

BS 2/...

Belt section

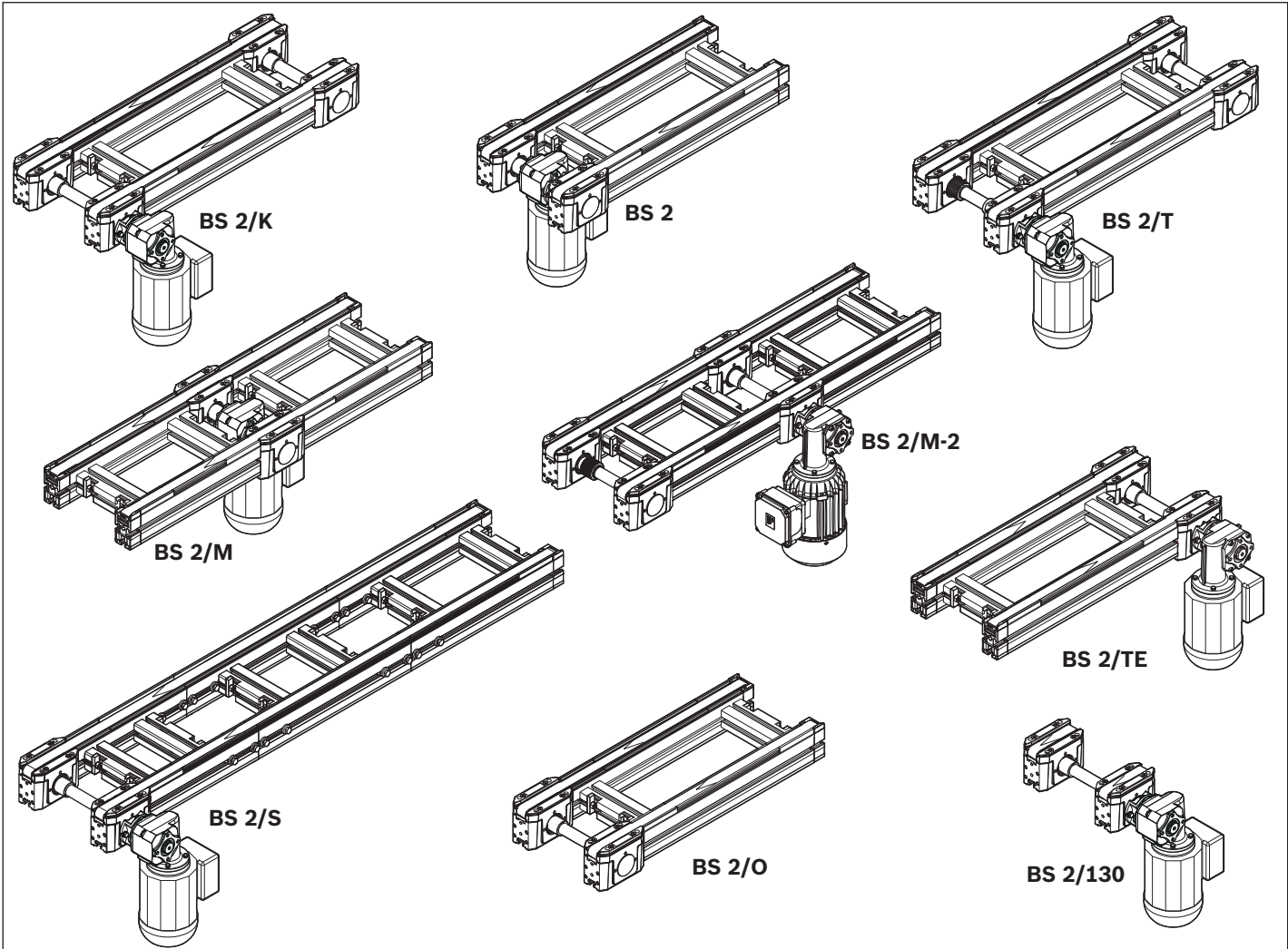
Valid for the following types:

3 842 994 164, BS 2/M-2	3 842 999 722, BS 2/T
3 842 996 463, BS 2/S	3 842 999 723, BS 2/TE
3 842 999 715, BS 2/K	3 842 999 724, BS 2/O
3 842 999 716, BS 2	3 842 999 743, BS 2/130
3 842 999 717, BS 2/M	

Assembly instructions
3 842 559 102/2021-03

Replaces: 2019-03
ENGLISH

ENGLISH



The information in this manual is for product description purposes only. Any information on how to use the product is only an example and a recommendation. 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 natural wear and aging.

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The cover depicts a sample configuration. The actual product may vary.

The original assembly instructions are in German.

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DE	3 842 559 101	BS 2/... Bandstrecke	Deutsch
EN	3 842 559 102	BS 2/... Belt section	English
FR	3 842 559 103	BS 2/... Section à bande	Français
IT	3 842 559 104	BS 2/... Tratto a nastro	Italiano
ES	3 842 559 105	BS 2/... Tramo de cinta	Español
PT	3 842 559 106	BS 2/... Via de esteira	Português
ZH	3 842 559 107	BS 2/... 皮带输送段	中文
CS	MTCS 559 101	1) BS 2/... Pásová trat'	Česky
PL	MTPL 559 101	1) BS 2/... Odcinek taśmy	Polski
HU	MTHU 559 101	1) BS 2/... Szalagszakasz	Magyar
RO	MTRO 559 101	1) BS 2/... Tronson de bandă	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:

- 3 842 994 164, BS 2/M-2
- 3 842 996 463, BS 2/S
- 3 842 999 715, BS 2/K
- 3 842 999 716, BS 2
- 3 842 999 717, BS 2/M
- 3 842 999 722, BS 2/T
- 3 842 999 723, BS 2/TE
- 3 842 999 724, BS 2/O
- 3 842 999 743, BS 2/130

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

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 start up 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
 Instructing Employees on Safety	3 842 527 147	
 Declaration of installation	3 842 358 415	
MTpro ¹⁾	3 842 539 057	With list of spare parts

¹⁾ Download from: www.boschrexroth.com/mtpro

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:

 SIGNAL WORD
Type and source of danger! Consequences of non-compliance ► Steps to prevent danger ► ...

- **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
 DANGER	Indicates a hazardous situation that will result in serious injury or death if not avoided.
 WARNING	Indicates a hazardous situation that may result in severe injury or death if not avoided.
 CAUTION	Indicates a hazardous situation that may result in minor to moderate injury if not avoided.
NOTICE	Property damage: The product or the surrounding area could be 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. 2. 3.	Numbered steps: 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
BS 2	Belt section from the Rexroth transfer system TS 2 <i>plus</i> , for longitudinal and transverse transport of workpiece pallet WT 2.
BS 2/K	Belt section from the Rexroth transfer system TS 2 <i>plus</i> , for driving a connecting curve (KE 2/O).
BS 2/M	Belt section from the Rexroth transfer system TS 2 <i>plus</i> , with motor in the middle of the belt section.
BS 2/T	Belt section from the Rexroth transfer system TS 2 <i>plus</i> , for transverse transport between two belt sections.

Designation	Meaning
BS 2/TE	Belt section from the Rexroth transfer system TS 2 <i>plus</i> , for transverse transport as branch section to a belt section.
BS 2/O	Belt section from the Rexroth transfer system TS 2 <i>plus</i> , without separate drive.
BS 2/130	Belt section from the Rexroth transfer system TS 2 <i>plus</i> , for shortest possible transverse transport.
BS 2/S	Belt section from the Rexroth Transfer System TS 2 <i>plus</i> , the section profiles are divided into 2, 3 or 4 sections and connected with profile connectors

1.3.4 Abbreviations

This document uses the following designations:

Table 5: Abbreviations

Abbreviation	Meaning
WT 2	Workpiece pallet from the Rexroth transfer system TS 2 <i>plus</i>
SZ 2/...	Leg set
HQ 2/...	Lift transverse unit

2 Safety instructions

2.1 About this section

This product has been manufactured to be state-of-the-art. 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 these instructions 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 an incomplete machine.

You may use the product as follows:

- for installation in a Rexroth transfer system TS 2*plus*
- for transporting Rexroth WT 2 workpiece pallets
- Maximum load / section load: see the Technical Data on page 39.
- Ambient conditions, see page 39.

The product is strictly intended for professional use and not for private use. The intended use also implies that you have read all this documentation and fully understood it, in particular chapter 2 "Safety instructions".

2.3 Improper use

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

Bosch Rexroth AG is not liable for any loss or 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.
- The transporting of people on the product or the transported material.
- Persons climbing onto the product – the product must not be walked on or climbed onto.
- Private use.

2.4 Personnel qualification

The activities described in this document require a basic knowledge of mechanical, electrical and pneumatic systems, as well as familiarity with the corresponding technical terms. Additional knowledge of the use of lifting gear and corresponding slings is required for transporting and handling the product. To ensure safe use, these activities should only be performed by a specialist or a person under the direction and supervision of a specialist.

"Specialist" refers to someone who can recognize possible hazards and take the appropriate safety measures given his/her technical training, knowledge and experience, and knowledge of relevant regulations. A specialist must follow with the relevant rules specific to his/her occupation and have the necessary expertise.



Bosch Rexroth offers measures to support training in specific areas. You can find an overview of the training content online at: <http://www.boschrexroth.de/didactic>

2.5 General safety instructions

- As a user, please note the following: Before starting the product for the first time, carry out a risk assessment according to the Occupational Health and Safety Act (DE).
- As distributing company/manufacturer of the machine, observe the following: Before initial commissioning of a conveyor system, conduct a risk assessment in accordance with DIN EN ISO 12100.
- Observe 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 start up the product if it has been determined that the end product (e.g. a machine or system) into which the Rexroth products have been installed complies with national provisions, safety regulations and application standards.

	2.5.1 Product-specific safety instructions
General	• Do not attempt to modify the product. • 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.
During transport During installation	• Always ensure that the product cannot topple over. • Follow the transport instructions on the packaging. • Inspect the product for obvious shipping damage. • Route the cables and lines adequately protected to prevent mechanical damage and ensure that no one can trip over them. • Make sure the system component you are working on is depressurized and de-energized before assembling the product or inserting or removing plugs. • Ensure that the system component cannot be switched back on. • Before start-up, make sure that all plug-in connection seals and caps are correctly installed and undamaged in order to prevent fluids and foreign material from getting into the product.
During start-up	• Allow the product to acclimatize for a few hours prior to start-up in order to prevent water condensation from forming in the housing. • Make sure that all electrical and pneumatic connections are either in use or covered. • Check the safety requirements according to DIN EN 619. • Only start up a product that has been completely installed. • 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. • Do not reach into moving parts. • Check the product for malfunctions.
During operation	• Make sure that only authorized personnel perform the following tasks as part of the intended use of the product – Starting or operating the system, or interfering with its normal operation. – Operating component or part adjusters. • Only allow people to be in the immediate vicinity of the product when it is operating if they are authorized by the operator to be there. This also applies while the product is not in motion. • Make sure that: – There are no obstacles preventing access to the EMERGENCY STOP controls. – All delivery points, workstations and passages are kept clear. • Do not use EMERGENCY STOP controls for routine stopping. • Regularly check the EMERGENCY STOP controls to ensure that they are functioning properly. • 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. • Do not reach into moving parts. • An idle system is not necessarily a safe system, as stored energy can be released unintentionally or through improper maintenance procedures.
EMERGENCY STOP, malfunction During maintenance and servicing	• After an EMERGENCY STOP or a malfunction, only switch the system back on when you have established and rectified the cause of the fault. • Make sure that access to maintenance and inspection points is kept unobstructed. • Perform the prescribed maintenance work at the intervals prescribed in section 10.3 on service. • 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.
During disposal	• Dispose of the product in accordance with the regulations in your country.

2.6 Personal protective equipment

- Wear appropriate protective clothing when handling the product (e.g. safety shoes, close-fitting clothing, a hair net for long, loose hair).
As the system user or operator, you are personally responsible for ensuring the use of appropriate protective equipment when the product is being used.
All pieces the personal protective equipment must be intact.

2.7 Owner responsibilities

- Before first use or re-commissioning of a conveyor system, run 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 start-up or re-commissioning, and then at regular intervals.

3 General notes on property and product damage

The warranty only applies to the delivered configuration.

- The warranty is void in the event of faulty installation, commissioning and operation, as well as improper use and/or improper handling.
 - The following safety information applies for chapters 6 to 14.
- During operation**
- Periodically perform a visual inspection of the toothed belt for signs of wear, especially in the area of the weld seam.
 - Keep a maintenance schedule.
 - If necessary, re-oil the toothed belt with mineral oil (viscosity 68 acc. to DIN).
 - Keep degreasers or corrosive cleaning agents away from the toothed belt.
- During maintenance and servicing**
- Place the drive unit evenly, and without jamming, into the lower parts. Be sure that the toothed belt is engaged in the teething of the toothed belt gear.
 - If necessary, re-oil the toothed belt with mineral oil (viscosity 68 acc. to DIN).
- During cleaning**
- Prevent cleaning agents from getting into the system.
 - Never use solvents or aggressive cleaning agents.
 - Do not use a pressure washer for cleaning.

4 Scope of delivery

Delivery includes the following:

- 1 belt section BS 2/...
- 1 Assembly instructions "BS 2/..., belt section".

Necessary accessories such as supports, fastening set for the connection to other belt sections or the floor must be ordered separately, see sales catalog **TS 2plus**.

4.1 Condition on delivery

- Mounted on pallet

5 About this product

5.1 Specifications

5.1.1 Using belt section BS 2/...

- Longitudinal conveying of the WT 2 workpiece pallet on conveyor sections of up to 6000 mm.
- Transverse conveying of the WT 2 workpiece pallet between parallel conveyor sections (in connection with two HQ 2 lift transverse units).

5.1.2 Design of belt section BS 2/...

- Ready-to-use conveyor section.
- Section load: see Technical Data on page 39.
- Conveyor medium:
 - BS 2/... : Toothed belt.
- Depending on the version, motor mounting on the right-hand side (MA = R), left-hand side (MA = L) or in the center (MA = M).
- Cable/plug or terminal-box motor connection.

5.2 Product description

- A:** Gear
- B:** Motor
- C:** Toothed belt
- D:** Preferred travel direction of the toothed belt (in direction of arrow)
- E:** The section profiles are divided into 2, 3 or 4 sections and connected with profile connectors (E)
- F:** Toothed belt gear for driving neighboring modular units, e.g. curve KE 2/...-O

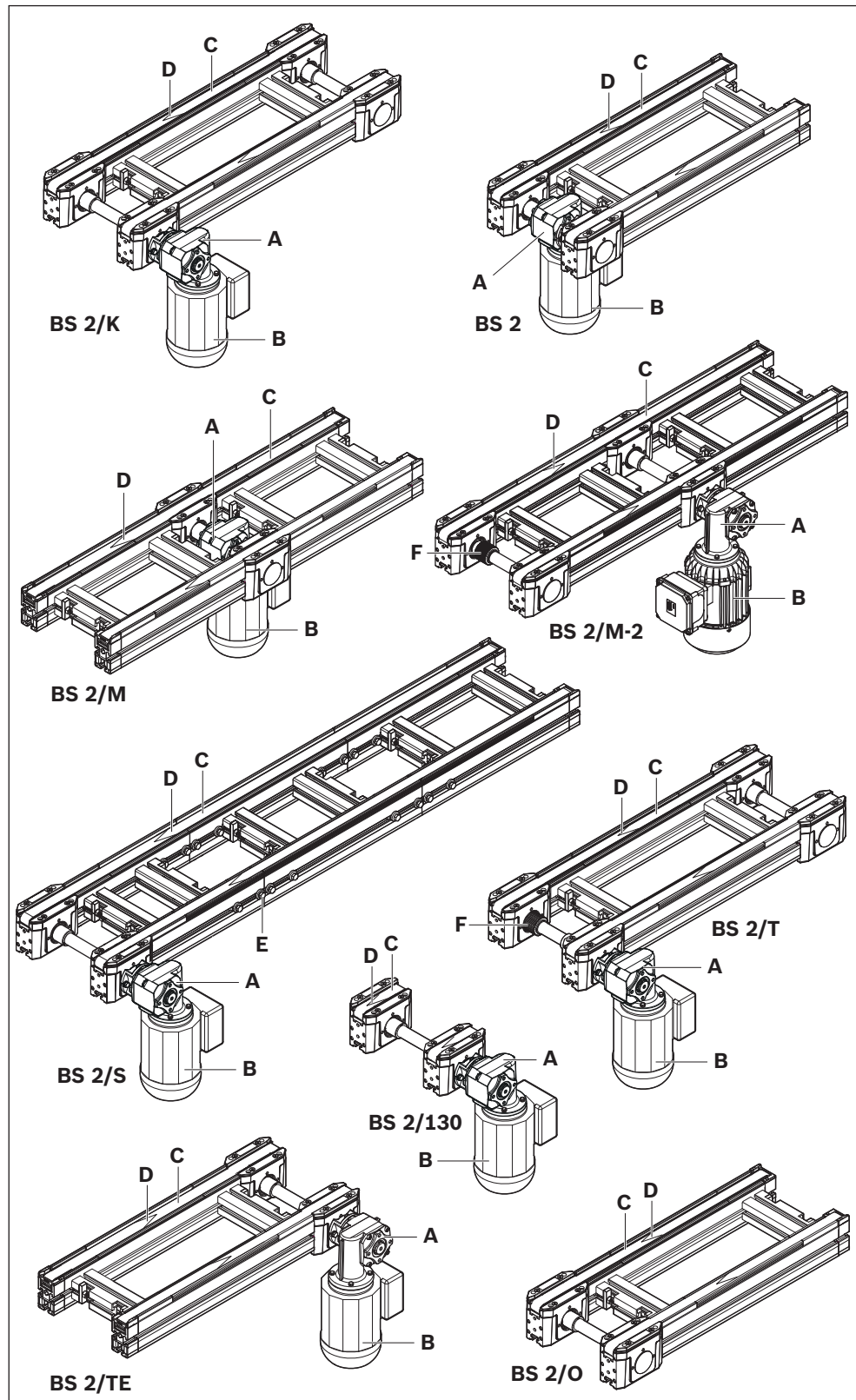


Fig. 1: Belt section BS 2/...

559101-01

5.3 Identification of the product

- A:** Material number
(order number)
- B:** Designation
- C:** Design and dimensions

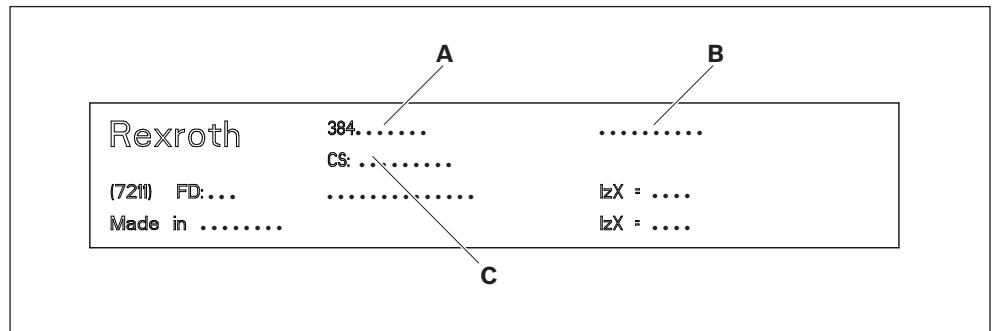


Fig. 2: Nameplate

Typschild

6 Transport and storage

- Follow the transport instructions on the packaging.
- Transport weight: see delivery documents.
- Secure the product to prevent toppling!
- Always maintain ambient conditions during loading and transport, see page 39.

6.1 Transporting the product

! WARNING

Lifted loads may fall!

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

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

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.
- Pay attention to the ambient conditions, see page 39.
- Support the product so that hanging-mounted motors/actuators/cylinders will not be burdened.

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 39).

7.2.1 Installation position

- ▶ Install the product level and plumb, at right angles, and axially parallel. This ensures proper functioning and prevents premature wear.

7.3 Required tools

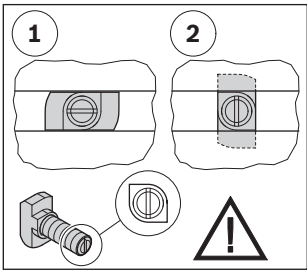
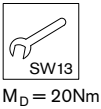
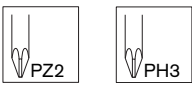
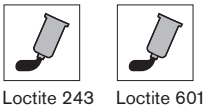
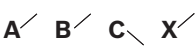
- Hex wrench (open-ended spanner) SW8, SW10, SW13, SW19, SW24.
- Hex socket wrenches SW3, SW4, SW5.
- Hexagon socket wrench (Torx™) T30, T50
- Phillips screwdriver PH2
- Spirit level
- Combination pliers
- Flange light file

7.4 Required accessories

- Section supports for holding up the belt section.
Please note: Support the belt section in the immediate vicinity of the drive and return unit. Max. distance between two support sections: 2000 mm.
 - for BS 2/...
 - SZ 2, **3 842 996 320**
 - SZ 2/U, **3 842 996 322**
 - SZ 2/T, **3 842 996 324**
- For fastening the section supports on the ground, you need the following for each connection:
 - 1x foundation bracket, **3 842 146 815**
 - 1x dowel, **3 842 526 560**
 - 2x T-bolts, **3 842 528 718**
 - 2x flange nuts, **3 842 345 081**
 - Connection kit for transverse conveying, for utilization of the belt section in lateral transverse conveying (drive head-at-section).
 - BS 2/..., **3 842 525 110**
- Connection kit for longitudinal conveyor (drive head at return unit)
 - BS 2/..., **3 842 525 110**

7.5 Symbols used

Table 6: Symbols used

	Connection with T-bolt and flange nut. Make sure the T-bolt is in the correct position when inserting into the slot and tightening. The notch at the head of the bolt indicates the orientation of the T-bolt. 1 = T-bolt insertion position in the slot 2 = T-bolt clamping position in the slot Tightening torque: 25 Nm
	Hex wrench SW = wrench size ... mm M_D = required tightening torque ... Nm
	Hex key SW = wrench size ... mm M_D = required tightening torque ... Nm
	Screwdrivers for cross-head screws PZ ... = Pozidriv cross recess, size ... PH ... = Phillips cross recess, size ...
	Lubricate/lubricate with specific grease 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 (detachable), www.loctite.de • Loctite 601: high-strength screw retention (non-detachable), www.loctite.de
	Oil/oil with specific mineral oil: • GHD: Structovis GHD, www.klueber.com • V 68: Mineral oil with viscosity 68 acc. to DIN
	The marked parts are not required for the described assembly. Dispose of the parts or use them for other purposes.
	Graphical depiction of the installation steps. The numbers correspond to the sequence of mounting steps, in accordance with the instructions in the accompanying text.
	Designation of components in graphics. The letters denote the components mentioned in the accompanying text.
	Detail view from a different direction, for example, the back or the bottom side of the product.

7.6 Installing the product

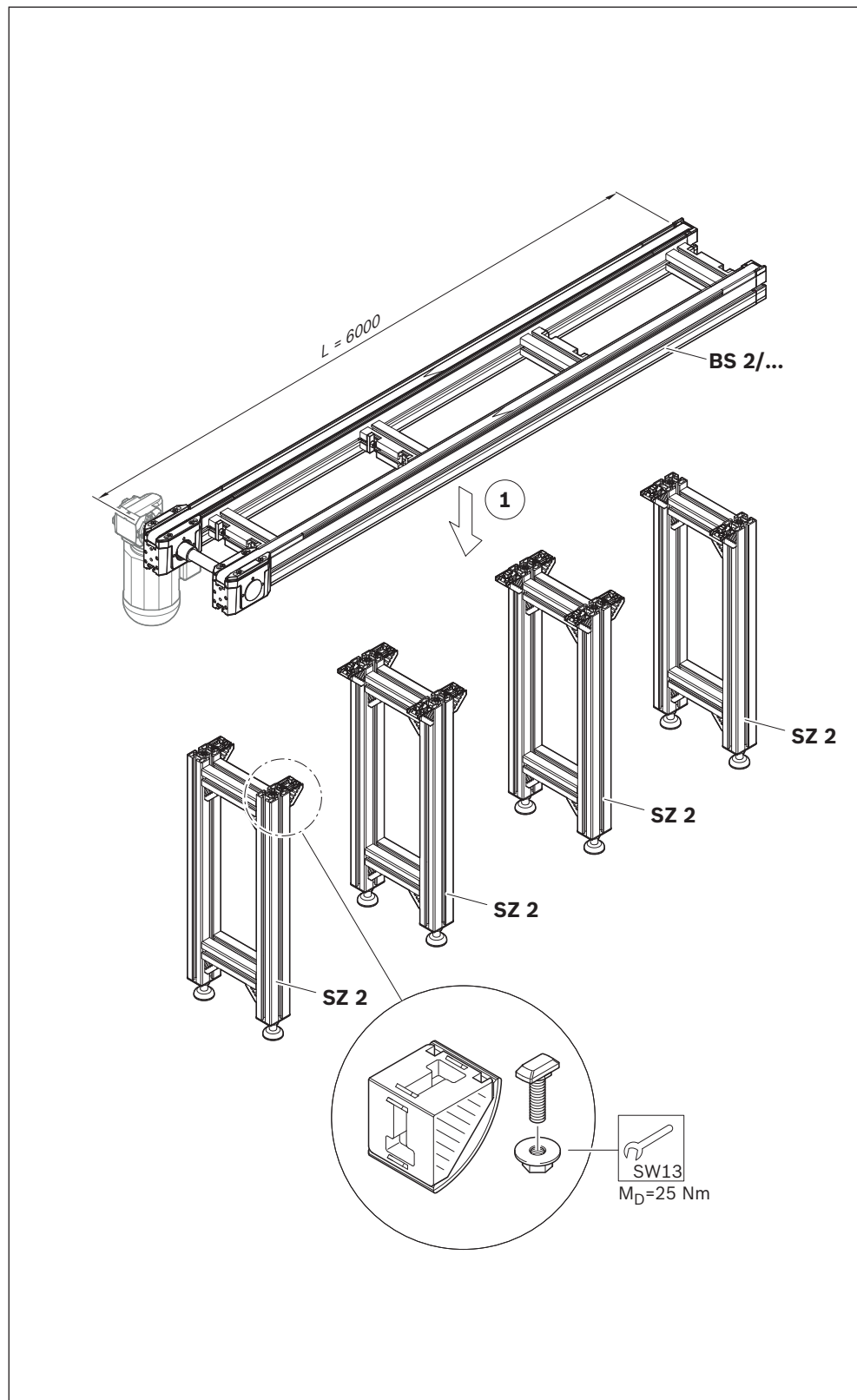
7.6.1 Installing the belt section on section supports

1. Install the belt section (BS 2/...) on 2 to 4 section supports (SZ 2).



Please note:

- Install one section support (SZ 2) each in the immediate vicinity of the drive and return unit.
- Install the section supports (SZ 2) under each of the cross connections of the belt section.
- Max. distance between 2 support sections: 2000 mm.



559101-02

Fig. 3: Installing the belt section on section supports (1/2)

2. Align the belt section (BS 2/...) flush, horizontally and by height.
3. Screw the belt section (BS 2/...) to the floor. For each connection, you will need:
 - 1x foundation bracket, **3 842 146 815**
 - 1x dowel, **3 842 526 560**
 - 2x T-bolts, **3 842 528 715**
 - 2x flange nuts, **3 842 345 081**
4. Install the motor, see the installation instructions enclosed with the motor.

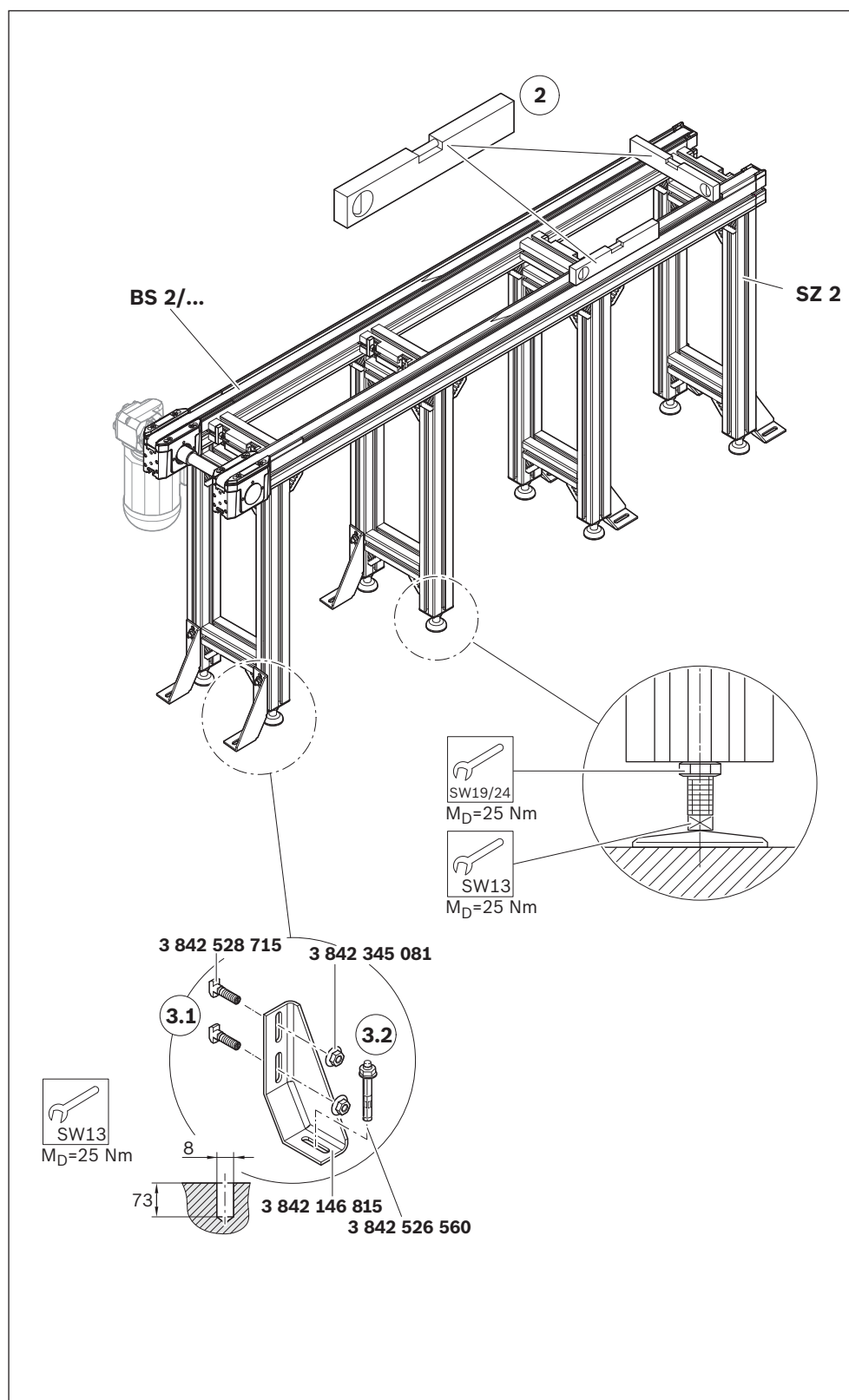


Fig. 4: Installing the belt section on section supports (2/2)

Installing belt section BS 2/S on section supports

**Please note:**

- Install one section support (SZ 2) each in the immediate vicinity of the drive and return unit.
- Install one section support (SZ 2) under each interruption (profile connectors, E) of the belt section.
- Max. distance between 2 section supports: 2000 mm.

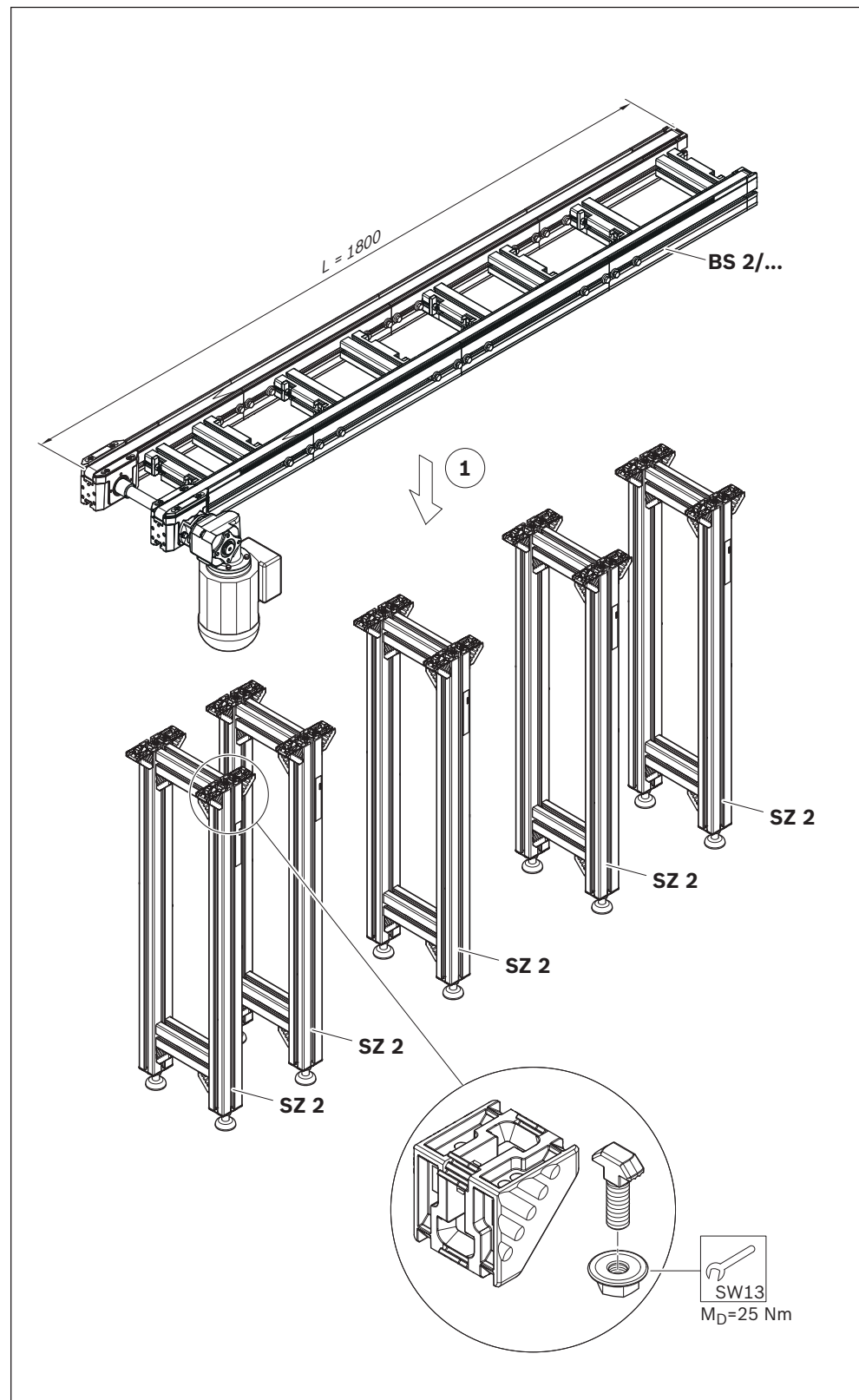


Fig. 5: Installing belt section BS 2/S on section supports

559101-15

7.6.2 Modifying the mounting position of the motor-gear combination

1. Remove the hexagon socket screws (O).
2. Pivot the motor-gear combination (K) around the drive axis in 90° intervals.
3. Install the hexagon socket screws (O).

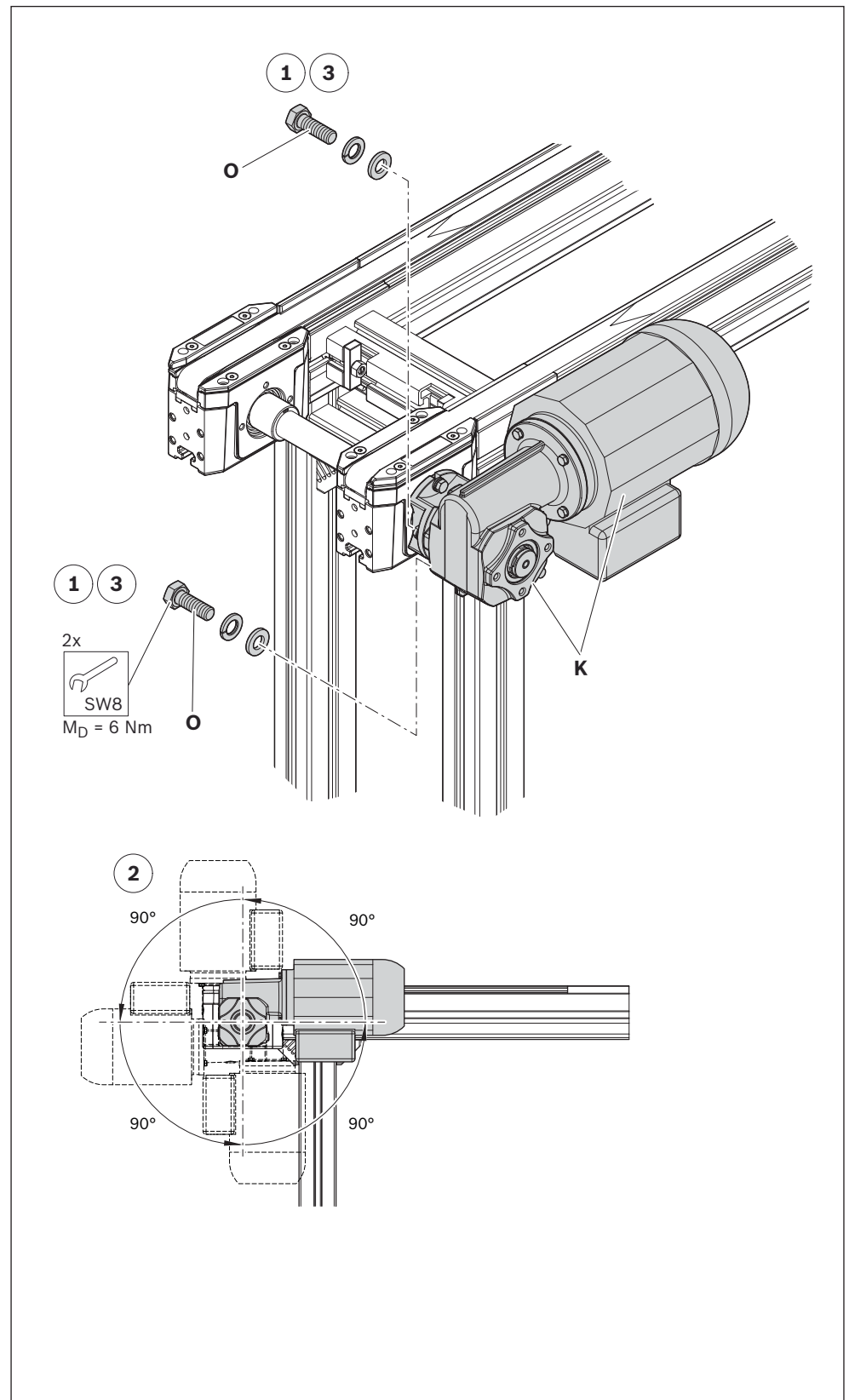


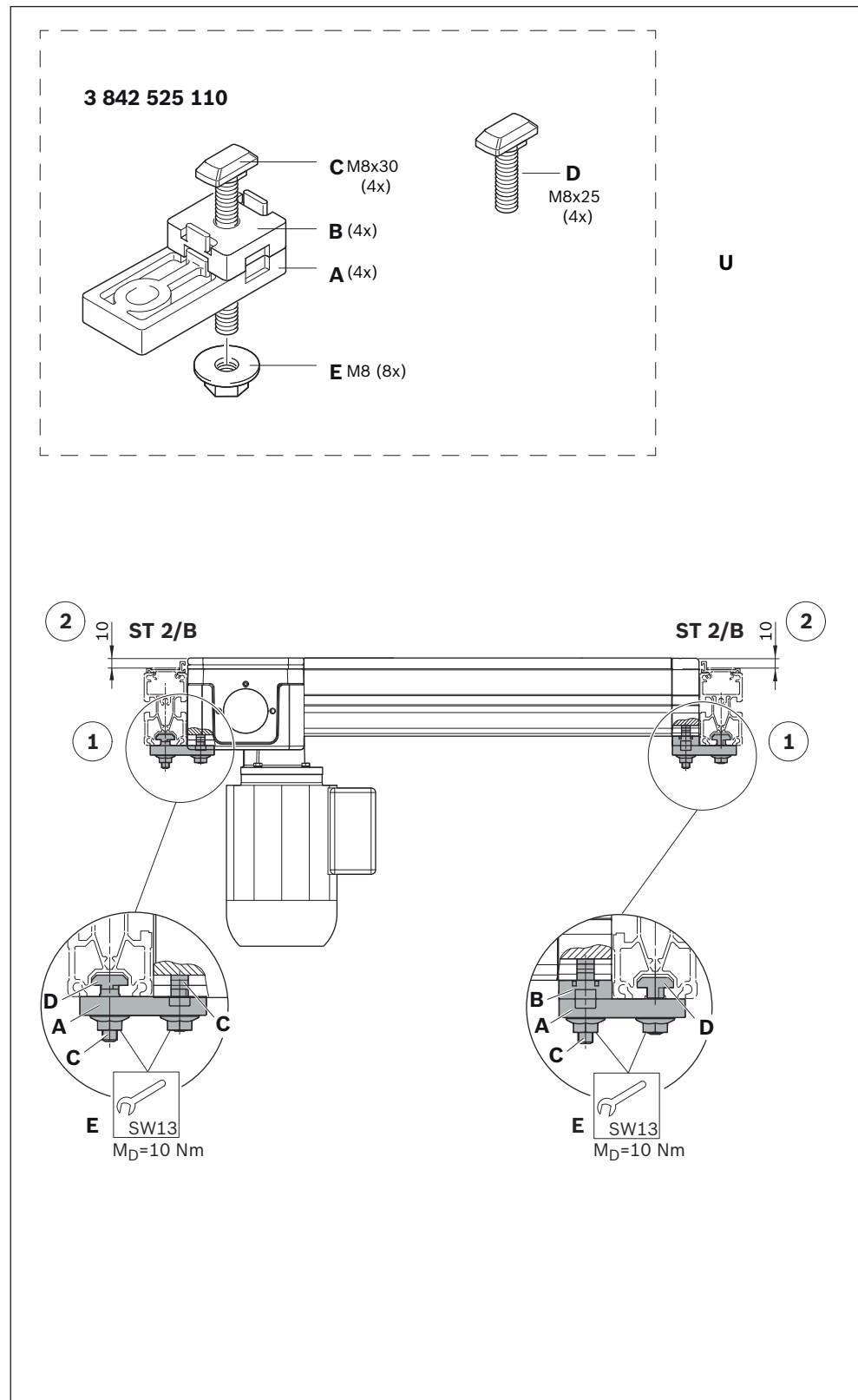
Fig. 6: Swivel the motor gear combination around the drive axle

Required accessories:

- Connection kit
3 842 525 110 (1x)

**Please note:**

- Support the belt section if necessary with section supports (see page 17).
1. Slide the connection kit into the T-groove of the drive or return head.
 2. Make sure that the sections are at the same height (ST 2/B).
 3. Install the connection kit.

7.6.3 BS 2/... Install the belt section between two sections

559101-05

Fig. 7: BS 2/... Install the belt section between two sections

7.6.4 Making the electrical connection to the product



WARNING

High electrical voltage!

Risk of serious injury or death from electric shock.

- ▶ Disconnect the system component requiring maintenance or servicing before starting.
- ▶ Secure the system against being unintentionally switched on again.

- Choose control and sensor elements in accordance with EN ISO 13849. Factor in the load being transported and the transport speed.
- The motor may only be connected by qualified personnel!
- Comply with VDE regulation VDE 0100 for Germany, or corresponding regulations in the country of use.

Motor connection

- Take account of the available supply voltage!
- Take account of the electrical power requirement shown on the motor nameplate, see Fig. 8 on page 22.
- Connect the motor in either a wye or a delta configuration in accordance with the wiring diagrams, see Fig. 9 on page 22, and the wiring diagram in the terminal box.
- 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 be damaged during operation.
- Optional motor connection with plug (AT = S), see Fig. 10 on page 22. Pay attention to the pre-fuse!

Checking the rotational direction of the motor

- Let the system run for no more than 2 secs., then make sure the motor is rotating in the proper direction.
- Switch any two wires (U1, V1 or W1, see Fig. 9 on page 22) 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.

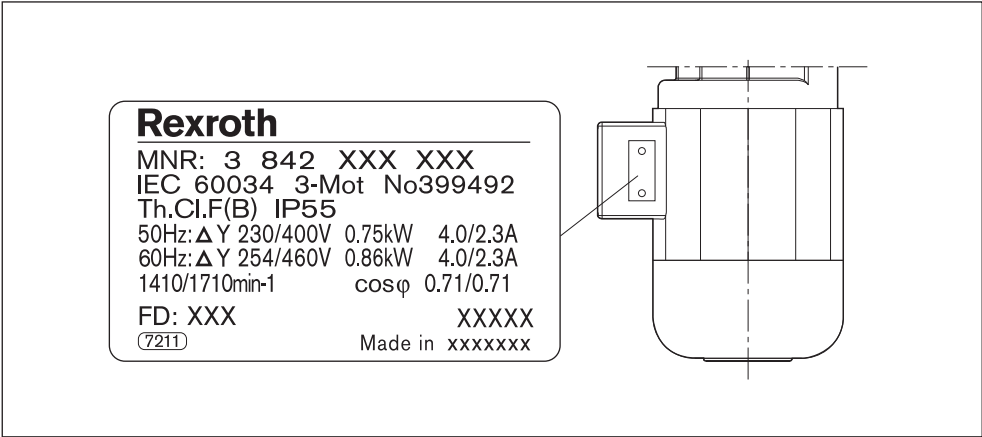


Fig. 8: Motor nameplate (example)

Installation_A

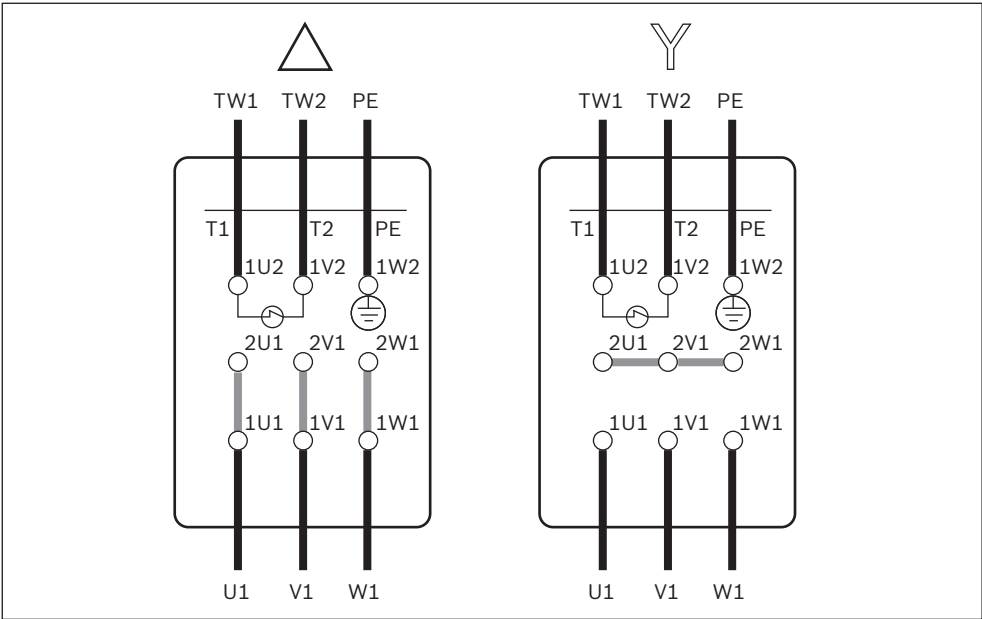


Fig. 9: Delta/ye wiring diagrams

Installation_DY

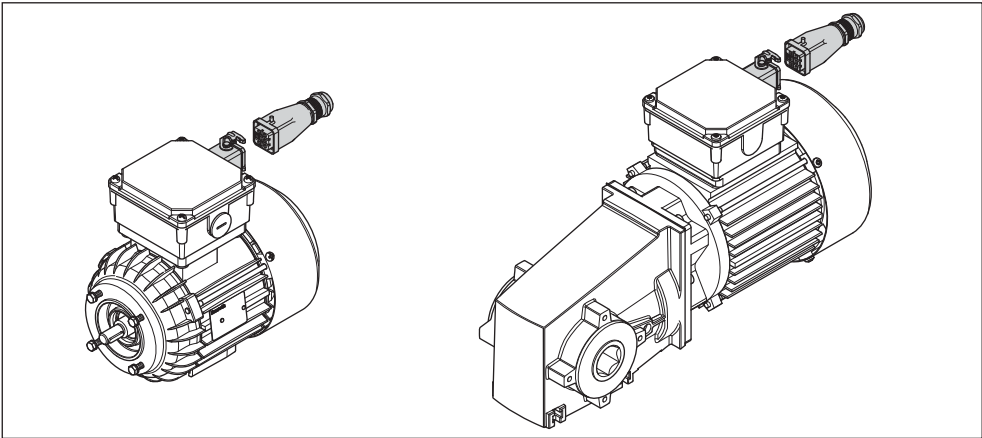
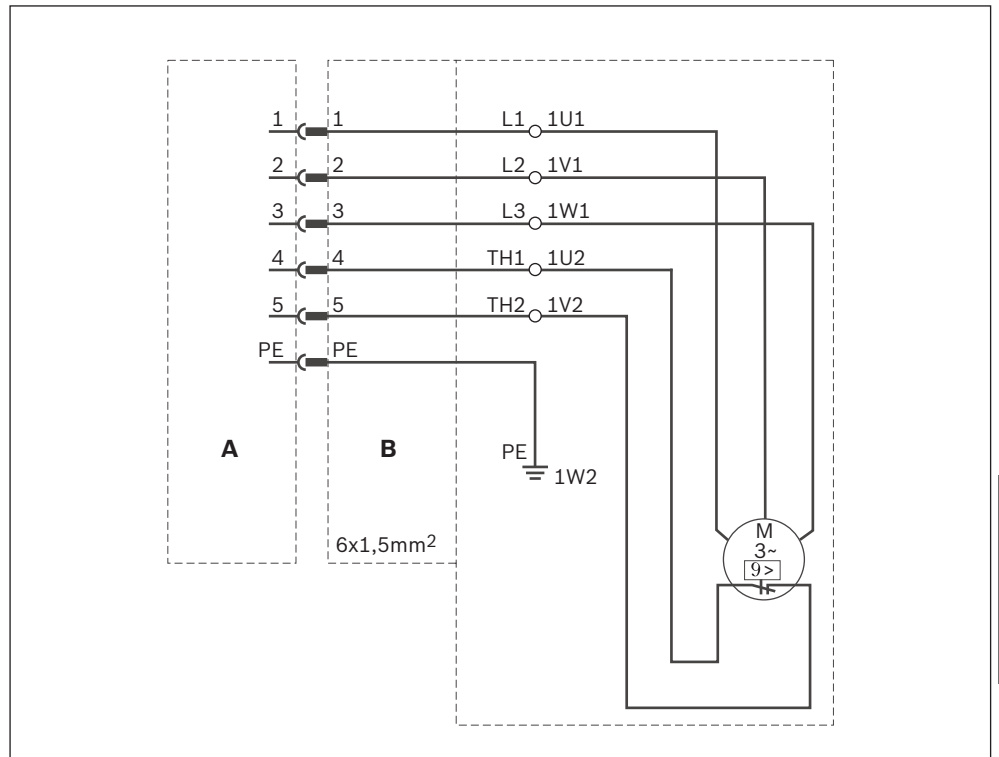


Fig. 10: Optional motor connection with plug (AT = S)

Installation_IEC



Installation_S-plan

Fig. 11: Motor connection with cable/plug (AT = 1), circuit diagram

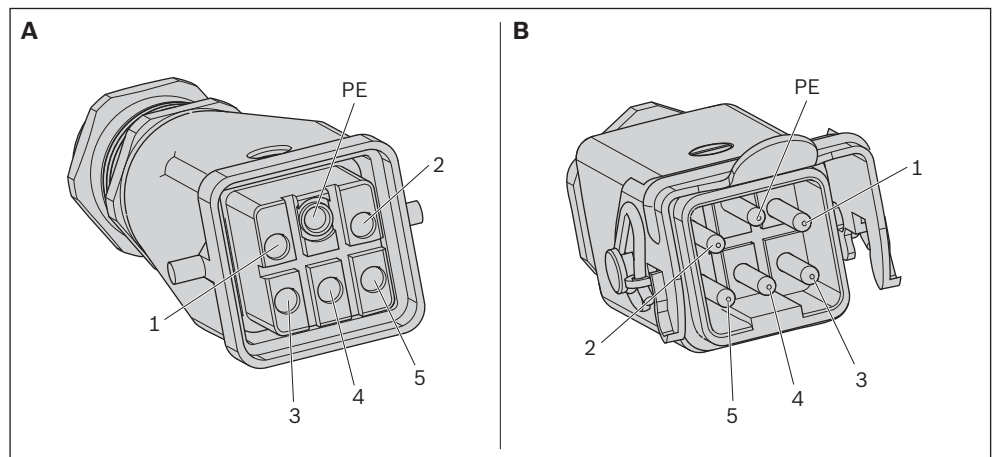
A: Connection cable side

B: Motor side

The plug connection consists of UL components.

Connection list

Connection terminals, motor 3~	Pin no.	Code
U1	1	L1
V1	2	L2
W1	3	L3
TW1	4	Th1
TW2	5	Th2
	PE	PE



Installation_Stecker

Fig. 12: Motor connection with plug (AT = 1), plug connection

A: Connection cable side

B: Motor side

8 Start-up

8.1 Initial start-up



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 commissioning it.

NOTICE

Malfunctions due to incorrect assembly and start-up

The product can get damaged and its service life shortened.

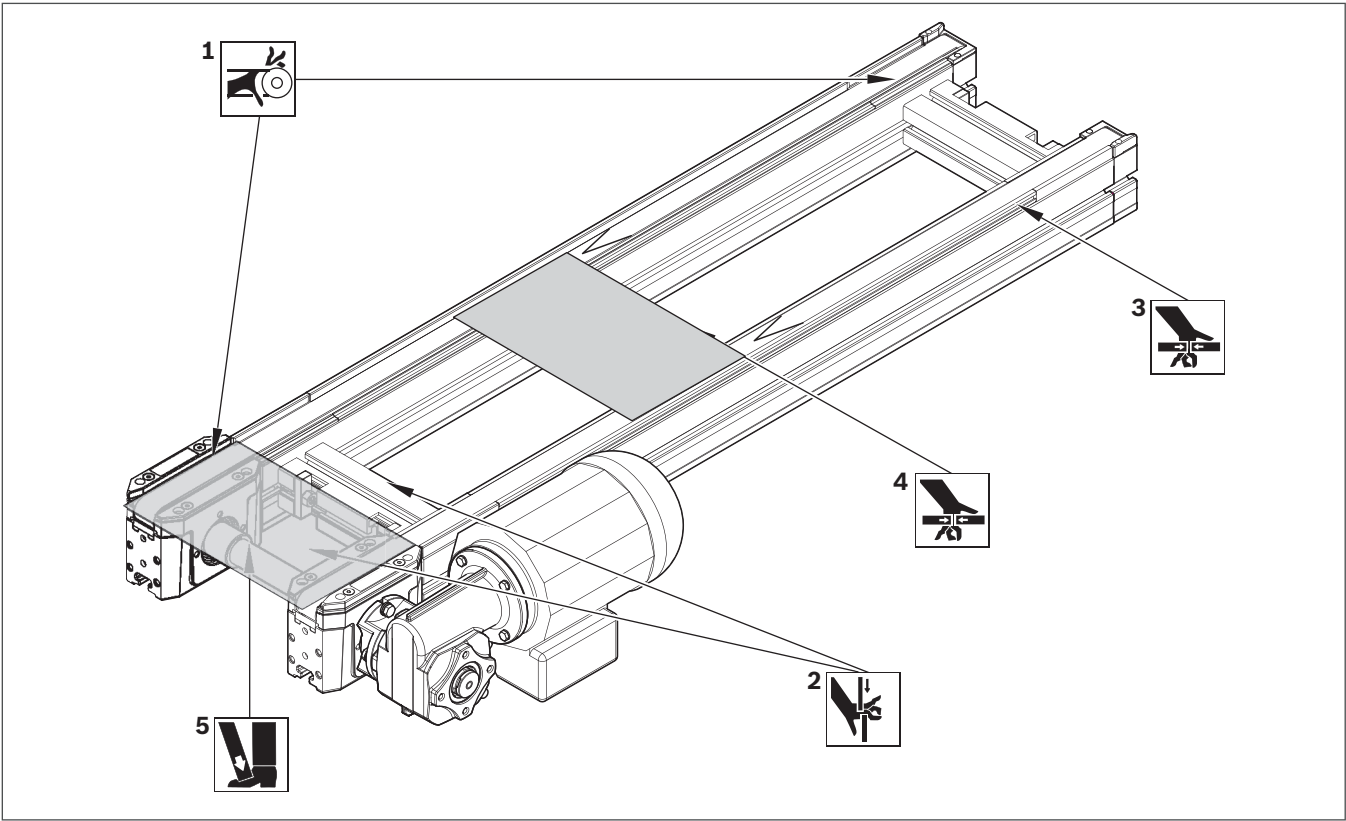
- ▶ Commissioning requires basic mechanical, pneumatic and electrical knowledge.
- ▶ The product may only be operated by qualified personnel (see page 8)

- Before first use or re-commissioning of a conveyor system, run 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 devices.
- The surfaces of motors and gears can reach temperatures of over 65 °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.
- Note 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 start up the product if all safety equipment has been installed in the system and is functional.

8.2 Residual risks

Table 7: Residual risks

	Location	Situation	Hazard	Action
1	Conveyor medium entanglement zone	Pieces of clothing or long hair can be pulled in	 Crushing, pulled out hair	Do not reach into the system while it is running. Wear protective clothing.
2	Cross connection, drive shaft, gear: between and workpiece pallet	Body parts can become trapped	 Dismemberment	Do not reach into the system while it is running. In the work area OR at transport speeds $v > 15$ m/min, a constructive solution, e.g. separation of the workpiece pallets, is required.
3	Conveyor medium: between running conveyor and stationary workpiece pallet (e.g. during separation)	Body parts can become trapped	 Crushing	Do not reach into the system while it is running.
4	Between workpiece pallets	Crush injury to body parts	 Crushing	Do not reach into the system while it is running. In the work area or at transport speeds $v > 15$ m/min, a constructive solution, e.g. separation of the workpiece pallets, is required.
5	End of belt section	Crush injury to body parts caused by falling objects	 Crushing	A constructive solution is required, e.g. by means of a stopper.



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8.3 Re-commissioning after a standstill period

Follow the steps outlined for 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 at least 30 minutes before performing maintenance and/or repair tasks.

9.1 Notes regarding operation

9.1.1 Wear

- Individual components are subject to unavoidable wear by their very nature. Structural measures and the selection of materials are used to achieve 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).
- The overloading of 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 commonsense measures will reduce wear:

- Switch off the conveyor section during system shutdowns, for example, 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 due to 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 line section. Workpiece pallets are both loaded and unloaded.

Significantly different weights may require special measures to avoid malfunctions.

This applies to:

- The permitted accumulation length before stop gates.
- Damper functionality.
- Dampened stop gates.

9.1.4 Environmental influences

- 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 reduced 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 can be 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 serious injury or death from electric shock.

- ▶ Disconnect the system component requiring maintenance or servicing before starting.
- ▶ Secure the system against being unintentionally switched on again.

High pneumatic pressure!

Risk of serious 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 unintentionally switched on again.

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 at least 30 minutes before performing maintenance and/or repair tasks.

- Only inspect and adjust continuous conveyors that are in motion or operation when the safety guards are in place.
- Note 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

Bearing failure

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 service life may be reduced.

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

Failure of the toothed belt

Applying grease-dissolving substances to the toothed belt, e.g. when cleaning, leads to the failure of the toothed belt. There is a risk of damage to property.

- ▶ Keep degreasers or corrosive cleaning agents away from the toothed belt!
- ▶ Only clean the product with a damp cloth.

10.2 Inspection

10.2.1 Toothed belt

Periodically perform a visual inspection of the toothed belt for signs of wear, especially in the area of the weld seam.

10.3 Maintenance

10.3.1 Toothed belt

If necessary, re-oil the toothed belt with mineral oil (viscosity 68 acc. to DIN, e.g. Aral, Shell). Apply some mineral oil to a cloth and spread the oil moist over the toothed belt.

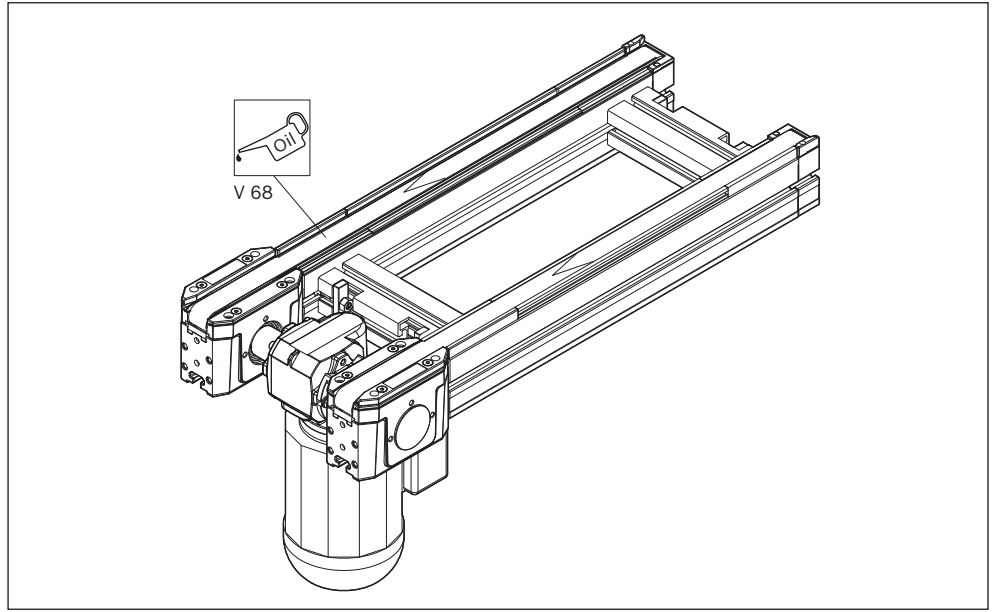


Fig. 13: Oiling the toothed belt

559101-07

10.3.2 Bearings

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

10.3.3 Gear

The gears are maintenance-free under normal conditions of use.

10.3.4 Motor

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

- 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 Replacement of wear parts

Required tools

- Hex wrench SW13.
- Hex socket wrenches SW3, SW4, SW5.
- Phillips screwdriver PH2
- Caliper, 500 mm
- Hammer
- Strainer

10.4.1 BS 2/..., Motor mounting (MA) = R / L / M, change motor

1. Remove the defective motor (J) from the gear (F).
2. Remove the yellow protective cap (N) from the motor shaft of the new motor (J). Grease the motor shaft (L).
3. Install the motor (J).

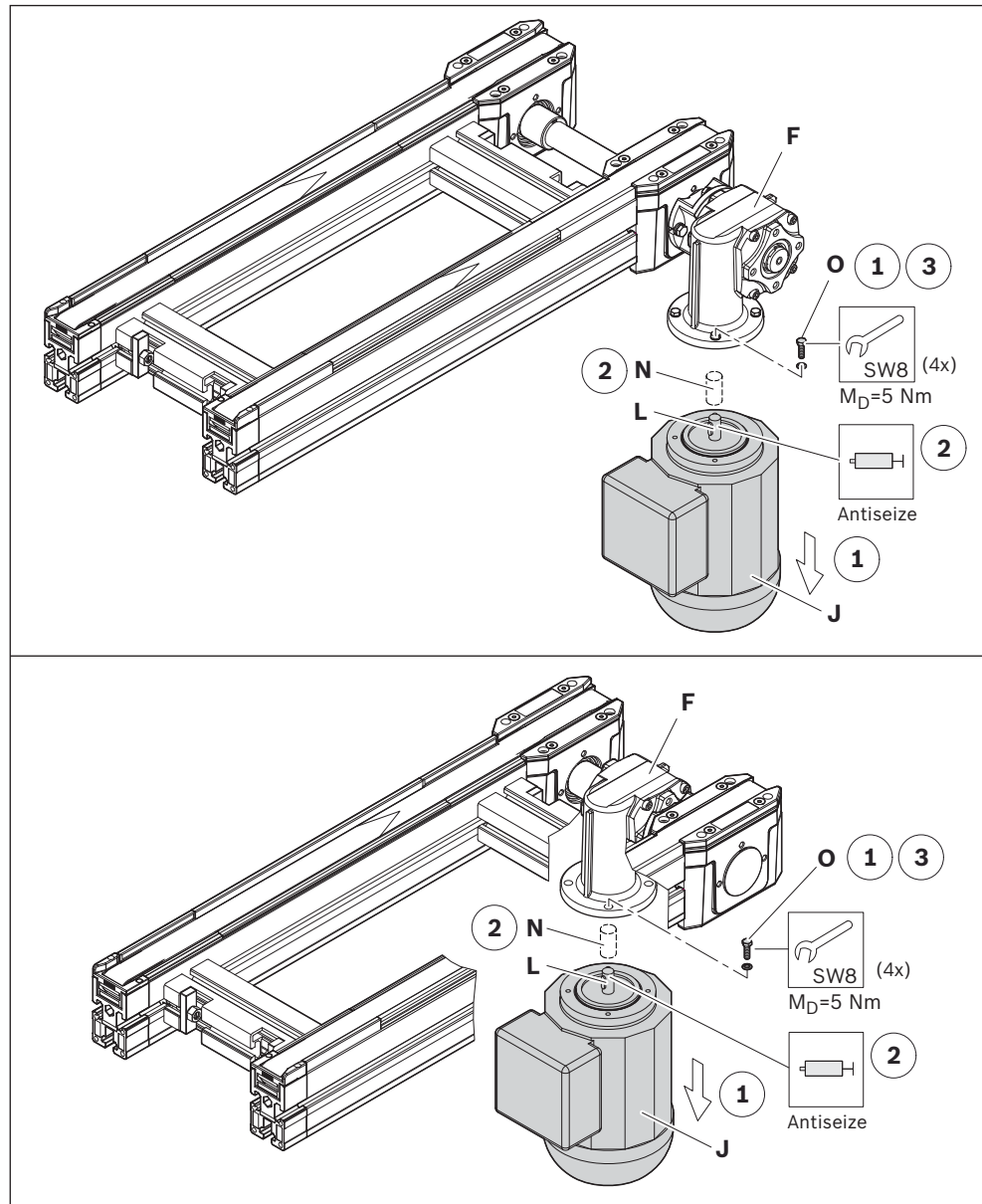


Fig. 14: BS 2/..., Motor mounting (MA) = R/L/M, change motor (represented: BS 2)



Please note:

- The end faces of the motor and gear must be undamaged.
- The gear hub comes lubricated with anti-seize lubricant.
- Do not tilt the motor, and make sure it has the necessary clearance area for installation.
- Install the motor in the proper position (terminal box) and connect it to the gear. If the motor is not in the proper orientation: do **NOT** rotate the motor. Disconnect the motor from the gear and reconnect it.

10.4.3 BS 2/..., Motor mounting (MA) = M, change gear

1. Remove the top parts (C₁) of the drive heads (C₂).
 2. Remove the drivetrain (X) by pulling it up without tilting it.
 3. Remove the toothed belt (V) to the side.
 4. Disconnect the motor-gear combination (K) from the drivetrain (X).
 5. Remove the defective gear (F) from the motor (J).
 6. Install the motor (J) on the gear (F).
 7. Assemble the drivetrain (X), do not forget the cover tube (Q) 1)
 8. Install the drivetrain (X), tighten the screws (G) of the drive heads (C) crosswise.
- 1) only when $b \geq 320$ mm

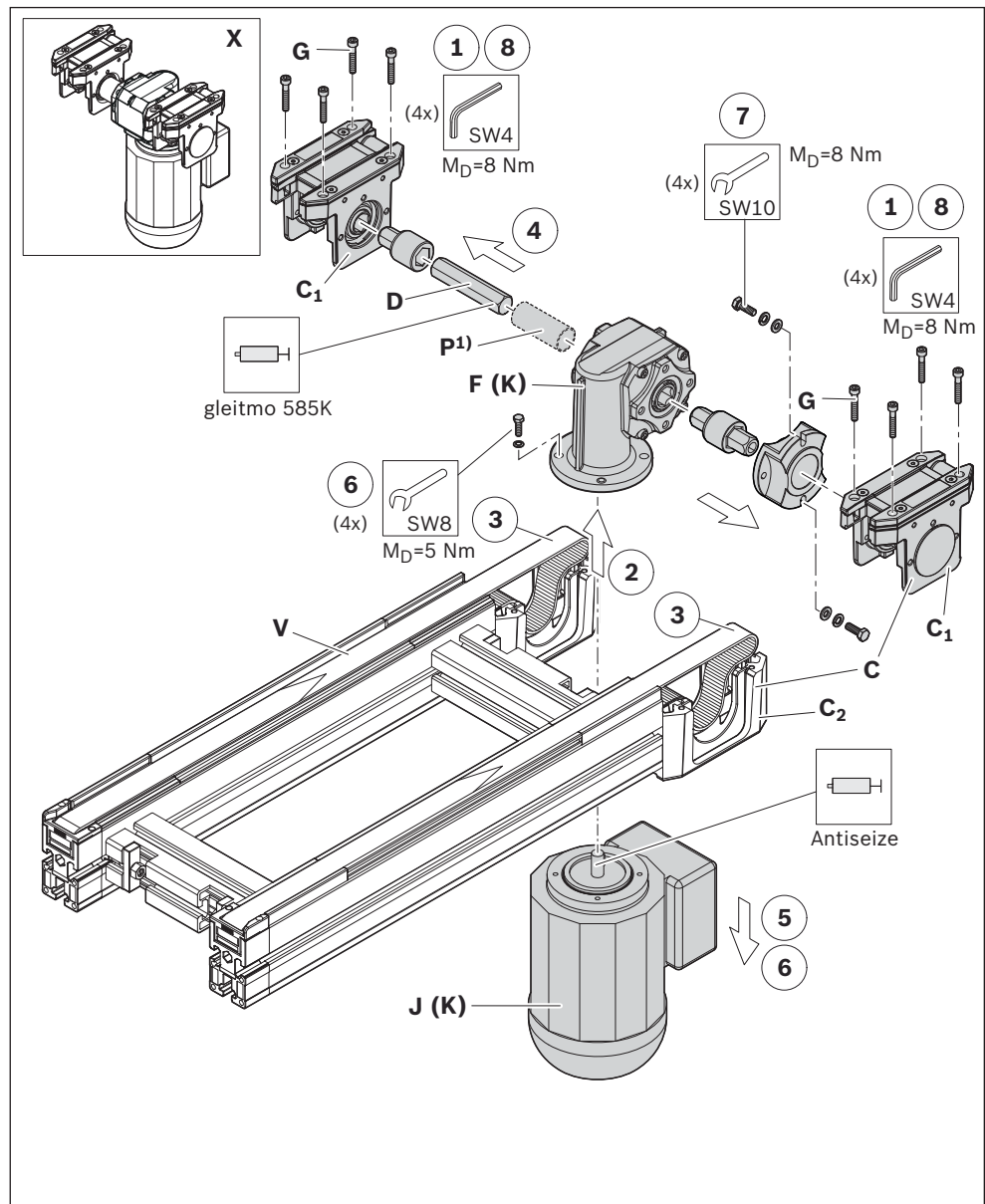


Fig. 16: BS 2/..., Motor mounting (MA) = M, change gear (represented: BS 2, MA = M)



Please note:

- The end faces of the motor and gear must be undamaged.
- The gear hub comes lubricated with anti-seize lubricant.
- Do not tilt the motor, and make sure it has the necessary clearance area for installation.
- Install the motor in the proper position (terminal box) and connect it to the gear. If the motor is not in the proper orientation: do **NOT** rotate the motor. Disconnect the motor from the gear and reconnect it.

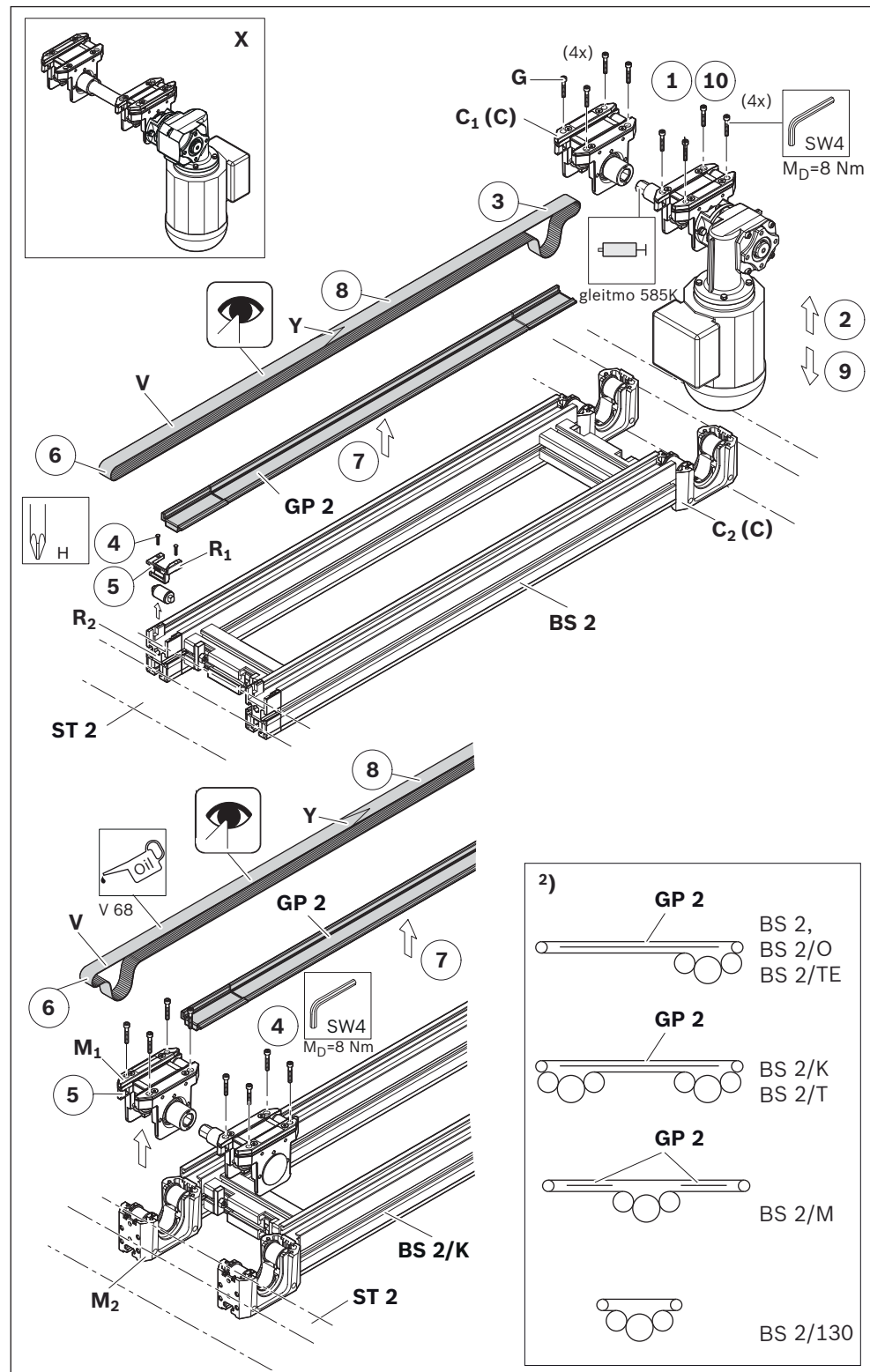
10.4.5 BS 2/..., Motor mounting (MA) = R/L, change toothed belt

1. Remove the top parts (C_1) of the drive heads (C_2).
2. Remove the drivetrain (X) by pulling it up without tilting it.
3. Disconnect the drivetrain (X) and remove the toothed belt (V).
4. Remove the top parts (M_1 / R_1) of the return units (M_2 / R_2) and remove the toothed belt (V).
5. Remove the belt guide profile (GP 2).
6. Replace the defective toothed belt (V) with a new one.
Be sure that the weld (Y) points in the direction of the drive.
7. Install the belt guide profile (GP 2).
8. Place the drivetrain (X) evenly, and without jamming, into the lower parts (C_2). Be sure that the toothed belt (V) is engaged in the teeth of the toothed belt gear.
9. Install the drivetrain (X), tighten the screws (G) of the drive heads (C) crosswise.
10. Install the top parts (M_1 / R_1) of the return units (M_2 / R_2).



Please note:

- Check whether the new toothed belt is oiled; if necessary, re-oil with:
– Mineral oil viscosity 68 acc. to DIN (e.g. Aral, Shell)



559101-12

Fig. 18: BS 2/..., Motor mounting (MA) = R/L change toothed belt (represented: BS 2/K and BS 2)

10.4.6 BS 2/..., Motor mounting (MA) = M, change toothed belt

1. Remove the top parts (C₁) of the drive heads (C₂).
2. Remove the drivetrain (X) by pulling it up without tilting it.
3. Remove the toothed belt (V) to the side.
4. Remove the top parts (M₁ / R₁) of the return units (M₂ / R₂) and remove the toothed belt (V).
5. Remove the belt guide profile (GP 2).
6. Replace the defective toothed belt (V) with a new one.
Be sure that the weld (Y) points in the direction of the drive.
7. Install the belt guide profile (GP 2).
8. Place the drivetrain (X) evenly, and without jamming, into the lower parts (C₂). Be sure that the toothed belt (V) is engaged in the teeth of the toothed belt gear.
9. Install the drivetrain (X), tighten the screws (G) of the drive heads (C) crosswise.
10. Install the top parts (M₁ / R₁) of the return units (M₂ / R₂).

**Please note:**

- Check whether the new toothed belt is oiled; if necessary, re-oil with:
– Mineral oil viscosity 68 acc. to DIN
(e.g. Aral, Shell)

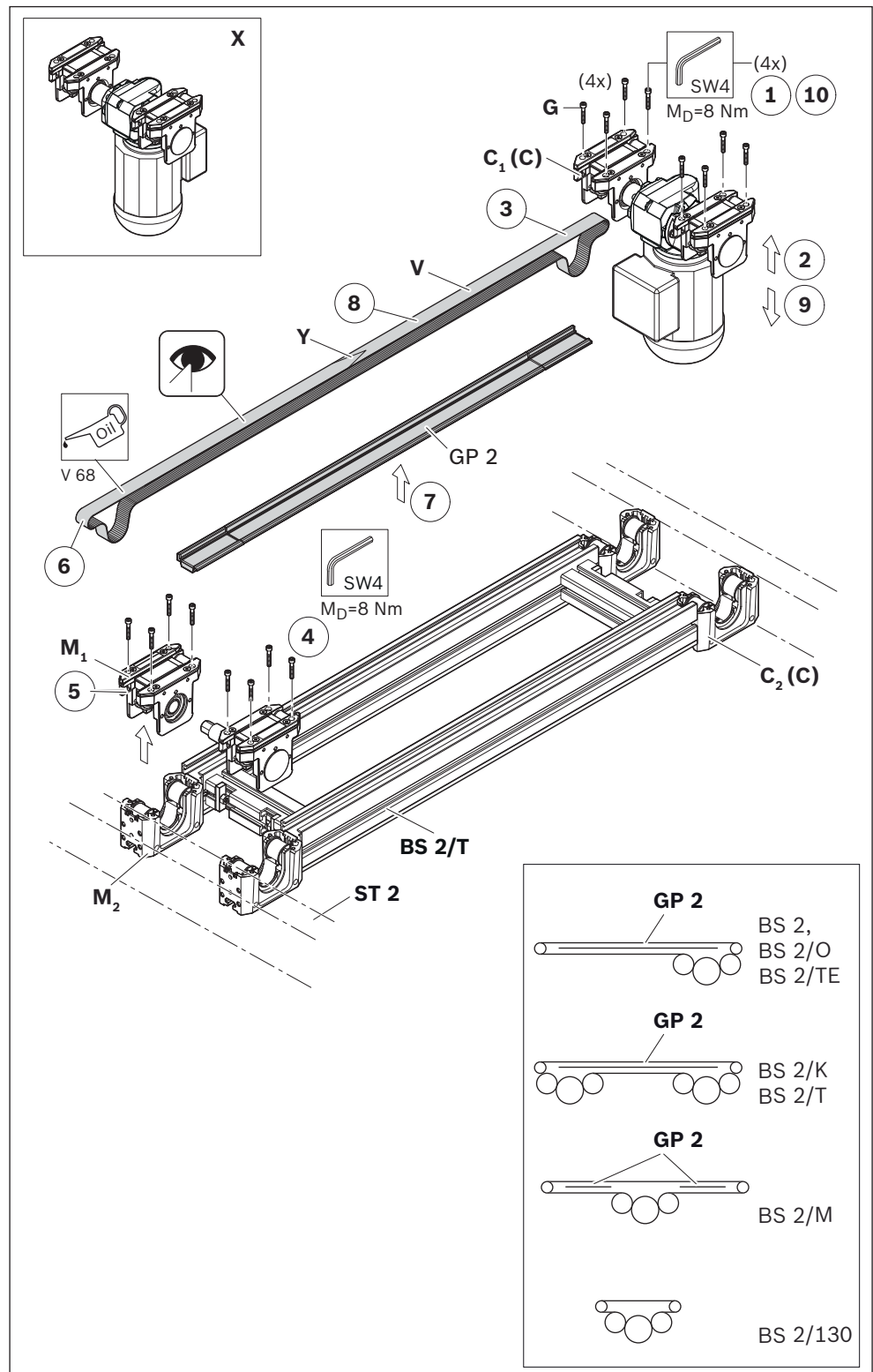


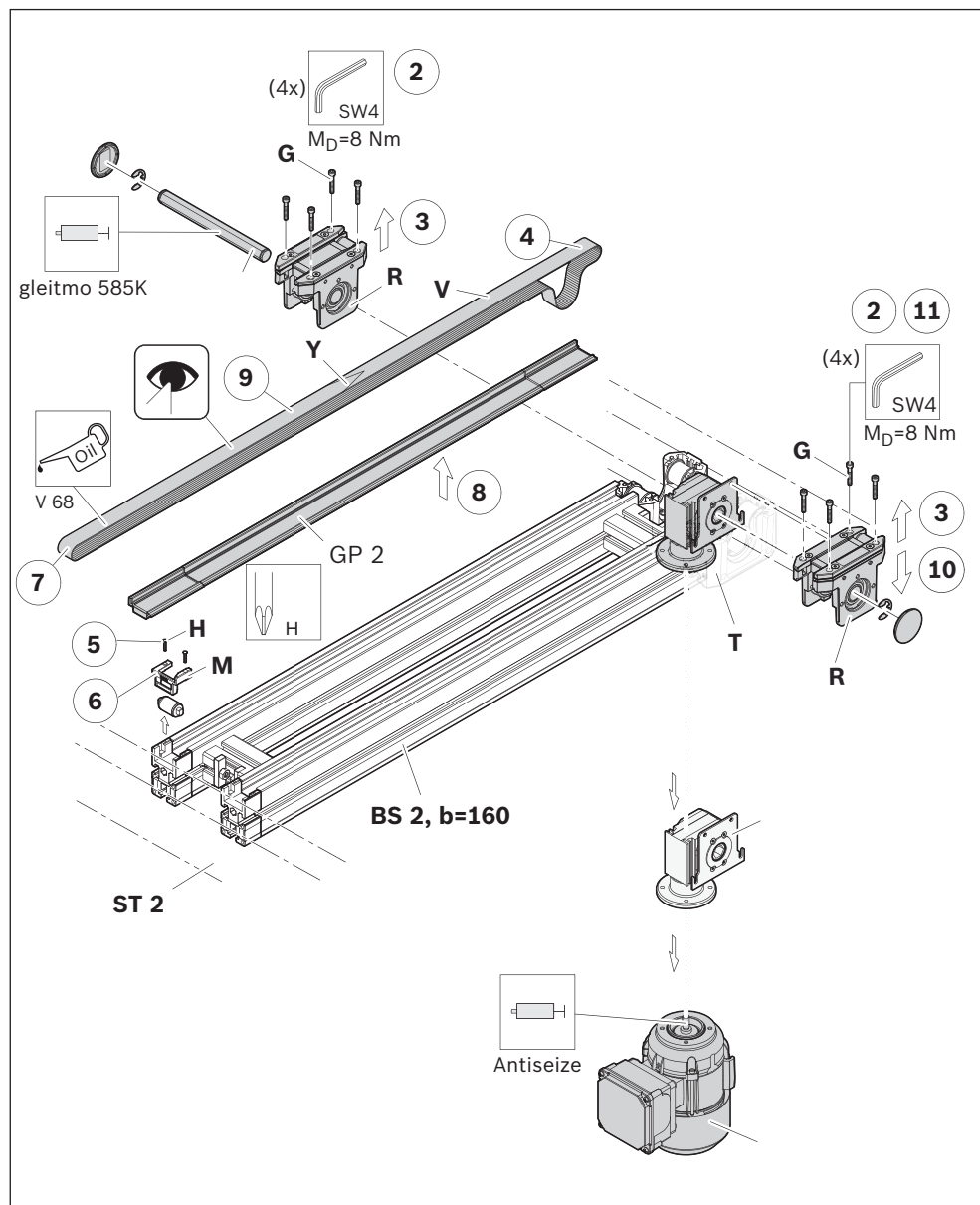
Fig. 19: BS 2/..., b ≥ 240, Motor mounting (MA) = M, change toothed belt

10.4.7 BS 2/..., b = 160, Motor mounting (MA) = M, change toothed belt

1. Remove the motor and gear, see 10.4.4
2. Remove the covers from the (G) drive heads (C).
3. Remove the top parts of the housing (R).
4. Remove the toothed belt (V).
5. Remove the return units (M / R) and remove the toothed belt (V).
6. Remove the belt guide profile (GP 2).
7. Replace the defective toothed belt (V) with a new one.
Be sure that the weld (Y) points in the direction of the drive.
8. Install the belt guide profile (GP 2).
9. Place the drivetrain (X) evenly, and without jamming, into the lower parts (T). Be sure that the toothed belt (V) is engaged in the teething of the toothed belt gear.
10. Install the drivetrain (X), tighten the screws (G) of the drive heads (C) crosswise.
11. Install the return units (M / R)
12. Install the motor and gear, see 10.4.4

**Please note:**

- Check whether the new toothed belt is oiled; if necessary, re-oil with:
 - Mineral oil viscosity 68 acc. to DIN (e.g. Aral, Shell)



559101-14

Fig. 20: BS 2/..., b = 160, motor mounting (MA) = M, change toothed belt

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)

11 Decommissioning

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

12 Disassembly and replacement

WARNING

High electrical voltage!

Risk of serious injury or death from electric shock.

- ▶ Disconnect the system component requiring maintenance or servicing before starting.
- ▶ Secure the system against being unintentionally switched on again.

High pneumatic pressure!

Risk of serious 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 unintentionally switched on again.

Lifted loads may fall!

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

- ▶ Use only slings with sufficiently high bearing load capacity (for product weight see shipping documents).
- ▶ Make sure the lifting straps are correctly fastened before lifting the product.
- ▶ Secure the product against tipping 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.
- Pay attention to the ambient conditions, see page 39.
- For products with a mounted motor: Support the product so that the motor is not placed under mechanical load.

13 Disposal

- 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.
- 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 and repair

- If you cannot correct a fault, go to www.boschrexroth.com to find the address to contact.

16 Technical data

- For dimensions, see sales catalog TS 2*plus*
- Maximum section load: 1.0 kg/cm support surface length
- Maximum permissible load: 60 kg
Maximum permissible load for BS 2, b = 160 mm, MA = M: 30 kg
- Noise emission: < 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
- Max. load capacity of floor: 1000 kg/m²
- At altitudes > 1400 m, the load values of the electric drives are reduced by 15%.
- Prevent 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.

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