

HP 2, HP 2/L

Lift positioning unit

3 842 999 678

3 842 998 952

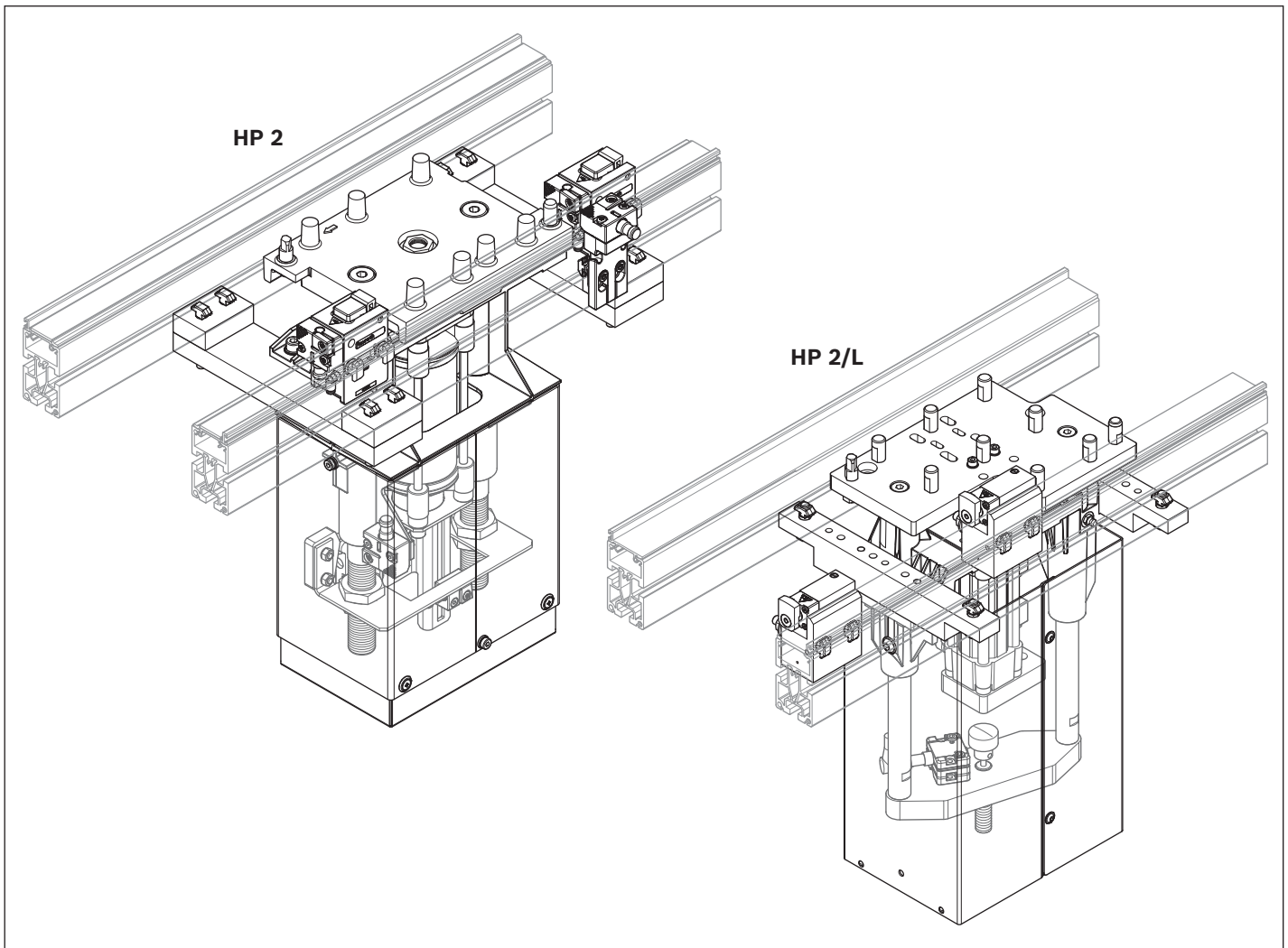
Assembly instructions

3 842 563 989/2021-03

Replaces: –

ENGLISH

ENGLISH



The data specified 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.

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- | | | | |
|-----------|----------------------|--|-----------|
| DE | 3 842 563 988 | HP 2, HP 2/L Hub-Positioniereinheit | Deutsch |
| EN | 3 842 563 989 | HP 2, HP 2/L Lift positioning unit | English |
| FR | 3 842 563 990 | HP 2, HP 2/L Unité de levée et de positionnement | Français |
| IT | 3 842 563 991 | HP 2, HP 2/L Unità di posizionamento e sollevamento | Italiano |
| ES | 3 842 563 992 | HP 2, HP 2/L Unidad de elevación y posicionamiento | Español |
| PT | 3 842 563 993 | HP 2, HP 2/L Unidade de posicionamento e elevação | Português |
| ZH | 3 842 563 994 | HP 2, HP 2/L 提升定位单元 | 中文 |
| CS | MTCS 563 988 | 1) HP 2, HP 2/L Zvedací a polohovací jednotka | Česky |
| PL | MTPL 563 988 | 1) HP 2, HP 2/L Jednostka podnośnikowo-pozycjonująca | Polski |
| HU | MTHU 563 988 | 1) HP 2, HP 2/L Emelő pozicionálóegység | Magyar |
| RO | MTRO 563 988 | 1) HP 2, HP 2/L Unitate de poziționare cursă | 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:

- 3 842 999 678, HP 2 lift positioning unit
- 3 842 998 952, HP 2/L lift positioning 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	3 842 527 147	
 Declaration of incorporation	3 842 358 424	
MTpro ¹⁾	3 842 539 057	With list of spare parts

¹⁾ Download at: 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 ► Measures 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 severe 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 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. 2. 3.	Numbered steps: The numbers indicate that the action steps are sequential.

1.3.3 Designations

This document uses the following designations:

Table 4: Designations

Designation	Meaning
HP 2, HP 2/L	Lift positioning unit from the Rexroth TS <i>2plus</i> transfer system
WT 2	Workpiece pallet from the Rexroth TS <i>2plus</i> transfer system

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 *2plus* transfer system
- For positioned lifting and lowering of Rexroth WT 2 workpiece pallets
- For vertical loads only
- Maximum load/section load: See technical data on page 60
- For ambient conditions, see page 60.

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 or customer-specific protective equipment.
- Using the product in accumulation operation.
- Transporting people on the product or transported material.
- Persons climbing onto the product
 - Do not climb on the product.
- 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 start up 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

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 assembly

- Always ensure that the product cannot topple over.
- Observe the transport instructions on the packaging.
- Inspect the product for obvious transport 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 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.
- During commissioning**
 - Allow the product to acclimatize for a few hours prior to commissioning 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 commission 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 within the scope of the product's intended use:
 - 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 owner to be there. This also applies when the product is idle.
 - 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 servicing and repair**
 - After an EMERGENCY STOP or a malfunction, only switch the system back on once 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 specified in chapter 10.3 "Maintenance".
 - 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.

2.7 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.

- 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.
- Never use solvents or corrosive cleaning agents.
- Do not use a pressure washer for cleaning.

During cleaning

4 Scope of delivery

The scope of delivery includes the following:

HP 2 lift positioning unit

- 1x HP 2 lift positioning unit incl. fastening material and switch brackets for mounting of M12 sensors for top and bottom lift position sensing
- 1x assembly instructions "HP 2, HP 2/L, lift positioning unit"

HP 2/L lift positioning unit

- 1x HP 2/L lift positioning unit incl. fastening material and throttle check valve
- 1x assembly instructions "HP 2, HP 2/L, lift positioning unit"

4.1 Condition on delivery

- HP 2 or HP 2/L lift positioning unit, ready-to-install.

4.2 Required accessories

HP 2 lift positioning unit

- VE 2/... stop gate
- Throttle check valve, exhaust air, G3/8", diameter 6 mm

HP 2/L lift positioning unit

- Position monitoring set for SA cylinder, **3 842 536 974**
- RA position monitoring set, **3 842 536 975**

4.3 Recommended accessories

HP 2 lift positioning unit

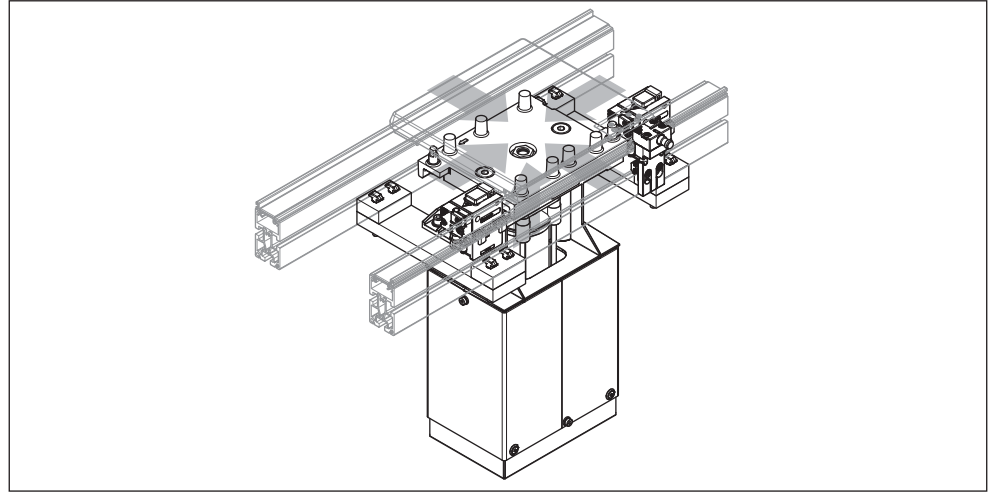
- Kit for lower end damping, **3 842 211 355**
- Protective case for HP 2

HP 2/L lift positioning unit

- Protective case for HP 2/L

5 About this product

5.1 Specifications



563 988-01

Fig. 1: Performance description for HP 2, HP 2/L lift positioning unit

5.1.1 Use of HP 2, HP 2/L lift positioning units

- Installation in belt section BS 2...
- For lifting conveyor medium and positioning workpiece pallets WT 2 in a processing station with high requirements on positioning accuracy.

5.1.2 Version of HP 2 lift positioning unit

- Positioning of a workpiece pallet in a processing station with high positioning accuracy requirements and higher workpiece pallet weights.
- Positioning via the HP 2 positioning pins and the positioning bushings on the WT 2 workpiece pallet.

5.1.3 Version of HP 2/L lift positioning unit

- Positioning of a workpiece pallet in a processing station with high positioning accuracy requirements.
- Positioning with exchangeable positioning pins in the HP 2/L and positioning bushings in the WT 2 workpiece pallet.

5.2 Product description

- A:** HP 2 lift positioning unit
- A1:** Mounting kit UB (substructure, according to customer order AO = UB)
- A2:** Mounting kit AT (on table, according to customer order AO = AT)
- B:** Protective case for HP 2 ¹⁾
- C:** Kit for lower end damping, **3 842 211 355** ¹⁾
- C1:** Switching tappets
- C2:** Valve

1) Not included in the scope of delivery.

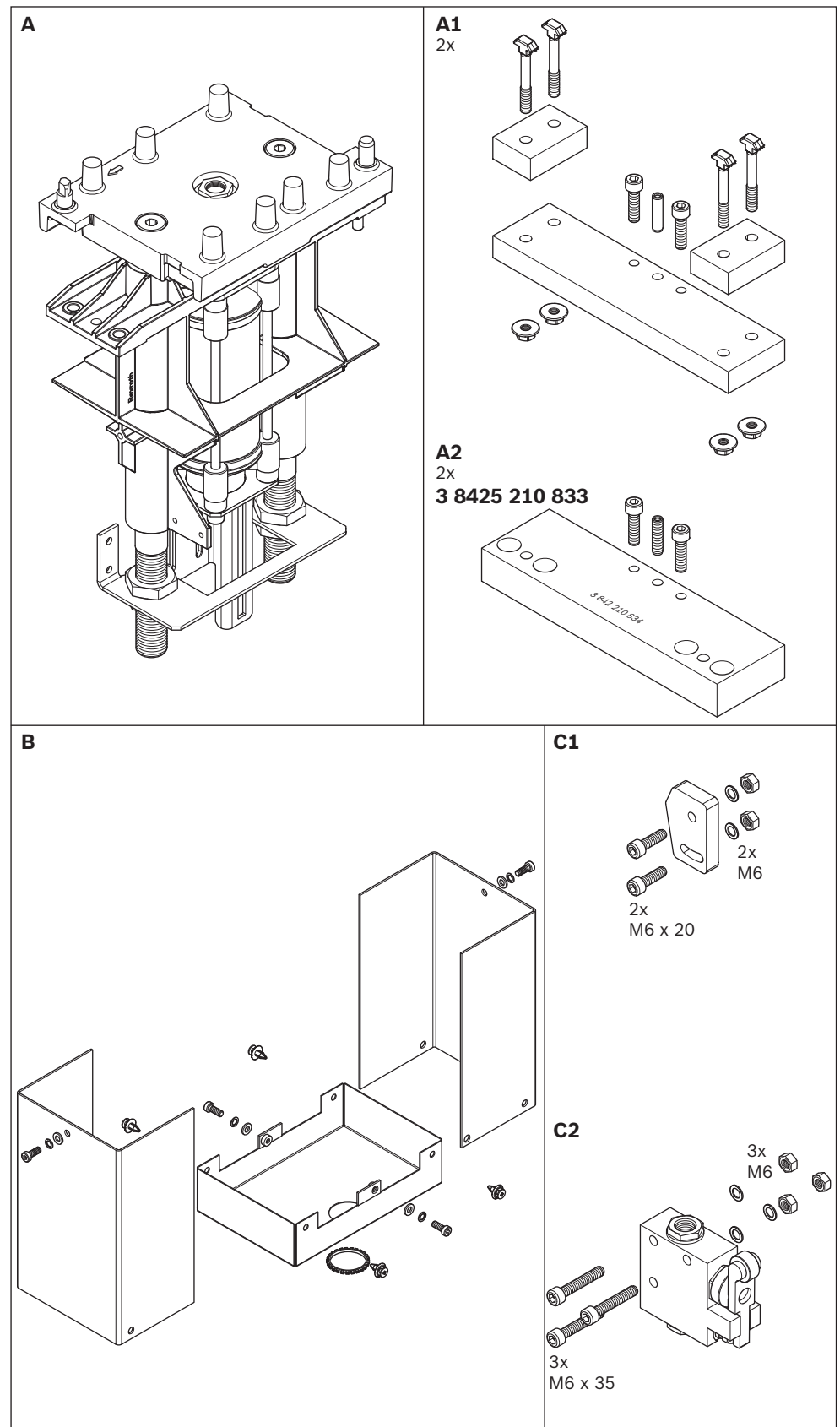


Fig. 2: HP 2 lift positioning unit

563 988-02

- A:** HP 2/L lift positioning unit
- B:** Protective case for HP 2/L ¹⁾
- C:** Position monitoring set for SA cylinder, **3 842 536 974** ¹⁾
- D:** RA position monitoring set, **3 842 536 975** ¹⁾

¹⁾ Not included in the scope of delivery.

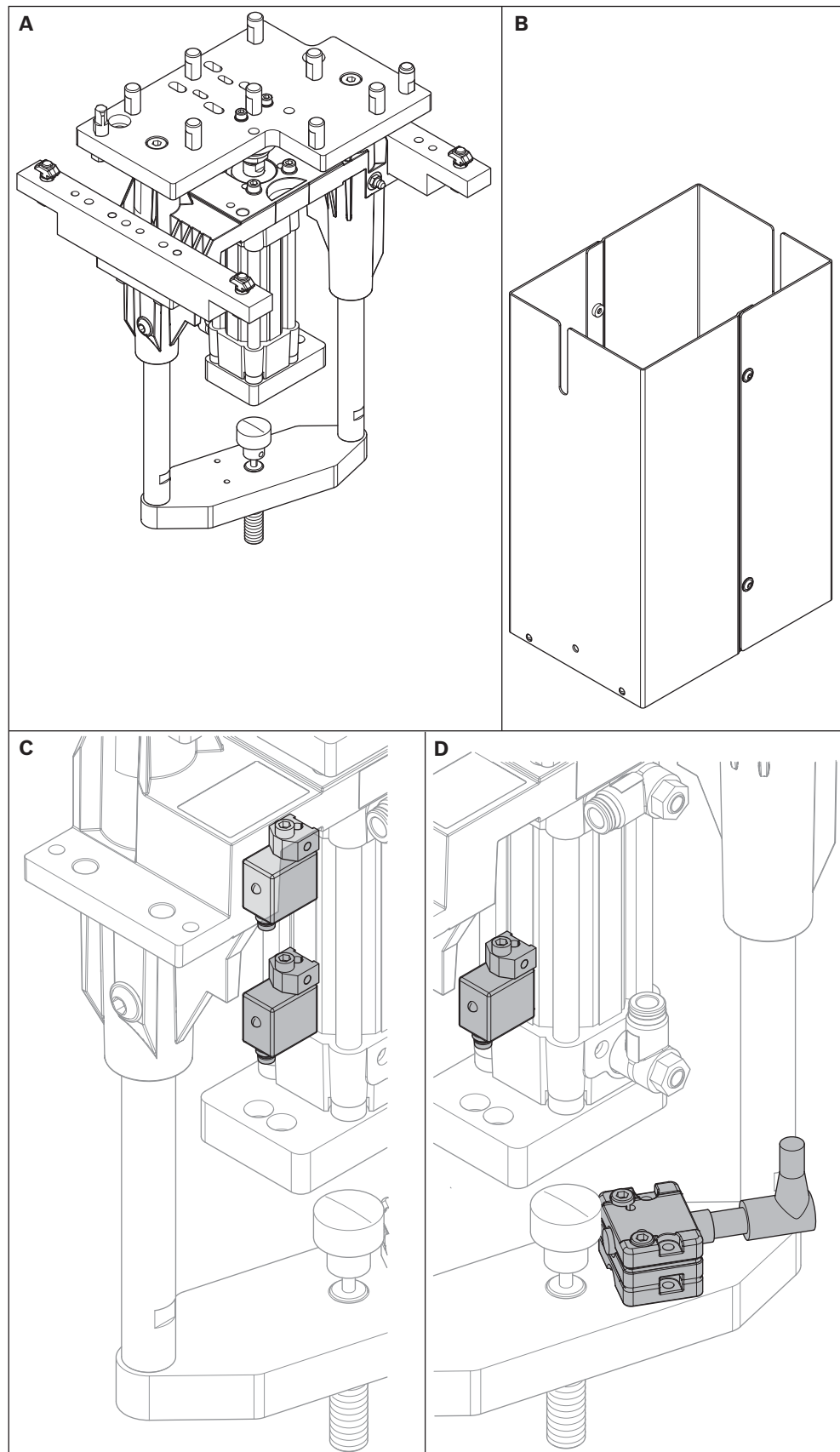


Fig. 3: HP 2/L lift positioning unit

563 988-21

5.3 Identification of the product

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

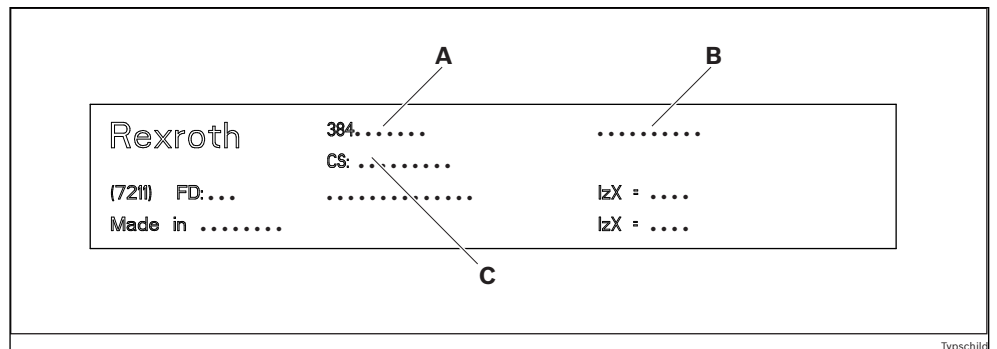


Fig. 4: Nameplate

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 60.

6.1 Transporting the product

WARNING

Suspended loads may 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!

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 60.
- Support the product so that suspended motors/actuators/cylinders will not be strained.

7 Installation

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 60).

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

7.4 Symbols used

Table 5: Symbols used

	Connection with T-bolt and flange nut. 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. 1 = T-bolt insertion position in the slot. 2 = T-bolt clamping position in the slot. Tightening torque: 25 Nm
 $M_D = 20\text{Nm}$	Hex wrench SW = wrench size ... mm M_D = required tightening torque ... Nm
 $M_D = 8\text{Nm}$	Hex socket wrench SW = wrench size ... mm M_D = required tightening torque ... Nm
	Screwdrivers for cross-head screws PZ ... = Pozidriv screw driver, size ... PH ... = Phillips screw driver, 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 • Dynalub 510: Bosch Rexroth R 341 603 700
	Lubricate/lubricate with specific mineral oil: • GHD: Structovis GHD, www.klueber.com • V 68: Mineral oil with a viscosity of 68
 Loctite 243	Secure the screws with: • Loctite 243: Medium-strength (detachable), www.loctite.de
	The marked parts are not required for the described assembly. Dispose of the parts or use them for other purposes.
	Graphical depiction of the assembly steps. The numbers correspond to the sequence of installation steps, in accordance with the instructions in the accompanying text.
	Graphical depiction of the designation of components. 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.

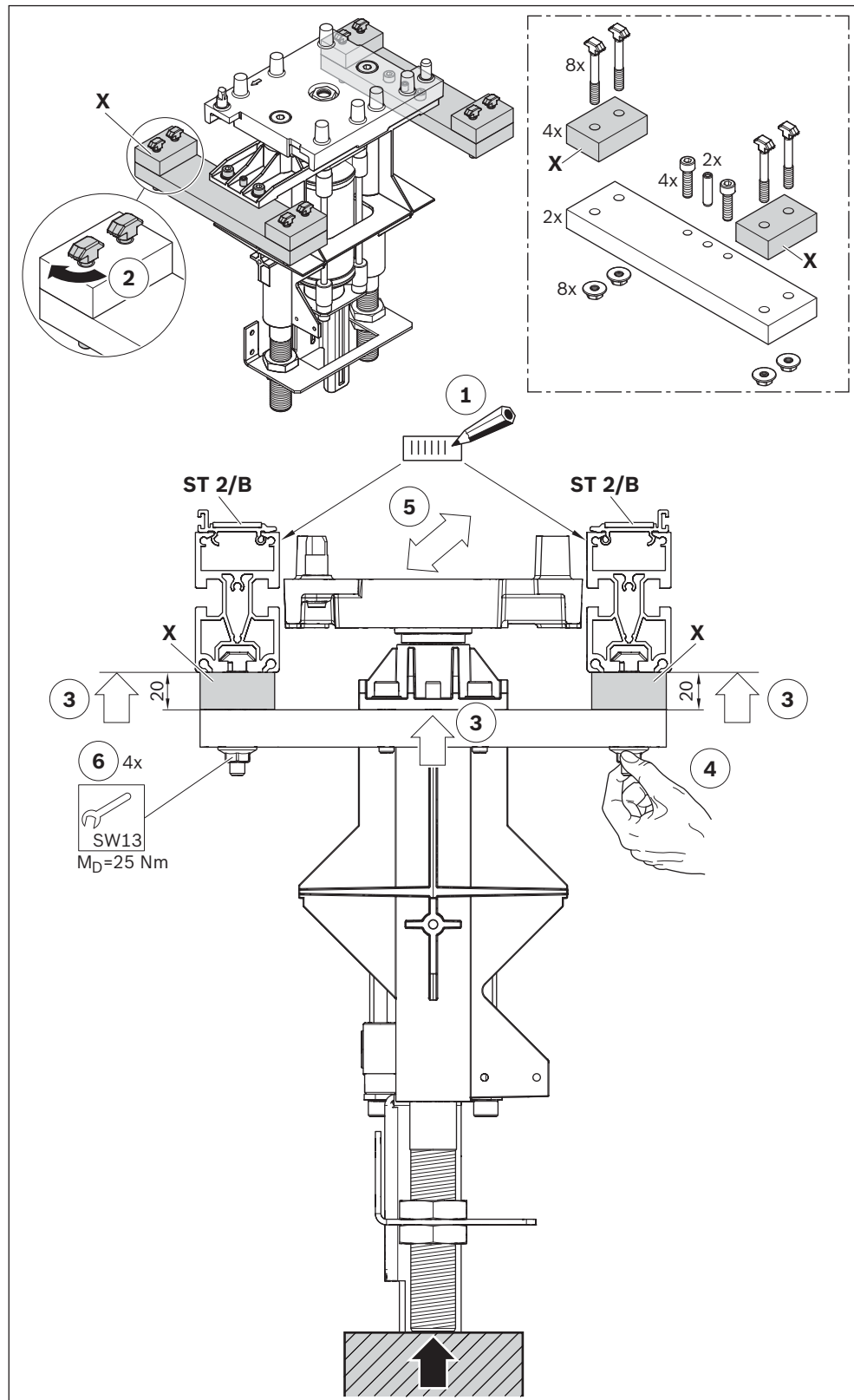
7.5 Installing the HP 2 lift positioning unit

7.5.1 Installing the HP 2 lift positioning unit under section ST 2/... (AO = UB)



Please note:

- Installation **with** intermediate plate X.
 - Support the HP 2 during alignment until final fastening.
1. Mark the installation location of the HP 2.
 2. Align the T-bolts in longitudinal direction.
 3. Lift the HP 2 into the section from below
 4. Tighten the flange nuts slightly by hand.
 5. Align the HP 2.
 6. Tighten the flange nuts.



563 988-03

Fig. 5: Installing the HP 2 lift positioning unit under section ST 2/B (AO = UB)

7.5.2 Installing the HP 2 lift positioning unit under section ST 2/B-100, ST 2/C, ST 2/R (AO = UB)



Please note:

- Installation **without** intermediate plate X.
- Support the HP 2 during alignment until final fastening.

1. Mark the installation location of the HP 2.
2. Align the T-bolts in longitudinal direction.
3. Lift the HP 2 into the section from below
4. Tighten the flange nuts slightly by hand.
5. Align the HP 2.
6. Tighten the flange nuts.

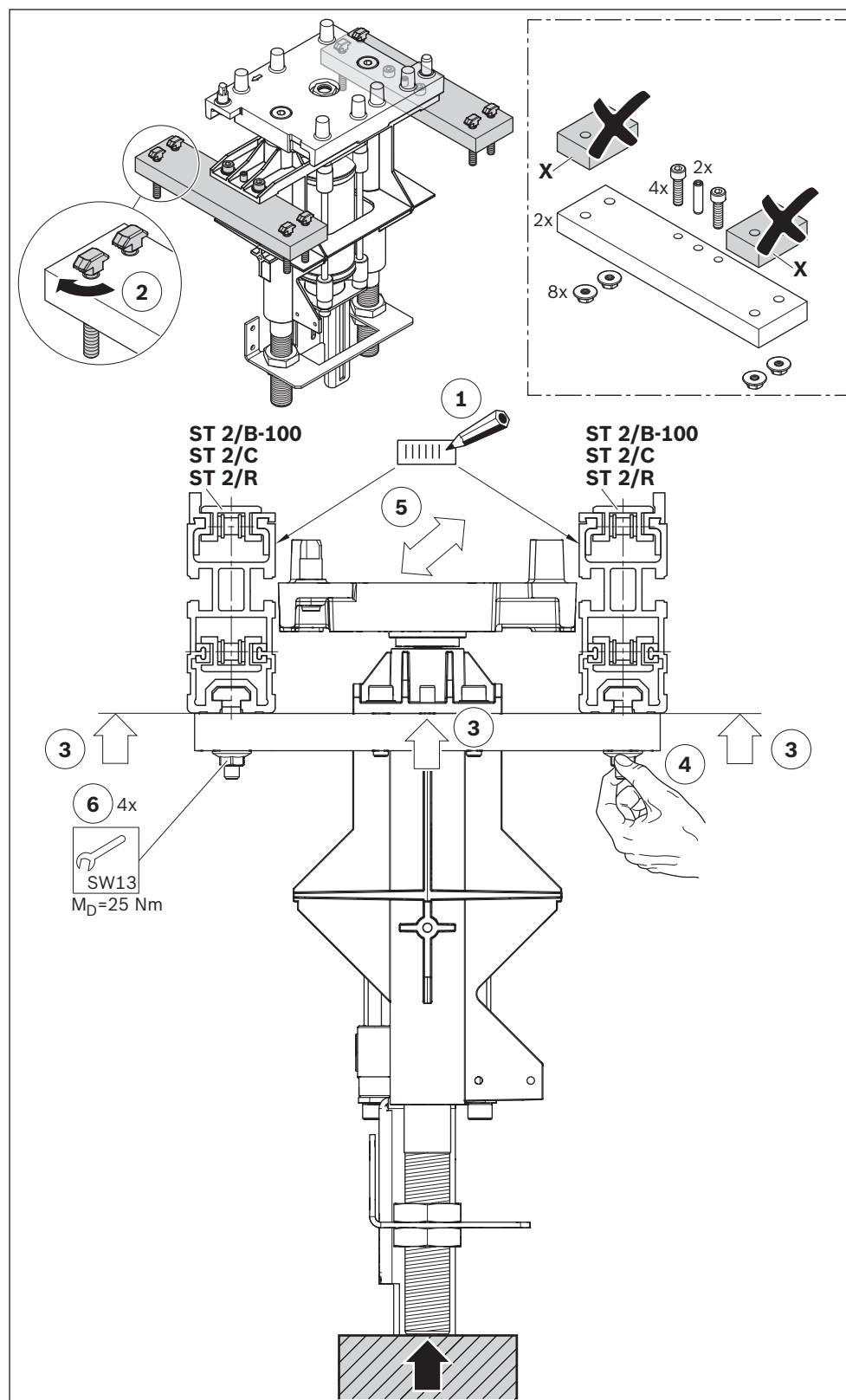


Fig. 6: Installing HP 2 lift positioning unit under section ST 2/B-100, ST 2/C, ST 2/R (AO = UB, shown ST 2/C)

563 988-04

7.5.3 Installing the HP 2 lift positioning unit in the table cut-out (AO = AT)



Please note:

- Table installation with mounting kit AT, **3 842 210 833**.
- All external radii on the cut-out must be rounded.
- Internal radii sharp-edged or $R_{\max} = 5 \text{ mm}$ depending on the manufacturer.

b: Track width in direction of transport

Y: Table top

1. Manufacture the cut-out and the mounting holes for the HP 2 according to Fig. 7.
2. Install the HP 2 in the table cut-out.

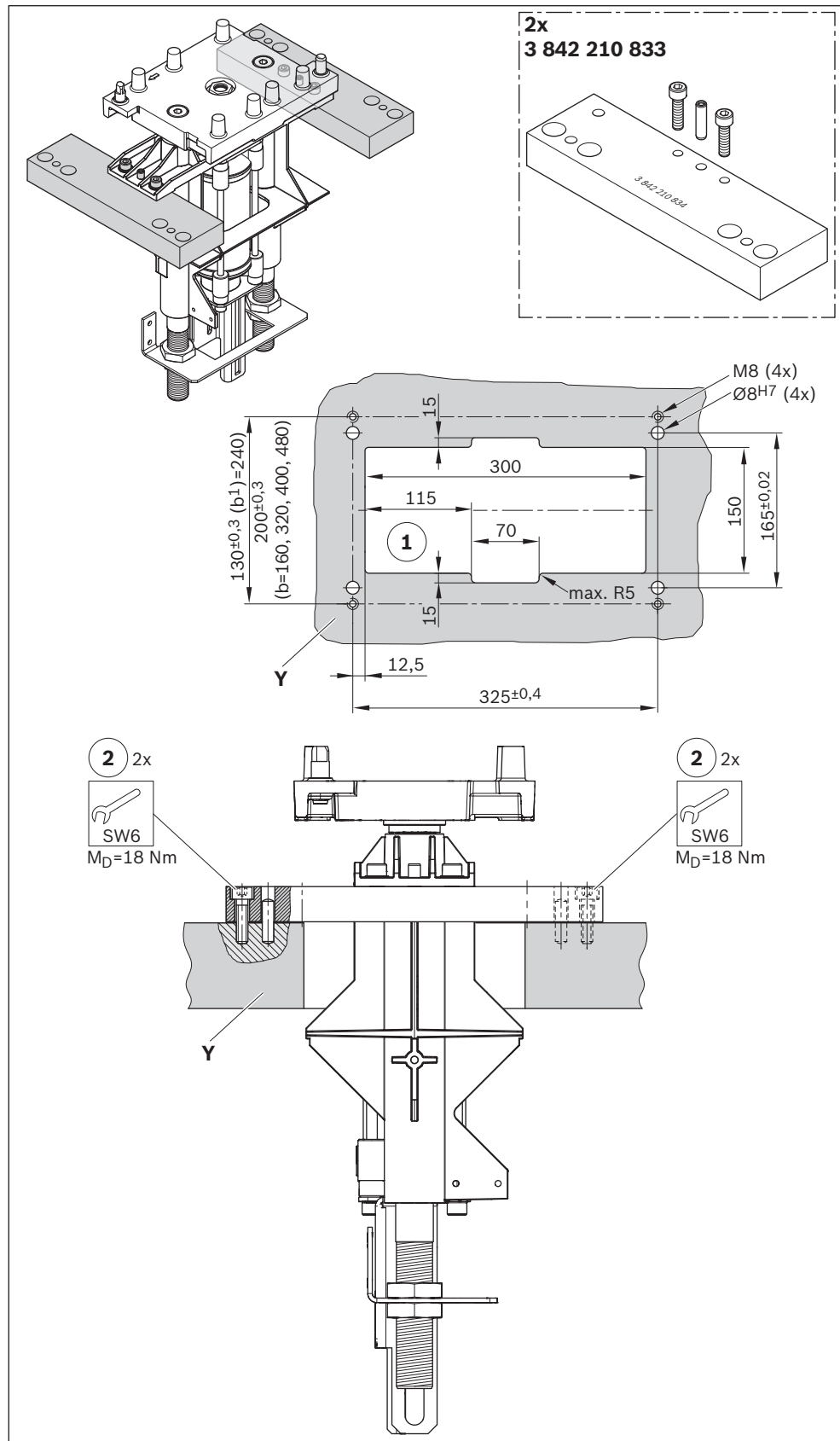


Fig. 7: Installing the HP 2 lift positioning unit in the table cut-out (AO = AT)

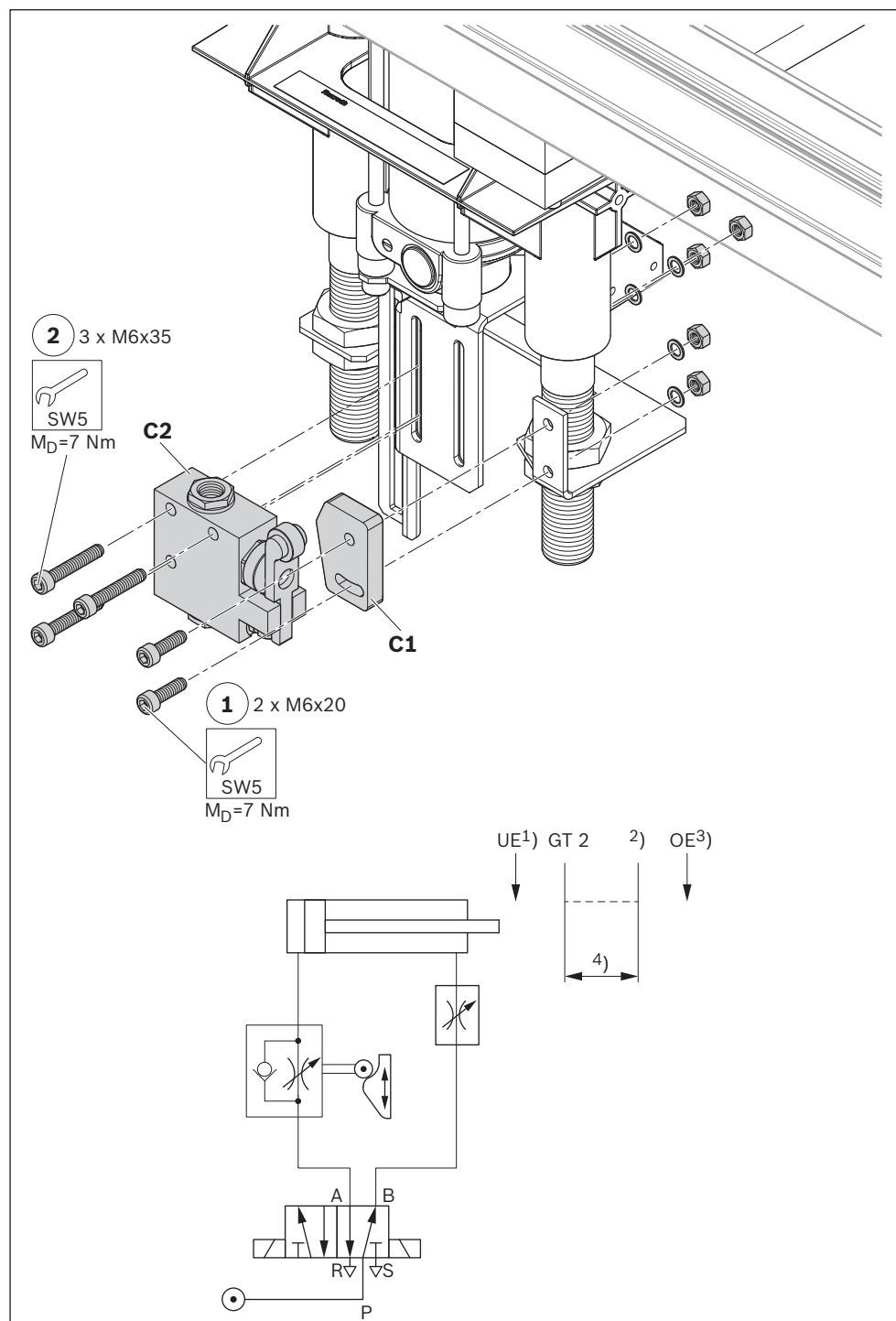
563 988-05

7.5.4 Installing the kit for lower end damping

Required accessories

- Kit for lower end damping, **3 842 211 355**.

1. Install the switching tappet (C1).
2. Install the valve (C2).



- 1) Lower end position
- 2) Tappet
- 3) Upper end position
- 4) Damping (adjustable)

Fig. 8: Installing the kit for lower end damping

563 988-06

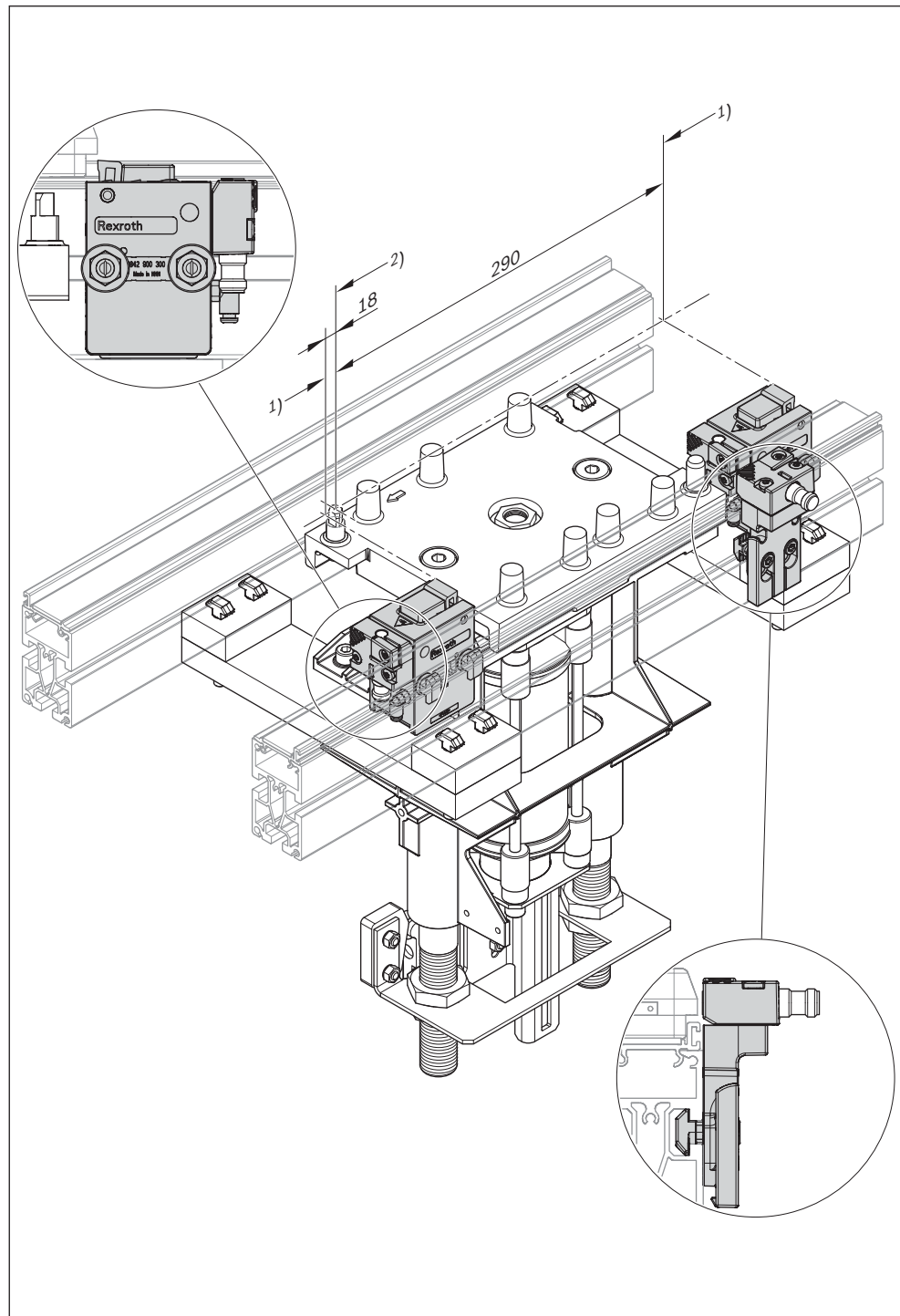
Required accessories

- 2x VE 2... stop gate
- 2x SH 2/UV switch bracket
- 1x SH 2/S switch bracket
- 3x proximity switch M12, $S_n \geq 4 \text{ mm}$

► Install the components according to Fig. 9.

- 1) Stopping surface VE 2
2) Center of pin

7.5.5 Installing components for workpiece pallet flow control

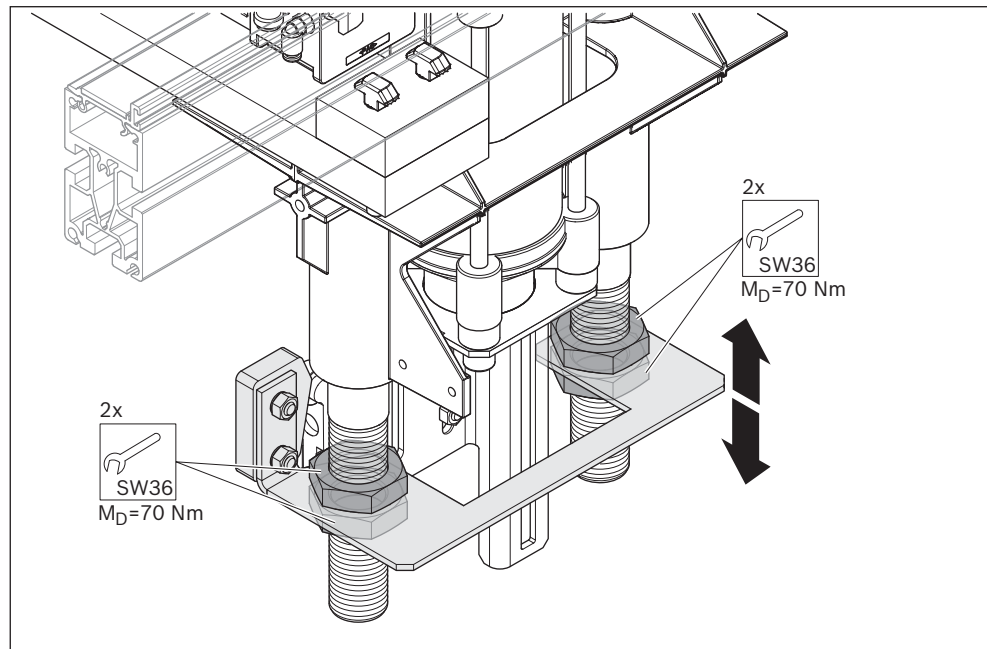


563 988-07

Fig. 9: Installing components for workpiece pallet flow control

7.5.7 Setting the lifting movement

- Set the desired stroke by adjusting the hexagon nuts in parallel.



563 988-09

Fig. 11: Setting the lifting movement

7.5.8 Installing the proximity switches for upper/lower position monitoring

Required accessories

- 2x proximity switches
EN 60947-5-2-I2A12

1. Install the proximity switches according to Fig. 12.
2. Set the switching distance.

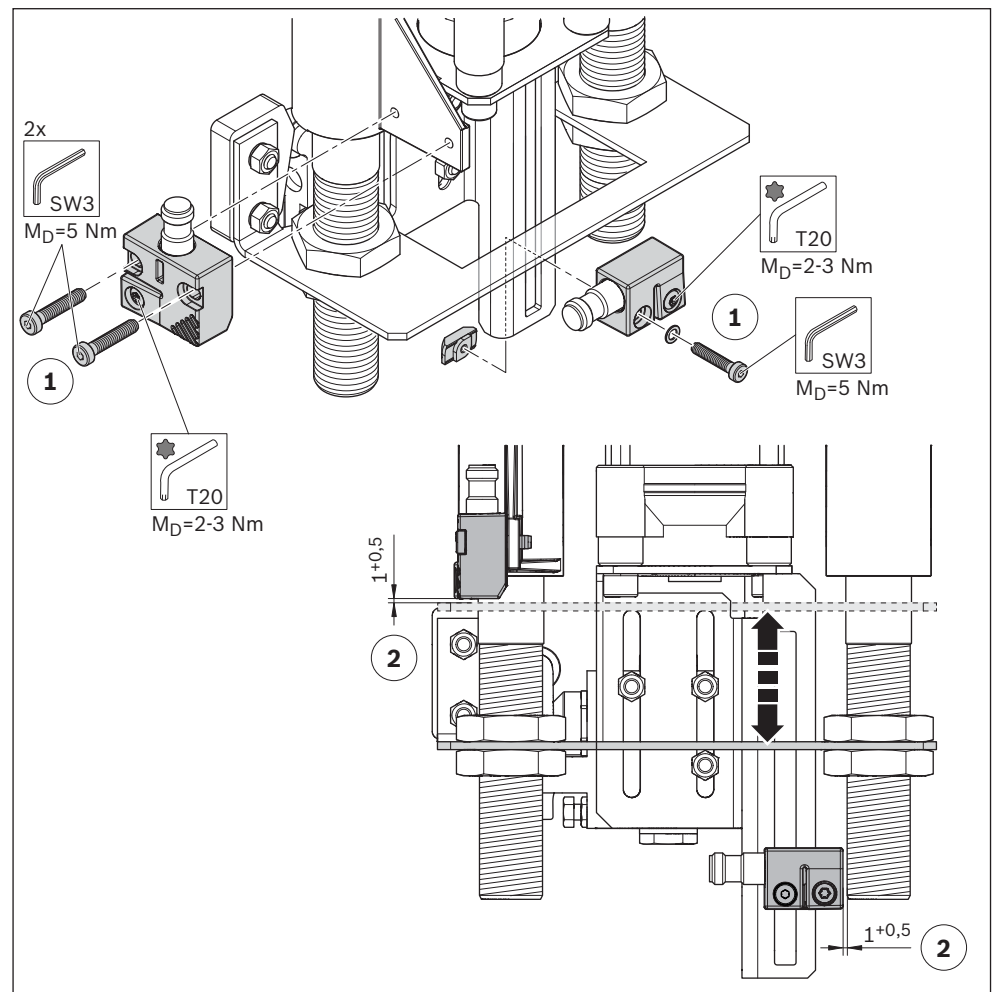


Fig. 12: Installing the proximity switches for upper/lower position monitoring

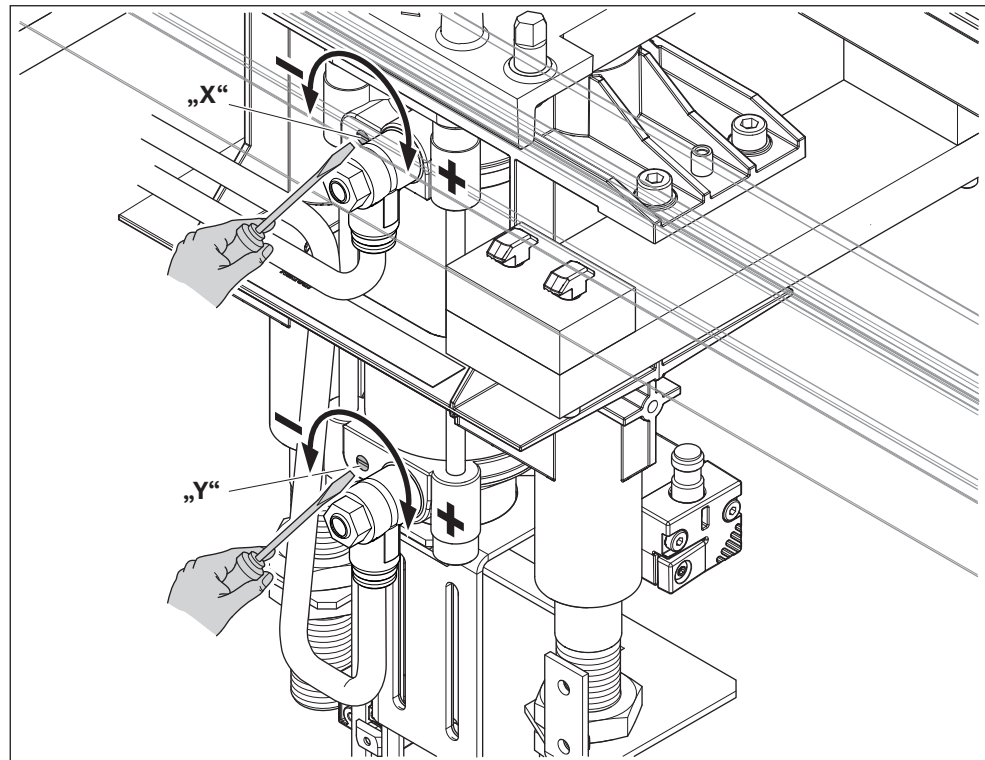
- Set the end position damping by screwing the adjusting screw in or out.

X: Adjusting screw for end position damping top

Y: Adjusting screw for end position damping bottom

- Turning in the direction marked "+" increases the damping.
- Turning in the direction marked "-" makes the damping softer.

7.5.9 Setting the end position damping top/bottom



563 988-11

Fig. 13: Setting the end position damping

7.5.10 Setting the lifting speed



Please note:

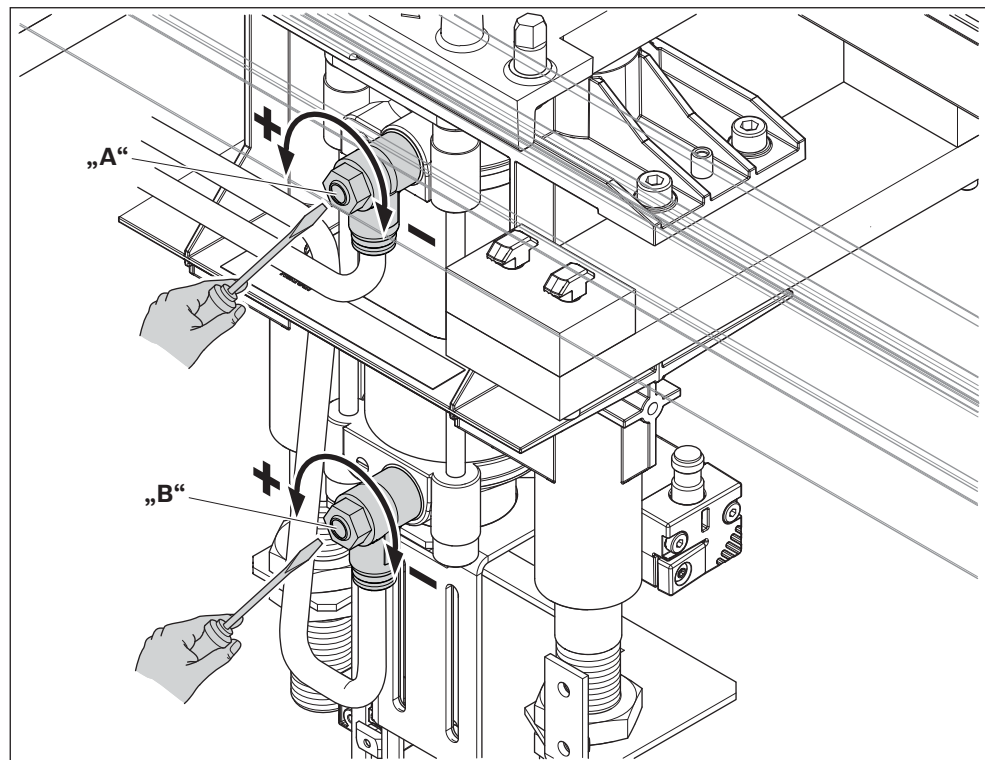
- For setting the lifting speed with mounted kit for lower end damping, see Fig. 14.
- On delivery an even, smooth lifting movement is set.

- Throttle the exhaust air to adjust the lifting speed.

A: Throttle screw upward stroke

B: Throttle screw downward stroke

- Turn it in the direction marked "+" to make the lifting movement faster.
- Turn it in the direction marked "-" to make the lifting movement slower.



563 988-12

Fig. 14: Setting the lifting speed (without kit for lower end damping)

- A:** Throttle screw upward stroke
- Z:** Pilot adjusting screw of the valve

- Set the speed of the upward stroke according to Fig. 14.
- Loosen the lock nut of the pilot adjusting screw of the valve and set the speed of the downward stroke.

- Turn it in the direction marked "+" to make the lifting movement faster.
- Turn it in the direction marked "-" to make the lifting movement slower.

- Re-tighten the lock nut of the pilot adjusting screw of the valve.

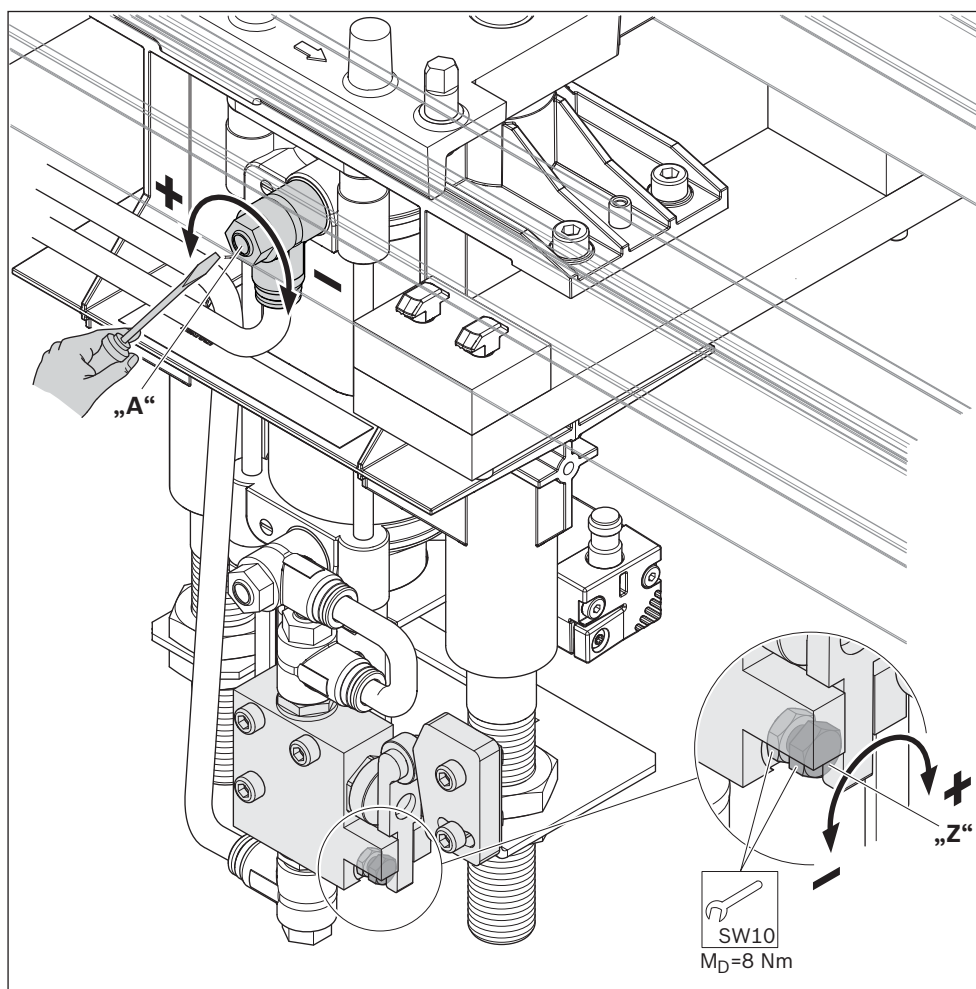


Fig. 15: Setting the lifting speed (with kit for lower end damping)

563 988-13

7.5.11 Installing the protective case

Required accessories

- Protective case for HP 2

1. Pre-install the protective case.
2. Lead the pneumatic hoses and connection cables through the opening in the base of the protective case.
3. Slide the protective case over the HP 2 from below.
4. Screw the protective case to the HP 2.

- The disassembly of the protective case is done in the reverse order.

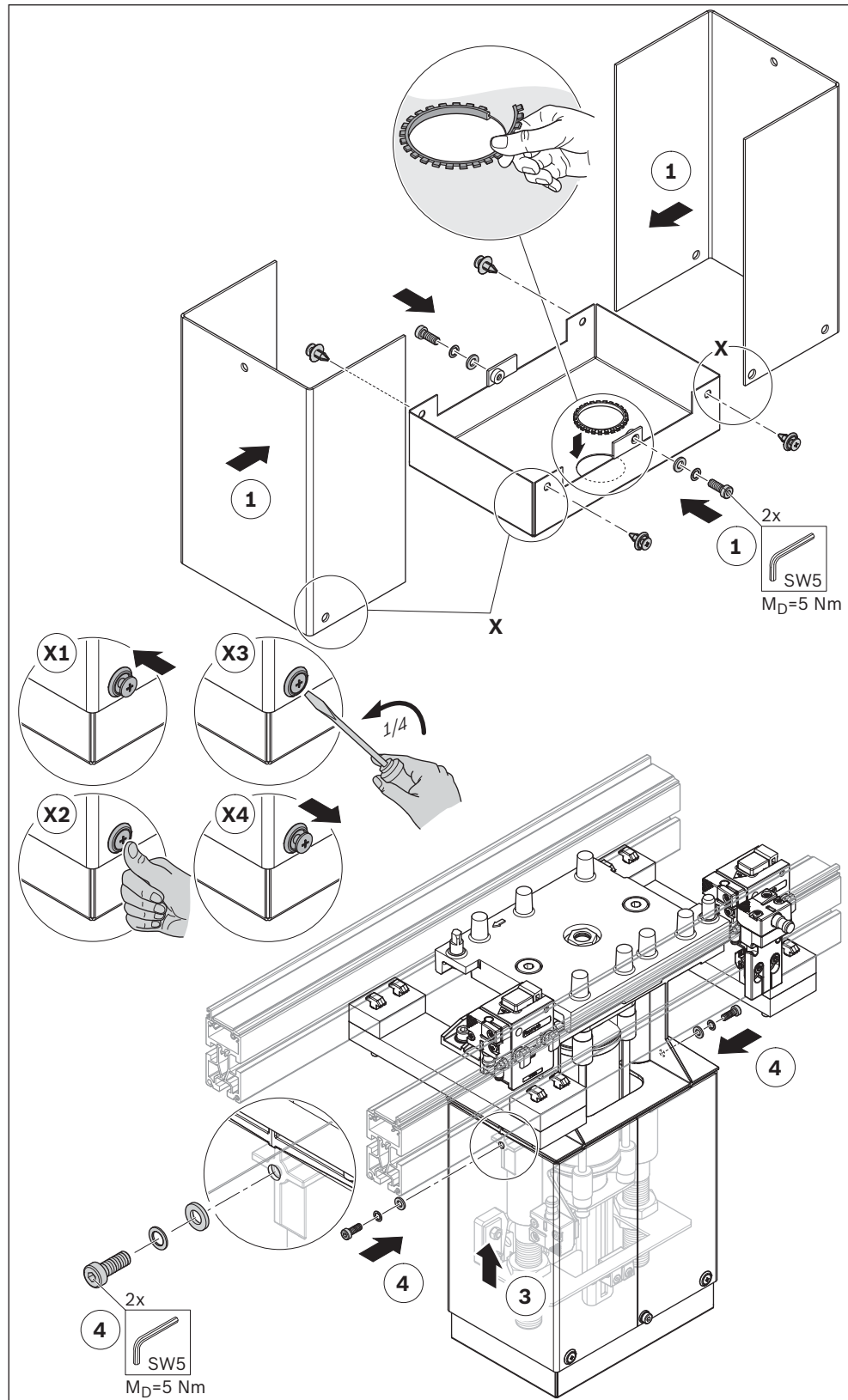


Fig. 16: Installing the protective case

7.6 Installing the HP 2/L lift positioning unit

7.6.1 HP 2/L lift positioning unit under section (AO = UB)



Please note:

- For section ST 2/...:
See detail A.
- For section ST 2/...-100:
See detail B.
- Support the HP 2/L
during alignment until
final fastening.

1. Mark the installation location of the HP 2/L.
2. Align the T-bolts in longitudinal direction.
3. Lift the HP 2/L into the section from below
4. Tighten the flange nuts slightly by hand.
5. Align the HP 2.
6. Tighten the flange nuts.

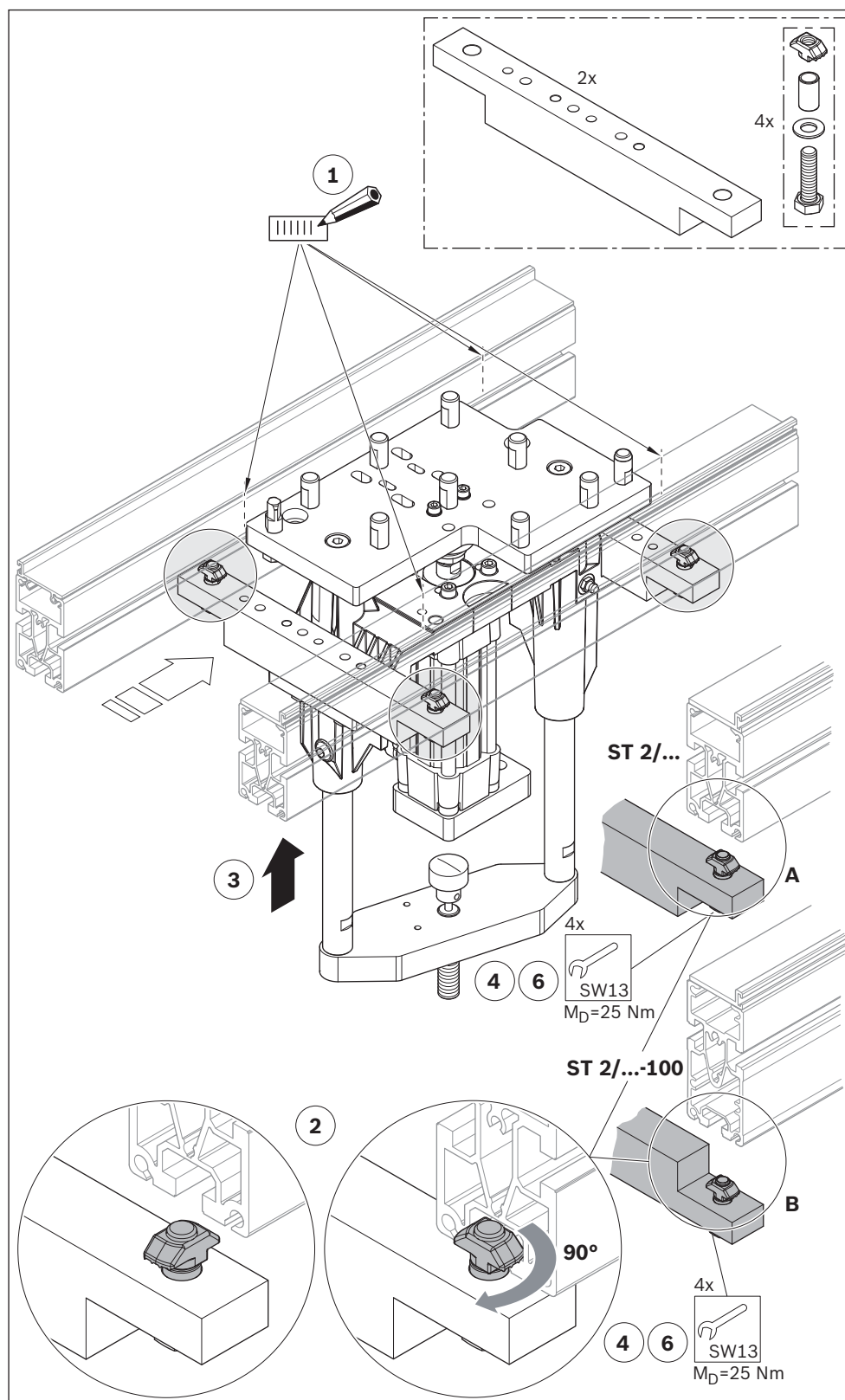


Fig. 17: Installing the HP 2/L lift positioning unit under section (AO = UB)

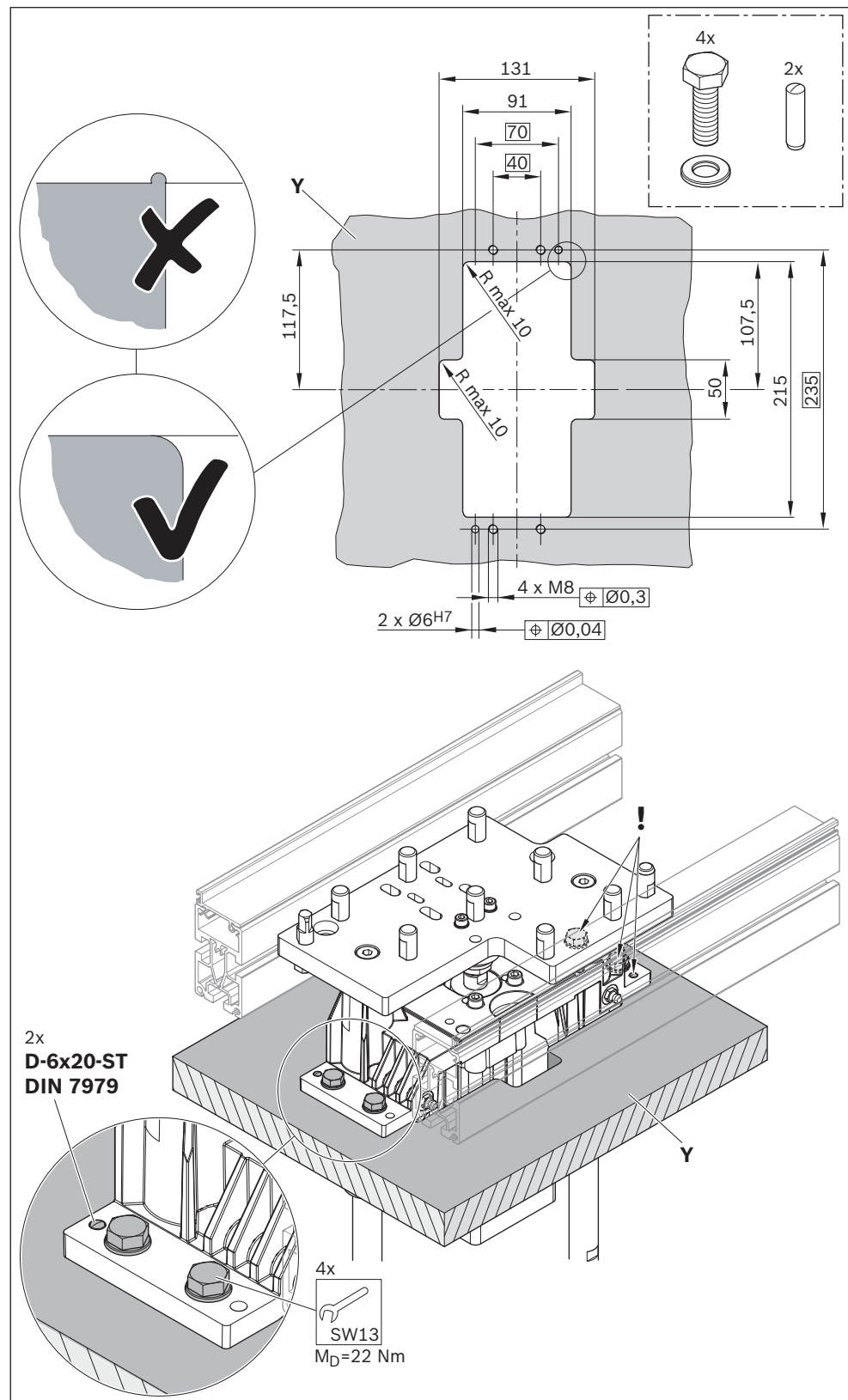
**Please note:**

- All external radii on the cut-out must be rounded.

Y: Table top

1. Prepare the cut-out and the mounting holes for the HP 2/L according to Fig. 18.
2. Install the HP 2/L in the table cut-out and pin the HP 2/L diagonally.

7.6.2 Installing the HP 2/L lift positioning unit in the table cut-out (AO = AT)



563 988-23

Fig. 18: Installing the HP 2 lift positioning unit in the table cut-out (AO = AT)

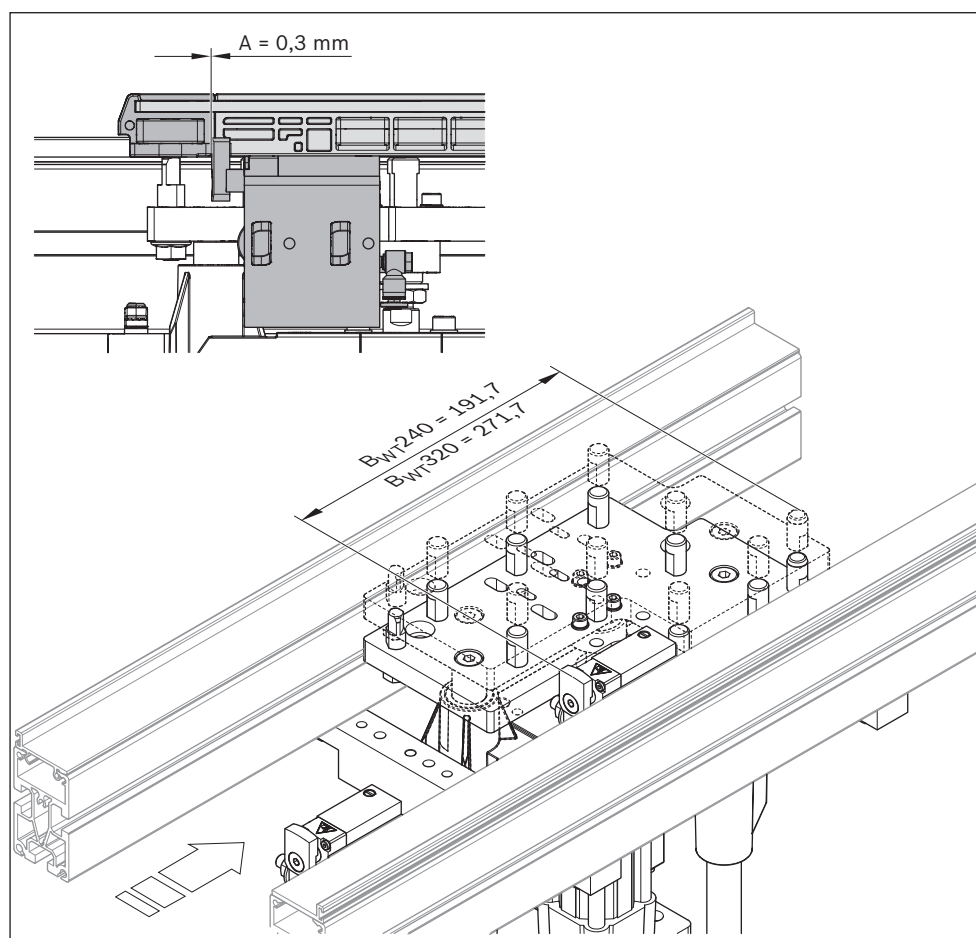
Required accessories

- VE 2... stop gate

**Please note:**

- An incorrectly set stop gate may lead to increased wear of the locating pins. Observe dimension A.
- When WT remain on the inside (possibly when b_{WT} 240 and 320 mm) the position of the stop gate without WT must be set.

1. Bring the lifting plate to the same level as the open stop blade of the stop gate, e.g. by lowering a 60 mm spacer.
2. Set the outer dimension of positioning pin/stop blade of the stop gate using a large caliper according to Fig. 19.

7.6.3 Setting the stop gate**Fig. 19: Setting the stop gate**

563 988-24

7.6.4 Pneumatic connection of the product



WARNING

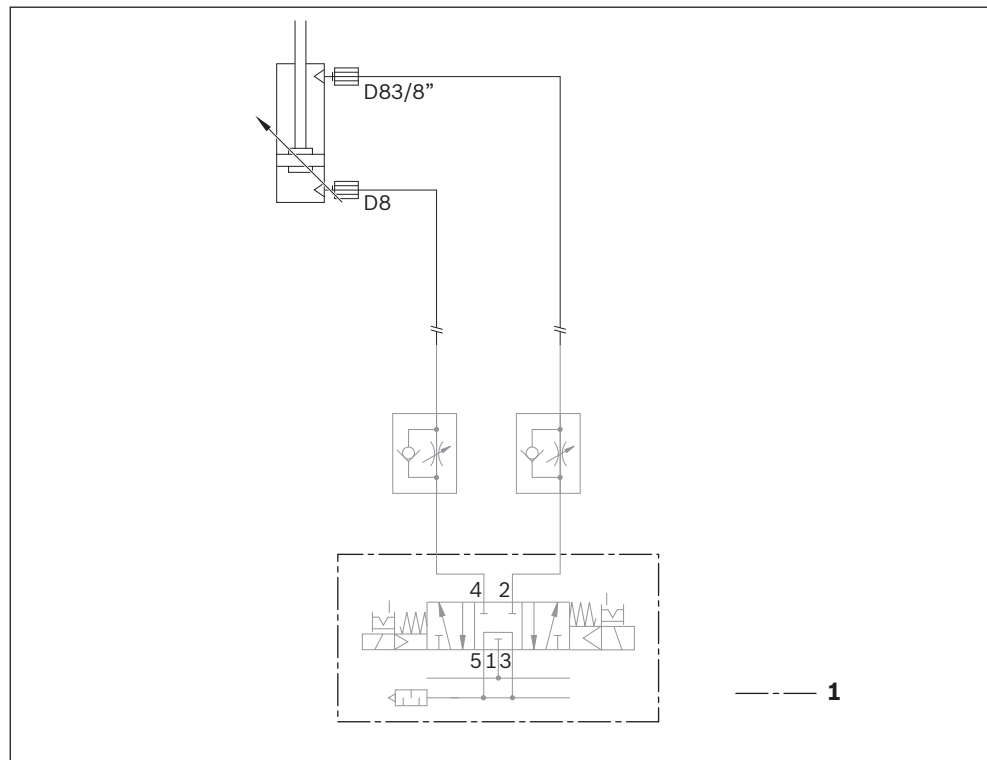
High pneumatic pressure!

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 unintentionally switched on again.

- For the compressed air and operating pressure specifications, see page 60.

- ▶ Connect the HP 2/L to the compressed air supply.



1) Not included in the scope of delivery

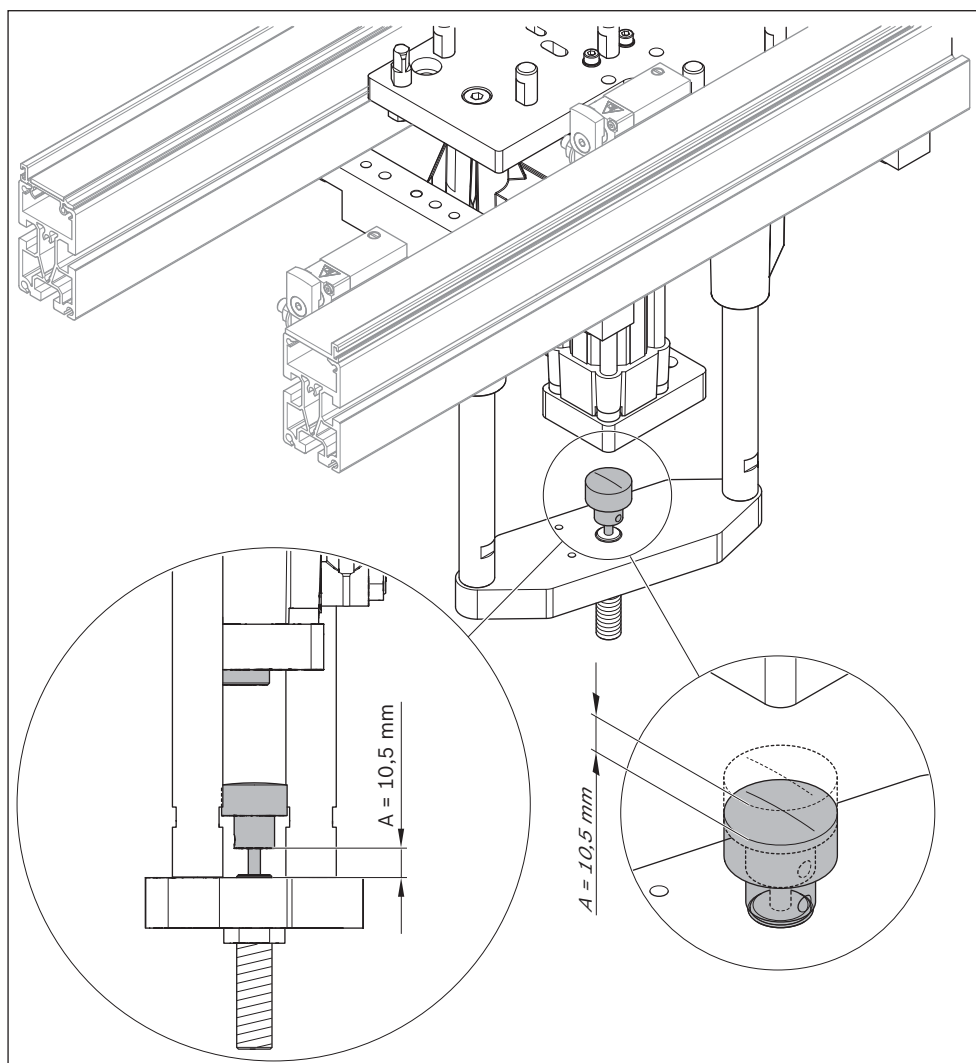
Fig. 20: Pneumatic diagram HP 2/L

563 988-15

**Please note:**

- The maximum lifting movement is set at the factory.
- The damping path (dimension A) of 10.5 mm must be maintained at all times.

1. Loosen the lock nut of the shock absorber.
2. Set the desired lifting movement by screwing the shock absorber in or out.
3. Tighten the lock nut of the shock absorber.

7.6.5 Setting the lifting movement**Fig. 21: Setting the lifting movement**

563 988-25

7.6.6 Setting the end position damping top/bottom

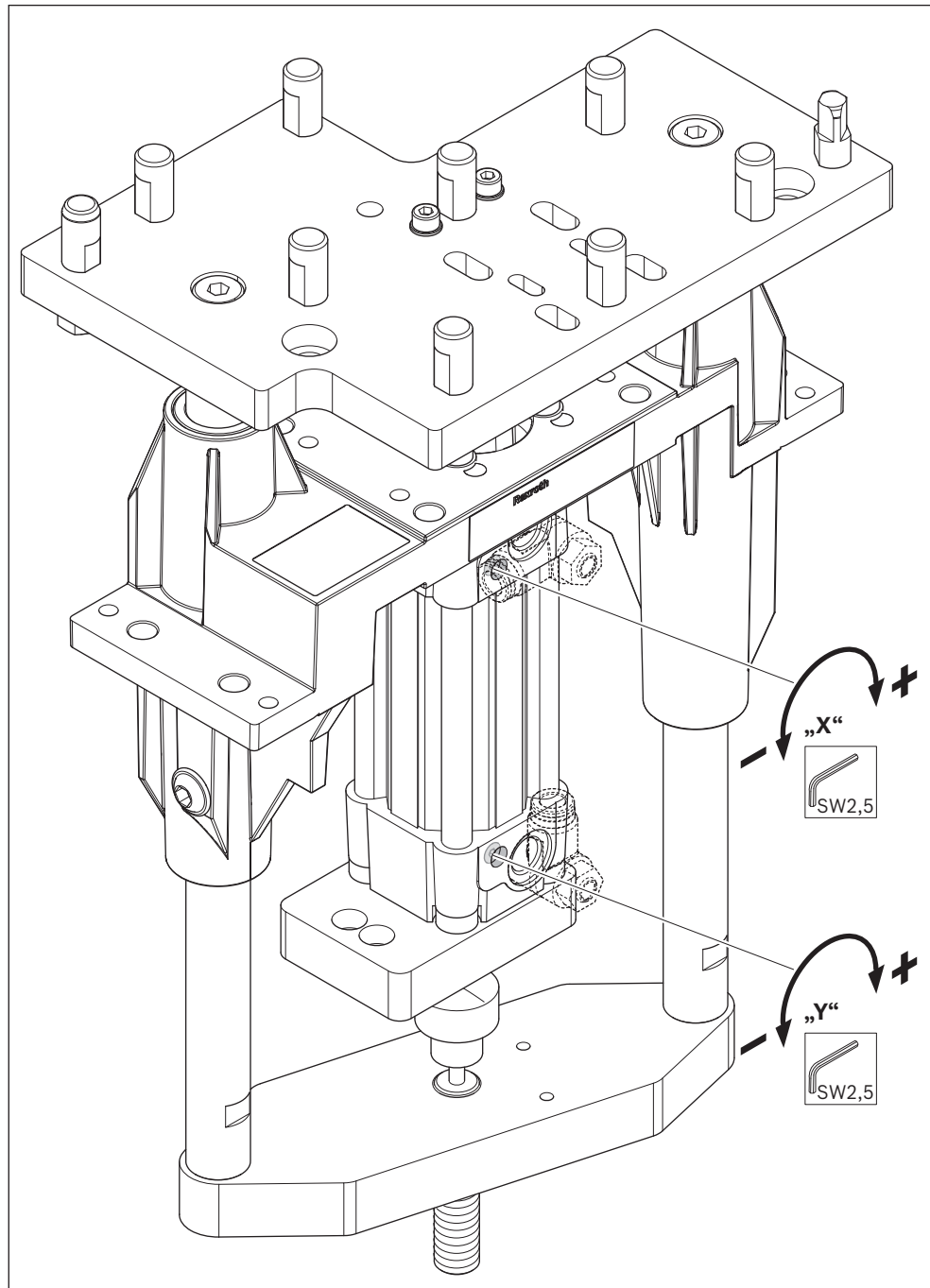
- Set the end position damping by screwing the adjusting screw in or out.
- X:** Adjusting screw for end position damping top
- Y:** Adjusting screw for end position damping bottom
- Turning in the direction marked "+" increases the damping.
- Turning in the direction marked "-" makes the damping softer.

NOTICE

Missing end position damping can result in property damage

Do not operate the HP 2/L without external damper or non-damped.

- Always set the lower end position damping.
- Always set the end position damping with a loaded WT.

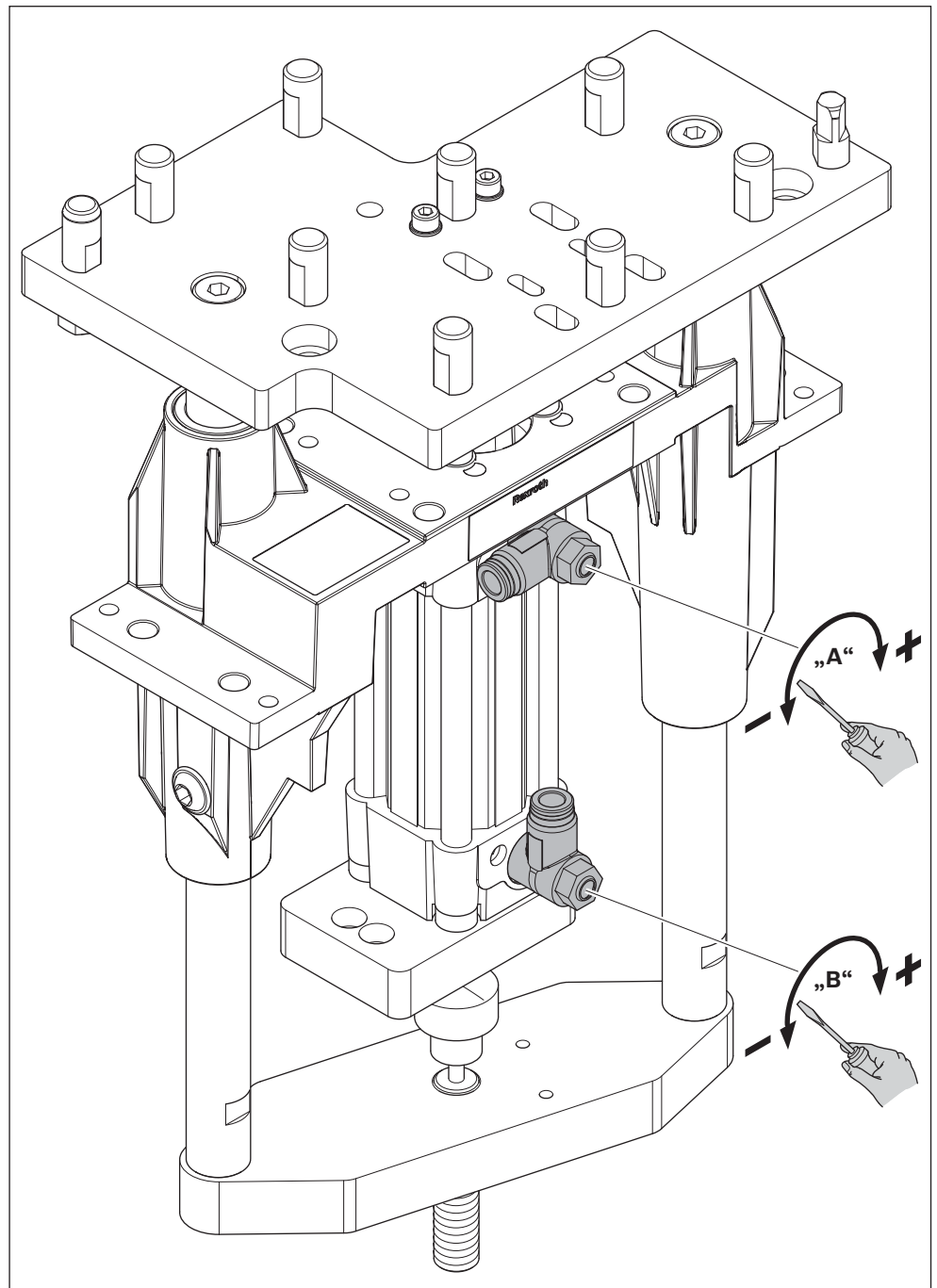


563 988-26

Fig. 22: Setting the end position damping

**Please note:**

- On delivery an even, smooth lifting movement is set.
- Throttle the exhaust air to adjust the lifting speed.
- A:** Throttle screw upward stroke
- B:** Throttle screw downward stroke
- Turn it in the direction marked "+" to make the lifting movement faster.
- Turn it in the direction marked "-" to make the lifting movement slower.

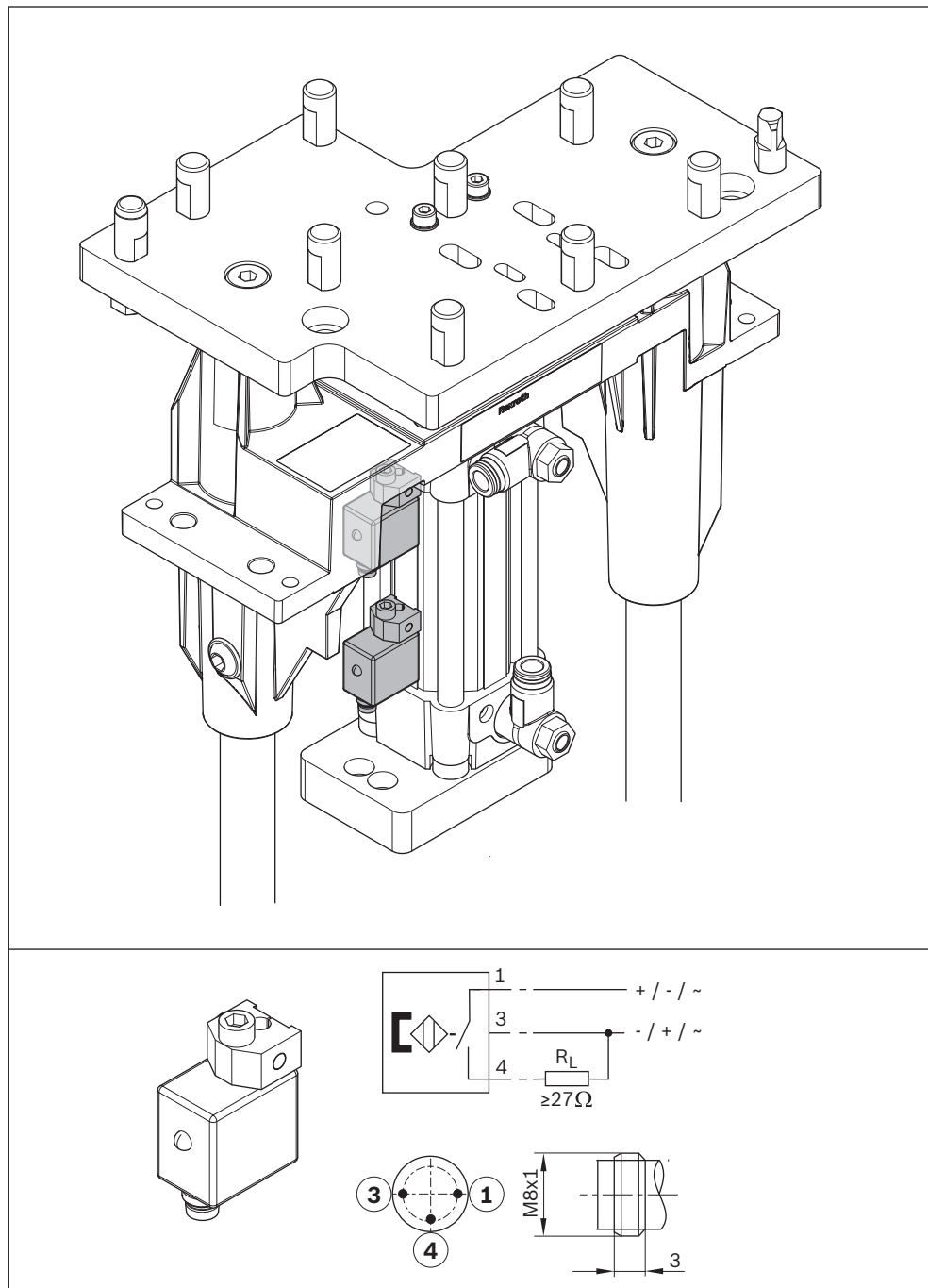
7.6.7 Setting the lifting speed**Fig. 23: Setting the lifting speed**

Required accessories

- Position monitoring set for SA cylinder, **3 842 536 974**

**Please note:**

- The cylinder switches can only be installed on the side of the pneumatic cylinder.
 - The switching points can be realized via the installed LEDs. For this purpose, the cylinder switches must be connected to the operating voltage.
- Install the cylinder switches according to the end positions on the pneumatic cylinder.

7.6.8 Installation of SA position monitoring set for upper and lower end position

563 988-28

Fig. 24: Installation of SA position monitoring set for upper and lower end position

7.6.9 Installation of RA position monitoring set for HP 2/L with turret stop

Required accessories

- RA position monitoring set, 3 842 536 975 ¹⁾



Please note:

- Only version SOMATEC® PRVA 8 can be used as turret stop.
- An accompanying sensor is used instead of the cylinder switch to sense the upper positions on the turret stop.
- The switching points can be realized via the installed LEDs. For this purpose, the switches must be connected to the operating voltage.

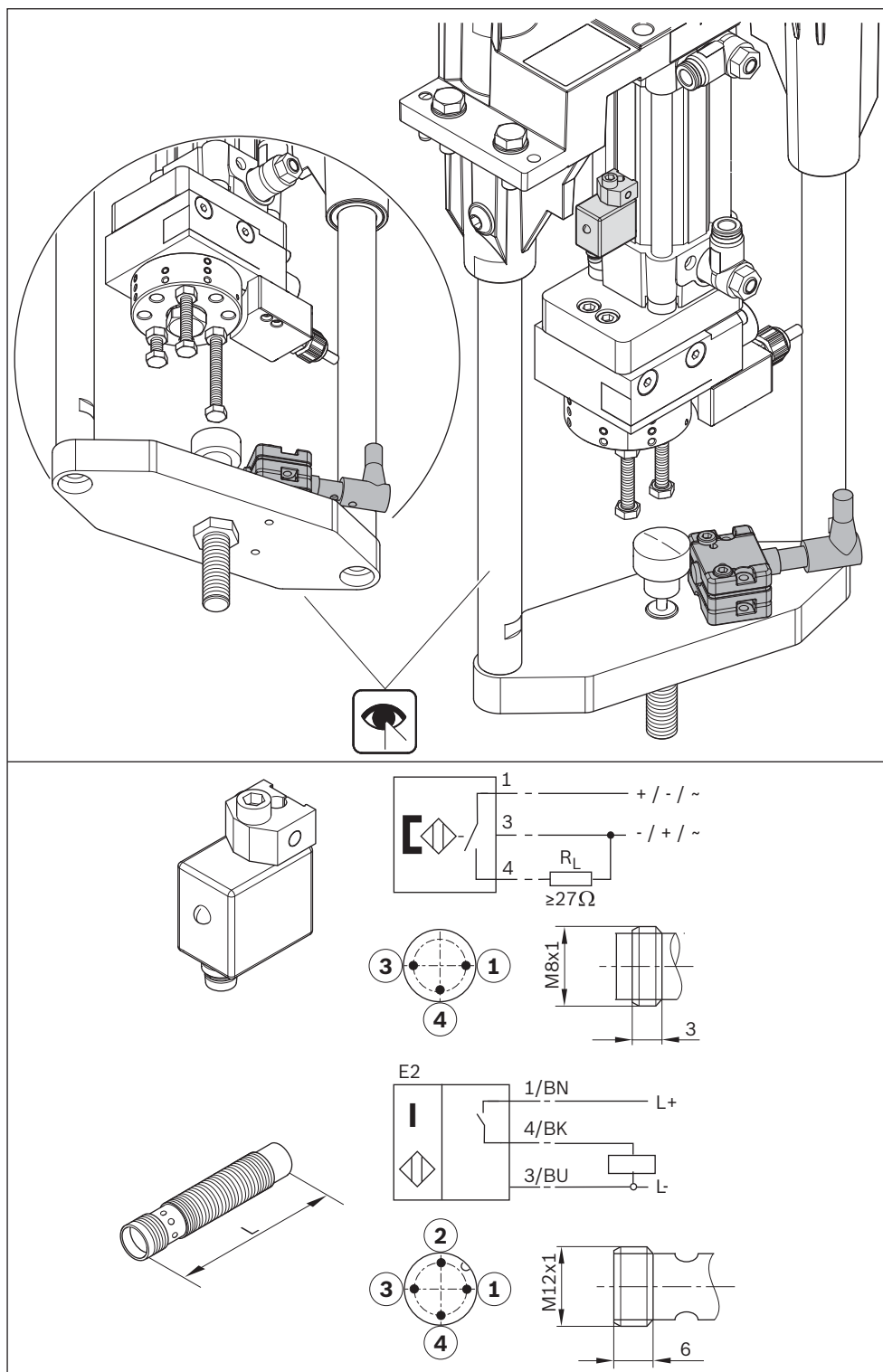


Fig. 25: Installation of RA position monitoring set for HP 2/L with turret stop

563 988-29

Required accessories

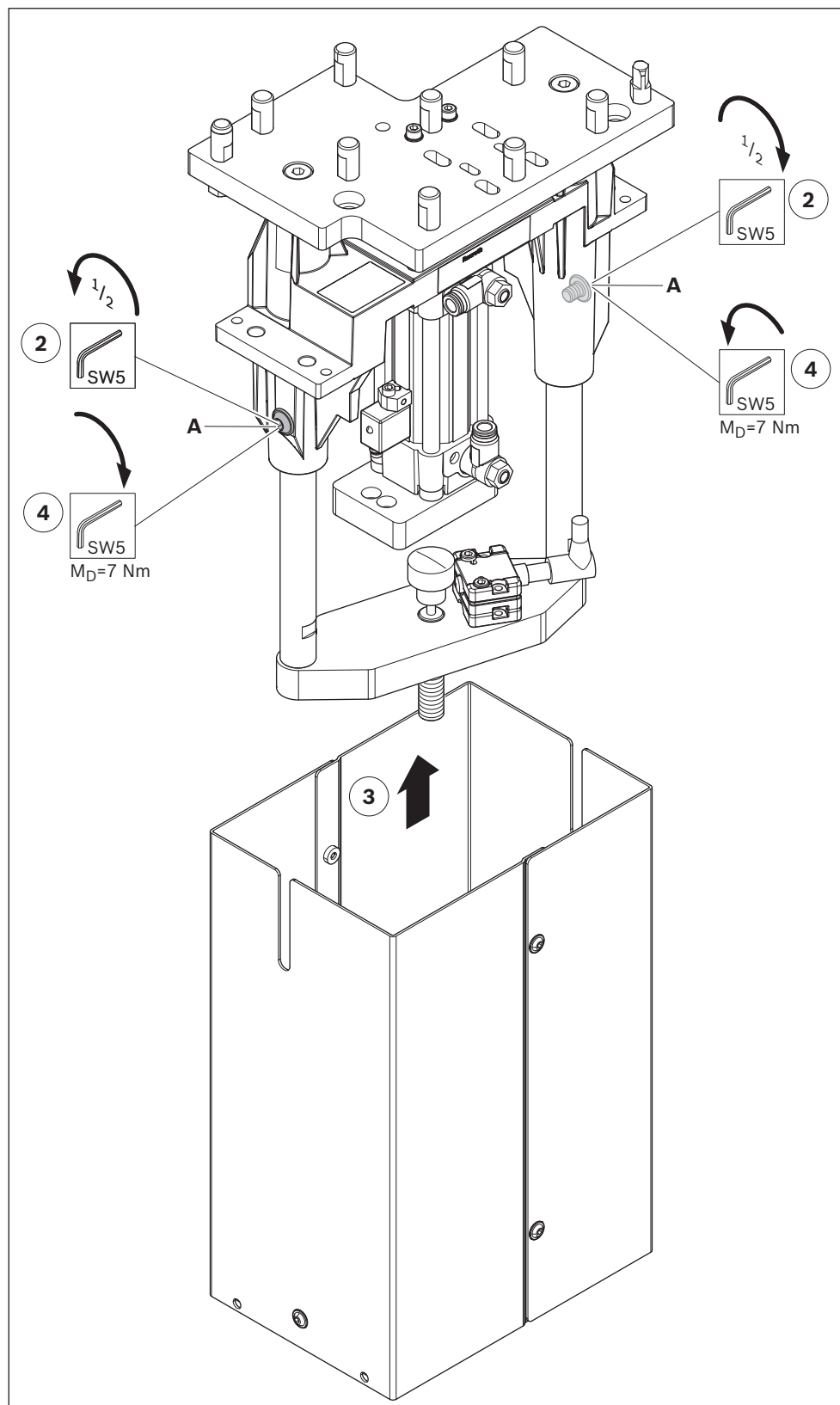
- Protective case for HP 2/L

**Please note:**

- The protective case is delivered pre-assembled.
- The clamping screws (A) for the protective case must not be removed completely. Grease leak!

1. Lead the pneumatic hoses and connection cables through the openings in the base of the protective case.
2. Loosen the clamping screws (A) for the protective case by $\frac{1}{2}$ revolution.
3. Slide the protective case over the HP 2/L from below.
4. Re-tighten the clamping screws (A) for the protective case.

- The disassembly of the protective case is done in the reverse order.

7.6.10 Installing the protective case

563 988-30

Fig. 26: Installing the protective case on HP 2

8 Commissioning

8.1 Initial commissioning

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.

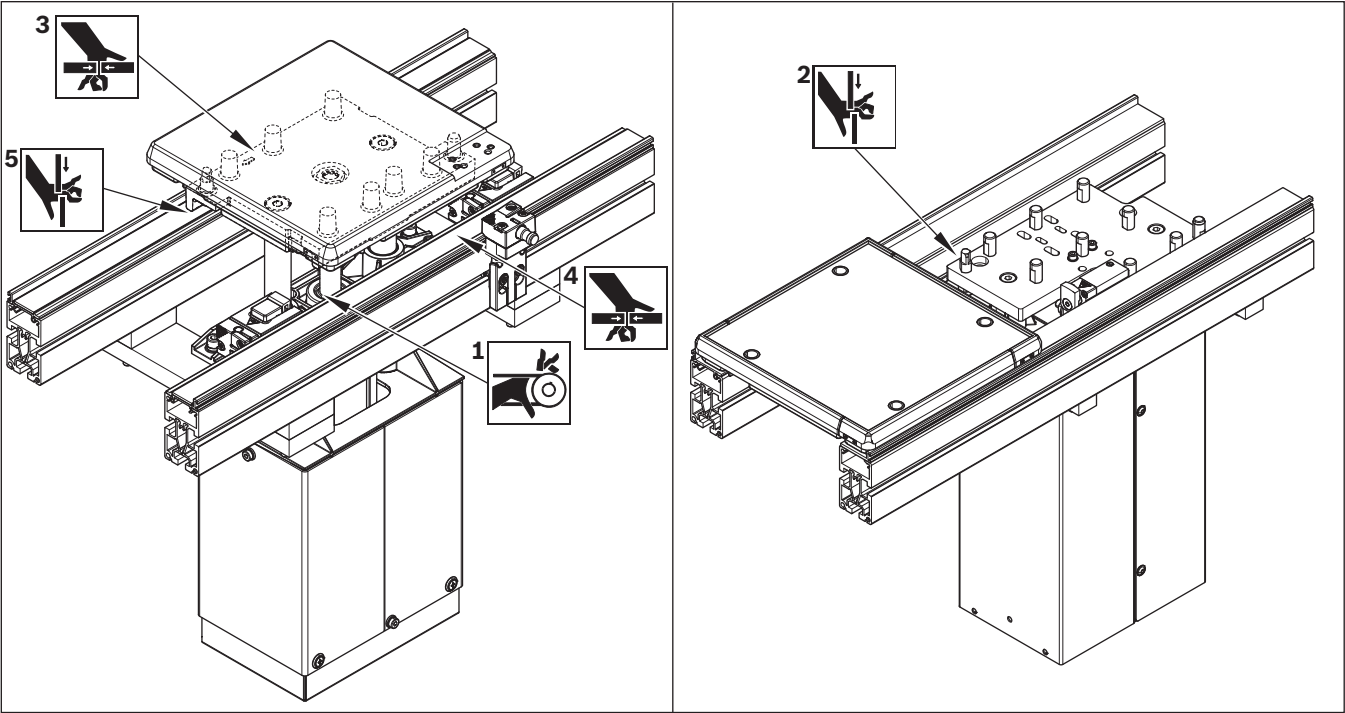
- ▶ Commissioning requires basic mechanical, pneumatic and electrical knowledge.
- ▶ The product should only be started up by qualified personnel (see page 8).

- 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 °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 protective equipment is in place.
- Observe DIN EN ISO 13857 when you remove or replace protective equipment 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.

8.2
Residual risks

Life stage ¹⁾ , location			Situation	Hazard	Action
1	2	Lifting plate, housing: Between moving parts	Limbs can become trapped		Crushing
	9				
	21				
	2				
	9				
	21				
2	2	Lifting plate: Between component and entering workpiece pallet	Limbs can become trapped		Shearing
	9				
	21				
	2				
	9				
	21				
3	2	Lifting plate: Between component and workpiece pallet	Body parts can be caught during lifting		Crushing
	9				
	21				
	2				
	9				
	21				
4	2	Conveyor medium: In between conveyor medium and workpiece pallet	Body parts can be caught during lowering		Crushing
	9				
	21				
	2				
	9				
	21				
5	2	Lifting plate: Between component and section profile	Body parts can be caught during lowering		Shearing
	9				
	21				
	2				
	9				
	21				

1) Life stages of the machine according to EN 12100 Sect. 5.4 a /b (No. 1- 27), Sect. 5.4 a (see page 41)



563 988-31

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 during line downtime, 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:

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

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 unintentionally switched on again.

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 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 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 protective equipment 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

Lift unit

Check the pneumatic connections regularly for leaks.

10.3 Maintenance HP 2

Bearings

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

10.4 Maintenance HP 2/L

Greasing the guide

- Grease the guide every 3 to 4 years (for each guide, 2 to 4 strokes with the grease gun).

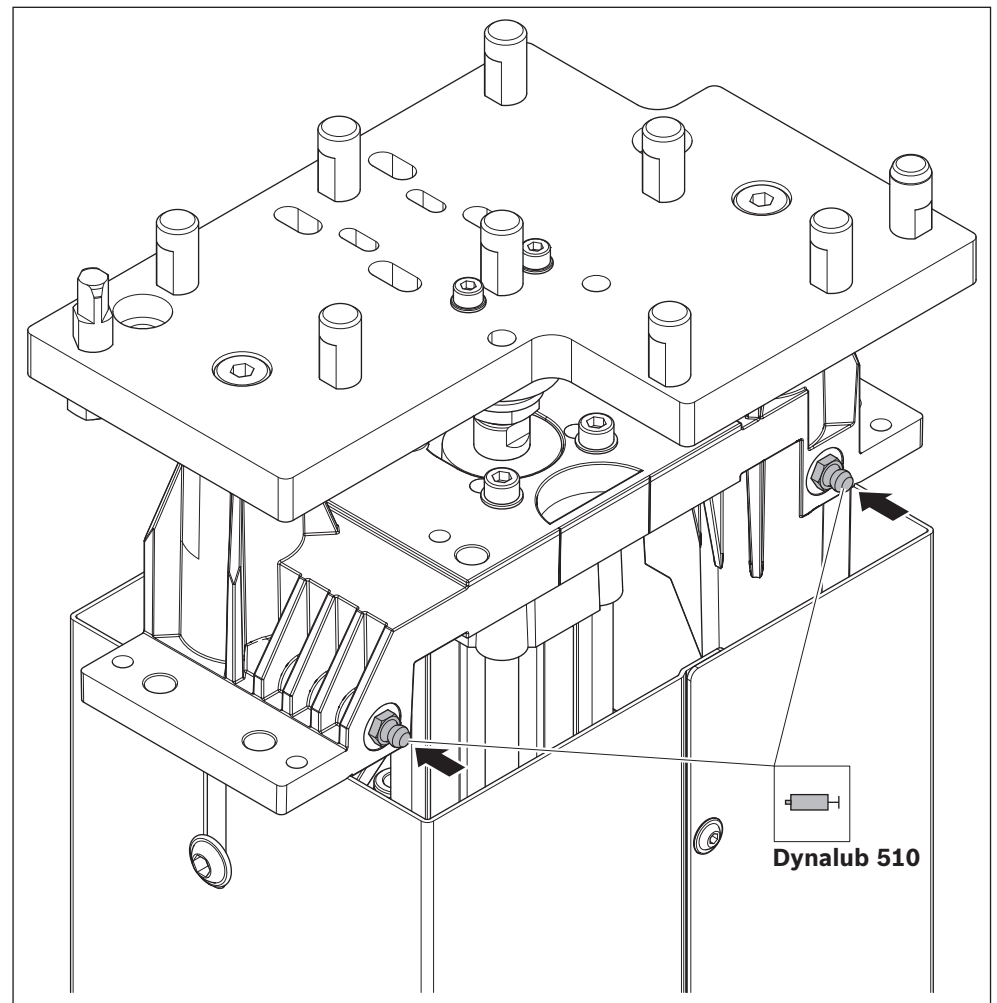


Fig. 27: Greasing the guide

10.5 Replacement of wear parts of HP 2

Required tools

- Hex wrench SW13.
- Hex socket wrenches SW3, SW4, SW5.
- Pozidriv screwdriver PZ2
- Caliper, 500 mm
- Hammer
- Drift punch
- Manual spindle press

10.5.1 Replacing the proximity switches for upper/lower end position

1. Remove the protective case (see section 7.5.11).
2. Remove the plug from the proximity switch.
3. Replace the proximity switch.
4. Push the plug back onto the proximity switch.
5. Set the switching distance.
6. Install the protective case (see section 7.5.11).

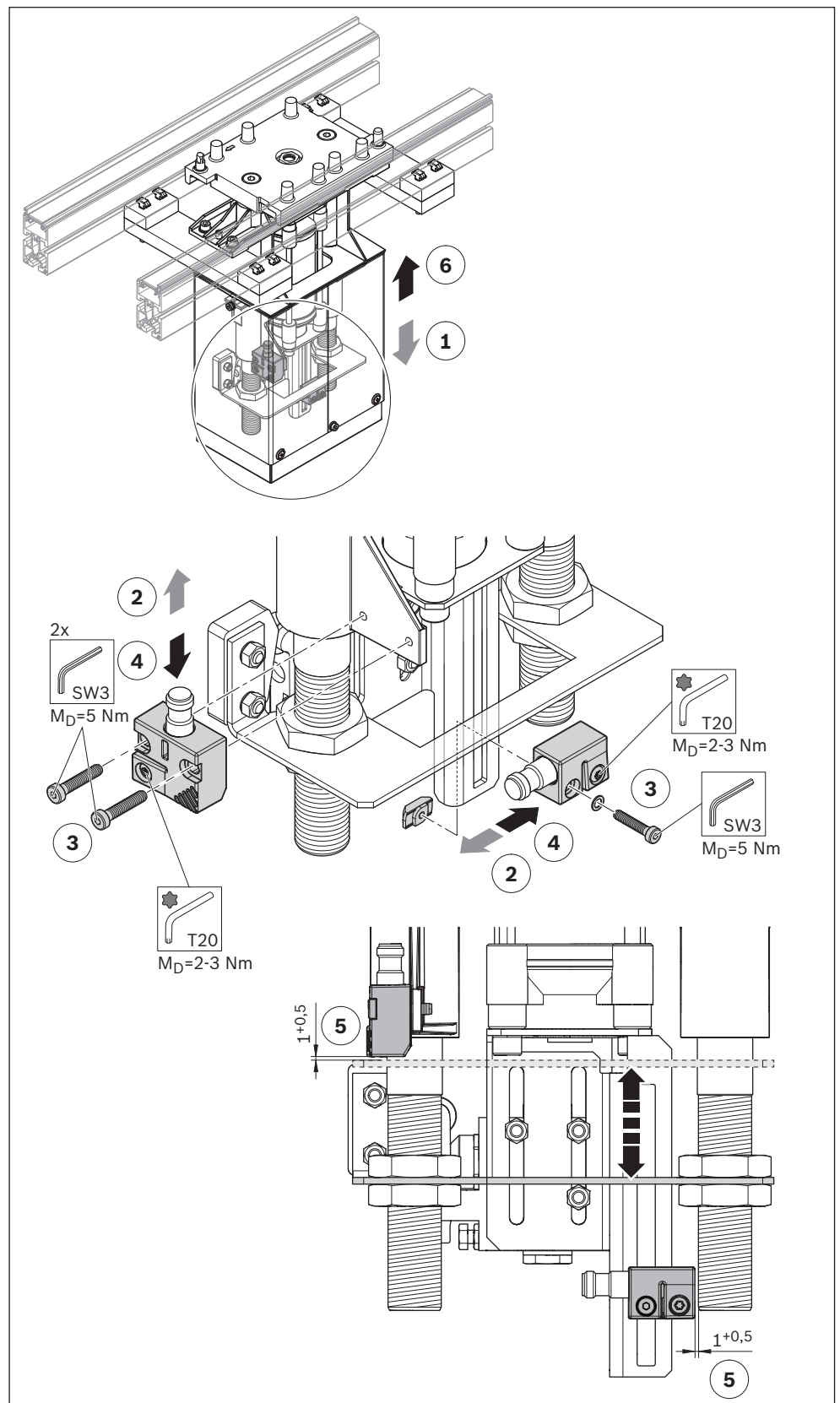


Fig. 28: HP 2; replacing the proximity switches for upper/lower end position

563 988-16

10.5.2 Replacing the pneumatic cylinders

- A:** With lifting plate
B: With positioning plate

1. Remove the protective case (see section 7.5.11).
 2. Loosen the pneumatic connections.
 3. Remove the proximity switches.
 4. Remove the coupling from the piston thread.
 5. Remove the pneumatic cylinder from the base body; pull out downwards.
- The assembly of the new pneumatic cylinder is carried out in reverse order.
- Re-adjust the HP 2 after installation (see chapters 7.5.7 to 7.5.10).

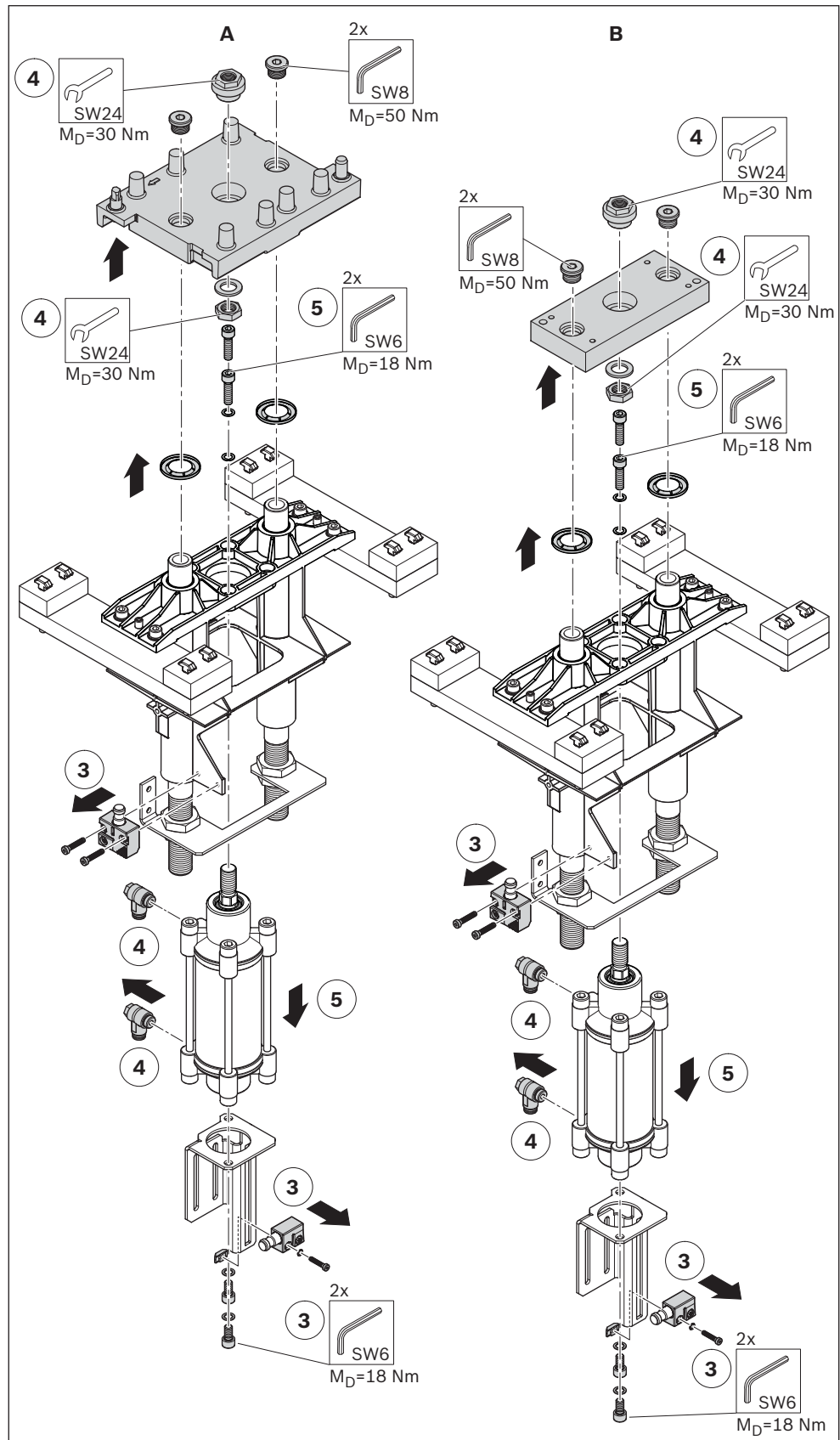


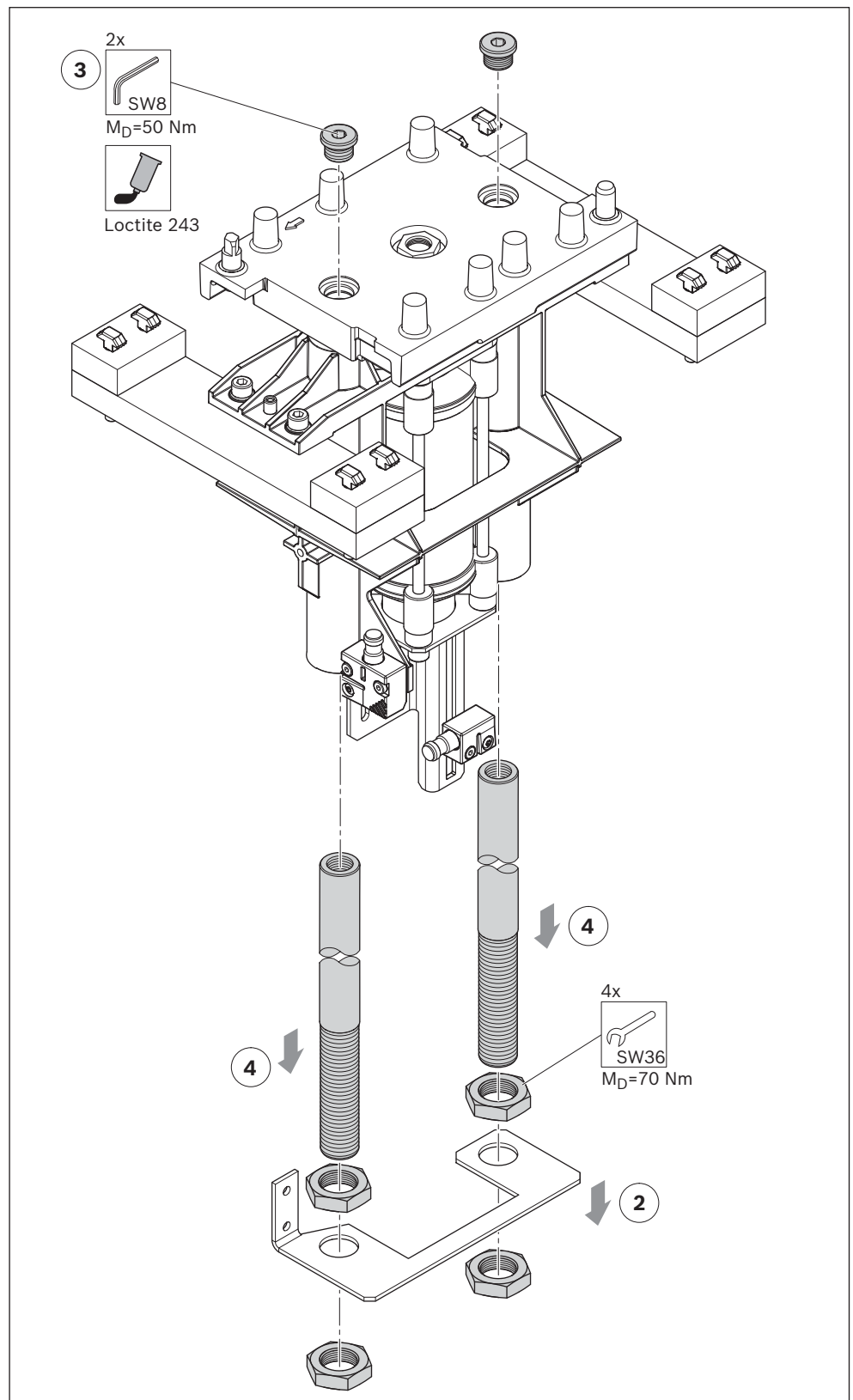
Fig. 29: HP 2; replacing the pneumatic cylinders

563 988-17

**Please note:**

- Do not tilt the new guide columns when inserting into the DU® guide sockets.

1. Remove the protective case (see section 7.5.11).
 2. Remove the metal bracket.
 3. Remove the screw plugs.
 4. Carefully pull the guide columns downwards from the base body.
- For installation of new guide columns, proceed in reverse order.
- Re-adjust the HP 2 after installation (see chapters 7.5.7 to 7.5.10).

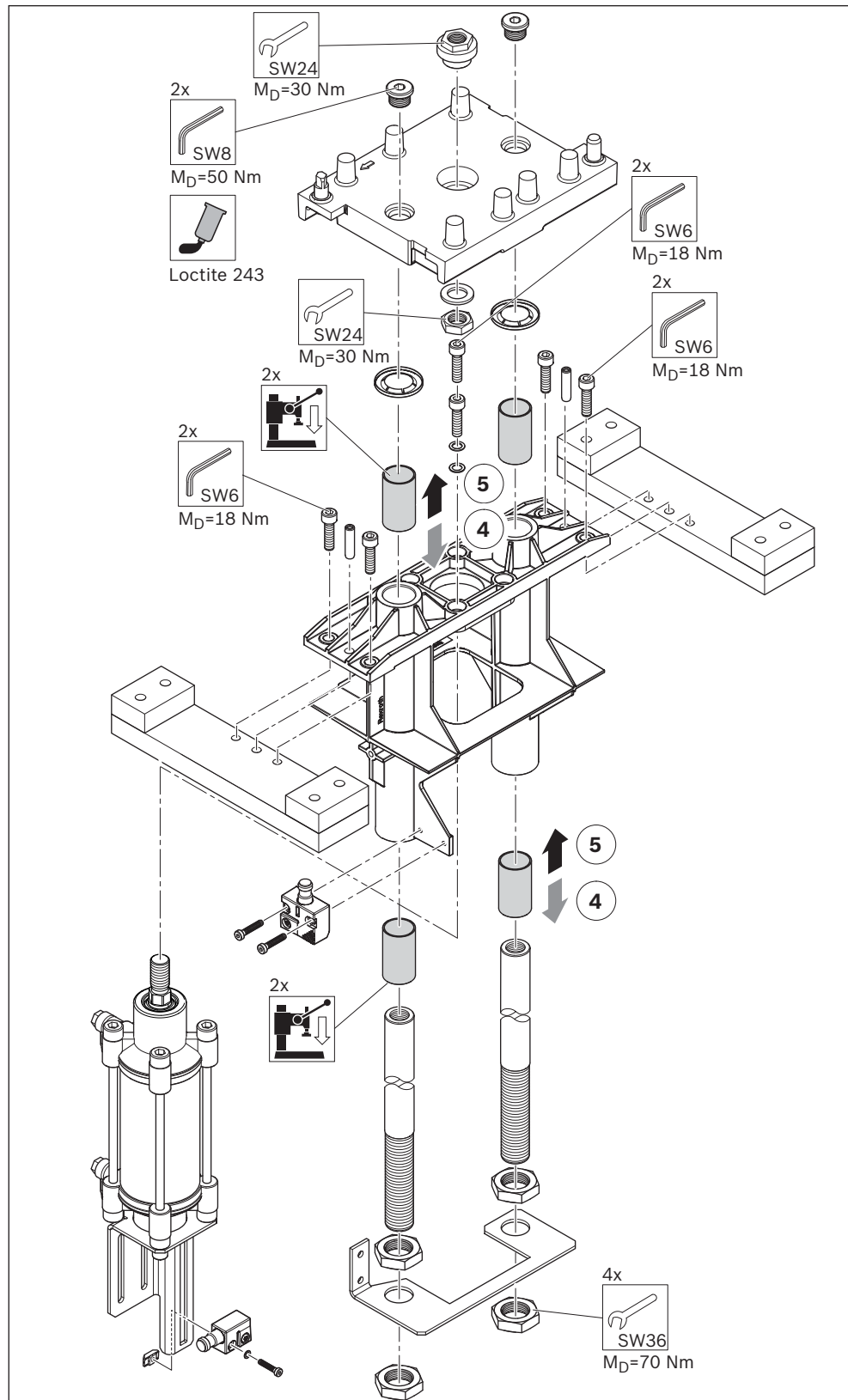
10.5.3 Replacing the guide columns**Fig. 30: HP 2; replacing the guide columns**

10.5.4 Replacing the DU® guide sockets



Please note:

- We recommend using a manual spindle press for removal and pressing in the DU® guide sockets.
1. Remove the protective case (see section 7.5.11).
 2. Remove the HP 2 from the section/table (see chapter 7.5).
 3. Remove the HP 2 according to Fig. 31.
 4. Using a manual spindle press, press the DU® guide sockets (4x) out of the base body.
 5. Press in the new guide sockets.
- For installation of the HP 2, proceed in reverse order.
 - Re-adjust the HP 2 after installation (see chapters 7.5.7 to 7.5.10).



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Fig. 31: HP 2; replacing the DU® guide sockets

10.5.5 Replacing the lifting / positioning plate

A: With lifting plate

B: With positioning plate

1. Remove the screw plugs.
2. Remove the coupling from the piston thread.
3. Remove the lifting / positioning plate to the top.

► For installation of the lifting / positioning plate, proceed in reverse order.

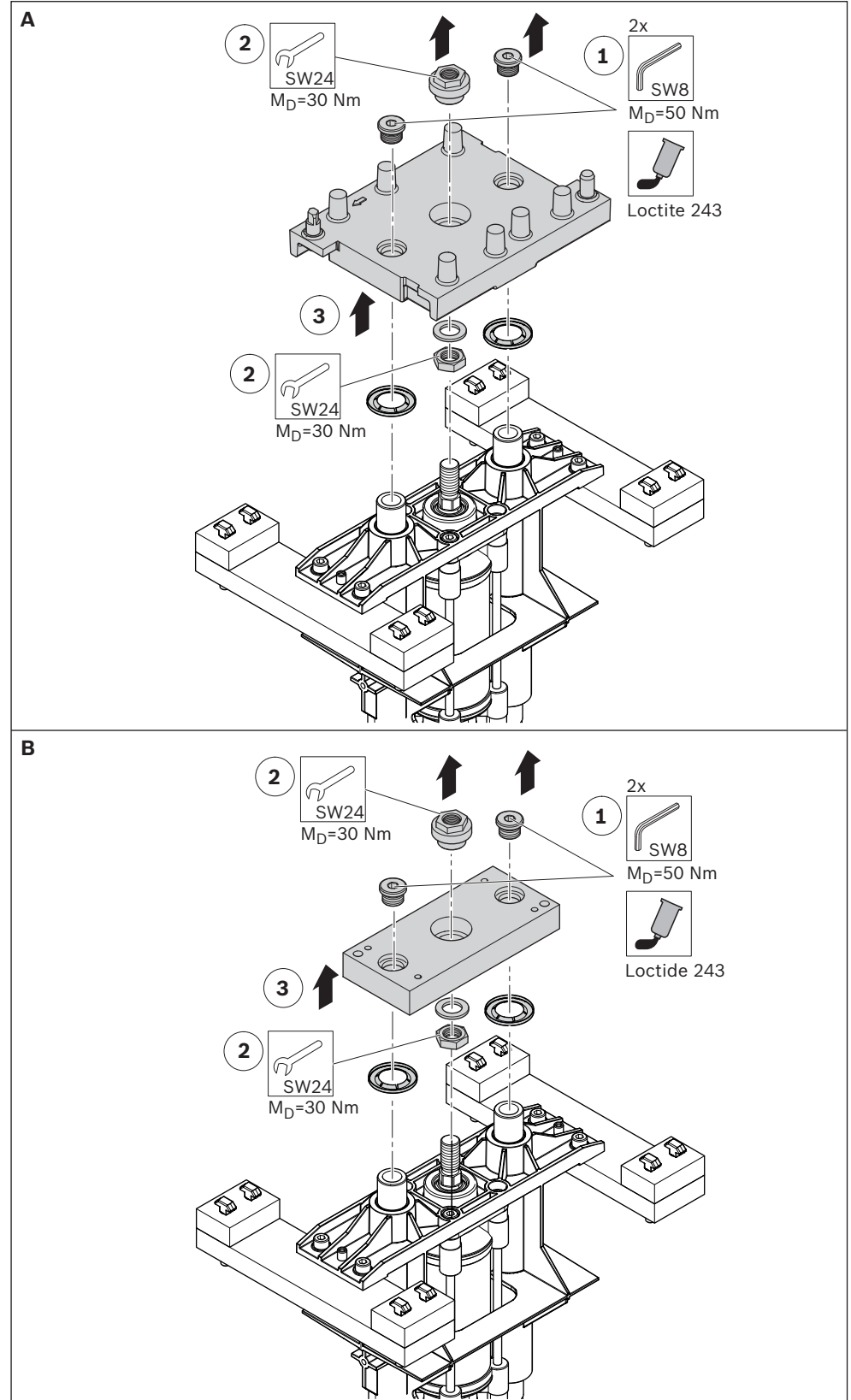


Fig. 32: HP 2; replacing the lifting / positioning plate

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10.6 Replacing wear parts of HP 2/L

Required tools

- Hex wrench SW13.
- Hex socket wrenches SW3, SW4, SW5.
- Pozidriv screwdriver PZ2
- Caliper, 500 mm
- Hammer
- Drift punch
- Manual spindle press

10.6.1 Replacing the pneumatic cylinders



Please note:

- For replacing the pneumatic cylinder, the HP 2/L does not have to be removed from the section.

1. Remove the protective case (see section 7.6.10).
 2. Loosen the pneumatic connections.
 3. Remove the cylinder switch(es).
 4. Remove the pneumatic cylinder from the base body; pull out downwards.
- The assembly of the new pneumatic cylinder is carried out in reverse order.
- During installation, set dimension X!
- Re-adjust the HP 2/L after installation (see chapters 7.6.5 to 7.6.9).

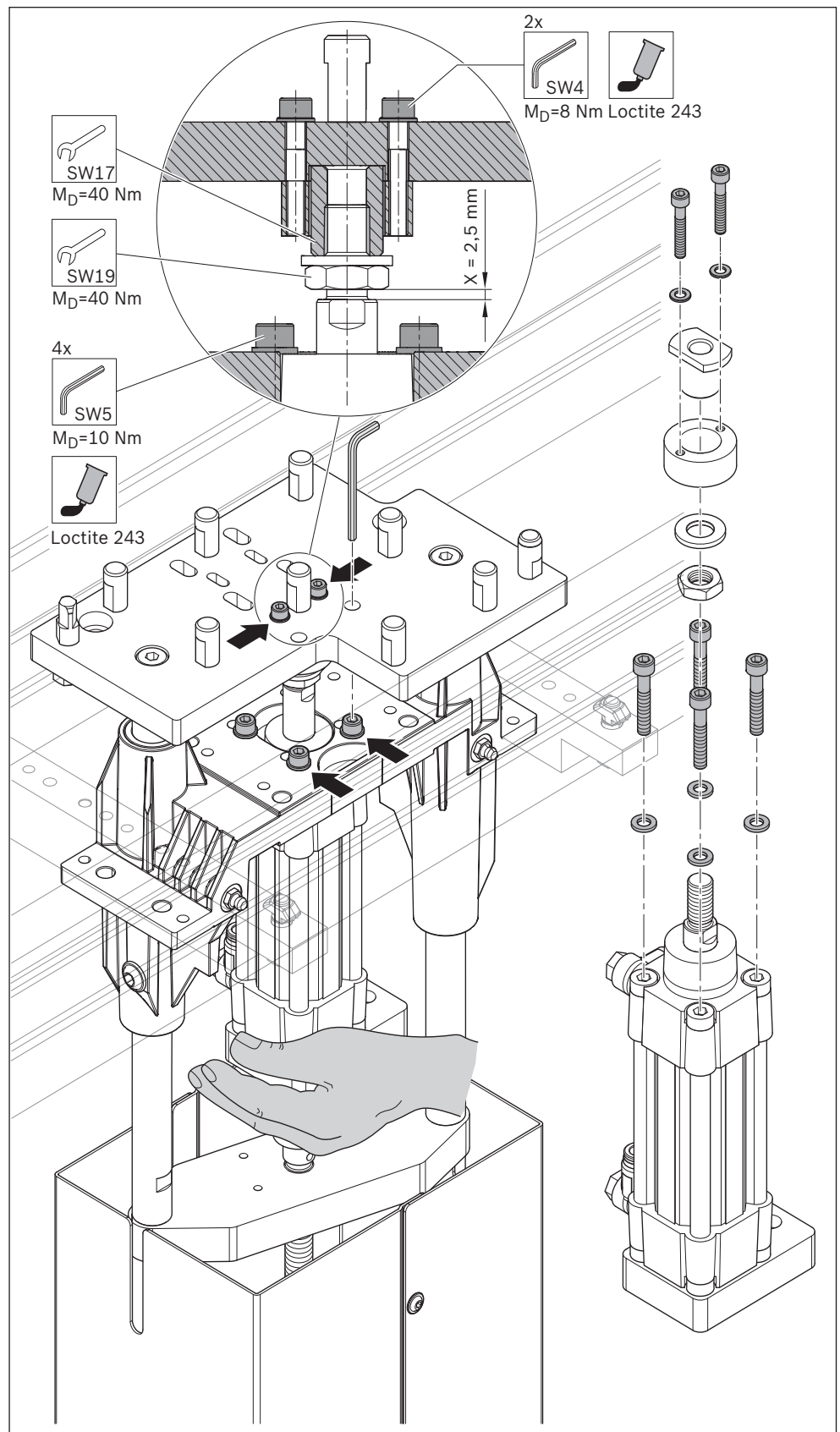


Fig. 33: HP 2/L; replacing the pneumatic cylinders

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10.6.2 Replacing the guide

**Please note:**

- Always replace the guide columns and the guide sockets together.
- Do not tilt the new guide columns when inserting into the guide sockets.
- The cylinder switches do not have to be disassembled!

1. Remove the protective case (see section 7.6.10).
 2. Remove the HP 2/L from the section/table (see chapter 7.6).
 3. Remove the HP 2/L according to Fig. 34.
 4. Using a manual spindle press, press the guide sockets (4x) out of the base body.
 5. Press in the new guide sockets. For variants, see Fig. 35
 6. Install the new guide columns
- For installation of the HP 2/L, proceed in reverse order.
- Re-adjust the HP 2/L after installation (see chapters 7.6.5 to 7.6.7).

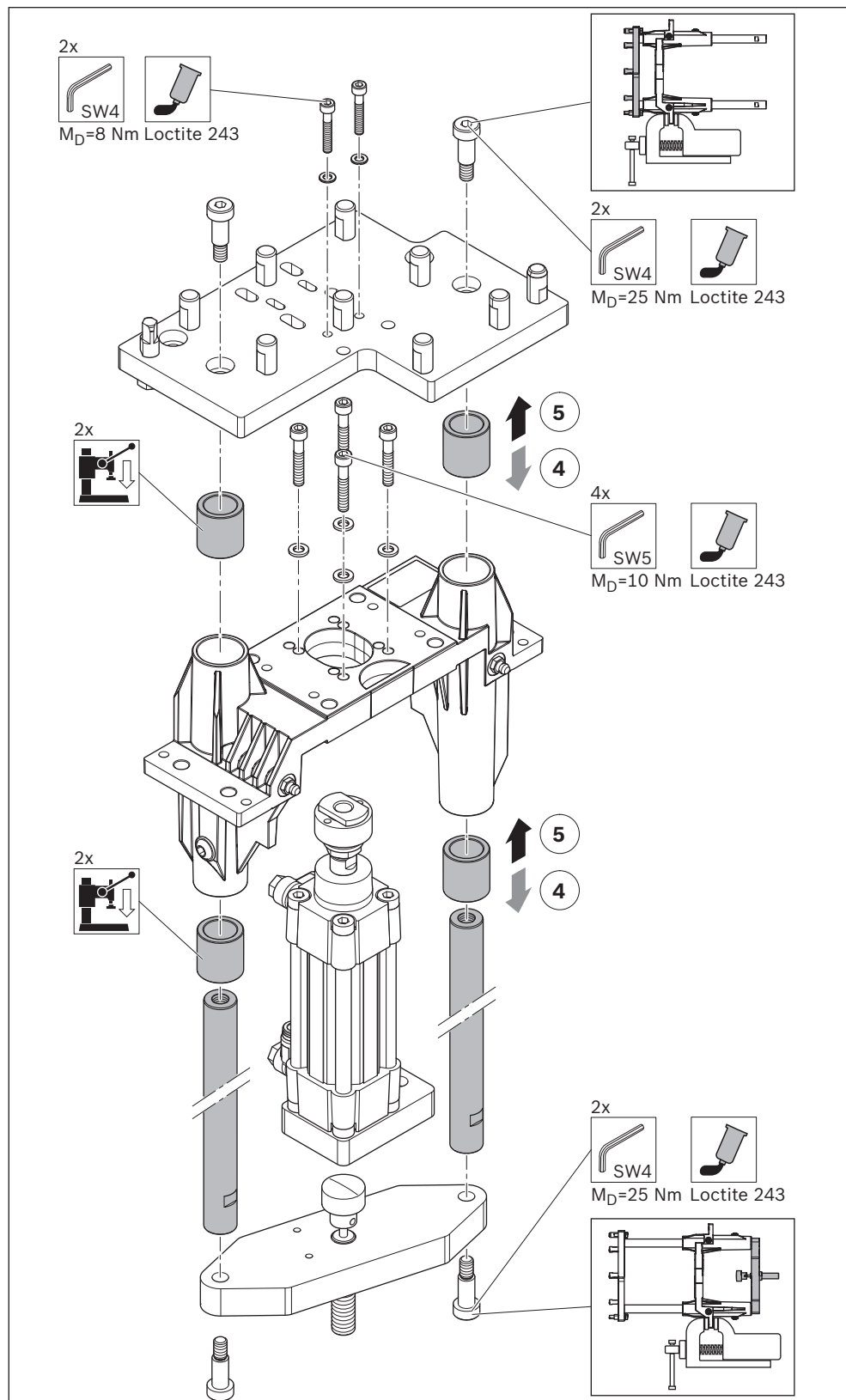


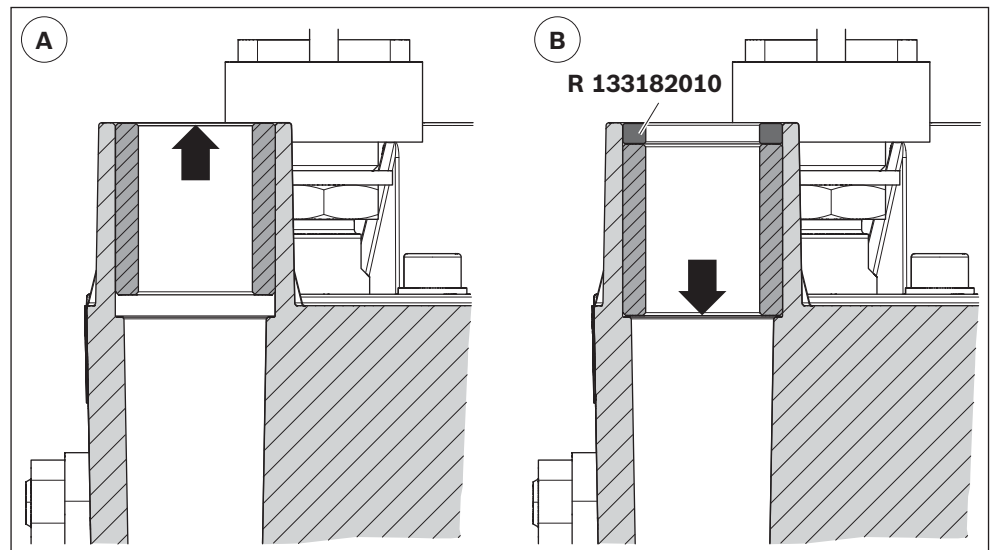
Fig. 34: HP 2/L; replacing the guide

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**Please note:**

- With variant B, an optional seal can be installed

- A:** Guide socket pressed in flush
- B:** Guide socket pressed in recessed for installation of an optional seal.

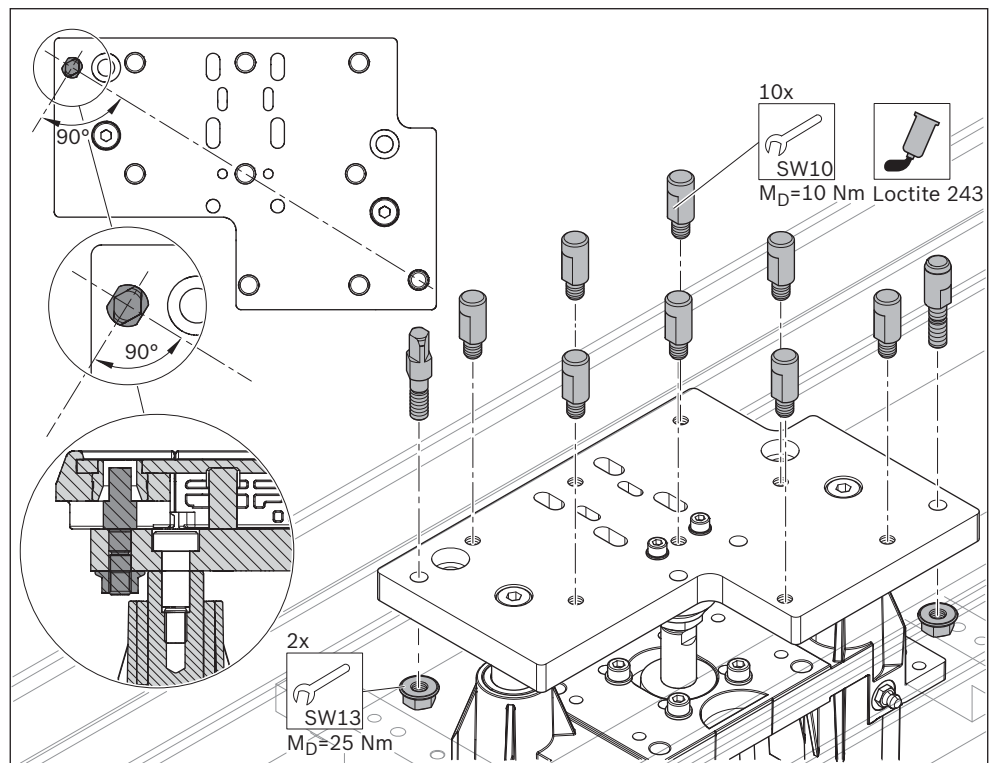


563 988-33

Fig. 35: HP 2/L; pressing in guide sockets variants

**Please note:**

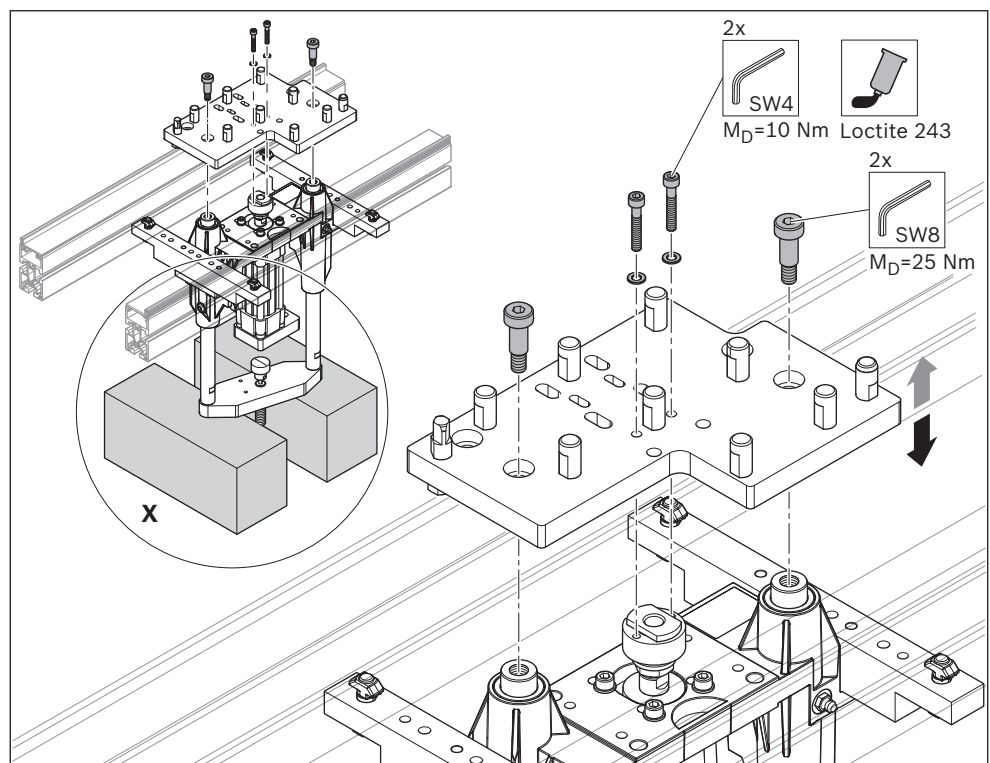
- The HP 2/L does not have to be removed from the section to replace the positioning pins/supporting bolts.
 - Always replace all positioning pins together.
 - Always replace all supporting bolts together.
- After replacing the positioning pins, check the stop gate setting (see chapter 7.6.3).

10.6.3 Replacing the positioning pins/supporting bolts

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Fig. 36: HP 2/L; replacing the positioning pins/supporting bolts**Please note:**

- The HP 2/L does not have to be removed from the section to replace the positioning plate.
 - Note the installation position of the positioning plate. With **HA = 1**, install the positioning plate offset by 40 mm (see chapter 10.6.5).
 - Support the HP 2/L base frame during replacement (detail X).
- After replacing the positioning plate, check the stop gate setting (see chapter 7.6.3).

10.6.4 Replacing the positioning plate

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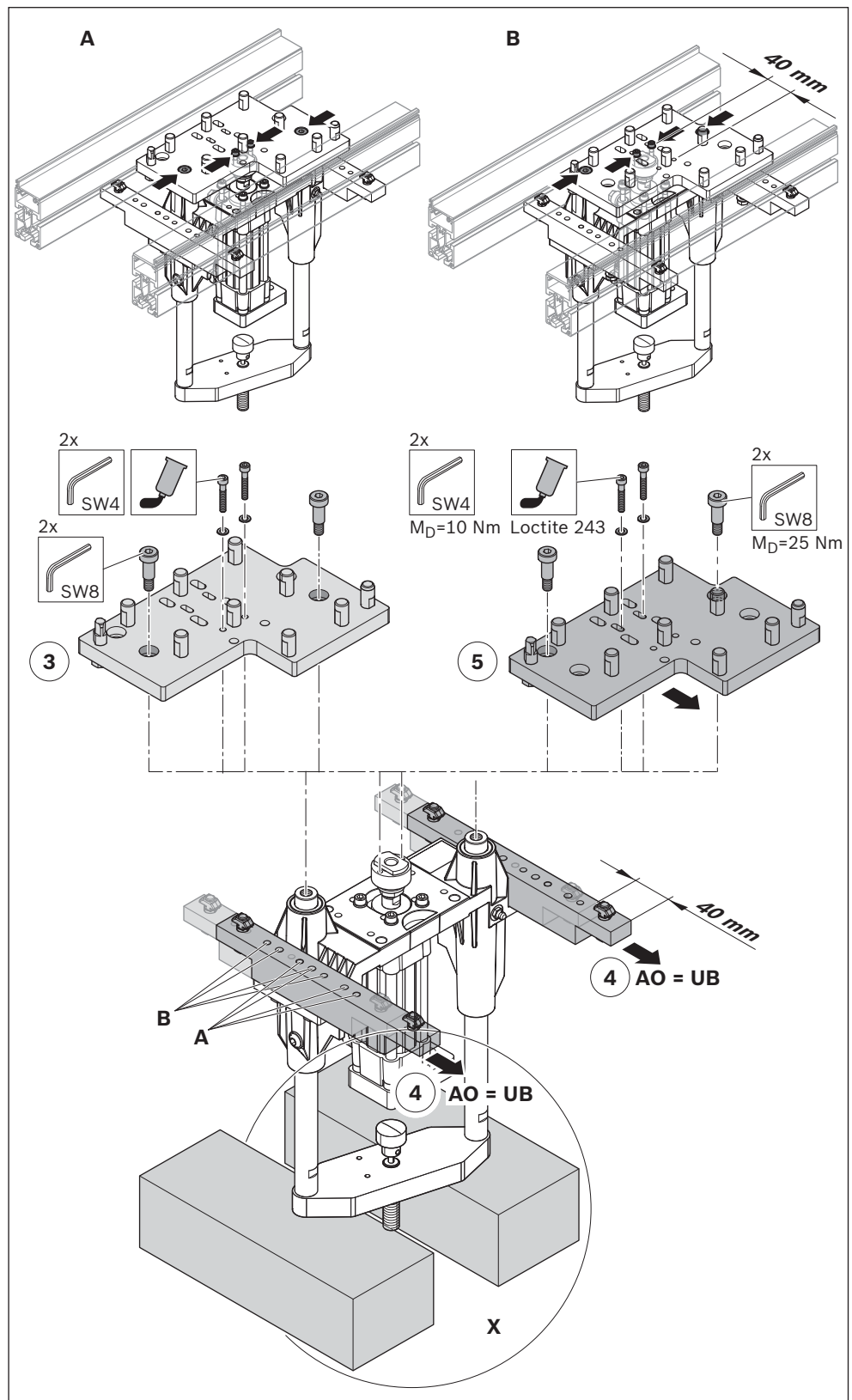
Fig. 37: HP 2/L; replacing the positioning plate

**Please note:**

- For installation on a table (AO = AT), the table top must be adjusted accordingly.
- For $b = 240$ mm WT center is clear.
- Support the base frame of the HP 2/L during conversion (detail X).

A: Central installation**B:** Off-center installation

1. Remove the protective case (see section 7.6.10).
 2. Remove the HP 2/L from the section/table (see chapter 7.6).
 3. Remove the positioning plate.
 4. **AO = UB:** Install the mounting plates offset.
AO = AT: Adjust the table top accordingly.
 5. Install the positioning plate offset (B).
- Re-adjust the HP 2/L after installation (see chapters 7.6.5 to 7.6.7).

**Fig. 38: HP 2/L; offset installation of the positioning plate**

10.7 Spare parts

For a list of spare parts, see spare parts list in MT*pro*, **3 842 539 057** (download: 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 unintentionally switched on again.

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 unintentionally switched on again.

Suspended loads may 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 60.
- 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.

16 Technical data

- For dimensions, see sales catalog TS 2*plus*
- Max. total weight of WT: HP 2 110 kg/HP 2/L 40 kg
- ESD: Yes
- 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
- Max. load capacity of floor: 1000 kg/m²
- At altitudes > 1400 m, the load values of the electric drives are reduced by 15 %.
- 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 ≤ 5 µm (Class 6 as per ISO 8573-1:2010)
 - Particle quantity ≤ 5 mg/m³ (Class 6 as per ISO 8573-1:2010)
- Humidity – water content
 - Pressure dew point ¹⁾ ≤ +3 °C (Class 4 as per ISO 8573-1:2010)
- ¹⁾ The pressure dew point should be at least 15 °C below the ambient temperature.
- Oil content:
 - Oil quantity ≤ 1 mg/m³ (Class 3 as per ISO 8573-1:2010)

17 Appendix

17.1 Trademark information

- SOMATEC® is a registered trademark of Mayer Christa, 88636 Illmensee, Germany
- DU® is a registered trademark of GGB Inc. Naples, Florida

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