Curve KU 1

Montageanleitung

3 842 999 986, KU 1/90°
3 842 999 987, KU 1/180°
3 842 999 988, KU 1/360°
The data specified above only serve to describe the product. The information provided in the instructions on how to use the supplied product should only be considered application examples and suggestions. Catalog information is not binding. The information given does not release the user from the obligation of own judgment and verification. Our products are subject to a natural process of 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.

Translation of the original assembly instructions

Die vorliegende Montageanleitung ist in folgenden Sprachen verfügbar.
These assembly instructions are available in the following languages.
Les présentes instructions de montage sont disponibles dans les langues suivantes.
Le presenti istruzioni di montaggio sono disponibili nelle lingue seguenti.
El presente manual de instrucciones de montaje está disponible en los siguientes idiomas.
Estas instruções de montagem estão disponíveis nas seguintes línguas.

3 842 531 106 Kurve KU 1 de Deutsch (original assembly instructions)
3 842 531 106 Curve KU 1 en English
3 842 531 106 Courbe KU 1 fr Français
3 842 531 106 Curva KU 1 it Italiano
3 842 531 106 Curva KU 1 es Español
3 842 531 106 Curva KU 1 pt Português
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1 About This Documentation

1.1 Scope of the documentation
This documentation applies to the following product:
• Curve KU 1/90°
• Curve KU 1/180°
• Curve KU 1/360°
This documentation is intended for installers, operators, and system owners.
This documentation contains important information on the safe and appropriate assembly, operation, maintenance, disassembly and simple troubleshooting of the product.
► These instructions, especially Chapter 2, are to be read completely before working with the product.

1.2 Required documentation
Documentation identified with a book symbol must be provided and read before working with the product:

<table>
<thead>
<tr>
<th>Tab. 1: Required documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Title</strong></td>
</tr>
<tr>
<td>System documentation</td>
</tr>
<tr>
<td>Instructions for Employees on Safety</td>
</tr>
<tr>
<td>MTparts</td>
</tr>
</tbody>
</table>

1.3 Presentation of information
Uniform safety instructions, symbols, terms, and abbreviations have been used in this documentation in order to ensure that you can get to work quickly and safely with the product. They are discussed in more detail in the following sections.
1.3.1 Safety instructions
In this documentation, there are safety instructions before the steps whenever there is a danger of personal injury or damage to the equipment. The measures described to avoid these hazards must be observed. Safety instructions are set out as follows:

<table>
<thead>
<tr>
<th>SIGNAL WORD</th>
<th>Type and source of risk</th>
<th>Consequences</th>
<th>Precautions</th>
</tr>
</thead>
<tbody>
<tr>
<td>DANGER</td>
<td>Indicating an imminently hazardous situation which, if not avoided, will certainly result in death or serious injury.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WARNING</td>
<td>Indicating a potentially hazardous situation which, if not avoided, could result in death or serious injury.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAUTION</td>
<td>Indicating a potentially hazardous situation which, if not avoided, could result in minor or moderate injuries.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NOTICE</td>
<td>Damage to equipment: The product or surrounding equipment may be damaged.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1.3.2 Symbols
The following symbols identify information that is not relevant for safety, but which increases the comprehensibility of the documentation.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Information" /></td>
<td>Failure to observe this information will result in suboptimal product use/operation.</td>
</tr>
<tr>
<td><img src="image" alt="Individual" /></td>
<td>Individual, independent action.</td>
</tr>
<tr>
<td>1.</td>
<td>Numbered steps. The numbers indicate the order for the steps.</td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>...</td>
<td>List format</td>
</tr>
<tr>
<td>...</td>
<td></td>
</tr>
</tbody>
</table>

Tab. 2: Hazard classes acc. to ANSI Z535.6

Tab. 3: Meaning of the symbols
2 Notes on Safety

2.1 About this chapter
The product has been manufactured according to the accepted rules of current technology. Even so, there is a risk of injury or damage when using the product if this chapter and the safety and warning information in these instructions are not observed.

- Read these instructions completely and thoroughly before working with the product.
- Keep these instructions in a location where they are accessible to all users at all times.
- Always include the operating instructions when you pass the product on to third parties.

2.2 Intended use
This product is an incomplete machine (in accordance with the EU Machinery Directive 2006/42/EC).

The product may be used as follows:
- For installation exclusively in a Rexroth TS 1 transfer system.
- For transporting WT 1 workpiece pallets.
- Maximum load/section load:
  - KU 1/90°: 30 kg
  - KU 1/180°: 30 kg
  - KU 1/360°, with one drive: 24 kg
  - KU 1/360°, with two drives: 30 kg

The product is intended for the industrial sector and not designed for private use.

Intended use includes having read and understood these instructions, especially the chapter "Notes on Safety".

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 damages resulting from improper use; the user alone bears the risks of improper use of the product.

Improper use of the product includes:
- Transport of goods other than those specified.
- Persons riding on the product or conveyed material.
- Persons climbing on the product – walking on the product is not permitted.
- Operation in the non-industrial sector.
- Operation of the product without a safety device to prevent toppling.
2.4 Personnel qualifications

The work described in this documentation requires basic mechanical and electrical knowledge, as well as knowledge of the appropriate technical terms. In order to ensure operating safety, these activities may therefore only be carried out by qualified technical personnel or an instructed person under the direction and supervision of qualified personnel.

Qualified personnel are those who can recognize possible hazards and institute the appropriate safety measures due to their professional training, knowledge, and experience, as well as their understanding of the relevant conditions pertaining to the work to be done. Qualified personnel must observe the rules relevant to the subject area.

2.5 General safety instructions

• Observe the regulations for accident prevention and environmental protection.
• Observe the safety instructions and regulations of the country in which the product is used or operated.
• Exclusively use Rexroth products in good technical order and condition.
• Follow all instructions printed on the product.
• Persons who assemble, operate, or disassemble Rexroth products must not consume any alcohol, drugs, or pharmaceuticals that may affect their ability to respond.
• Only use accessories and spare parts approved by the manufacturer.
• Comply with the technical data and ambient conditions listed in the product documentation.
• Check the product for visible transport damage.
2.6 Safety instructions related to the product and technology

General
• Do not modify or convert the product.
• Do not expose the product to any mechanical loads under any circumstances. Never use the product as a handle or step. Do not place any objects on the product.
• Always secure the product to prevent toppling.

During transport
• Observe the transport instructions on the packaging.

During assembly
• Lay cables and lines so that they cannot be damaged and no one can trip over them.
• Make sure the relevant system component is not under pressure or voltage before assembling the product or when connecting and disconnecting plugs.
• Protect the system component against being switched on.
• Before commissioning, make sure that all seals and caps for the screwed connections are correctly installed and undamaged to prevent fluids and foreign bodies from penetrating the product.

During commissioning
• Let the product acclimate itself for several hours before commissioning, otherwise water may condense in the housing.
• Make sure that all electrical and pneumatic connections are either used or covered.
• Check the safety requirements in accordance with DIN EN 619.
• Commission the product only if it is installed completely.
• Make sure that all safety equipment belonging to the product is present, has been installed properly, and is fully functional. Do not modify the position of, bypass, or disable the safety equipment.
• Do not reach into moving parts.
• Check the product for malfunctions.

During operation
• Ensure that only authorized personnel do the following within the scope of intended product use:
  — Start or operate the system, or intervene in its normal functioning
  — Activate adjustment devices on components.
• Only allow persons who are authorized by the system owner to access the product’s direct operating area. This also applies when the product is standing still.
• Make sure that
  — There are no obstacles preventing access to the emergency-off switches.
  — All delivery points, workstations and passages remain freely accessible.
• Do not use the emergency-off switching device for routine stops.
• Regularly check the proper functioning of the emergency-off switching device.
• In case of an emergency, fault, or any other anomalies, switch the product off and protect it against being switched on again.
• Do not reach into moving parts.
• An idle system is not a safe system, as stored energy can be released unintentionally or through improper maintenance procedures.
After an emergency stop or a malfunction, only switch on the system once the cause of the fault has been determined and the error resolved.

- Prevent cleaning agents from entering the system.
- Never use solvents or aggressive detergents. Only clean the product using a slightly damp, lint-free cloth. Only use water to do this and, if necessary, a mild detergent.
- Do not use a high-pressure cleaner for cleaning.

- Make sure that there are no obstacles blocking access to maintenance and inspection points.
- Perform the prescribed maintenance work at the intervals specified in the operating instructions.
- Make sure that no lines, connectors, or components are disconnected as long as the system is under pressure and voltage. Protect the system against being switched on.

- Dispose of the product in accordance with the currently applicable national regulations in your country.

### 2.7 Safety equipment

- Make sure that all safety equipment belonging to the product is present, has been installed properly, and is fully functional and that the access points are not obstructed. Do not modify the position of, bypass, or disable the safety equipment.
- Observe the information in the following documents when arranging the safety equipment:
  - Machinery Directive 2006/42/EC
  - DIN EN 619
  - DIN EN 60204-1

### 2.8 Personal protective equipment

As a plant operator, you are responsible for appropriate protective equipment when working with the product (e.g. wearing safety shoes). All personal protective equipment must be intact.

### 2.9 Operator workstations

No special operator workstations are foreseen for this product.
3 Scope of Delivery

The delivery contents include:

- Various products according to the order. Please consult the shipping documents to make sure that the delivery is complete.
- 1 "Curve KU 1" assembly instructions.

3.1 Delivery condition

- KU 1/90°: Partially assembled, motor/gearbox combination and belt section (optional) are included separately.
- KU 1/180°: Partially assembled, motor/gearbox combination and belt section (optional) are included separately.
- KU 1/360°: Fully assembled, motor/gearbox combination is included separately. If delivered without a motor, additional toothed drive belt wheels and return rollers are included that the customer can install if needed.
- Fastening material for connecting to other belt sections or the floor must be ordered separately, see Accessories.

3.2 Accessories

- SZ 1 leg sets: See the TS 1 transfer system sales catalog, 3 842 528 596.
- To fasten the SZ 1 leg sets to the floor, each connection requires:
  - 1 foundation bracket, 3 842 146 815
  - 1 dowel, 3 842 526 560
  - 2 T-bolts, 3 842 528 718
  - 2 flange nuts, 3 842 345 081
4 Product Description

4.1 Performance description

Application with KU 1/90° or KU 1/180° curve:
- KU 1/90 or KU 1/180° curve with own drive for transport of a workpiece pallet through 90° or 180° curves.
- Thanks to accumulation operation, the KU 1/90 or KU 1/180° can be operated without extensive controlling.
- It is also suitable for use with ESD applications.
- Reversible operation is not possible.

KU 1/90° or KU 1/180° curve version:
- Integrated common drive for the turntable and the connected belt sections in the infeed and outfeed sections.
- Section load up to 30 kg.
- Conveyor medium: turntable
- Length of the infeed and outfeed section can be selected by the user, lmax = 5000 mm.
- Curve direction to the right (KR = R) or left (KR = L).
- Motor mounting on interior (MA = I) or exterior (MA = A).
- Curve in a conductive (ZA = A) or non-conductive version (ZA = N).

Application with KU 1/360° curve:
- A closed workpiece pallet circuit can be inexpensively set up with just one drive using the KU 1/360° curve.
- Thanks to accumulation operation, the KU 1/360° can be operated without extensive controlling.
- It is also suitable for use with ESD applications.
- Reversible operation is not possible.

KU 1/360° curve version:
- Belt distance a = 135 mm.
- Integrated common drive for both turntables and the connected belt sections.
- Section load up to 24 kg.
- Section load of up to 30 kg if a second drive is used (AE = 2).
- Conveyor medium: turntable
- Belt section length may be selected by the user, lmax = 5000 mm.
- Curve direction to the right (KR = R) or left (KR = L).
- Motor mounting on interior (MA = I) or exterior (MA = A).
- Curve in a conductive (ZA = A) or non-conductive version (ZA = N).
4.2 Device description

Tab. 4: Versions

<table>
<thead>
<tr>
<th>Versions</th>
<th>90° left</th>
<th>90° right</th>
<th>180° left</th>
<th>180° right</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard</strong></td>
<td><img src="531106-01a" alt="Image" /></td>
<td><img src="531106-01b" alt="Image" /></td>
<td><img src="531106-01c" alt="Image" /></td>
<td><img src="531106-01d" alt="Image" /></td>
</tr>
<tr>
<td>Variable L1 infeed section</td>
<td><img src="531106-02a" alt="Image" /></td>
<td><img src="531106-02b" alt="Image" /></td>
<td><img src="531106-02c" alt="Image" /></td>
<td><img src="531106-02d" alt="Image" /></td>
</tr>
<tr>
<td>Variable L2 outfeed section</td>
<td><img src="531106-03a" alt="Image" /></td>
<td><img src="531106-03b" alt="Image" /></td>
<td><img src="531106-03c" alt="Image" /></td>
<td><img src="531106-03d" alt="Image" /></td>
</tr>
<tr>
<td>Variable L1 infeed section and L2 outfeed section</td>
<td><img src="531106-04a" alt="Image" /></td>
<td><img src="531106-04b" alt="Image" /></td>
<td><img src="531106-04c" alt="Image" /></td>
<td><img src="531106-04d" alt="Image" /></td>
</tr>
<tr>
<td>Circuit section (360°)</td>
<td><img src="531106-05a" alt="Image" /></td>
<td><img src="531106-05b" alt="Image" /></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.3 Product identification

1: Part number
2: Designation
3: Information about version and dimensions

5 Transport and Storage

- Observe the transport instructions on the packaging.
- See the shipping documents for transport weight.
- Secure the product to prevent toppling!
- When storing and transporting the product, always observe the ambient conditions, see 37.

5.1 Lifting and positioning the product

**WARNING**

Lifted loads may fall!

Falling objects may result in severe injuries (or even death).

- Always use lifting equipment with a sufficiently high load bearing capacity (see the shipping documents for product weight).
- Before lifting the product, make sure that the carrying straps are correctly fastened!
- Secure the product to prevent toppling while carrying!
- Make sure that no one is in the danger area when raising and lowering, with the exception of the operator!

5.2 Storing KU 1 curves

- Only store the product on a flat surface.
- For ambient conditions, see 38.
- For curves with an assembled motor/gearbox combination:
  Support the curve so that there is no load on the motor/gearbox combination.
6 Assembly

6.1 Unpacking

- Lift the product out of the packaging.
- Dispose of the packaging in accordance with the currently applicable national regulations in your country.

6.2 Installation requirements

When installing the product, always observe the ambient conditions, see □ 37.

6.3 Mounting orientation

The product should be aligned and level at right angles and parallel to the axis. This ensures correct functioning and prevents premature wear.

6.4 Mounting with T-bolts

Mount the transfer systems TS 1, TS 2\textit{plus}, TS 2\textit{pv}, TS 4\textit{plus}, TS 5 and chain conveyor systems VarioFlow and VarioFlow S with T-bolts and flange nuts.

Make sure the T-bolt is in the correct position when inserting and tightening in the groove. The notch at the end of the bolt indicates the T-bolt orientation.

1 = T-bolt insertion orientation in the groove.
2 = T-bolt clamping position in the groove.

Maximum tightening torque: 25 Nm.

6.5 Required tools

- Hexagon wrench (open-end) WS 10, WS 13, WS 19, WS 24
- Hex socket wrenches WS 3, WS 4, WS 5, WS 6, WS 8
- Recessed head screwdriver PH3
- Level, minimum length 1200 mm
6.6 Symbols used

Connect with T-bolt and flange nut.
Make sure the T-bolt is in the correct position when inserting and tightening in the groove. The notch at the end of the bolt indicates the T-bolt orientation.

1 = T-bolt insertion orientation in the groove.
2 = T-bolt clamping position in the groove.
Maximum tightening torque: 25 Nm.

Wrench for hexagonal screw
SW = wrench size (WS) ... mm
M_D = required tightening torque ... Nm

Wrench for hex-socket screw
SW = wrench size (WS) ... mm
M_D = required tightening torque ... Nm

Screwdriver for recessed head screws
PZ ... = Pozidriv recessed head, size ...
PH ... = Phillips recessed head, size ...

Grease/grease with specified lubricant:
• gleitmo 585 K: gleitmo 585 K, www.fuchs-lubritech.com
• Anti-Seize: Food Grade Anti-Seize/Loctite 8014, www.henkel.com

Secure the screws with:
• Loctite 243: medium strength adhesive (detachable), www.loctite.de
• Loctite 601: high strength adhesive (permanent), www.loctite.de

The identified parts are not required for the assembly situation described. Use the parts in another application or dispose of them.

Sequence of assembly steps in the graphics.
The numbers correspond with the order of the assembly steps according to the instructions in the accompanying text.

Designation of components in graphics.
The letters identify the components specified in the accompanying text.
1. Disassemble the inner guide (A).
2. Disassemble the turntable (B).
3. Disassemble the finger guards (C).
4. Disassemble the top part of the drive heads (D).

6.7 Preparing for assembly

Fig. 2 Preparing for assembly (1/2)
5. Remove the drive train ¹) upwards. Disconnect the drive train and remove the toothed drive belt. The toothed drive belt remains loose in the housing.

¹) Drive train: 2 top parts, connected to the toothed belt wheel (E) by the coupling and hexagon shaft

6. Disassemble the top part of the return heads (F).

7. Remove all toothed belts and return rollers from the drive and return heads.

8. Loosen the tensioning roller (G) on the bottom of the curve and remove the toothed drive belt from the horizontal toothed belt wheel (H). The toothed drive belt remains loose in the housing.

---

Fig. 3 Preparing for assembly (2/2)
6.8 Assembling the KU 1 curve on the BS 1 belt section

Please note:
• Support the BS 1 belt section with SZ 1 leg sets, if l > 2000 mm.

Assembly of the KU 1 with variable infeed/outfeed section L1/L2

1. Insert 4 centering pins (J) each with the cylindrical end in the front of the drive heads (D), so that the chamfer sticks out.
2. Insert 2 hex-socket screws (K) each from the inside through the front of the drive heads.
3. Place the BS 1 belt section on the centering pins.

Please note:
• Do not jam or bend the toothed belt!
4. Bolt the BS 1 belt section to the drive heads (the thread is pre-cut in the BS 1 section profile).

Assembling the KU 1 curve on the BS 1 belt section

1. Remove the spacer (L) from the drive heads (D). Dispose of the spacer (L).
2. Connect the KU 1 curve to the BS 1 belt section in the T-grooves of the drive heads using 2 KU 1/BS 1 connectors (M).
6.9 Assembling the toothed belt

1. Connect the drive and return train; the retainer ring on the hexagon shaft must be between the toothed belt wheel and the outside of the curve.

2. Assemble the toothed belt return roller (N), see also Fig. 7, 21.

3. Place the toothed drive belt from the KU 1 on the toothed belt wheel (E).

Fig. 6 Assembling the toothed belt (1/2)
4. Assemble the drive and return train.

**Please note:**
- The BS 1 toothed belt should rest on the toothed belt return rollers.
- Lower the drive unit steadily into the subframe, taking care to keep it level. Make sure that the toothed belt sits in the gear teeth of the toothed belt wheels!
- Tighten the screws, while alternating between opposing and diagonal screws!

5. Place the toothed drive belt on the horizontal toothed belt wheel and return roller. Make sure the toothed belt is in the proper position.

6. Tension the toothed belt by sliding the tensioning roller (G). Permissible belt tension: 22 ±2 Nm.

See also Fig. 14, 34

![Fig. 7  Assembling the toothed belt (2/2)](image)
7. Assemble the finger guards (C).
8. Assemble the turntable (B).

Fig. 8  Mounting the belt section as a transverse section between two longitudinal sections
6.10 Assembling the motor/gearbox combination

Please note:

• The motor/gearbox combination is included separately and is ready to assemble.
• Assembly with a bayonet flange.
• Suspended assembly required.

1. Assemble the motor/gearbox combination.

![Fig. 9 Assembling the motor/gearbox combination](image)
6.11 Accumulation stop gate

The accumulation stop gate limits the number of workpiece pallets in the curve to a defined workpiece pallet number \( n \).

The accumulation stop gate consists of a WI/M rocker and VE 1/... stop gate.

Once the last workpiece pallet leaves the rocker, the stop gate is released.

| Tab. 1: Assembly dimensions for WI/M and VE 1/... |
|-----------------|----------------|----------|---|---|
| \( b_{WT} \) [mm] | \( l_{WT} \) [mm] | \( a \) [mm] | \( n \) (90°) | \( n \) (180°) |
| 80 | 80 | 200 | 8 | 10 |
| 120 | 120 | 300 | 6 | 7 |
| 160 | 160 | 400 | 5 | 6 |

After the belt section has been aligned, bolt the leg sets to the floor with foundation brackets and dowels to prevent the legs from moving.

The following is required per connection:

- 1 foundation bracket, \( 3 \ 842 \ 146 \ 815 \)
- 1 dowel, \( 3 \ 842 \ 526 \ 560 \)
- 2 T-bolts, \( 3 \ 842 \ 528 \ 718 \)
- 2 flange nuts, \( 3 \ 842 \ 345 \ 081 \)

6.12 Aligning the system and bolting to the floor

Fig. 10 Accumulation stop gate

Fig. 11 Aligning the system and bolting to the floor
Please note:

- If delivered without a motor, additional toothed drive belt wheels (X) and return rollers are included (Y).
- Assemble the toothed drive belt wheels (X) and return rollers (Y) as required (driven by one or two motors),  17/18,  19/20.

Fig. 12  KU 1/360° curve, driven by one motor

Fig. 13  KU 1/360° curve, driven by two motors
6.14 Connecting the power supply

⚠️ WARNING

High electrical voltage!
Danger of severe injuries or death due to electric shock.
- Make sure the relevant system component is not under pressure or voltage before performing any maintenance or repair work.
- Protect the system against being switched on.

• Select the control and sensor elements in accordance with EN ISO 13849. Observe the load to be conveyed and the transportation speed.
• Only trained specialists are permitted to connect the motor!
• Observe regulation VDE 0100 for Germany or the appropriate regulations for the country where the product is used.

6.14.1 Motor connection

• Note the existing line voltage!
• Note the electrical voltages on the motor rating plate, see "Fig. A: Motor rating plate (example)" on page 27.
• Connect the motor as a Y-connection or a triangle connection in accordance with the connection plans, see “Fig. B: Connection plans: triangle connection/Y-connection" on page 27, and the connection plan in the terminal box.
• The motor is equipped with a bi-metal switch (potential-free thermal contact, 230 V AC, 300 mA) to monitor the temperature. Connect the monitor so that it becomes currentless when the switch is actuated.
• Select a cable entry that prevents damage to the cable during operation.
• Connection cable option: 3 842 410 191 (M20x1.5), see “Fig. C: Cable connection option” on page 27. Pay attention to the ballast fuse!

Checking the motor's direction of rotation

• Start the system for a maximum of 2 s and check that the motor is rotating in the correct direction.
• Exchange any two wires to change the motor’s direction of rotation (L1, L2 or L3, see “Fig. B: Connection plans: triangle connection/Y-connection" on page 27).
• Note: In motors with a factory-installed plug, correct the direction of rotation in the switch cabinet or at the plug coupling (socket side). This will simplify exchanges.
**Rexroth**

MNR: 3 842 XXX XXX
IEC 60034 3-Mot No399492
Th.CLF(B) IP55
50Hz: ΔY 230/400V 0.75kW 4.0/2.3A
60Hz: ΔY 254/460V 0.86kW 4.0/2.3A
1410/1710min⁻¹ cos φ 0.71/0.71
FD: XXX XXXXX
Made in xxxxxxx

---

**Fig. A: Motor rating plate (example)**

---

**Fig. B: Connection plans: triangle connection/Y-connection**

---

**Fig. C: Cable connection option**
7 Commissioning

7.1 Commissioning for the first time

⚠️ CAUTION

**Unexpected movements, falling workpiece pallets**

Injuries due to falling objects

- Before commissioning, make sure that the product has been correctly assembled by qualified personnel (see § 8).

NOTICE

**Malfunctions due to incorrect assembly and commissioning**

The product may be damaged or its service life shortened.

- Commissioning requires basic mechanical, pneumatic, and electrical knowledge.

- The product may only be commissioned by qualified personnel (see § 8).

- According to EU Machinery Directive 2006/42/EC, you must provide the transfer system with an emergency-OFF device!

- The surfaces of motors and gears can reach temperatures of over 70°C under certain load and operating conditions. In such cases, the valid accident prevention regulations (in Germany: UVV) must be met by corresponding constructive measures (safety devices) or safety warning signs!

- Make sure that all electrical and pneumatic connections are either used or covered. Check to see that all threaded and push-in fittings are securely mounted. All relevant protective covers must be in place.

- Continuous conveyors that are in motion or operation may only be inspected or adjusted if protective devices are present and correctly positioned.

- Observe DIN EN 13857 when removing or replacing protective devices and/or deactivating safety devices.

- Test runs with open housings are only permitted when they are performed by skilled workers using hold-to-run controls and when the influence of all other switching devices can be excluded.

- Only commission the belt section if all safety devices have been installed in the system and are functional.

- Commission the product only if it is installed completely.
7.2 Residual hazards

<table>
<thead>
<tr>
<th>Location</th>
<th>Situation</th>
<th>Hazard</th>
<th>Measure</th>
</tr>
</thead>
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<td><strong>Belt section</strong></td>
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<tr>
<td>1</td>
<td>Infeed point for conveyor medium</td>
<td>Drawing in of clothing or long hair</td>
<td>Crushing</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Tearing hair out</td>
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<td></td>
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<td>Crushing</td>
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<tr>
<td></td>
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<td>Tearing hair out</td>
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<tr>
<td></td>
<td></td>
<td>Do not reach into the system during operation.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Transverse connector; drive shaft: Between component and workpiece pallet</td>
<td>Catching of body parts</td>
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<tr>
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<td>Between workpiece pallet and workpiece pallet</td>
<td>Catching of body parts</td>
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<td>Turntable: Infeed point between turntable and inner/outer guide</td>
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<td>Crushing</td>
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<td></td>
<td>Tearing hair out</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Do not reach into the system during operation.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Turntable; inner/outer guide: Between component and workpiece pallet</td>
<td>Catching of body parts</td>
<td>Crushing</td>
</tr>
</tbody>
</table>

7.3 Recommissioning after shutdowns

Follow the same procedure used for initial commissioning.
8 Operation

⚠️ CAUTION

Hot electric motor surfaces during operation!
Possible burns if the hot surfaces (over 65°C) are touched
▶ Provide appropriate safety devices to seal off the motors.
▶ Let the system cool off for at least 30 min. before performing any maintenance or repair work.

NOTE

Malfunctions due to additional load
There is a tendency to place objects on covers or protective hoods at curve KU 1. The additional load can cause lowering of curve KU 1. A displacement of the curve leads to malfunctions.
▶ Provide ground support for covers or protective hoods in addition to fastening at curve KU 1.

8.1 Notes on operation

8.1.1 Wear

• Wear is caused by the basic principle of this system and cannot be avoided. Constructive measures and selection of the proper materials will help functional safety last for the lifetime of the system. However, wear depends on the operating, maintenance, and ambient conditions of the system, as well as the location (resistance, contamination).
• Overloading the conveyor sections may damage the conveying medium and cause the motor and gears to fail.
• Function cannot be guaranteed if the pneumatic components are overloaded.

8.1.2 Measures to reduce wear
The following measures reduce wear:
• Switch off conveyor sections when the system is not running, e.g. during breaks, over night, on the weekend.
• Only select speeds that correspond with the particular function.
• Especially important: Avoid contamination by abrasive media; reduce contamination through regular cleaning.
8.1.3 Loading the workpiece pallet

When setting up and testing the modular units, the workpieces pallets should not all have the same weight on the conveyor sections. Full and empty pallets should all come through the circuit. Extreme differences in weight may, however, require special measures to avoid functional disruptions. This applies for:

- Permissible accumulation length before stop gates.
- Damper function.
- Dampened stop gates.

8.1.4 Environmental conditions

- Resistant to many common media used in production 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 detergents, solvents, or brake fluid.
- Avoid long-term contact with acidic or basic reacting materials.
- Wear may increase dramatically if the system is contaminated due to environmental factors, particularly with abrasive media such as sand and silicates, but also due to processes running on the transfer system (e.g. welding beads, pumice dust, glass shards, shavings, or lost parts...). In such cases, maintenance intervals must be substantially shortened.
- Resistance to media and contamination does not mean that functional safety is guaranteed in every case.
  - Liquids that thicken on evaporation and are highly viscous or adhesive (sticky) could lead to a disruption in function.
  - Media with lubricating properties may reduce the driving power that is caused by friction if they are carried over onto systems with rollers.

Such cases require special attention when planning the system and adjusting the maintenance intervals.
9 Maintenance and Repair

⚠️ WARNING

High electrical voltage!
Danger of severe injuries or death due to electric shock.
- Make sure the relevant system component is not under pressure or voltage before performing any maintenance or repair work.
- Protect the system against being switched on.

High pneumatic pressure!
Danger of severe injuries or death.
- Switch off the compressed air supply on the relevant system component before performing any maintenance or repair work.
- Protect the system against being switched on.

⚠️ CAUTION

Hot electric motor surfaces during operation!
Possible burns if the hot surfaces (over 65°C) are touched
- Provide appropriate safety devices to seal off the motors.
- Let the system cool off for at least 30 min. before performing any maintenance or repair work.

- Continuous conveyors that are in motion or operation may only be inspected or adjusted if protective devices are present and correctly positioned.
- Observe DIN EN 13857 when removing or replacing protective devices and/or deactivating safety devices.
- Test runs with open housings are only permitted when they are performed by skilled workers using hold-to-run controls and when the influence of all other switching devices can be excluded.
9.1 Cleaning and care

**NOTICE**

**Bearing malfunctions**
Moistening of the bearings with grease-dissolving substances, e.g. for cleaning purposes, will lead to bearing malfunctions. There is a danger of damage to property; the service life may be shortened.
- Keep grease-dissolving or aggressive cleaning agents away from the bearings!
- Only use water and a slightly damp cloth to clean the product.

**Toothed belt malfunctions**
Moistening of the toothed belt with grease-dissolving substances, e.g. for cleaning purposes, will lead to toothed belt malfunctions. There is a danger of damage to property.
- Keep grease-dissolving or aggressive cleaning agents away from the toothed belts!
- Only use water and a slightly damp cloth to clean the product.

9.2 Inspection

9.2.1 Toothed transport belts on belt section
Conduct regular visual inspections (1x/week) of the toothed transport belt for wear, particularly near the weld seam.

9.2.2 Toothed drive belts on the curve
Conduct regular inspections (2x/year) of the tension of the toothed drive belt using a spring balance. Pre-tensioning force: 22 ± 2 Nm.

9.3 Maintenance

9.3.1 Bearings
All bearings are provided with lifelong lubrication and are maintenance-free under normal conditions.

9.3.2 Gears
The gear is maintenance-free.
Motor
To ensure adequate motor cooling, dirt and dust must be removed at regular intervals from the:
• Motor surface
• Fan housing inlets
• Interior surfaces of the cooling fins
The cleaning intervals are based on the ambient conditions and operating conditions.

9.3.3 Toothed transport belt
The transport side of the toothed belt is lightly lubricated on delivery to increase the service life of the toothed belt. Apply subsequent lubrication to the toothed belt if necessary by wiping a lightly oiled rag (mineral oil viscosity 68 according to DIN, Aral/Shell) along the transport side of the toothed belt.

9.3.4 Toothed drive belts on the curve
The toothed belt is wear-free. If the pre-tensioning is less than 22 ± 2 Nm, tension the toothed belt again.

1. Disassemble the inner guide, turntable, and finger guards (see Fig. 2, § 17).
2. Loosen the tensioning roller on the bottom side of the curve (KU 1/90°: one tensioning roller, KU 1/180°, KU 1/360°: two tensioning rollers).
3. Slide the tensioning roller towards the outer side of the curve. (With two tensioning rollers: divide the preload length as equally as possible between the two tensioning rollers).
4. Assemble the inner guide, turntable, and finger guards (see Fig. 2, § 17).

Fig. 14 Tensioning the toothed drive belt
9.4 Repairs

9.4.1 Required tools

- Hexagon wrenches (open-end) WS 8, WS 10, WS 13, WS 17, WS 19, WS 24
- Hex socket wrenches WS 3, WS 4, WS 5, WS 6

9.4.2 Belt section: Exchanging the motor and/or gear
How to exchange the motor and/or gear is described in the assembly instructions for the BS 1 belt section, 3 842 522 488, and the BS 1/T belt section, 3 842 522 489.

9.5 Spare parts
For spare parts, see the MTparts spare parts list, 3 842 529 770.

10 Decommissioning
The product is a component that does not have to be decommissioned. As a result, this chapter in these instructions does not contain any information.
How to disassemble and exchange the product is described in chapter 11 "Disassembly and Exchange" on page 35.

11 Disassembly and Exchange

⚠️ WARNING
High electrical voltage!
Danger of severe injuries or death due to electric shock.
- Make sure the relevant system component is not under pressure or voltage before performing any maintenance or repair work.
- Protect the system against being switched on.

High pneumatic pressure!
Danger of severe injuries or death.
- Switch off the compressed air supply on the relevant system component before performing any maintenance or repair work.
- Protect the system against being switched on.
WARNING

Lifted loads may fall!
Falling objects may result in severe injuries (or even death).

► Always use lifting equipment with a sufficiently high load bearing capacity (see the shipping documents for product weight).
► Before lifting the product, make sure that the carrying straps are correctly fastened!
► Secure the product to prevent toppling while lifting!
► Make sure that no one is in the danger area when raising and lowering, with the exception of the operator!

11.1 Preparing the KU 1 curve for storage or further use

• Only store the product on a flat surface.
• For curves with an assembled motor/gearbox combination:
  Support the curve so that there is no load on the motor/gearbox combination.
• Protect the product against environmental influences such as contamination and humidity.
• Protect the product against mechanical influences.
• For ambient conditions, see § 38.
12 Disposal
• The materials used are environmentally sustainable.
• They may be recycled or reused (if components are converted or replaced). Recyclability is ensured by the selection of material and the possibility to take the components apart.
• Careless disposal of the product may pollute the environment.
• Dispose of the product in accordance with the currently applicable national regulations in your country.

13 Extension and Conversion
• Do not convert the product.
• The Bosch Rexroth warranty only applies to the delivered configuration and extensions taken into account in the configuration. The manufacturer can accept no warranty claims if the system is converted or extended in a manner not listed in these instructions.

14 Troubleshooting and Resolution
If you are unable to remedy the error, please get in touch with one of the contact addresses listed at www.boschrexroth.com.

15 Technical Data
• For dimensions, see the TS 1 transfer system sales catalog, 3 842 528 596
• Maximum load/section load:
  – KU 1/90°: 30 kg
  – KU 1/180°: 30 kg
  – KU 1/360°, with one drive: 24 kg
  – KU 1/360°, with two drives: 30 kg
• Noise emissions: < 70 dB (A)
15.1 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 with 20% reduced load
- Storage temperature –25°C to +70°C
- Relative humidity 5% to 85%
- Air pressure > 84 kPa, appropriate height < 1400 m above sea level
- Permissible floor load: 1000 kg/m²
- Load values are reduced by 15% when the system is set up in a location with an altitude > 1400 m.
- Avoid molds, fungi, rodents, and other vermin.
- Do not install or operate near industrial systems with chemical emissions.
- Do not install or operate near sandy or dusty sources.
- Do not install or operate in areas that are regularly jarred by high forces caused by e.g. presses or heavy machinery.
- Resistant to many common media used in production 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 detergents, solvents, or brake fluid.
- Avoid long-term contact with acidic or basic reacting materials.

15.2 Pneumatics

- Oiled or non-oiled, filtered, dry compressed air.
- Operating pressure: 4 to 6 bar
- Solids
  - Particle size ≤ 5 μm
  - Particle quantity ≤ 5 mg/m³
- Humidity – water content
  - Pressure dew point¹) ≤ +3°C
  ¹) The pressure dew point should be at least 15°C below the ambient temperature.
- Oil content
  - Oil quantity ≤ 1 mg/m³