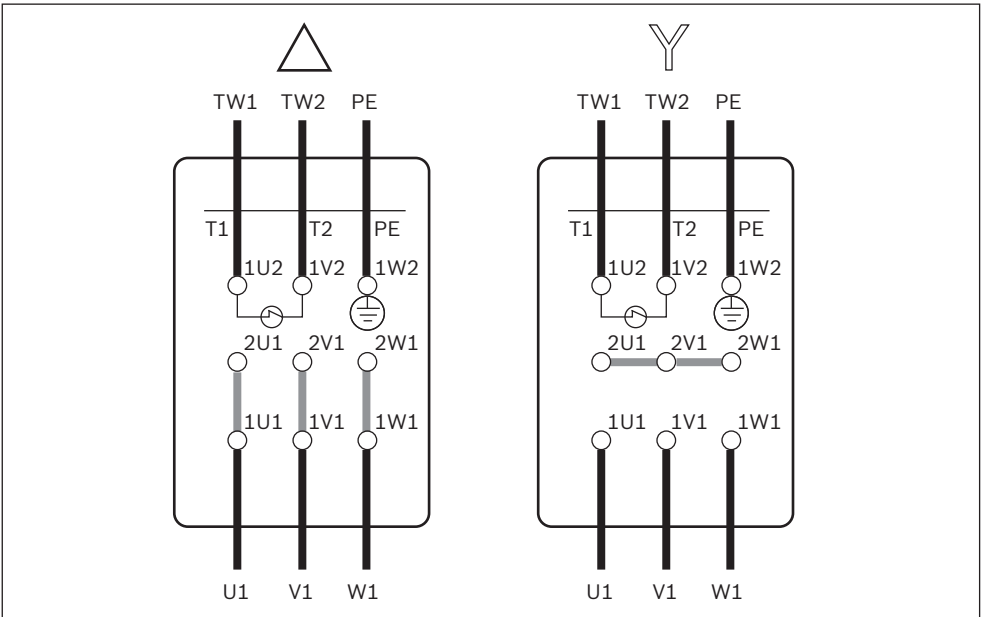


Fig. 26: Delta/wye connection diagrams

Installation\_DY

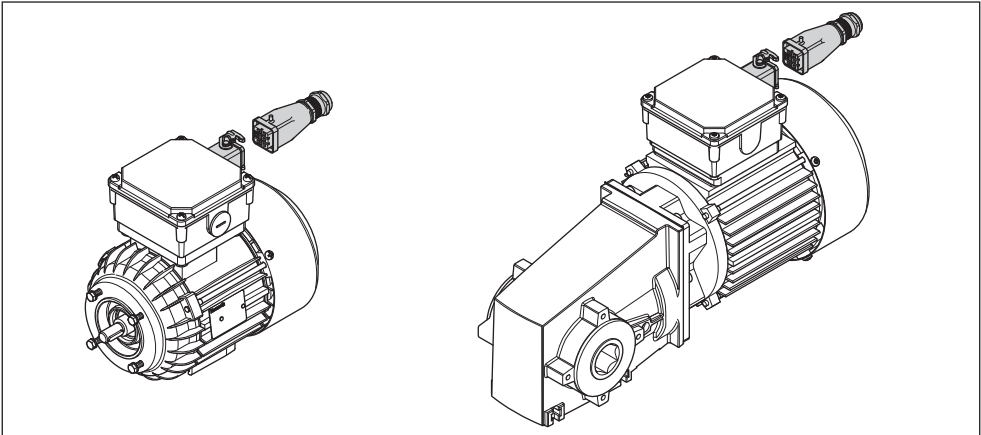
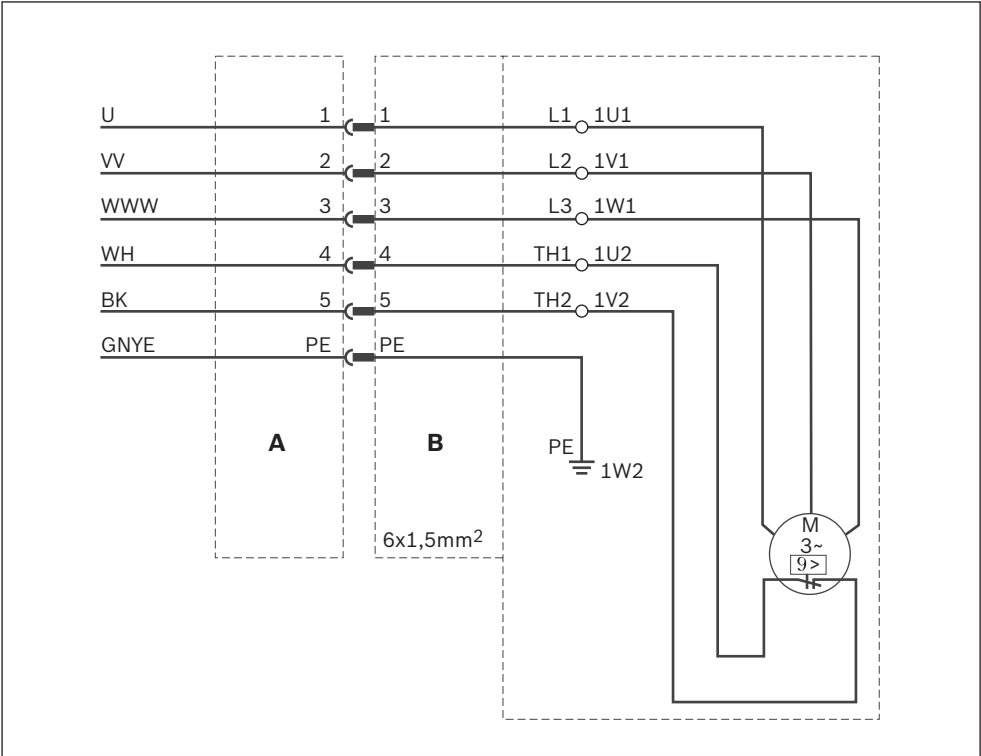


Fig. 27: Motor connection with plug (AT = S)

Installation\_IEC





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**Fig. 28: Motor connection with plug (AT = S), circuit diagram**

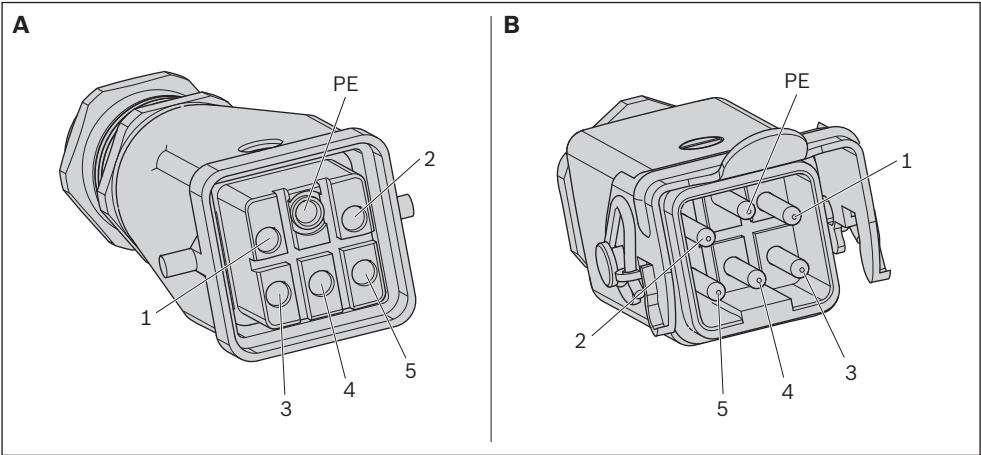
**A:** Connection cable side

**B:** Motor side

The connector consists of UL components.

**Connection list**

| Connection terminals, no. | Pin | Code | Wire color |
|---------------------------|-----|------|------------|
| U1                        | 1   | L1   | U          |
| V1                        | 2   | L2   | VV         |
| W1                        | 3   | L3   | WWW        |
| TW1                       | 4   | TH1  | WH         |
| TW2                       | 5   | TH2  | BK         |
|                           | PE  | PE   | GNYE       |



Installation\_Stecker

**Fig. 29: Motor connection with plug (AT = S), connector**

**A:** Connection cable side

**B:** Motor side

## 8 Commissioning

### 8.1 Initial commissioning



#### WARNING

##### Sudden movements!

Risk of severe injury or death.

- ▶ Do not reach into moving parts during operation.
- ▶ Before commissioning, ensure that nobody is within the range of the rotate unit.
- ▶ Do not initiate rotary movement unless it is ensured that no objects are within the transitions from the rotate unit to connected section.



#### CAUTION

##### Sudden movements, falling workpiece pallets

- ▶ Injuries caused by falling objects.
- ▶ Make sure that the product has been installed properly by qualified personnel (see page 8) before starting it up.

#### NOTICE

##### Malfunctions due to incorrect assembly and commissioning

The product can get damaged, shortening its service life.

- ▶ Commissioning requires basic mechanical, pneumatic and electrical knowledge.
- ▶ The product should only be commissioned by qualified personnel (see page 8).

##### Short-circuit in the motor due to ingress of fluids

The product can get damaged, shortening its service life.

- ▶ Make sure that all electrical connections are either used or covered. Make sure that all bolted connections and plug-in connections are properly seated.

##### Malfunctions due to incorrectly set or non-configured end position switches

The product can get damaged, shortening its service life.

- ▶ Make sure that the travel range is free from obstacles.
- ▶ Do not set the product to the end stop or beyond the end positions ( $0^\circ (-5^\circ)$  to  $270^\circ (+5^\circ)$  in counter-clockwise direction).  
There is one mechanical end stop for both rotational directions, rotary movements are possible in a range of  $-5^\circ$  and  $+275^\circ$ .
- ▶ Before the initial start of the program, make sure that the sensors are switching correctly.

- Before the initial commissioning or re-commissioning of a conveyor system, carry out a risk assessment in accordance with DIN EN ISO 12100.
- According to EU Machinery Directive 2006/42/EC, you must equip the transfer system with EMERGENCY STOP control devices.
- The surfaces of motors and gears can reach temperatures of over  $65^\circ\text{C}$  under certain load and operating conditions. In these cases, you must comply with the respective applicable accident prevention regulations (UVV) by taking appropriate constructive measures (safety guards) or by affixing/displaying appropriate warning signs!

- Make sure that all the electrical and pneumatic connections are either in use or covered. Make sure that all bolted connections and plug-in connections are properly seated. All relevant protective covers must be fitted.
- Only inspect and adjust continuous conveyors that are in motion or operation when the safety guards are in place.
- Observe DIN EN ISO 13857 when you remove or replace safety guards and/or bypass safety equipment.
- Test runs with open paneling should only be performed by a person with appropriate knowledge and experience using tip switches, and if there is no possibility of interference from other switching devices.
- Only commission the product if all safety equipment has been installed in the system and is ready for use.
- Only commission a product that has been completely installed.
- The motors **must always be** operated at frequency converters as only stop gates without damping are used for rotary movement control and control of the deceleration of WT 5.
- Observe the max. load and the section load of the rotate unit (see section 16 Technical data).
- Observe the permissible gravity center position on the workpiece pallet (see section 16.3).
- The maximum permissible speed and accelerations depend on the weight and gravity center position of the load.

#### 8.1.1 Test run, running in

- ▶ Do not commission the product before carrying out successful production tests.
- ▶ Travel at low speed (~5-10 % of operating speed) over the full travel distance. Check the correct setting and function of sensors.
- ▶ As necessary, optimize the interaction of mechanical and electronic systems.
- ▶ After successful test of the sequence, set the frequency converter parameters for normal operation and repeat testing the sequence at normal operating speed.
- ▶ As necessary, optimize the acceleration and deceleration times.
- ▶ **Our recommendation:**
  - Set the acceleration and deceleration times of the frequency converter to 1.5 – 2 sec. (if this time is too short, system vibrations occur due to mechanical tolerances, this prevents smooth movements)
  - Set 2 times for the deceleration ramp of the frequency converter:
    1. Section for reduction of the operating speed to reduced speed.
    2. Section for reduction of the reduced speed to standstill in the desired position.

**Setting options of the frequency converter:**

## – Harmonic movement/sequence:

Coordinate the deceleration ramp time, the reduced speed and a stopping time <sup>1)</sup> in the program to set the rotate unit to end position in a smooth movement.

Take into account any possible differences between settings for loaded and unloaded workpiece pallets.

**Please note:**

For the precise position of sensors and actuators, refer to sections 7.6.3 Fig. 14 to Fig. 15.

**Rotate unit sensors**

**A:** iDrehZuPos0

**B:** iDrehZuPos90

**C:** iStopprampe\_Pos0

**D:** iStopprampe\_Pos90

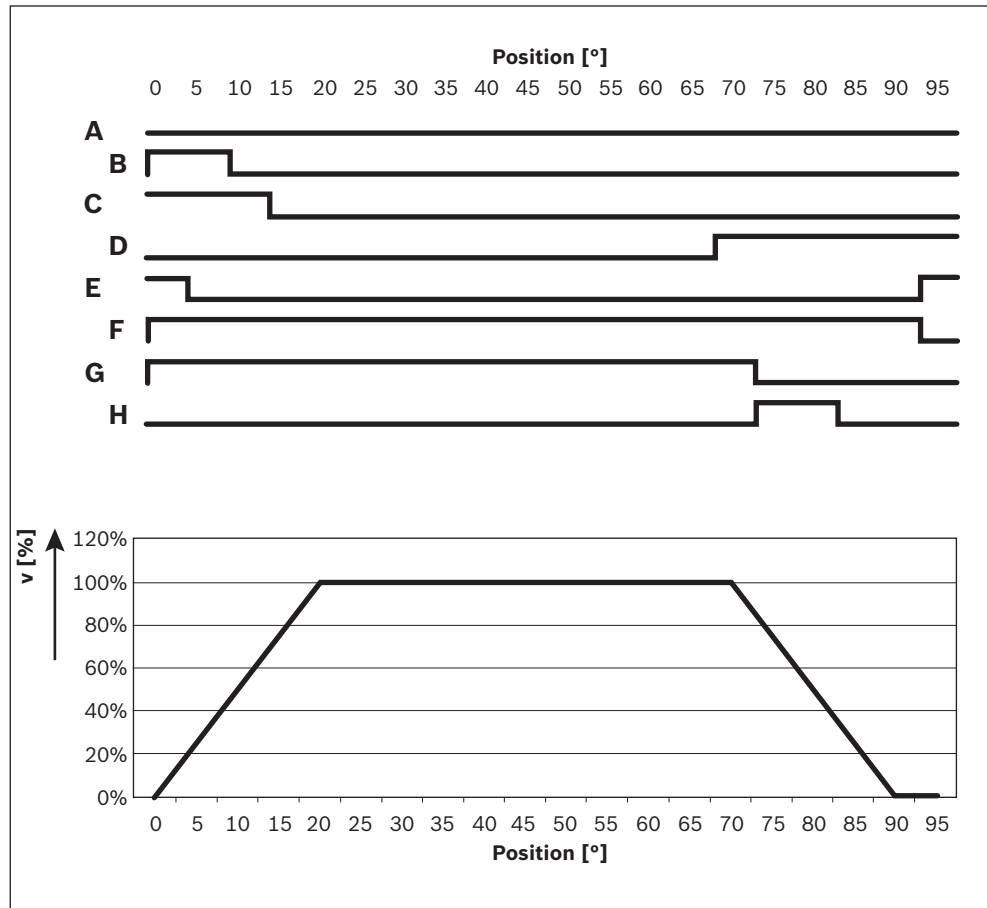
**E:** iDEinPos

**Control signals for frequency converter**

**F:** qDE\_FU\_GUZ

**G:** qDE\_FUFreq1

**H:** qDE\_FUFreq2



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**Fig. 30: Harmonic movement/sequence:**

- <sup>1)</sup> The rotate unit has not reached its end position if the sensor is reached.  
The width of the switching element exceeds the sensor width.  
Both compensates a stopping time.

– Safe sequence: the deceleration ramp time and the reduced speed are set in such a way that setting of the rotate unit to end position is identical with and without load.

In the program, a stopping time <sup>1)</sup> must be set.



**Please note:**

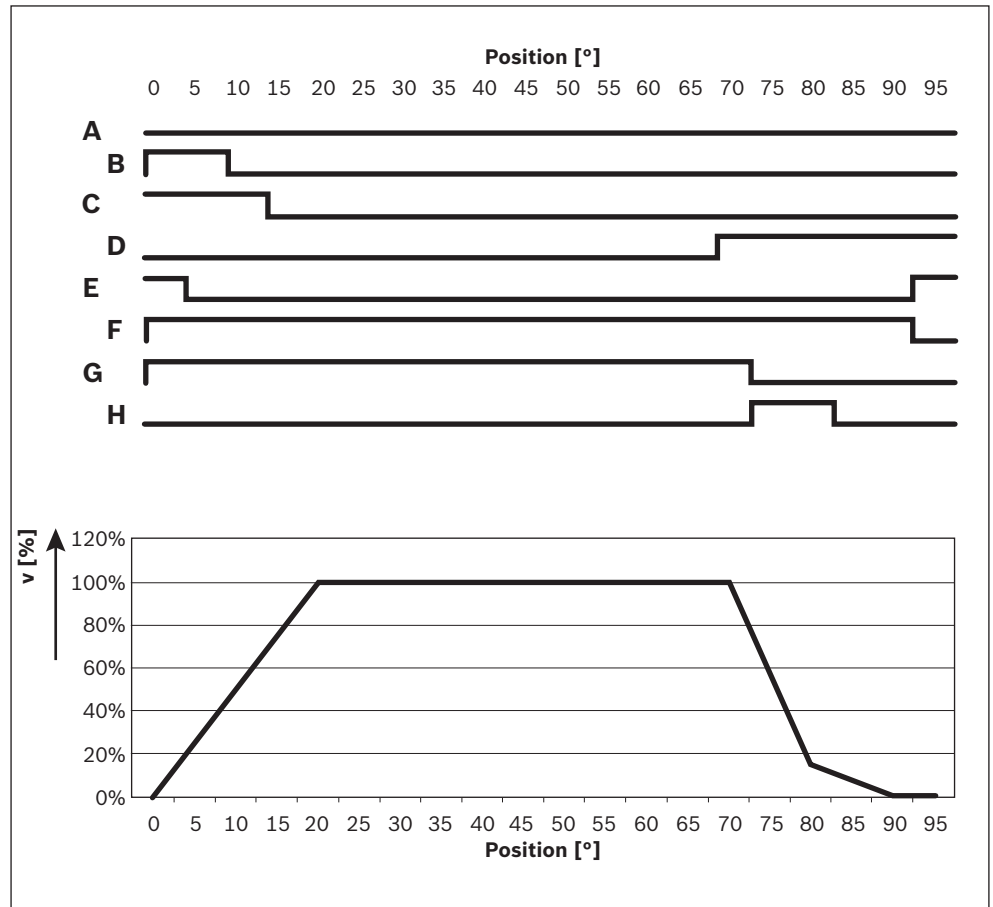
For the precise position of sensors and actuators, refer to sections 7.6.3 Fig. 14 to Fig. 15.

**Rotate unit sensors**

- A:** iDrehZuPos0
- B:** iDrehZuPos90
- C:** iStopprampe\_Pos0
- D:** iStopprampe\_Pos90
- E:** iDEinPos

**Control signals for frequency converter**

- F:** qDE\_FU\_GUZ
- G:** qDE\_FUFreq1
- H:** qDE\_FUFreq2



**Fig. 31: Safe sequence**

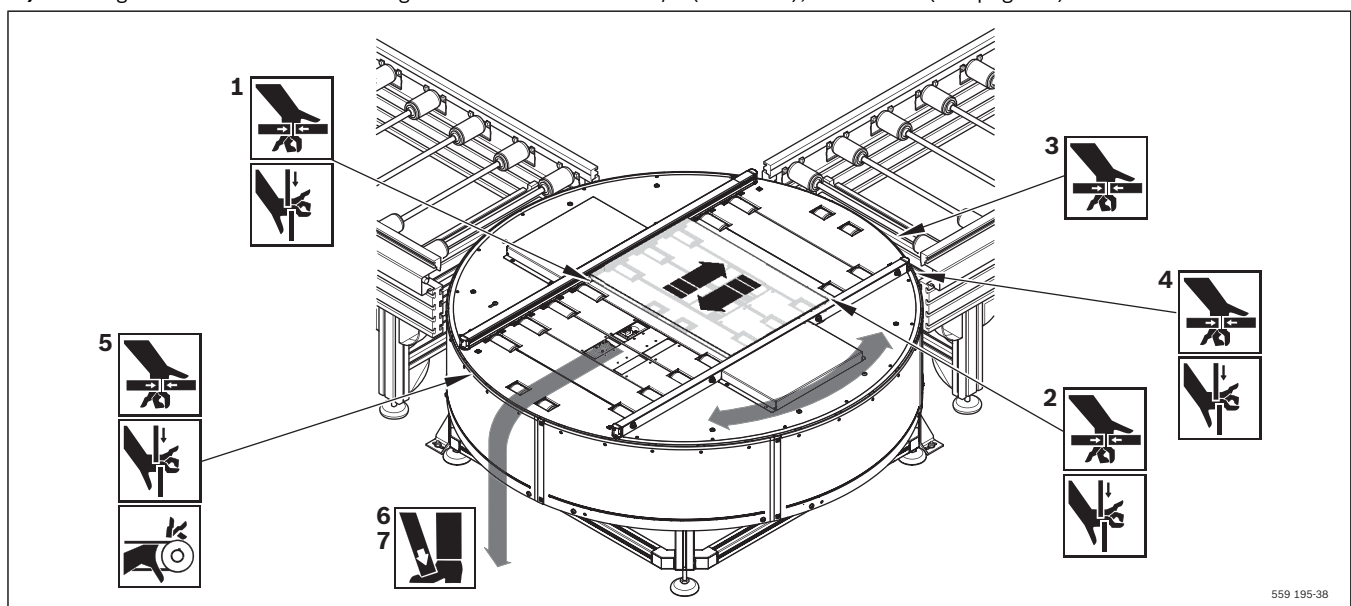
<sup>1)</sup> The rotate unit has not reached its end position if the sensor is reached.  
The width of the switching element exceeds the sensor width.  
Both compensates a stopping time.

## 8.2 Residual risks

### 8.2.1 Rotate unit DE 5 with protective covers

| Life stage <sup>1)</sup> , location |              |                                                                                                                                          | Situation                                                                | Hazard                                                                                                                                                                                                                                                         | Action                                                                                                                                                               |
|-------------------------------------|--------------|------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1                                   | 2<br>9<br>21 | Between workpiece pallet and rollers                                                                                                     | Limbs can become trapped.                                                |                                                                                                                                                                               | Crushing<br>Do not reach into the system while it is running. The hazard must be eliminated by structural measures, for example with a separating barrier.           |
| 2                                   | 2<br>9<br>21 | Between workpiece pallet and lateral guide.                                                                                              | Limbs can become trapped.                                                |                                                                                                                                                                               | Crushing<br>Do not reach into the system while it is running. The hazard must be eliminated by structural measures, for example with a separating barrier.           |
| 3                                   | 2<br>9<br>21 | Between WT and upstream/downstream section                                                                                               | Limbs can become trapped parts between WT and components of the section. |                                                                                                                                                                               | Crushing<br>Do not reach into the system while it is running. The hazard must be eliminated by structural measures, for example with a separating barrier.           |
| 4                                   | 2<br>9<br>21 | Between lateral guides upstream/downstream section and lateral guides at rotate unit during rotation                                     | Limbs can become trapped.                                                | <br>                                                                                         | Crushing, shearing<br>Do not reach into the system while it is running. The hazard must be eliminated by structural measures, for example with a separating barrier. |
| 5                                   | 2<br>9<br>21 | Between edges of the top and lateral cover sheets.                                                                                       | Limbs can become trapped.<br>Clothing or long hair can become entangled. | <br><br> | Crushing, shearing or pulling out of hair<br>Do not reach into the system while it is running. Regular safety training for employees. Wear protective clothing.      |
| 6                                   | 2<br>9<br>21 | Workpiece pallet dropping from drive unit during rotation.                                                                               | Crushing of body parts due to falling WT.                                |                                                                                                                                                                             | Crushing<br>Structural measure required, e.g. use of stop gate, operated with safety controller according to DIN EN 13849-1.                                         |
| 7                                   | 2<br>9<br>21 | During running in and out of the WT: Workpiece pallet dropping off the drive unit as the end position of the rotate unit is not reached. | Crushing of body parts due to falling WT.                                |                                                                                                                                                                             | Crushing<br>Structural measure required, e.g. use of stop gate, operated with safety controller according to DIN EN 13849-1.                                         |

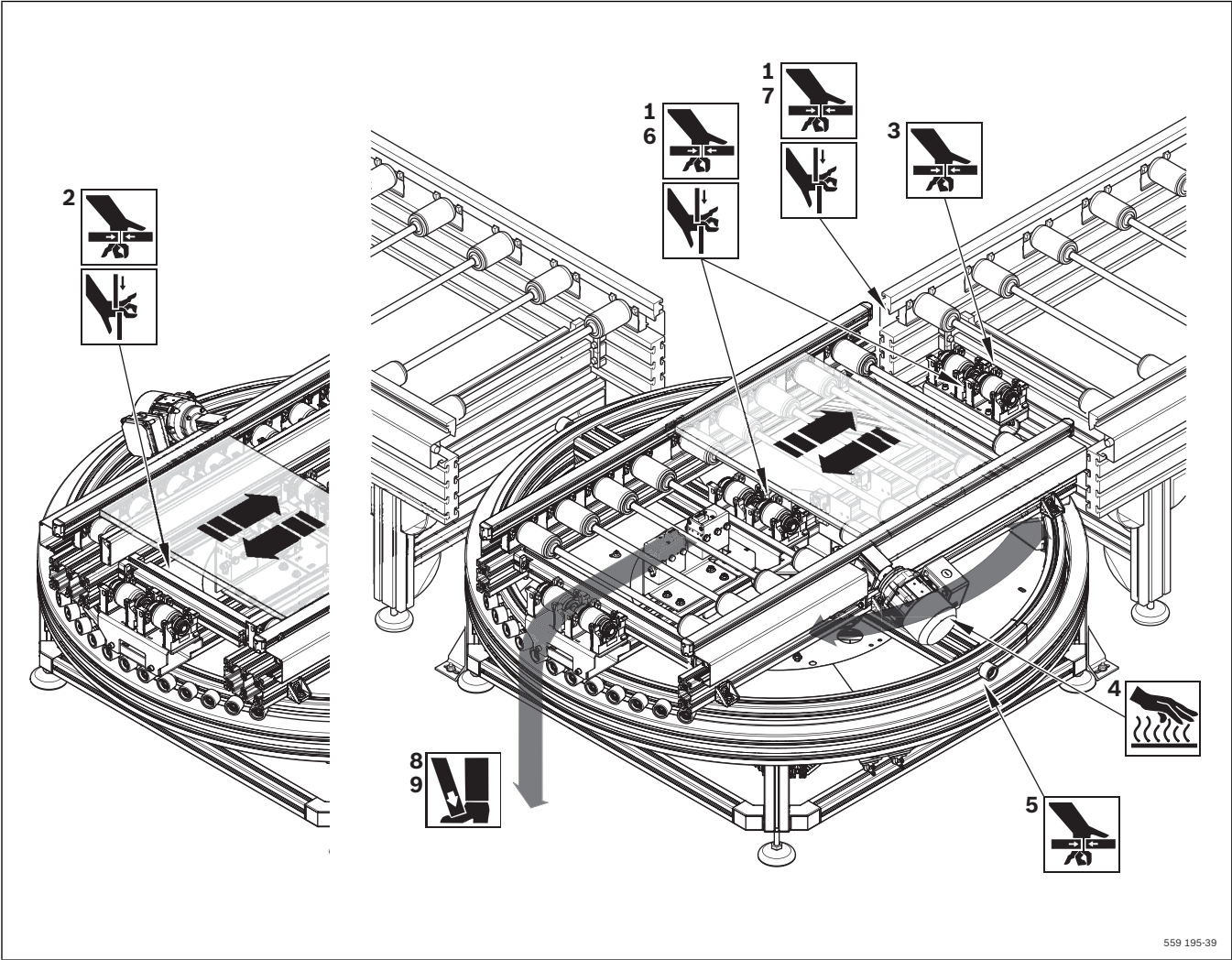
<sup>1)</sup> Life stages of the machine according to EN 12100 Sect. 5.4 a /b (No. 1- 27), Sect. 5.4 a (see page 51)



## 8.2.2 Rotate unit DE 5 without protective covers

| Life stage <sup>1)</sup> , location |   |                                                                                                                                             | Situation                                                                          | Hazard                                                                              | Action             |                                                                                                                                                                     |
|-------------------------------------|---|---------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1                                   | 2 | Between cross connector, stop gate, sensor/sensor holder, lateral guide front face frame, support rollers and moving WT.                    | Limbs can become trapped.                                                          |    | Crushing, shearing | Do not reach into the system while it is running. The hazard must be eliminated by structural measures, for example with a separating barrier.                      |
|                                     | 9 |                                                                                                                                             |                                                                                    |    |                    |                                                                                                                                                                     |
| 2                                   | 2 | DE 5-OC:<br>Between workpiece pallet and cross connector                                                                                    | Limbs can become trapped                                                           |    | Crushing, shearing | Do not reach into the system while it is running. The hazard must be eliminated by structural measures, for example with a separating barrier.                      |
|                                     | 9 |                                                                                                                                             |                                                                                    |    |                    |                                                                                                                                                                     |
| 3                                   | 2 | Between WT and upstream/downstream section                                                                                                  | Limbs can become trapped parts between WT and components of the section.           |    | Crushing           | Do not reach into the system while it is running. The hazard must be eliminated by structural measures, for example with a separating barrier.                      |
|                                     | 9 |                                                                                                                                             |                                                                                    |                                                                                     |                    |                                                                                                                                                                     |
| 4                                   | 2 | Motor/gear surface.                                                                                                                         | Contact between motor/gear and body part.                                          |    | Burning            | Motor and gears must be covered if the drive temperature exceeds 65°C. The hazard must be eliminated by structural measures, for example with a separating barrier. |
|                                     | 9 |                                                                                                                                             |                                                                                    |                                                                                     |                    |                                                                                                                                                                     |
| 5                                   | 2 | Between support wheels and running surface.                                                                                                 | Limbs can become trapped between support wheels and running surface.               |    | Crushing           | Do not reach into the system while it is running. The hazard must be eliminated by structural measures, for example with a separating barrier.                      |
|                                     | 9 |                                                                                                                                             |                                                                                    |                                                                                     |                    |                                                                                                                                                                     |
| 6                                   | 2 | Between rotating and stationary parts in the rotate unit.                                                                                   | Limbs can become trapped between rotating and stationary parts in the rotate unit. |  | Crushing, shearing | Do not reach into the system while it is running. The hazard must be eliminated by structural measures, for example with a separating barrier.                      |
|                                     | 9 |                                                                                                                                             |                                                                                    |  |                    |                                                                                                                                                                     |
| 7                                   | 2 | Between section ends of upstream/downstream sections and the section of the rotate unit during rotation.                                    | Limbs can become trapped between section ends.                                     |  | Crushing, shearing | Do not reach into the system while it is running. The hazard must be eliminated by structural measures, for example with a separating barrier.                      |
|                                     | 9 |                                                                                                                                             |                                                                                    |  |                    |                                                                                                                                                                     |
| 8                                   | 2 | Workpiece pallet dropping from drive unit during rotation.                                                                                  | Crushing of body parts due to falling WT.                                          |  | Crushing           | Structural measure required, e.g. use of stop gate, operated with safety controller according to DIN EN 13849-1.                                                    |
|                                     | 9 |                                                                                                                                             |                                                                                    |                                                                                     |                    |                                                                                                                                                                     |
| 9                                   | 2 | During running in and out of the WT:<br>Workpiece pallet dropping off the drive unit as the end position of the rotate unit is not reached. | Crushing of body parts due to falling WT.                                          |  | Crushing           | Structural measure required, e.g. use of stop gate, operated with safety controller according to DIN EN 13849-1.                                                    |
|                                     | 9 |                                                                                                                                             |                                                                                    |                                                                                     |                    |                                                                                                                                                                     |

<sup>1)</sup> Life stages of the machine according to EN 12100 Sect. 5.4 a /b (No. 1- 27), Sect. 5.4 a (see page 51)





**Life stages of the machine according to EN 12100 Sect. 5.4 a /b (No. 1- 27),  
Sect. 5.4 a**

- 1** Transport, assembly and installation
- 2** Commissioning
- 3** Use
- 4** Disassembly, decommissioning and disposal
- 5** Setting up
- 6** Verifying
- 7** Teaching/programming
- 8** Changeover
- 9** Startup
- 10** All operating modes
- 11** Feeding the machine
- 12** Removing product from the machine
- 13** Shutting the machine down
- 14** Shutting the machine down in the case of an emergency
- 15** Restoring operation after a bottleneck or blockage
- 16** Restarting after unscheduled shutdown
- 17** Troubleshooting and remedial action (intervention by operating personnel)
- 18** Cleaning and keeping clean
- 19** Preventive maintenance
- 20** Corrective maintenance

**Operating states of the machine, Sect. 5.4 b**

- 21** Normal operation
- 22** Modification of a property or a dimension of the material or workpiece to be processed
- 23** Failure of one (or more) of its components or supply devices
- 24** External disturbances (e.g. impact, vibration, electromagnetic interference)
- 25** Design faults or defects (e.g. software errors)
- 26** Disruption in the power supply
- 27** Ambient conditions (e.g. damaged floors)

### **8.3 Re-commissioning after a standstill**

Follow the steps outlined for the initial commissioning.

## 9 Operation

### CAUTION

#### **Hot electric motor surfaces during operation!**

Risk of burns from touching hot surfaces above 65 °C.

- ▶ Install appropriate guards.
- ▶ Let the unit cool down for at least 30 minutes before performing maintenance and/or repair work.

### 9.1 Information on operation

#### 9.1.1 Wear

- Individual components are subject to unavoidable wear by their very nature. Constructive measures and the selection of materials help ensure functional reliability over the full service life. However, wear is also dependent on the operating, maintenance and ambient conditions at the place of use (resistance, contamination).
- Overloading the conveyor sections can cause the conveyor medium to malfunction and lead to the premature breakdown of motors and gears.
- If pneumatically activated components are overloaded, it is not possible to guarantee their function.

#### 9.1.2 Measures to reduce wear

The following obvious measures will reduce wear:

- Switch off the conveyor section when the system is not in use, e.g. during breaks, at night and on weekends.
- Do not select a higher speed for the conveyor section than that required for the corresponding function.
- Avoid contamination caused by abrasive media, reduce contamination by cleaning on a regular basis.

#### 9.1.3 Loading the workpiece pallet

The modular units are designed and tested under the assumption that the workpiece pallets will not all have the same weight during one cycle on one conveyor section. Workpiece pallets are both loaded and unloaded.

Significantly different weights may require special measures to avoid malfunctions.

This applies to:

- Reaching of the end position with the settings for reduced speed and ramp speed.
- Setting the workpiece pallets on the drive unit back into motion.

#### 9.1.4 Environmental factors

- Our products are resistant to many media that are commonly found in manufacturing, such as water, mineral oil, grease and detergents. Contact your Rexroth representative if you have any doubts about resistance to specific chemicals, such as test oil, doped oils, aggressive cleaning agents, solvents or brake fluid.
- Avoid prolonged contact with highly reactive acidic or alkaline materials.
- Contamination can greatly increase wear – specifically from abrasive media from the surrounding area, such as sand and silicates, e.g. from construction as well as machining processes in the transfer system (e.g. welding beads, pumice powder, glass shards, chips, waste parts, etc.). Maintenance intervals should be significantly shortened under these circumstances.
- Resistance to media and contamination does not mean that functional safety is guaranteed in every case.
  - Liquids that thicken as they evaporate and become highly viscous or adhesive (sticky) can lead to malfunctions.
  - If they get carried onto systems with rollers, media which have a lubricating effect can lead to a reduction in the drive power that is transmitted via friction.In such instances, special care must be taken when planning the system, and the maintenance intervals must be correspondingly shortened.

## 10 Maintenance and repair



### WARNING

#### High electrical voltage!

Risk of severe injury or death from electric shock.

- ▶ Disconnect the relevant system component before performing any maintenance or repair work.
- ▶ Secure the system against being switched back on unintentionally.

#### High pneumatic pressure!

Risk of severe injury or death.

- ▶ Switch off the compressed air supply to the relevant system component before performing any maintenance or repair work.
- ▶ Secure the system against being switched back on unintentionally.



### CAUTION

#### Hot electric motor surfaces during operation!

Risk of burns from touching hot surfaces above 65 °C.

- ▶ Install appropriate guards.
- ▶ Let the unit cool down for at least 30 minutes before performing maintenance and/or repair work.

- Only inspect and adjust continuous conveyors that are in motion or operation when the safety guards are in place.
- Observe DIN EN ISO 13857 when you remove or replace safety guards and/or bypass safety equipment.
- Test runs with open paneling should only be performed by a person with appropriate knowledge and experience using tip switches, and if there is no possibility of interference from other switching devices.

### 10.1 Cleaning and care

#### NOTICE

##### Failure of bearings

Applying grease-dissolving substances to the bearing points, e.g. during cleaning, leads to bearing failure. There is a risk of damage to property, and the service life may be reduced.

- ▶ Keep degreasers or aggressive cleaning agents away from the bearings!
- ▶ Only clean the product with a damp cloth.

## 10.2 Inspection

### Stop gate

Check the pneumatic connections regularly for leaks.

## 10.3 Maintenance

### Bearings

The bearings have lifelong lubrication and are maintenance-free under normal conditions of use.

### Gear

The gears are maintenance-free.

### Motor

To ensure adequate cooling of the motors, regularly remove dirt and dust deposits:

- from the surface of the motor,
- from the intake openings on the fan hood,
- from between the cooling ribs.

The cleaning intervals depend on the ambient and operating conditions.

## 10.4 Replacing wear parts

### Required tools

- Hex wrench SW13.
- Hex socket wrenches SW3, SW4, SW5, SW6.
- Posidriv screwdriver PZ2
- Caliper, 500 mm
- Hammer
- Drift punch

### 10.4.1 Assembling/disassembling the protective covers of the rotate unit

See section 7.6.2 Assembling/disassembling the protective covers of the rotate unit on page 25.

### 10.4.2 Replacing the rollers/components of the drive unit

See assembly instructions for "Modular Units for TS 5 Transfer System"



#### Please note:

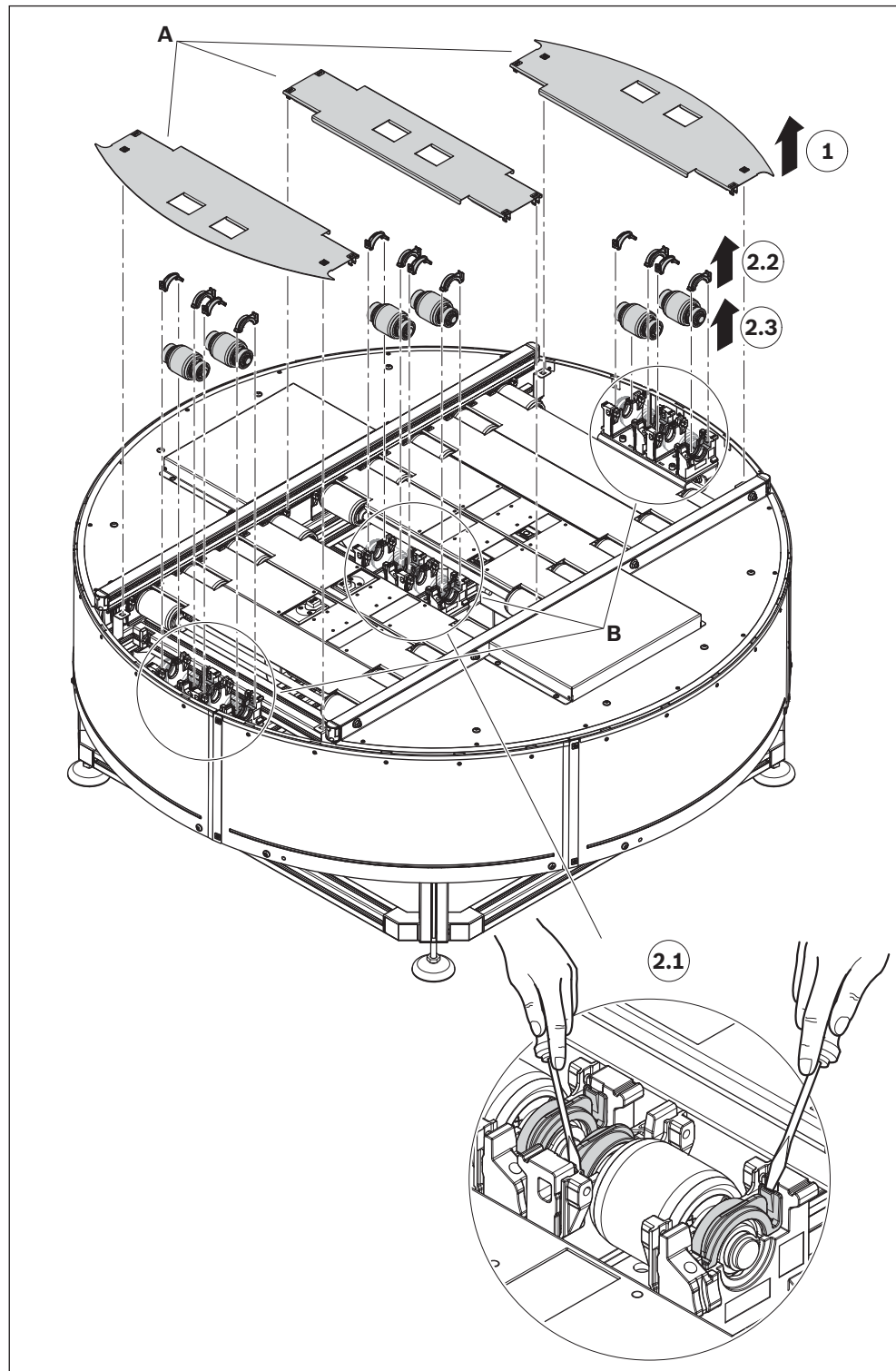
For replacement of components, the drive unit does not need to be fully disassembled as replacement is also possible, while it is installed.

For complete disassembly of the drive unit from the rotate unit:

- Mark the position of the mounting plates at the drive unit and the rotate unit.
- For installation, centrally align the drive unit to the rotate unit.

### 10.4.3 Replacing the support rollers

1. If applicable, disassemble the protective cover (A) of the support roller (B) to be replaced (see page 25).
  2. Remove the clamps and vertically lift out the roller to the top.
- Install the roller in reverse order.



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Fig. 32: Replacing the support rollers (illustrated: DE 5 with split rollers)

## 10.4.4 Replacing the motor of the AS 5 drive unit

**Please note:**

- DE 5** 1 drive side  
**DE 5/FR** 1 drive side  
**DE 5/OC** 1 or 2 drive sides,  
 depending on  
 configuration/  
 requirements

1. If applicable,  
 disassemble the  
 protective cover (A) of  
 the motor to be replaced  
 (see page 25).
  2. Remove the motor.
- Install the new motor in  
 reverse order.
3. Remove the yellow  
 protective cap "X" from  
 the motor shaft of the  
 new motor.
  4. Lubricate the motor  
 shaft before assembly.

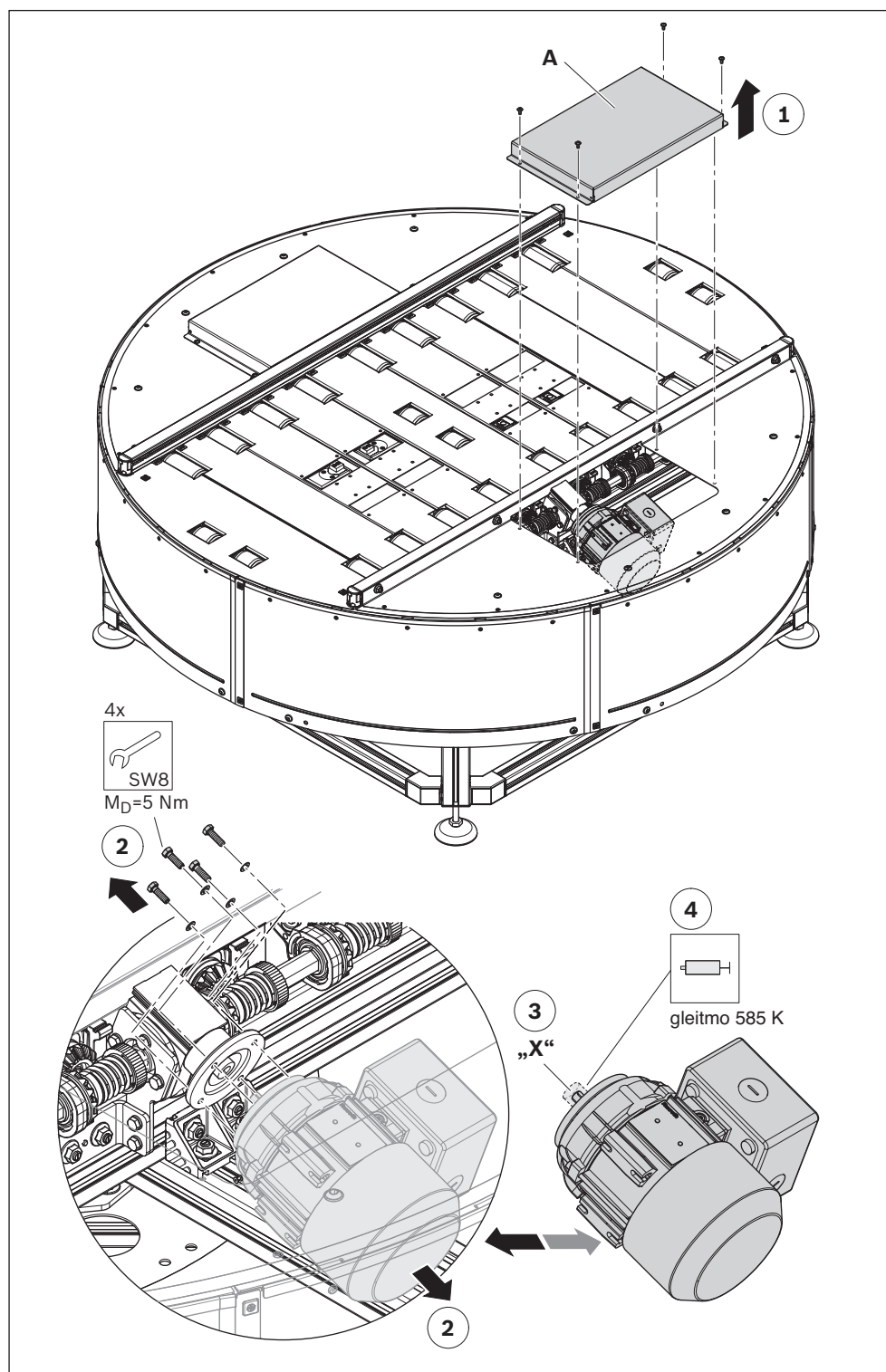


Fig. 33: Replacing the motor of the AS 5 drive unit (illustrated: DE 5 with split rollers)

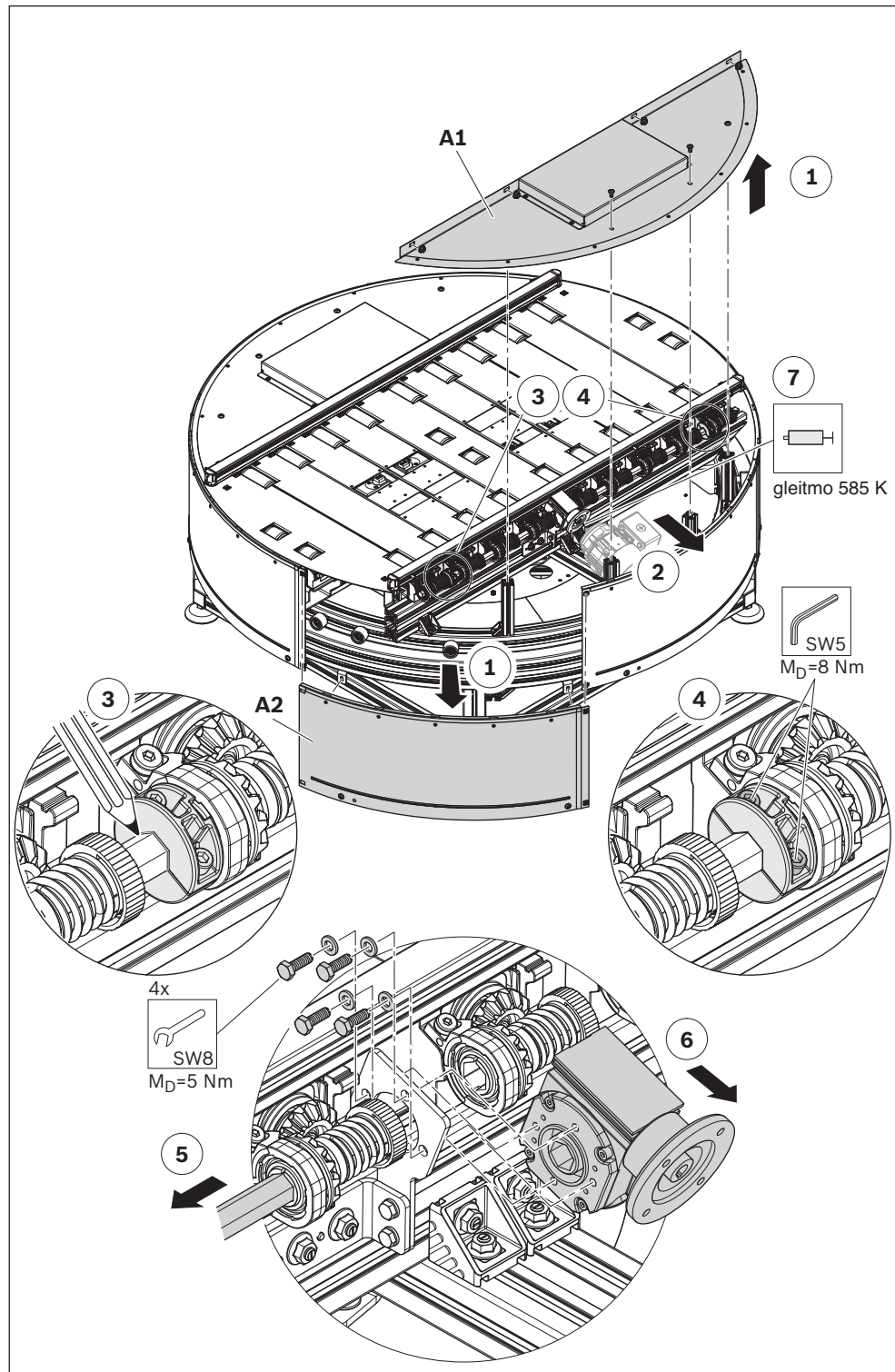
559 195-21

## 10.4.5 Replacing the gear of the AS 5 drive unit

**Please note:**

- DE 5** 1 drive side  
**DE 5/FR** 1 drive side  
**DE 5/OC** 1 or 2 drive sides,  
 depending on  
 configuration/  
 requirements

1. If applicable, disassemble the protective covers (A1 + A2) on the side of the gear to be replaced (see page 25).
  2. Dismount the motor (see page 57).
  3. Mark the position of the coupling half-shells (B) on the hexagonal shaft.
  4. Loosen the screws at the coupling half-shells
  5. Pull the hexagonal shaft out of the friction clutches until the gear is free.
  6. Remove the gear.
- Install the new gear in reverse order.
7. Lubricate the motor shaft and the hexagonal gear shaft before assembly. New gear hubs are pre-lubricated.



559 195-22

Fig. 34: Replacing the gear of the AS 5 drive unit (illustrated: DE 5 with split rollers)



#### 10.4.6 Replacing the support wheels of the rotate unit

1. If applicable, remove the lateral protective covers (see page 25).
2. Remove the worn support wheel (K).
3. Install the new support wheel (K).

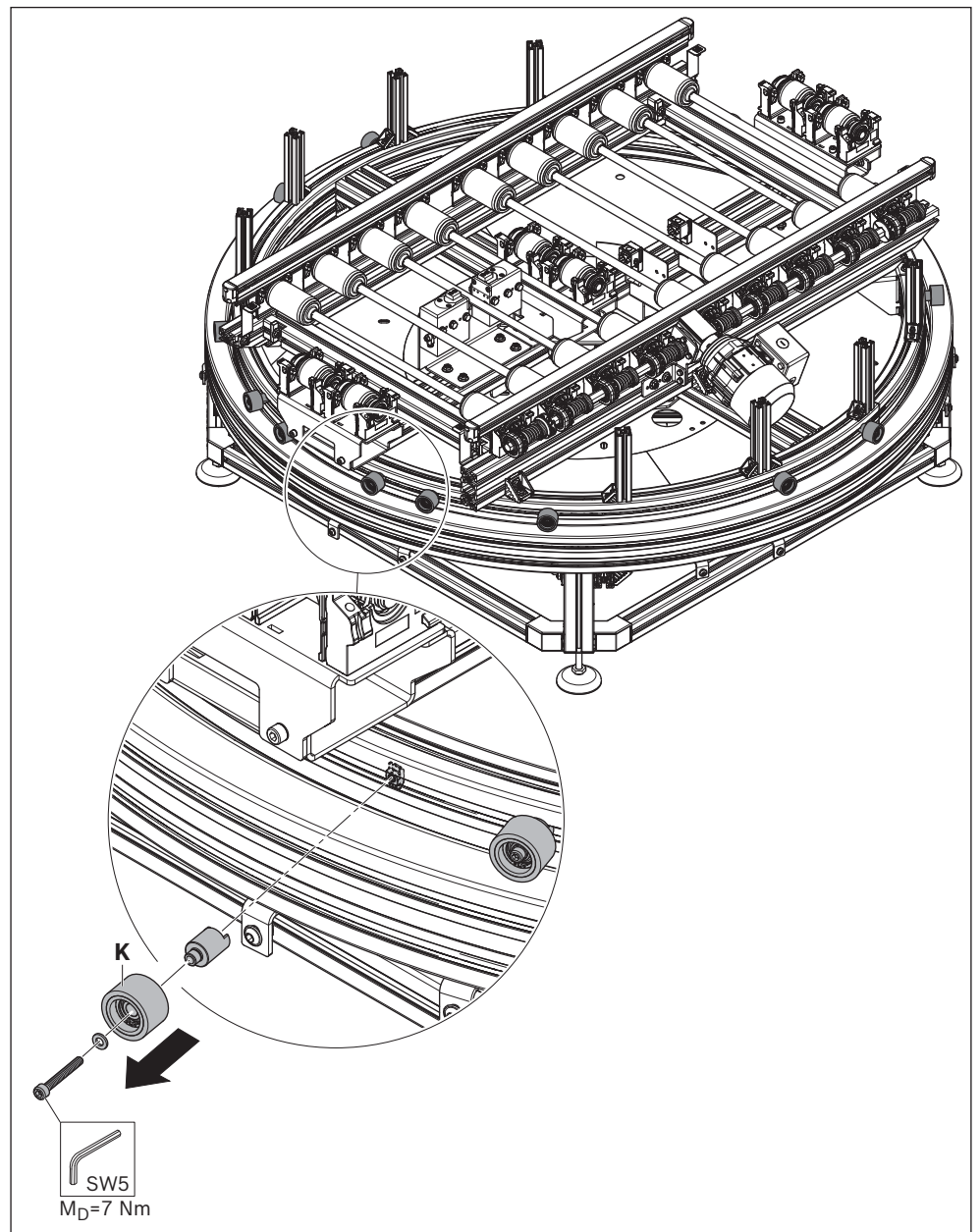


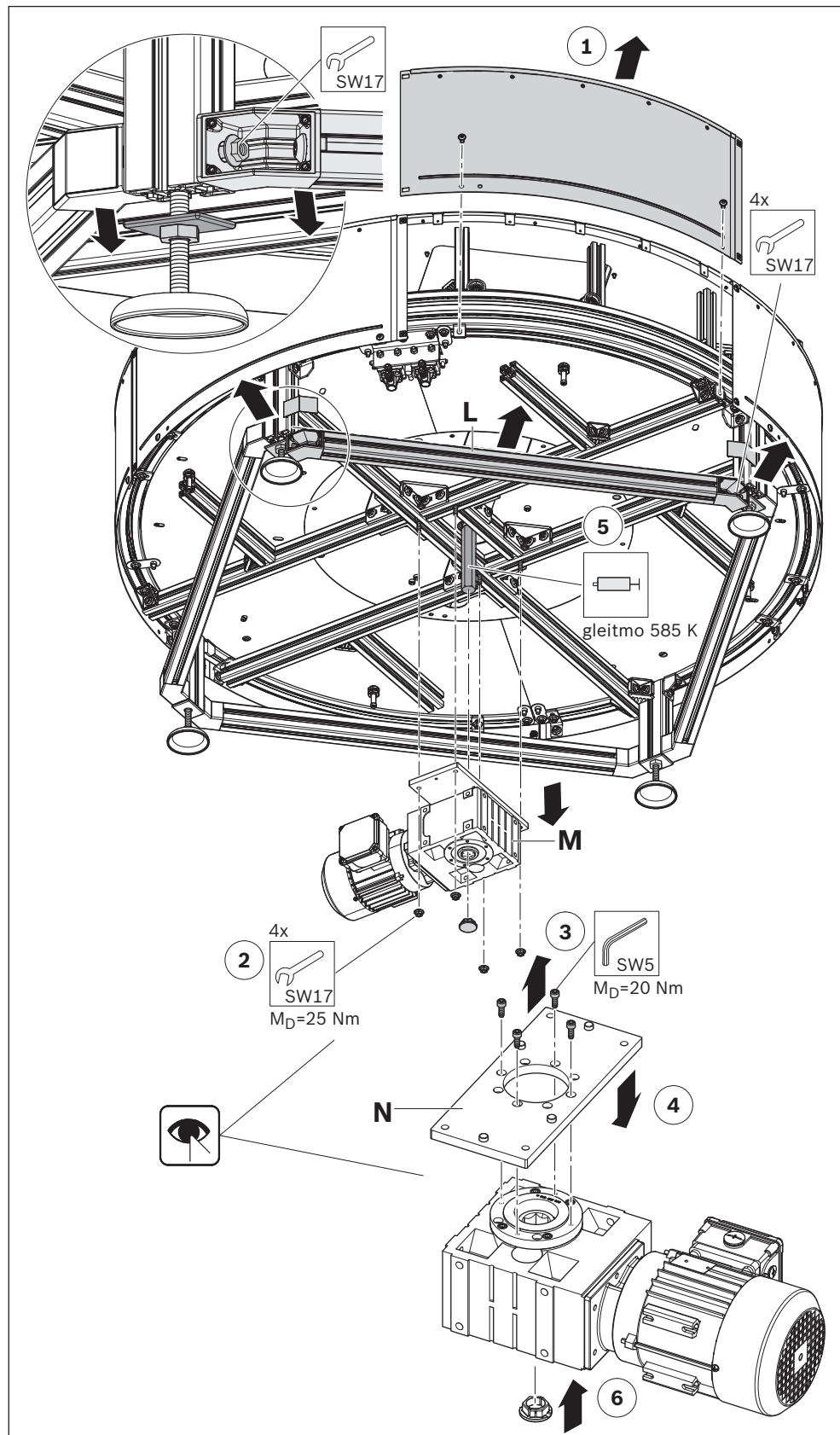
Fig. 35: Replacing the support wheels of the rotate unit (illustrated: DE 5 with split rollers)

**Please note:**

For disassembly of the gear motor, the hexagonal shaft does not need to be removed.

If the hexagonal shaft needs to be disassembled, the clamping cone of the hexagonal shaft must be tightened with 41 Nm during assembly.

1. Only at a transport height of  $\leq 665$  mm for better access:
    - If applicable, remove the lateral cover (see page 25).
    - Remove a cross strut (L)
  2. Remove the drive unit (M).
  3. Remove the carrying plate (N).
  4. Install the carrying plate (N) at the new gear motor.
  5. Lubricate the hexagonal shaft.
  6. Insert the old hub cover into the new drive unit.
- Install the drive unit in reverse order.

**10.4.7 Replacing the gear motor of the rotate unit**

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**Fig. 36: Replacing the gear motor of the rotate unit (illustrated: DE 5 with split rollers)**

**Please note:**

By loosening of the flange nuts and repositioning of the stop brackets (A), the four actual end positions for 0°, 90°, 180°, 270° can be adjusted in a range of  $\pm 5^\circ$ .

Proceed as follows:

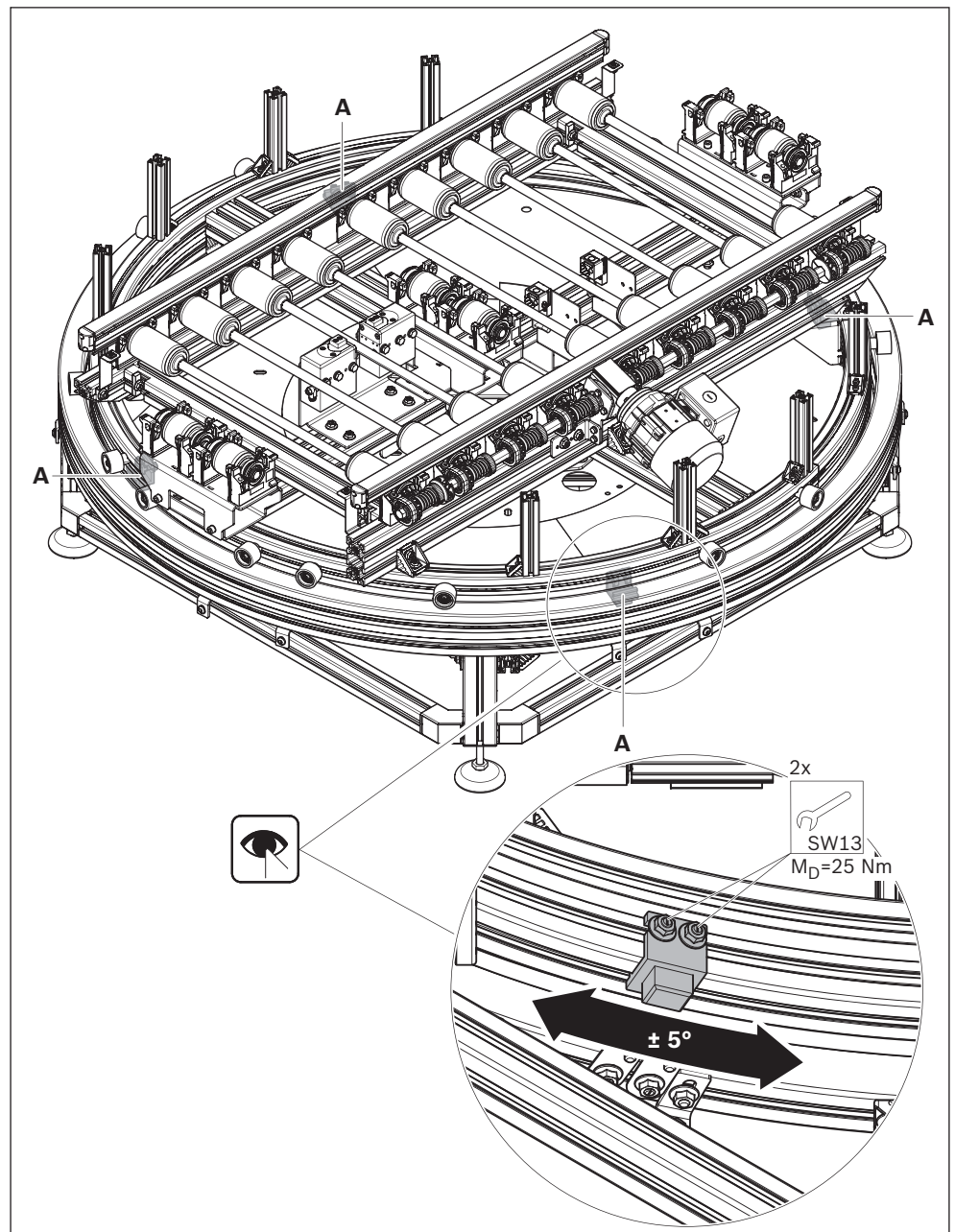
1. If applicable, disassemble the top and lateral protective covers (see page 25).
2. Lock the rotary movement in the desired position by engaging the limit stop between the stop gates.
3. Loosen the screws at the locked limit stop and align the section of the rotate unit at the connected section.
4. Tighten the screws at the limit stop.

► Install the protective covers in reverse order.

**Please note:**

- The condition on delivery is a setting of precisely 0°, 90°, 180° and 270°.
- If the stop angle is moved, the deceleration ramp for these positions must be adjusted in the program.

#### 10.4.8 Setting the rotary movement stop bracket (actual end positions at 0°, 90°, 180°, 270°)



**Fig. 37: Setting the rotary movement stop bracket (illustrated: DE 5 with split rollers)**

#### 10.4.9 Replacing the rotary movement end position sensor

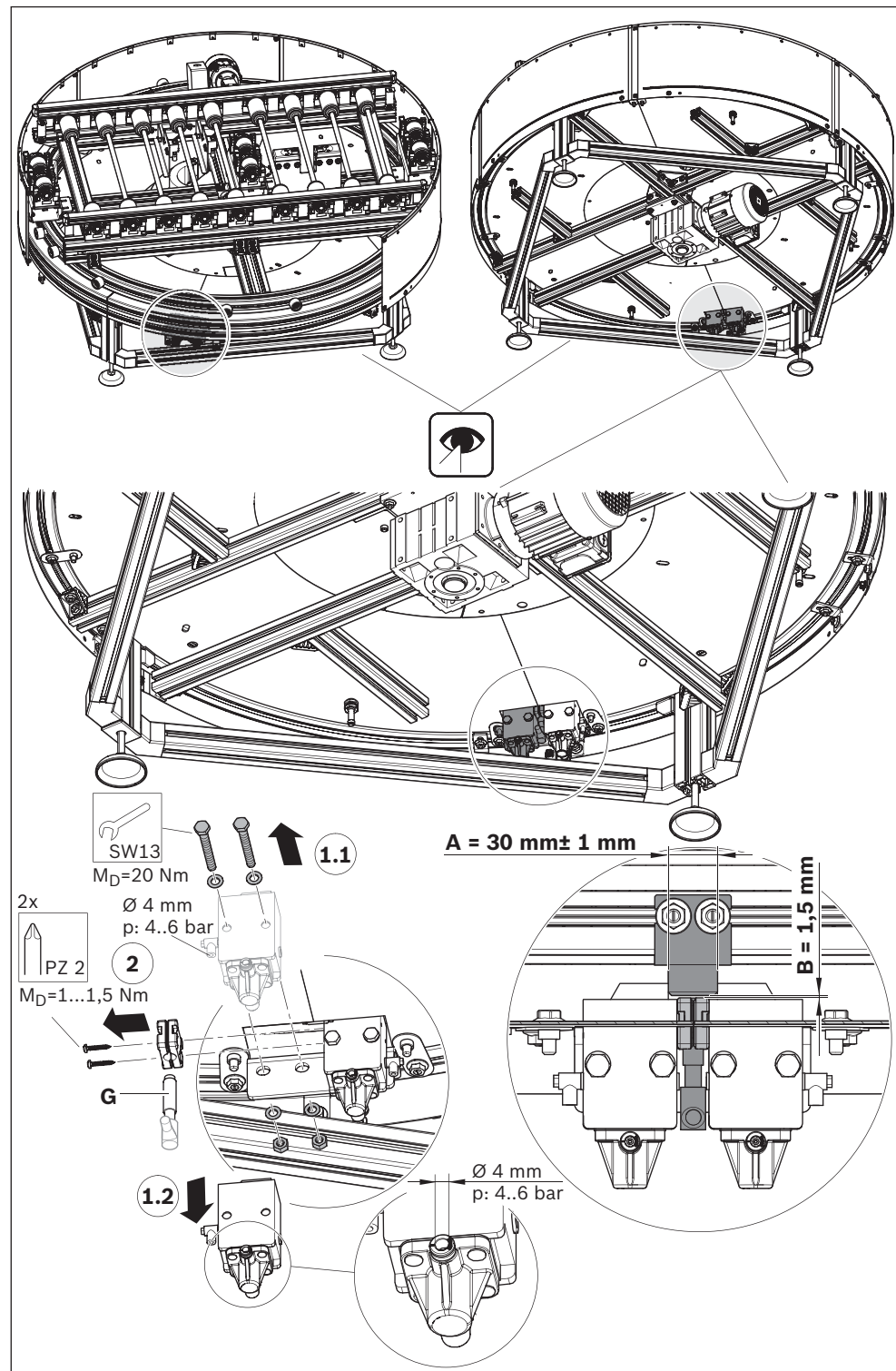
**Required sensor:**

- 1x M8, Sn 4 mm, flush,  
**3 842 549 811**

**A:** Distance of stop gate  
latches 30 mm  
± 1 mm

**B:** Distance of sensor to  
tappets 1.5 mm

1. Remove the stop gate.
  2. Loosen the screws of the switch bracket and replace the sensor.
- Install in reverse order.



**Fig. 38: Assembling the sensors for end position, stopping and locking of the rotary movement (illustrated: DE 5 with split rollers)**

**10.4.10 Replacing the sensors for rotary movement control**

See page 31.

**10.4.11 Replacing the sensor/stop gate for stopping and locking of the rotary movement**

See page 32.

**10.4.12 Replacing the sensors for WT5 end position and WT 5 deceleration control**

See page 33.

**10.4.13 Replacing the stop gates for end position and WT 5 workpiece pallet locking**

See page 34.

**10.5 Spare parts**

For a list of spare parts, see spare parts list in *MTpro*, **3 842 539 057**  
(download: [www.boschrexroth.com/mtpro](http://www.boschrexroth.com/mtpro)).



# 11 Decommissioning

This product is a component which does not need to be decommissioned. Accordingly, this section has been left blank.

# 12 Disassembly and replacement



## WARNING

### High electrical voltage!

Risk of severe injury or death from electric shock.

- ▶ Disconnect the relevant system component before performing any maintenance or repair work.
- ▶ Secure the system against being switched back on unintentionally.

### High pneumatic pressure!

Risk of severe injury or death.

- ▶ Switch off the compressed air supply to the relevant system component before performing any maintenance or repair work.
- ▶ Secure the system against being switched back on unintentionally.

### Suspended loads can fall!

Falling objects can result in severe injury (or even death).

- ▶ Use only slings with sufficiently high bearing loads (for product weight, see delivery documents).
- ▶ Make sure the lifting straps are correctly fastened before lifting the product.
- ▶ Secure the product against tipping over when lifting!
- ▶ Make sure that no one but the operator is in the danger zone during lifting and lowering!

## 12.1 Preparing the product for storage/later use

- Only set the product down on a flat surface.
- Protect the product from mechanical stress.
- Protect the product from environmental influences, such as dirt and moisture.
- Observe the ambient conditions, see page 66.
- For products with a mounted motor: support the product so that the motor is not placed under mechanical load.

## 13 Disposal



### Please note:

- The materials used are environmentally friendly.
- They can be recycled or reused (components may have to be processed and replaced). Recyclability is ensured by the selection of materials and the ability to take the components apart.
- Careless disposal may lead to environmental contamination.
- **Disposal of electrical components:**
  - Electrical components, tools, batteries, and packaging must be recycled in accordance with environmental protection regulations.
  - Never dispose of electrical components, tools, and accumulators/batteries in household waste or commercial waste!
- **Only in EU countries:**
  - According to the currently valid EU Directive on Waste Electrical and Electronic Equipment (WEEE) and its implementation into national law, electrical components and devices that are no longer used must be collected, separated, and recycled in accordance with environmental protection regulations.
  - According to the currently valid WEEE EU Directive, exhausted or defective accumulators/batteries must be recycled.
  - According to the Directive, the product may **not** contain any foreign substances or foreign components when it is recycled.
- Dispose of the product in accordance with the regulations in your country.

## 14 Upgrading and modification

- Do not modify the product.
- The Bosch Rexroth warranty only applies to the configuration as delivered, and to approved upgrades. The manufacturer will not accept any warranty claims for systems with unapproved modifications or upgrades.

## 15 Troubleshooting

- If you cannot correct a fault, please contact one of the addresses you can find at [www.boschrexroth.com](http://www.boschrexroth.com).

## 16 Technical data

- For the dimensions of the DE 5 rotate unit, refer to the sales catalog TS 5
- Section load:  $\leq 400$  kg
- Maximum load:  $\leq 50$  kg per roller
- Permissible load of the WT 5 workpiece pallet:

| w [mm] | L <sub>T</sub> [mm] | m <sub>WT</sub> [kg] |
|--------|---------------------|----------------------|
| 455    | 455                 | 150                  |
| 455    | 650                 | 250                  |
| 650    | 650                 | 300                  |
| 650    | 845                 | 300                  |
| 845    | 845                 | 300                  |
| 845    | 1040                | 400                  |

- Suitable for reversible operation
- Noise emissions:  $< 70$  dB (A)

### 16.1 Ambient conditions

- The transfer systems have been designed for stationary use in a location that is protected from the elements.
- Operating temperature  $+5$  °C to  $+40$  °C  
 $-5$  °C to  $+60$  °C at 20 % reduced load
- Storage temperature  $-25$  °C to  $+70$  °C
- Relative humidity 5 % to 85 %, non-condensing
- Air pressure  $> 84$  kPa, corresponds to an altitude  $< 1400$  m above sea level
- At altitudes  $> 1400$  m, the load values of the electric drives are reduced by 15 %.
- Max. load capacity of floor:  $1000 \text{ kg/m}^2$
- The area should be kept free of mold, fungus, rodents and other vermin.
- Do not install or operate in the immediate vicinity of industrial equipment producing chemical emissions.
- Do not install or operate near sources of sand or dust.
- Do not install or operate in areas that are regularly subjected to high-energy forces caused, for example, by presses or heavy machinery.
- Resistant to many media that are commonly found in manufacturing, such as water, mineral oil, grease, and detergents. Contact your Rexroth representative if you have any doubts about resistance to specific chemicals, such as test oil, doped oils, corrosive detergents, solvents or brake fluid.
- Avoid prolonged contact with highly reactive acidic or alkaline materials.



## 16.2 Pneumatics

- Oiled or non-oiled, filtered, dry compressed air.
- Operating pressure: 4 to 6 bar
- Solids
  - Particle size  $\leq 5 \mu\text{m}$  (Class 6 as per ISO 8573-1:2010)
  - Particle quantity  $\leq 5 \text{ mg/m}^3$  (Class 6 as per ISO 8573-1:2010)
- Humidity – water content
  - Pressure dew point <sup>1)</sup>  $\leq +3 \text{ }^\circ\text{C}$  (Class 4 as per ISO 8573-1:2010)
- <sup>1)</sup> The pressure dew point should be at least 15 °C below the ambient temperature.
- Oil content:
  - Oil quantity  $\leq 1 \text{ mg/m}^3$  (Class 3 as per ISO 8573-1:2010)

## 16.3 Permissible gravity center position

During deceleration, start-up, rotation or change of direction, it is important to observe the position of the load center of gravity on the workpiece pallet to ensure that the acceleration forces can be absorbed without any interferences.

We generally recommend that:

- the workpiece pallet is loaded as centrally as possible.
- the load center of gravity should not exceed a height  $h_s$  of  $\frac{1}{3} b_{WT}$  (with  $b_{WT} \leq l_{WT}$ ).

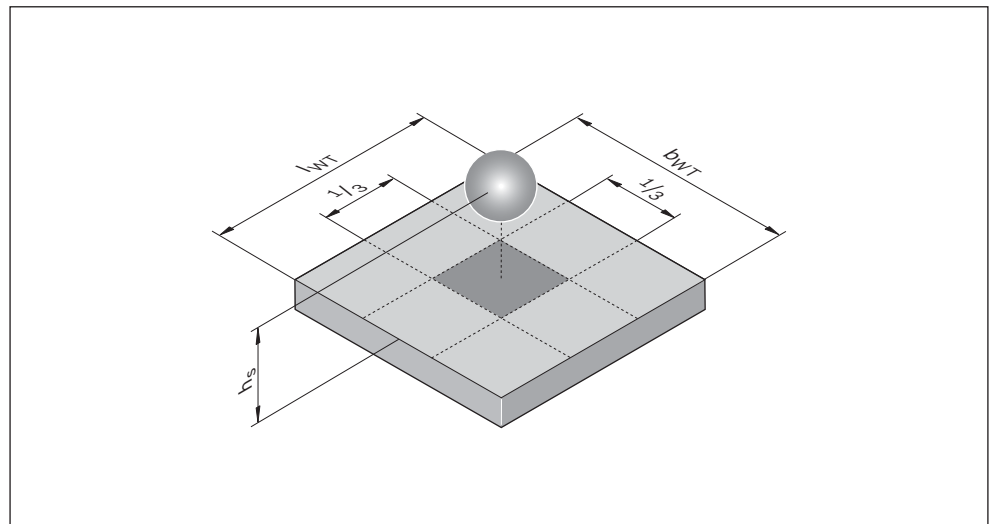


Fig. 39: Position of load center of gravity

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# 17 Appendix

## 17.1 Function examples

### 17.1.1 Control diagram

| <div>FALSE</div>        | <div>TRUE</div> |                           |                           |                 |              |                                               |                                            |                                                    |                                                                                                                            |                                |                                             |                                                            |                                                                 |                            |
|-------------------------|-----------------|---------------------------|---------------------------|-----------------|--------------|-----------------------------------------------|--------------------------------------------|----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|--------------------------------|---------------------------------------------|------------------------------------------------------------|-----------------------------------------------------------------|----------------------------|
| Sensors / actuators     |                 | Rotate unit in position 0 | Operation of iDrehZuPos90 | Stopper opening | Stopper open | Starting frequency converter with frequency 1 | Rotate unit is moving and leaving iDEinPos | Rotate unit is moving and leaving iStopprampe_Pos0 | Rotate unit is moving and exciting iStopprampe_Pos90, qDE_Stopper_GUZ is closed and frequency 1 is switched to frequency 2 | Stopper qDE_Stopper_GUZ closed | Rotate unit is moving and exciting iDEinPos | Stopping time in program until rotate unit in end position | Reaching of end position and closing of stopper qDE_Stopper_GUZ | Rotate unit in position 90 |
| A (iDrehZuPos0)         |                 | FALSE                     | FALSE                     | FALSE           | FALSE        | FALSE                                         | FALSE                                      | FALSE                                              | FALSE                                                                                                                      | FALSE                          | FALSE                                       | FALSE                                                      | FALSE                                                           | FALSE                      |
| B (iDrehZuPos90)        |                 | FALSE                     | TRUE                      | TRUE            | TRUE         | FALSE                                         | FALSE                                      | FALSE                                              | FALSE                                                                                                                      | FALSE                          | FALSE                                       | FALSE                                                      | FALSE                                                           | FALSE                      |
| C (iDrehZuPos180)       |                 | FALSE                     | FALSE                     | FALSE           | FALSE        | FALSE                                         | FALSE                                      | FALSE                                              | FALSE                                                                                                                      | FALSE                          | FALSE                                       | FALSE                                                      | FALSE                                                           | FALSE                      |
| D (iDrehZuPos270)       |                 | FALSE                     | FALSE                     | FALSE           | FALSE        | FALSE                                         | FALSE                                      | FALSE                                              | FALSE                                                                                                                      | FALSE                          | FALSE                                       | FALSE                                                      | FALSE                                                           | FALSE                      |
| X (iStopprampe_Pos0)    |                 | TRUE                      | TRUE                      | TRUE            | TRUE         | TRUE                                          | TRUE                                       | FALSE                                              | FALSE                                                                                                                      | FALSE                          | FALSE                                       | FALSE                                                      | FALSE                                                           | FALSE                      |
| X (iStopprampe_Pos90)   |                 | FALSE                     | FALSE                     | FALSE           | FALSE        | FALSE                                         | FALSE                                      | FALSE                                              | TRUE                                                                                                                       | TRUE                           | TRUE                                        | TRUE                                                       | TRUE                                                            | TRUE                       |
| X (iStopprampe_Pos180)  |                 | FALSE                     | FALSE                     | FALSE           | FALSE        | FALSE                                         | FALSE                                      | FALSE                                              | FALSE                                                                                                                      | FALSE                          | FALSE                                       | FALSE                                                      | FALSE                                                           | FALSE                      |
| X (iStopprampe_Pos270)  |                 | FALSE                     | FALSE                     | FALSE           | FALSE        | FALSE                                         | FALSE                                      | FALSE                                              | FALSE                                                                                                                      | FALSE                          | FALSE                                       | FALSE                                                      | FALSE                                                           | FALSE                      |
| Y (iDEinPos)            |                 | TRUE                      | TRUE                      | TRUE            | TRUE         | TRUE                                          | FALSE                                      | FALSE                                              | FALSE                                                                                                                      | FALSE                          | TRUE                                        | TRUE                                                       | TRUE                                                            | TRUE                       |
| Y (iDE_StopperUZoffen)  |                 | FALSE                     | FALSE                     | FALSE           | TRUE         | TRUE                                          | TRUE                                       | TRUE                                               | TRUE                                                                                                                       | TRUE                           | TRUE                                        | TRUE                                                       | TRUE                                                            | FALSE                      |
| Y (iDE_StopperGUZoffen) |                 | FALSE                     | FALSE                     | FALSE           | TRUE         | TRUE                                          | TRUE                                       | TRUE                                               | TRUE                                                                                                                       | FALSE                          | FALSE                                       | FALSE                                                      | FALSE                                                           | FALSE                      |
| Z (qDE_Stopper_UZ)      |                 | FALSE                     | FALSE                     | TRUE            | TRUE         | TRUE                                          | TRUE                                       | TRUE                                               | TRUE                                                                                                                       | TRUE                           | TRUE                                        | TRUE                                                       | FALSE                                                           | FALSE                      |
| Z (qDE_Stopper_GUZ)     |                 | FALSE                     | FALSE                     | TRUE            | TRUE         | TRUE                                          | TRUE                                       | FALSE                                              | FALSE                                                                                                                      | FALSE                          | FALSE                                       | FALSE                                                      | FALSE                                                           | FALSE                      |
| Z (qDE_FU_UZ)           |                 | FALSE                     | FALSE                     | FALSE           | FALSE        | FALSE                                         | FALSE                                      | FALSE                                              | FALSE                                                                                                                      | FALSE                          | FALSE                                       | FALSE                                                      | FALSE                                                           | FALSE                      |
| Z (qDE_FU_GUZ)          |                 | FALSE                     | FALSE                     | FALSE           | FALSE        | TRUE                                          | TRUE                                       | TRUE                                               | TRUE                                                                                                                       | TRUE                           | TRUE                                        | TRUE                                                       | FALSE                                                           | FALSE                      |
| Z (qDE_FU_Freq1)        |                 | FALSE                     | FALSE                     | FALSE           | FALSE        | TRUE                                          | TRUE                                       | TRUE                                               | FALSE                                                                                                                      | FALSE                          | FALSE                                       | FALSE                                                      | FALSE                                                           | FALSE                      |
| Z (qDE_FU_Freq2)        |                 | FALSE                     | FALSE                     | FALSE           | FALSE        | FALSE                                         | FALSE                                      | FALSE                                              | TRUE                                                                                                                       | TRUE                           | TRUE                                        | TRUE                                                       | FALSE                                                           | FALSE                      |

Fig. 40: Control diagram



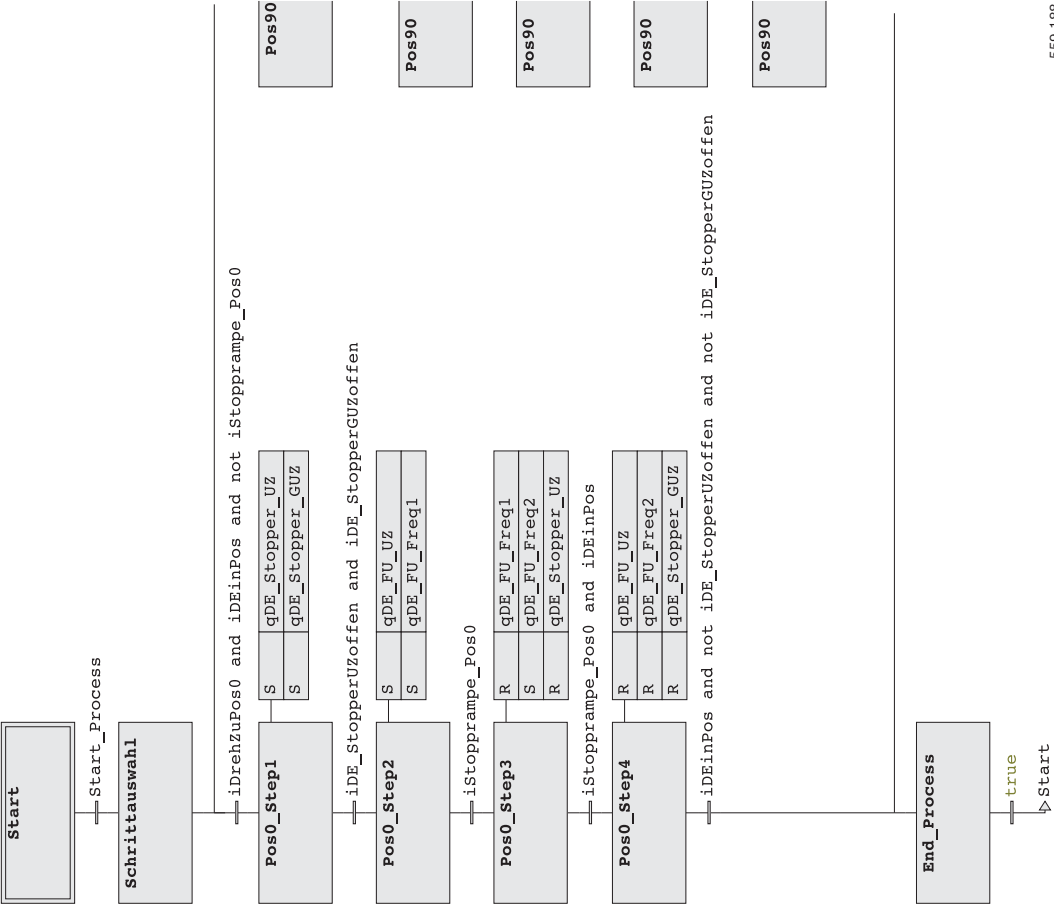
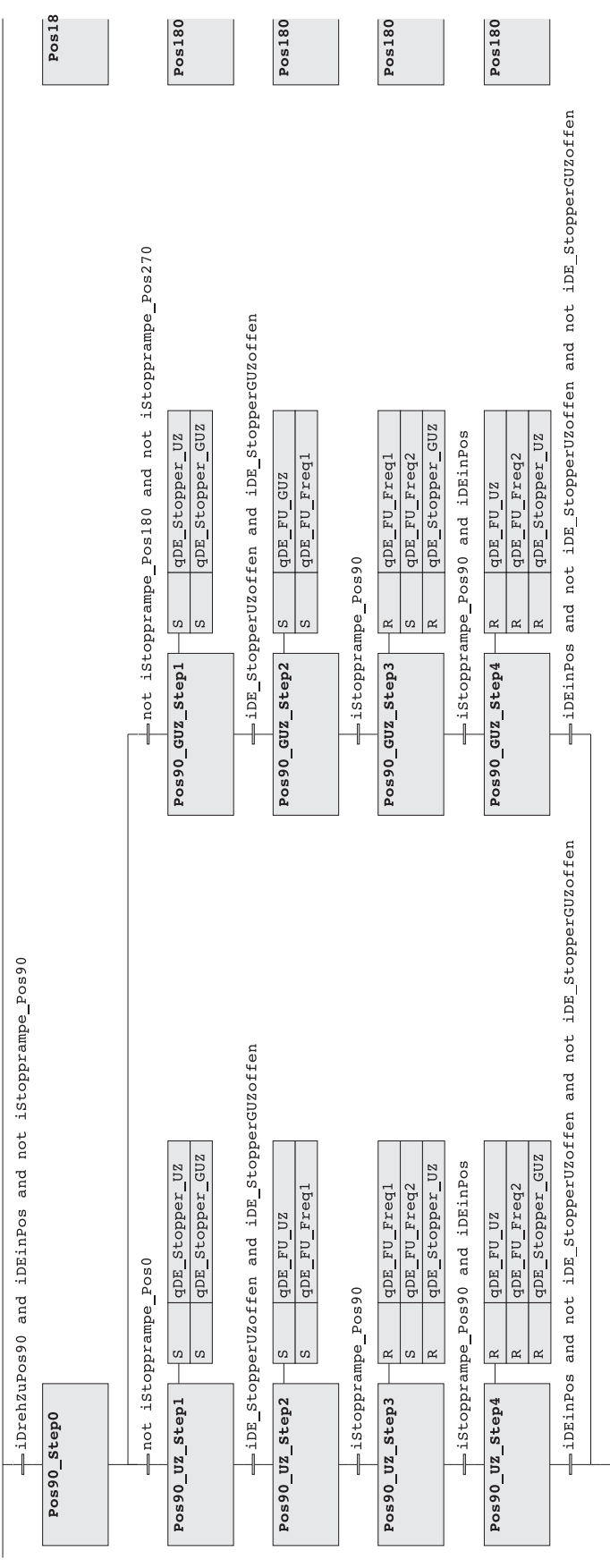
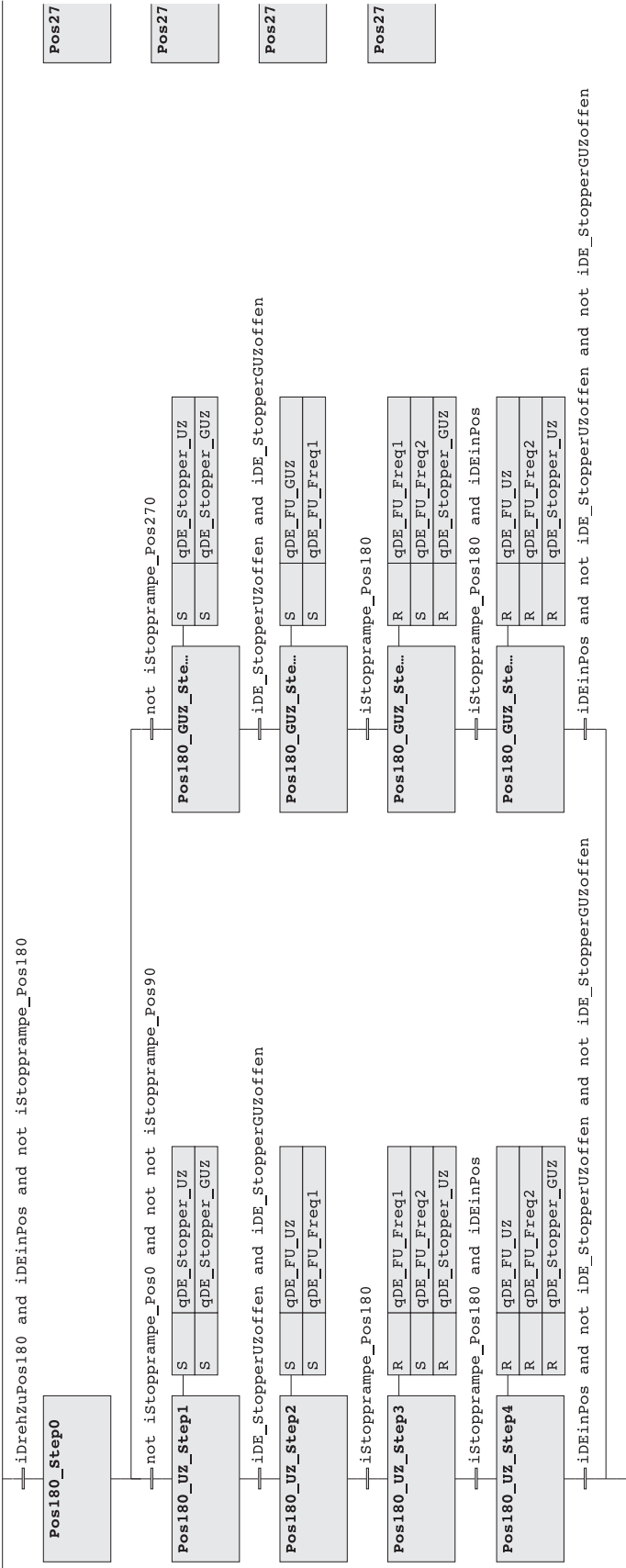


Fig. 42: Program sequence detail rotation to position 0



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Fig. 43: Program sequence detail rotation to position 90



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Fig. 44: Program sequence detail rotation to position 180

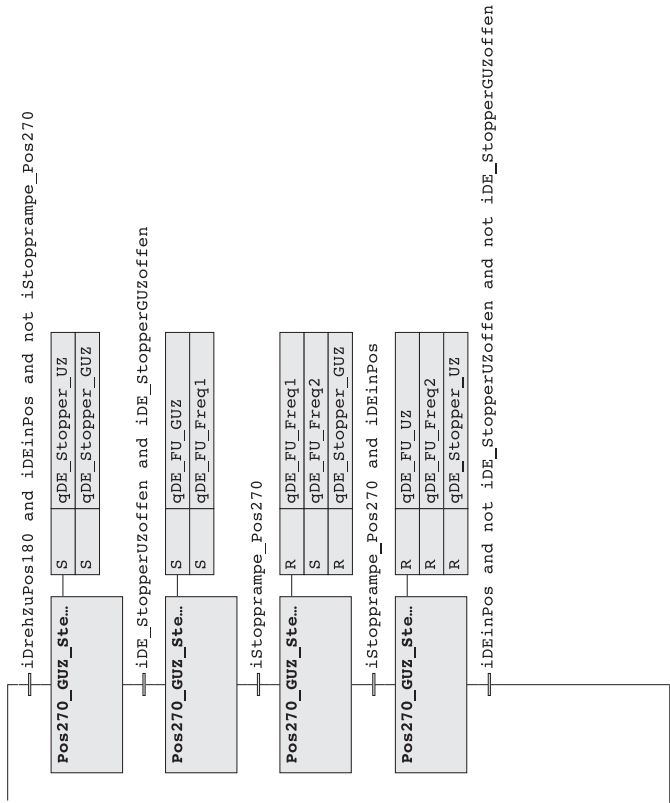


Fig. 45: Program sequence detail rotation to position 270

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### **17.2 Trademark information**

- PROFIBUS® is a registered trademark of PROFIBUS Nutzerorganisation e.V.





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