The Drive & Control Company

Rexroth
Bosch Group

HD 2/H

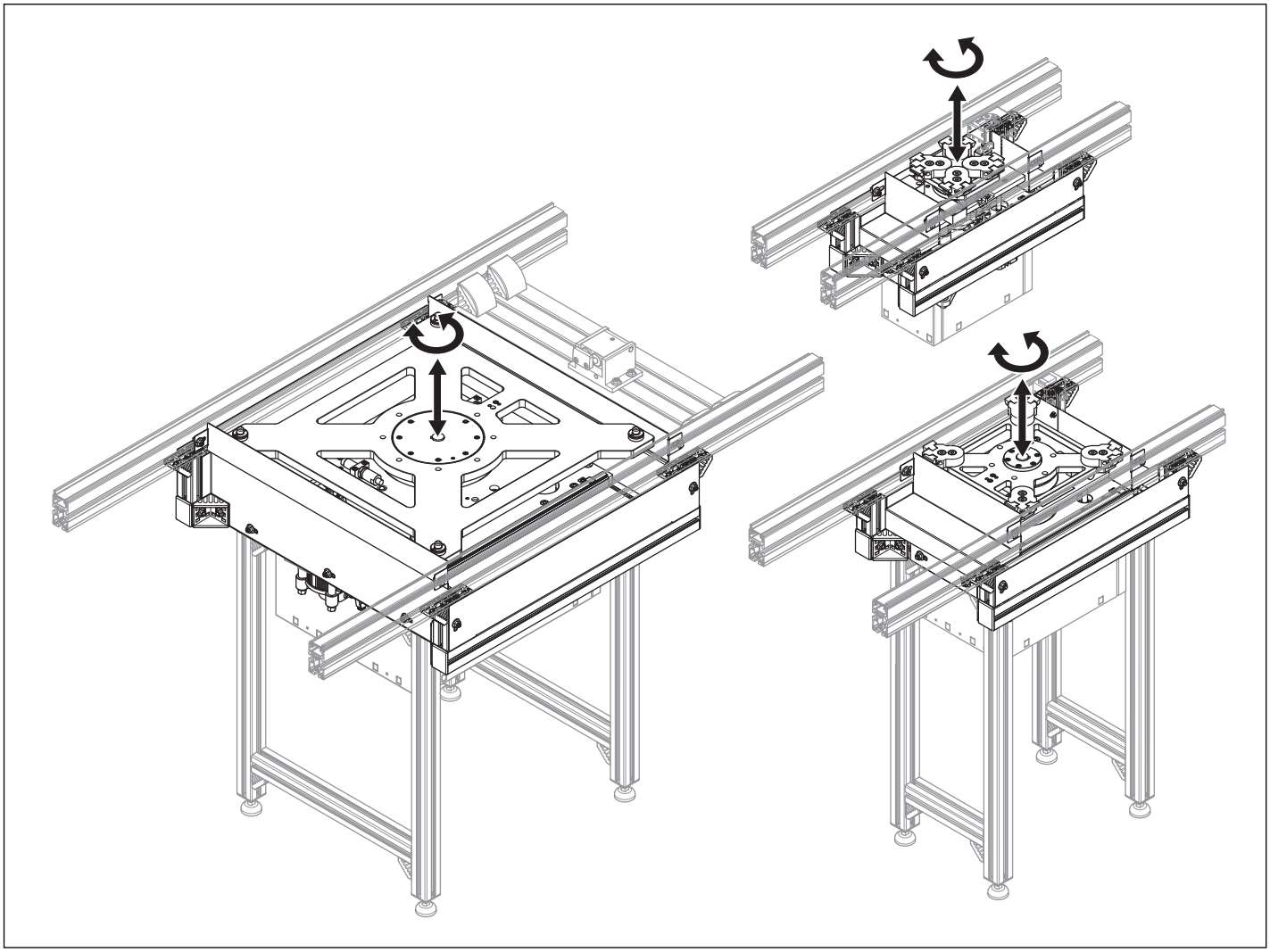
Lift-rotate unit

ENGLISH

3 842 998 760
3 842 998 761
3 842 998 762

Assembly instructions
3 842 358 796/2015-01

Replaces: –
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.

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

The original assembly instructions were generated in German.

DE Die vorliegende Montageanleitung ist in den hier angebenen Sprachen verfügbar. Weitere Sprachen auf Anfrage.
Als gedruckte Version (print) oder als PDF-Datei (media) zum Download aus dem Medienverzeichnis:
www.boschrexroth.com/medienverzeichnis
Geben Sie in die Suchmaske (oben rechts, unter „**Suche**“) **3 842 358 732** ein, dann klicken Sie auf „▶**Suche**“.

EN These assembly instructions are available in the languages indicated here. Other languages on request.
They come in a hard copy (print) or a PDF file (media) that can be downloaded at:
www.boschrexroth.com/mediadirectory
Enter **3 842 358 796** in the search mask (at the top right, under “**Search**”), then click “▶**Search**”.

FR Les présentes instructions de montage sont disponibles dans les langues spécifiées ici. Autres langues sur demande.
En version imprimée (print) ou en version PDF (media) téléchargeable sur le répertoire multimédia :
www.boschrexroth.com/mediadirectory
Saisissez **3 842 358 797** (en haut à droite, sous « **Search** »), puis cliquez sur « ▶**Search** ».

IT Le presenti istruzioni di montaggio sono disponibili nelle lingue seguenti. Altre lingue su richiesta.
Scaricabile come versione stampata (print) o come file PDF (media) dal Media Directory:
www.boschrexroth.com/mediadirectory
Digitare il codice **3 842 358 798** nel campo di ricerca “**Search**” (in alto a destra), quindi fare clic su “▶**Search**”.

ES Las presentes instrucciones de montaje están disponibles en los idiomas indicados. Hay más idiomas a petición.
Las instrucciones están disponibles como versión impresa (print) o como archivo PDF (media) para descargar del archivo de medios: **www.boschrexroth.com/mediadirectory**
En el buscador (en la parte superior derecha, donde pone "**Search**") introduzca **3 842 358 799**, a continuación haga clic en "▶**Search**".

PT-BR Este manual de montagem está disponível nos idiomas especificados aqui. Outros idiomas mediante pedido.
Como versão impressa (impressão) ou como arquivo PDF (mídia) para download do índice de mídias:
www.boschrexroth.com/mediadirectory
Entre na máscara de pesquisa (canto superior direito, em «**Search**») **3 842 358 806** e clique em «▶**Search**».

ZH 本安装说明书有这里给出的语言版本。有印刷版本 (print) 或者电子版 PDF 文件 (media) 供使用，电子版文件可在下列的公司网站媒体网页上下载: **www.boschrexroth.com/mediadirectory**
1. 在搜索窗口 (右上角，“**Search**”窗口) 内输入编号 **3 842 358 807**。2. 点击“▶**Search**”。

CS Tento návod k montáži je k dispozici ve zde uvedených jazycích. Jako tištěná verze (print) nebo jako soubor PDF (media) je ke stažení z adresáře médií: **www.boschrexroth.com/mediadirectory**
1. Zadejte do vyhledávací obrazovky (nahoře vpravo, pod „**Search**“) **MTCS 358 732**. 2. Klikněte na „▶**Search**“.

PL Dana instrukcja montażu jest dostpna w podanych tutaj językach. W postaci wydrukowanej lub w wersji pdf (media) do pobrania ze strony: **www.boschrexroth.com/mediadirectory**
1. Do wyszukiwarki wpisać (w prawym górnym rogu „**Search**“) **MTPL 358 732** . 2. KKliknać „▶**Search**“

3 842 358 732	print	media	LG 2/H Hub-Dreheinheit	DE Deutsch
3 842 358 796	print	media	LG 2/H Lift-rotate unit	EN English
3 842 358 797	print	media	LG 2/H Unité de levage et de rotation	FR Français
3 842 358 798	print	media	LG 2/H Unità di sollevamento e rotazione	IT Italiano
3 842 358 799	print	media	LG 2/H Unidad de tornado y elevación	ES Español
3 842 358 806	print	media	LG 2/H Unidade de rotação e elevação	PT Português
3 842 358 807	print	media	HD 2/H 升降旋转装置	ZH 中文
MTCS 358 732		media	HD 2/H Zvedací otočná jednotka	CS Česky
MTPL 358 732		media	HD 2/H Jednostka podnośnikowo-obrotowa	PL Polski

Contents

1 About this documentation

1.1 Validity of the documentation

This documentation applies to the following products:
- 3 842 998 760, Lift-rotate unit HD 2/H size 1
- 3 842 998 761, Lift-rotate unit HD 2/H size 2
- 3 842 998 762, Lift-rotate unit HD 2/H size 3

This manual is intended for engineers, operators, service engineers and system end users.
This document contains important information to install, transport, commission, operate, use, maintain, and dismantle the product safely and correctly and on simple troubleshooting.

▶ Read this manual completely, especially chapter 2 “Safety” and Chapter 3, “General notes for property damage and product damage” before working with the product.

1.2 Required and supplementary documentation

▶ Only operate when you are in possession of the documentation marked with the book symbol 🕮 and you have understood and observed this.

Table 1: Required and supplementary documentation

	Title	Document number	Document type
🕮	Safety-related information for staff	3 842 527 147	
	MT*parts*	3 842 529 770	Spare part list available on CD

1.3 Presentation of information

In order for you to work with your product quickly and safely using this documentation, safety symbols, terms and abbreviations are used in a uniform manner. These are explained in the following sections to help you understand them better.

1.3.1 Safety instructions

In this documentation, safety instructions are given in chapter 2.6 “Specific product precautions” and Chapter 3 “General notes on property and product damage”, and before a course of action or a required action, in which there is a risk of personal injury or property damage. The measures described to avoid these hazards must be observed.

Safety instructions are structured as follows:

⚠ SIGNAL WORD

Type and source of danger!
Consequences resulting from non-compliance
▶ Measures to prevent hazards
▶ ...

- **Warning sign:** draws attention to 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 resulting from non-compliance
- **Precaution:** explains how to avoid the hazard

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

Warning sign, signal word	Meaning
⚠ DANGER	Indicates a hazardous situation which will result in death or serious injury if not avoided.
⚠ WARNING	Indicates a hazardous situation which can result in death or serious injury if not avoided.
⚠ CAUTION	Indicates a hazardous situation which can result in minor or moderate injury if not avoided.
NOTICE	Damage to property: The product or the surrounding environment can be damaged.

1.3.2 Symbols

The following icons indicate information which is not relevant to safety, however, it makes the documentation easier to comprehend.

Table 3: Meaning of the icons

Icon	Meaning
	If this information is not observed, the product can not be optimally used or operated.
▶	Single, non-related actions
1. 2. 3.	Numbered instructions The numerals indicate that the actions are in chronological order.

1.3.3 Designations

In this documentation, the following designations are used:

Table 4: Designations

Designation	Meaning
HD 2/H	Lift-rotate unit from the Rexroth transfer system TS 2*plus*
WT 2	Workpiece carrier from the Rexroth transfer system TS 2*plus*
BG	Size

2 Safety instructions

2.1 About this chapter

The product was manufactured in accordance with generally accepted engineering standards. Nevertheless, there is a risk of personal injury and property damage if you do not observe this chapter and the safety instructions in this document.

- Read this manual thoroughly and completely before you start working with the product.
- Keep the documentation accessible to all users at all times.
- When passing on the product to a third party, make sure that it is always accompanied by the necessary documentation.

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 lifting and rotating Rexroth-workpiece carriers WT 2 from the conveyor section.
- Maximum load / line load: See technical data on page 51.
- For the environmental conditions see page 54.

The product is strictly intended for professional use and not for private use.
The intended use also implies that you have read and understood this documentation, especially chapter 2 “Safety”.

2.3 Improper use

Any other use than that which is described as the intended use is improper and not permitted.
Bosch Rexroth AG is not liable for damage resulting from improper use. The risks associated with improper use lie solely with the user.
The following also fall under the category of improper use:
- Transporting other transport materials than those which are specified.
- The use of the product without protective case or other protective guard on the premises.
- Operating the product in accumulation mode.

- The transport of persons on the product or the cargo.
- Persons climbing onto the product
  – the product is not accessible.
- Private use.

2.4 Personnel qualifications

The activities described in this documentation require basic knowledge of mechanical, electrical and pneumatic systems, as well as knowledge of the appropriate technical terms. Additional knowledge in dealing with a hoist and the associated slings are required for transport and handling of the product. In order to ensure safe use, these activities may only be carried out by authorized personnel or an instructed person under the supervision of a qualified person.
An expert is someone who can evaluate the work assigned to them due to their professional training, knowledge and experience as well as knowledge of the relevant provisions, recognize potential hazards and take appropriate safety measures. Qualified personnel must comply with the relevant technical regulations and have the necessary expertise.

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

2.5 General safety instructions

- Observe the current regulations for accident prevention and environmental protection.
- Observe the safety rules and regulations of the country in which the product is used / applied.
- Only use Rexroth products which are in technically perfect condition.
- Follow all instructions printed on the product.
- Persons who install, operate, disassemble or service Rexroth products may not be under the influence of alcohol, drugs or medications that affect their responsiveness.
- Use only original accessories and spare parts from Rexroth to prevent hazards to persons due to improper spare parts.
- Observe the ambient conditions specified in the product documentation and technical data.
- You may operate the product only when it was found that the final product (such as a machine or system), in which the Rexroth products are installed, is in accordance with the respective national provisions, safety regulations and the standards for the application.

2.6 Product-specific safety instructions

General
- You must not alter the product design principle or reconstruct it.
- Do not put the product unduly under mechanical strain under any circumstances. Never use the product as a handle or step. Do not place objects on it.
- The product must always be prevented from tipping over.

During transport
- Pay attention to the transport instructions on the packaging.

During installation
- Inspect the product for visible transport damage.
- Lay the cables and wires so that they are not damaged and no one can trip over them.
- Always switch the relevant system component to a pressure-free and tension-free state before installing the product or connecting or disconnecting plugs.
- Secure the component against reconnection.
- Before beginning, make sure that all gaskets and seals of the connectors are installed properly and are not damaged to prevent fluids and debris from entering the product.

During startup
- Allow the product to acclimatize for a few hours prior to first-time operation, otherwise condensation can form inside the housing.
- Make sure that all the electrical and pneumatic connections are assigned or closed.
- Check the security requirements according to DIN EN 619.
- Only start up a fully assembled product.
- Make sure that all pertinent product safety devices are on hand, properly installed and fully functional. You must not change the position of, circumvent or disable safety devices.
- Do not touch any moving parts.
- Inspect the product for malfunctioning.

While running
- Make sure that only authorized personnel
  - start, operate or modify the functional sequence in the context of the intended use of the product
  - or make adjustments to components or parts.
- Only allow persons authorized by the operator access to the direct operating zone of the system. This also applies to periods when the product is not in operation.
- Make sure that:
  - the access to EMERGENCY STOP devices is free from obstructions,
  - all feeding points, workplaces and passageways are kept clear.
- Do not use the EMERGENCY STOP devices for normal stopping action.
- Regularly check the correct operation of the EMERGENCY STOP devices.
- In the event of an error or other irregularities, after an EMERGENCY STOP turn the product off and secure it against restarting.
- Do not touch any moving parts.
- A resting system is not a safe system because stored energy can be released unintentionally or due to improper maintenance work.

EMERGENCY STOP, fault
- Start the system again after an EMERGENCY STOP or malfunctioning only after you have identified the cause of and have eliminated the fault.

During maintenance and repair
- Make sure that the access to maintenance and inspection points are free of obstacles.
- Perform the prescribed maintenance work at the intervals prescribed in chapter 10.3 Maintenance.
- Make sure that no lines, connections and components are loose while the system is under pressure and tension. Secure the system against restarting.

During disposal
- Dispose of the product in accordance with the national laws of your country.

2.7 Personal protective equipment

- Appropriate protective clothing is to be worn when handling the product (e.g. safety shoes, close-fitting clothing, a hair net for long, loose hair).
  As an operator or end user, you are responsible for wearing appropriate protective equipment when handling the product.
  All parts of your personal protective equipment must be intact.

2.8 Responsibilities of the end user

- Before first use or re-commissioning of a conveyor system, run a risk assessment in accordance with DIN EN ISO 12100.
- Please also refer to the further risks of the individual components (see chapter 8.2 “Further risks” on page 36).
- Before initial commissioning ensure that there are no protruding or sharp-edged parts that may endanger personnel working or moving in the area.
- Provide safety-related instructions to the operating personnel before first use or re-commissioning, and then in regular intervals.

3 General information regarding damage to property and the product

The warranty only applies to the delivered configuration.
- The warranty is void in case of faulty installation, commissioning and operation, as well as improper use and / or improper handling.

While cleaning
- Avoid the penetration of detergent into the system.
- Never use solvents or aggressive cleaning agents.
- When cleaning, do not use high-pressure washers.

4 Delivery contents

The following is included in the delivery:
- 1 lift rotate unit HD 2/H
- Mounting material
- Pneumatic elements such as screw fittings, throttle check valves, etc
- 1 assembly instructions “HD 2/H, lift rotate unit”

The protective case kit is not part of the delivery and must be ordered separately.

4.1 Delivery state

- Lift rotate unit HD 2/H manufacturer-assembled.

5 About this product

5.1 Performance description

Please note:
- Only 180° horizontal rotation for non-square workpiece carriers.
- With sizes 1 and 2, angle of rotation 90°, the reverse rotation of the rotary table is performed below the belt section.
- With size 3, angle of rotation 90°, the reverse rotation of the rotary table is performed above the belt section.

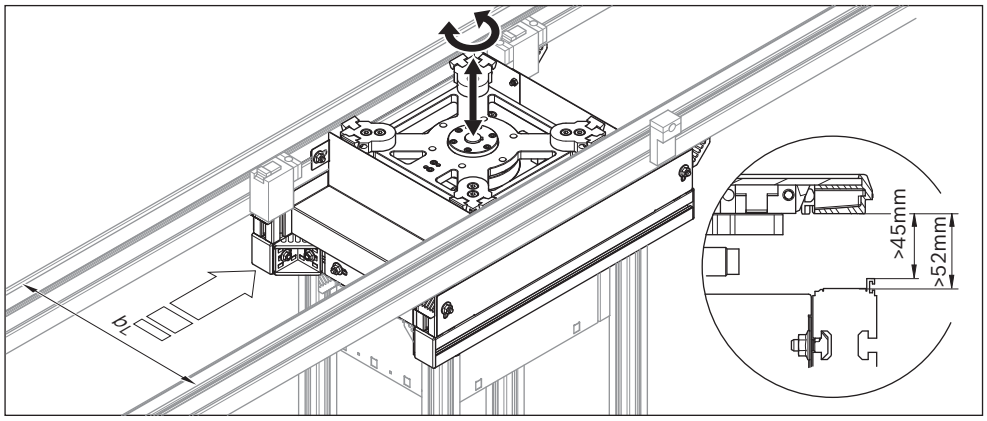


Fig. 1: Lift rotate unit HD 2/H performance description

5.1.1 Lift rotate unit HD 2/H use

- Installation in conveyor belt BS 2... or conveyor section ST 2...
- Lifting and rotating (90° / 180°) workpiece carriers WT2 from the conveyor section (> 45 mm via conveyor level, see Fig. 1, detail X).

5.1.2 Lift rotate unit HD 2/H design

- Extremely compact construction Suitable for limited installation space.
- Pneumatic drive

5.2 Product description

Please note:
- Only 180° horizontal rotation for non-square workpiece carriers.
- With sizes 1 and 2, angle of rotation 90°, the reverse rotation of the rotary table is performed below the belt section.

A: Lift rotate unit HD 2/H size 1 For possible workpiece carrier sizes see Page 15.
A1: Protective case kit (not included in the delivery)
D: Rotary table
E: Lifting plate
F: Base plate
G Threaded hole position query rotation position
H Damper
I Mounting frame

*)
w = Width in conveyor direction
l_T = Length in conveyor direction

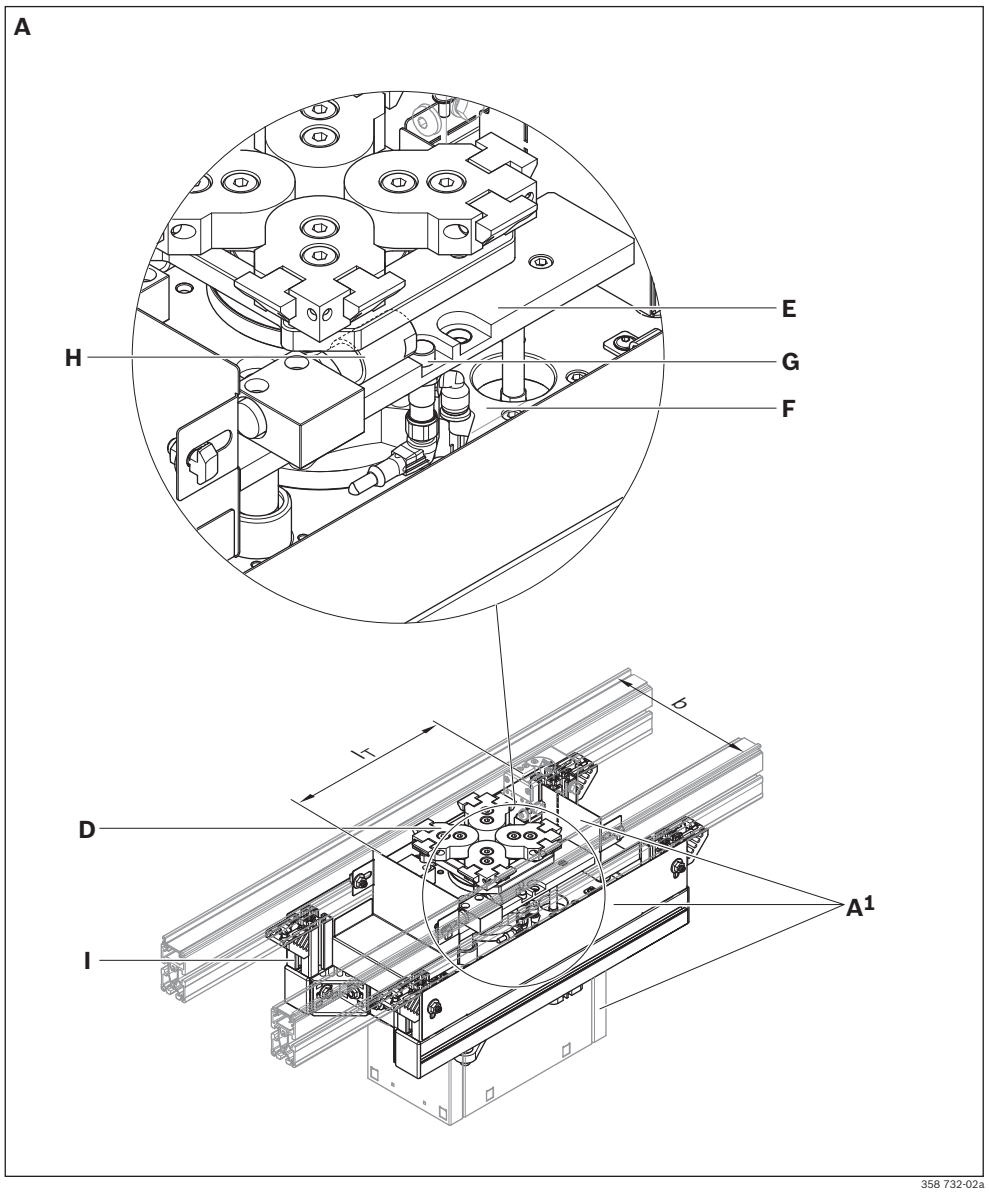


Fig. 2: Lift rotate unit HD 2/H size 1

Please note:
- Only 180° horizontal rotation for non-square workpiece carriers.
- With sizes 1 and 2, angle of rotation 90°, the reverse rotation of the rotary table is performed below the belt section.

B: Lift rotate unit HD 2/H size 2 For possible workpiece carrier sizes see Page 15.
B[1]: Protective case kit (not included in the delivery)
D: Rotary table
E: Lifting plate
F: Base plate
G Threaded hole position query rotation position
H Damper
I Mounting frame
J Additional support with loads of > 50 kg (not included in the delivery)

*)
w = Width in conveyor direction
l_T = Length in conveyor direction

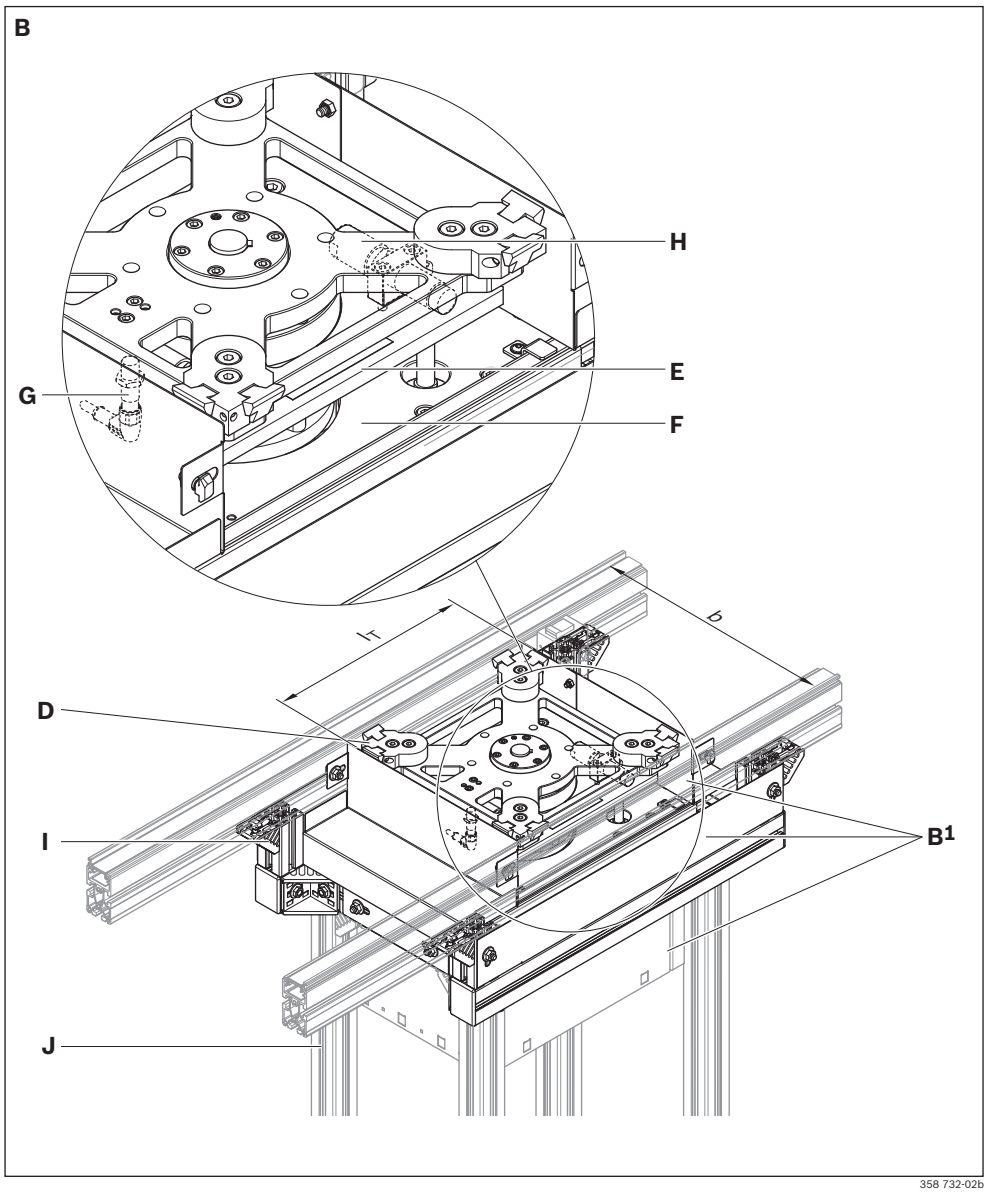


Fig. 3: Lift rotate unit HD 2/H size 2

ENGLISH

Please note:

- Only 180° horizontal rotation for non-square workpiece carriers.
- With size 3, angle of rotation 90°, the reverse rotation of the rotary table is performed above the belt section.

C: Lift rotate unit HD 2/H size 3 For possible workpiece carrier sizes see Page 15.

C1: Protective case kit (not included in the delivery)

D: Rotary table

E: Lifting plate

F: Base plate

G Threaded hole position query rotation position

H Damper

I Mounting frame

J Additional support is absolutely necessary.

*)
w = Width in conveyor direction
l_T = Length in conveyor direction

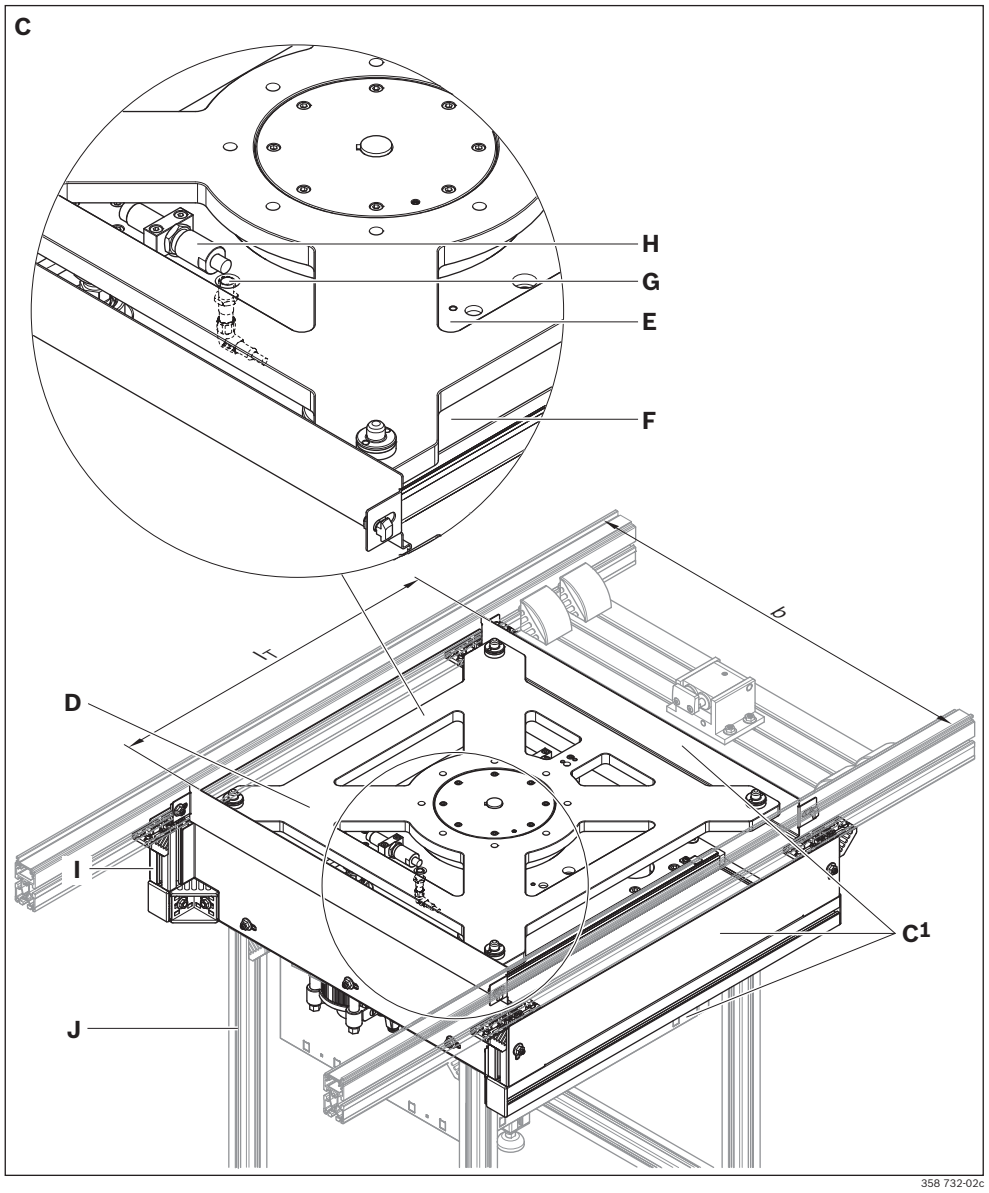
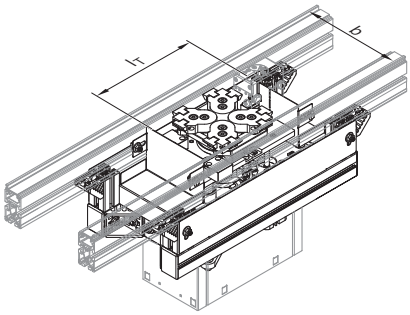
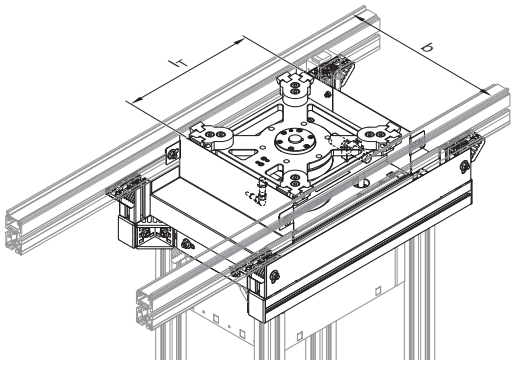
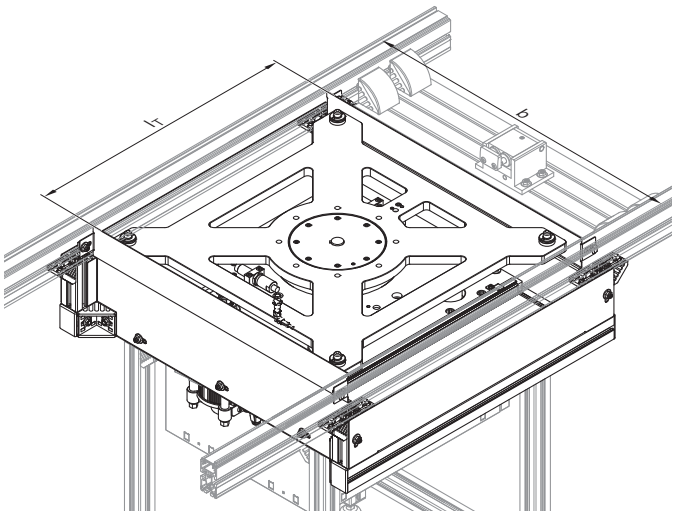


Fig. 4: Lift rotate unit HD 2/H size 3

Table 5: Possible workpiece carrier sizes for size ...

Size HD 2/H	Applicable work-piece carrier	Width in conveyor direction w [mm]	Length in conveyor direction l_t [mm]
Size 1 **3 842 998 760**  Load up to 50 kg *	WT 2 WT 2/F	240	240
			320
			400
		320	240
			320
			400
			480
		400	320
Size 2 **3 842 998 761**  Load up to 128 kg * Additional support with loads of > 50 kg (not included in delivery).	WT 2 WT 2/F	400	400
			480
		480	400
			480
			640
			800
		640	480
			640
			800
			1040
		800	640
Size 3 **3 842 998 762**  Load up to 240 kg * Additional support is absolutely necessary.	WT 2/H WT 2/F-H	800	800
			1040
		1040	800
			1040
			1200
		1200	1200

*The maximum conveyor belt line load is to be observed (see chapter 16 “Technical data” on page 51)

ENGLISH

5.3 Identification of the product

A: Part number
Order number
B: Designation
C: Design and dimensions

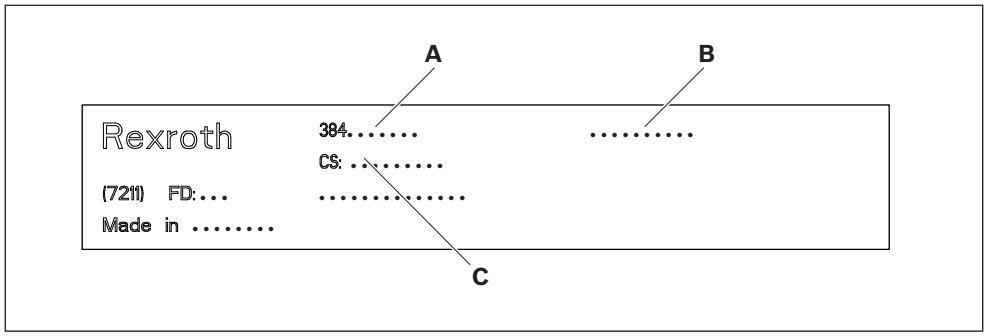


Fig. 5: Name plate

6 Transportation and storage

- Pay attention to the transport instructions on the packaging.
- Shipping weight: see delivery documents.
- The product must always be prevented from tipping over!
- The ambient conditions must be controlled when storing and transporting; see page 54.

6.1 Transporting the product

⚠ WARNING

Raised loads can fall down!
Serious injury (or death) can occur if the product falls down.
- ▶ Use only slings with sufficiently high load capacity (for product weight see shipping documents).
- ▶ Check if the carrying straps are attached properly before lifting the product!
- ▶ The product must always be prevented from tipping over when lifting!
- ▶ During raising and lowering pay attention that nobody other than the operator is in the danger zone!

6.2 Storing the product

- Only set the product down onto a level surface.
- Protect the product from mechanical influences.
- Protect the product from environmental influences such as dirt and moisture.
- Pay attention to the ambient conditions, see page 54.
- Support the product so that hanging-mounted engines/actuators/cylinders will not be burdened.

7 Installation

7.1 Unpacking the product

▶ Lift the product from its packaging.

Use a lifting aid to lift the product. For example, the eye bolts (X) in the base plate serve as lifting points for a round sling (see e.g. Fig. 6 on page 19)

▶ Dispose of the packaging material in accordance with the national laws of your country.

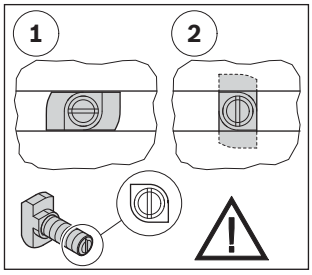
7.2 Installation conditions

▶ During installation the ambient conditions specified in the technical data (see page 54) must be maintained.

7.2.1 Installation position

▶ Install the product at right angles and parallel to the axis. This ensures proper functioning and prevents premature wear and tear.

7.2.2 Fixing with T-head bolts



- Mount the transfer systems TS 1, TS 2*plus*, TS 2*pv*, TS 4*plus*, TS 5 and the chain conveyor systems VarioFlow and VarioFlow S with T-head bolt and collar nut.
- When inserting and tightening, make sure the T-head is in the correct position in the collar nut. The notch at the end of the screw indicates the position of the T-head.

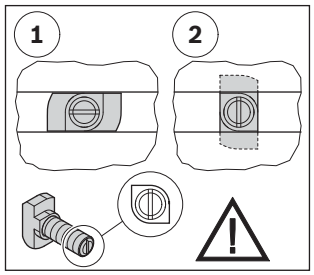
▶ 1 = insertion position of the T-head bolt into the slot
▶ 2 = clamping position of the T-head bolt into the nut
▶ Tightening torque 25 Nm (M8).

7.3 Required tools

- Hex head cap screw SW14
- Hex socket head cap screw SW3, SW4, SW5, SW6.
- Cross recess screwdriver PZ2
- Rubber mallet
- Spirit level

7.4 Symbols used

Table 6: Symbols used

	Connection with T-head bolt and collar nut. When inserting and tightening, make sure the T-head is in the correct position in the collar nut. The notch at the end of the screw indicates the position of the T-head. 1 = insertion position of the T-head bolt into the nut 2 = clamping position of the T-head bolt into the nut Tightening torque 25 Nm
 M_D = 20Nm	Hex key SW = screw width ... mm M_D = necessary tightening torque ... Nm
 M_D = 8Nm	Hex socket head cap screw key SW = screw width ... mm M_D = necessary tightening torque ... Nm
 	Screwdrivers for cross-head screws PZ ... = Pozidriv screwdriver, size ... PZ ... = Phillips screwdriver, size ...
   ISO-FLEX TOPAS NCA 52 Klüber Struktovis GHD	Lubricate / Lubricate with specific grease: • ISO-FLEX TOPAS NCA 52: www.klueber.com • Klüber Struktovis GHD: www.klueber.com
  Loctite 243 Loctite 601	Secure the screws with: • Loctite 243: medium strength (detachable), www.loctite.de • Loctite 601: high-strength screw retention (non-detachable), www.loctite.de
	The marked parts are not required for the assembly described. Dispose of the parts or use them for other purposes.
1 2 3	Graphical depiction of assembly sequence. The numbers correspond to the sequence of assembly, in accordance with the instructions of the accompanying text.
A B C X	Graphical depiction of components. The letters denote the components mentioned in the accompanying text.
	Detail view from a different direction, for example, on the back or bottom of the product.

7.5 Installing the product

NOTICE

Incomplete or incorrect installation can lead to property damage

The product can be damaged; the service life may be adversely affected.

- With size 3 ensure that the additional supports are installed (mandatory).

7.5.1 Install lift rotate unit HD 2/H size 1 in section ST 2

Please note:
Because of its low weight, size 1 can be installed into the section profile directly from below without dismantling.

1. Mark the installation position of HD 2/H.
2. Install the T-head bolts.
3. Install the lift rotate unit HD 2/H to the section profile from below

Please note:
Use a lifting aid to lift the product. For example, the eye bolts (X) in the base plate serve as lifting points for a round sling (see Fig. 6)

4. Insert the T-bolts into the section profile.
5. Hand tighten the collar nuts

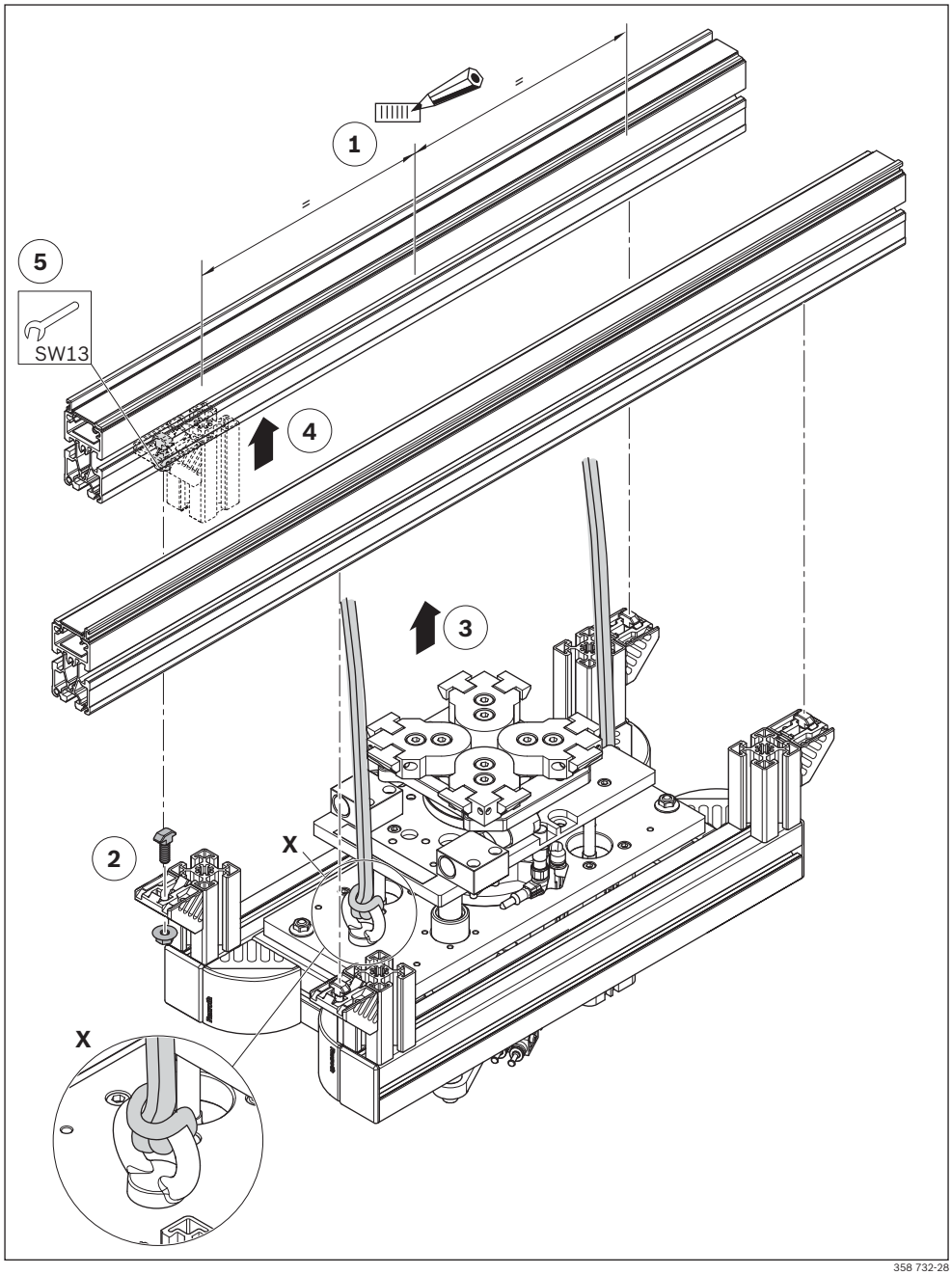


Fig. 6: Install lift rotate unit HD 2/H size 1 in section ST 2 (example shown here size 1 180°)

6. Adjust the position of the base plate between the conveyor sections.
7. Tighten down the collar nuts.
8. Remove the eye bolts

Please note:
Optionally, size 1 can be installed as described in chapter 1.1.9 on page 21.

NOTICE

Improper adjustment can result in property damage
The product can be damaged; the service life may be adversely affected.

- During commissioning the angle of rotation must be checked and precisely set Not performing this work may result in the lift rotate unit being damaged or cause premature wear. See chapter 8.4 “Check and adjust the rotation angle of the lift rotate unit” on page 37.

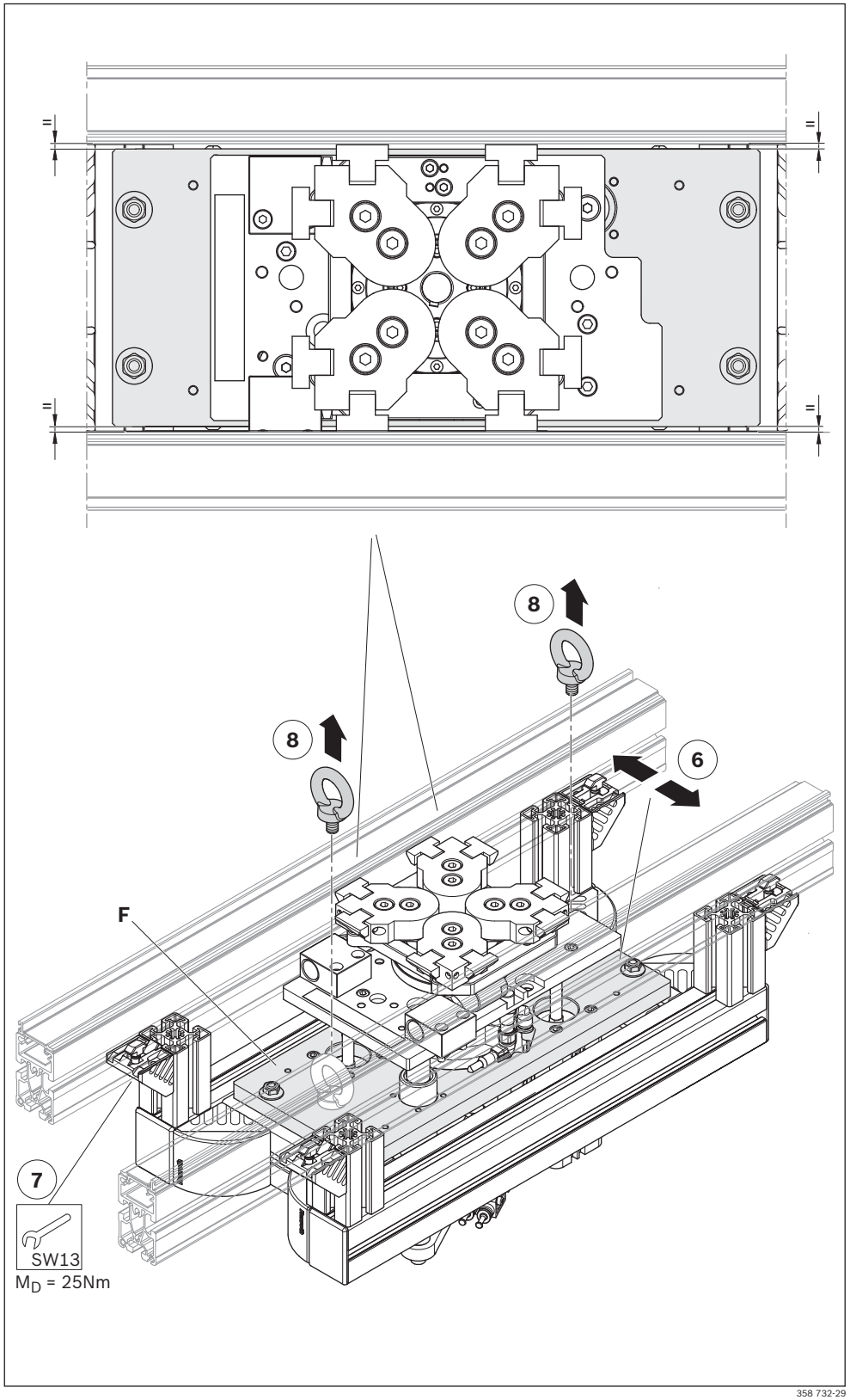


Fig. 7: Adjust lift rotate unit HD 2/H size 1 in section ST 2 (example shown here size 1 180°)

7.5.2 Install lift rotate unit HD 2/H size 2 and size 3 in section ST 2

Please note:
Due to their heavy weight, it is recommended that sizes 2 and 3 are disassembled before installing in the section profile. This enables the mounting frame of the HD 2/H to be installed from below and the HD 2/H to be added from above.

1. Mark the position of the lift rotate unit on the mounting frame.
2. Remove the lift rotate unit from the mounting frame.

Please note:
Use a lifting aid to lift the product. For example, the ring bolts (X) in the base plate serve as lifting points for a round sling (see Fig. 8)

3. Mark the installation position of HD 2/H.
4. Install the T-head bolts.
5. Insert the T-bolts into the section profile.
6. Hand tighten the collar nuts

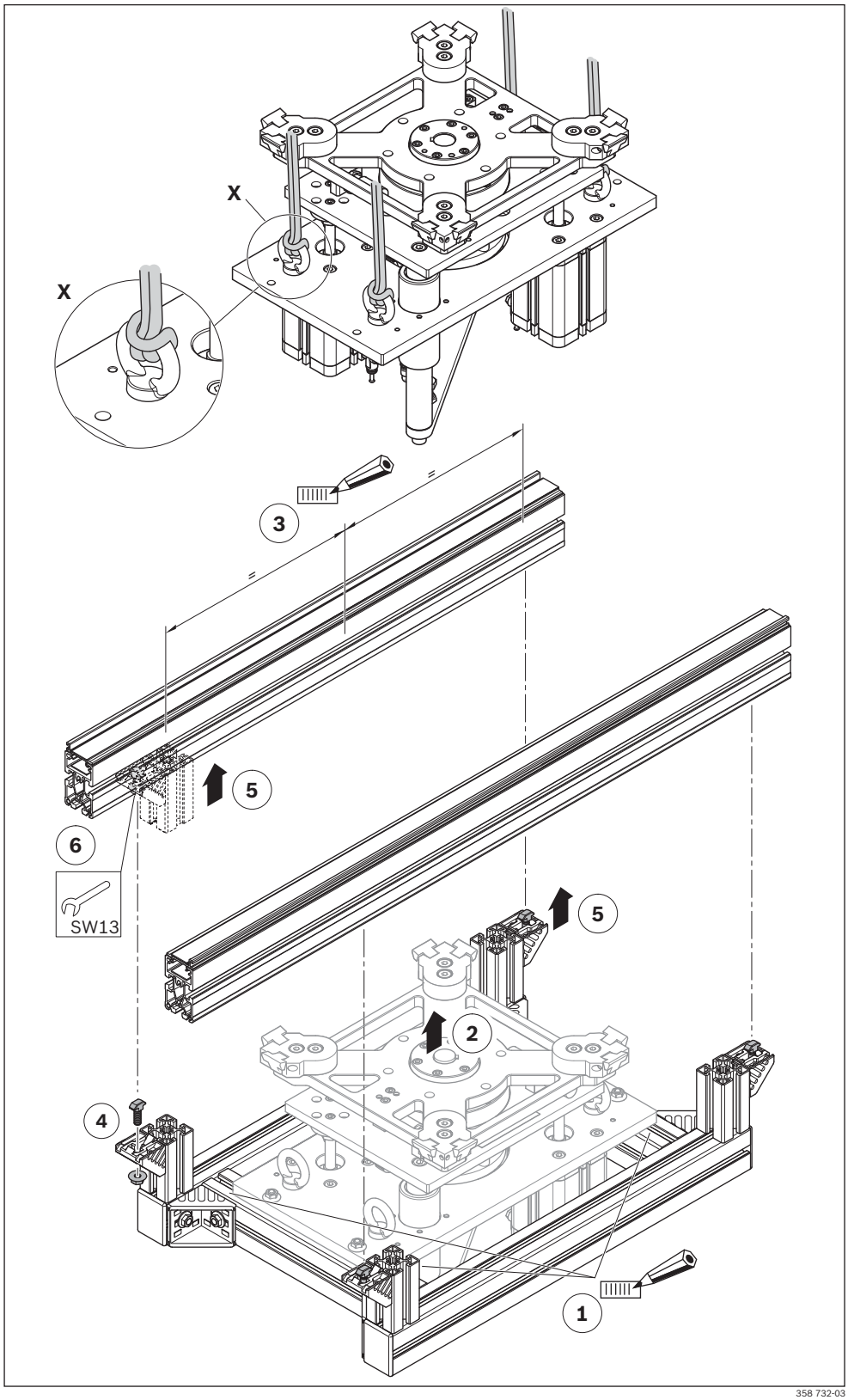


Fig. 8: Install lift rotate unit HD 2/H size 2 and 3 in section ST 2 (example shown here size 2 180°)

7. Install the HD 2/H on the mounting frame from above (observe the markings).
8. Adjust the position of the base plate between the conveyor sections.
9. Tighten down the collar nuts.
10. Remove the eye bolts
11. With size 3 ensure that the additional supports are installed (mandatory).
    For size 2 with loads of > 50 kg.
    For **size 2**:
    3 842 993 324
    For **size 3**:
    3 842 993 325

NOTICE

Improper adjustment can result in property damage

The product can be damaged; the service life may be adversely affected.

- ▶ During commissioning the angle of rotation must be checked and precisely set Not performing this work may result in the lift rotate unit being damaged or cause premature wear. See chapter 8.4 “Check and adjust the rotation angle of the lift rotate unit” on page 37.

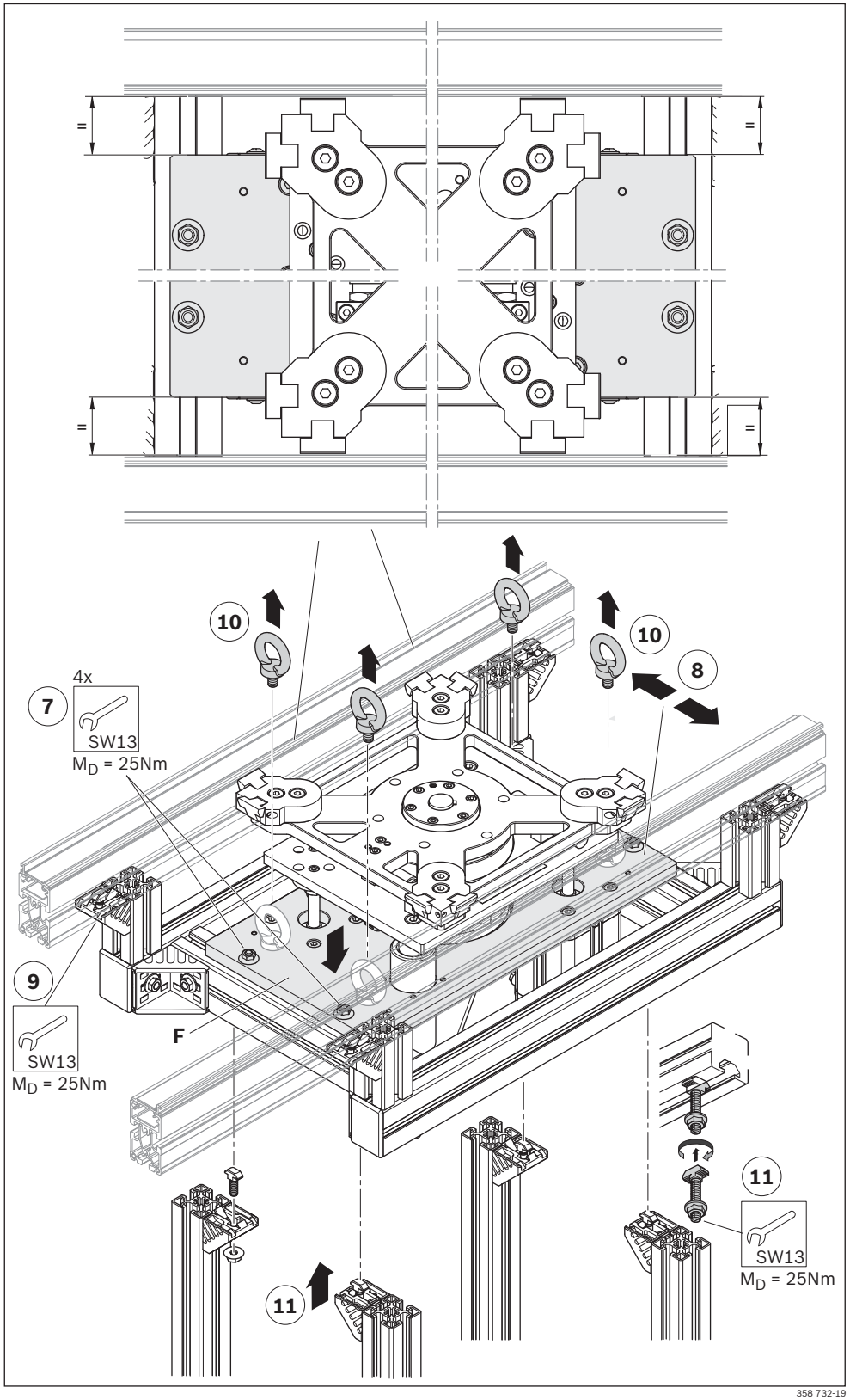


Fig. 9: Adjust lift rotate unit HD 2/H size 2 and 3 in section ST 2 (example shown here size 2 180°)

7.5.3 Install the additional supports

Please note:
- With size 3 ensure that the additional supports are installed (mandatory).
- For size 2 with loads of > 50 kg.

1. Pre-install the lock nuts.
2. Lubricate the threaded spindle.
3. Install the plates.
4. Screw in the articulated feet with a screwdriver.
5. Mount the remaining parts of the support.

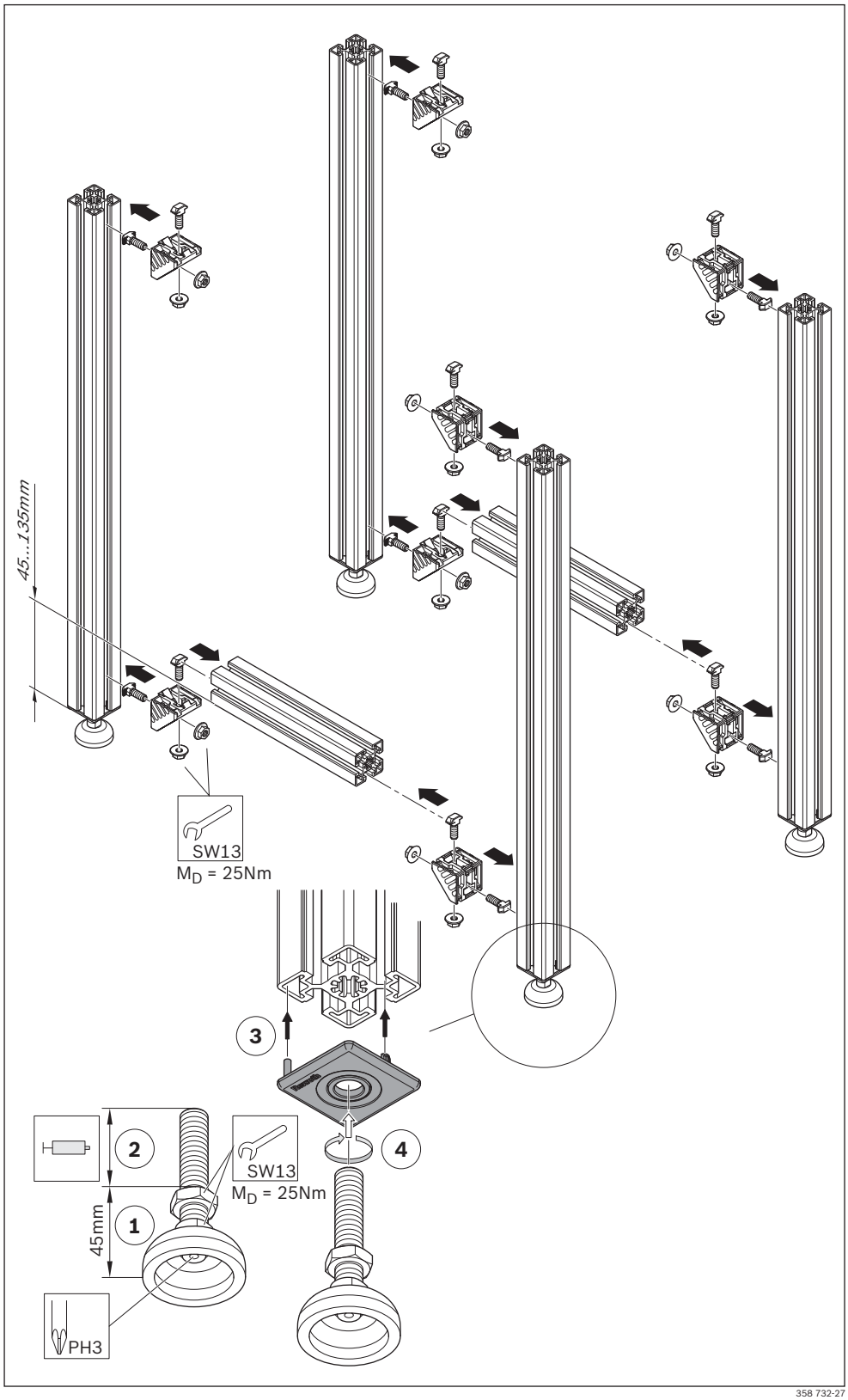


Fig. 10: Install the additional supports

7.5.4 Install position query for vertical lift and horizontal rotation

Required accessories

- Cylinder switch ST6-PN-M12R-030 SENSOR, **0 830 100 433**.
- Proximity switch short IEC/EN 60947-5-2-2004, **3 842 549 811**.

1. Mount the cylinder switch (A) to the cylinder profile.

Please note:

- For sizes 1/2/3 angle of rotation 180° and size 3 angle of rotation 90° two switches per cylinder.
- For sizes 1 and 2 angle of rotation 90° three switches per cylinder (multiple position cylinder).

2. Install 2 proximity switches (B) to the lifting plate.

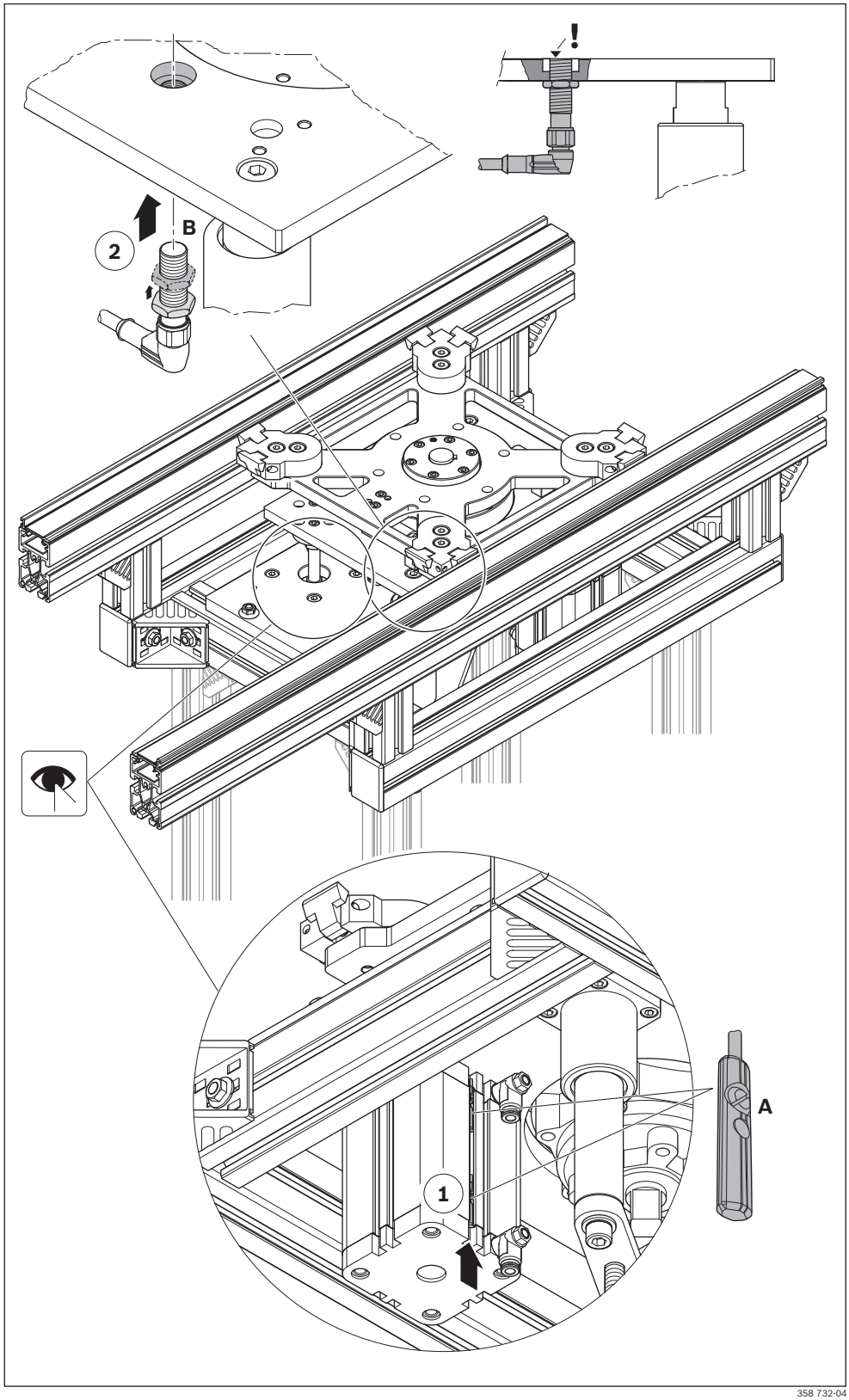


Fig. 11: Install position query for vertical lift and horizontal rotation (example shown here size 2 180°)

7.5.5 Install parts for WT 2 control (size 1/size 2)

Required accessories

- Separating stop VE 2, see catalog TS 2*plus*.
- Proximity switch IEC/EN 60947-5-2-2004, **3 842 537 995**.

1. Install the two separating stop (2 x VE 2) and the proximity switches (S 1, S 2, S 3) on the section profile.

Check functionality

1. Starting position: Pre-separating stop (A) open main separating stop (B) closed; lift rotate unit in the lower end position
2. S 1 actuated by passing WT2: VE (A) closes.
3. S 2 actuated by passing WT2: Cylinder moves to upper end position, WT2 is lifted.
4. Switch upper end position actuated: Rotation 90° or 180°.
5. Rotation end position reached: If required start operation.
6. If required, complete operation, external signal: Cylinder moves to lower end position, WT2 is raised.
7. Switch lower end position actuated: main separating stop (B) opens.
8. S 3 actuated by passing WT2: main separating stop (B) closes, pre-separating stop (A) opens (starting position).

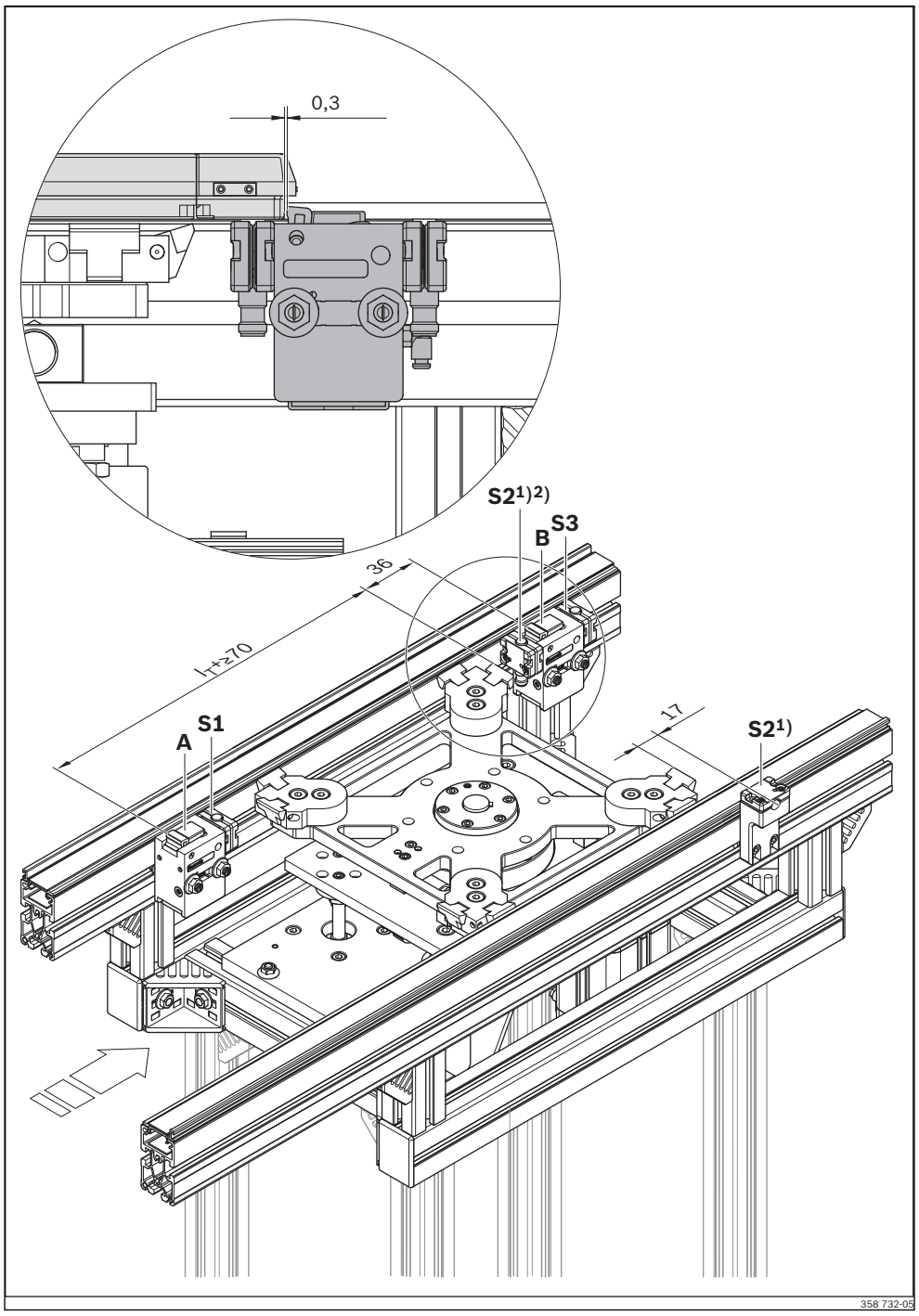


Fig. 12: Install separator stop and proximity switches (example shown here size 2 180°)

[1]) S2: Query of WT optionally either from below or from the side
[2]) S2: Query of WT from the side possible only on size 1, WT 240 mm x 240 mm

ENGLISH

7.5.6 Install parts for WT 2 control (size 3)

Required accessories

- Separating stop VE 2, see catalog TS 2*plus*.
- Proximity switch IEC/EN 60947-5-2-2004, **3 842 537 995**.

1. Install the two separating stop (2 x VE 2) and the proximity switches (S 1, S 2, S 3) on the section profile.

Check functionality

1. Starting position: Pre-separating stop (A) open main separating stop (B) closed; lift rotate unit in the lower end position
2. S 1 actuated by passing WT2: VE (A) closes.
3. S 2 actuated by passing WT2: Cylinder moves to upper end position, WT2 is lifted.
4. Switch upper end position actuated: Rotation 90° or 180°.
5. Rotation end position reached: If required start operation.
6. If required, complete operation, external signal: Cylinder moves to lower end position, WT2 is raised.
7. Switch lower end position actuated: main separating stop (B) opens.
8. S 3 actuated by passing WT2: main separating stop (B) closes, pre-separating stop (A) opens (starting position).

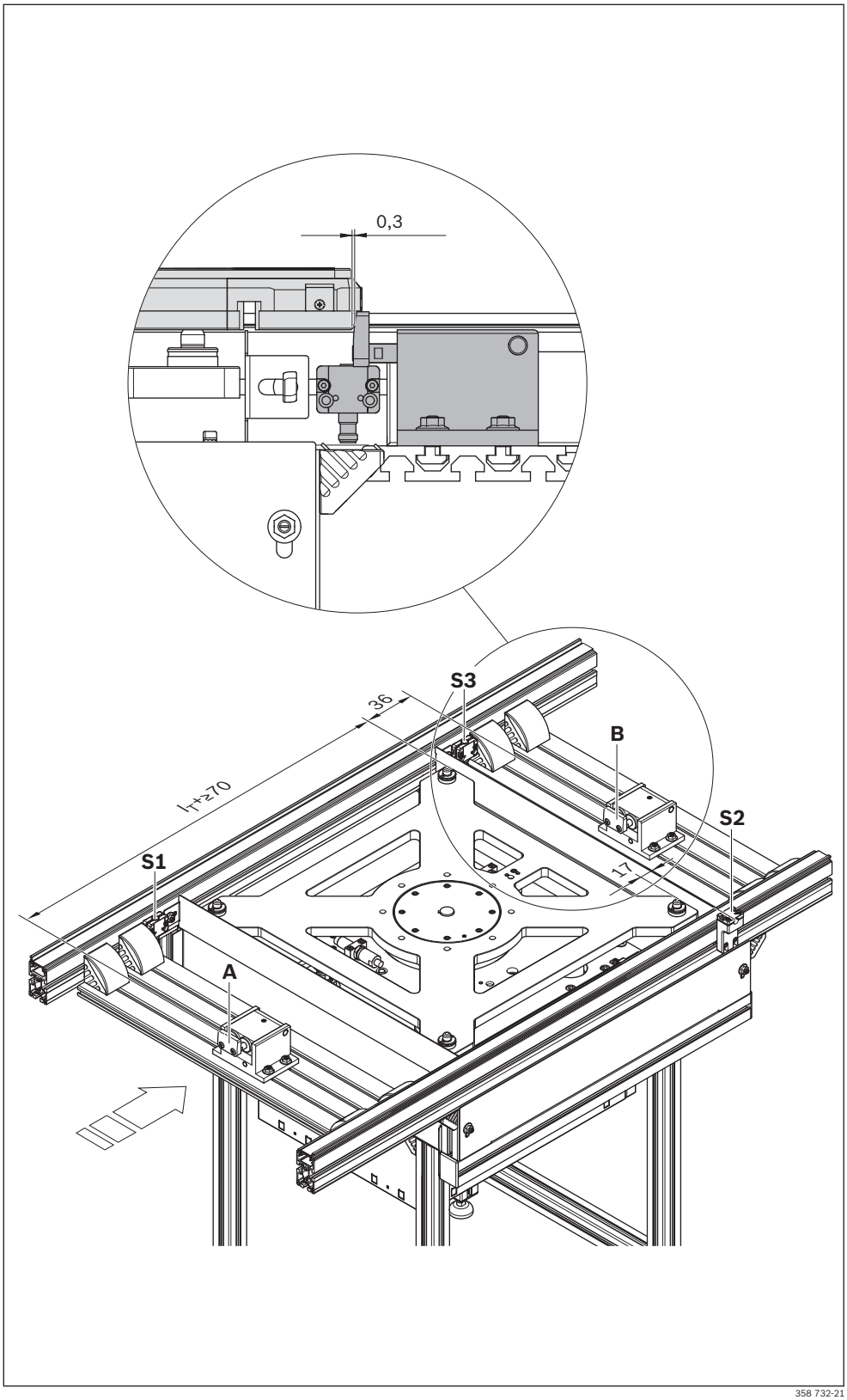


Fig. 13: Install separator stop and proximity switches (example shown here size 3 180°)

7.5.7 Install protective case set (example size 2 180°)

Please note:
Please also perform all necessary holes / recesses before locking the side walls (permanent connection).

1. If present, remove the protective film from the sheet metal.
2. Install the edge protection pieces in the cable recess.
3. Install the side walls (B) in the base (A).
   The side walls connect with an audible click.
4. Install the covers with the inspection openings (C).

Please note:
The requirements of the Machinery Directive 2006/42 / EC on captive screws are only fulfilled if the locking wasters (X, 3842542330) are fitted on the inspection openings.

5. Install the fixing bracket (D)

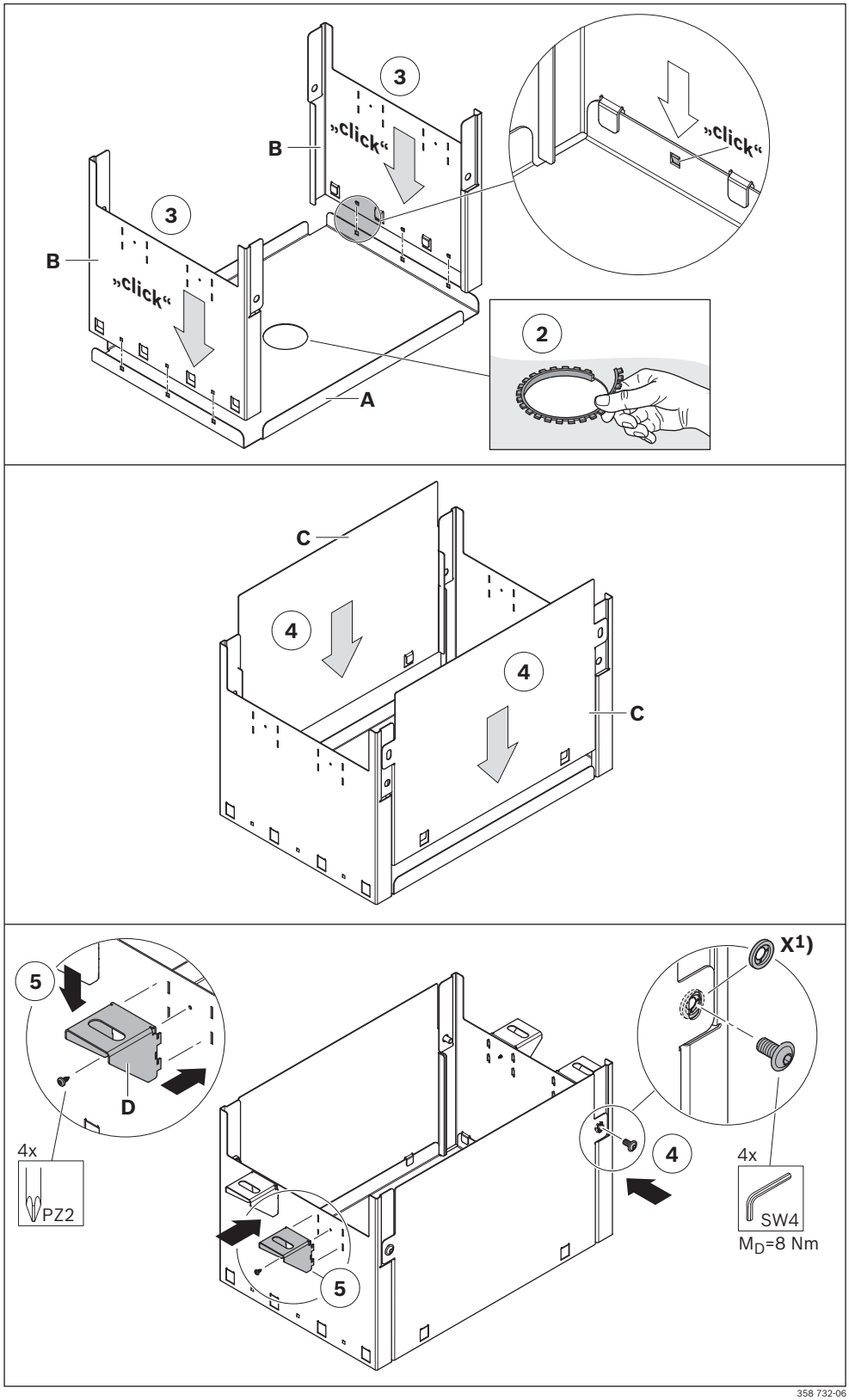


Fig. 14: Pre-install protective case (example shown here size 2 180°)

6. Insert the connecting cable through the opening in the base of the protective case.
7. Slide the protective case over the HD 2/H from below.
   Screw the protective case to the mounting frame.

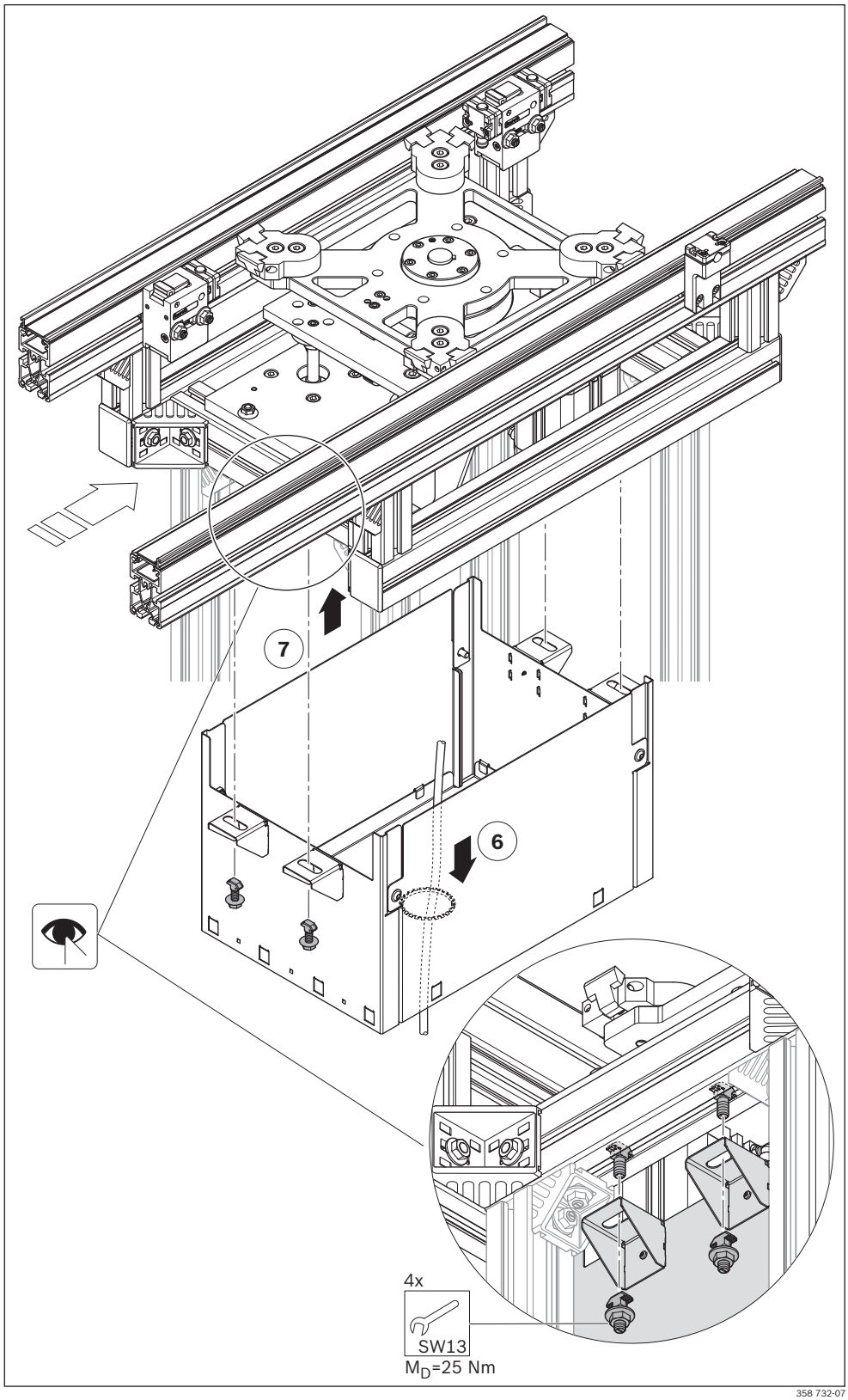


Fig. 15: Install protective case (example shown here size 2 180°)

8. Install the side protective sheets

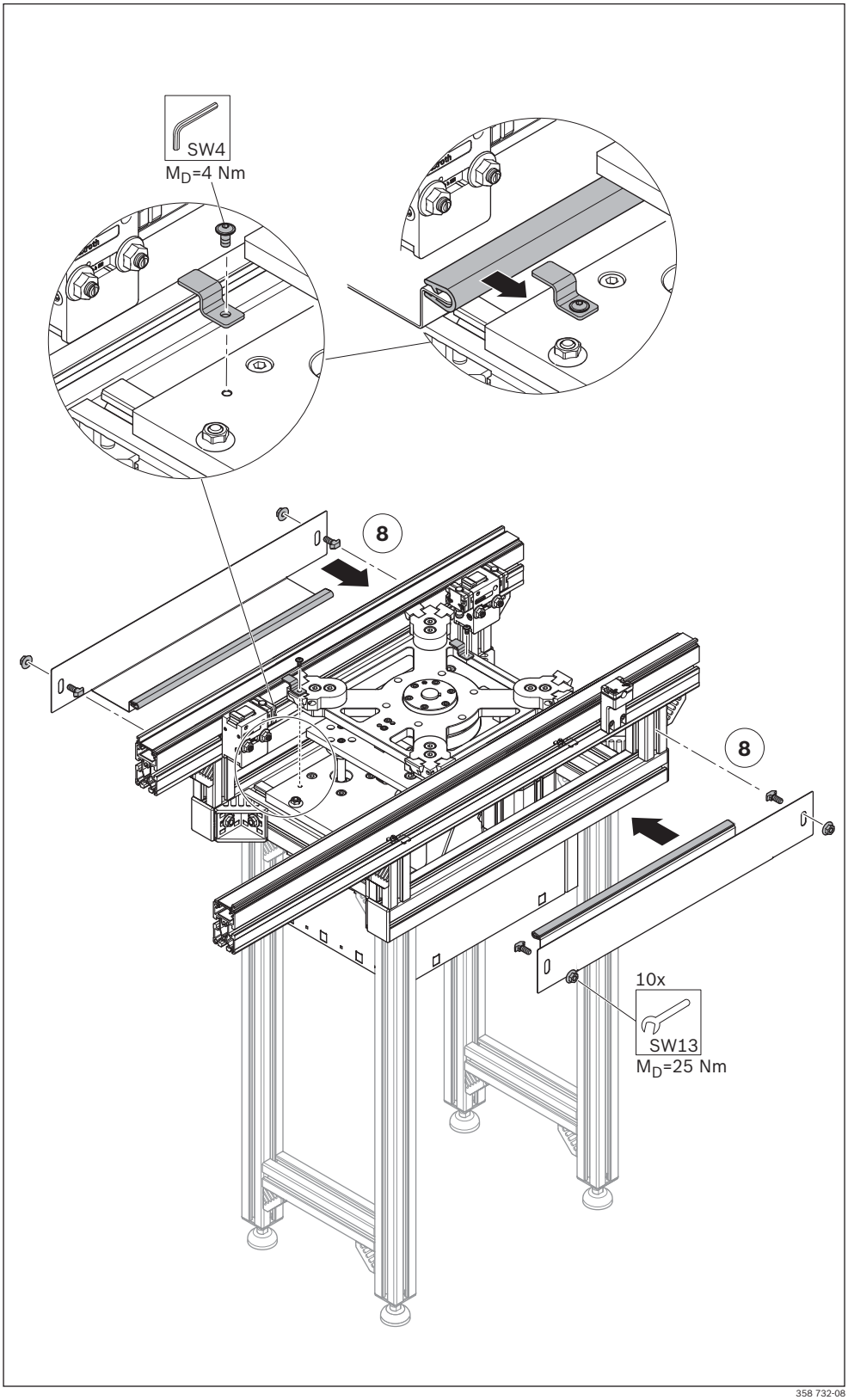


Fig. 16: Install front protective covers (example shown here size 2 180°)

9. Install the front protective sheets

Please note: Depending on the configuration of the workpiece carrier and the separating stops used, it may be necessary to separate the protection sheets at the perforation (X, Y) (saw).

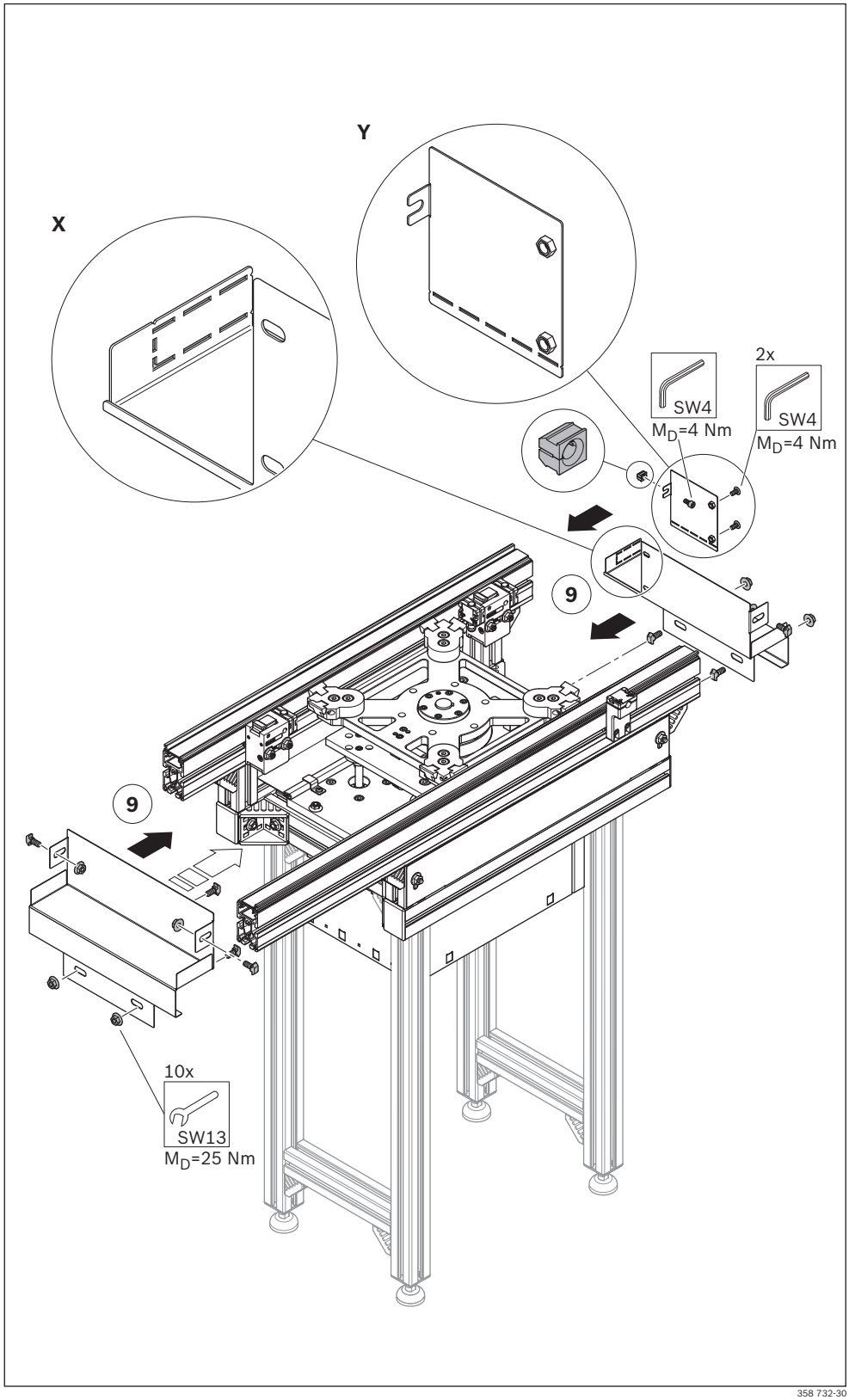


Fig. 17: Install side protective covers (example shown here size 2 180°)

7.5.8 Make the pneumatic connection to the product

⚠ WARNING

High pneumatic pressure!

Risk of serious injury and even death.

- ▶ Deactivate the compressed air supply to the relevant system component before making the pneumatic connection to the product, installing, or disassembling it.
- ▶ Secure the system against unintentional restarting.

⚠ CAUTION

Unintentional rapid rotational movements, falling objects

- ▶ Risk of injury caused by unintentional rapid rotational movements and falling objects.
- ▶ Make sure that the rotating cylinder is in its original position and under pressure (exhaust air) before commissioning/re-commissioning and in particular before each restart of the system after shutdown, malfunction, breaks, shift changes or rest periods.

• For the specification of the compressed air and the operating pressure, see page 54.

- ▶ Remove the covers of the inspection openings (C) and connect the HD 2/H to the compressed air supply.

1. Loosen the screws
2. Pull the cover upwards
3. Remove the cover (C).

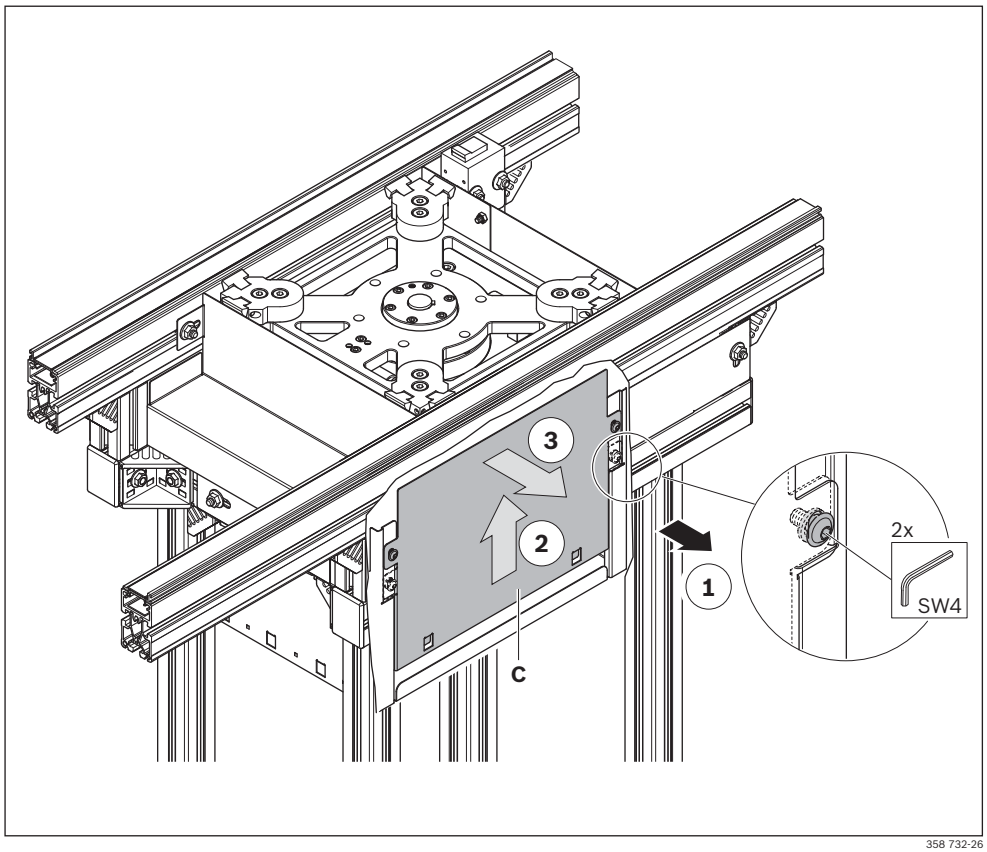


Fig. 18: Open inspection openings

Use the pneumatic diagram
- **A**, rotating cylinder for size1/2/3, rotation angle 90° and 180°.
- **B**, lifting cylinder for sizes 1/2, rotation angle 90° (multiple position cylinder).

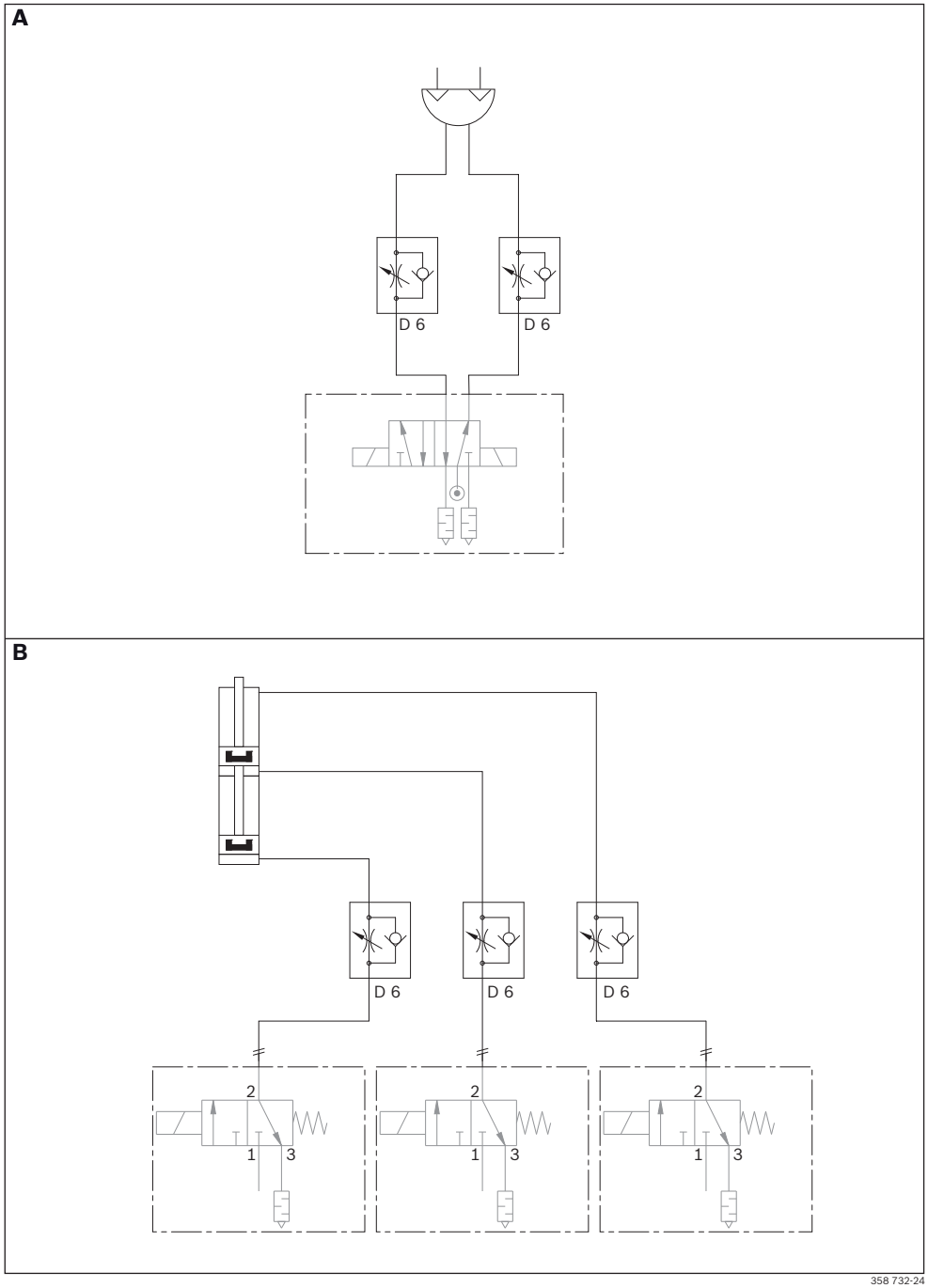


Fig. 19: Pneumatic diagrams A and B

Use the pneumatic diagram
- **C**, lifting cylinder for sizes 1/2, rotation angle 180°.
- **D**, rotating cylinder for size 3, rotation angle 180°.

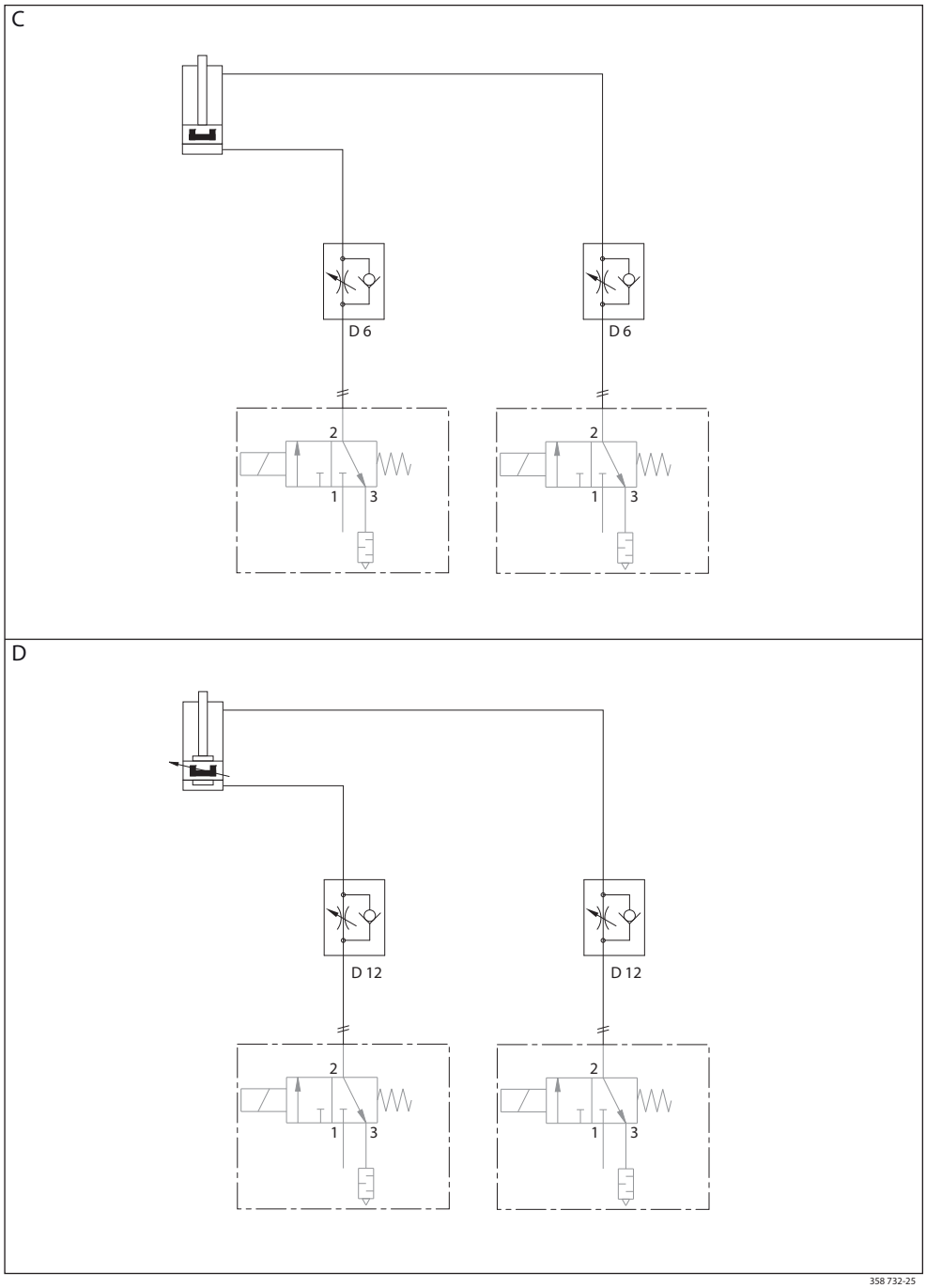


Fig. 20: Pneumatic diagrams C and D

8 Starting up

8.1 First-time operation

⚠ CAUTION

Unforeseen movements, falling workpiece carrier

- ▶ Risk of injury caused by unforeseen movements and falling objects.
- ▶ Make sure that the product has been installed correctly by qualified personnel (see page 8) before starting it up.

⚠ CAUTION

Unintentional rapid rotational movements, falling objects

- ▶ Risk of injury caused by unintentional rapid rotational movements and falling objects.
- ▶ Make sure that the rotating cylinder is in its original position and under pressure (exhaust air) before commissioning/re-commissioning and in particular before each restart of the system after shutdown, malfunction, breaks, shift changes or rest periods.

NOTICE

Malfunctions due to incorrect installation and startup

The product can be damaged; the service life may be adversely affected.

- ▶ Starting up requires basic mechanical, pneumatic and electrical knowledge.
- ▶ The product may only be operated by qualified personnel (see page 8).
- ▶ At commissioning it is essential to check the angle of rotation and adjusted if necessary (see chapter 8.4 “Check and adjust the rotation angle of the lift rotate unit” on page 37.

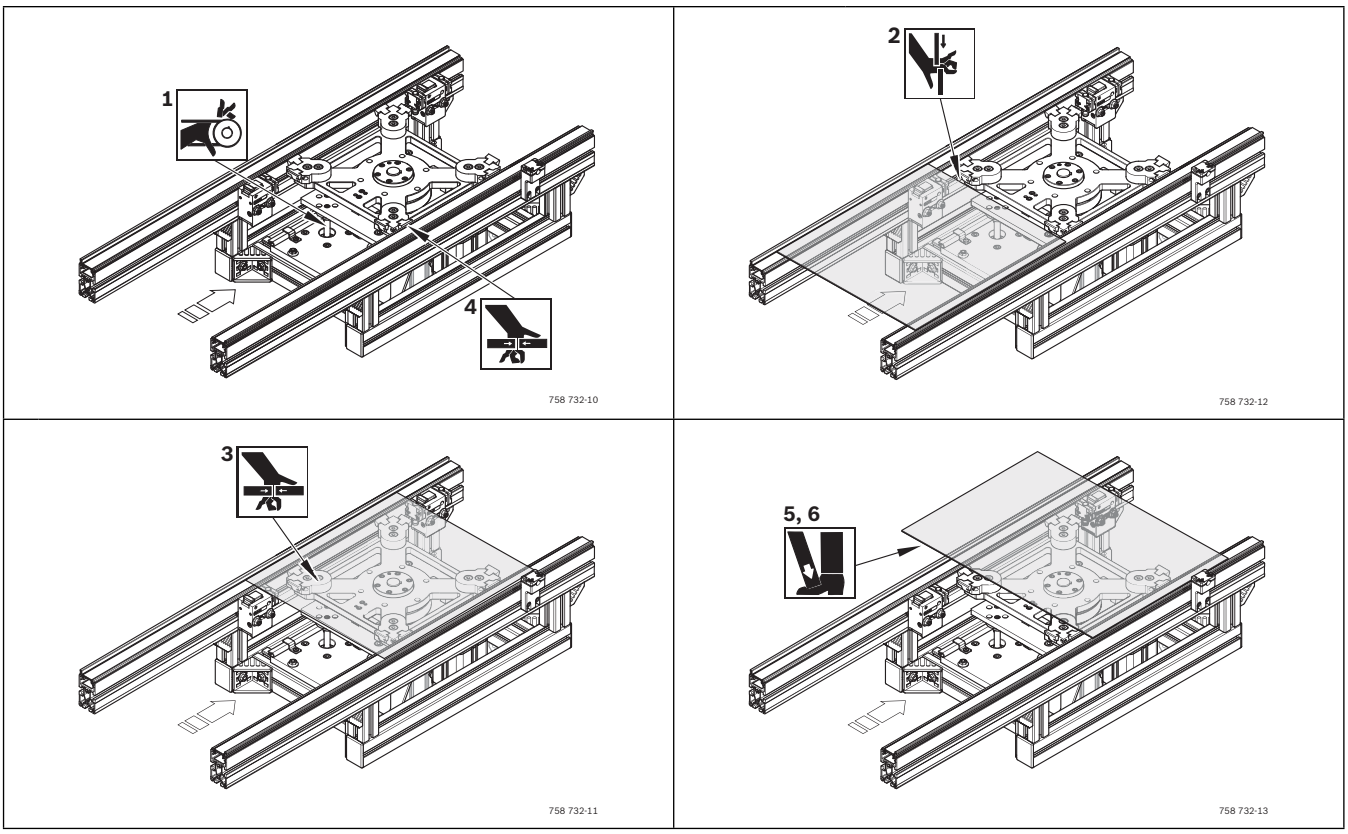
- Before first use or re-commissioning of a conveyor system, run a risk assessment in accordance with DIN EN ISO 12100.
- Before initial commissioning ensure that there are no protruding or sharp-edged parts that may endanger personnel working or moving in the area.
- According to EU Machinery Directive 2006/42/EC, you must equip the transfer system with EMERGENCY STOP devices.
- The surfaces of engines and gearboxes can reach temperatures of over 65 °C under certain load and operating conditions. In these cases, you must comply with the appropriate design measures (protective measures) or the corresponding warnings of the applicable accident prevention regulations (UVV)!
- Make sure that all electrical and pneumatic connections are in use or closed. Check that all screws and plugs are securely fastened. All relevant protective covers must be installed.
- Continuous conveyors which are in motion or in operation may only be inspected and adjusted once all required safeguards are in place.
- Note EN ISO 13857 when you remove or replace safeguards and/or nullify a safety guideline.

- Test runs with open panels are only allowed if they are carried out by a competent person using tip switches and no interference through other switching elements exists.
- Only start up the product when all safety devices of the system are installed and are operational.
- Only start up a fully assembled product.
- Double check the correct adjustment of the lift rotate table in the section profile (see Fig. 7 on page 20 and Fig. 21 on page 37).

8.2 Further risks

Table 7: Further risks

	Place	Situation	Danger		Action
1	Lifting plate, housing: Between fixed and moving parts of the product	Body parts can become caught		Crush injury	The danger areas must be removed by structural measures, e.g. by separating barriers.
2	Lifting plate: In between component and workpiece carrier	Trapping of body parts during the retraction of the workpiece carrier		Danger of cutting	
3	Lifting plate: In between component and workpiece carrier	Trapping of parts of the body while lifting		Crush injury	
4	Lifting plate: Between the component and the section profile	Trapping of parts of the body at lowering			
5	Workpiece carrier: Improper setting of the adjusting throttle will cause the lifting rotary table to strike the end stop hard.	Trapping of body parts from falling workpiece carriers			Only relevant during the adjustment process. Installation and service only by qualified personnel.
6	Workpiece carrier: The workpiece carrier is incorrectly oriented along the entire belt section if the adjustment of the angle of rotation is incorrect.	Trapping of body parts from falling workpiece carriers			



8.3 Re-commissioning after a standstill period

Follow the steps for first-time operation.

8.4 Check and adjust the rotation angle of the lift rotate unit

Please note:

- Perform the test/setting in both end positions with the rotating cylinder at operating pressure. Only then are the end dampers fully retracted.
- Perform the test/ setting under operating conditions (rotational speed load).

1. Bring the rotary table to the end position (under operating pressure).
2. Check the parallelism of the rotary table to the belt section and adjust if necessary
3. To do this, first depressurize the cylinder (vent).
4. Correct the position of the rotary table by turning screwing in / screwing out the damper For further information on setting the damper, see chapter 1.1.22 “Replace damper for rotary table” on page 48.

⚠ WARNING

Unexpected movements

Risk of serious injury and even death.

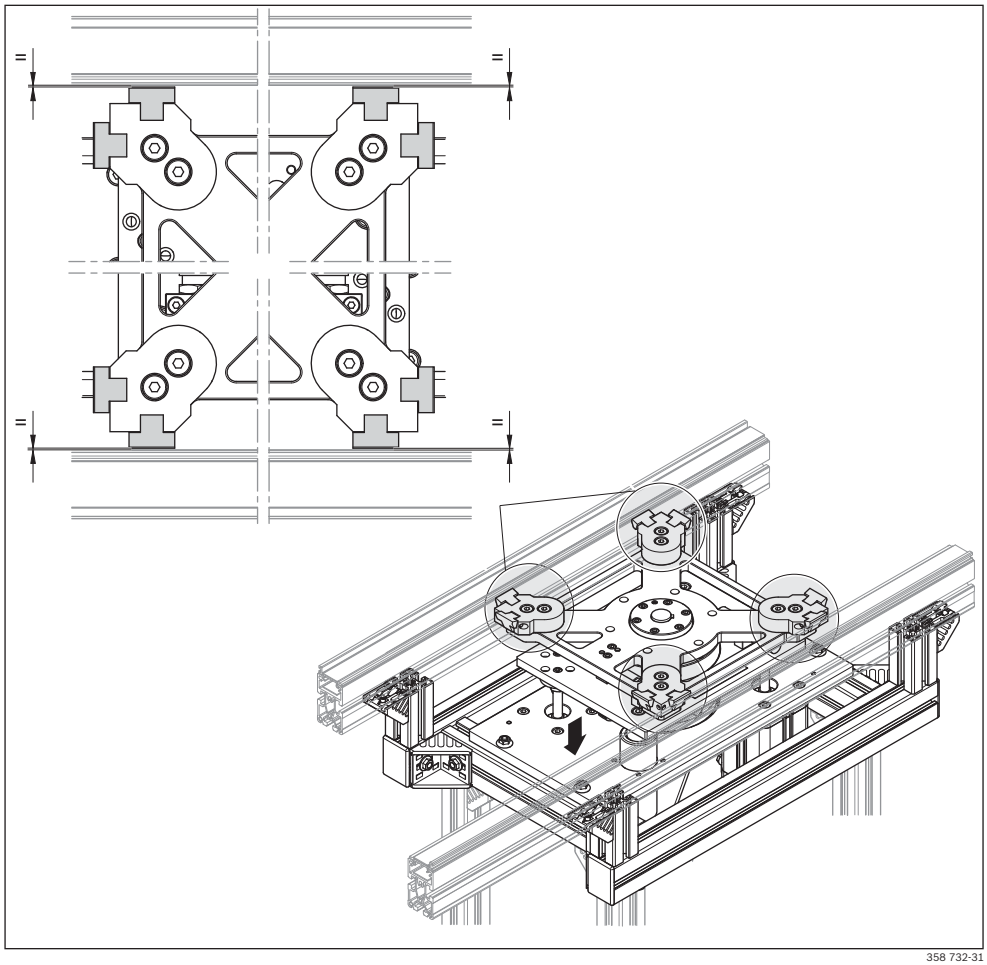
- ▶ Final commissioning may only be performed with guards in place These must be provided and installed by the customer.
- ▶ Do not leave objects on the lift rotate unit

NOTICE

Improper adjustment can result in property damage

The product can be damaged; the service life may be adversely affected.

- ▶ The angle of rotation of the lift rotate unit is factory-set, it is essential that this is checked at commissioning and, if necessary precisely set. Not performing this work may result in the lift rotate unit being damaged or cause premature wear.



358 732-31

Fig. 21: Check and set the angle of rotation (example shown here size 2 180°)

ENGLISH

8.5 Adjust stroke, lift and rotate speed

Please note:
- Before setting the stroke speed mount the workpiece carrier WT (working load).
- On delivery the setting achieves an even, smooth lifting and rotating movement of the lift rotate unit.
- Set the check throttle valves for both lifting cylinders in the same position.

▶ To adjust the speed for the stroke and rotation movement throttle the exhaust air.

- Rotate in the direction "**+**"

  The movement is slower.

- Rotate in the direction "**–**"

  The movement is faster.

Functionality of exhaust air throttles

Sz* 1/2/3 180°	**A**:	Rotate right
	B:	Rotate left
	C:	Lower
	D:	Lift
Only Sz* 1/2 90°	**C_2**:	Lowering upper to middle position
	C_1:	Lowering middle to lower position

*) Sz = size

WARNING

Unexpected movements

Risk of serious injury and even death.

▶ Final commissioning may only be performed with guards in place
These must be provided and installed by the customer.

▶ Do not leave objects on the lift rotate unit

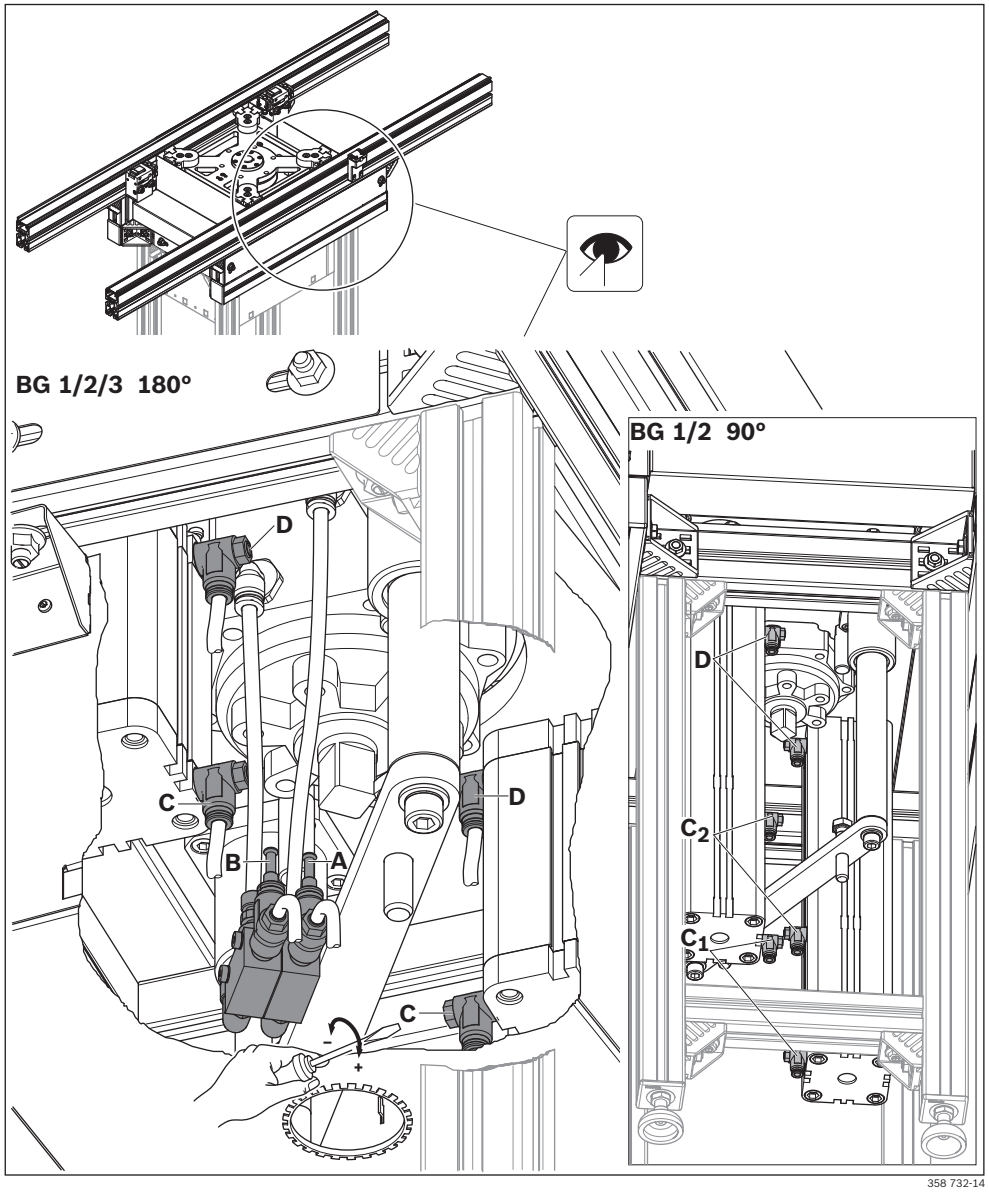


Fig. 22: Adjust stroke, lift and rotate speed (example shown here size 2)

8.6 Reduce stroke over conveyor level

Please note:
- It is recommended not to change the factory preset stroke.
- If the hub is to nonetheless be reduced, both stop screws must be precisely adjusted to the same height ±0.1 mm.
- Perform the adjustment of the stroke at lower end position of the lift rotate unit.

1. Loosen lock nut
2. Adjust the stop screw to the desired height.
3. Counter stop screws
4. Check stop screws for identical height adjustment.

Stop screws and lock nuts

Size HD 2/H	A SW [mm]	B M_D [Nm]
Sz* 1	16	20
Sz* 2/3	18	25

*) Sz = size

⚠ WARNING

Unexpected movements

Risk of serious injury and even death.

- ▶ Final commissioning may only be performed with guards in place These must be provided and installed by the customer.
- ▶ Do not leave objects on the lift rotate unit

NOTICE

Improper adjustment can result in property damage

The product can be damaged; the service life may be adversely affected.

- ▶ If both stop screws are not set at precisely the same level ±0.1 mm the lift rotate unit can be damaged or can wear prematurely.

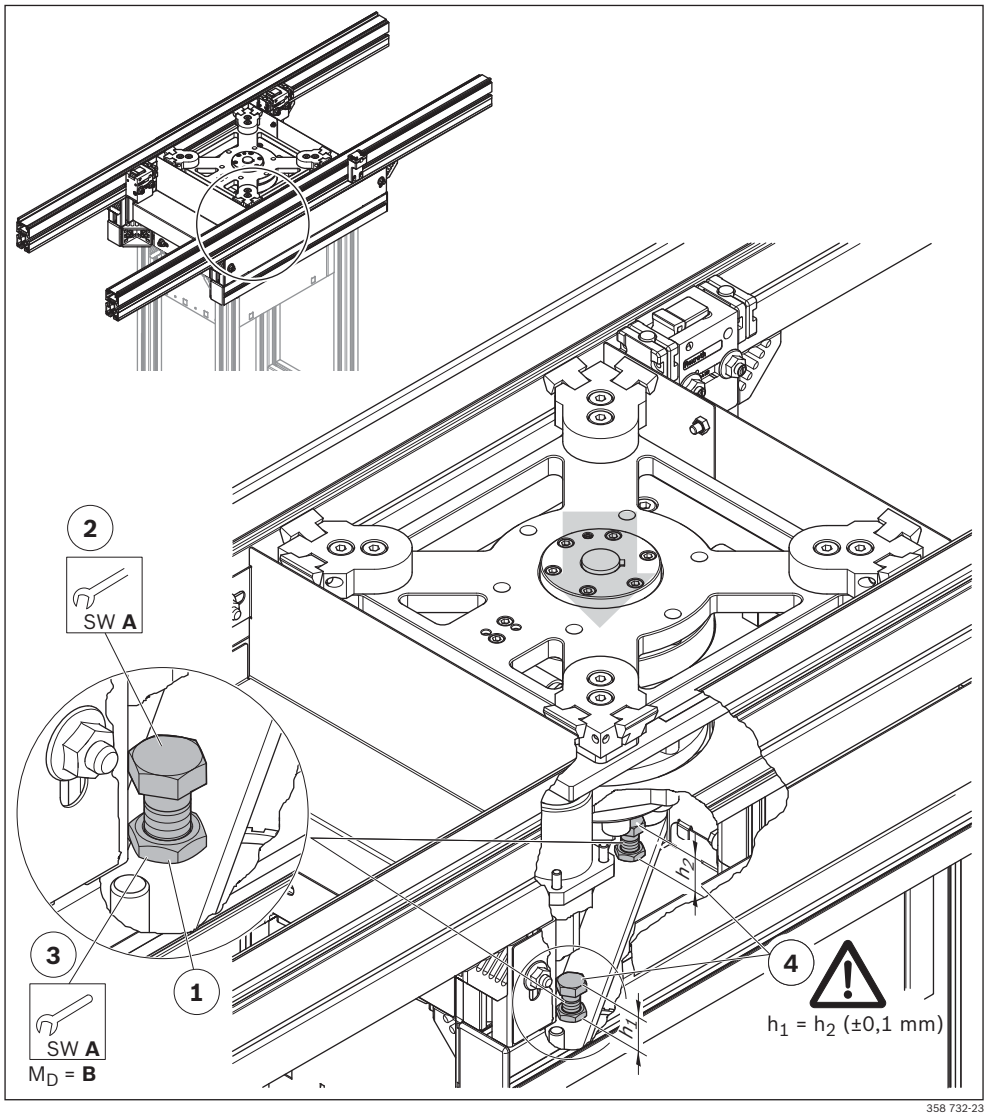


Fig. 23: Set the stroke over the conveyor level (example shown here size 2 180°)

ENGLISH

8.7 Example for guard to be provided by the customer

Final commissioning may only be performed with guards in place
These must be provided and installed by the customer.
See also chapter 2.8 “Responsibilities of the end user” on page 10.

A: Contact protection from below
B: Contact protection from above

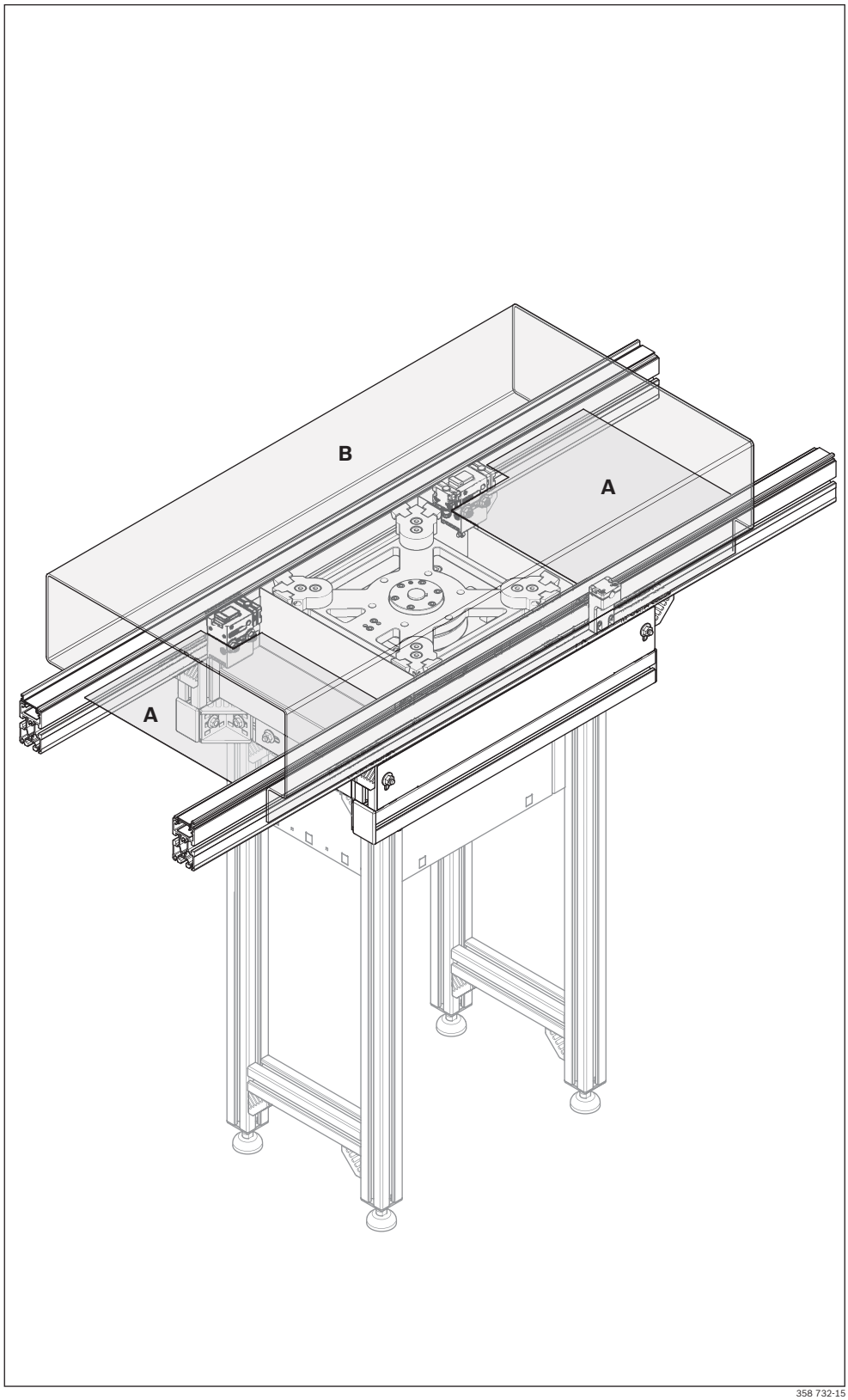


Fig. 24: Example for guard to be provided by the customer

9 Operation

⚠ CAUTION

Hot surfaces of the electric motors in operation!
Burns can result from the > 65 °C surfaces.
- ▶ Provide for appropriate guard devices.
- ▶ Let the unit cool down at least 30 minutes before performing maintenance and/or repair work.

9.1 Notices regarding operation

9.1.1 Wear

- The principle of individual components leads to unavoidable wear. Structural measures and choice of materials are used to achieve functional reliability for the full service life. However, wear is also dependent on the operating, maintenance and ambient conditions at the place of use (resistance, contamination).
- Overloading conveyor sections can lead to failure of the conveyor and the premature failure of motors and gearboxes.
- If the pneumatically activated components are overloaded, it is not possible to guarantee their function.

9.1.2 Measures to minimize wear

The following measures will reduce wear:
- Switch off the conveyor line when at standstill e.g. during breaks, at night, at weekends.
- Do not select a higher speed for the conveyor line 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 carrier

In the design and testing of the units it is assumed that the workpiece carriers will not all have the same weight in one line section in one cycle. Loaded and unloaded workpiece carriers are mixed.
Significantly different weights may require special measures to avoid malfunctions. This applies to:
- the permitted congestion length before separating stops.
- the damper functionality.
- damped separating stop.

9.1.4 Permitted center of gravity on the workpiece carrier

The position of the center of gravity of the load must be taken into account to be able to absorb acceleration forces when separating or altering direction (curves, change to transverse direction of transport).
In the arrangement of supports and workpieces on the WT (= workpiece carrier) it must be ensured that the center of gravity of the loaded WT lies within the area ⅓ of the length, respectively of the width, around the center of the WT. The maximum height of the center of gravity above the level of transport should not exceed ½ of the WT

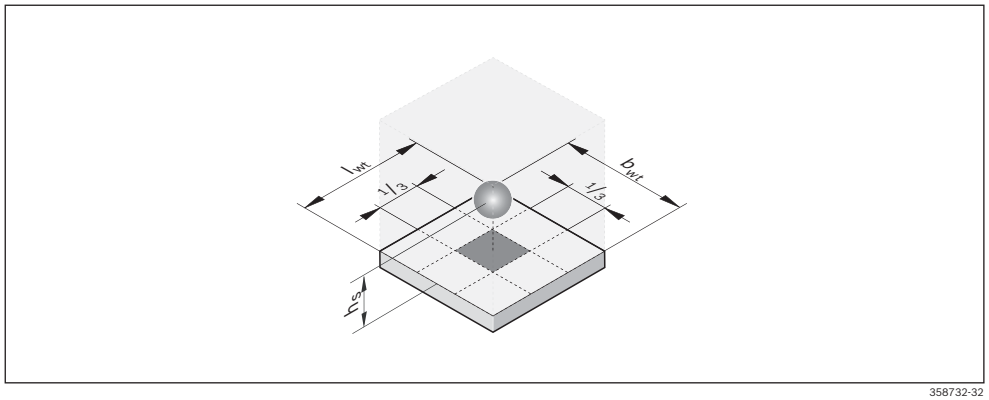


Fig. 25: Center of gravity on the workpiece carrier

In general we recommend:
- to load the workpiece carrier as centrally as possible.
- do not let the loading center of gravity exceed in height h_S ½ b_{WT} (with $b_{WT} \leq l_{WT}$).

Failure to comply with this requirement can compromise the conveyor safety particularly at higher conveyor speeds.

Maximum mass moment of inertia see “Mass moment of inertia” on page 51.

9.1.5 Environmental influences

- Resistant to many conventional substances used in the manufacturing sector, such as water, oil, grease, and detergents. If you are unsure about resistance against certain chemicals such as test oil, doped oils, aggressive detergents, solvents, or brake fluid, we recommend that you consult with your specialized Rexroth representative.
- Avoid prolonged contact with highly acidic or alkaline reacting substances
- Wear can increase significantly in the case of contamination with abrasive media in the environment in particular; these include sands and silicates from construction work, for example, as well as from processes on the transfer system (e.g. welding beads, pumice dust, shards of glass, or loose and easily lost items). Under such conditions the maintenance intervals should be significantly reduced.

- Resistance to media and contaminants does not mean that functional reliability can be guaranteed under all circumstances.
  - Liquids that thicken when they evaporate and become highly viscous or adhesive can lead to malfunctions.
  - Media that have a lubricating effect can reduce the drive power that is transmitted via friction if these media are displaced on systems with rollers.

  In cases like these, particular care must be taken when planning the system and the maintenance intervals must be shortened appropriately.

10 Maintenance and repair

⚠ WARNING

High electrical voltage!
Risk of serious injury and even death from electrical shock.
- ▶ Disconnect the relevant system component before you perform maintenance and repair work.
- ▶ Secure the system against unintentional restarting.

High pneumatic pressure!
Risk of serious injury and even death.
- ▶ Disconnect the relevant system component from the pneumatic pressure source before you perform maintenance and repair work.
- ▶ All pneumatic cylinders must be depressurized (vented).
- ▶ Secure the system against unintentional restarting.

⚠ CAUTION

Hot surfaces of the electric motors in operation!
Burns can result from the > 65 °C surfaces.
- ▶ Provide for appropriate guard devices.
- ▶ Let the unit cool down at least 30 minutes before performing maintenance and/or repair work.

- Continuous conveyors which are in motion or in operation may only be inspected and adjusted once all required safeguards are in place.
- Note EN ISO 13857 when you remove or replace safeguards and/or nullify a safety guideline.
- Test runs with open panels are only allowed if they are carried out by a competent person using tip switches and no interference through other switching elements exists.

10.1 Cleaning and care

NOTICE

Failure of the bearings
Applying grease-dissolving substances to the bearing points, e.g. when cleaning, leads to the failure of the bearings. There is a risk of damage to property, and the service life may be reduced.
- ▶ Keep degreasers or aggressive cleaning away from the bearings!
- ▶ Clean the product only 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 aggressive cleaning away from the toothed belt
- ▶ Clean the product only with a damp cloth.

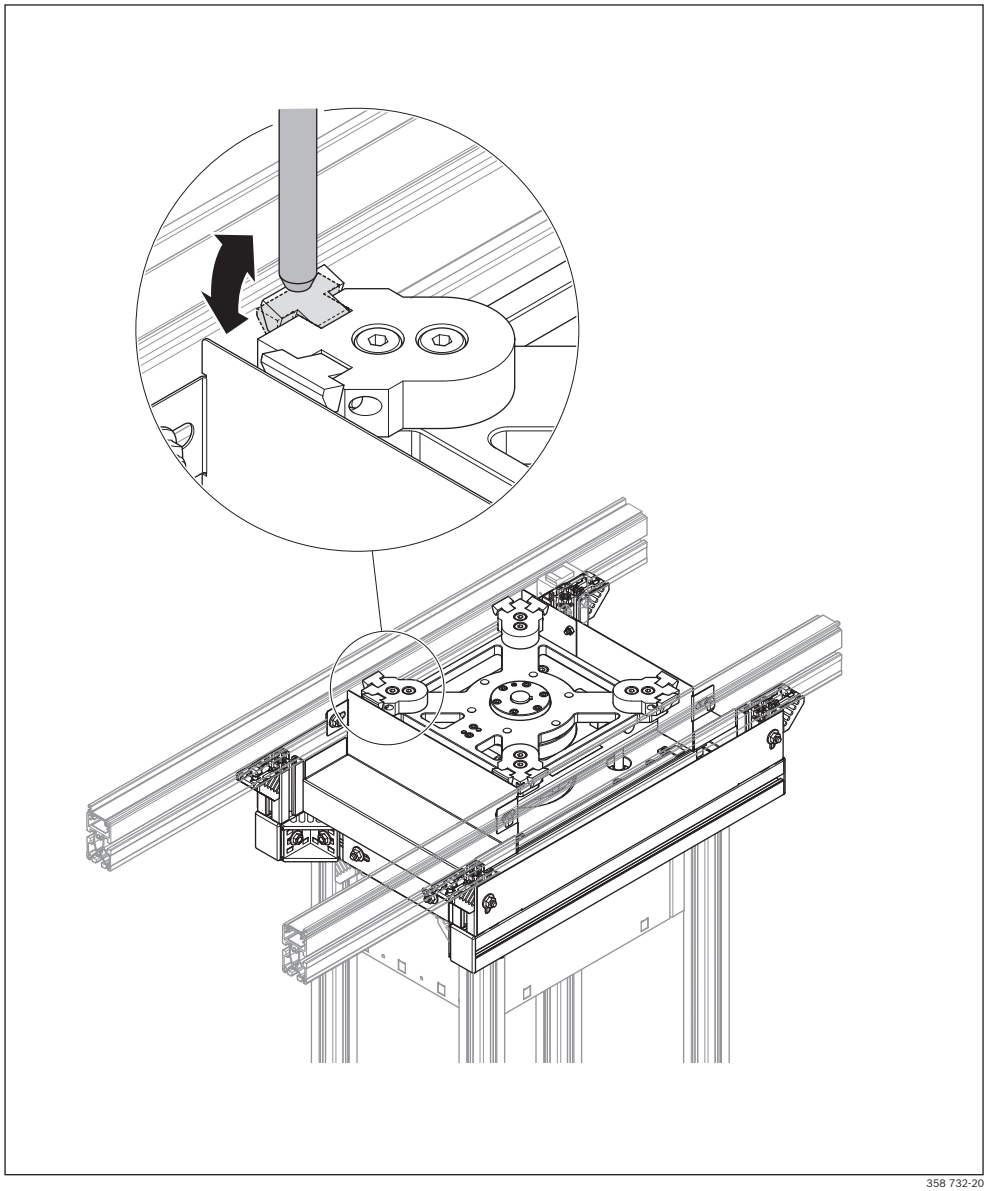
10.2 Inspection

Lift rotate unit

Regularly check the pneumatic connections for leaks.

The pressure point of the fingers in the hub latches (only sizes 1 and 2).

Check the spring action of **all** pressure points regularly, every 2000 hours or every 500000 cycles (whichever is reached first). The spring action of the pressure points must be felt across the entire movement of the finger.



358 732-20

Fig. 26: Check the spring action of the pressure point

Worn pressure points must be replaced (see chapter 10.4 “Replacement of worn parts” on page 47),

10.3 Maintenance

NOTICE

Failure of the lift rotate unit by non compliance with the maintenance cycles
The load adapter damper must be lubricated every 2000 hours or every 500 000 cycles (whichever is reached first).
There is a risk of damage to property, and the service life may be reduced if the maintenance intervals are not complied with.

Please note:
- Perform the work at the upper end position of the lift rotate unit.
- The rotating cylinder must be depressurized (vented). The rotary table must be rotated for disassembly/assembly.

▶ Lubricate the damper load adapter.

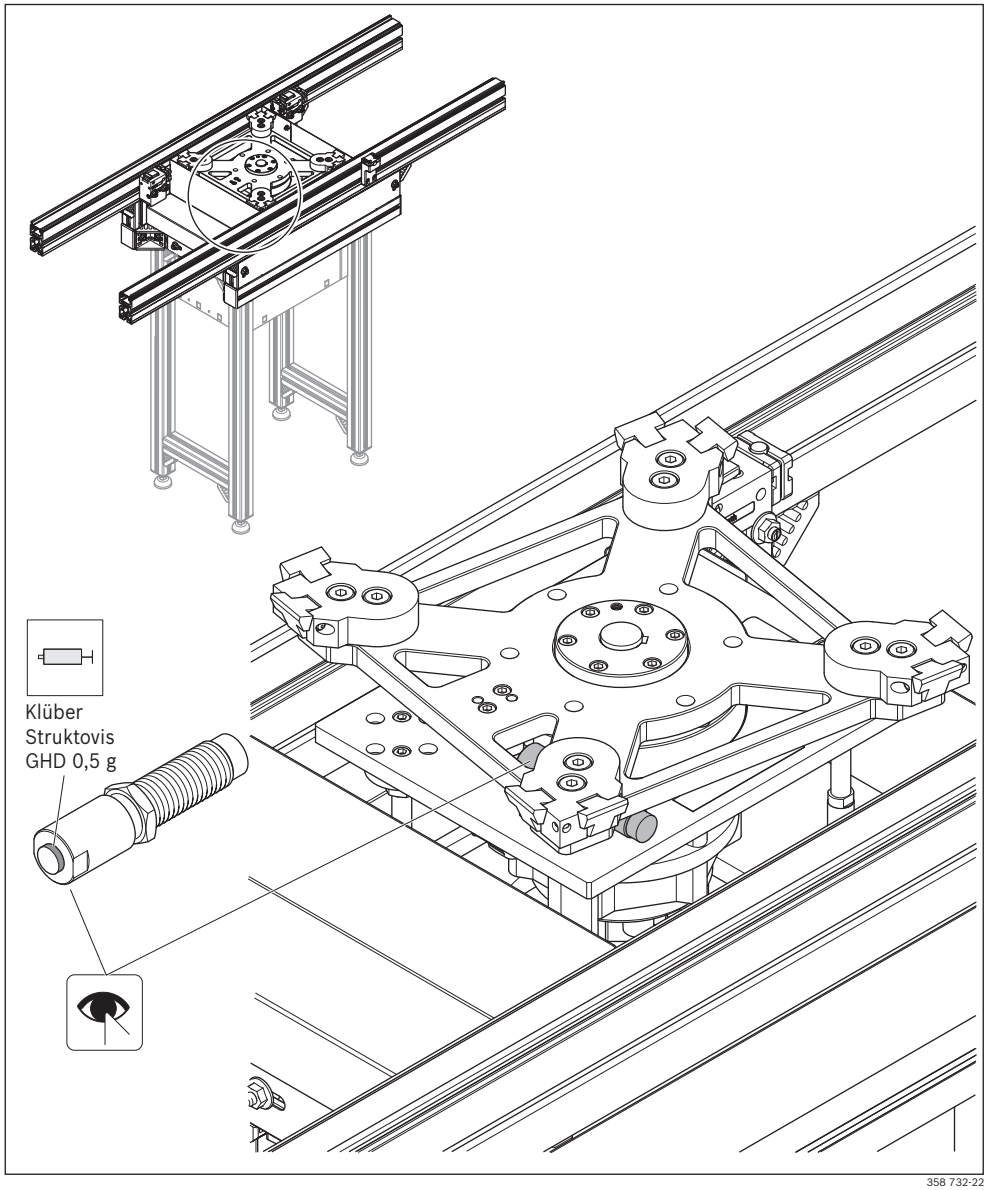


Fig. 27: Lubricate the load adapter damper

10.4 Replacement of worn parts

Required tools

- Hex head cap screw SW13
- Hex socket head cap screw SW3, SW4, SW5, SW6.
- Cross recess screwdriver PZ2
- Calipers, 500 mm
- Rubber mallet
- Strainer

10.4.1 Replace the pressure point of the fingers in the rotary table (only sizes 1 and 2).

Please note:

- Perform the replacement at the upper end position of the lift rotate unit.
- The rotating cylinder must be depressurized (vented).

Required tools

- Hex socket head cap screw SW6
- Strainer

1. Remove the latch (A) from the rotary table.
2. Remove the finger (B)
3. Replace the pressure point (C).
4. Lubricate the pressure point.
5. Reassemble the finger and the latch.

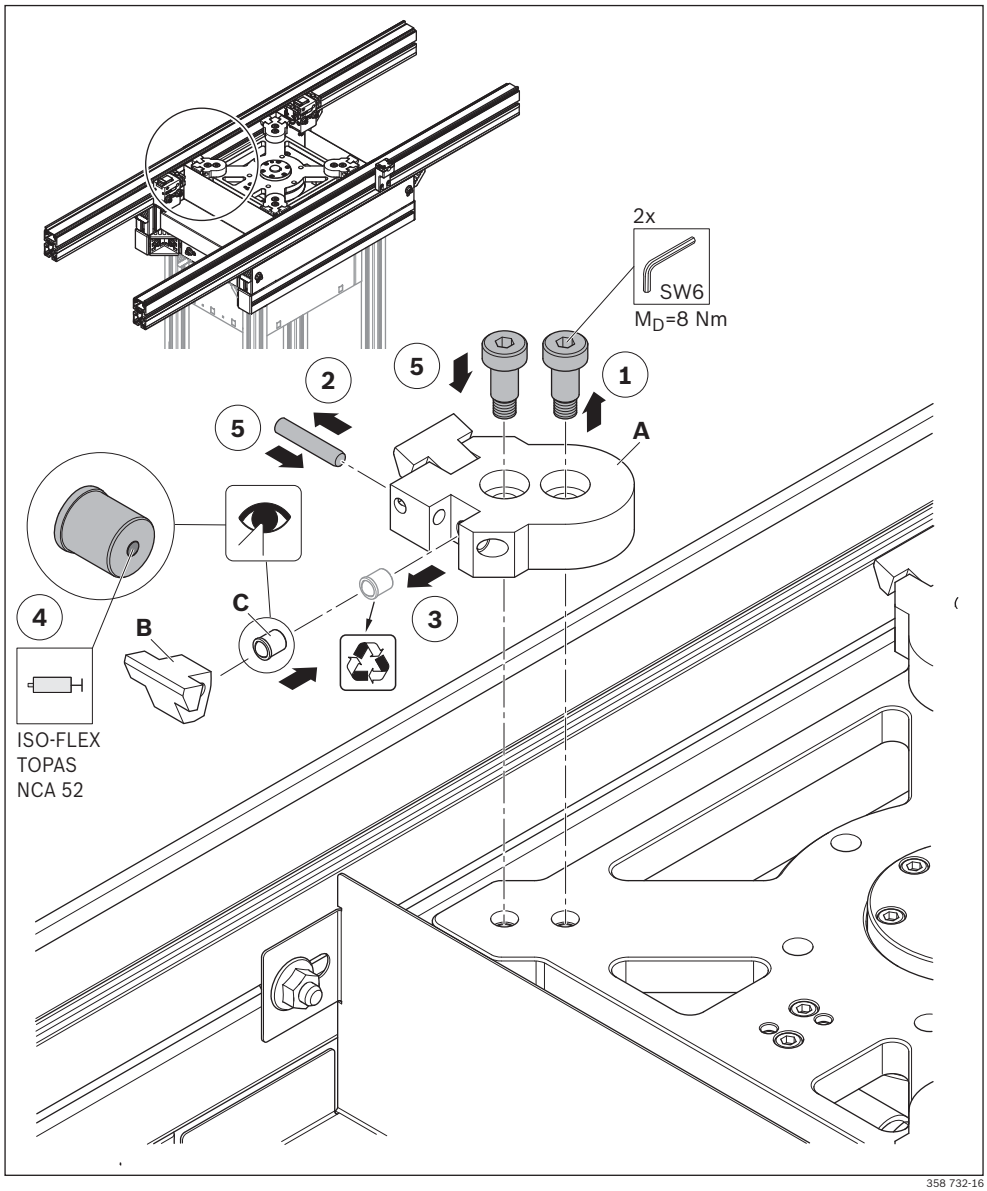


Fig. 28: Exchange the pressure point of the fingers in the rotary table (only sizes 1 and 2).

ENGLISH

10.4.2 Replace damper for rotary table

Please note:
- Perform the replacement at the upper end position of the lift rotate unit.
- The rotating cylinder must be depressurized (vented). The rotary table must be rotated for disassembly/assembly.

1. Remove the damper (A)
2. Install the new damper.
3. Adjust the damper by screwing in/out of the damper housing so that the rotary table is parallel to the belt section at the end position (see chapter 8.4 “Check and adjust the rotation angle of the lift rotate unit” on page 37).
4. Lubricate the load adapter.

Please note:
Repair of the lift rotate unit must be carried out by Rexroth!

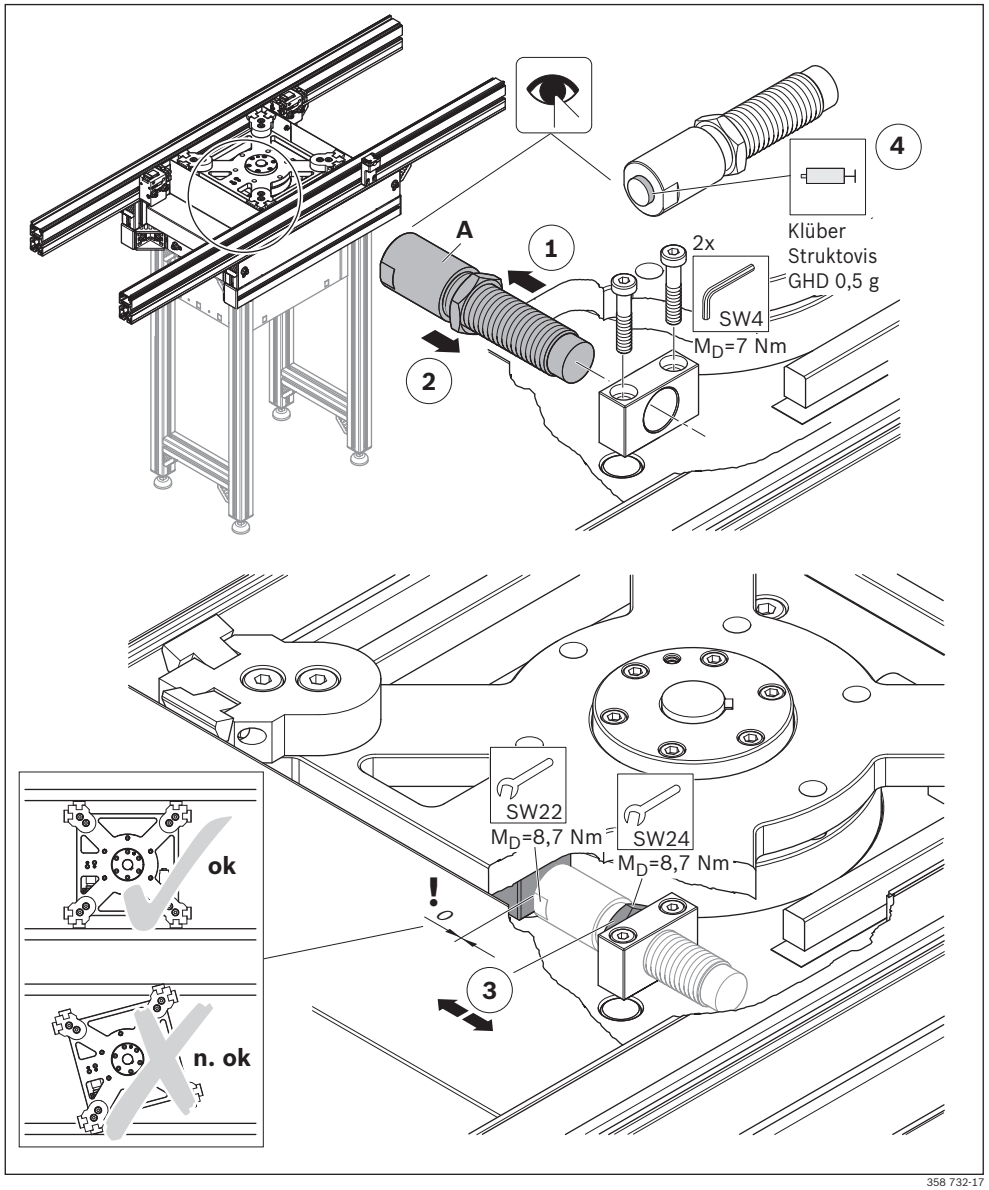


Fig. 29: Replace damper for rotary table (example shown here size 2 180°)

10.4.3 Spare parts

For a list of spare parts, see MT*parts*, **3 842 529 770**.

11 Decommissioning

The product is a component that does not need to be taken out of service.
Therefore, the chapter in these instructions contains no information on the topic.

12 Disassembly and replacement

⚠ WARNING

High electrical voltage!

Risk of serious injury and even death from electrical shock.

- ▶ Disconnect the relevant system component before you perform maintenance and repair work.
- ▶ Secure the system against unintentional restarting.

High pneumatic pressure!

Risk of serious injury and even death.

- ▶ Disconnect the relevant system component from the pneumatic pressure source before you perform maintenance and repair work.
- ▶ Secure the system against unintentional restarting.

Raised loads can fall down!

Serious injury (or death) can occur if the product falls down.

- ▶ Use only slings with sufficiently high load capacity (for product weight see shipping documents).
- ▶ Check if the carrying straps are attached properly before lifting the product.
- ▶ The product must always be prevented from tipping over when lifting.
- ▶ During raising and lowering pay attention that nobody other than the operator is in the danger zone.

12.1 Preparing the product for storage/re-use

- Only set the product down onto a level surface.
- Protect the product from mechanical influences.
- Protect the product from environmental influences such as dirt and moisture.
- Pay attention to the ambient conditions, see page 54.
- For products with mounted motor, support the product so that hanging-mounted engines will not be burdened.

13 Disposal

- The materials used are environmentally friendly.
- The possibility of reproduction or re-use (possibly after reconditioning and replacement of components) is provided for. Recyclability is ensured by the selection of materials and dismantling capacity.
- Careless disposal of the product may cause pollution.
- Dispose of the product in accordance with the national laws of your country.

14 Extension and modification

- You may not modify the product.
- The Bosch Rexroth manufacturer's warranty only applies to the delivered configuration and extensions that were included in the configuration. After a renovation or extension beyond the structural modifications or extensions described here, the warranty will become null and void.

15 Troubleshooting

- If you are unable to fix the error, you should contact us at one of the contact addresses which you can find at www.boschrexroth.com.

16 Technical data

- For dimensions, see sales catalog TS 2*plus*, 3 842 531 138.
- Maximum line load: Up to 2.0 kg/cm support length (depending on the belt section used)
- Maximum load: Size 1 50 kg
  Size 2 128 kg
  Size 3 240 kg
- Acoustic emission: < 70 dB (A)

16.1 Mass moment of inertia

Permitted center of gravity, see page 42.

Exception: HD 2/H, size 3, b_{WT} x l_{WT} = 1200 x 1200, here the center of gravity **must** be centered.

Refer to the following illustration for the minimum rotation times for different moments of inertia J_{ges}. Please remember to observe the maximum moment of inertia for the sizes 1 to 3.

Lift rotate unit HD 2/H, 3 842 998 760 (size 1)

Mass max. 50 kg; mass moment of inertia max. 1.8 kgm²

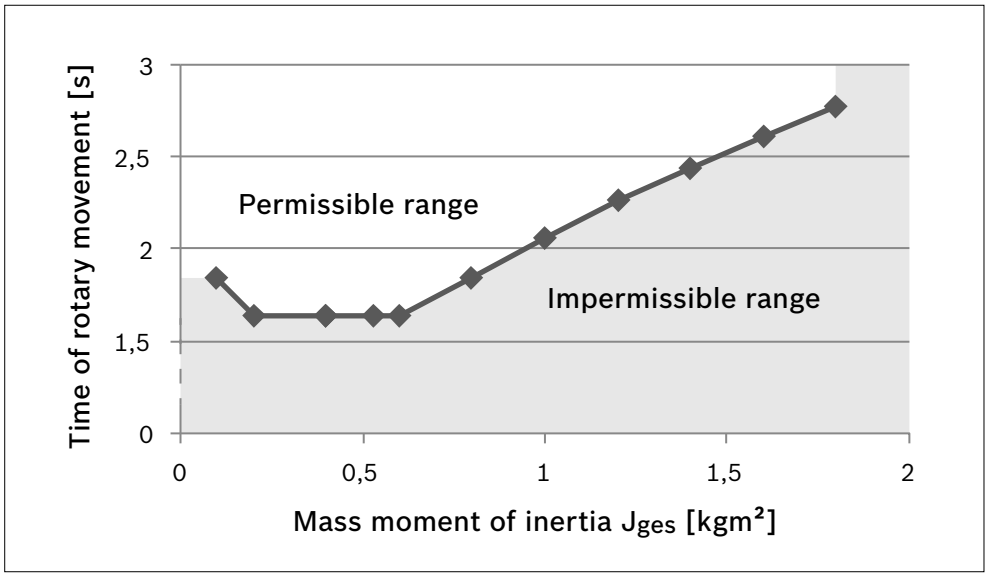


Fig. 30: Diagram mass moment of inertia size 1

Table 8: Mass moment of inertia size 1

Mass moment of inertia [kgm²]	0.1	0.2	0.4	0.53	0.6	0.8	1.0	1.2	1.4	1.6	1.8
Rotation time (s)	1.84	1.64	1.64	1.64	1.64	1.84	2.06	2.26	2.44	2.61	2.77

Lift rotate unit HD 2/H, 3 842 998 761 (size 2)

Mass max. 128 kg; mass moment of inertia max. 15.9 kgm²

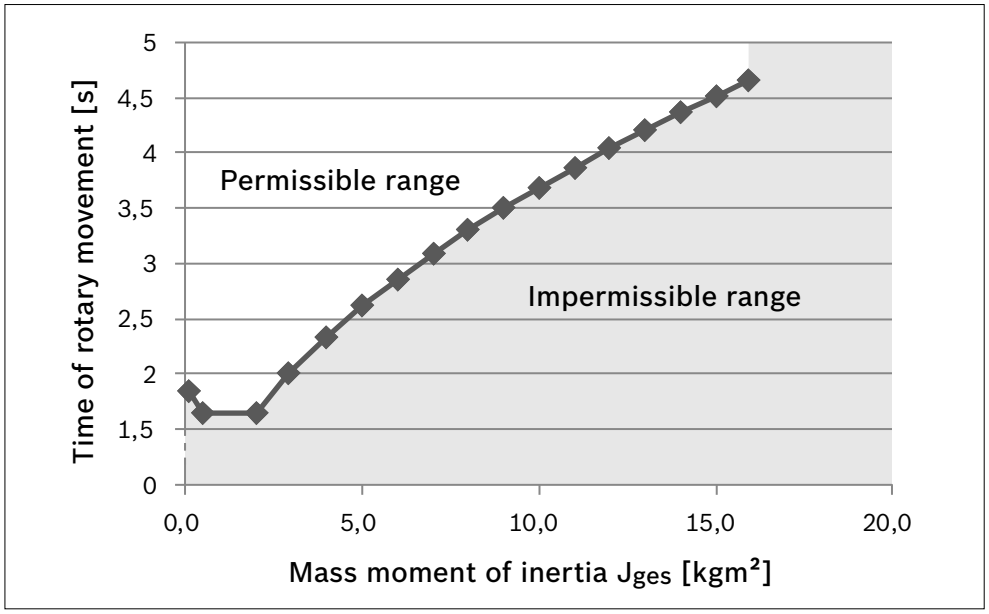


Fig. 31: Diagram mass moment of inertia size 2

Table 9: Mass moment of inertia size 2

Mass moment of inertia [kgm^2]	0.1	0.5	2.0	2.93	4.0	5.0	6.0	7.0	8.0	9.0	10.0
Rotation time (s)	1.84	1.65	1.65	2.0	2.33	2.61	2.86	3.09	3.3	3.5	3.69

Mass moment of inertia [kgm^2]	11.0	12.0	13.0	14.0	15.0	15.9
Rotation time (s)	3.87	4.05	4.21	4.37	4.52	4.66

Lift rotate unit HD 2/H, 3 842 998 761 (size 3)

Mass max. 240 kg; mass moment of inertia max. 57.6 kgm²

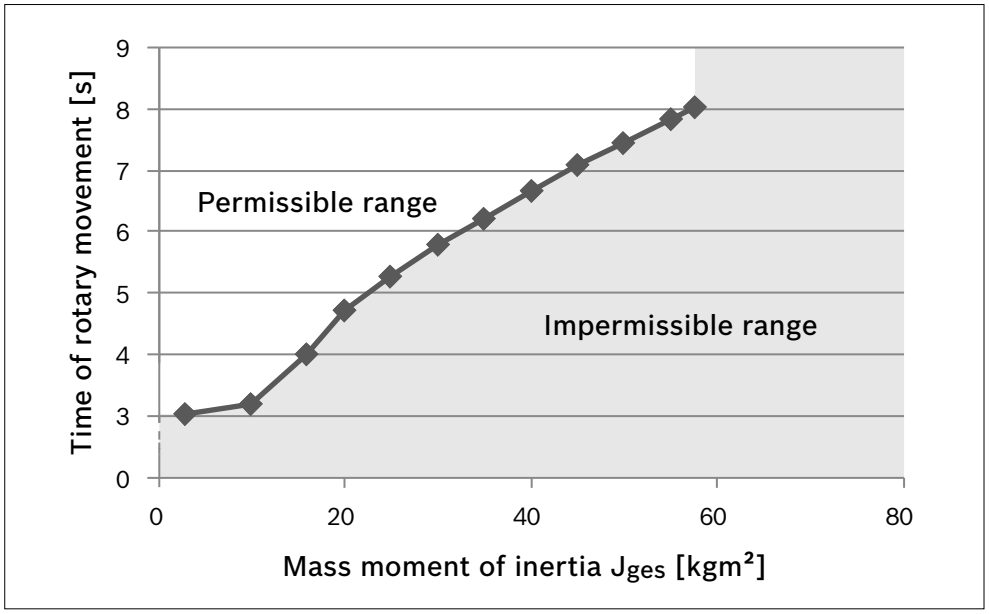


Fig. 32: Diagram mass moment of inertia size 3

Table 10: Mass moment of inertia size 3

Mass moment of inertia [kgm²]	2.8	10.0	15.84	20.0	25.0	30.0	35.0	40.0	45.0	50.0	55.0	57.6
Rotation time (s)	3.03	3.2	4.0	4.7	5.27	5.78	6.22	6.67	7.07	7.45	7.82	8.02

The following formulas are available for the calculation:

$$J_x = {}^1/_{12} \times m(b_{wt}^2 + l_{wt}^2)$$

$$J_z = m \times d^2$$

$$J_{ges} = J_x + J_z$$

J_x = Mass moment of inertia of the uniformly distributed load

J_z = Steiner's displacement law

J_{ges} = Total mass moment of inertia [kgm²]

m = Mass (including workpiece carrier) [kg]

b_{wt} = Width of workpiece carrier [m]

l_{wt} = Length workpiece carrier [m]

d = Shift axis of rotation [m]

ENGLISH

16.2 Ambient conditions

- The transfer systems are designed for stationary use in weather-protected areas.
- Working 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
- Permissible load capacity of floor: 1000kg/m^2
- At altitudes > 1400 m, the load values of the electric drives are reduced by 15%.
- Avoid molds, fungi and rodents, and other pests.
- Installation and operation in the immediate vicinity of industrial equipment with chemical emissions is not permitted.
- Do not install and operate in the vicinity of sand or dust sources.
- Do not install and operate in areas which are regularly jarred by high forces caused by presses or heavy machinery, for example.
- Resistant to many conventional substances used in the manufacturing sector, such as water, oil, grease, and detergents. If you are unsure about resistance against certain chemicals such as test oil, doped oils, aggressive detergents, solvents, or brake fluid, we recommend that you consult with your specialized Rexroth representative.
- Prolonged contact with highly acidic or alkaline reacting substances must be avoided.

16.3 Pneumatics

- Oiled compressed air or unlubricated, filtered, dry.
- Operating pressure: 4 to 6 bar
- Solid materials
  – Size of particles ≤ 5 µm (Class 6 according to ISO 8573-1:2010)
  – Amount of particles ≤ 5 mg/m^3 (Class 6 according to ISO 8573-1:2010)
- Water content
  – Pressure dew point[1]) ≤ +3 °C (Class 4 according to 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/m^3 (Class 3 according to ISO 8573-1:2010)

Bosch Rexroth AG
Post box 30 02 07
70442 Stuttgart
Germany
Fax +49 711 811–7777
info@boschrexroth.de
www.boschrexroth.com

Subject to modifications
3 842 358 796/2015-01