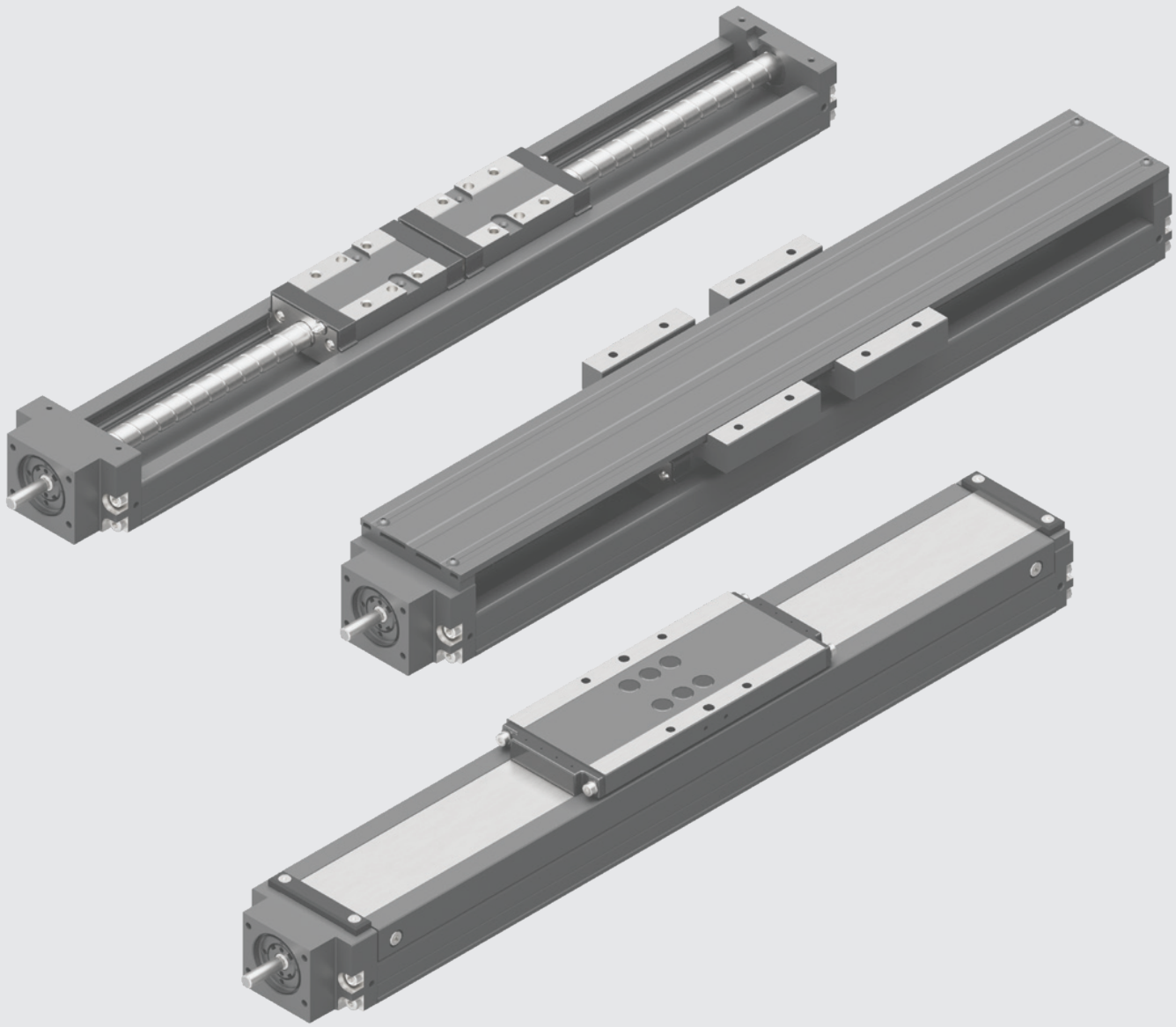
rexroth
A Bosch Company

Precision Modules PSK

R320103170/2022-10
EN

Instruction



The data specified above only serves to describe the product. No statements concerning a certain condition or suitability for a certain purpose can be derived from our information. The information given does not release the user from the obligation of own judgment and verification.
Please note that our products are subject to a natural process of wear and aging.

The title page contains an illustration of a sample configuration. The product as delivered can differ from the illustration.
The original instructions are in German.

Any dissemination of the product must include these mounting instructions and the safety instructions and information for linear motion systems R320103152.

These instructions are available in the following languages.

DE German (Original document)

EN English

Contents

1 About these instructions

1.1 Scope and purpose of the documentation

This documentation applies to the following products:

- Precision Modules PSK as described in the “Precision Modules PSK” catalog.

This documentation is intended for assembly/installation personnel, line operators and machinery/plant users.

This documentation contains important information for proper and safe installation, operation, maintenance and disassembly of the product and for troubleshooting simple errors oneself.

▶ Before working with the product, be sure to read these instructions carefully and completely, especially the section titled “Safety instructions”.

1.2 Required documentation

Documentation which is indicated by the book symbol 🕮 must be obtained before handling the product and must be observed:

Table 1: Required documentation

	Title	Document number	Document type
🕮	Safety instructions for Linear Motion Systems	R320103152	Safety instructions
🕮	Precision Modules PSK	R999000500	Catalog
🕮	IndraDrive C for Linear Motion Systems	R310 2730	Catalog
🕮	IndraDrive Cs for Linear Motion Systems	R310 2735	Catalog
🕮	Safety data sheet for Dynalub 510	R320103160	
🕮	Product data sheet for Dynalub 510	R310 2052	

The Rexroth documentation is available for download at www.boschrexroth.com/mediadirectory.

1.3 Presentation of information

To enable users to work rapidly and safely with the product while following these instructions, this documentation uses standardized safety instructions, symbols, terms and definitions, and abbreviations. These are explained in the following sections.

1.3.1 Safety instructions in this manual

This manual contains safety instructions preceding any actions that involve a risk of personal injury or damage to property. The safety precautions described must be adhered to.

Safety instructions are structured as follows:

⚠ SIGNAL WORD

Type of hazard.

Consequences if ignored.

▶ Precautions to avoid hazard.

- **Warning sign:** draws attention to the hazard
- **Signal word:** indicates the degree of hazard
- **Type of hazard:** indicates the type or source of the hazard
- **Consequences:** describes the consequences that may occur if precautions to avoid the hazard are not taken
- **Precautions:** indicates how the hazard can be avoided

The safety instructions cover the following hazard levels. The hazard level describes the risks involved if the safety instruction is not complied with.

Table 2: Hazard levels per ANSI Z535.6 - 2011

Warning sign, signal word	Meaning
⚠ DANGER	Indicates an hazardous situation which will result in death or serious injury if not avoided.
⚠ WARNING	Indicates a hazardous situation which may result in death or serious injury if not avoided.
⚠ CAUTION	Indicates a hazardous situation which may result in minor or moderate injury if not avoided.
NOTICE	Property damage The product or surroundings may be damaged

1.3.2 Symbols

The following symbols indicate information that is not related to safety but makes the documentation easier to understand.

Table 3: Meaning of the symbols

Symbol	Meaning
	If this information is not observed, the product will not be optimally used/operated.
▶	Single, independent work step
1. 2. 3.	Numbered work steps The numbers indicate the sequence of the work steps.
➠ 7	See section 7
➠ ☒ Fig. 7.1	See Figure 7.1
	Screw with strength class...
⊘	Tightening torque
μ	Friction factor for screws

1.3.3 Abbreviations

The following abbreviations are used in this documentation:

Table 4: Abbreviations and definitions

Abbreviation	Meaning
PSK	Precision Modules
BASA	BAll Screw Assembly

2 Safety instructions

The general safety instructions for this product can be found in the documentation “Safety instructions for Linear Motion Systems”. You must have read and understood these before handling the product.

3 Scope of delivery

The following is included in delivery:

- Precision Module
- Drive (with motor and mount, or motor and timing belt side drive installed) if ordered
- Switch if ordered
- Final inspection certificate

▶ Upon receipt of the delivery, immediately check for completeness against the receipt and notify the carrier or Bosch Rexroth Corporation if any parts are missing.

3.1 Delivery condition

- Depending on the order, fully assembled with drive.
- Precision Modules come lubricated or preserved, depending on the order.

3.2 Accessories

The following accessories are available:

- Mounting accessories
- Switch
- Motor attachment

 **Dimensions and part numbers of the accessories as well as additional mounting accessories ➠ see catalog.**

4 Product description

4.1 Features

Precision Modules are precise, ready-to-install Linear Motion Systems that feature high performance in a compact size and can be delivered quickly at an affordable price.

4.2 Product description

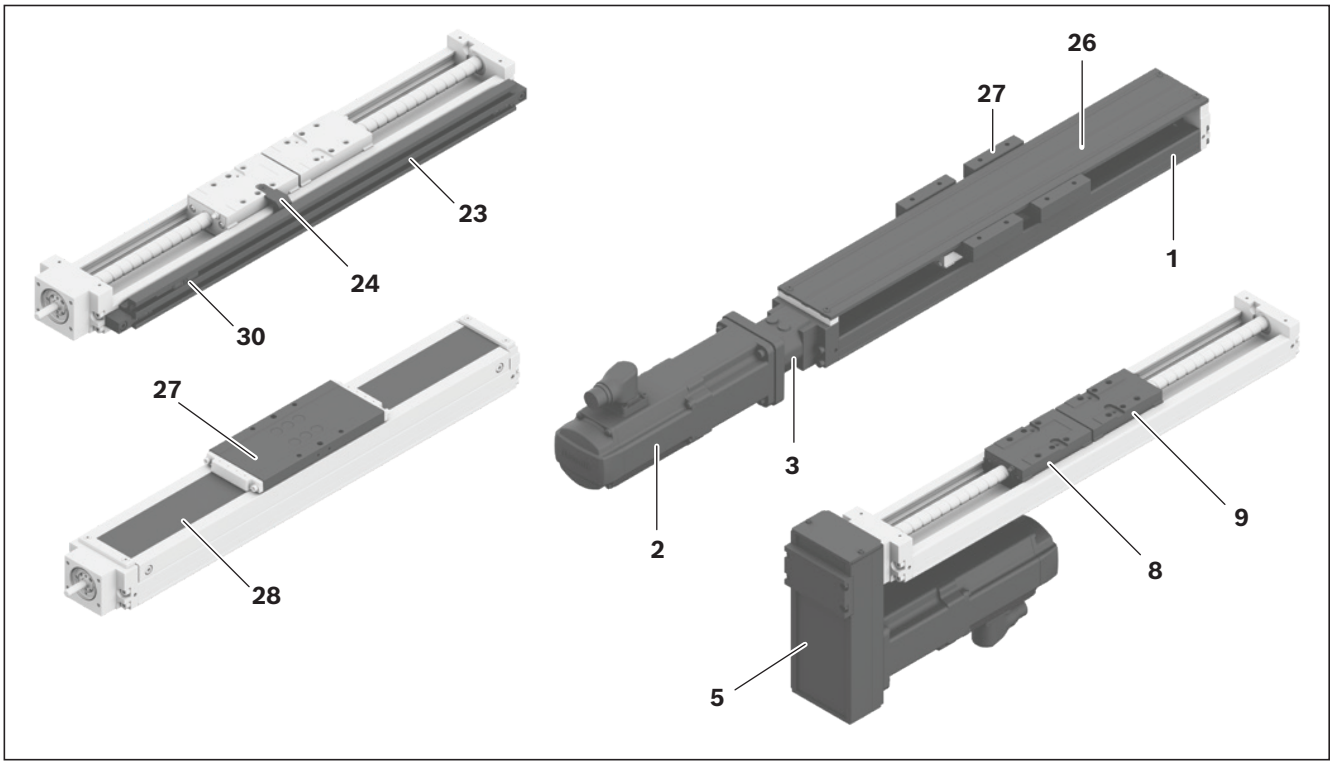


Fig. 1: **Parts of the Precision Module (with drive)**

A Precision Module has the following parts:

1 Frame
2 Motor
3 Mount (integrated or attached)
5 Timing belt side drive
8 Carriage (driven)
9 Carriage (undriven)
23 Mounting channel
24 Switching tab
26 Cover plate
27 Carriage
28 Sealing strip
30 Switch

Second carriage

- The two carriages are not connected.
- Only the carriage on the drive side is driven.
- The attachment determines the distance L_W.
- Observe $L_{W\ min}$ ➠ catalog.

4.3 Precision Modules overview

Precision Modules are available in three sizes ➠ catalog.

The name plate of the product contains the following information:

Table 5: Information on name plate

Name plate information	Meaning
MNR	Part number
SYN	Serial number
FD	Date of manufacture
CS	Customer order number
7210	Manufactoring location

4.4 Identification (start-up)

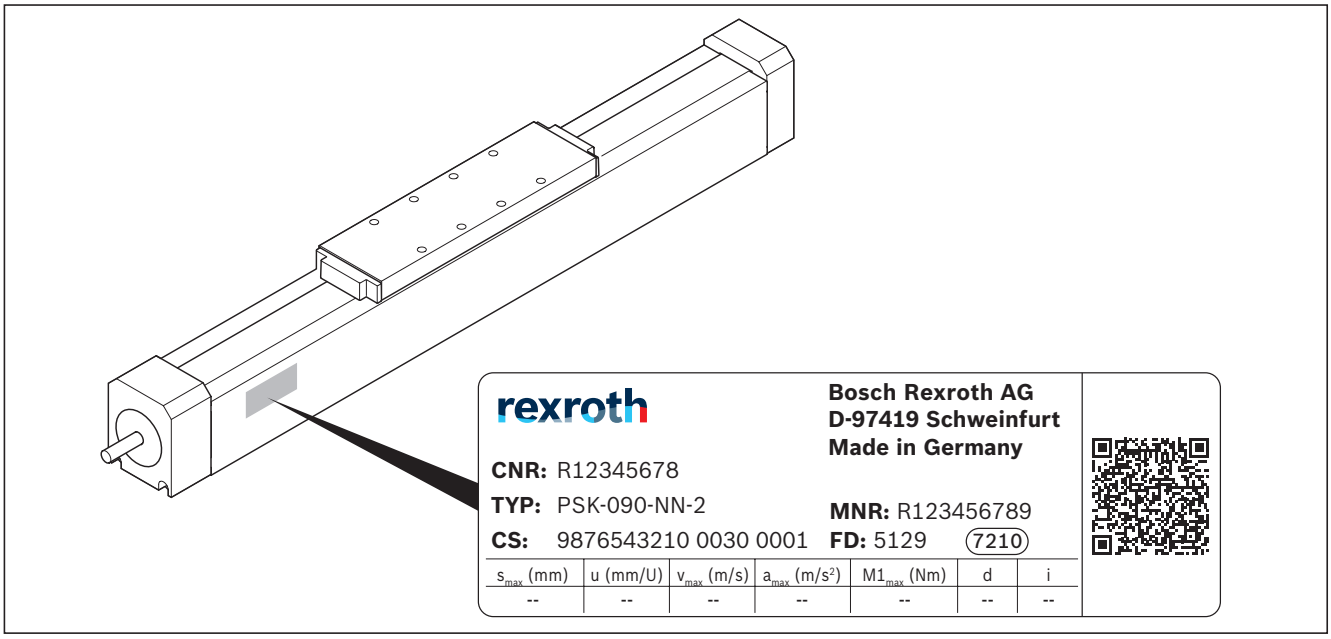


Fig. 2: **Name plate**

The name plate contains additional technical data for start-up. With these parameters and the EasyWizard software, starting up the drives of Linear Motion Systems becomes easier, faster, and more effective than ever before ➠ **8**

5 Transport and storage

5.1 Transporting the product

Precision Modules come ready to install.

⚠ WARNING

Risk of product falling due to inadequate load handling equipment.

Death or serious injury.

- ▶ Use only inspected and suitable load handling equipment.
- ▶ Attach load handling equipment only to the frame or at the designated points.
- ▶ Do not stand under suspended loads.

NOTICE

Risk of damage to motor connection through vibration.

Motor breaks off.

- ▶ When transporting the product with motor attached, always provide support for the motor, or
- ▶ Remove the motor prior to transport

1. Before hoisting the product, note the weight ➠ see catalog.
2. Hoist the product as shown in the figure.

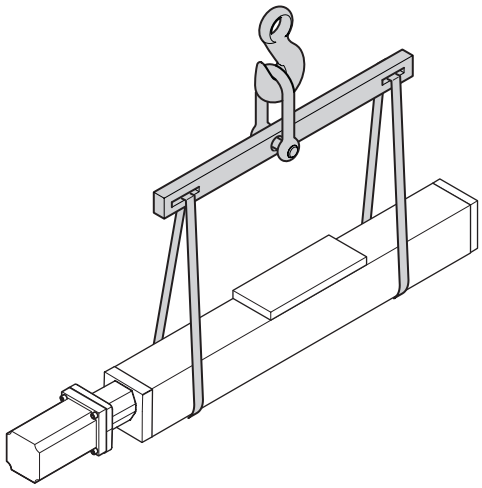


Fig. 3: **Hoisting the product**

5.2 Storing the product

NOTICE

Risk of damage due to improper storage.

Potential corrosion of product parts.

- ▶ Store the product only in dry, covered areas.
- ▶ Protect the product from humidity and corrosive agents.

6 Assembly

For dimensions and part numbers of the individual components ➠ catalog.

⚠ WARNING

Risk of product falling due to inadequate load handling equipment.

Death or serious injury.

- ▶ Use only inspected and suitable load handling equipment.
- ▶ Attach load handling equipment only to the frame or at the designated points.
- ▶ Do not stand under suspended loads.

Risk of product falling if installed vertically or suspended due to lack of fall protection.

Death or serious injury.

- ▶ Secure the product against falling.
- ▶ Do not stand under the product in the hazard zone.

▶ Before hoisting the product, note the weight ➠ catalog.

6.1 Unpacking the product

1. Before hoisting the product, note the weight ➠ catalog.
2. Take the product out of the packaging and remove the packaging material.
3. Dispose of the packaging material according to the local regulations in your country.

6.2 Required accessories

▶ Use suitable screws for fastening.

6.3 Installation conditions

- Note operating conditions ➠ **15** and catalog.
- For special operating conditions, please contact us.

NOTICE

Risk of damage due to improper loads.

Damage to the product.

- Do not attach any projecting loads.

6.4 Installation position

The Precision Module can generally be installed in any position.

⚠ WARNING

Risk of carriage falling if installed vertically or at an angle due to lack of fall protection.

Death or serious injury.

- If the Precision Module is installed vertically or at an angle, secure carriage against falling.

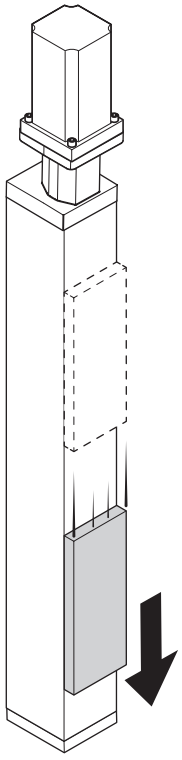


Fig. 4: **Securing carriage for vertical installation**

6.5 Attaching Precision Module to adjoining structures

NOTICE

Risk of product loosening or warping due to improper mounting.

Damage to the product.

- Be sure to use enough supports for the system dynamics at work.

Risk of frame bending.

Damage to the product.

- Support the frame along its entire length **(A)**
- Do not support the Precision Module at the end blocks **(B)**

- Remove the cover plate or sealing strip, if present ➠ **6.10** or **6.12**.
- Use reference edges **(29)**.
- Fasten the product to the specified tightening torque.
- If necessary, install cover plate or sealing strip ➠ **6.10** or **6.12**.
- When mounting to the frame, keep a minimum distance of 5 mm from the end blocks.

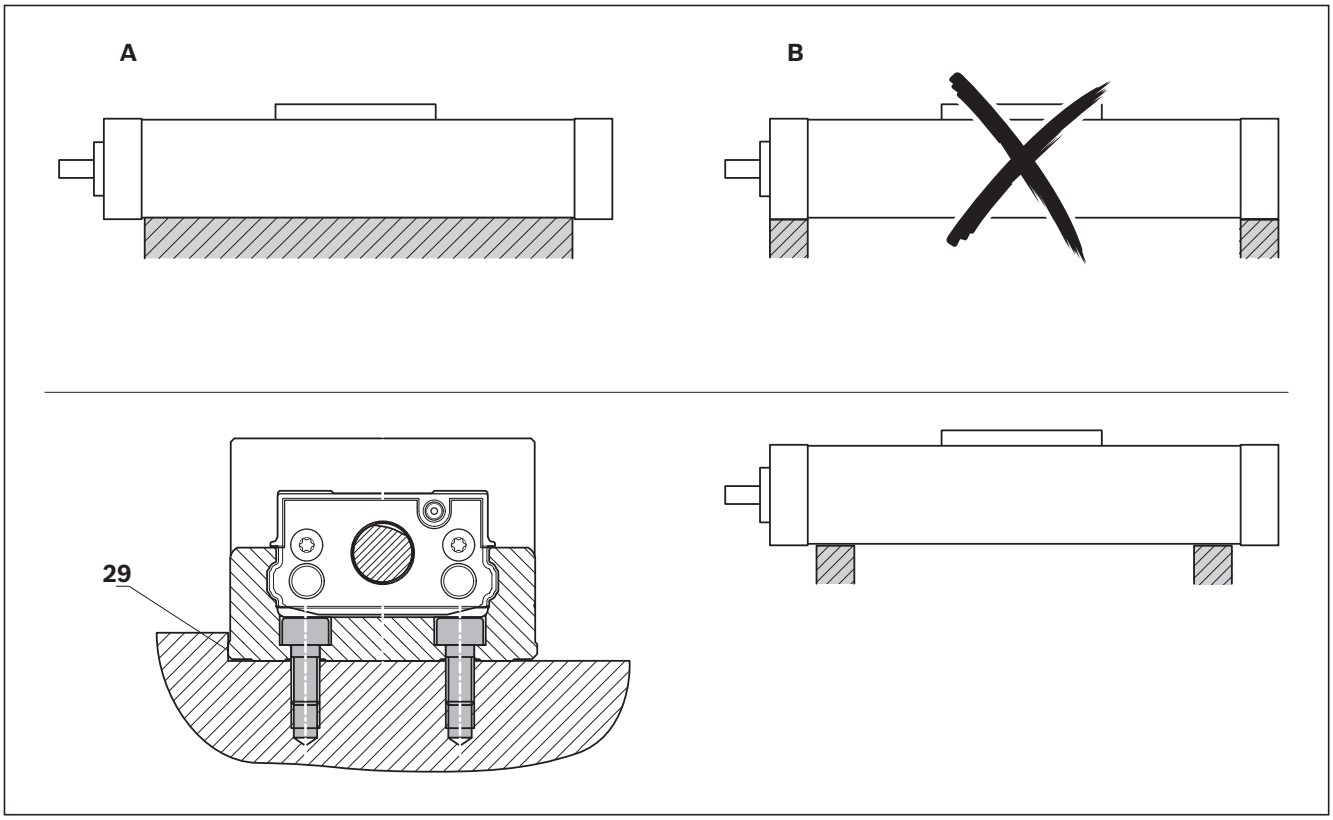


Fig. 5: **Mounting**

6.6 Installing the drive

NOTICE

Risk of excessive torque and rotary speed if limits are not observed.

Damage to the product.

- ▶ Observe the specified limits.

For technical data and limits ➠ see catalog.

Drive types:

- Mount **(3)** and coupling **(4)** with motor **(2)**
- Integrated mount **(3.1)** and coupling **(4)** with motor **(2)**
- Timing belt side drive **(5)** with motor **(2)**

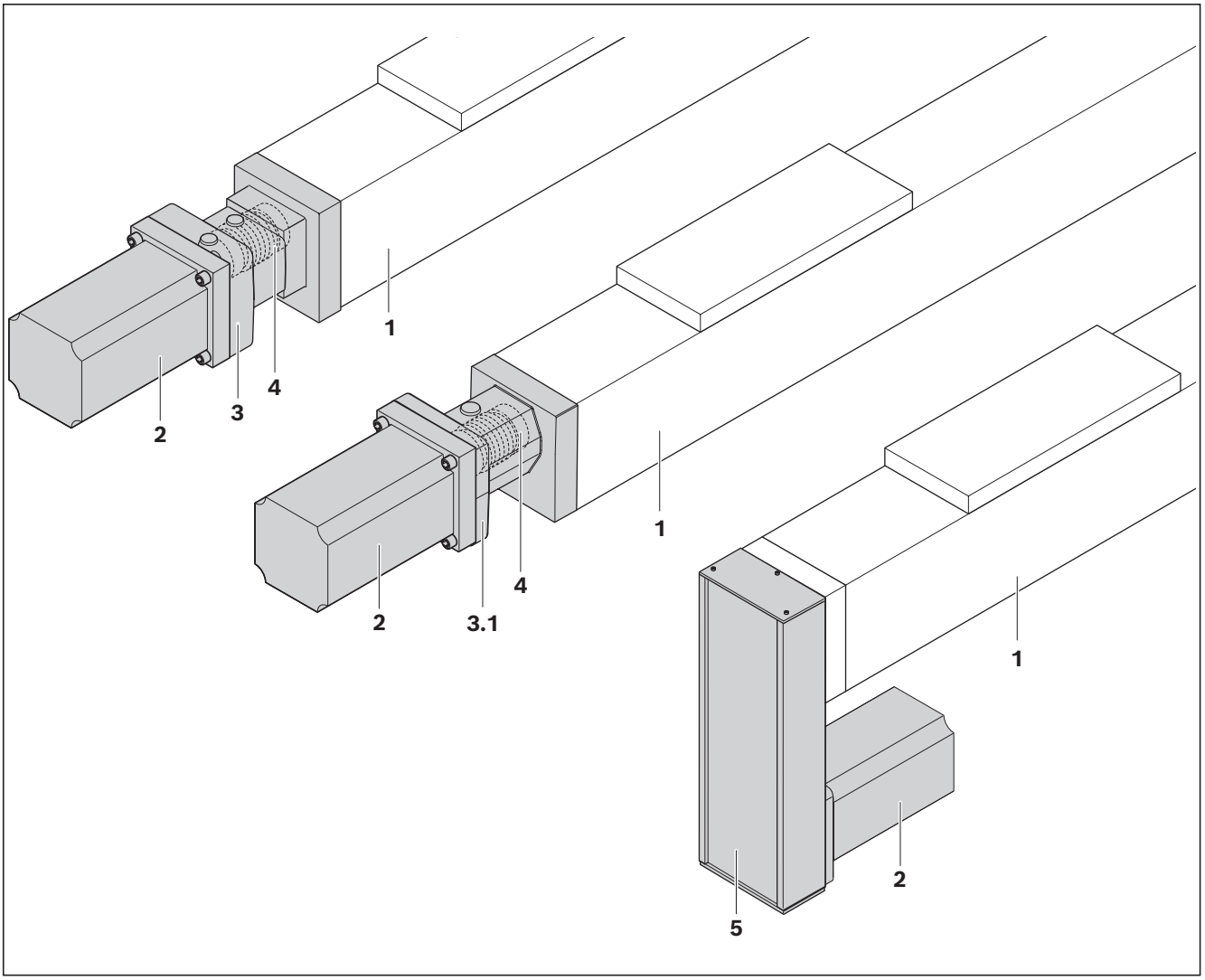


Fig. 6: **Drive types**

6.6.1 Installing the motor with mount and coupling

⚠ WARNING

Risk of electric shock due to contact with live parts.

Death or serious injury.

- Before working on the electrical equipment, switch off the power supply and secure it against reactivation.

NOTICE

Risk of excessive torque and rotary speed if limits are not observed.

Damage to the product.

- Observe the specified limits.

Risk of screws loosening due to improper installation.

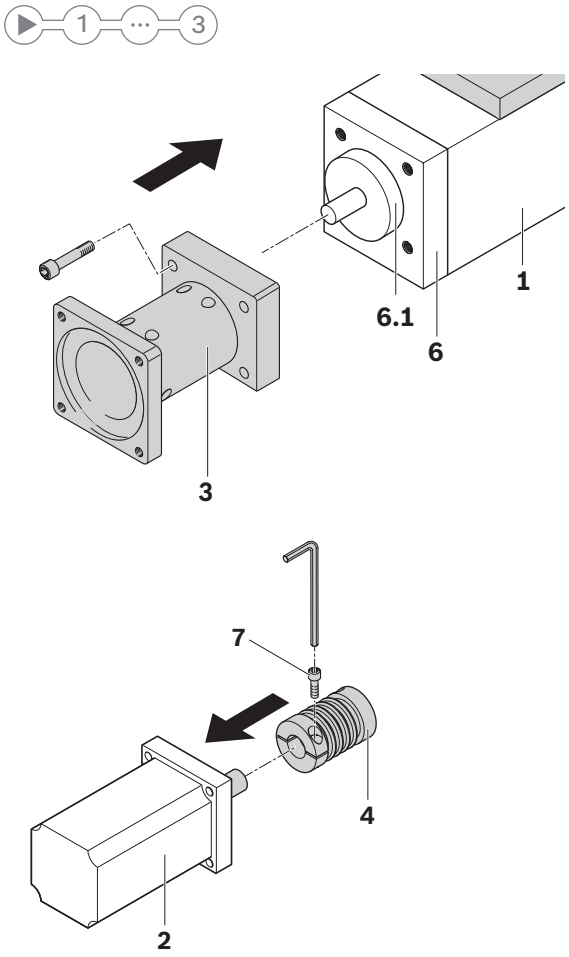
Damage to the product.

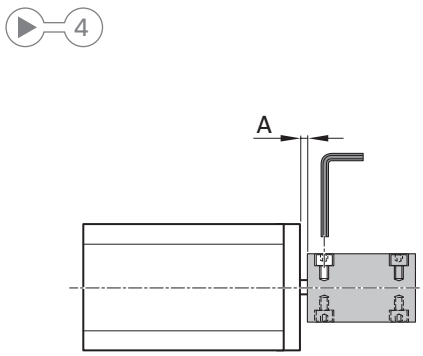
- Secure uncoated screws with threadlocking adhesive.

Observe specified tightening torque.

Run initial cycles at reduced speed to test the function of the limit switches and to optimize the interaction between the mechanical equipment and the electronics.

1. Attached mount **(3)**: Insert the mount **(3)** into the pilot **(6.1)** of the end block **(6)** and fasten with four screws to the specified tightening torque.
2. Insert coupling **(4)** onto the drive journal of the motor **(2)**.
3. Set clearance **A** per the table.
4. Tighten the fastening screw **(7)** in the coupling on the side facing the motor to the tightening torque specified under **“Coupling tightening torques”**.
5. Insert motor **(2)** with coupling into the attached/integrated mount **(3)** on the screw journal of the product **(1)** and fasten with four screws to the specified tightening torque.
6. Tighten fastening screw **(7)** in the coupling on the side facing the product **(1)** to the tightening torque specified under **“Coupling tightening torques**”.
7. If necessary, release the motor brake and move the carriage **(8)** so the screw journal turns.



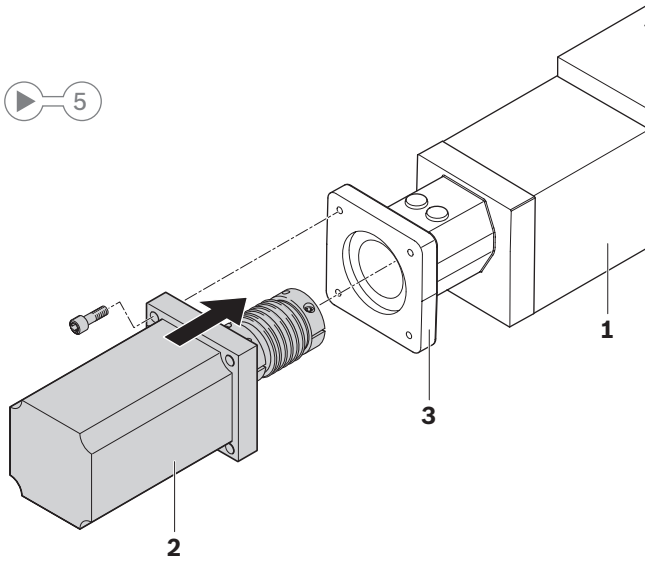


Dimension table

PSK	Motor	A ±0.1 (mm)
-050	MSM 019B	11.0
	MSM 031B	5.0
	MS2N 03-B	5.0
-060	MSM 019B	10.0
	MSM 031B	5.5
	MS2N 03-B	5.0
-090	MSM 031C	6.0
	MSM 041B	13.0
	MS2N 03	5.0
	MS2N 04	10.5

Coupling tightening torques

8.8	M2.5	M3	M4
M_A (Nm)	1.0	1.7	4.0



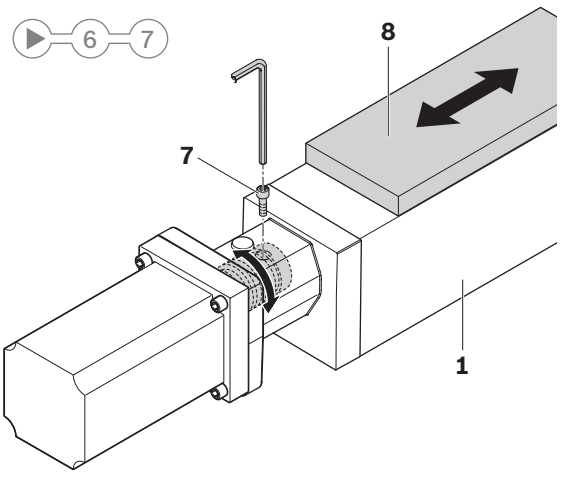


Fig. 7: **Installing the motor with mount and coupling**

6.7 Installing the motor with timing belt side drive

The timing belt side drive can be attached on any side in four directions.

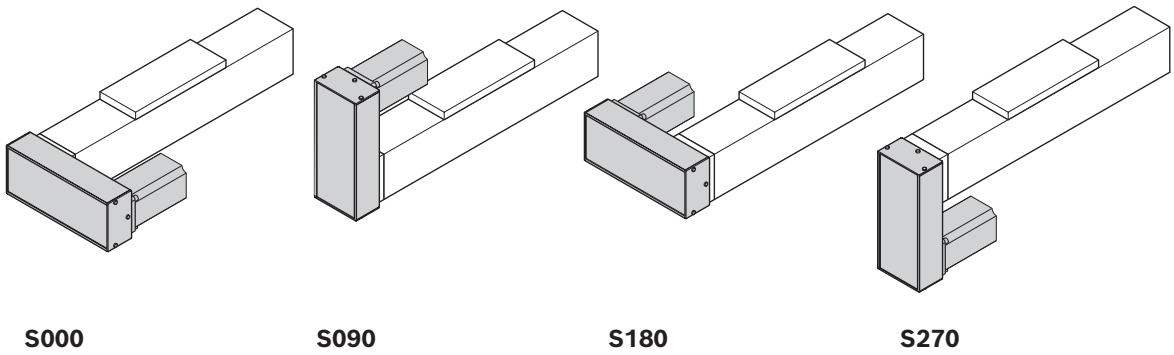


Fig. 8: **Options for installing the timing belt side drive**

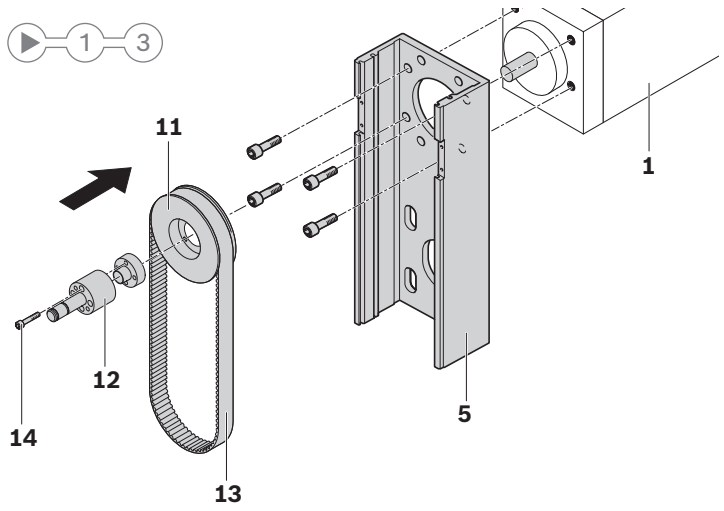
⚠ CAUTION
Risk of excessive torque and rotary speed if limits are not observed. Damage to the product. ▶ Observe the specified limits.
Risk of screws loosening due to improper installation. Damage to the product. ▶ Secure uncoated screws with threadlocking adhesive.
Risk of insufficient lubrication due to use of improper lubricants. Damage to the product. ▶ Do not use lubricant with MoS_2 additives!

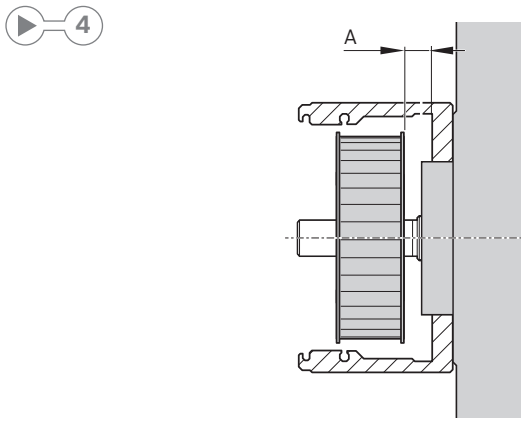
Observe specified tightening torque.

1. Fasten the housing of the timing belt side drive **(5)** onto the product **(1)** and tighten to the specified tightening torque.

6.7.1 Installing the first belt pulley

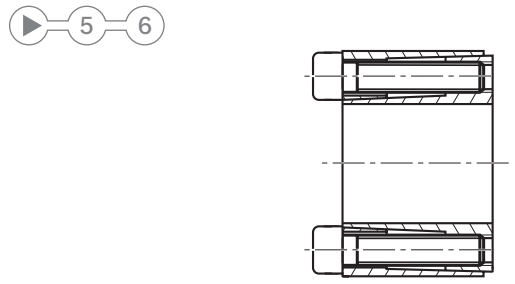
1. Lightly lubricate the tensioning unit **(12)**, then insert it into the belt pulley **(11)** as far as it will go.
2. Push the belt pulley **(11)** and tensioning unit **(12)** with the toothed belt **(13)** onto the screw journal of the product **(1)**.
3. Set clearance **A** from the housing.
4. Thread the screws **(14)** into the tensioning unit and tighten slightly.
5. Tighten the screws evenly in a criss-cross pattern in several stages to the tightening torque under **“Tensioning unit tightening torques”**.





Belt pulley clearance (A)

PSK	Motor	A $^{\pm 0.1}$ (mm)
-050	MSM019B	5.0
-060	MSM019B	5.0
	MSM031B	7.0
	MS2N03-B	7.0
-090	MSM031C	7.0
	MSM041B	8.0
	MS2N03	7.0
	MS2N04	8.0



Tensioning unit tightening torques

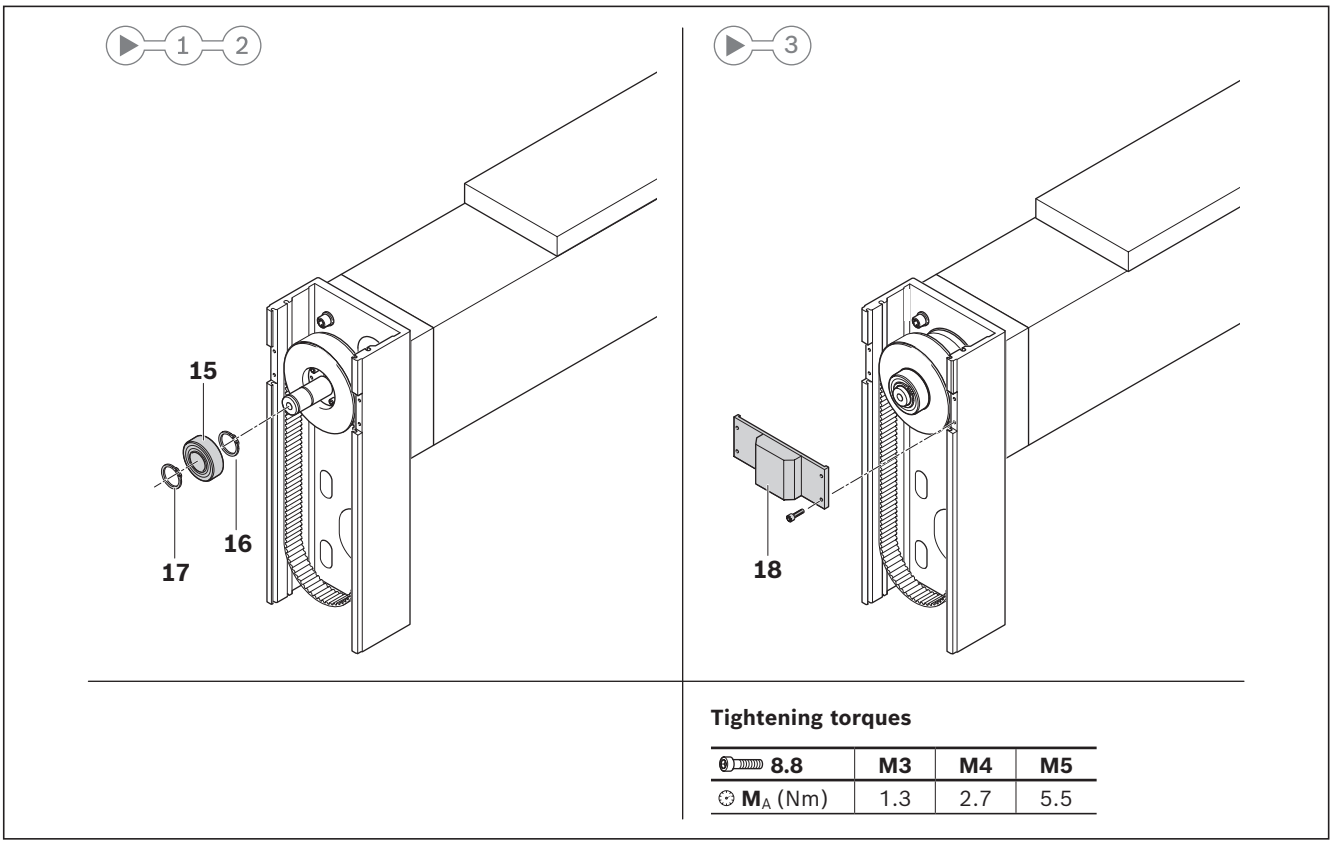
8.8	M2.5	M3	M4	M5
M_A (Nm)	1.2	2.1	4.9	9.7

Fig. 9: **Installing the first belt pulley**

6.7.2 Installing the support bearing

1. Push the first retaining ring **(16)** onto the journal of the tensioning unit to act as a stop.
2. Push the bearing **(15)** manually onto the journal of the tensioning unit and secure it with the second retaining ring **(17)**.
3. Carefully push the bearing flange **(18)** onto the bearing and screw to the housing to the specified tightening torque.

Observe specified tightening torque.



Tightening torques

8.8	M3	M4	M5
M_A (Nm)	1.3	2.7	5.5

Fig. 10: **Installing the support bearing**

6.7.3 Installing second belt pulley and motor for i = 1

Pre-installing the motor

1. Pre-install the motor **(2)** with the two motor mounting strips **(20)** as close as possible to the product **(1)** with the screw **(19)** so the belt pulley on the motor **(11)** can be inserted easily.

Installing the belt pulley:

2. Lightly lubricate the tensioning unit **(12)**.
3. Insert belt pulley **(11)** and tensioning unit **(12)** onto the journal of the motor **(2)**, then thread the belt on.
4. Set clearance **B** from the housing.
5. Install the tensioning unit. ➠ **6.7.1**.

Tensioning the toothed belt:
We recommend a low pretension for the toothed belt.

NOTICE

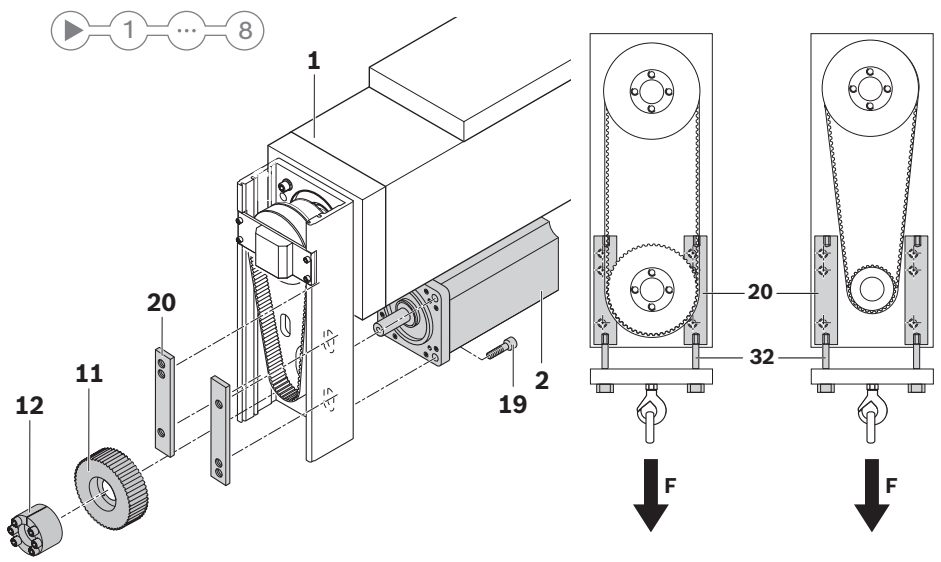
Excessive belt pulley pretensioning can cause the toothed belt to break at the product or the motor.

Damage to the product.

- **Observe maximum limits.**

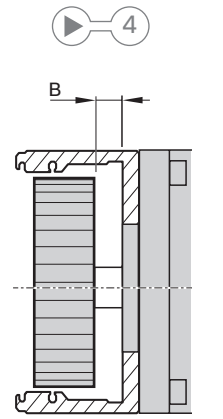
6. Loosen the motor mounting screws.
7. Screw suitable screws **(32)** into the pretensioning thread in motor mounting strips **(20)**.
8. Set belt frequency with a force **F** to the frequency listed in **Table 6** using a frequency meter (R913057897). See also inside of housing for belt frequency. Tighten the mounting screws **(19)** to the specified tightening torque.

Observe specified tightening torque.



Tightening torques

8.8	M4	M5	M6	M8
M_A (Nm)	2.7	5.5	9.5	23



Belt pulley clearance (B)

PSK	Motor	B ±0.1 (mm)
-050	MSM019B	5.0
-060	MSM019B	5.0
	MSM031B	7.0
	MS2N03-B	7.0
-090	MSM031C	9.0
	MSM041B	8.0
	MS2N03	7.0
	MS2N04	7.0

Fig. 11: **Installing second belt pulley and motor i = 1**

6.7.4 Installing second belt pulley and motor for i = 1.5

Installing the belt pulley:

1. Lightly lubricate the tensioning unit **(12)**.
2. Insert belt pulley **(11)** and tensioning unit **(12) or** just the belt pulley onto the journal of the motor **(2)**, then thread the belt on.

Pre-installing the motor:

3. Pre-install the motor **(2)** with the two motor mounting strips **(20)** as close as possible to the product **(1)** with the screw **(19)** so the belt pulley on the motor **(11)** can be inserted easily.
4. Set clearance **C** from the housing.
5. Install tensioning unit (➠ **6.7.1**) or install belt pulley with set screw **(21)**.

Tensioning the toothed belt:

We recommend a low pretension for the toothed belt.

NOTICE

Excessive belt pulley pretensioning can cause the toothed belt to break at the product or the motor.
Damage to the product.
- **Observe maximum limits.**

6. Loosen the motor mounting screws.
7. Screw suitable screws **(32)** into the pretensioning thread in motor mounting strips **(20)**.
8. Set belt frequency with a force **F** to the frequency listed in **Table 6** using a frequency meter (R913057897). See also inside of housing for belt frequency. Tighten the mounting screws **(19)** to the specified tightening torque.

Table 6: Belt frequency

PSK	**Motor**	**i**	**Frequency** (Hz) **BASA d_0 x p** (mm) **8x1**	**8x2**	**8x2.5/8x5**	**12x2**	**12x5**	**12x10**	**16x5**	**16x10**	**16x16**
-050	MSM019B	1	135	208	224	–	–	–	–	–	–
		1.5	135	208	224	–	–	–	–	–	–
-060	MSM019B	1	–	–	–	253	327	327	–	–	–
		1.5	–	–	–	253	327	327	–	–	–
	MSM031B	1	–	–	–	178	318	332	–	–	–
		1.5	–	–	–	185	330	345	–	–	–
	MS2N03-B	1	–	–	–	178	318	332	–	–	–
		1.5	–	–	–	185	330	345	–	–	–
-090	MSM031C	1	–	–	–	–	–	–	270	270	270
		1.5	–	–	–	–	–	–	243	243	243
	MSM041B	1	–	–	–	–	–	–	144	168	176
		1.5	–	–	–	–	–	–	144	168	176
	MS2N03-D	1	–	–	–	–	–	–	270	270	270
	MS2N03-B	1.5	–	–	–	–	–	–	243	243	243
	MS2N04	1	–	–	–	–	–	–	144	168	176
		1.5	–	–	–	–	–	–	144	168	176

Table 7: Belt frequency tolerances

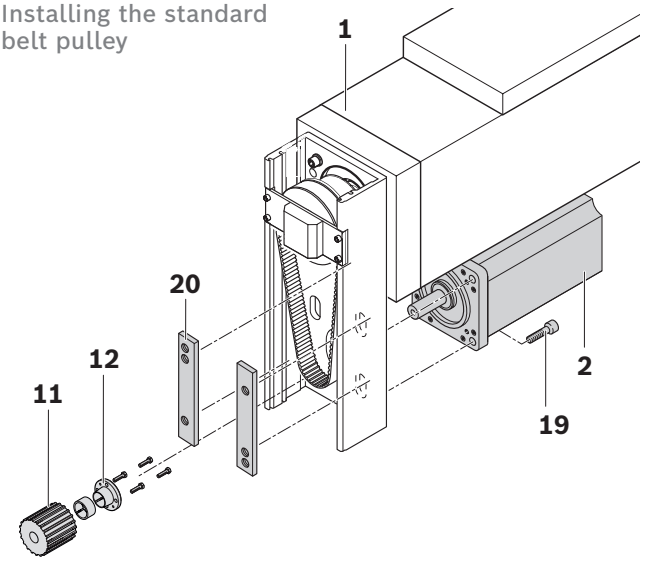
Frequency (Hz)	**Tolerance** (Hz)
≤ 100	± 3
> 100 ≤ 200	± 5
> 200 ≤ 300	± 7
> 300	± 10

6.7.5 Installing the belt pulley on the motor

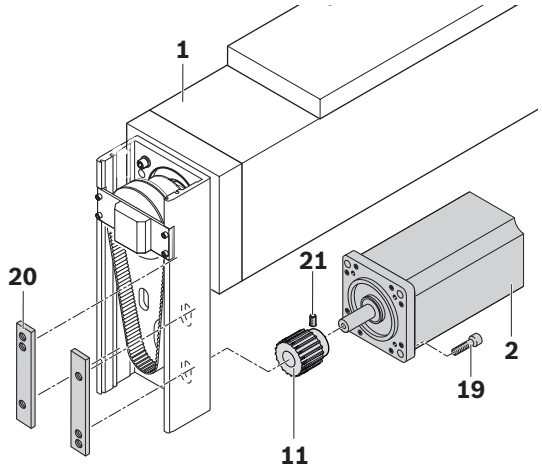
Observe specified tightening torque.

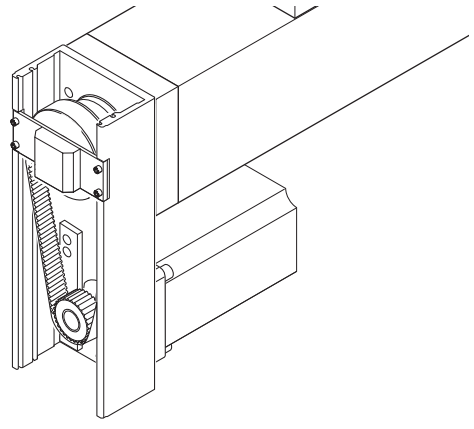
1 ··· 8

Installing the standard belt pulley



Installing the belt pulley with set screw

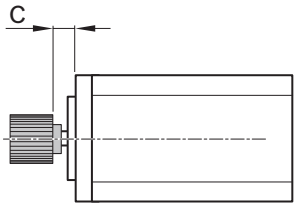




4

Belt pulley clearance (C)

PSK	Motor	C ±0.1 (mm)
-050	MSM019B	8.0
-060	MSM019B	8.0
	MSM031B	12.0
	MS2N03-B	12.0
-090	MSM031C	15.0
	MSM041B	15.0
	MS2N03	12.0
	MS2N04	14.0



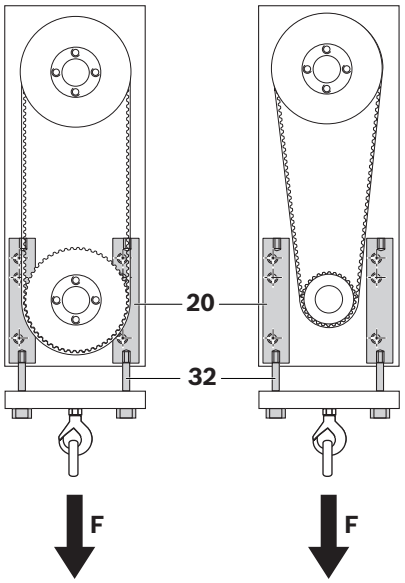


Fig. 12: **Installing the belt pulley on the motor**

6.7.6 Completing assembly

1. Install all covers to the housing of the timing belt side drive.

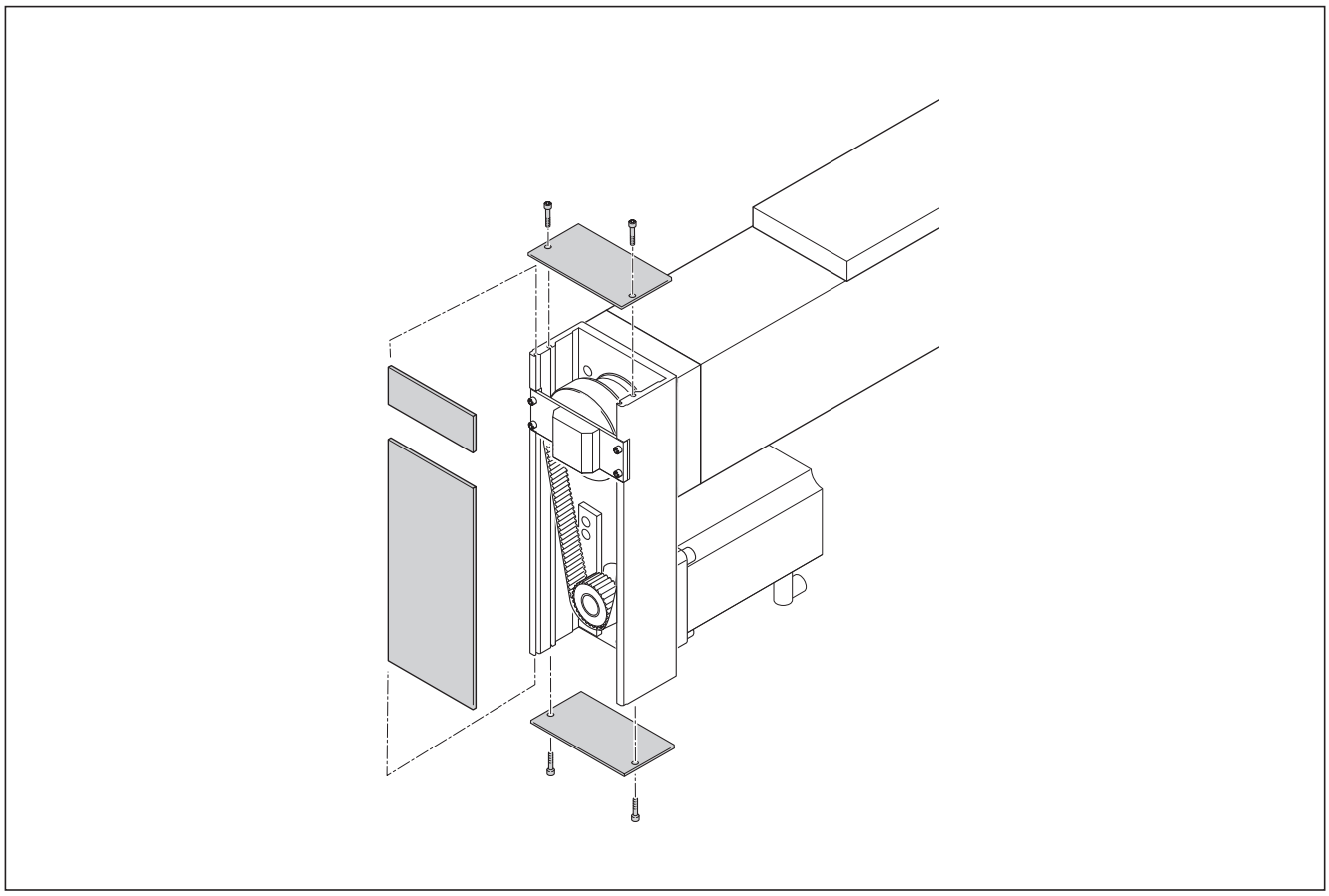


Fig. 13: **Installing covers on the timing belt side drive**

6.8 Switch mounting

Switching system overview

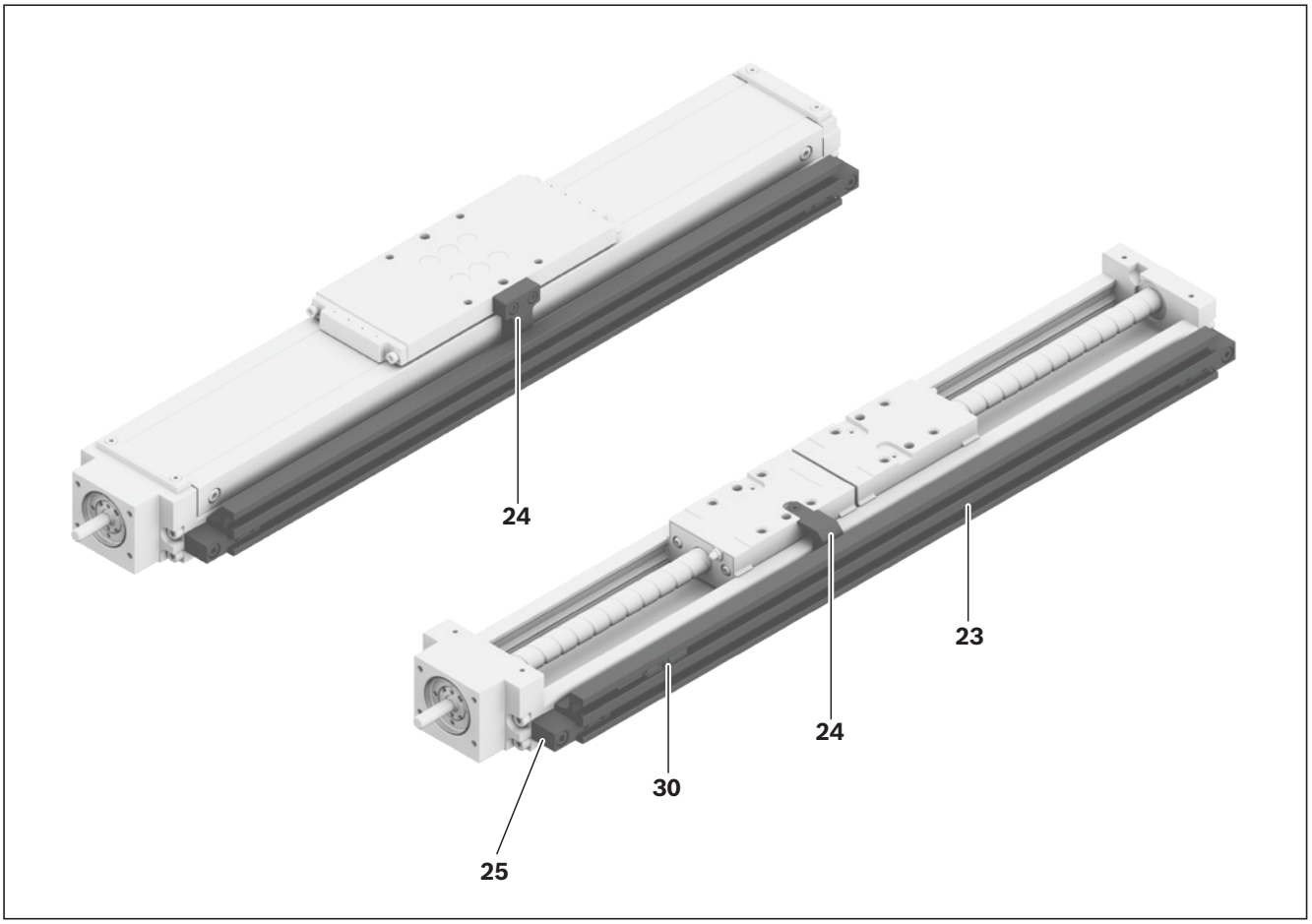


Fig. 14: **Switching system**

The switching system contains the following parts:

23 Mounting channel

24 Switching tab

25 Clamp for mounting channel

30 Switch

6.8.1 Installing the switching system

NOTICE

Potential collision due to incorrect installation of the switching system.

Damage to product, adjoining structure and workpieces.

- Install the entire switching system on one side of the product.

If there are two carriages, always install the switching tab (24) to the carriage on the drive side.

1. Remove cover plate **(26)**. ➠ **6.10** (if present)
2. Remove carriage plate **(27)** on the drive side. ➠ **6.9** (if present)
3. Install the switching tab **(24)** on the carriage using flat head screws, or to the carriage plate using socket head screws if sealing strip is present.
4. Attach mounting channel **(23)**.
5. Insert switch **(30)** into the mounting channel so the groove in the knurled head screw **(31)** is vertical.
6. Set the switching point.
7. Fasten switch with knurled head screw **(31)**.
8. Lay the cable **(32)** in the free space of the mounting channel.

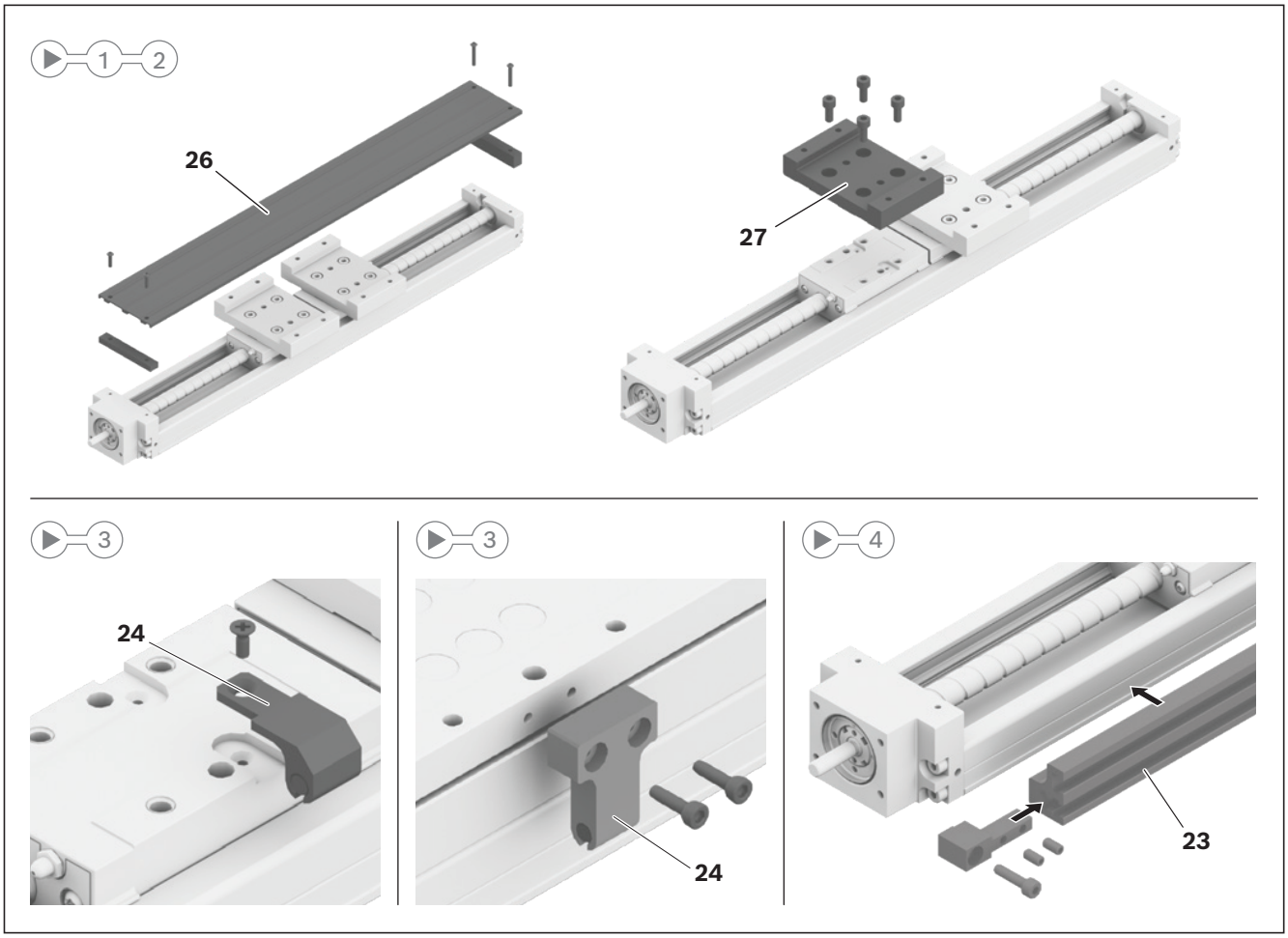


Fig. 15: **Installing the switching system**

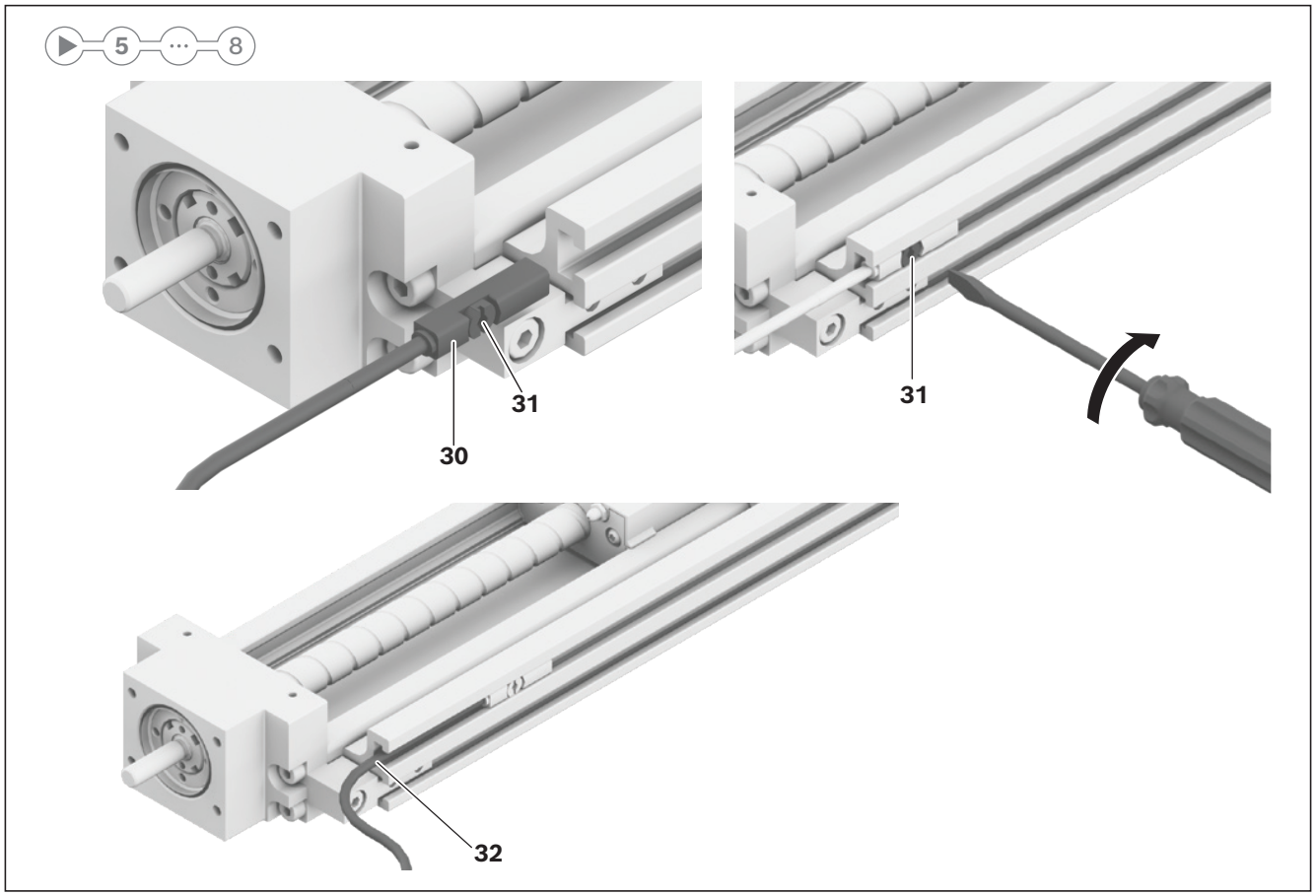


Fig. 16: **Installing the switching system**

6.8.2 Completing assembly

1. Install the carriage plate **(27)**. ➠ **6.9**
2. Lay the adapter plates **(33)** on the end blocks **(6)**.
3. Install cover plate **(26)**. ➠ **6.10**.

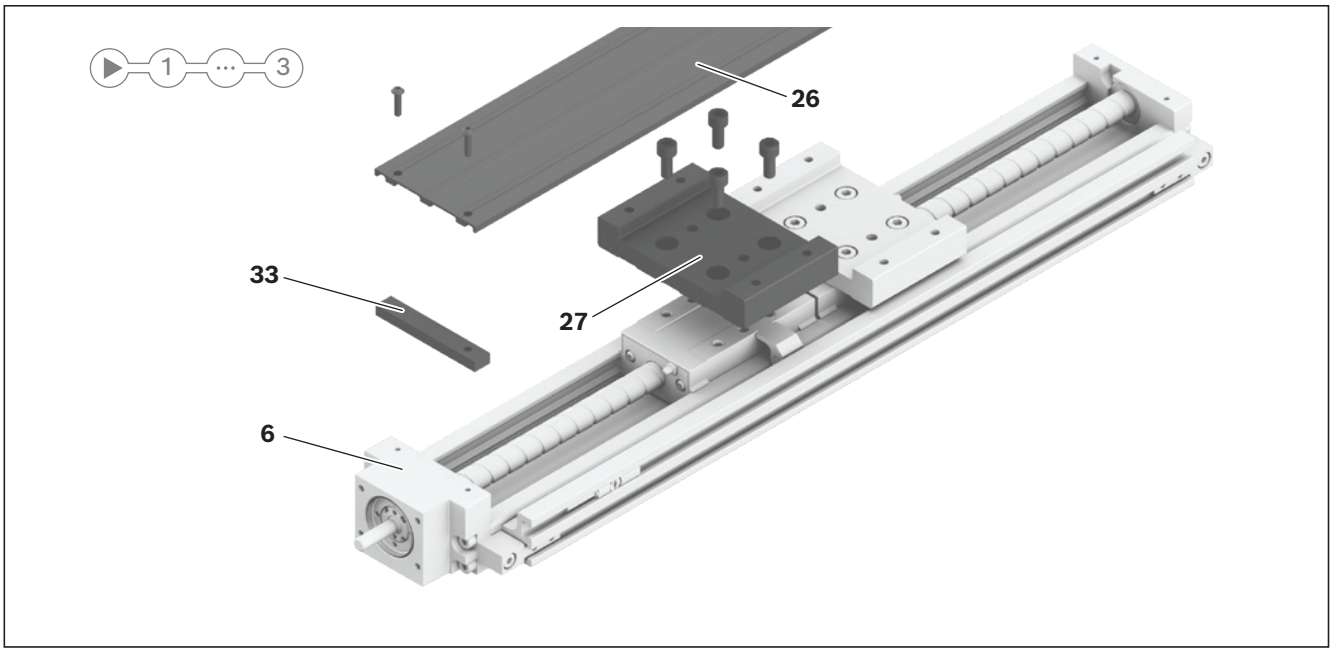


Fig. 17: **Completing assembly**

6.8.3 Moving or removing the switch

⚠ WARNING

Switch off the power supply.

Death or serious injury.

- Before working on the electrical equipment, switch off the power supply and secure it against reactivation.

When checking function, please follow the instructions in the “Start-up” section. ➠ 8.

Death or serious injury.

- Before starting work, switch off the power supply and secure it against reactivation.
- Secure the frame against falling.
- Observe the safety regulations for working with compressed air.

1. Loosen the knurled head screw **(31)** on the switch.
2. To set a new switching point, move the switch and then secure in place with the knurled head screw.
3. To remove, pull the switch out of the mounting channel.

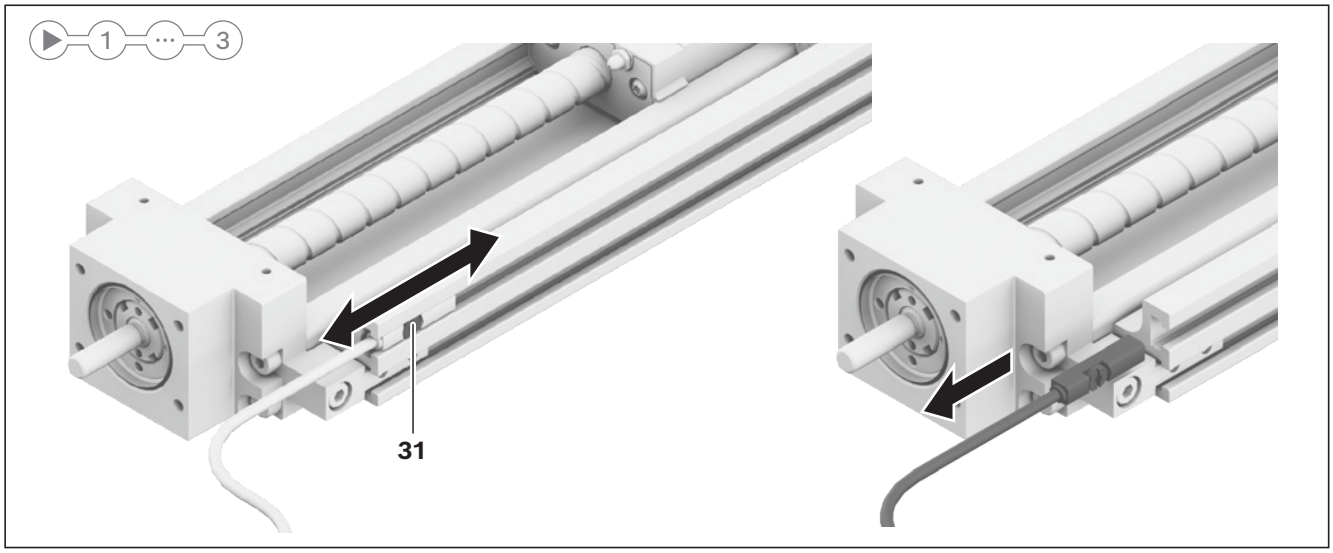


Fig. 18: **Moving the switch**

6.9 Installing carriage plates on Precision Modules with cover plate

1. Place the carriage plate **(27)** on the carriage **(8)**, then pre-install with screws **(34)**.
2. Tighten the screws **(34)** to the specified tightening torque.

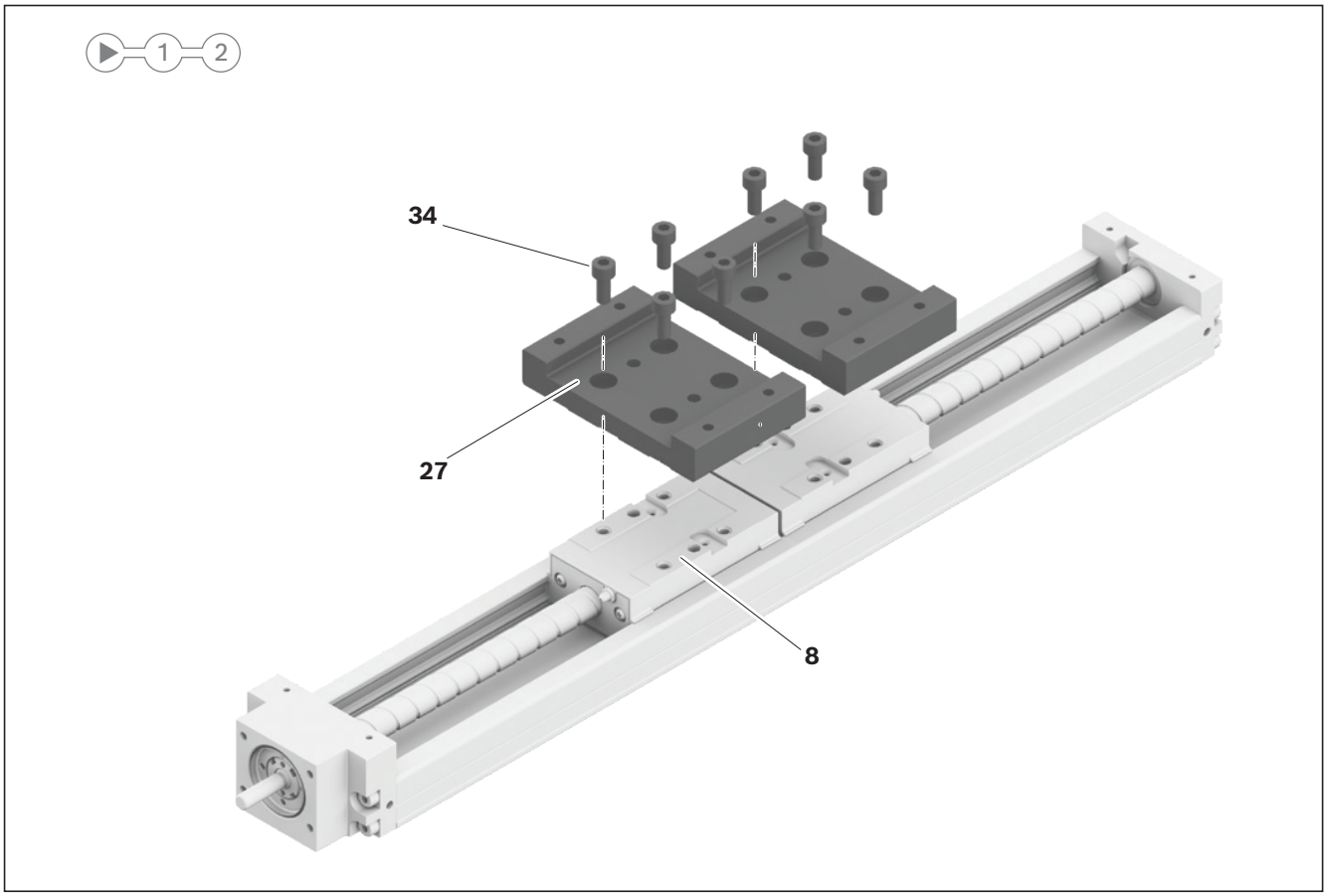


Fig. 19: **Installing the carriage plate**

6.10 Installing the cover plate

1. Lay the adapter plates **(33)** on the end blocks **(6)**.
2. Place the cover plate **(26)**, then tighten the screws to the specified tightening torque.

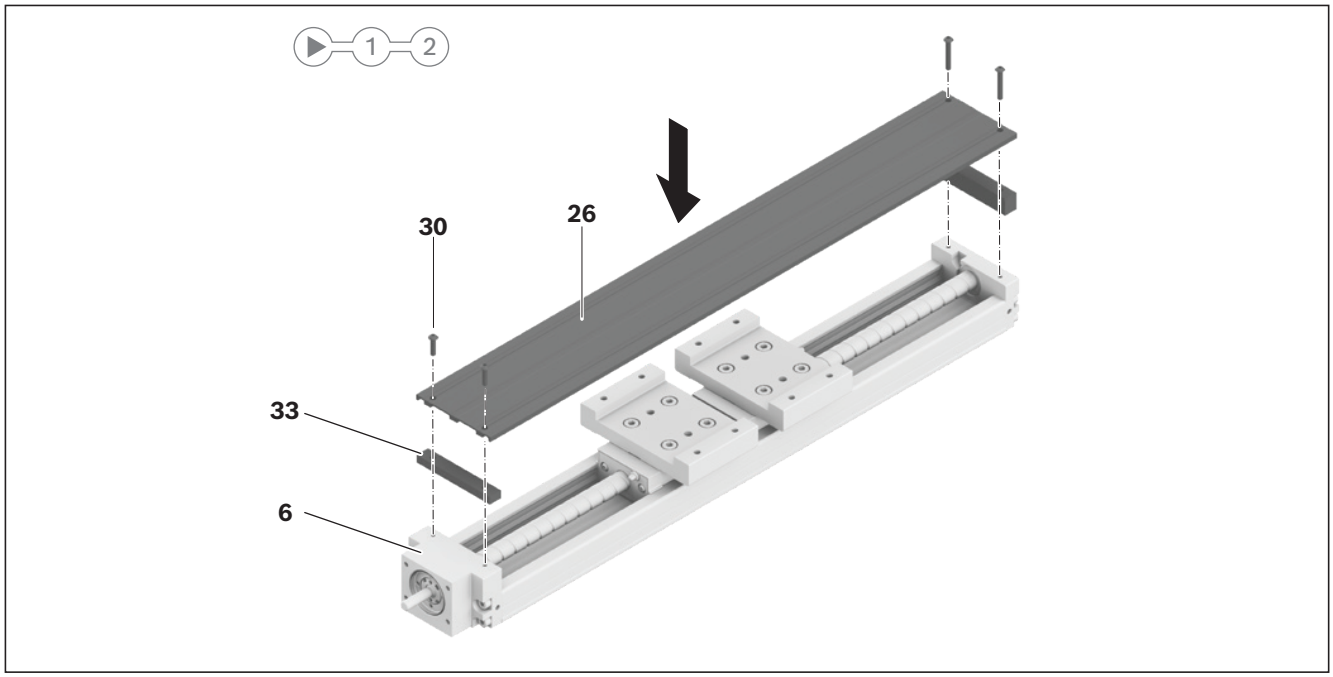


Fig. 20: **Installing the cover plate**

6.11 Installing the carriage plate on PSKs with sealing strip

1. Place the carriage plate **(27)** on the carriage **(8)** and loosely insert the screws **(34)**.
2. Drive in two pins **(35)**.
3. Tighten the screws **(34)**.
4. Cover the screw and pin holes with plastic protective caps **(36)**.

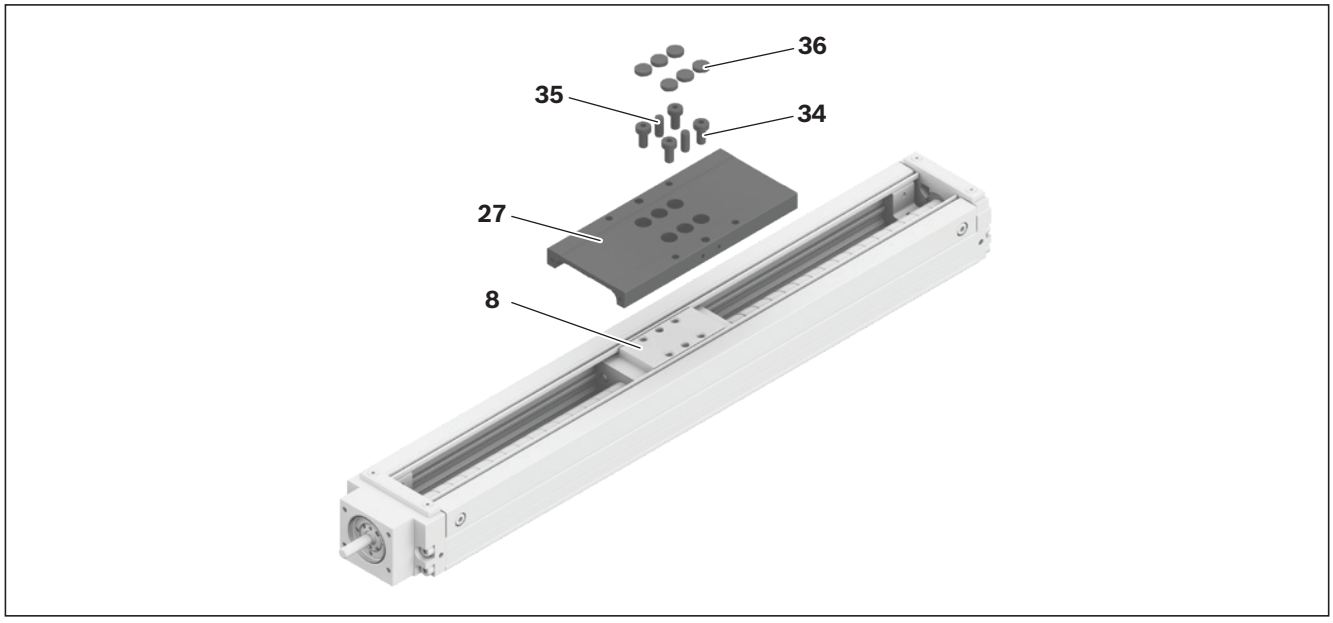


Fig. 21: **Installing the carriage plate for sealing strip**

6.12 Installing the sealing strip

⚠ WARNING

Do not grip the steel strip with bare hands.

Risk of injury!

1. Soak any dry felt pads in oil for at least 5 minutes.
2. Slide the steel strip **(28)** through the carriage plate **(27)** and deflectors **(37)**.

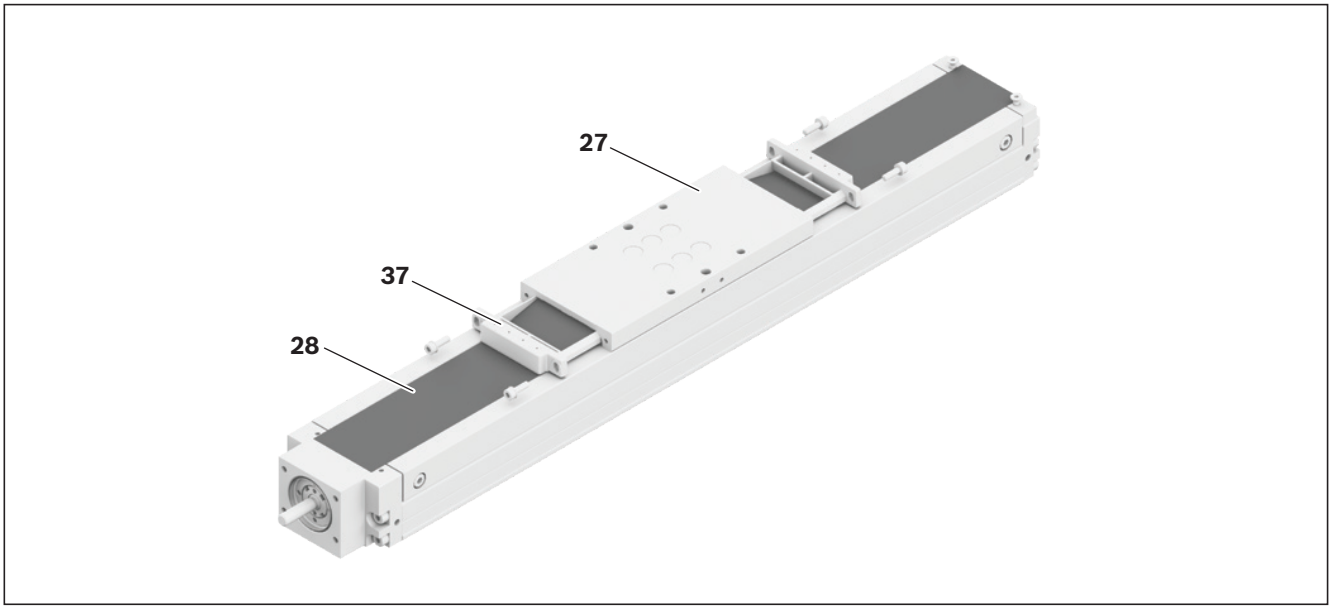


Fig. 22: **Installing the sealing strip**

3. Push the deflectors **(37)** against the carriage plate **(27)** and down onto the steel strip **(28)** and screw them into place with socket head screws and washers.
4. Secure the steel strip **(28)** to the end blocks with clamps **(38)** and flat head screws, using an adapter plate **(33)** at the float end.

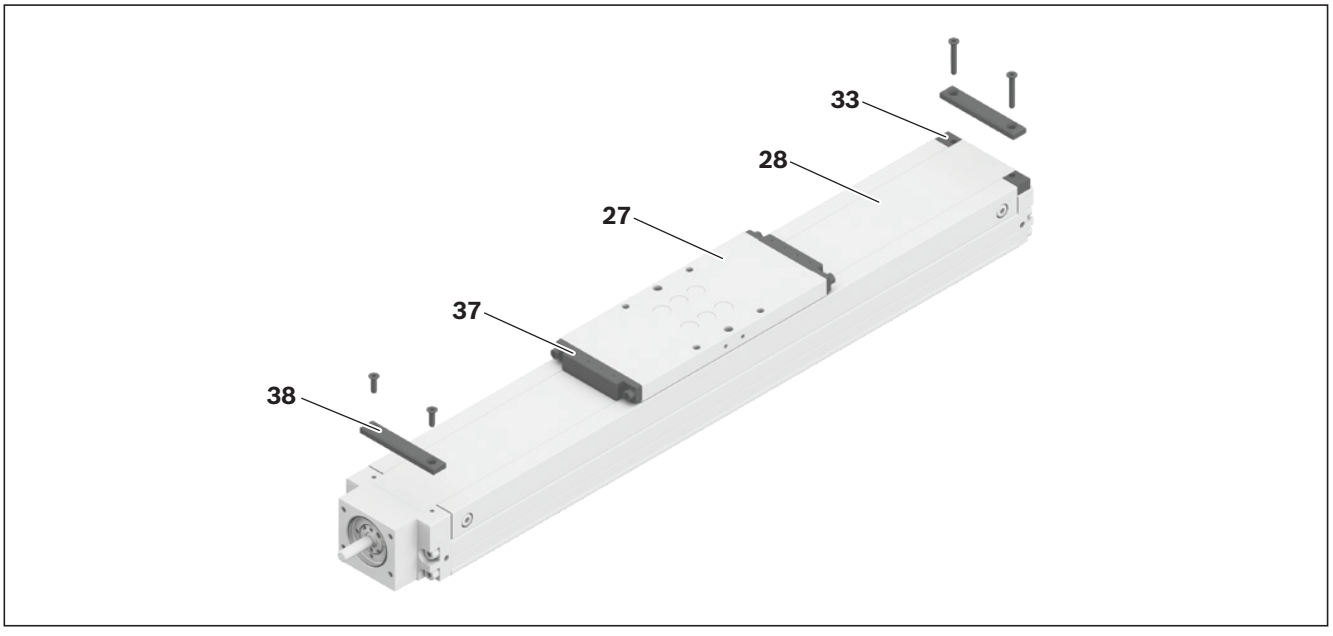


Fig. 23: **Securing the sealing strip**

7 Connecting the Precision Module to power

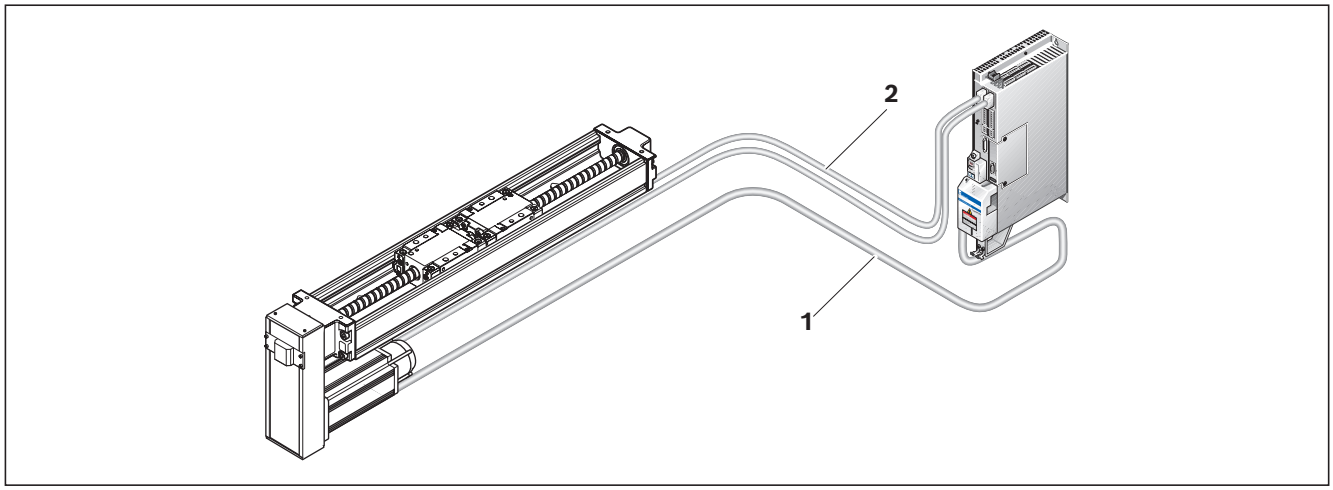


Fig. 24: **Connecting the product to power**

⚠ WARNING

Risk of electric shock due to contact with live parts.

Death or serious injury.

- Before working on the electrical equipment, switch off the power supply and secure it against reactivation.
- Follow the safety instructions given in the documentation for the controller used.
- Observe the safety regulations for working with high-voltage equipment.

1. Keep the documentation for the motor/controller at hand.
2. Lay the motor cable **(1)** away from the encoder cables **(2)**.

8 Start-up

▶ Do not start up the product until it has been verified that the end product (for example a machine or system) into which the Rexroth product has been installed complies with the country-specific requirements, safety regulations and standards for the application.

8.1 Easy start-up using the integrated wizard

EasyWizard is the standard wizard integrated in the Rexroth engineering framework IndraWorks DS to help you start up Linear Motion System drives easily and quickly. Start-up has never been easier thanks to pre-configured data sets and a name plate on the Linear Motion Systems that is keyed to the wizard.

- Quick, easy and intuitive start-up
- Text-based and graphic online help for the individual input fields
- Plausibility checks for free data entry
- Compatible with all Rexroth Linear Motion Systems
- Incorrect parameter settings are minimized by the similar arrangement of the data on the nameplate and the wizard input mask
- For system optimization, the axis can be moved in the test mode after parameterization

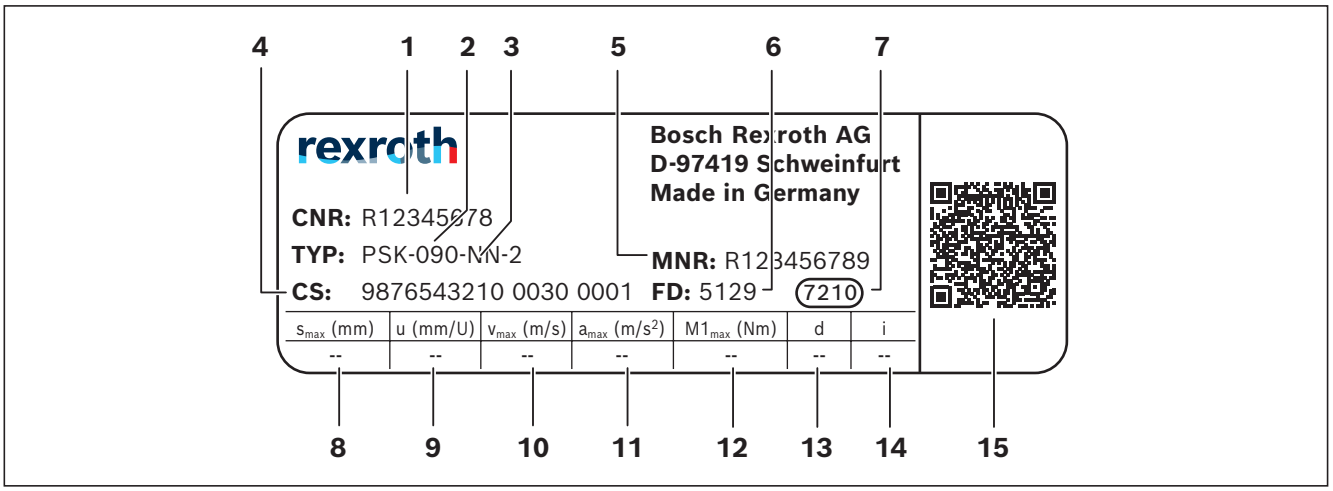
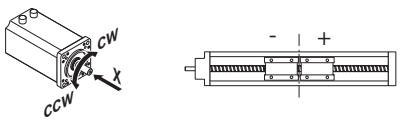


Fig. 25: **Name plate**

1	CNR	Customer's part number
2	TYP	Short product name
3	090	Size
4	CS	Customer information
5	MNR	Part number
6	FD	Date of manufacture
7	7210	Manufacturing location
8	s_{max}	Maximum travel range
9	u	Lead constant without motor attachment
10	v_{max}	Maximum speed
11	a_{max}	Maximum acceleration

12	$M1_{max}$	Maximum drive torque at motor journal
13	d	Direction of motor rotation to move in positive (+) direction CW = clockwise CCW = counterclockwise
		
14	i	Gear ratio
15		QR code

8.2 Checking operating conditions

- Observe the technical data ➠ catalog.
- For operating conditions ➠ **15**.

8.3 Test run, running in

⚠ WARNING

Dangerous movements. Risk of death or serious injury, or property damage.

Do not stand in the product's range of movement.

Do not allow persons to inadvertently enter the hazard zone.

Never perform maintenance on running machines.

Secure the system against restart and unauthorized use during maintenance.

Securely fasten the product in the system or machine.

The product is not self-locking; this means that if it is used vertically or at an angle, it can drop or move uncontrollably.

To prevent this, the manufacturer/vendor must take precautions when installing in this manner. The Division Information Sheet on “Gravity-Loaded Axes” of DGUV Fachbereich Holz und Metall, the Woodworking and Metalworking Division of the German statutory accident assurance association (DGUV), and other sources offer further information on this topic.

Risk of burns due to hot surfaces. Temperatures above 60 °C possible

- Avoid touching the hot surface of, e.g., the carriage assembly or motor.
- After switching off the product, let hot surfaces cool down before touching them.
- Temperature-sensitive components should not touch the surface of the carriage assembly.
- Pay attention to the clearance of the connecting cables from other components.

- Only start up the product after running successful tests under simulated production conditions.
- Move at low speed over the entire travel distance. While doing so, be sure to check the settings and the function of the limit switches.
- If necessary, optimize the interaction of the mechanical equipment and the electronics.

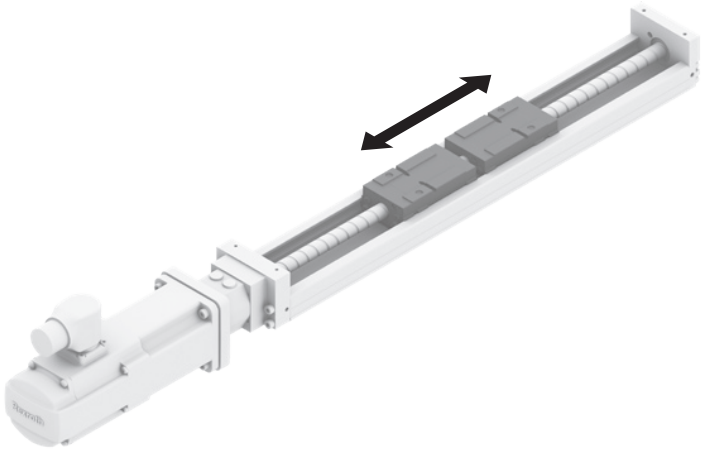


Fig. 26: **Moving the carriage**

9 Operation

NOTICE
Lubricant may leak if installed vertically. Environmental contamination. ▶ Take suitable precautions to collect any leaking lubricant and dispose of it properly**.**
Risk of motor overheating when overloaded. Fire risk. ▶ Observe the technical data during operation ➠ catalog.

10 Maintenance and repair

Maintenance is limited to lubrication.

11 Lubrication

11.1 Notes

Maintenance of the Precision Module is limited to lubricating at the prescribed intervals.
The Precision Module is designed to be lubricated with grease from a grease gun.
The Ball Screw Assembly and Ball Rail System are simultaneously lubricated through a lube fitting.

▶ Before using lubricants, read and observe the appropriate safety data sheets.

The basic lubrication of all other components, such as deep-groove ball bearings, is done by the manufacturer.

- Do not use lubricants with solid particles (e.g. graphite or MoS_2).
- Using lubricants other than those specified may impact performance and chemically interact with the plastics used in the product.
- If using a central lubrication system, ensure these lubricants can be sufficiently pumped through the system.
- If using a central lubrication system, make sure all lines and elements are filled with lubricant all the way to the connection to the consumer (carriage) and that there are no air bubbles.
- Lubricant reservoirs should contain an agitator to ensure the lubricant maintains fluidity (avoids hardening in the reservoir).
- If environmental factors such as contamination, vibrations, impact loads, etc. are present, we recommend shorter lubrication intervals. Even under normal operating conditions, relubrication is required every two years due to grease aging.
- Rexroth recommends piston distributors by SKF. These should be installed as close to the carriage lube fittings as possible. Long lines and small line diameters should be avoided, and the lines should be laid on an upward angle.
- If other consumers are connected to the single-line lubrication system, the weakest link in this chain determines the lubrication cycle.
- Excess lubricant can contaminate the environment.

Lack of lubrication. Failure to perform basic lubrication will damage the product. ▶ Never start up a Linear Motion System without basic lubrication (lubrication type: LPG).
Overlubrication. Increased friction and temperatures in the Ball Screw Assembly and Ball Rail System. ▶ Use only recommended lubricants.
Insufficient lubrication. Damage to the product. ▶ Only use recommended lubricants and observe lubrication intervals.
Special operating conditions. Possible damage to the product. ▶ Consult Bosch Rexroth before starting up the product under special operating conditions, specifically in the presence of fiber glass or wood dust and solvents, or in short-stroke operations and extreme temperatures.

NOTICE

Lubrication of the preserved carriage with H1 lubricant.

Loss of H1 approval

- H1 lubricants or release agents (anti-corrosion agents) only have H1 approval if they are separated and unmixed (including at the lubrication point). A blend of two H1 approval lubricants or separating agents does not have H1 approval.

No approval or authorization for use in the food industry

- Because of the use of H1 lubricants, the products listed under 1.1 do not have authorization or approval for use in the food industry.

Components lubricated at the factory

- Components lubricated at the factory, such as deep-groove ball bearings, do not use H1 lubricants.

11.2 Overview of lubrication types

LSS: Basic lubrication with Dynalub at the factory

LPG: Preserved variant without basic lubrication

LCF: Prepared for connection to central lubrication systems with liquid grease

LSC: Basic lubrication with Tribol GR 100 at the factory

For further information regarding each lubrication type, please refer to the following sections.

11.3 Lube fittings

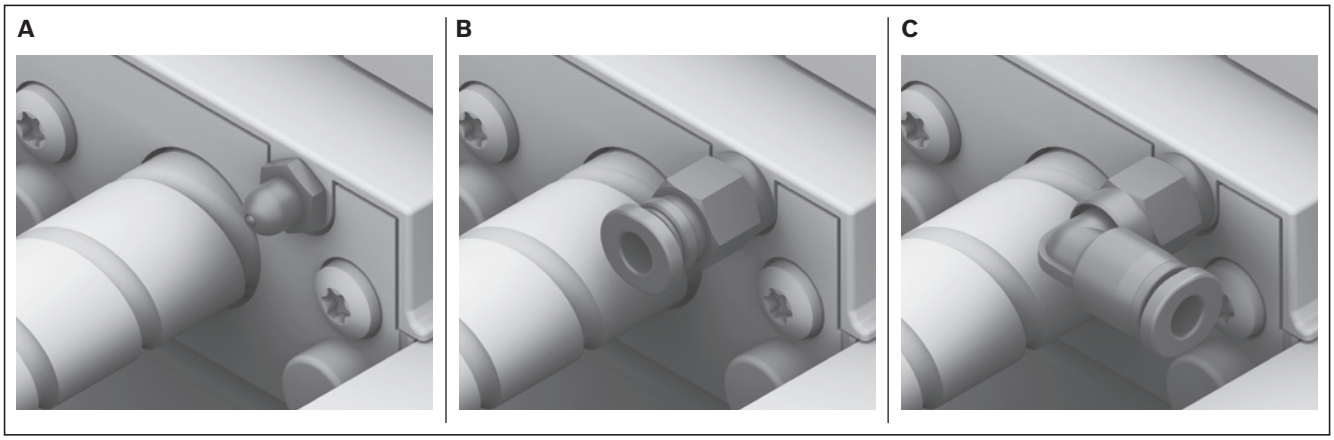


Fig. 27: **Lube fittings**

Types

A Ball-type lube nipple (from the factory)

B Straight connectors for plastic tubes and metal pipes (accessory)

C Rotatable elbow plug-in connections rotatable for plastic tubes and metal pipes (accessory)

- For dimensions, part numbers and data ➠ see “Precision Modules PSK” catalog.

11.4 Lubricants

The Precision Module is designed to be lubricated with grease from a grease gun.

- Before using lubricants, read and observe the appropriate safety data sheets.
- For Precision Modules with two carriages, always lubricate both carriages.

Table 8: Authorized lubricants

Lubrication version	LSS		LPG	
Basic lubrication	Dynalub 510	Dynalub 520	Preserved, basic lubrication required (see instructions)	
Size: BASA d_0xP	PSK-050: 8x2.5; 8x5 PSK-060: 12x5; 12x10 PSK-090	PSK-050: 8x1; 8x2 PSK-060: 12x2	PSK-050: 8x2.5; 8x5 PSK-060: 12x5; 12x10 PSK-090	PSK-050: 8x1; 8x2 PSK-060: 12x2
Consistency class	NLGI 2 (DIN 51818)	NLGI 00 (DIN 51818)	–	
Marking	KP2K-20 (DIN 51825)	GP00K-20 (DIN 51826)	–	
Lubrication with grease gun	yes		yes	
Prepared for connection to central lubrication systems	–		–	
Recommended lubricants	Dynalub 510 (grease lubricant) (NLGI2 DIN 51818)	Dynalub 520 (liquid grease) (NLGI00 DIN 51818)	Dynalub 510 (grease lubricant) (NLGI2 DIN 51818)	Dynalub 520 (liquid grease) (NLGI00 DIN 51818)
	Tribol GR 100-2 PD (grease lubricant) (NLGI2 DIN 51818)	Tribol GR 100-00 PD (liquid grease) (NLGI00 DIN 51818)	Tribol GR 100-2 PD (grease lubricant) (NLGI2 DIN 51818)	Tribol GR 100-00 PD (liquid grease) (NLGI00 DIN 51818)
Features	Good water resistance Corrosion protection Temperature range: -20 to +80 °C		Good water resistance Corrosion protection Temperature range: -20 to +80 °C	
Alternative lubricants	Tribol GR 100-2 PD Elkalub GLS 135/N2	Tribol GR 100-00 PD Elkalub GLS 135/N00	Tribol GR 100-2 PD Elkalub GLS 135/N2 Tribol GR 100-00 PD Elkalub GLS 135/N00 Dynalub 520	Tribol GR 100-00 PD Elkalub GLS 135/N00
Alternative lubricants with H1 approval	–		Berulub FG H2 SL Cassida Grease EPS2 VP 874	Berulub FB 34-00 Elkalub GLS 367/N00

Lubricant	Availability	400 g cartridge	5 kg bucket	25 kg hobbock
Dynalub 510	Europe	R3416 037 00	–	R3416 035 00
Dynalub 520	Europe	R3416 043 00	R3416 042 00	–
Tribol GR 100-2 PD	World	R3416 031 00	–	–
Tribol GR 100-00 PD	World	R3416 032 00	–	–

11.5 LSS/LCF/LSC-type lubrication

- Pay attention to the notes on lubrication ➠ **11**
- Lube fittings ➠ **11.3**
- Lubricants ➠ **11.4**
- Relubrication ➠ **11.7**

LCF: The pulse count is the integral quotient of the relubrication quantity and the piston distributor size. The lubricating cycle (km) is the product of dividing the lubrication interval by the calculated pulse count.

	LCF	LSC	
	Dynalub 520	Castrol Tribol GR 100-2 PD	Castrol Tribol GR 100-00 PD
	PSK-050, -060, -090	PSK-050: 8x2.5; 8x5 PSK-060: 12x5; 12x10 PSK-090	PSK-050: 8x1; 8x2 PSK-060: 12x2
	NLGI 00 (DIN 51818)	NLGI 2 (DIN 51818)	NLGI 00 (DIN 51818)
	GP00K-20 (DIN 51826)	KP2K-20 (DIN 51825)	GP00K-20 (DIN 51826)
	–	yes	
	only via single-line piston distributor system smallest permissible piston distributor size: 0.1 cm^3	–	
	Dynalub 520 (liquid grease) (NLGI00 DIN 51818)	Tribol GR 100-2 PD (Grease lubricant) (NLGI2 DIN 51818)	Tribol GR 100-00 PD (Liquid grease) (NLGI00 DIN 51818)
	Tribol GR 100-00 PD (liquid grease) (NLGI00 DIN 51818)		
	Good water resistance Corrosion protection Temperature range: -20 to +80 °C	Good water resistance Corrosion protection Temperature range: -35 to +140 °C	
	Tribol GR 100-00 PD Elkalub GLS 135/N00	Elkalub GLS 135/N2 Dynalub 510 Castrol Tribol GR 215-2 PD	Elkalub GLS 135/N00 Dynalub 520
	–	–	

11.6 LPG-type lubrication

NOTICE

Lack of lubrication.
Failure to perform basic lubrication will damage the product.
- Never start up product without basic lubrication.

- Pay attention to the notes on lubrication ➠ **11**
- Lube fittings ➠ **11.3**
- Lubricants ➠ **11.4**
- Relubrication ➠ **11.7**

Ideal distribution of the lubricant in the Ball Rail System as well as the Ball Screw Assembly requires basic lubrication in three stages. After each stage, the carriage of the Precision Module is moved three double-strokes along the entire travel distance.

Procedure for the basic lubrication:
1. Lubricate the PSK in the first stage by slowly applying the amount of grease specified for “Stage 1” ➠ **Table 9**.
2. Move the carriage at a double stroke three times at a slow speed (< 0.5 m/s).
3. Lubricate the PSK in the second stage by slowly applying the amount of grease specified for “Stage 2” ➠ **Table 9**.
4. Repeat steps 2 and 3 with the amount of grease specified for “Stage 3” ➠ **Table 9**.

Table 9: Initial amounts/intervals (for LSS, LPG, LCF, LSC)

PSK	Lubrication stage	Amount for basic lubrication			
		Driven carriage	(cm^3)	Undriven carriage	(cm^3)
-050	Stage 1	1.00		0.30	
	Stage 2	1.00		0.30	
	Stage 3	1.00		0.30	
-060	Stage 1	1.00		0.40	
	Stage 2	1.00		0.40	
	Stage 3	1.00		0.40	
-090	Stage 1	1.90		0.80	
	Stage 2	1.90		0.80	
	Stage 3	1.90		0.80	

11.7 Relubrication amounts (for LSS, LPG, LCF, LSC)

Table 10: Relubrication amounts

PSK	BASA	Relubrication quantity			
		Driven carriage	(cm^3)	Undriven carriage	(cm^3)
-050	8x1	0.10		0.10	
	8x2	0.20		0.10	
	8x2.5/8x5	0.60		0.20	
-060	12x2	0.30		0.10	
	12x5	0.10		0.10	
	12x10	0.70		0.20	
-090	16x5	1.40		0.40	
	16x10	1.90		0.70	
	16x16	3.00		1.20	

Use of lubricants with H1 approval:
First relubrication takes place after 20 km. Use 50% of the standard relubrication interval as a guideline for the other relubrication intervals.

11.8 Relubrication intervals (for LSS, LPG, LCF, LSC)

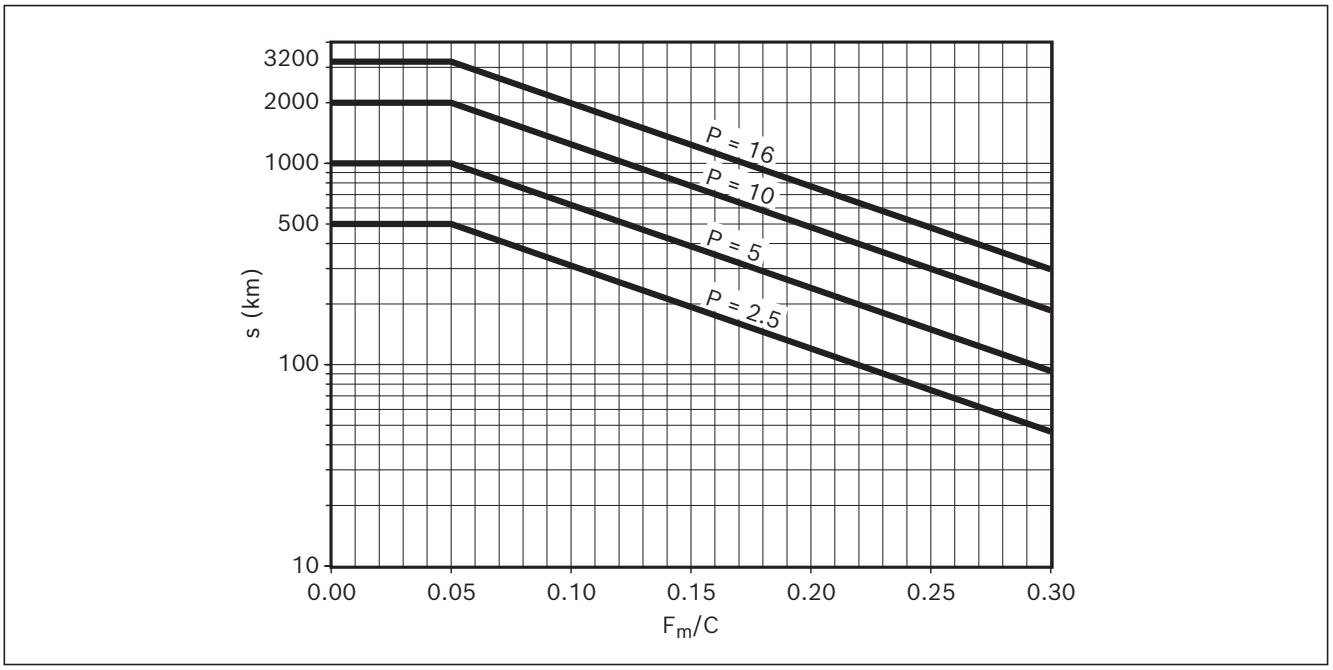


Fig. 28: **Relubrication – Lubricant NLGI 2 (Dynalub 510)**

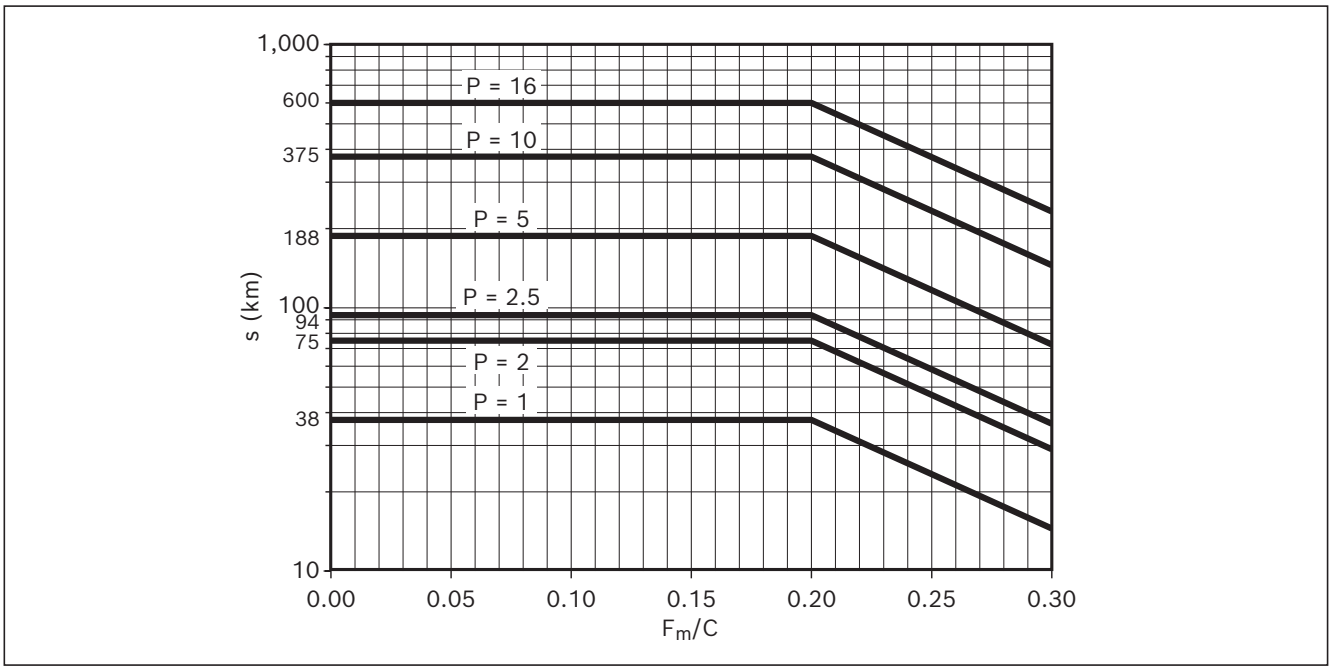


Fig. 29: **Relubrication – Lubricant NLGI 00 (Dynalub 520)**

11.9 Repairs

Repairs to the linear axis should only be performed by Bosch Rexroth.

12 Removal and replacement

To ensure the accuracy of the product after replacement of assemblies (e.g. Ball Rail Systems, carriage, frame, etc.), such assemblies should only be removed and replaced by Bosch Rexroth.

12.1 Removing the drive

Removal is the reverse of the **6.6** section.

Be sure to observe the safety instructions in that section.

13 Disposal

The Precision Module is constructed from various materials: aluminum, steel, plastics, grease and possibly electronic components.

NOTICE
Environmentally hazardous materials can pollute the environment if not disposed of properly. Environmental pollution. ▶ Collect any leaking lubricant and dispose of it properly. ▶ The product and its components should be disposed of properly and in compliance with all applicable national and international guidelines and laws.

14 Technical data

For technical data ➠ catalog.

15 Operating conditions

Table 11: Operating conditions

Operating condition	Value
Ambient temperature with Bosch Rexroth servo motor	0 °C ... 40 °C, loss of performance above 40 °C
Ambient temperature for mechanical system (no dropping below dew point)	-10 °C ... 60 °C
Travel s_{min} [1)]	See “Technical data” tables in the catalog
Soiling	Do not allow

15.1 Tightening torques

We use screws in the 8.8 strength class as standard. Use of other screws is indicated.

Table 12: Tightening torques

8.8	M2	M2.5	M3	M4	M5	M6	M8	M10	M12	M14	M16
$M_{A\ max}$ (Nm)	0.4	0.7	1.3	2.7	5.5	9.5	23	46	80	123	194
μ = 0.125											

16 Service and support

The Bosch Rexroth Customer Service help desk and hot-line staff will be happy to assist you in any way they can.

Phone: (800) REXROTH (739-7684)

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