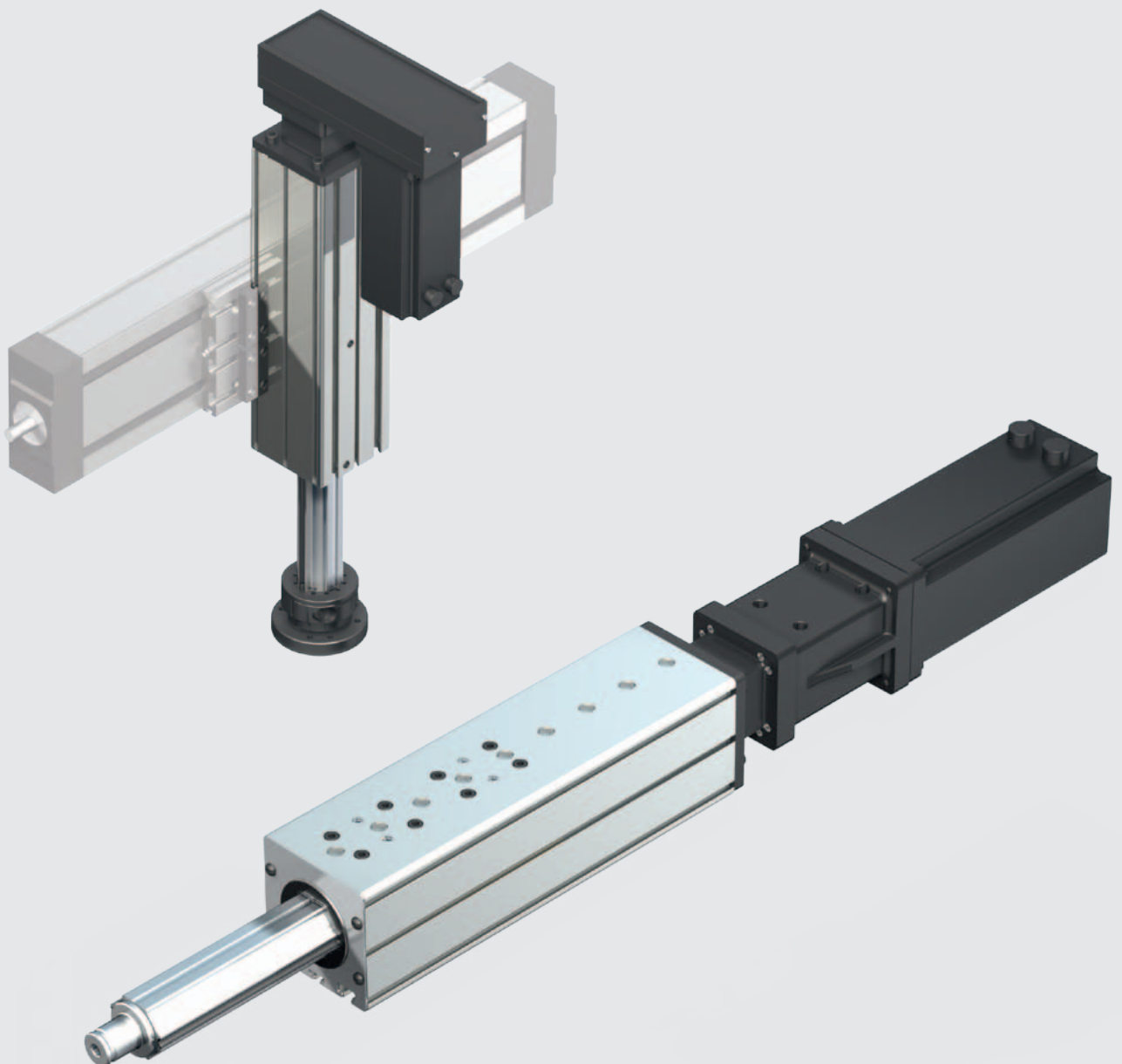


Feed Modules VKK

R320103150/2012-10
Replaces: 2009.09
EN

Instructions

EN



This data has been provided solely for the purpose of product description. No statement regarding any particular quality or suitability for any particular use can be derived from this information. The information does not release the user from making his/her own inspections and evaluations. It should be noted that our products are subject to a natural process of aging and wear and tear.

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The title page contains an illustration of a sample configuration. The product as delivered can differ from the illustration.

The original instructions are in the German language.

Any dissemination of the product must include these instructions.

Die vorliegende Anleitung ist in folgenden Sprachen verfügbar.
These operating instructions are available in the following languages.
Les présentes instructions de service sont disponibles dans les langues suivantes.
Le presenti istruzioni per l'uso sono disponibili nelle lingue seguenti.
El presente manual de instrucciones está disponible en los siguientes idiomas.
As presentes instruções de serviço estão disponíveis nas seguintes línguas.

DE	Deutsch (Originaldokumentation)
EN	English
FR	Français
IT	Italiano
ES	Español
PT	Português

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1 About these Instructions

1.1 Scope and purpose of the documentation

This documentation applies to the following products:

Feed Modules VKK as described in the “Feed Modules VKK” 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 deinstallation of the product and for troubleshooting simple errors oneself.

- Before commencing any work with the product, be sure to read these Instructions and the “Safety Instructions for Linear Motion Systems” carefully and completely.

1.2 Required documentation

Documentation which is indicated by the book symbol  must be obtained before handling the product and must be adhered to.

Table 1: Required documentation

	Title	Document no.	Description
	Safety Instructions for Linear Motion Systems	R320103152	Safety instructions
	Feed Modules VKK	R310DE2403	Catalog
	IndraDrive C for Linear Motion Systems	R310 2730	Catalog
	IndraDrive Cs for Linear Motion Systems	R310 2735	Catalog
	Material safety data sheet for Dynalub 510	R320103160	Safety instructions
	Product data sheet for Dynalub 510	R310 2052	Product data sheet
	System documentation of the machinery/system manufacturer		
	Manuals for the other machine/system components		

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 sub-sections.

1.3.1 Sicherheitshinweise in dieser Anleitung

These Instructions contain safety (warning) notices preceding any actions that involve a risk of personal injury or damage to property. The safety precautions described must be adhered to.

Warning notices are structured as follows:

 SIGNAL WORD
Type of hazard! Consequences if ignored. ▶ Hazard avoidance precautions.

- Safety alert symbol: draws attention to the hazard
- Signal word: indicates the severity of the hazard
- Type of hazard: indicates the type or source of the hazard
- Consequences: describes the consequences that may occur if the hazard avoidance precautions are ignored
- Hazard avoidance precautions: indicates how to avoid the hazard

The warning notices cover the following hazard levels. The hazard level describes the risks involved if the warning notice is ignored.

Table 2: Hazard levels as per ANSI Z535

Safety alert symbol, signal word	Meaning
 DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
 WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
 CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
NOTICE	Damage to property: Risk of damaging the product or the surrounding environment

1.3.2 Symbols

The following symbols designate notes or crossreferences that are not safety-relevant but increase the clarity of the documentation.

Table 3: Meaning of the symbols

Symbol	Meaning
	If this information is not observed, the product will not be used optimally.
▶	Single, independent work step
1.	Numbered work steps
2.	The sequence of the work steps is indicated by the numbers.
3.	
➡ 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 document:

Table 4: Abbreviations and definitions

Abbreviation	Meaning
VKK	Feed Modul VKK

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 supply

The scope of supply includes:

- VKK (as ordered per catalog)
- 1 copy of “Safety Instructions for Linear Motion Systems”
- 1 copy of the Instruction manual for “Feed Modules VKK”
- Final inspection certificate

3.1 Delivery

Delivery as ordered, e.g. complete with pre-assembled drive.

3.2 Accessories

The following accessories are available:

- Mounting elements
- Switches
- Protective bellows
- Cable drag chain and fastening elements
- Connection elements from the EasyHandling range



Dimensions, part number, and further information ➡ “VKK” catalog.

4 Product description

4.1 Features

Feed Modules are ready-to-install linear axes. Further information ➡ “VKK” catalog.

4.2 Equipment description

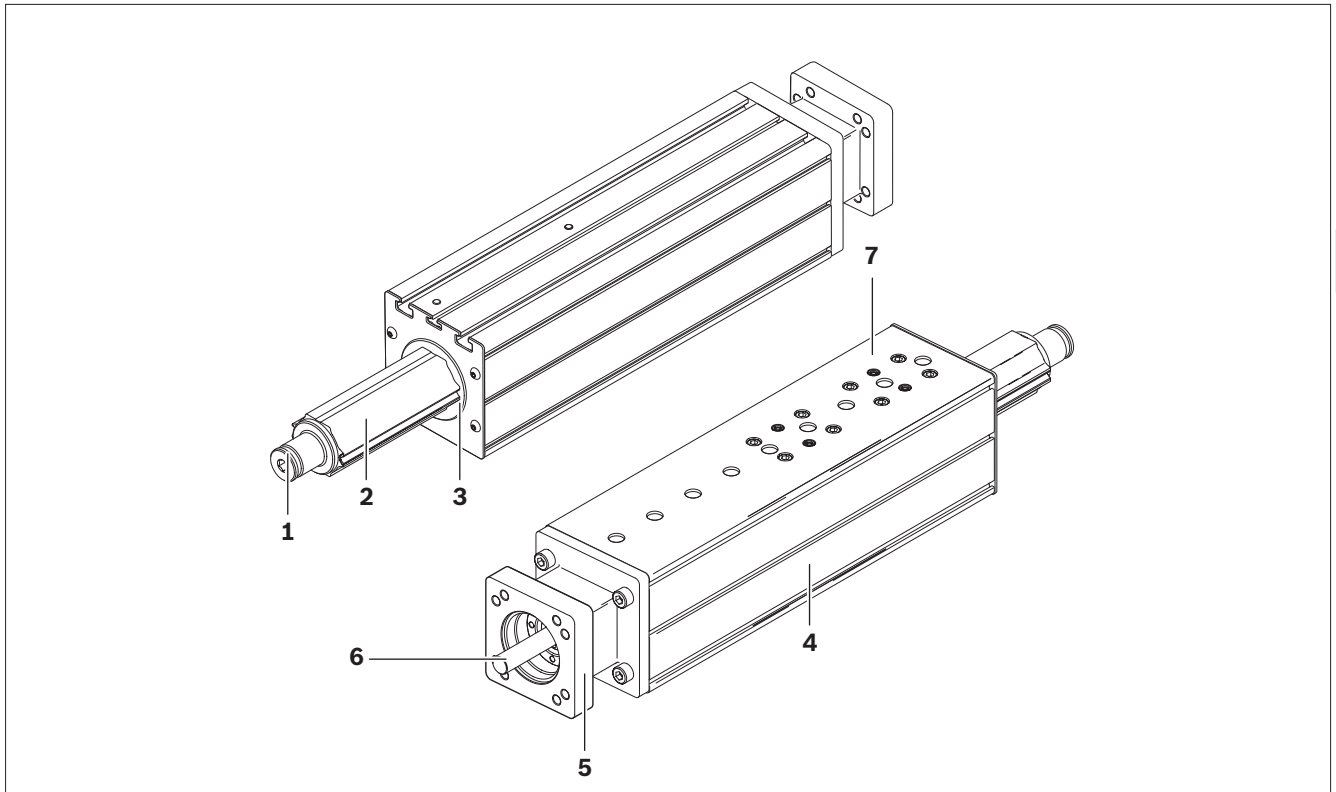


Fig. 1: Structural design of the VKK

A Feed Modul consists of the following parts:

- 1** Mounting interface for adapter flange
- 2** Thrust rod
- 3** End seal
- 4** Frame
- 5** Motor mount for motor attachment
- 6** Drive journal
- 7** Mounting surface with centering holes

4.3 Identification of the product

The nameplate of the product carries the following information:

Table 5: Details given on nameplate

Nameplate details	Meaning
MNR	Part number
SYN	Serial number
FD	Date of manufacture
CS	Customer order number

- ▶ Further information about the nameplate ➡ 7.
- ▶ When ordering replacement parts, please always state all data given on the nameplate.

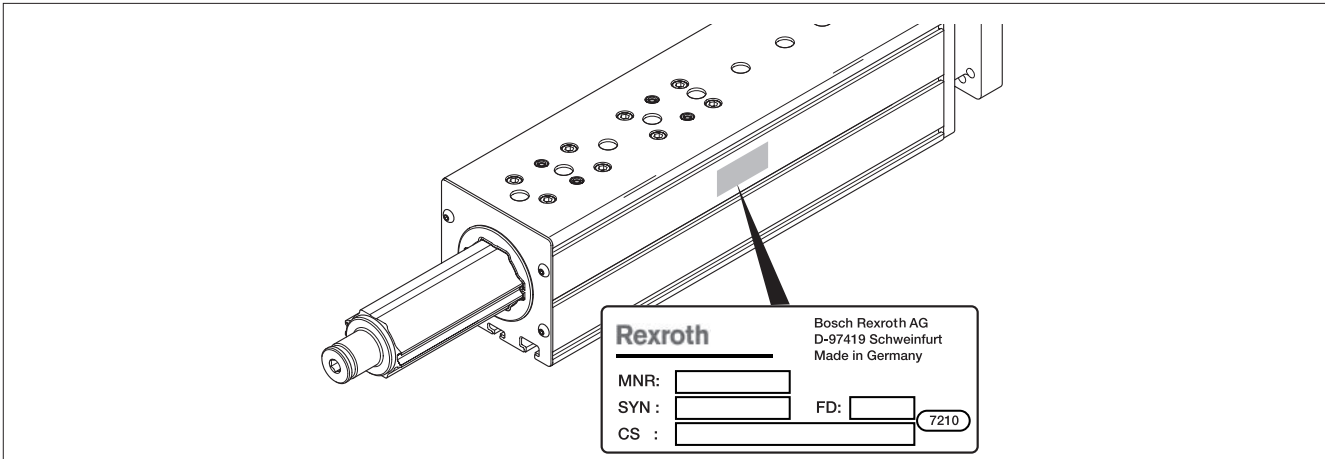


Fig. 2: Nameplate

5 Transport and storage

Take note of the environmental conditions ➡ 14 and “VKK” catalog.
For special environmental conditions, please consult us.

5.1 Transporting the Feed Modules

WARNING

Risk of product crashing down due to inadequate load hoisting equipment!
Severe personal injury or even death.

- ▶ Use only safety-inspected and suitable load hoisting equipment.
- ▶ Attach load hoisting equipment only to the frame (main body) or at the designated points.
- ▶ Do not stand under hoisted loads.

NOTICE

Risk of damage to motor attachment through vibrations!
Motor may break off.

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

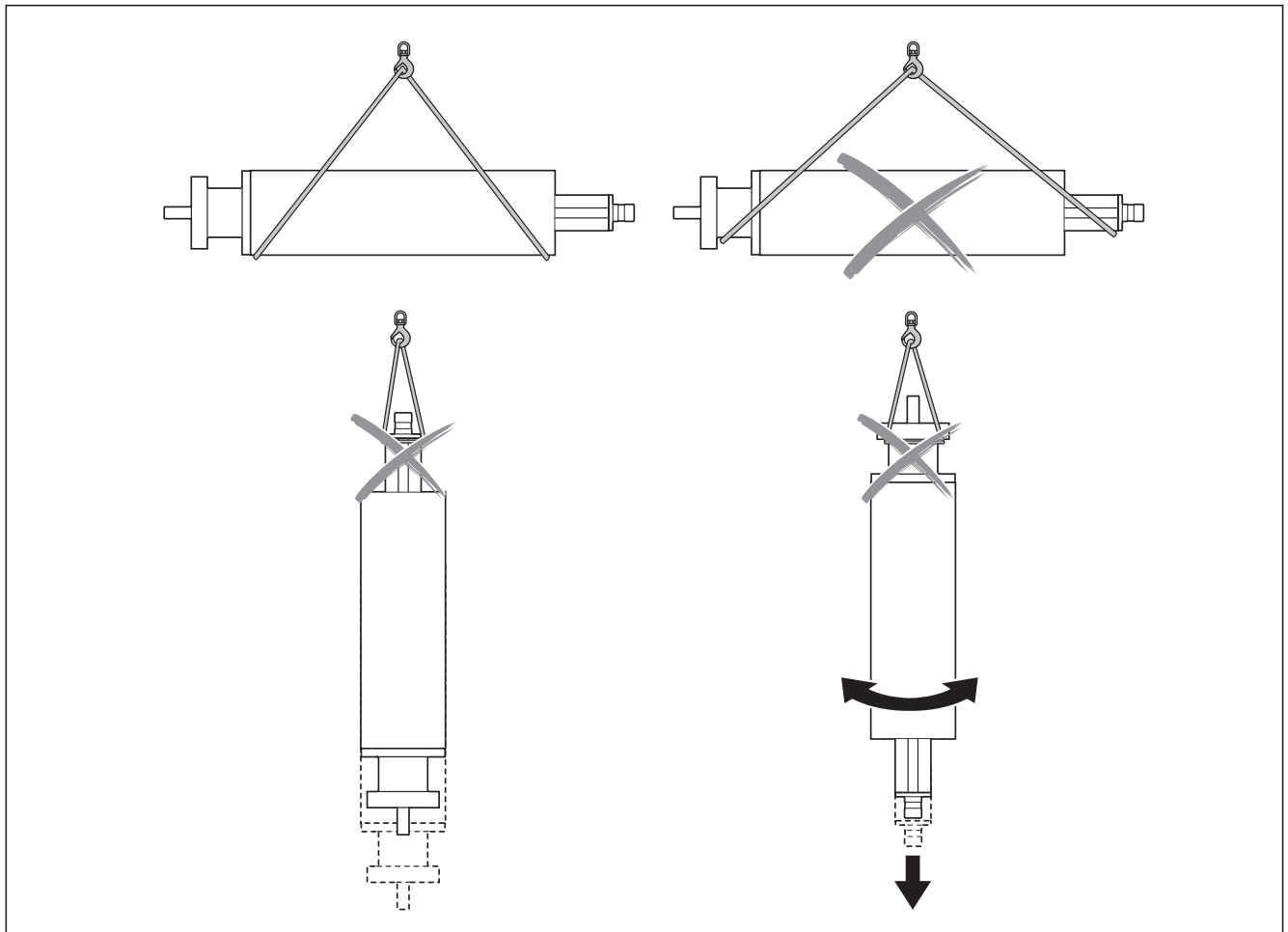


Fig. 3: Transporting the VKK

NOTICE

Damage to the product due to improper transport

Damage to the VKK.

- ▶ Retract the thrust rod.
- ▶ Lift the VKK only by the frame.
- ▶ The ball screw is not self-locking.
- ▶ Prevent the VKK from swinging during lifting operations.

1. Before hoisting the VKK, take note of the weight ➡ “VKK” catalog.
2. Hoist the VKK

5.2 Storing the VKK

NOTICE

Risk of damage due to incorrect storage!

Potential corrosion of product parts.

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

6 Mounting



WARNING

Risk of product crashing down due to inadequate load hoisting equipment!

Severe personal injury or even death.

- ▶ Use only safety-inspected and suitable load hoisting equipment.
- ▶ Attach load hoisting equipment only to the frame (main body) or at the designated points.
- ▶ Do not stand under hoisted loads.

Risk of product crashing down in vertical or hanging installations due to lack of protection against falling loads!

Severe personal injury or even death.

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

- ▶ Before hoisting the VKK, take note of the weight ➡ “VKK” catalog.

6.1 Installation conditions

Take note of the operating conditions ➡ 13 and “VKK” catalog.

- ▶ For special operating conditions, please ask.

NOTICE

Risk of damage due to non-permissible loads!

Damage to the product.

- ▶ Do not attach any overhanging loads.
- ▶ Do not subject the thrust rod to torsion (it is not designed to absorb torque).
- ▶ The frame is not intended for attachment of other machine elements for absorbing force.

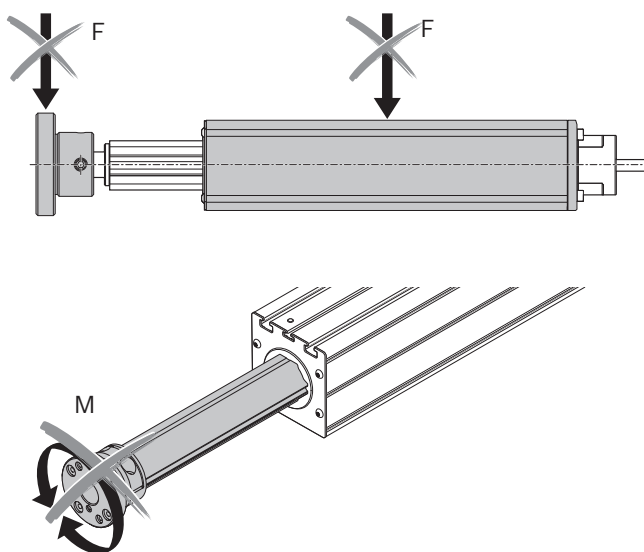


Fig. 4: Non-permissible loads

6.2 Mounting orientation

The VKK can be mounted in any orientation.

⚠ WARNING

Risk of thrust rod crashing down in vertical or slanting installations due to lack of arrestor devices!

Severe personal injury or even death.

- ▶ In vertical or slanting installations, secure the thrust rod so that it cannot drop out.
- ▶ Do not stand in line with the direction in which the thrust rod could fall.

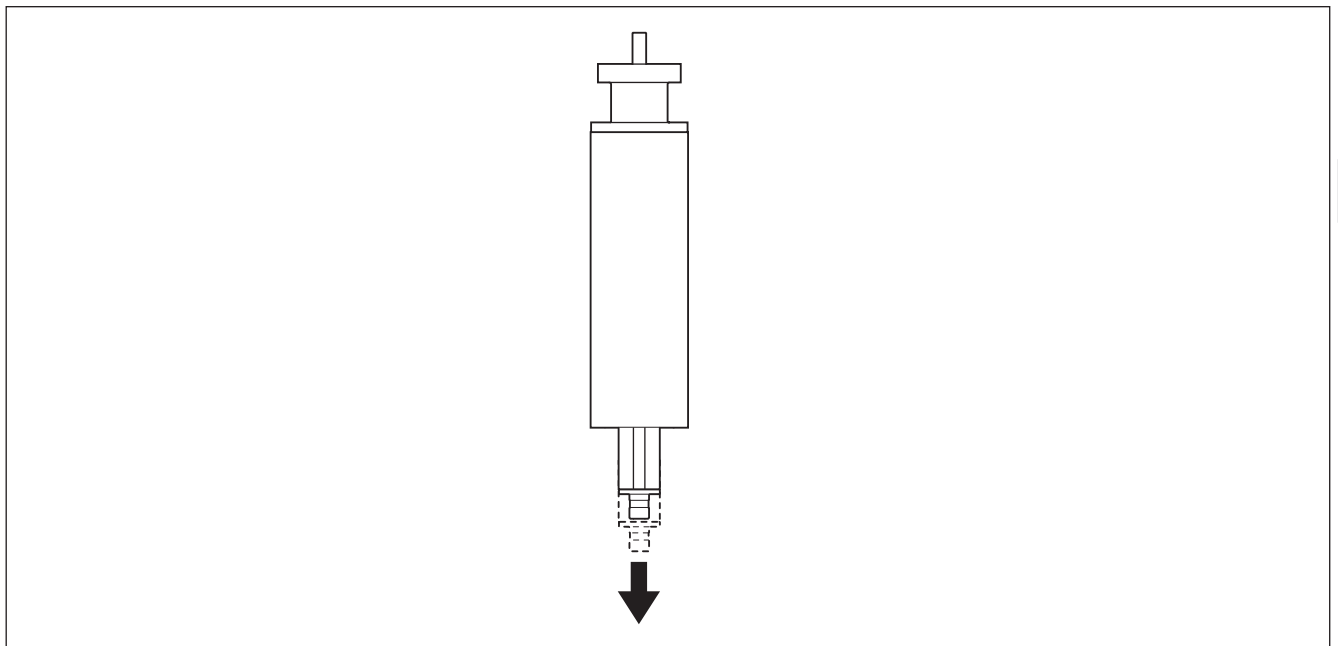


Fig. 5: Dropping of the thrust rod

6.3 Required accessories

Required mounting accessories ➞ “VKK” catalog.

6.4 Fastening the Feed Module to the adjoining structure

6.4.1 Mounting the Feed Module by the frame

NOTICE

Incorrect fastening may cause product to work loose or become distorted!

Damage to the product.

- ▶ Fasten the product with the recommended fastening elements.
- ▶ Always fasten or support the product by the frame (main body).
- ▶ Take note of the tightening torques.

- Locating holes (1) are provided for precise alignment when fastening the Feed Module by the frame.
- Matching centering rings (2) and pliers (3) for easy removal are available as mounting accessories.
- Data and dimensions can be found in the “VKK” catalog.

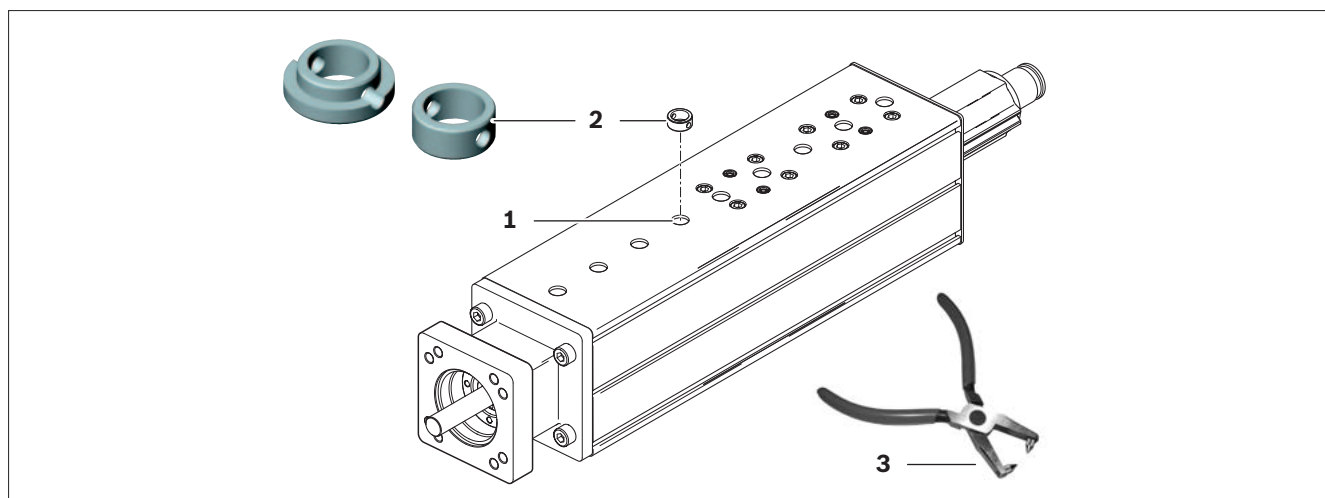


Fig. 6: Locating holes on the frame

- The Feed Module can be mounted by means of clamping fixtures.
- Recommended number of clamping fixtures:
Type 1: 4 pieces per side/per 300 mm
Type 2: 2 pieces per side/per 300 mm
Type 3: 1 pieces per side/per 300 mm
- Take note of the tightening torques. ➔ 12.1.
- Details of clamping fixtures ➔ “VKK” catalog.

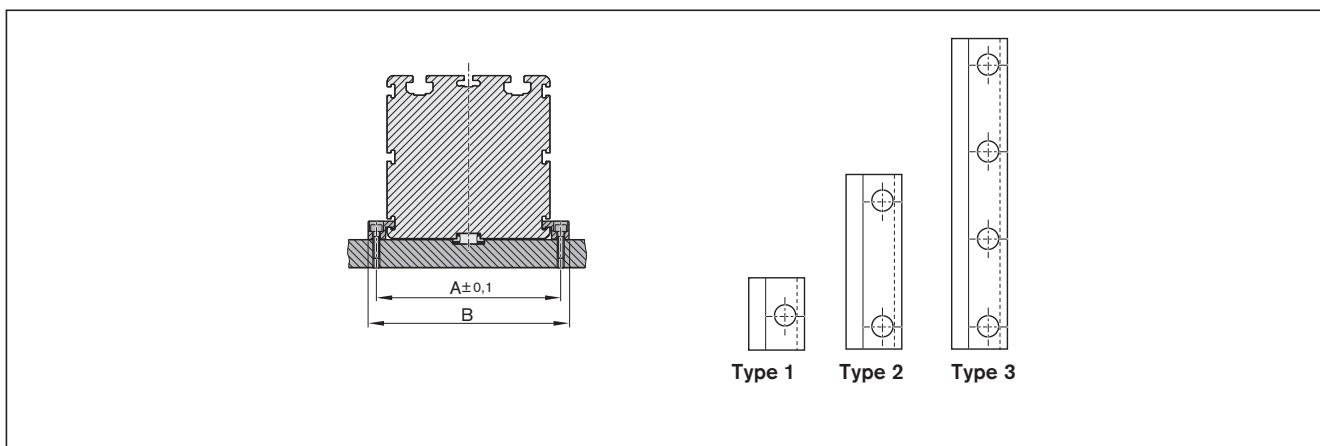


Fig. 7: Mounting the VKK by the frame with clamping fixtures

6.4.2 Mounting the Feed Module to other linear systems

NOTICE

Risk of product damage due to incorrect mounting!

Damage to the product.

- ▶ Fasten the product with the recommended fastening elements.
 - ▶ Always fasten or support the product by the frame (main body).
 - ▶ Take note of the tightening torques.
- ▶ Fasten the VKK to already installed linear systems by using clamping fixtures and centering rings. No intermediate plate is needed.

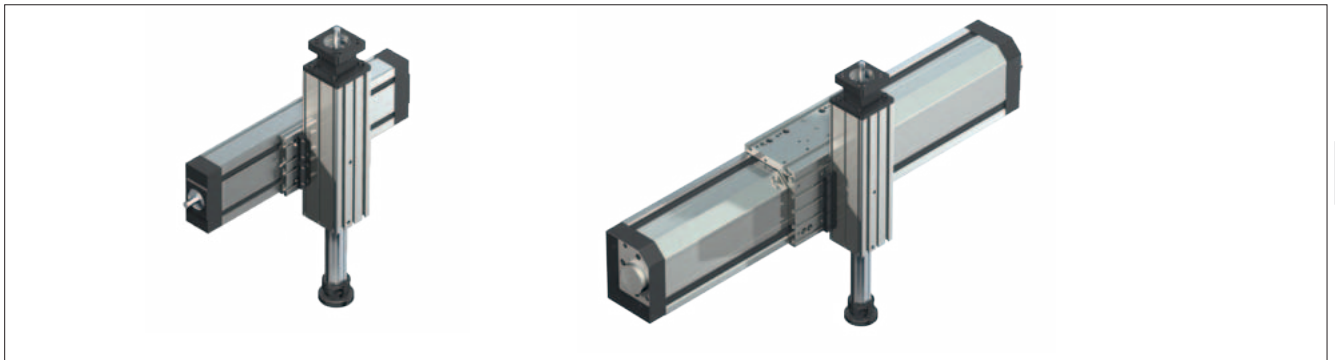


Fig. 8: Mounting the Feed Module to a Compact Module or a Bridge Module

6.5 Mounting the drive

NOTICE

Risk of excessive torque and rotary speed if limits are exceeded!

Damage to the product.

- ▶ Keep within specified maximum values.

Technical data and maximum values ➡ “VKK” catalog.

Drive options:

- Motor **(1)** with motor mount and coupling **(2)**
- Motor **(1)** with timing belt side drive **(3)**

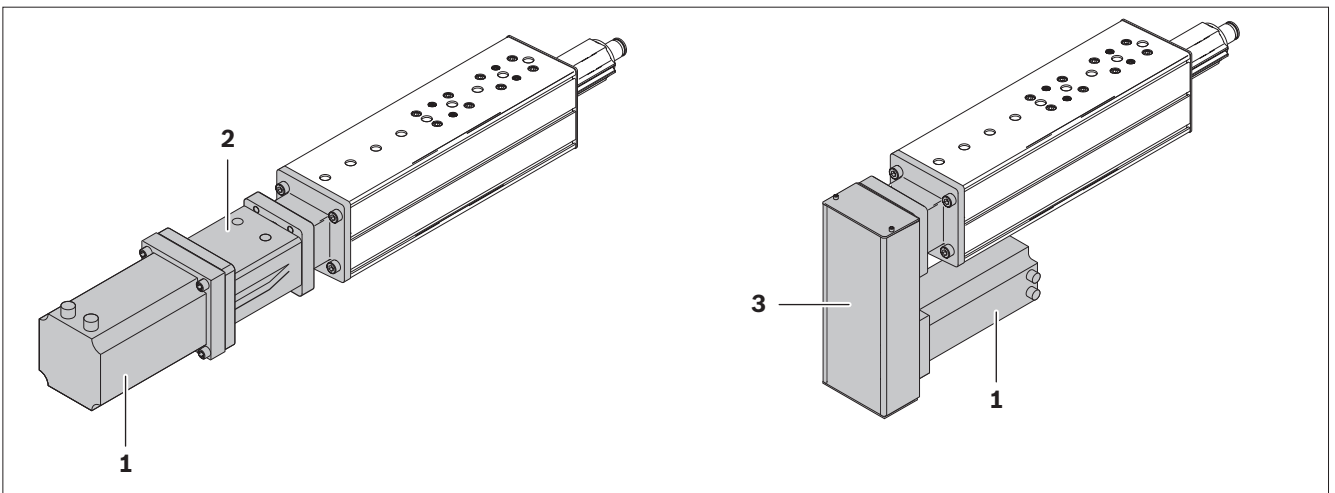


Fig. 9: Drive options

6.5.1 Mounting the motor via motor mount and coupling

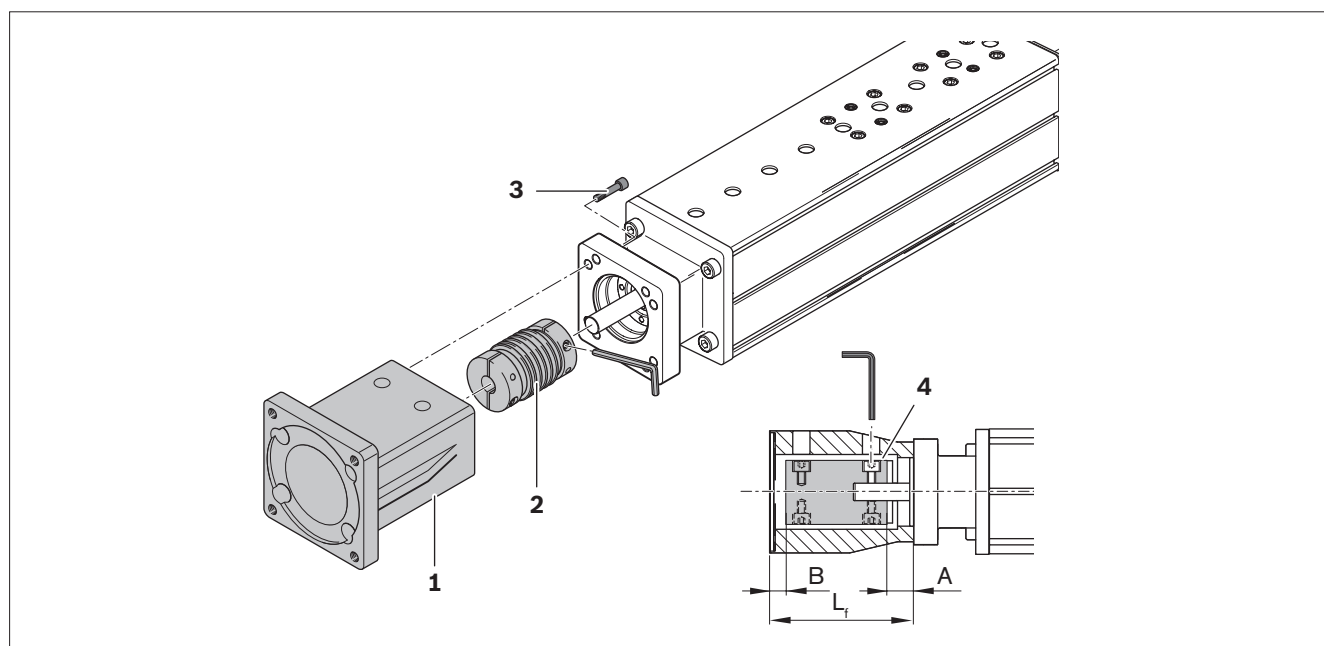


Fig. 10: Mounting the motor mount and coupling

1. Push the coupling (2) onto the drive journal. Make sure the mounting orientation is correct: The diameters of the bores in the coupling and the drive journal must match up.
2. Adjust dimension A and tighten the two fastening screws (4) (tightening torque M_{A1}).
3. Loosely pre-mount the motor mount (1) to the end block.
4. Check dimension B.
5. Screw down the motor mount to the end block using four screws (3) (tightening torque M_{A2}).

Table 6: Tightening torque $M_{A \max}$

 8.8, $\mu = 0,125$	M3	M4	M5	M6	M8
$\varnothing M_{A1 \max}$ (Nm)	1,7	3,5	8	14	30
$\varnothing M_{A2 \max}$ (Nm)	1,3	2,7	-	9,5	23

Dimensions A and B for motor mount and coupling

	Motor	(mm)		
		A	B	L_f
VKK 15-50	MSM019B	5,0	10,0	45,0
	MSM031B	1,5	5,5	50,0
	MSK030C	1,5	5,5	50,0
VKK 15-70	MSM031C	2,0	11,0	72,0
	MSM041B	6,5	18,5	83,0
	MSK030C	5,0	5,0	75,0
	MSK040C	2,0	10,5	77,5
VKK 25-110	MSM041B	25,0	6,0	90,0
	MSK050C	23,0	11,0	115,0

6. Push the motor into the locating feature of the motor mount and coupling and screw down to the motor mount using four screws (5) (tightening torque M_{A2}).

7. Tighten the fastening screws (6) on the motor side of the coupling (tightening torque (M_{A1})).
If necessary, release the motor brake and move the thrust rod so that the drive journal turns (7).

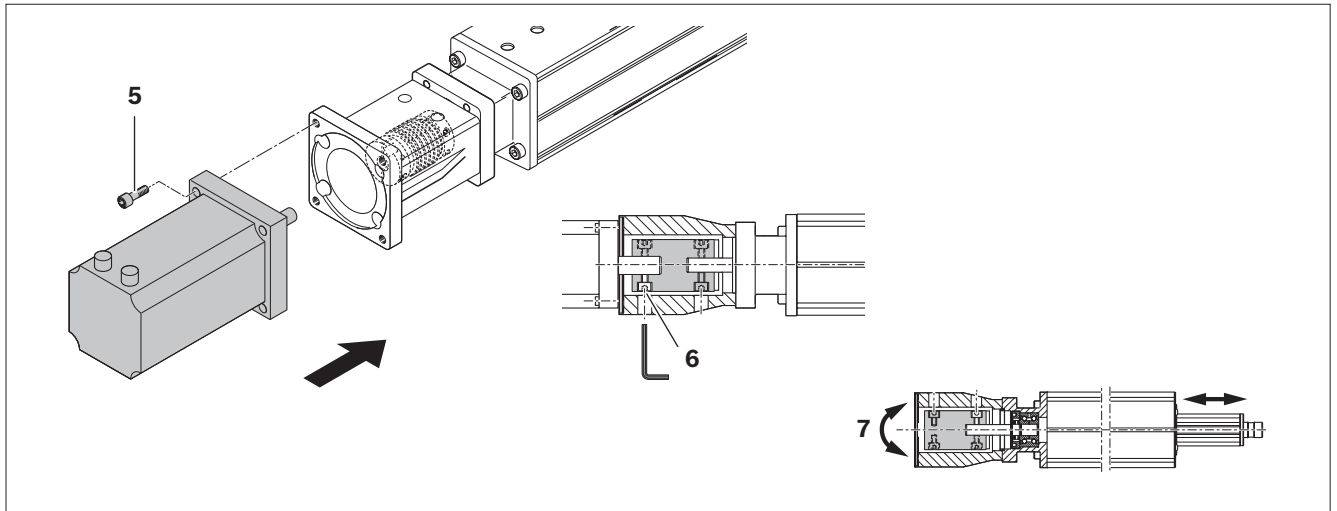


Fig. 11: Mounting the motor to the motor mount

6.5.2 Mounting the motor via timing belt side drive

1. Screw down the protective profile (1) of the timing belt side drive to the end block (tightening torque M_{A2}).

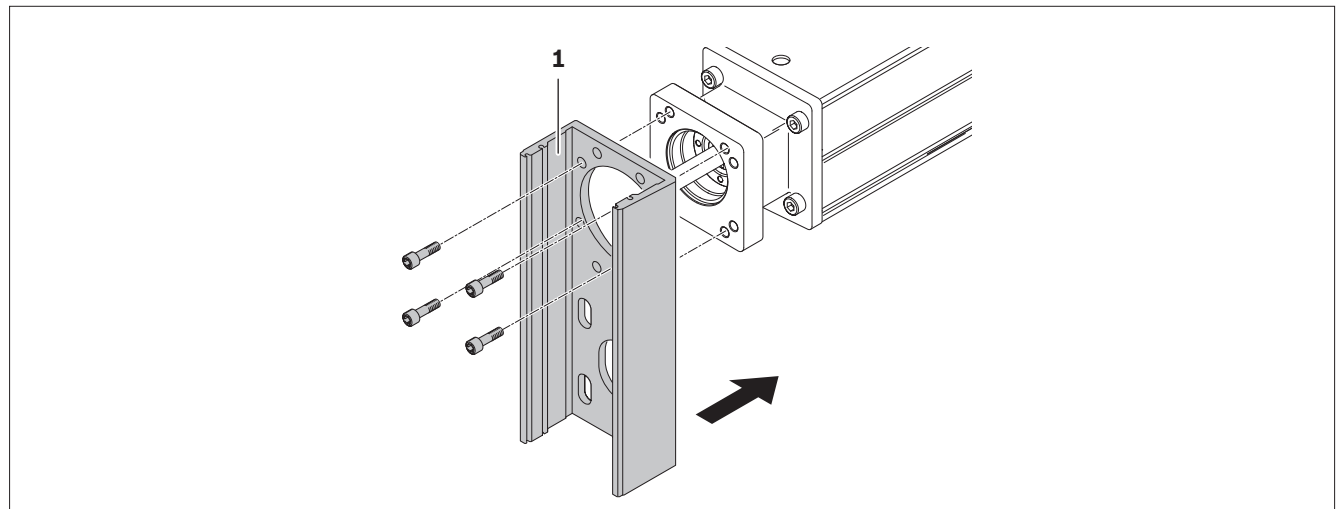


Fig. 12: Mounting the protective profile

Mounting the screw-side belt pulley

- Lightly oil the tensioning unit (2).

NOTICE

Risk of insufficient lubrication due to use of wrong lubricants

Damage to the product.

- Do not use oil with MoS₂ additives!

Tensioning unit type 1:

1. Insert the tensioning unit (2) into the belt pulley (3) and drive screws into the tapped holes in the belt pulley.
2. Push the belt pulley with fitted toothed belt and tensioning unit onto the drive journal.
3. Adjust clearance A to the protective profile.
4. Tighten the screws on the tensioning unit.

Tensioning unit type 2:

1. Insert the tensioning unit into the belt pulley. The tensioning elements must be completely inserted into the bore of the belt pulley.
2. Push the belt pulley (2) with fitted toothed belt and tensioning unit onto the drive journal.
3. Lightly tighten the screws.
4. Adjust clearance A to the protective profile.
5. Tighten the screws on the tensioning unit cross-wise in several equal steps until the tightening torque given in the table is reached.

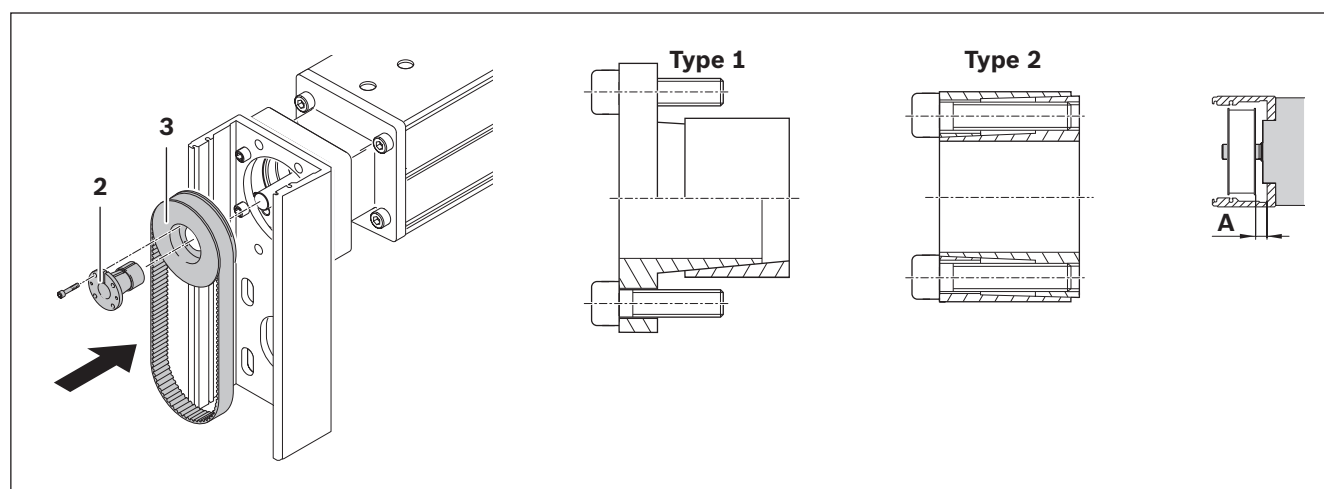


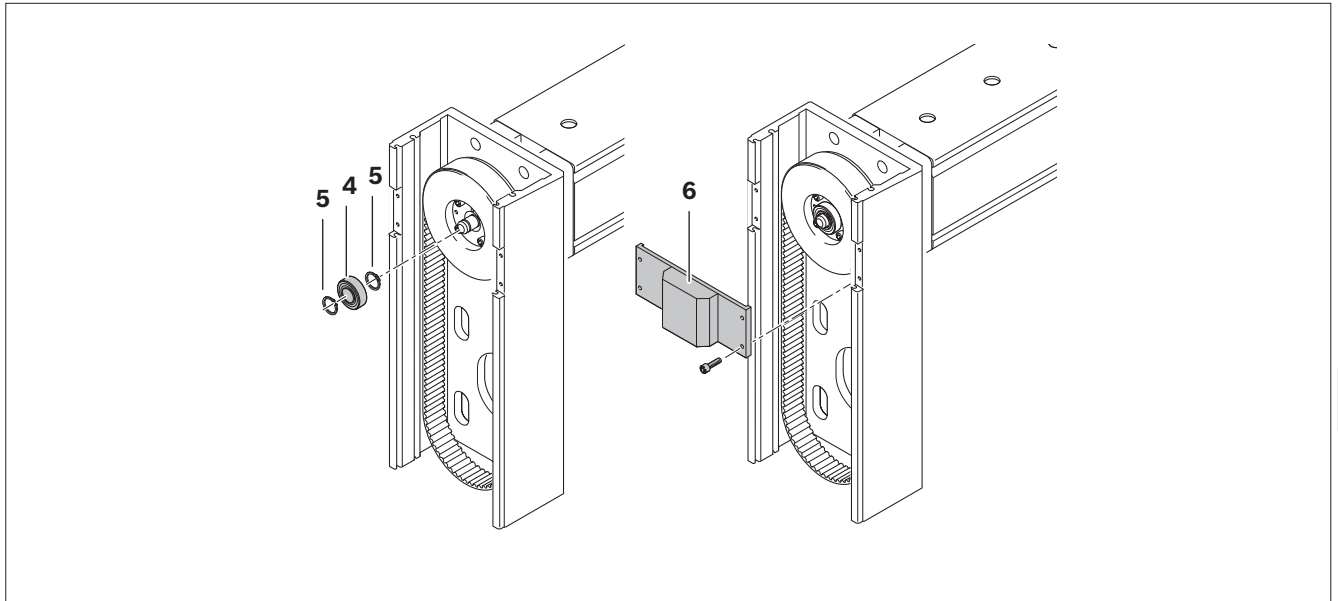
Fig. 13: Mounting the belt pulley and tensioning unit

Table 7: Dimension A for timing belt side drive

	Motor	A (mm)	
		i=1	i=1,5 / i=2
VKK 15-50	MSM019B	5,0	5,0
	MSM031B	6,5	6,5
	MSK030C	6,5	6,5
VKK 15-70	MSM031C	6,0	6,0
	MSM041B	7,5	7,5
	MSK030C	6,0	6,0
	MSK040C	7,5	7,5
VKK 25-110	MSM041B	10,0	10,0
	MSK050C	11,0	11,0

Mounting the counterbearing (VKK 15-50 and VKK 15-70)

1. Push the first lock washer (5) onto the screw end as a stop.
2. Push the bearing (4) manually onto the screw end and secure it with the second lock washer (5).
3. Carefully push the bearing flange (6) onto the bearing and screw it down on the housing.

**Fig. 14: Mounting the counterbearing**

Mounting the motor-side belt pulley and motor for $i = 1$

1. Pre-mounting the motor:
2. Pre-mount the motor with the two motor strips (3) as close as possible to the Feed Module. This will allow easy insertion of the belt pulley (2). Do not tighten the motor mounting screws yet.
3. Mounting the belt pulley:
4. Lightly oil the tensioning unit (1).
5. Push the belt pulley and tensioning unit onto the motor journal.
6. Adjust clearance B to the protective profile.
7. Mount the tensioning unit.
8. Tensioning the belt ➡ 6.5.3.

Table 8: Dimensions B and C for timing belt side drive

	Motor	B (mm)	C (mm)
VKK 15-50	MSM019B	5,0	7,5
	MSM031B	6,5	12,0
	MSK030C	6,5	11,5
VKK 15-70	MSM031C	9,0	14,5
	MSM041B	8,0	15,0
	MSK030C	7,0	12,5
	MSK040C	7,0	14,0
VKK 25-110	MSM041B	9,5	16,0
	MSK050C	9,0	19,0

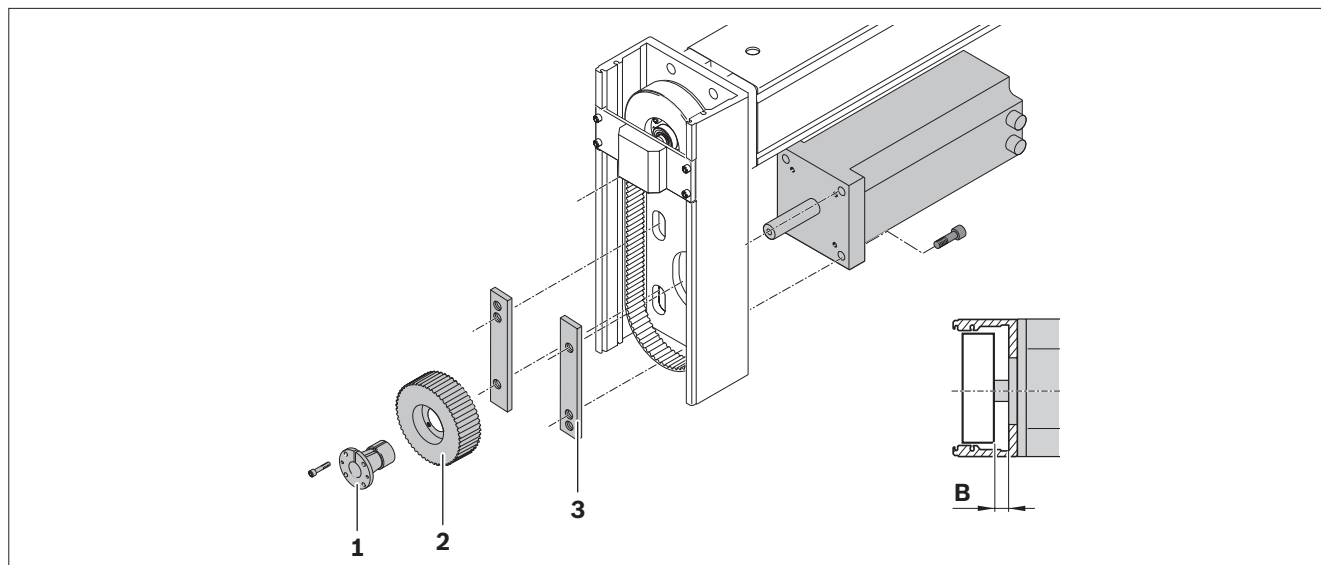
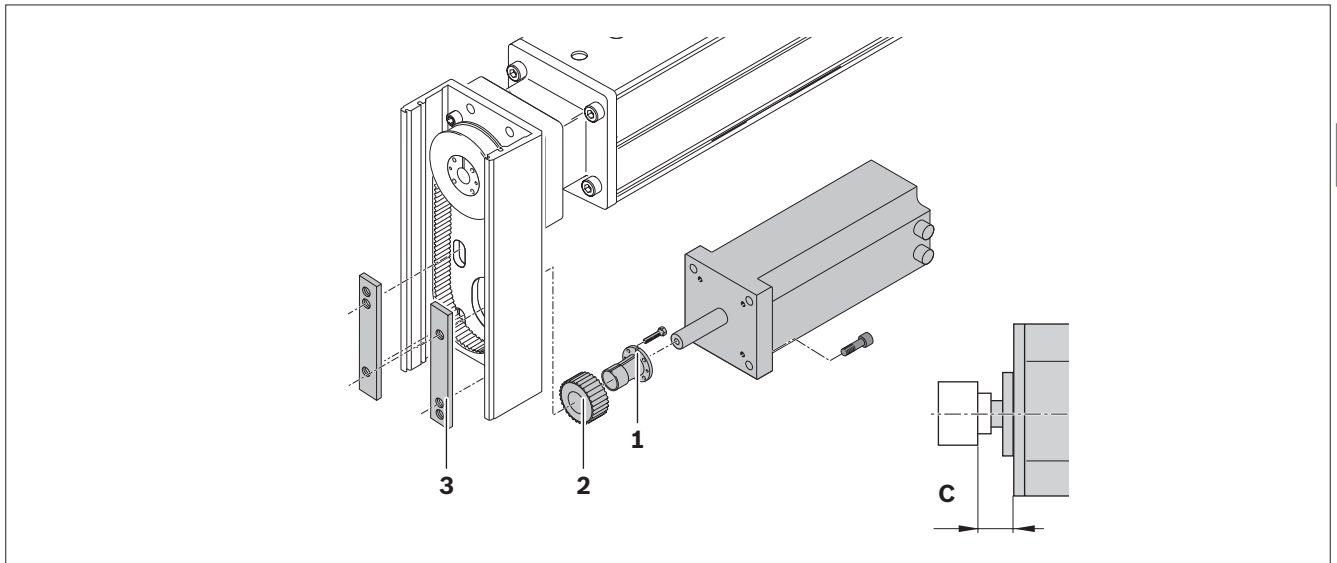


Fig. 15: Mounting the belt pulley for $i=1$

Mounting the motor-side belt pulley and motor for $i = 1.5$ or $i = 2$

1. Mounting the belt pulley:
2. Lightly oil the tensioning unit (1).
3. Push the belt pulley (2) and tensioning unit onto the motor journal.
4. Adjust clearance **C** to the motor.
5. Mount the tensioning unit.
6. Pre-mounting the motor:
Pre-mount the motor with the two motor strips (3) as close as possible to the Feed Module.
Do not tighten the motor mounting screws yet.
7. Tensioning the belt. ➔ 6.5.3.

**Fig. 16: Mounting the belt pulley for $i=1.5$ or 2**

6.5.3 Tensioning the belt:



The pretensioning force F_{pr} depends on the size of the unit, the motor, belt pulleys, and on the torque. The pretensioning value is indicated on the inside of the gear cover. If the timing belt side drive is not mounted horizontally, take account of the dead weight of the motor!

Table 9: Masses of motor and brake

	Motor	m_m (kg)	m_{br} (kg)
VKK 15-50	MSM019B		
	MSM031B	0,82	0,48
	MSK030C	2,10	0,25
VKK 15-70	MSM031C	1,20	0,50
	MSM041B		
	MSK030C	2,10	0,25
	MSK040C		
VKK 25-110	MSM041B	2,30	0,80
	MSK050C	5,40	0,70

m_m = mass of motor without brake

m_{br} = mass of brake

1. Loosen the motor mounting screws.
2. Screw a suitable cross plate (4) to the two motor strips (3).
3. Pull the cross plate (4) away from the protective profile with pretensioning force F_{pr} and tighten the mounting screws ➡ „12.1“.

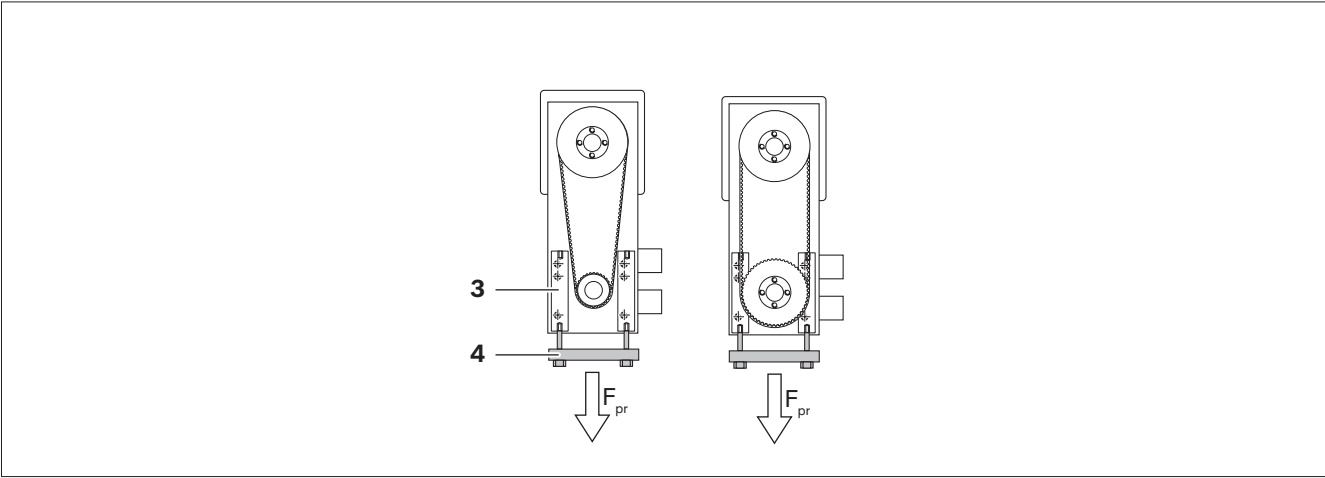


Fig. 17: Tensioning the belt

Fastening the timing belt side drive cover

- Fasten all covers on the housing of the timing belt side drive.

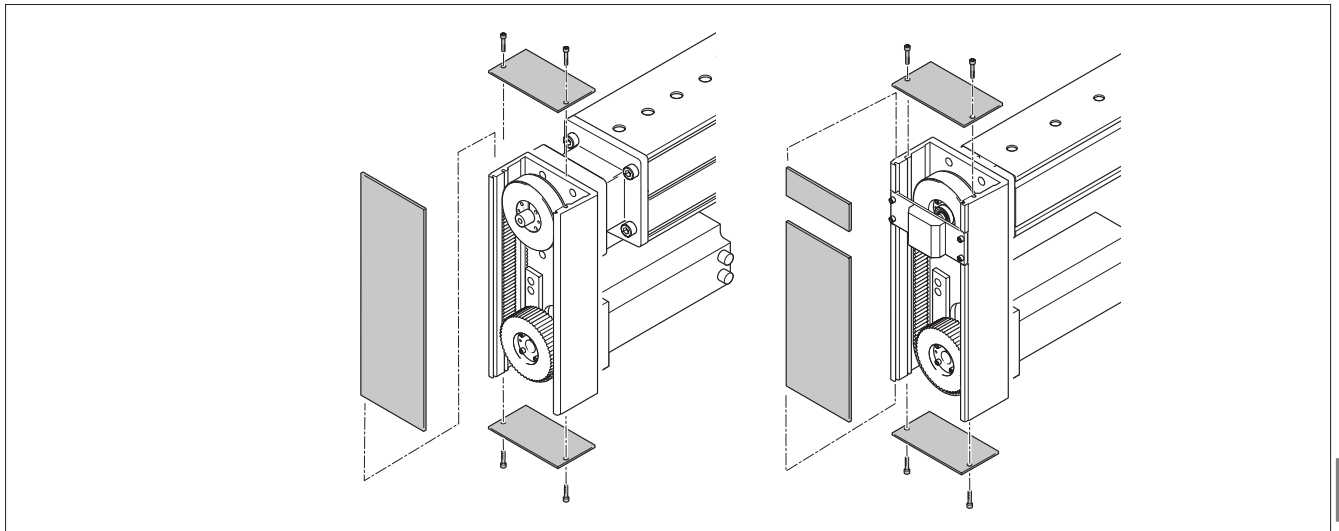


Fig. 18: Fastening the timing belt side drive cover

6.6 Mounting the switching system

6.6.1 Overview of switching system

NOTICE

Potential collision due to wrong mounting of the switching system!

Damage to product, adjoining structure and workpieces.

- The entire switching system must be mounted on one side of the product.

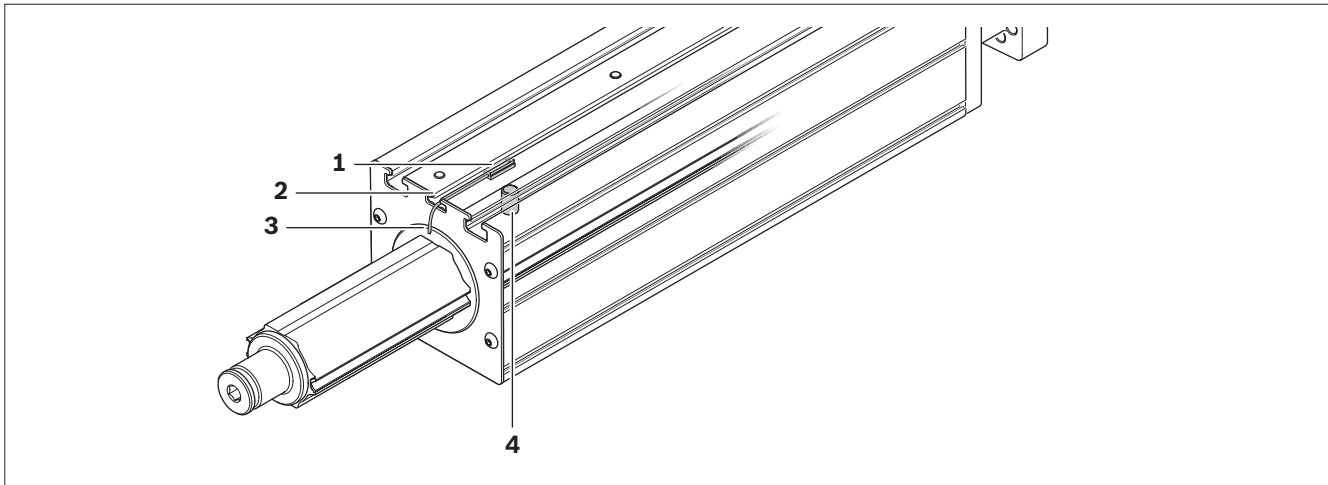


Fig. 19: Switching system with magnetic field sensor

- 1 Switch (magnetic field sensor)
- 2 T-slot for switch
- 3 Cable
- 4 Switch activator (is a magnet integrated in the thrust rod).

6.6.2 Switch activation points

The Feed Module must already have been installed. ➡ 6.2.

A T-slot for magnetic field sensor and cable management is provided on one side of the Feed Module frame. Switches can only be installed on this side. The switch activation points must be located within zone C.

Only the magnetic field sensors need to be installed at the customer. The required switch activator is already integrated in the thrust rod.

Table 10: Dimension A and B for determining switch activation points

	A (mm)	B (mm)
VKK 15-50	64	37
VKK 15-70	68	79
VKK 25-110	103	100

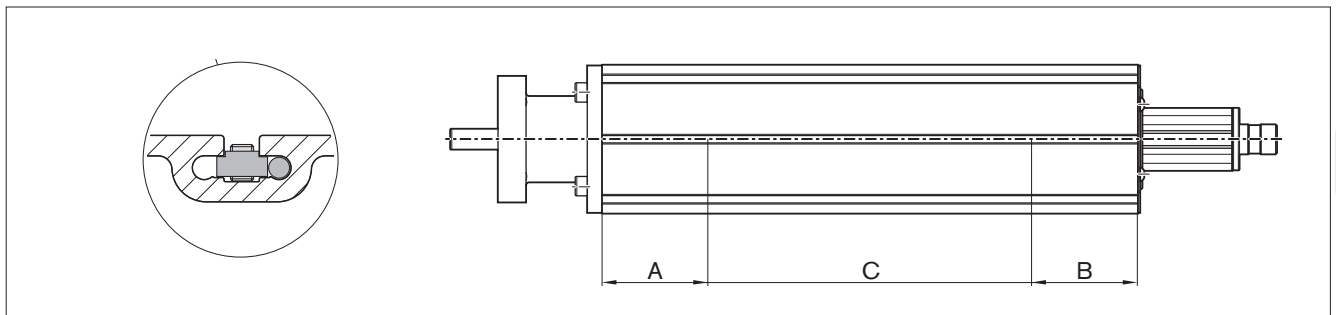


Fig. 20: Switch activation points

6.6.3 Magnetic field sensor without connector

Magnetic field sensor with potted cable.

- 1 Set screw for fixing
- 2 Active surface

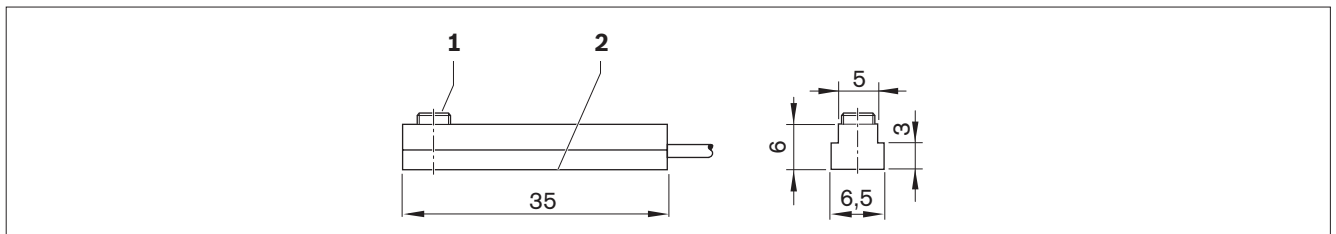


Fig. 21: Magnetic field sensor without connector

6.6.4 Magnetic field sensor with connector

Magnetic field sensor with potted cable and connector.

- 1 Set screw for fixing
- 2 Activation point (Dimension X)

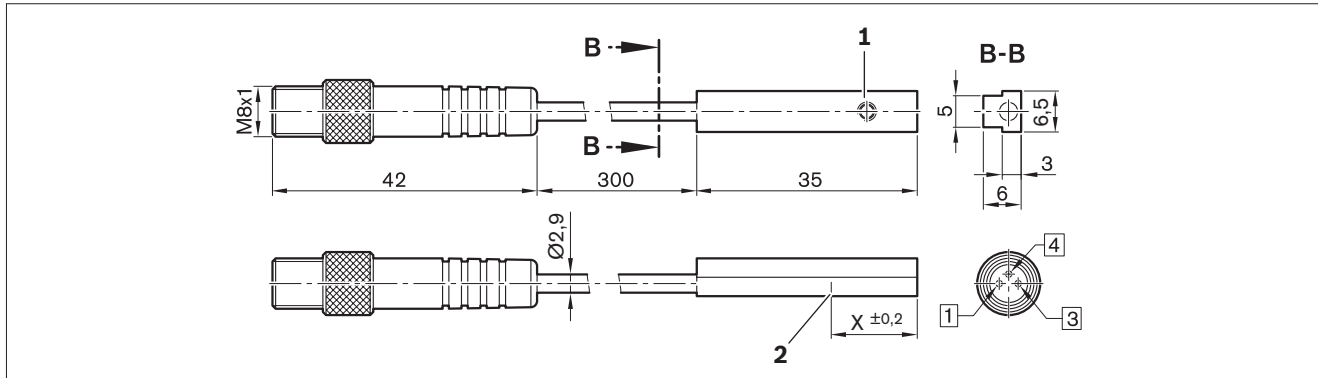


Fig. 22: Magnetic field sensor with connector

Pin assignment

Hall sensor (A):

- 1 White: + 3.8 ... 30 VDC
- 4 Green: Output
- 3 Brown: 0 V ground
- X = 13.65 mm

Reed sensor (B):

- 1 Brown
- 4 White
- 3 Green
- X = 9 mm

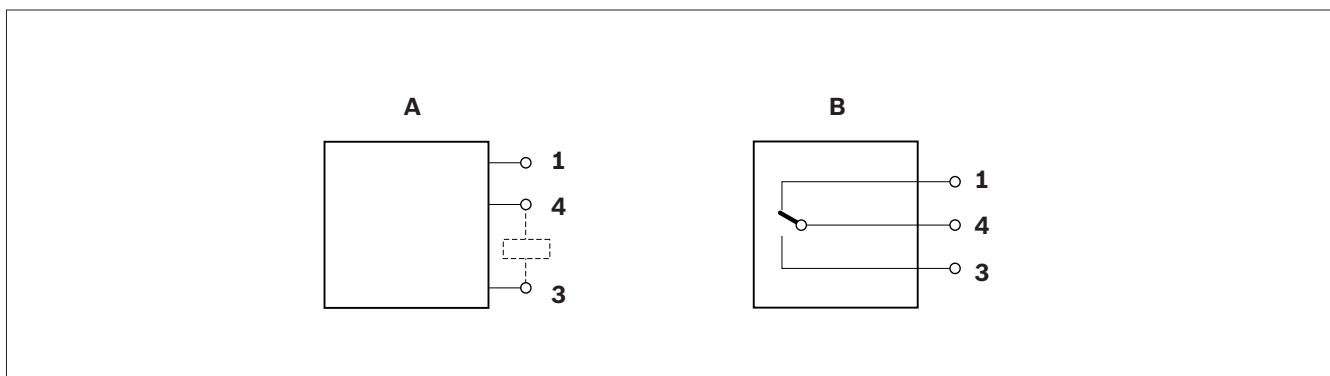


Fig. 23: Pin assignment for magnetic field sensors

6.6.5 Mounting the magnetic field sensor

1. Insert the sensor (1) with the set screw (2) pointing outward into the T-slot on the frame.
2. Adjust the switch activation point and fix the sensor using the set screw (2).
3. Press the signal cable (3) into one of the two cable ducts in the T-slot to fix it in place.

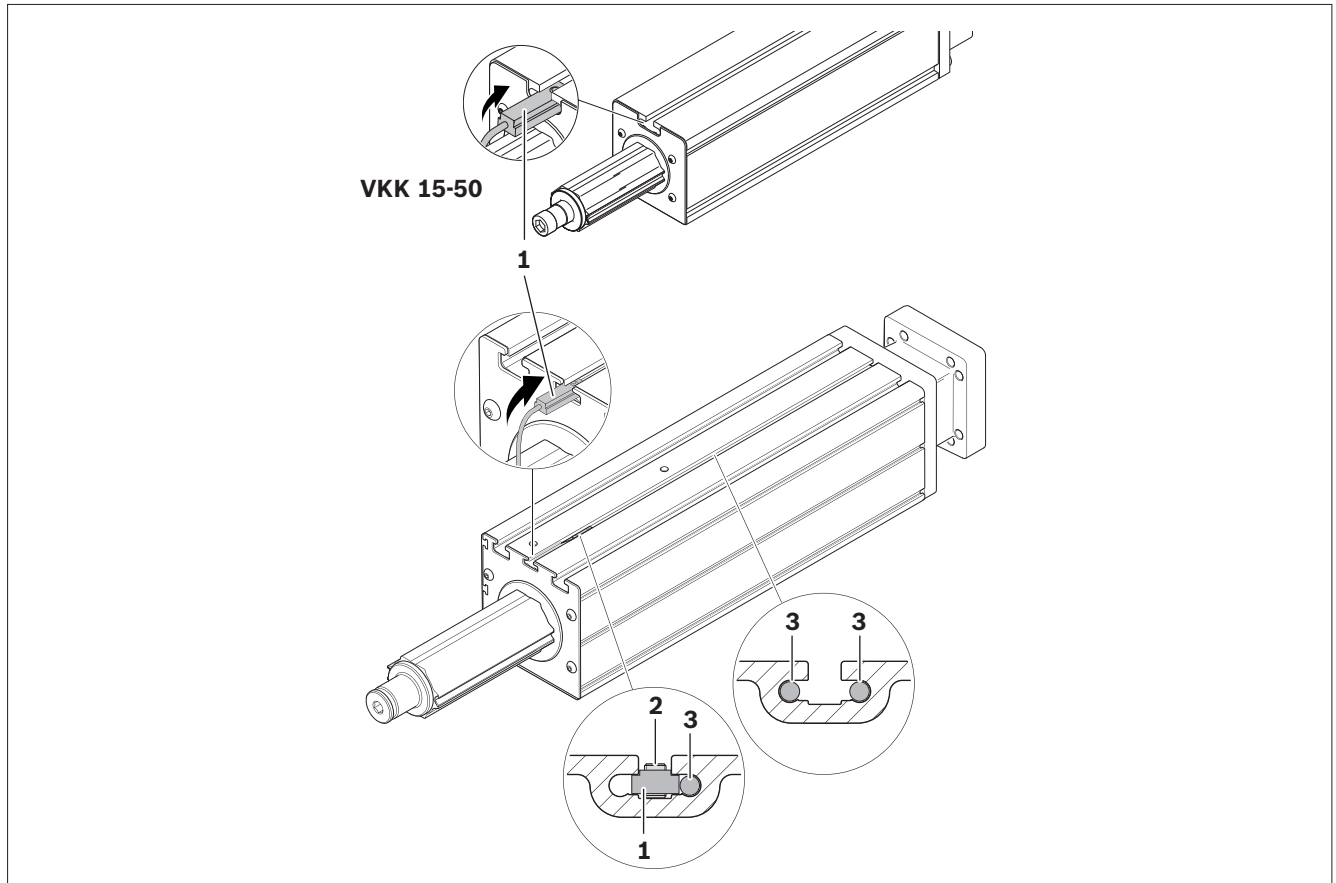


Fig. 24: Mounting the magnetic field sensor

6.7 Mounting the accessories

NOTICE

Potential collision due to wrong mounting of the attachments!

Damage to product, adjoining structure and workpieces.

- ▶ Use only the fastening elements provided and be sure to read the mounting instructions any special notes for mounting.
- ▶ If the adapter flange is removed, the socket head cap screws must be secured again when it is re-installed! (For example with liquid medium-strength threadlocker adhesive).

6.7.1 Mounting the adapter flange

An adapter flange is available for mounting accessories from the EasyHandling range to the thrust rod.

The adapter flange consists of the adapter flange itself **(1)** and a clamping shell **(2)**.

For more information on the adapter flange and on the mounting procedure, refer to the VKK catalog.

1. Push the adapter flange **(1)** onto the mounting interface **(3)** as far as it will go. Make sure that the locating feature **(4)** engages in the groove on the mounting interface **(5)**.
2. If desired, use the locating pins **(6)** to align the flange with the running tracks.
3. Position the clamping shell **(2)** on the adapter flange so that it also engaged with the slot on the mounting interface **(5)**. Tighten the socket head cap screws **(7)** to the specified tightening torque.
4. If high moment loads are expected, the adapter flange can be additionally secured on the opposite site with the straight pin **(8)**. To do this, the pin hole must be bored open after aligning the adapter flange and reamed to $\varnothing 6^{H7}$. Drilling depth 25 $\pm$ 2 mm.

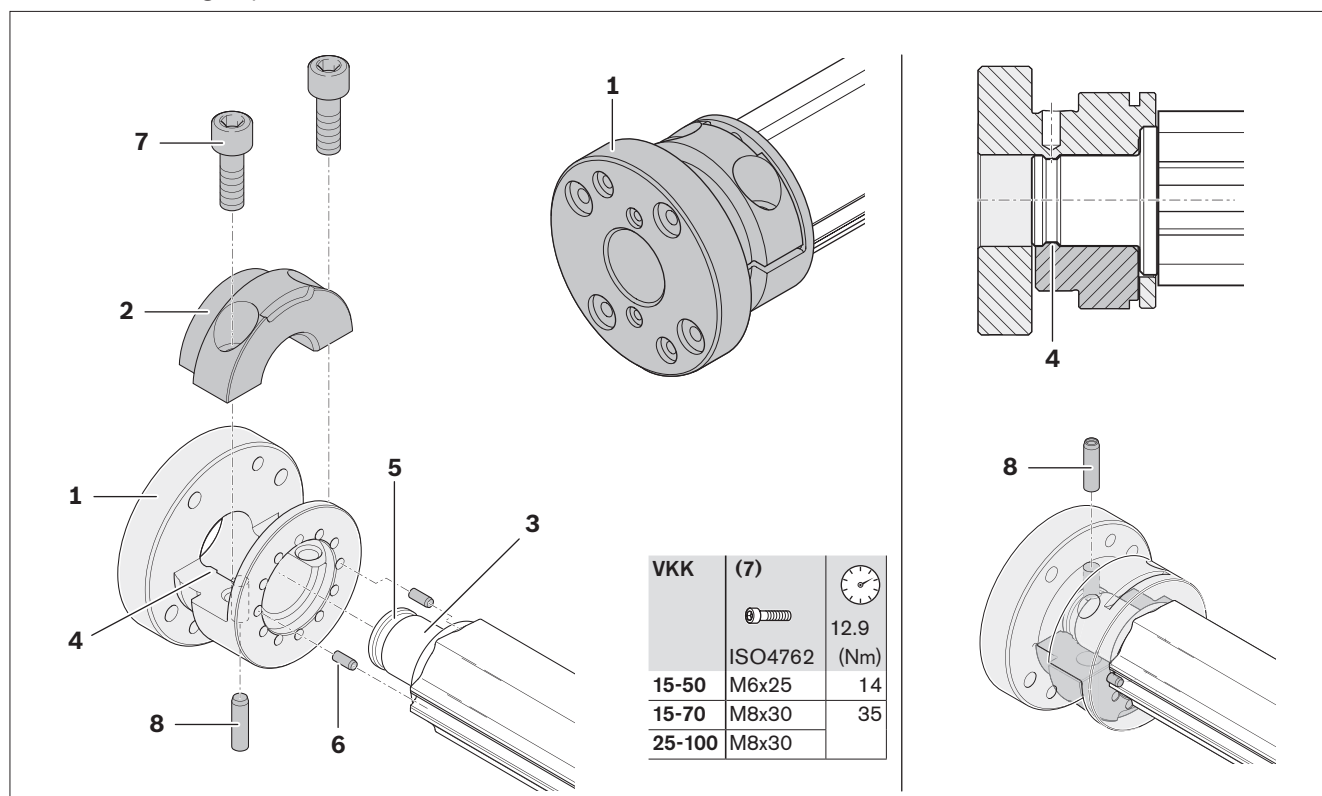


Fig. 25: Mounting the adapter flange

6.7.2 Mounting the Gripper GSP

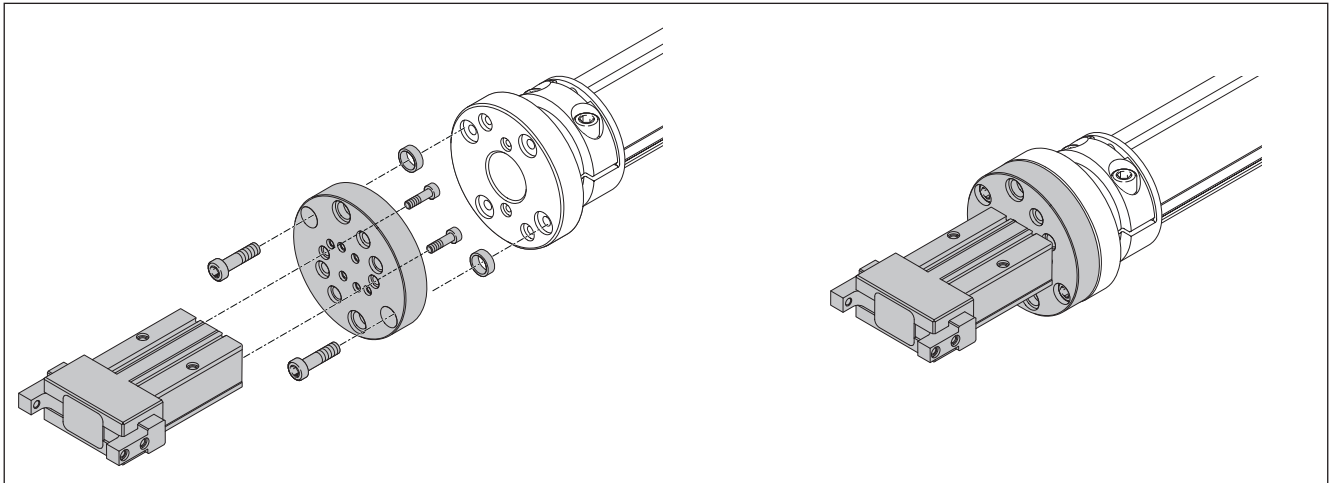


Fig. 26: Mounting the Gripper GSP

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6.7.3 Mounting the Gripper GSP-Z

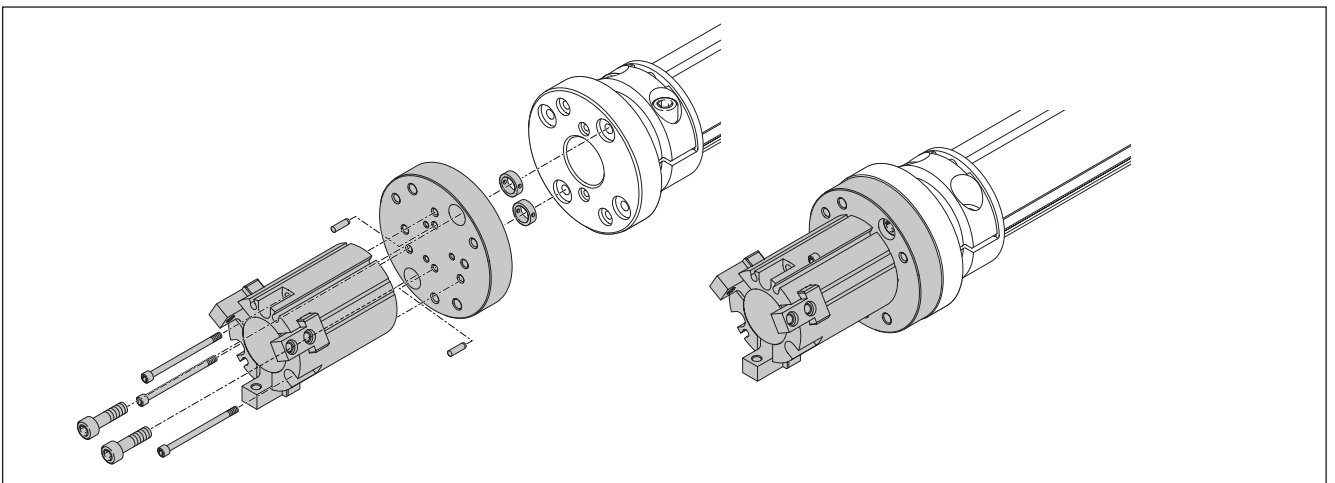


Fig. 27: Mounting the Gripper GSP-Z

6.7.4 Mounting the Rotary Compact Module RCM

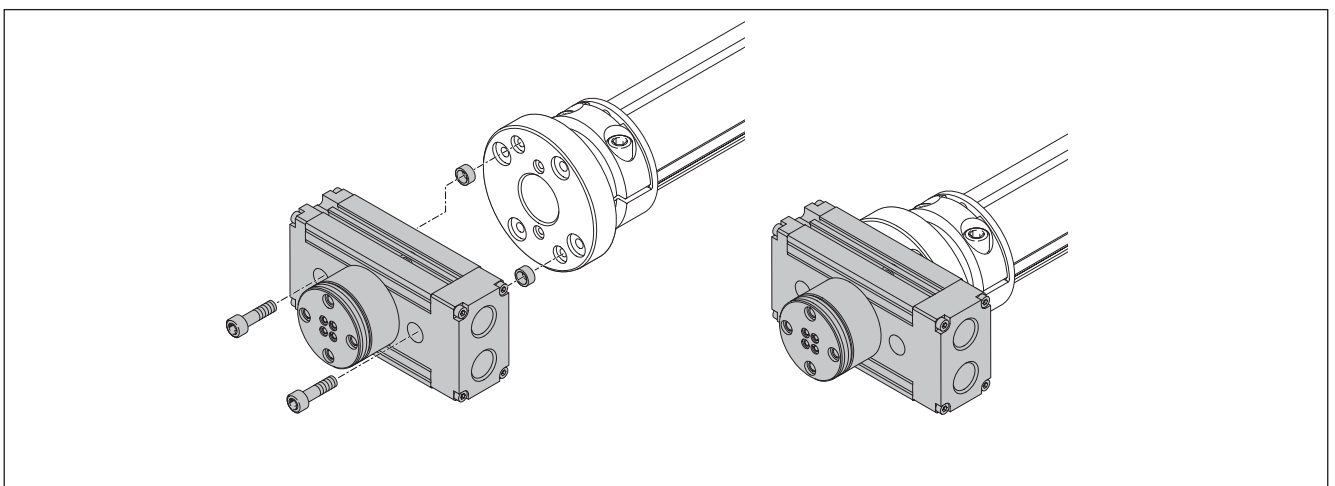


Fig. 28: Mounting the Rotary Compact Module RCM

6.7.5 Mounting cable drag chains



WARNING

Risk of electrical shocks through touching live parts!

Severe personal injury or even death.

- Before commencing any electrical installation work, switch off the power supply and secure it against reactivation.

This requires prior mounting of the adapter flange ➡ 6.7/6.7.1.

A two-piece clamp **(1)** and a profile **(4)** are then fixed to the adapter flange.

1. Insert the two halves of the clamp **(1)** into the gap in the adapter flange **(2)** and fix them in place with the mounting screws **(3)**. Position the profile **(4)** in the desired direction and fasten it by driving screws into the threads **(5)** on the clamp.

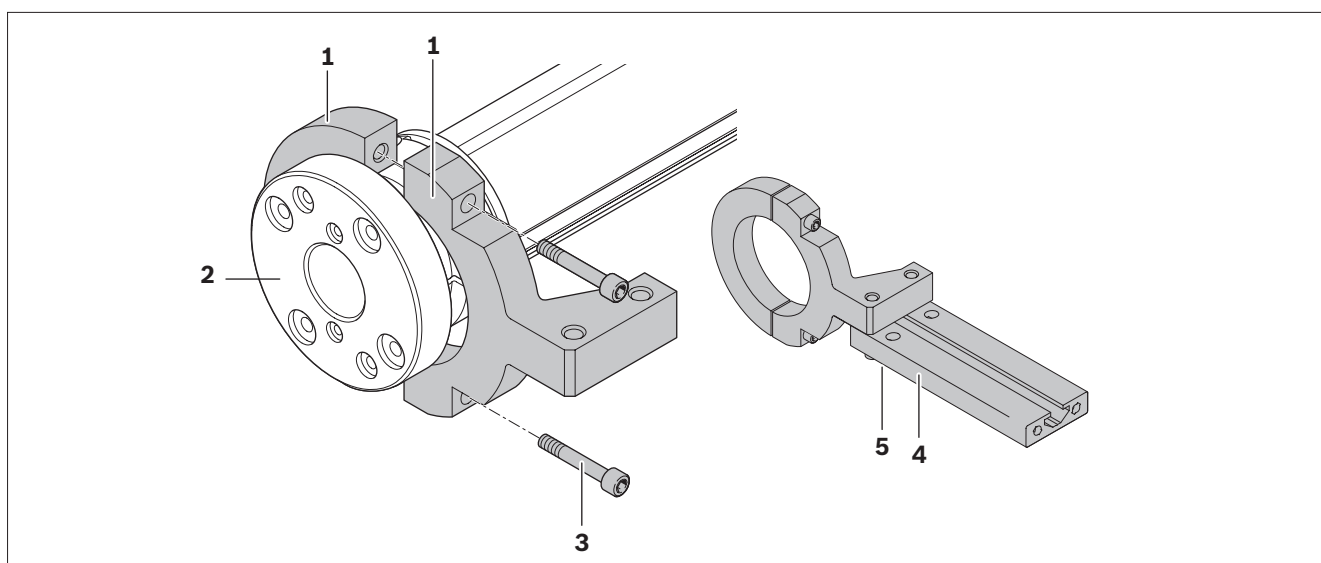


Fig. 29: Mounting the two-piece clamp and the profile

2. Fasten the cable drag chain **(6)** using sliding blocks **(7)** in the T-slot of the mounting profile.

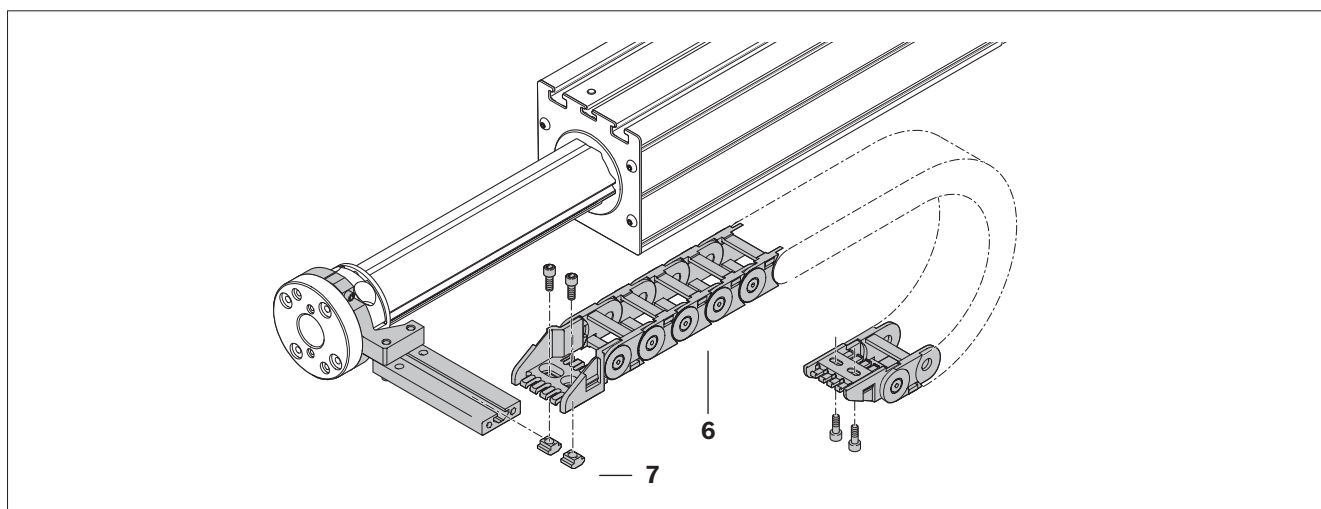


Fig. 30: Mounting the cable drag chain

6.8 Connecting the electrical power supply to the VKK

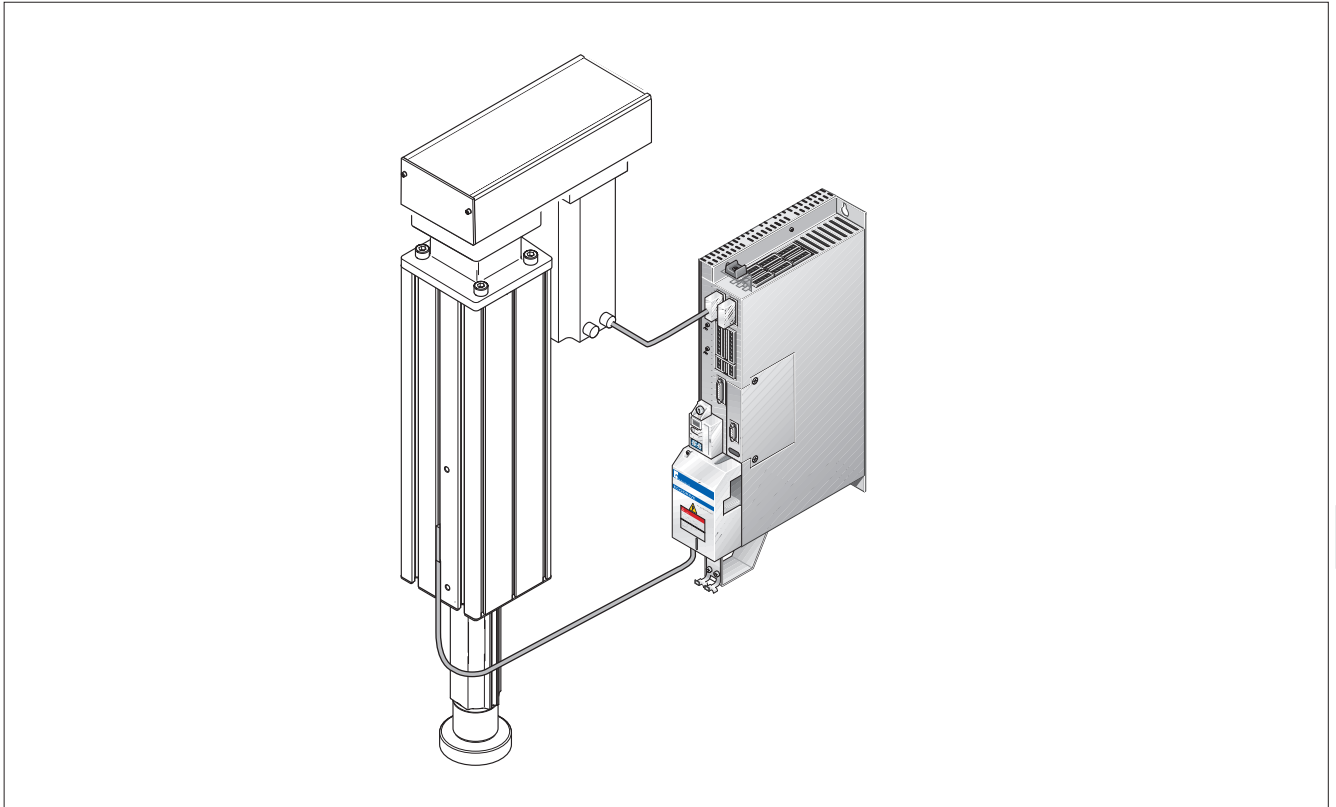


Fig. 31: Connecting the electrical power supply to the VKK



WARNING

Risk of electrical shocks through touching live parts!

Severe personal injury or even death.

- ▶ Before commencing any electrical installation work, switch off the power supply and secure it against reactivation.
- ▶ Follow the safety instructions given in the documentation for the controller used.

1. Switch off the voltage supply to the relevant parts of the system.
2. Connect the electrical components to the VKK as illustrated in the drawing.

7 Putting into service

- The product must not be put into service until it has been verified that the final 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.

7.1 Easy start-up thanks to integrated assistant EasyWizard

Preconfigured data sets and a nameplate designed to dovetail with the assistant.

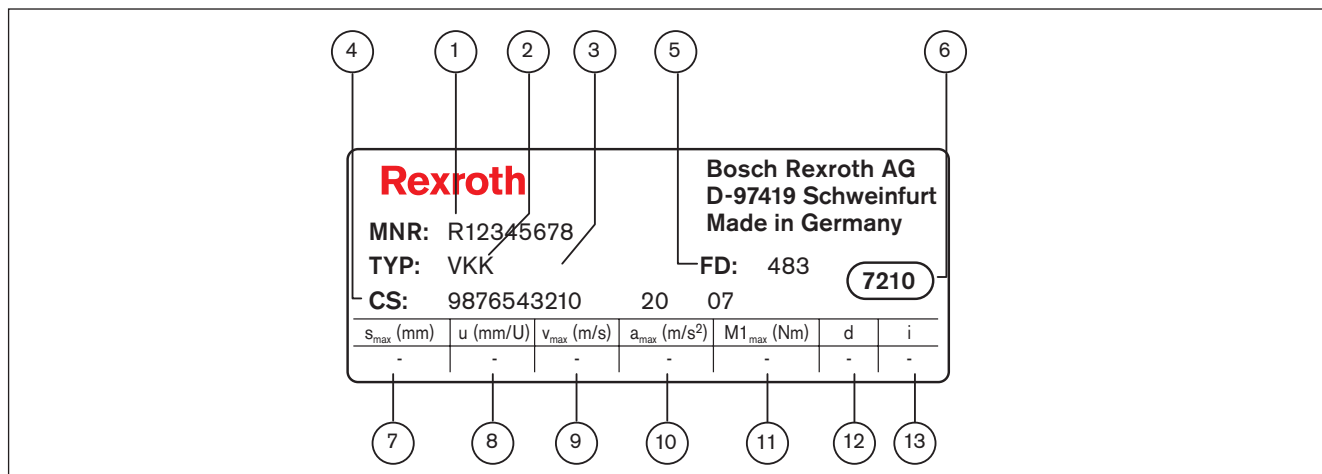
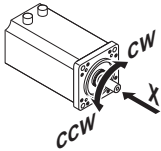


Fig. 32: Nameplate VKK

- | | |
|---|---|
| 1 Part number | 12 d = motor direction of rotation for travel in positive direction |
| 2 Type designation | |
| 3 Size | |
| 4 Customer information | |
| 5 Date of manufacture | |
| 6 Manufacturing location | |
| 7 $s_{\max}$ = max. travel range (mm) | |
| 8 u = feed/lead constant without gear unit (mm/U) | |
| 9 $v_{\max}$ = max. linear speed without gear unit (m/s) | |
| 10 $a_{\max}$ = max. acceleration without gear unit (m/s ²) | |
| 11 $M1_{\max}$ = max. drive torque at motor journal (Nm) | |
| |  |
| | CW = Clockwise
CCW = Counter Clockwise |
| | 13 i = gear ratio |

Fast start-up with mechanical data input



Fig. 33: Putting into service VKK

7.2 Checking the operating conditions

- ▶ Take note of the permitted ambient temperature, load, linear travel speed and maximum travel of the VKK ➞ 13 and “VKK” catalog.
- ▶ For special operating conditions, please ask.

7.3 Trial run, running in



WARNING

Risk of injury due to moving parts!

Limbs or extremities may be crushed.

- ▶ Do not attempt to grasp any moving parts.

- ▶ The product may only be put into service after running successful trials under near-real production conditions.
- ▶ Traverse the unit at low speed over the entire travel range. While doing so, be sure to check the settings and the function of the limit switches.
- ▶ If necessary, optimize the interaction of the mechanical system and the electronics.

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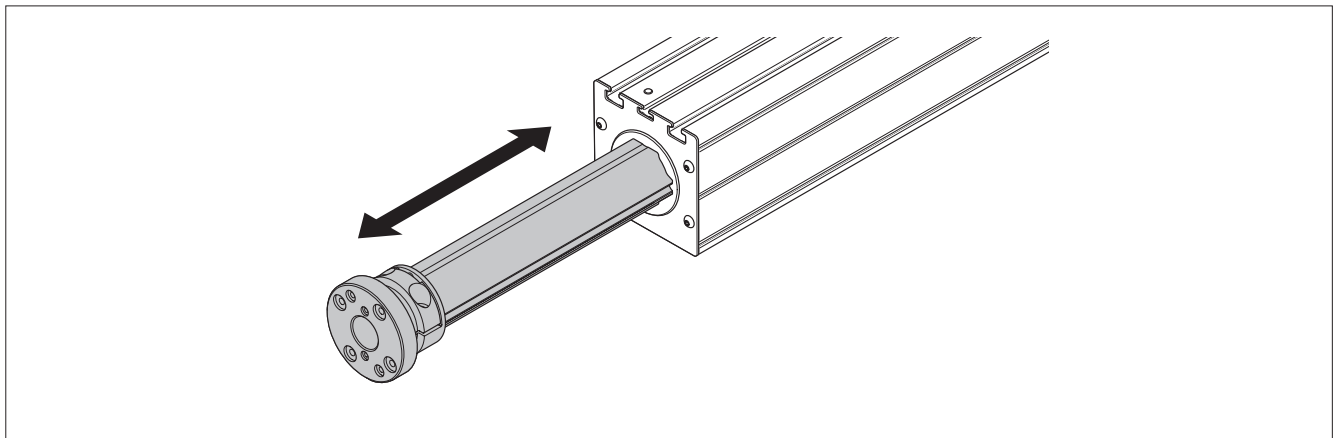


Fig. 34: Extending and retracting the thrust rod

7.4 Shifting the switches



CAUTION

Risk of electrical shocks through touching live parts (24 V)!

Minor injuries.

- ▶ Before commencing any work on the switches, switch off the power supply and secure it against reactivation.
- ▶ If problems occur with the switches during the function check or trial run, re-adjust the switches ➞ 6.6.

8 Operation



WARNING

Risk of electrical shocks through touching live parts!

Severe personal injury or even death.

- ▶ Before commencing any electrical installation work, switch off the power supply and secure it against reactivation.
- ▶ Follow the safety instructions given in the documentation for the controller used.

Risk of injury due to moving parts (e.g. thrust rod)!

Limbs or extremities may be crushed.

- ▶ Do not attempt to grasp any moving parts while the system is in operation.
- ▶ Do not stand in the hazard zone in front of the thrust rod.



CAUTION

Motor becomes very hot during operation!

Risk of burns.

- ▶ During operation, do not touch the motor or only when wearing suitable protective equipment (e.g. heat-resistant gloves).

NOTICE

Lubricant may escape during operation!

Environmental contamination

- ▶ Take suitable precautions to collect any escaping lubricant and dispose of it in the proper way.

Motor will overheat when overloaded!

Fire risk.

- ▶ During operation, be sure to comply with technical data such as load moments, maximum rotary speeds, motor data, etc. ➞ “VKK” catalog.

- ▶ During operation, be sure to comply with technical data such as load moments, maximum rotary speeds, motor data, etc. ➞ “VKK” catalog.

9 Cleaning and care

NOTICE

Damage to the surface from solvents and aggressive detergents!

Degradation of seals and malfunction of the product.

- For cleaning use only water and, if necessary, a mild detergent.

1. Seal all holes with suitable protective caps/devices.
2. Check that all seals and locks of plug connections fit tightly, to ensure that no moisture can penetrate the VKK during cleaning.
3. To extend the service life of the seal, apply a little lubricant to the piston rod in the vicinity of the seal after cleaning.

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10 Maintenance and repair

The only maintenance required is lubrication of the ball screw assembly using a commercially available manual grease gun. Basic lubrication is carried out by the manufacturer.

10.1 Lubrication

- ▶ Before using lubricants, read and take note of the corresponding material safety data sheets!
- ▶ Feed Modules are designed for grease lubrication.

NOTICE

Risk of property damage due to insufficient lubrication!

Loss of performance and corrosion.

- ▶ Lubricate the product every 500 operating hours or when the specified travel distance has been covered – whichever limit is reached first ➡ Table 12 and Table 13.

Risk of insufficient lubrication due to use of wrong lubricants!

Damage to the product.

- ▶ Use only the recommended lubricants ➡ Table 11

Performance altered by special operating conditions!

Damage to the product.

- ▶ Before putting the product into service under special operating conditions, please consult Bosch Rexroth AG. This applies especially to environments with glass fiber or wood dust, solvents, extreme temperatures, and for shortstroke applications.

10.1.1 Lubrication intervals

➡ 10.1 „NOTICE“

10.1.2 Lubricant/Lubricant quantities

Lubricant: Do not use greases containing solid particles (e.g., graphite or MoS₂)!

Lubricant quantities: ➡ 10.1 „NOTICE“

Table 11: Recommended lubricant

	Grease	Part number
VKK 15-50/VKK 15-70/VKK 25-110	Dynalub 510	R341603700 (cartridge)

Table 12: Lubrication intervals and lubricant quantities (Ball screw)

	Ball screw lead P (mm)	Revolutions rev U (mill)	Travel (km)	Grease relube quantity (g)
VKK 15-50	2	50	100	0.20
	5		250	0.20
	10		500	0.30
VKK 15-70	5		250	0.70
	10		500	0.90
	16		800	1.00
VKK 25-110	5		250	1.00
	10		500	1.90
	20		1000	2.40

Table 13: Lubrication intervals and lubricant quantities (guide)

	Travel (km)	Grease relube quantity/Grease partial relube quantity (g)
VKK 15-50	4000	0.40 (2x)
VKK 15-70	4000	0.60 (2x)
VKK 25-110	4000	2.40 (2x)

10.1.3 Lubricating the VKK

The lube nipples are located on the side with the T-slot for the switches. The front lube port (1) is for lubricating the ball rail system and the central lube port (2) for lubricating the ball screw assembly.

- ▶ Check that the operating conditions are normal ➡ 7.2.
- ▶ Lubricate Feed Modules using a manual grease gun. Weigh out the quantity of grease per stroke.

Lubricant must be applied to both of the lube ports.

When designing the adjoining structure, make sure that the maximum stroke may be attained.

Lubricating the ball screw drive

1. Extend the thrust rod to the lubricating position **a** ➡ Table 14.
2. Apply grease to the ball screw via lube port (1). Apply the full quantity as specified in the table 12 in one go.
3. Extend and retract the thrust rod over its entire travel range for three full cycles.

Table 14: Thrust rod position for lubrication

	Length (mm)	a (mm)	b (mm)	c (mm)
VKK 15-50	240	138	-5.75 ¹⁾	85.0
	280	178		
	360	258		
	480	378		
VKK 15-70	280	120	7.50	123.5
	320	160		
	400	240		
	520	360		
	600	440		
VKK 25-110	360	130	10.00	154.0
	400	170		
	480	250		
	600	370		
	680	450		

1) The lube port is in a front-mounted lube plate

Lubricating the runner blocks

1. Extend the thrust rod to the lubricating position **a** ➡ Table 14.
2. Apply the grease gun to lube port (2).
3. Slowly retract the thrust rod and simultaneously apply one partial quantity of lubricant! ➡ Table 13.
4. Extend and retract the thrust rod over its entire travel range for three full cycles, then extend it again.
5. Apply the second partial quantity of lubricant.

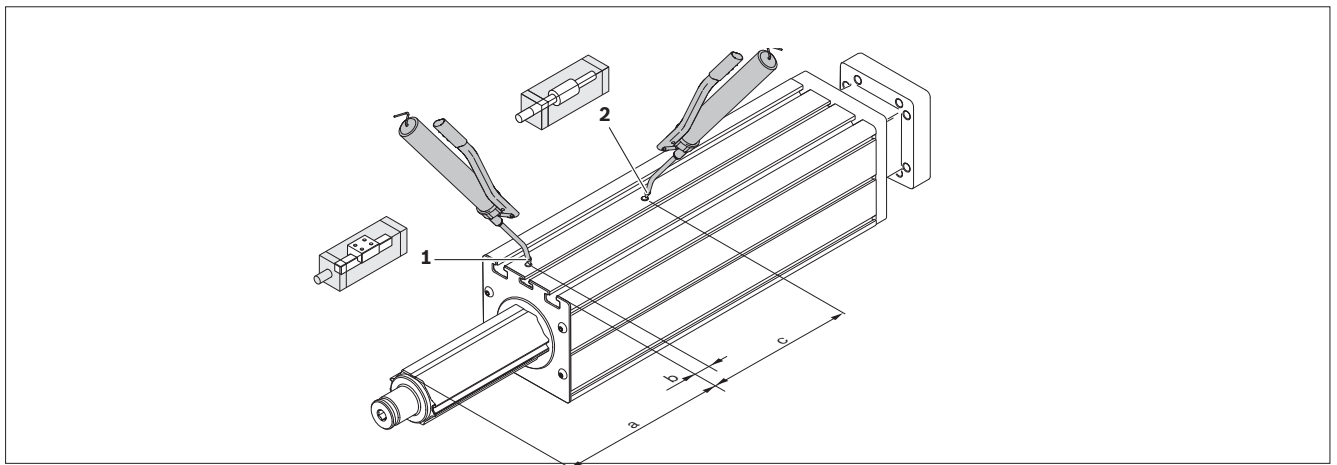


Fig. 35: Lubricating position

10.2 Repair

Repairs to the linear axis may only be carried out by Bosch Rexroth.

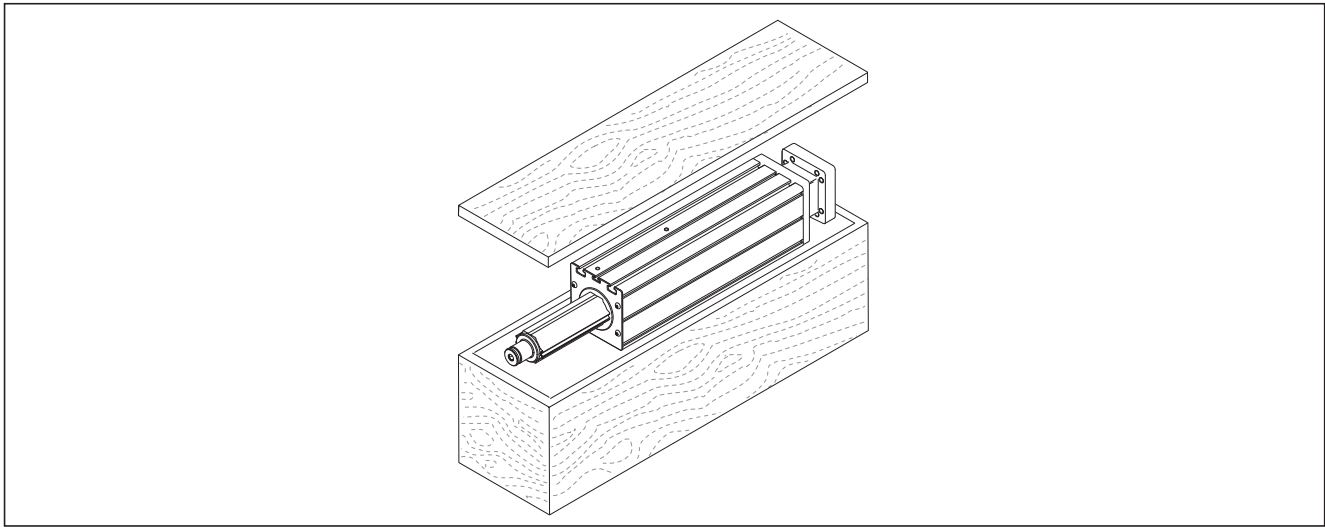


Fig. 36: Return the Feed Module to Bosch Rexroth

11 Disassembly and replacement

To assure the accuracy of the VKK after replacement of assemblies, sub-assemblies may only be dismantled and replaced by Rexroth. The only exceptions to this rule are the work steps described in this section.

11.1 Removing the switches

CAUTION

Risk of electrical shocks through touching live parts (24 V)!

Minor injuries.

► Before commencing any work on the switches, switch off the power supply and secure it against reactivation.



The proximity switches have potted cables.
If a replacement is required, we recommend ordering a new switch.

1. To remove switches, follow the same procedure as for installing, but in reverse order. For the switch mounting arrangements, see section “6.6 Mounting the switching system”.

11.2 Removing the drive



WARNING

Risk of electrical shocks through touching live parts!

Severe personal injury or even death.

- ▶ Before commencing any electrical installation work, switch off the power supply and secure it against reactivation.

Risk of thrust rod crashing down in vertical or slanting installations as the unit is not selflocking!

Severe personal injury or even death.

- ▶ If the product is installed vertically or on a slant, secure the thrust rod against dropping before loosening the mounting screws.
- ▶ Do not stand in line with the direction in which the thrust rod could fall.

11.2.1 Removing the Motor with Coupling

1. Loosen the fastening screws (1) on the motor side of the coupling.
If necessary, release the motor brake and move the thrust rod (2) so that the drive journal turns.
2. Unscrew and remove the motor from the motor mount (3).

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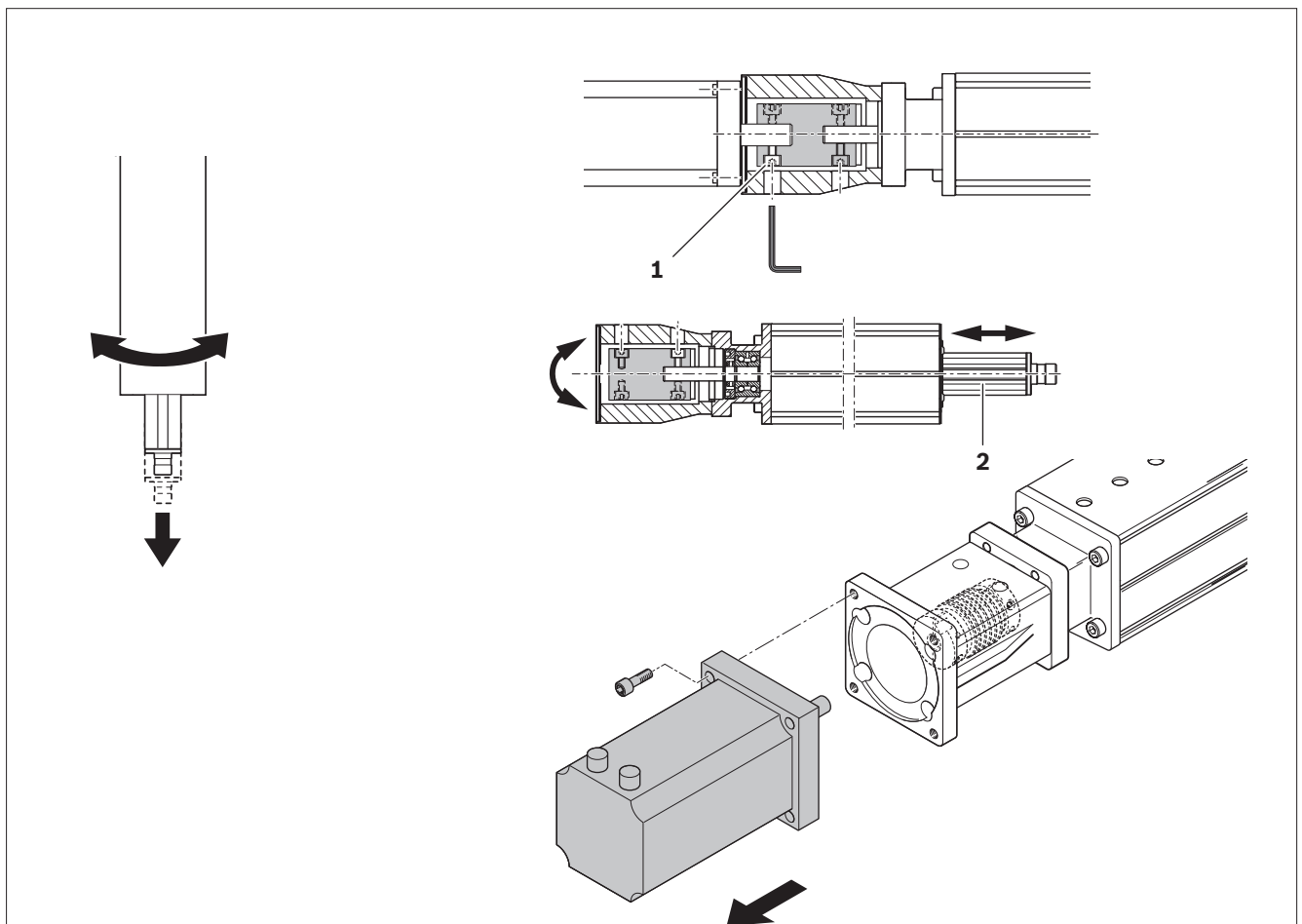


Fig. 37: Removing the motor from the mount

11.2.2 Removing the motor and timing belt side drive



CAUTION

Potential uncontrolled motion of the pretensioned toothed belt when loosening the screws!

Risk of injury!

- Remove the covers from the protective profile as required.

- Remove the covers from the protective profile as required.

Gear ratio $i = 1$:

1. Loosen the motor mounting screws.
2. Loosen the tensioning unit (1) on the motor-side belt pulley. Tapped holes for jack screws are provided in the tensioning units as dismantling aids.
3. Unscrew the motor mounting screws and remove the motor.

Gear ratio $i = 1,5$ or $i = 2$:

1. Unscrew the motor mounting screws and remove the motor.
2. Loosen the tensioning unit (1) on the belt pulley. Tapped holes for jack screws are provided in the tensioning units as dismantling aids.
3. Remove the belt pulley with tensioning unit.

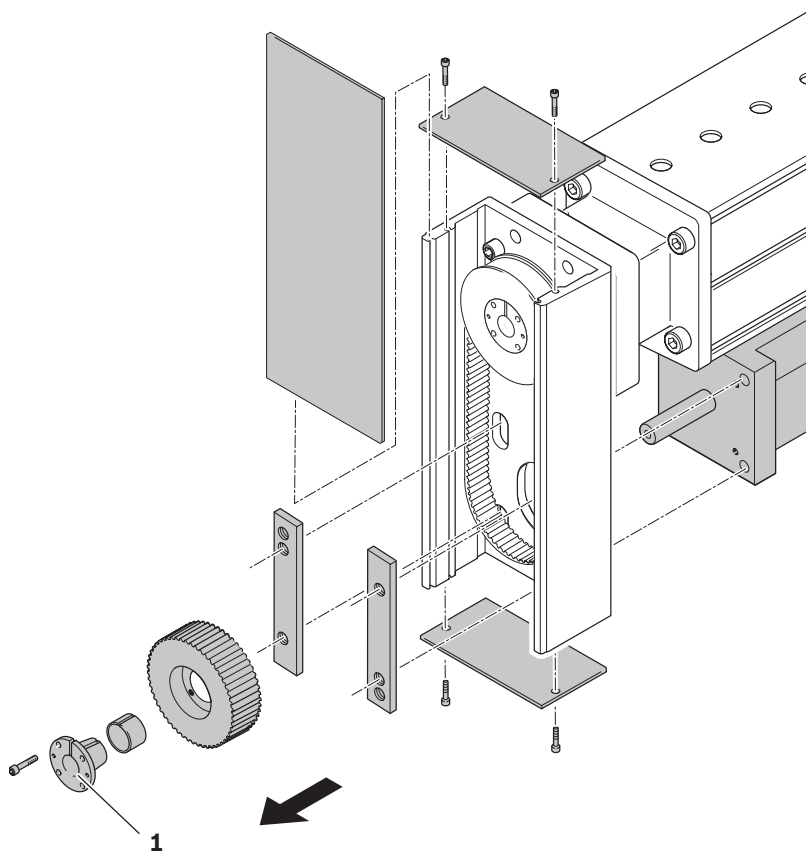


Fig. 38: Removing the motor and timing belt side drive

12 Disposal

The product contains a number of different materials: aluminum, steel, plastics, grease and, where appropriate, electronic components.

NOTICE

Environmentally hazardous materials can pollute the environment if not disposed of properly!

Environmental pollution.

- ▶ Collect any escaping lubricant and dispose of it correctly.
- ▶ The product and its components must be disposed of correctly and in compliance with all applicable national and international guidelines and regulations.

13 Technical data

Technical data ➡ “VKK” catalog.

EN

13.1 Tightening torques

We use screws of strength class 8.8 as standard. If other screws are used, this is indicated.

Table 15: Tightening torques

 8.8	M2	M2,5	M3	M4	M5	M6	M8	M10	M12
Ø M _{A max} (Nm) μ = 0,125	0,4	0,7	1,3	2,8	5,5	9,6	23	46	79

14 Operating conditions

Table 16: Operating conditions

Ambient temperature must not fall below dew point	0 °C ... 50 °C
Degree of protection	IP 54

- Consider the motor temperature limits

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