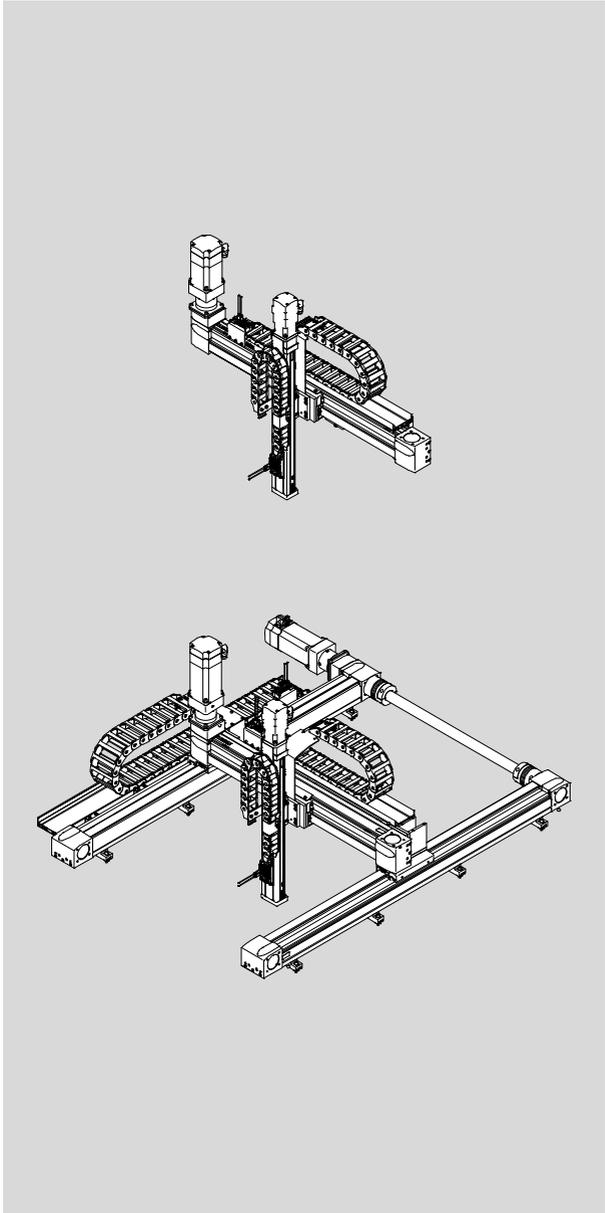


# Handling system

YXC...



# FESTO

**Description**  
Mechanical  
installation

8030870  
1502NH  
[8030863]

YXC...

Translation of the original instructions

GDCP-YXC-EN

Identification of hazards and instructions on how to prevent them:



**Danger**

Immediate dangers which can lead to death or serious injuries.



**Warning**

Hazards that can cause death or serious injuries.



**Caution**

Hazards that can cause minor injuries or serious material damage.

Other symbols:



**Note**

Material damage or loss of function.



Recommendations, tips, references to other documentation.



Essential or useful accessories.



Information on environmentally sound usage.

Text designations:

- Activities that may be carried out in any order.
- 1. Activities that should be carried out in the order stated.
- General lists.
- ➔ Result of an action/References to more detailed information.

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# 1 Safety and requirements for product use

## 1.1 Technical data



### Note

The technical data are contained in a separate data sheet, depending on the order. Damage to the product from incorrect use and non-compliance with the technical data. The separate data sheet as well as the CAD model are components of the product documentation and must be downloaded as follows.

- Determine order ID of the handling system (➔ Product labelling on the Y-module).
- Download data sheet and CAD model from the Festo Support Portal by specifying the order ID (➔ [www.festo.com/sp](http://www.festo.com/sp)).
- Print out data sheet and keep it together with this description.
- Dimensions and other required measurements should be derived from the CAD model.

### 1.1.1 Ordered strokes [mm]

For single-axis system and linear gantry:

- Determine stroke in Y-direction ( $H_y$ ) (➔ Product labelling on the Y-module):
  - $H_y$  = stroke in Y-direction e.g.: EHYM-LP-EGC-120-TB-KF-**1000**-...

For planar surface gantry and three-dimensional gantry:

- Determine width in Y-direction ( $B_y$ ) and stroke in X-direction ( $H_x$ ) (➔ Product labelling on the X-module):
  - $B_y$  = width in Y-direction e.g.: EHMx-EGC-120-TB-KF-1200-**642**-...
  - $H_x$  = stroke in X-direction e.g.: EHMx-EGC-120-TB-KF-**1200**-642-...

## 1.2 Safety

### 1.2.1 General safety information

- Observe all warnings in this documentation.
- Observe all warnings and safety instructions for the related accessories.

## 1.3 Intended use

This product is a handling system and executes positioning tasks within machines or automated systems with a higher-order controller.



### Warning

Unexpected risks in commissioning and operation of the product in a system. Hazard for system safety as well as for persons within range of the system.

- Prepare risk evaluation of the complete system.

- Use product only as follows:
  - in excellent technical condition
  - in original condition, without unauthorised modifications
  - within the limits of the product defined in the technical data (➔ 1.1 Technical data)
  - in an industrial environment



### Note

In the event of damage caused by unauthorised manipulation or other than intended use, the guarantee is invalidated and the manufacturer is not liable for damages.

### 1.3.1 Possible misuse

- Never use product as follows:
  - with unauthorised modifications or alterations to the product
  - outside of an industrial environment
  - in an invalid mounting position
  - with load limits exceeded
  - without sufficient risk evaluation of the complete system
  - without a safety concept for the complete system

## 1.4 Permitted mounting position

Use product only in the following mounting positions:

Handling system	Mounting position <sup>1)</sup>		
	X-module	Y-module	Z-module
Single-axis system	–	Horizontal	–
Linear gantry	–	Horizontal	Vertical
Planar surface gantry	Horizontal	Horizontal	–
Three-dimensional gantry	Horizontal	Horizontal	Vertical

1) Related illustrations (→ 3.2 Module types).



### Note

Deviating mounting positions or overhead mounting are not permitted. Energy chains sag due to gravity. Cables and hoses are overloaded.

- Use product only in a permitted mounting position.

## 1.5 Requirements for product use

- Provide this documentation to the following persons:
  - design engineer
  - installer
  - commissioner of the machine or system
- Comply with the specifications of the documentation. Follow all accompanying documentation and the documentation of any associated accessories.
- Take the following into consideration for the destination:
  - applicable legal regulations
  - regulations and standards
  - regulations of the testing organisations and insurers
  - national specifications
- For correct and safe use, take the following into account:
  - all warnings and notes
  - all load limits of the product and the connected components (→ 1.1 Technical data)

## 1 Safety and requirements for product use

### 1.5.1 Obligations of the operating company

The product is an incomplete machine.

Commissioning is prohibited until it has been established that the machinery in which it will be installed is in compliance with the provisions of the Machinery Directive 2006/42/EC.

### 1.5.2 Qualified specialized personnel

Installation, mounting, commissioning, maintenance, repair and de-commissioning should only be performed by qualified personnel who are familiar with:

- installation and operation of electrical control systems
- installation and operation of pneumatic systems
- mounting and operation of mechatronic handling systems
- the applicable regulations for accident prevention and occupational safety
- the documentation and mode of operation of the product.

### 1.5.3 Range of application and certifications

Standards and test values that the product complies with and fulfills (→ 1.1 Technical data).

## 2 Conveying and storage

### 2.1 Conveying

The handling system is attached to the transport protection crate.



**Note**

Damage to the product due to incorrect transport.

- Observe the markings for transport on the transport-protection crate.

- Set the transport-protection crate on a firm and flat base.

### 2.2 Storage conditions

- Comply with storage conditions (→ 1.1 Technical data)

Storage conditions	
Ambient conditions of the storage location	Dry, solid and flat base, in original transport-protection crate

### 2.3 Unpacking



**Note**

Damage to the product due to incorrect unpacking.

- Observe the markings for unpacking on the transport-protection crate.
- Unpack product with at least 2 persons.
- Use correct tools.
- Parts of the transport-protection crate are large and heavy; do not let them fall onto the product.

- Remove marked transport protection aids (→ 2.4.1 Securing in the transport protection crate).

## 2.4 Transport protection aids

Three different types of transport protection aids prevent uncontrolled movement of the product during unpacking, transport to the mounting location and installation.



### Note

Keep the safety components for later use, e.g. for maintenance or dismantling.

### 2.4.1 Securing in the transport protection crate

The product is fastened in the transport protection crate by means of labelled screws.



### Caution

Transport protection aids connected to the transport protection crate are not removed completely. Transport protection crate breaks away when the product is lifted and falls down.



Injury due to impact or pinching. Damage to the product.

Before the product is removed from the transport protection crate:

- Remove all transport protection aids marked with this symbol (screws).

### 2.4.2 Securing when lifting



### Warning

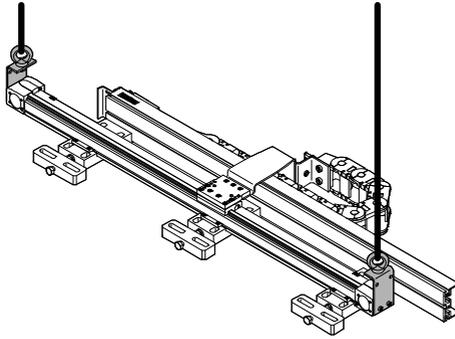
Product is heavy. The centre of gravity is not in the middle.

Injury due to impact or pinching. Damage to the product.

When lifting the product, carry out the following actions:

- Use lifting points (e.g. lifting eye bolts) on the transport component kit.
- Attach transport belts vertically to prevent the system from bending.
- Use appropriate lifting gear (traverse) for safe handling.
- Take weight into account (→ Label on transport protection crate).
- Take adequate safety precautions.
- Assign sufficient number of people for mounting.
- Adjust lifting speed.

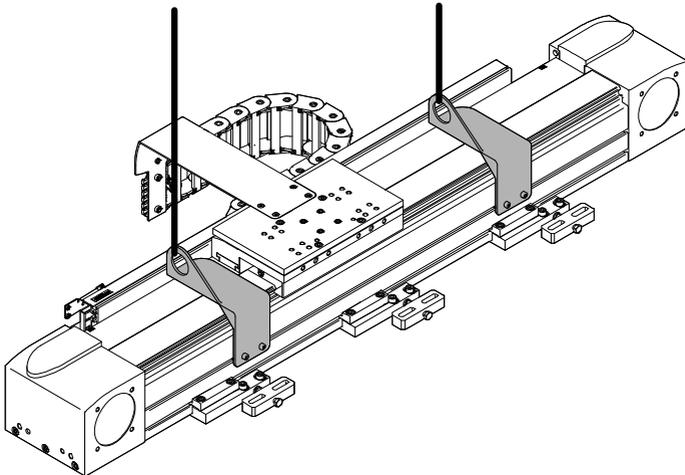
**For the single-axis system and the linear gantry with EGC 50**



To lift the handling system safely:

- Use mounted transport component kit.

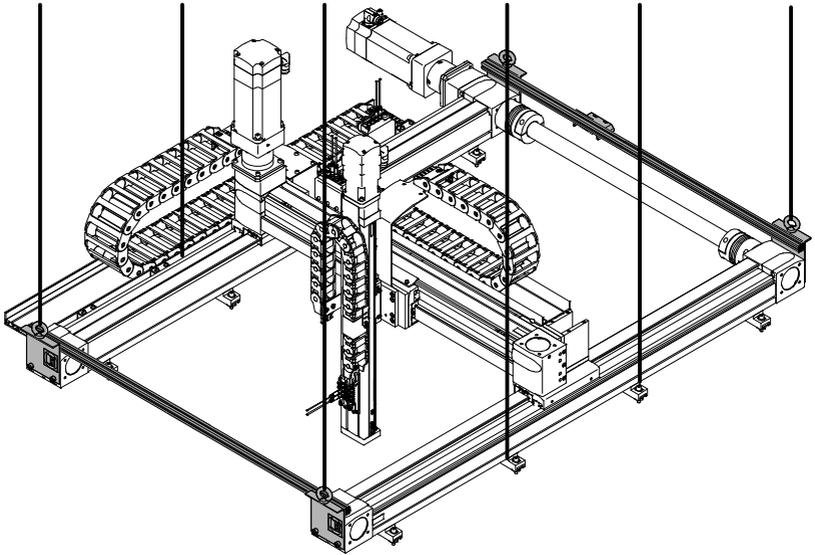
**For the single-axis system and the linear gantry with EGC80/120/185 and EGC-HD**



To lift the handling system safely:

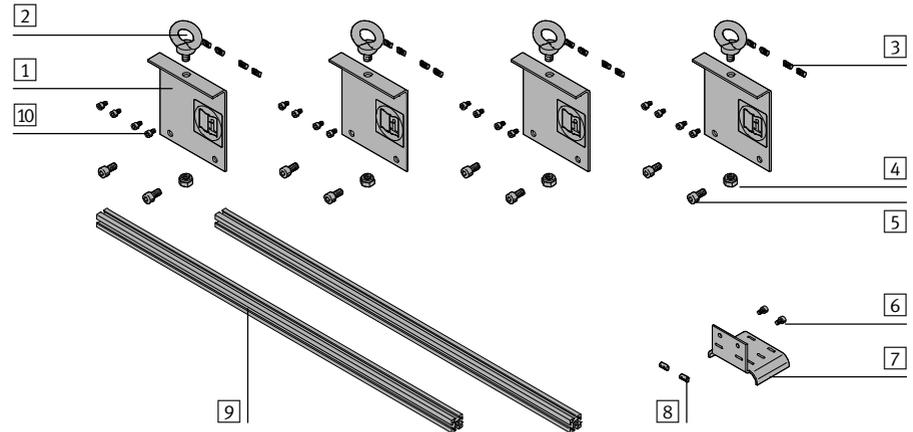
- Use mounted transport component kit.

**For the planar surface gantry and the three-dimensional gantry**



To lift the handling system safely:

- Use the following transport component kit.

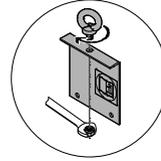


- 1 Mounting bracket (4x)
- 2 Lifting eye bolt (4x)
- 3 Slot nut (8 ... 16x)
- 4 Nut (4x)
- 5 Screw (8x)

- 6 Screw (2x)
- 7 Cable guide (1x)
- 8 Slot nut (2x)
- 9 Stay (2x)
- 10 Screw (8 ... 16x)

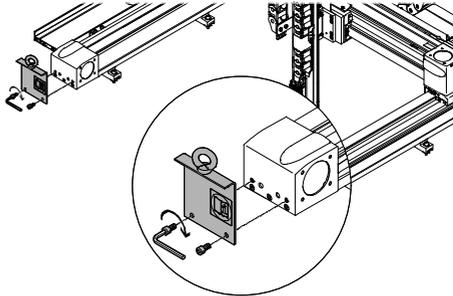
## 2 Conveying and storage

- Fasten lifting eye bolts to mounting brackets with the nut.



Screw size and tightening torque	EHMX-EGC-			
	50	80	120	185
	M8	M12		
[Nm]	12	24		

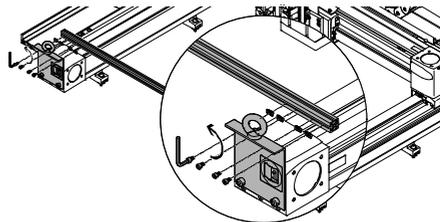
- Attach the mounting bracket to the front sides of the X-axes.



Screw size and tightening torque	EHMX-EGC-			
	50	80	120	185
	M4x10	M5x12	M8x16	M10x16
[Nm]	4.1	8.3	34	47

For clamping the Y-width (By):

- Fasten stays with the slot nuts to the mounting brackets.

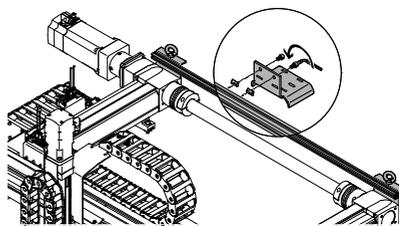


Screw size and tightening torque	EHMX-EGC-			
	50	80	120	185
	M5x8			
[Nm]	5.9			

## 2 Conveying and storage

For clamping the cables and hoses

- Position cable guide on the drive side at the stay.
- Fasten the cable guide with the slot nuts.
- Wrap cables and hoses around the cable guide and clamp them with cable ties.



Screw size and tightening torque	EHMX-EGC-			
	50	80	120	185
	M5x8			
[Nm]	5.9			

### 2.4.3 Securing during transport and mounting

Moving parts are secured during transport of the product to prevent them from sliding.



#### **Danger**

Moving parts are secured. Product is energised. Moving parts break free and run uncontrollably and with high acceleration into the end position.

Injury (death) due to impact or pinching.

To place the product safely in operation:

- After mounting, remove all safety components marked with this symbol before energising the product.



#### **Safety component group at the Z-module**

A Z-module with motor from Festo has a brake function. There are no moving parts to secure there.

For the Z-module without motor from Festo:

For the long-stroke Z-module (EMHZ-DGEA/EHMZ-EGC), the drive shaft is clamped through a safety component group.

For the short-stroke Z-module (EHMZ-EGSL/DHMZ-DGSL), the moving parts do not need to be secured. The slide can move.

#### **When removing the safety component group at the Z-module:**



#### **Warning**

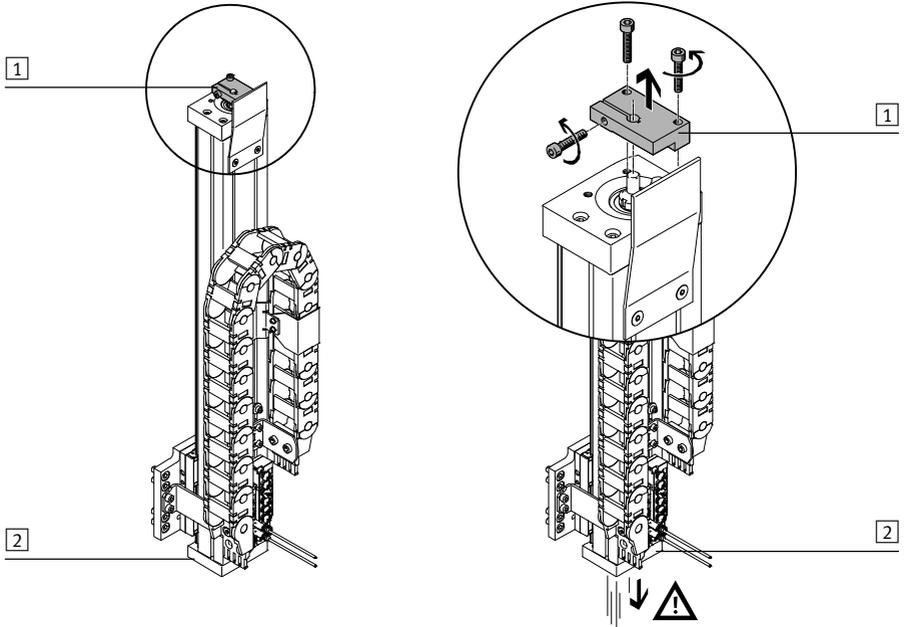
Moving parts are secured. Safety component group is removed. Z-axis runs uncontrollably and with high acceleration into the end position.

Injury due to impact or pinching. Damage to the product.

Remove the safety component group as follows:

1. Support Z-axis from below.
2. Remove safety component group.
3. Bring Z-axis slowly into the lower end position.
4. Mount motor.

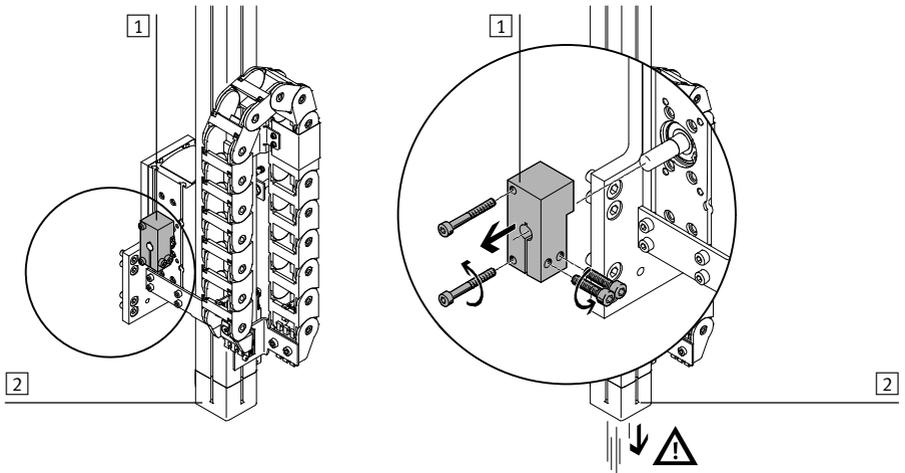
**EHMZ-DGEA**



1 Safety component group

2 Z-axis

**EHMZ-EGC**



1 Safety component group

2 Z-axis

## 3 Overview

The handling systems are based on 3 module types: X-module, Y-module and Z-module.



All illustrations show an example for the structure of the modules and handling systems. The actual design differs depending on size and the order.

### 3.1 Delivery status

Depending on the order, the handling system is shipped as follows.

#### 3.1.1 Completely mounted handling system

All modules are connected to each other. Motors are mounted onto the modules (exception: middle motor position for the X-module). Cables and hoses are installed. Controllers and controller accessories accompany the shipment.

#### 3.1.2 Partially mounted handling system

The modules are not connected to each other. Motors are mounted onto the modules (exception: middle motor position for the X-module). Cables and hoses, controllers and controller accessories accompany the shipment.

### 3.2 Module types

#### 3.2.1 X-module EHM<sub>X</sub> (including motor)

The X-module consists of 2 parallel linear axes with a shared electric drive. The X-module moves the Y-module along the X-axes. Adapters are mounted on the slides of the X-axes to connect the Y-module.

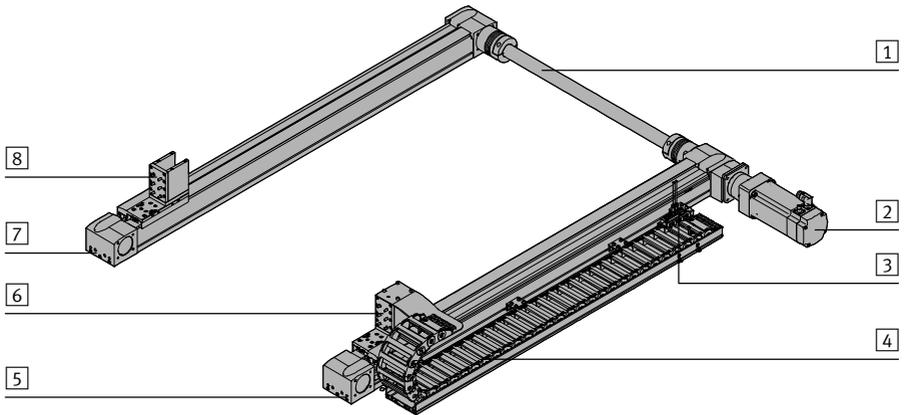
##### Structure

The motor is connected to both X-axes through a connecting shaft. The position of the motor and energy chain is dependent on the order.

The following components are located on the motor side:

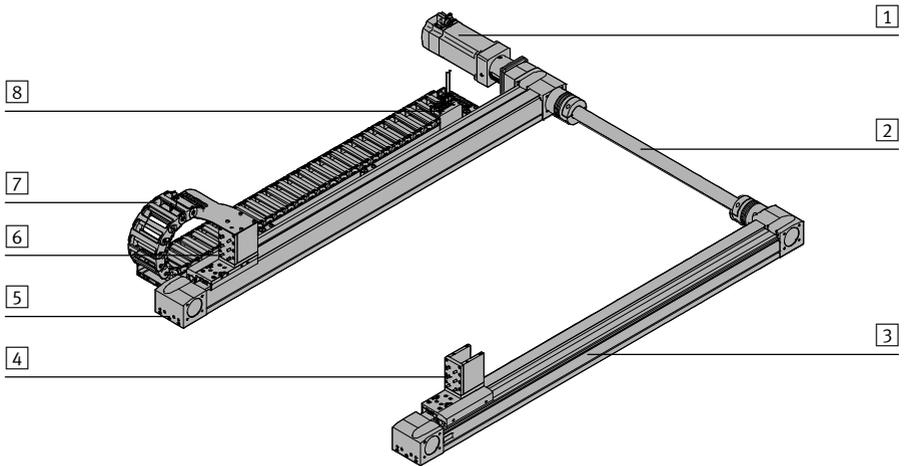
- Energy chain
- Multi-pin plug for sensors (optional)

**Motor position right (EHMX-...-R)**



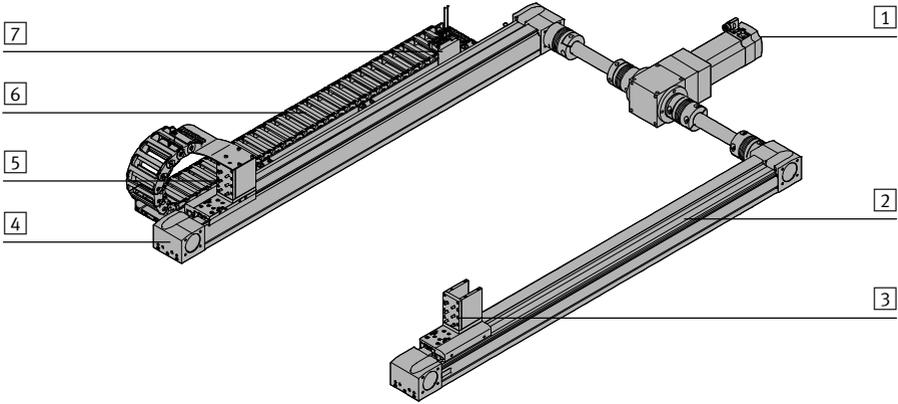
- |          |                                   |          |                  |
|----------|-----------------------------------|----------|------------------|
| <b>1</b> | Connecting shaft                  | <b>5</b> | X-axis           |
| <b>2</b> | Motor (optional)                  | <b>6</b> | Adapter Y-module |
| <b>3</b> | Multi-pin plug/sensors (optional) | <b>7</b> | X-axis           |
| <b>4</b> | Energy chain                      | <b>8</b> | Adapter Y-module |

**Motor position left (EHMX-...-L)**



- |          |                  |          |                                   |
|----------|------------------|----------|-----------------------------------|
| <b>1</b> | Motor (optional) | <b>5</b> | X-axis                            |
| <b>2</b> | Connecting shaft | <b>6</b> | Adapter Y-module                  |
| <b>3</b> | X-axis           | <b>7</b> | Energy chain                      |
| <b>4</b> | Adapter Y-module | <b>8</b> | Multi-pin plug/sensors (optional) |

**Motor position middle (EHMX-...-M)**



**1** Connecting shaft with gear unit/motor<sup>1)</sup>

**2** X-axis

**3** Adapter Y-module

**4** X-axis

1) Accompanying

**5** Adapter Y-module

**6** Energy chain

**7** Multi-pin plug/sensors (optional)

### 3.2.2 Y-module EHYM (including motor)

The Y-module consists of a linear axis with electric drive.

The Y-module moves the Z-module, or customer-provided attachments, along the Y-axis.

EHYM-LP: Y-module in the single-axis system or linear gantry

EHYM-RP: Y-module in the planar surface gantry or three-dimensional gantry

The main difference is the mounting option.

Handling system	Attachment of the Y-module
Single-axis system	EHYM-LP on mounting surface
Linear gantry	
Three-dimensional gantry	EHYM-RP to X-module
Planar surface gantry	

#### Structure

For the single-axis system and the linear gantry, the position of the motor on the Y-module is dependent on the order.

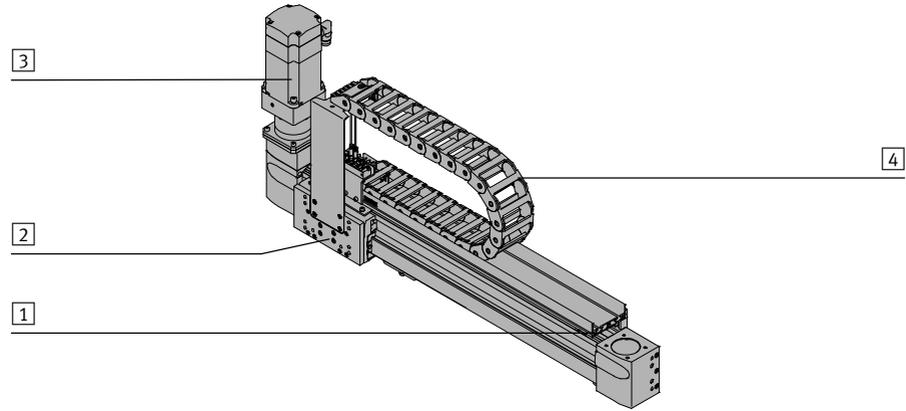
For the planar surface gantry and the three-dimensional gantry, the position of the motor on the Y-module is dependent on the position of the motor on the X module.

Motor X-module	Motor Y-module
Right	Right
Middle	Left
Left	Left

The following components are located on the motor side:

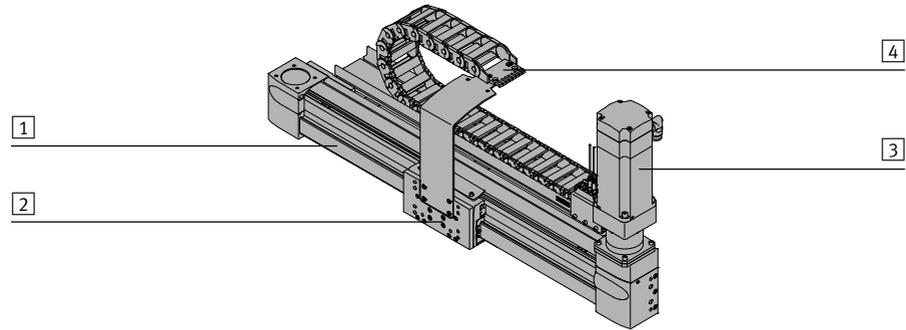
- Input and output of the energy chain
- Multi-pin plug for sensors (optional)

**Y-module for single-axis system/linear gantry EHYM-LP**



- |   |                                |
|---|--------------------------------|
| <b>1</b> Y-axis                                 | <b>3</b> Motor left (optional) |
| <b>2</b> Adapter Z-module/attachment components | <b>4</b> Energy chain          |

**Y-module for planar surface gantry/three-dimensional gantry EHYM-RP**



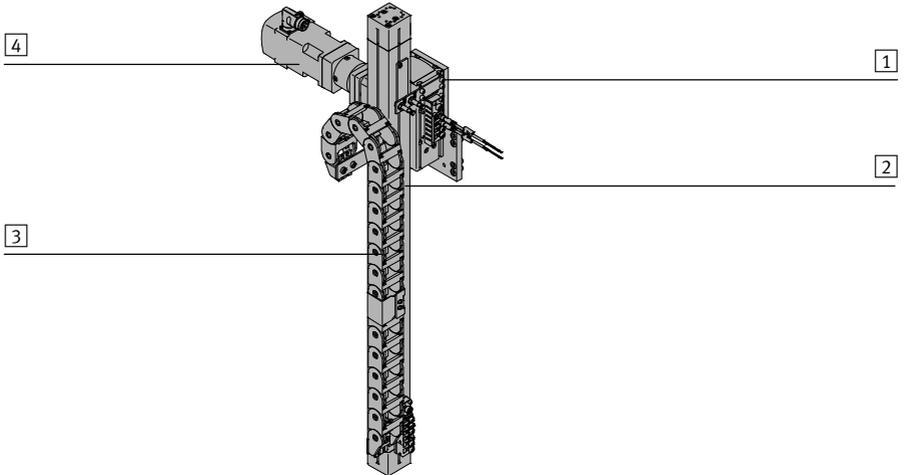
- |   |                                 |
|---|---------------------------------|
| <b>1</b> Y-axis                                 | <b>3</b> Motor right (optional) |
| <b>2</b> Adapter Z-module/attachment components | <b>4</b> Energy chain           |

### 3.2.3 Z-module EHMZ (including motor)/DHMZ

The Z module consists of an electric or pneumatic drive.

The Z-module moves customer-provided attachments, along the Z-axis.

#### Structure



1 Adapter on Y-module

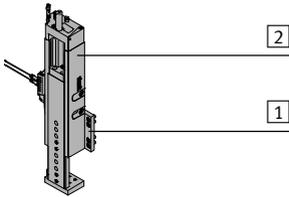
2 Z-axis

3 Energy chain

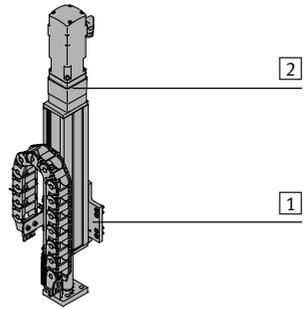
4 Motor (optional)

Depending on the order, a three-dimensional or linear gantry is equipped with the following Z-modules.

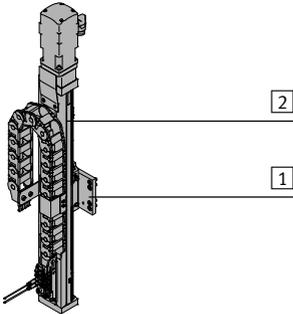
**DHMZ-DGSL**



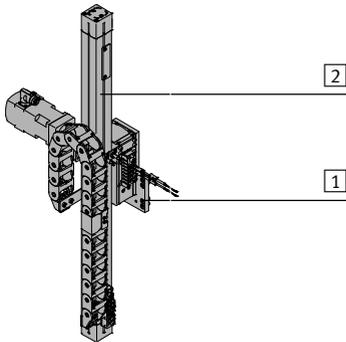
**EHMZ-EGSL**



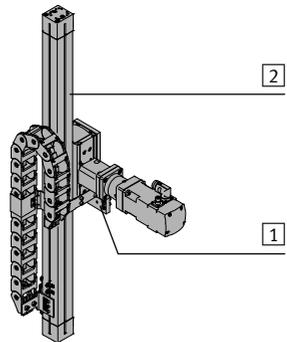
**EHMZ-EGC**



**EHMZ-DGEA (motor position left)**



**(Motor position right)**



**1** Adapter on Y-module

**2** Z-axis

### 3.3 Handling systems

A handling system consists of up to 3 modules.

Handling system	X-module	Y-module	Z-module
Single-axis system	–	EHMY-LP <sup>2)</sup>	–
Linear gantry	–	EHMY-LP <sup>2)</sup>	EHMZ/DHMZ
Planar surface gantry	EHMX <sup>1)</sup>	EHMY-RP	–
Three-dimensional gantry	EHMX <sup>1)</sup>	EHMY-RP	EHMZ/DHMZ

1) Basic module with 2 parallel axes

2) Basic module

- Observe the mounting position (→ 1.4 Permitted mounting position).

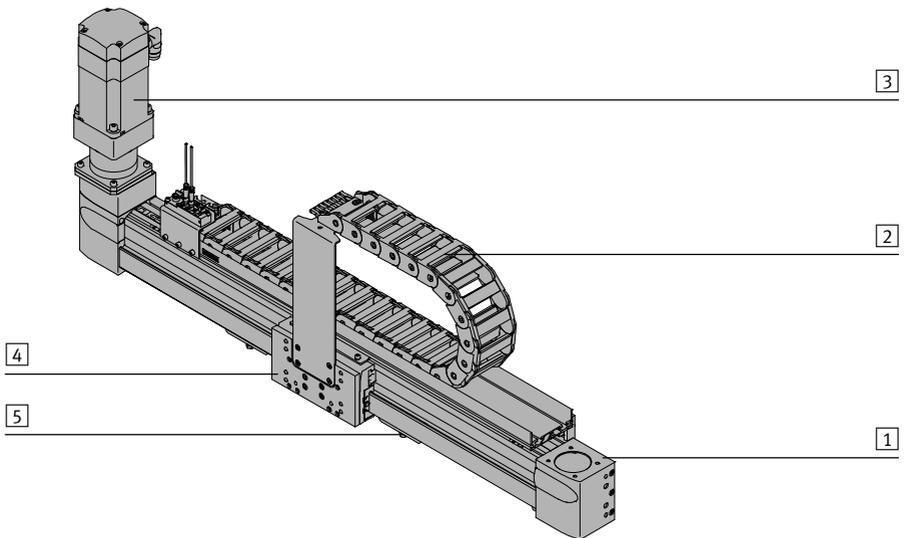
#### 3.3.1 Single-axis system YXCS

##### Function

The single-axis system moves a customer-provided attachment linearly.

##### Structure

The following figure shows an example for the fundamental structure of the single-axis system.



- 1 Y-axis
- 2 Energy chain
- 3 Motor (optional)

- 4 Adapter, attachment components
- 5 Mounting components

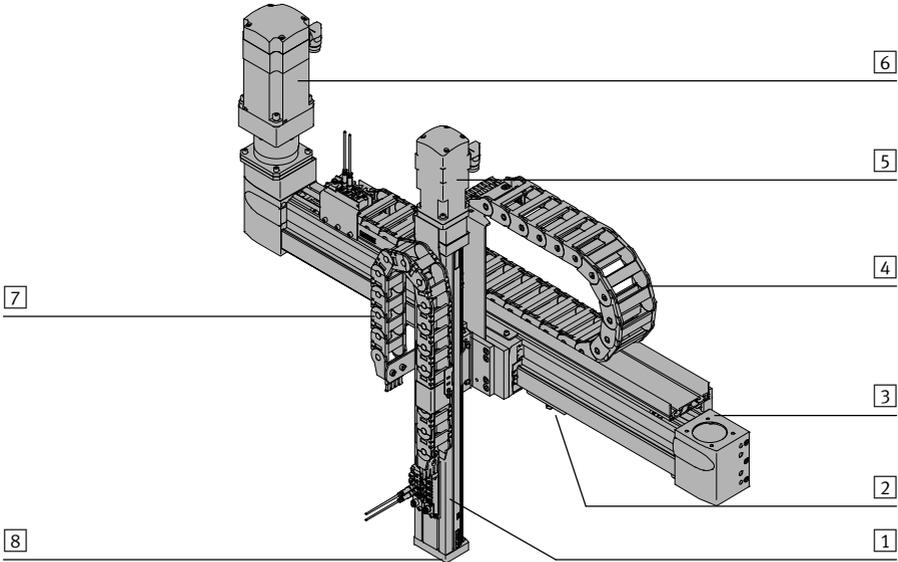
### 3.3.2 Linear gantry YXCL

#### Function

The linear gantry moves a customer-provided attachment within a vertical plane.

#### Structure

The following figure shows an example for the fundamental structure of the linear gantry.



- |                              |   |
|------------------------------|---|
| <b>1</b> Z-axis              | <b>5</b> Motor Z (optional)             |
| <b>2</b> Mounting components | <b>6</b> Motor Y (optional)             |
| <b>3</b> Y-axis              | <b>7</b> Energy chain Z                 |
| <b>4</b> Energy chain Y      | <b>8</b> Adapter, attachment components |

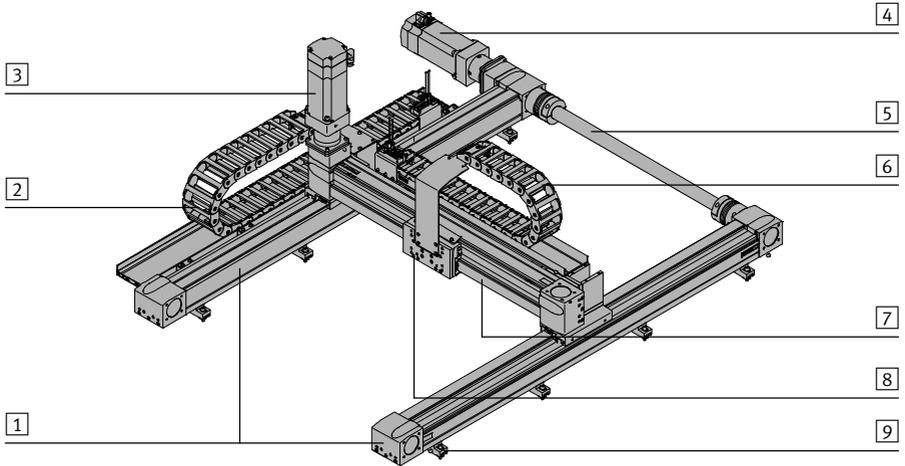
### 3.3.3 Planar surface gantry YXCF

#### Function

The planar surface gantry moves a customer-provided attachment within a horizontal plane.

#### Structure

The following figure shows an example for the fundamental structure of the planar surface gantry.



- 1 X-axes
- 2 Energy chain X
- 3 Motor Y (optional)
- 4 Motor X (optional)
- 5 Connecting shaft

- 6 Energy chain Y
- 7 Y-axis
- 8 Adapter, attachment components
- 9 Mounting components<sup>1)</sup>

1) Dependent on order

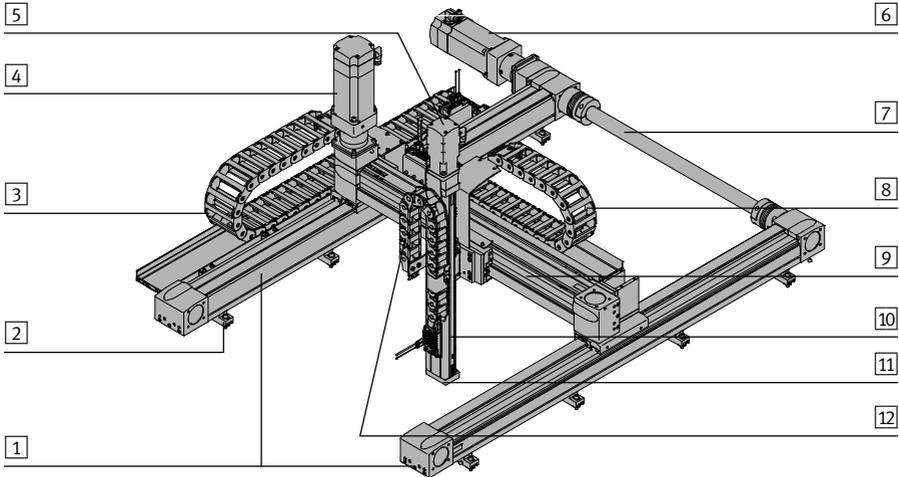
### 3.3.4 Three-dimensional gantry YXCR

#### Function

The three-dimensional gantry moves a customer-provided attachment within a space.

#### Structure

The following figure shows an example for the fundamental structure of the three-dimensional gantry.



- 1 X-axes
- 2 Mounting components<sup>1)</sup>
- 3 Energy chain X
- 4 Motor Y (optional)
- 5 Motor Z (optional)
- 6 Motor X (optional)

- 7 Connecting shaft
- 8 Energy chain Y
- 9 Y-axis
- 10 Z-axis (electrical/pneumatic)
- 11 Adapter, attachment components
- 12 Energy chain Z

1) Dependent on order

### 3.4 Handling systems without motors

- Use the following motors from Festo (recommended).

<b>X-module EHMx</b>	
<b>Axes</b>	<b>Motor</b>
EGC-50-TB-KF	EMMS-AS-40-M-LS-...
EGC-80-TB-KF	EMMS-AS-70-M-LS-...
EGC-120-TB-KF	EMMS-AS-100-M-HS-...
EGC-185-TB-KF	EMMS-AS-140-L-HS-...

<b>Y-module EHM<sub>y</sub></b>	
<b>Axis</b>	<b>Motor</b>
EGC-50-TB-KF	EMMS-AS-40-M-LS-...
EGC-80-TB-KF	EMMS-AS-70-S-LS-...
EGC-120-TB-KF	EMMS-AS-100-S-HS-...
EGC-125-TB-HD	EMMS-AS-70-S-LS-...
EGC-160-TB-HD	EMMS-AS-100-S-HS-...
EGC-185-TB-KF	EMMS-AS-140-S-HS-...
EGC-220-TB-HD	

<b>Z-module EHM<sub>z</sub></b>	
<b>Axis</b>	<b>Motor</b>
DGEA-18-TB-KF	EMMS-AS-55-S-LS-...
DGEA-25-TB-KF	EMMS-AS-70-S-LS-...
DGEA-40-TB-KF	EMMS-AS-100-S-HS-...
EGC-70-BS-KF	EMMS-AS-55-S-LS-...
EGC-80-BS-KF	EMMS-AS-70-S-LS-...
EGC-120-BS-KF	EMMS-AS-100-S-HS-...
EGSL-35-BS-KF	EMMS-ST-28-L-...
EGSL-45-BS-KF	EMMS-AS-40-M-LS-...
EGSL-55-BS-KF	EMMS-AS-55-S-LS-...
EGSL-75-BS-KF	EMMS-AS-70-S-LS-...

If you use motors from other manufacturers (not recommended):

- Only use motors with comparable technical limits  
(→ [www.festo.com/catalogue](http://www.festo.com/catalogue)).
- Comply with technical limits of the axes used in the modules  
(→ [www.festo.com/catalogue](http://www.festo.com/catalogue)).



#### **Note**

The product can be damaged if the technical limits are not complied with.

## 4 Installation of the single-axis systems and the linear gantries

- Observe safety instructions
- Pay attention to transport protection (→ 2.4 Transport protection aids).

### 4.1 Preparation

#### 4.1.1 Installation space

The installation space required depends on the order.

- Take dimensions from the CAD model (→ 1.1 Technical data).

#### 4.1.2 Number n of mounting components

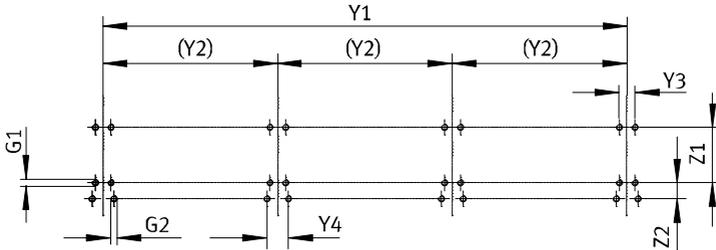
<b>EHMY-LP-EGC-...-KF</b>	<b>50</b>	<b>80</b>	<b>120</b>	<b>185</b>	<b>n<sup>2)</sup></b>
<b>Hy<sup>1)</sup></b> [mm]	≤ 475	≤ 600	≤ 450	≤ 590	2
	476 ... 950	601 ... 1150	451 ... 1100	591 ... 1220	3
	951 ... 1425	1151 ... 1700	1101 ... 1750	1221 ... 1850	4
	1426 ... 1900	1701 ... 2250	1751 ... 2400	1851 ... 2480	5
	–	2251 ... 2800	2401 ... 3050	2481 ... 3110	6
	–	2801 ... 3350	3051 ... 3700	3111 ... 3740	7
	–	3351 ... 3900	3701 ... 4350	3741 ... 4370	8
	–	3901 ... 4450	4351 ... 4500	4371 ... 4500	9
	–	4451 ... 4500	–	–	10

<b>EHMY-LP-EGC-...-TB-HD</b>	<b>125</b>	<b>160</b>	<b>220</b>	<b>n<sup>2)</sup></b>
<b>Hy<sup>1)</sup></b> [mm]	≤ 560	≤ 590	≤ 550	2
	561 ... 1170	591 ... 1220	551 ... 1150	3
	1171 ... 1780	1221 ... 1850	1151 ... 1750	4
	1781 ... 2390	1851 ... 2480	1751 ... 2350	5
	2391 ... 3000	2481 ... 3110	2351 ... 2950	6
	–	3111 ... 3740	2951 ... 3550	7
	–	3741 ... 4370	3551 ... 4150	8
	–	4371 ... 4500	4151 ... 4500	9

1) Hy = stroke in Y-direction (→ 1.1 Technical data)

2) n = number of mounting components

**4.1.3 Preparation of the mounting surface**



- Ensure that the mounting surface is flat and vertical.  
The required flatness depends on the length of the handling system.

Flatness	Y1 [mm]				
	≤ 1000	1001 ... 2000	2001 ... 3000	3001 ... 4000	4001 ... 5000
[mm]	0.1	0.2	0.3	0.4	0.5

- Prepare mounting option on mounting surface. Mounting kit of the intermediate mounting is movable. If required, change support spacing Y2.

EHMY-LP-EGC-...-KF	50	80	120	185	
Dimensions [mm]	Y1 <sup>1)</sup>	Hy - 97	Hy - 16	Hy - 23	Hy + 67
	Y2 <sup>2)</sup>	Y1 / (n - 1)			
	Y3	40			
	Y4	55			
	Z1	80	125	140	220
	Z2	40			
	G1	M4	M6	M8	M8
	Depth of thread	≥ 9	≥ 9	≥ 13	≥ 13
	G2	M8			

EHMY-LP-EGC-...-HD	125	160	220	
Dimensions [mm]	Y1 <sup>1)</sup>	Hy + 60	Hy + 94	Hy + 90
	Y2 <sup>2)</sup>	Y1 / (n - 1)		
	Y3	40		
	Y4	55		
	Z1	180	220	260
	Z2	40		
	G1	M6	M6	M8
	Depth of thread	≥ 9	≥ 9	≥ 13
	G2	M8		

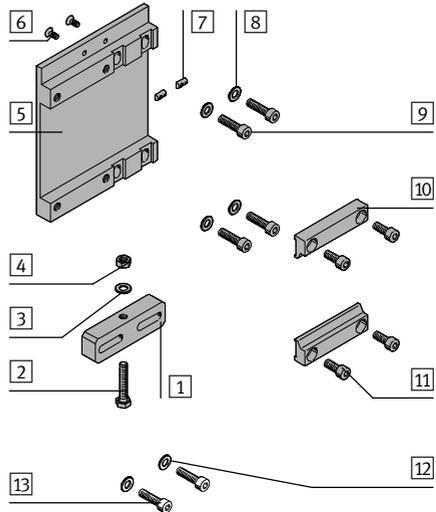
1) Hy = stroke in Y-direction (→ 1.1 Technical data)  
2) n = number of mounting components (→ 4.1.2 Number n of mounting components)

## 4.2 Mounting components

### 4.2.1 Mounting kit with adjustment possibility

#### Structure

<b>1</b>	Adjusting piece	(1x)
<b>2</b>	Adjusting piece screw	(1x)
<b>3</b>	Adjusting piece washer	(1x)
<b>4</b>	Adjusting piece nut	(1x)
<b>5</b>	Lower part	(1x)
<b>6</b>	Support profile screw	(2x)
<b>7</b>	Support profile slot nut	(2x)
<b>8</b>	Lower part washer	(4x)
<b>9</b>	Screw, lower part <sup>1)</sup>	(4x)
<b>10</b>	Upper part	(2x)
<b>11</b>	Screw, upper part	(4x)



Not included in delivery:

<b>12</b>	Washer	(2x)
<b>13</b>	Screw M8	(2x)

- 1) The screw and tightening torque are designed for mounting on steel.
- 2) Adjusting pieces (1 ... 4) and screws (8 ... 9) accompany the shipment. The remaining parts are pre-assembled.

#### Requirements

- Number n of mounting components is known (→ 4.1.2 Number n of mounting components).
- Mounting surface is prepared (→ 4.1.3 Preparation of the mounting surface).

#### Mounting



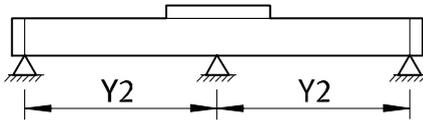
#### Warning

Incorrect mounting. Entire product moves uncontrollably.

Injury due to impact or pinching. Damage to the product.

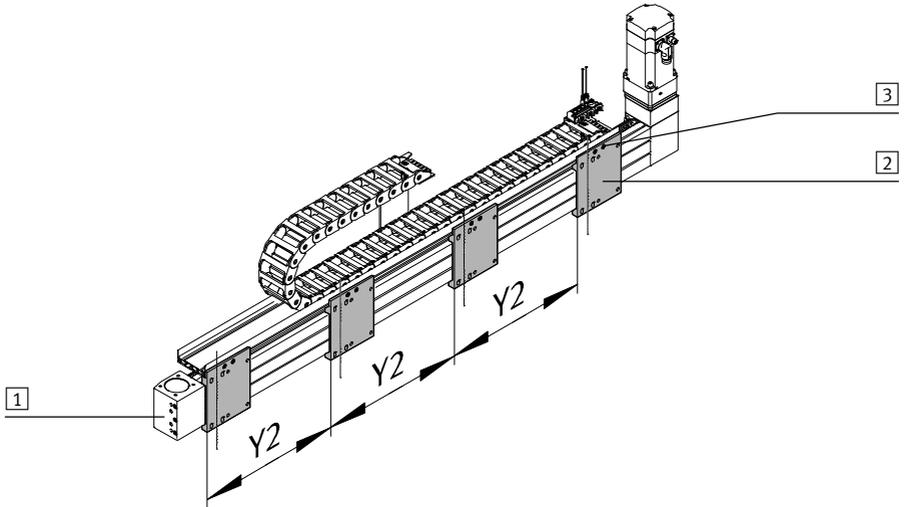
- Use screws **9** and **13** with strength class of at least 8.8.
- Select screws **9** and **13** suitable for the installation situation.
- Mount product free of distortion.
- Use only the mounting kits supplied.
- Secure threaded connections.
- Make sure the mounting surface is sufficiently strong to absorb the maximum forces.

#### 4 Installation of the single-axis systems and the linear gantries



The mounting kits are pre-mounted to the Y-module.

- Check number n and support spacing Y2.
- Place Y-module.



- 1 Y-module
- 2 Mounting kit

- 3 Screw



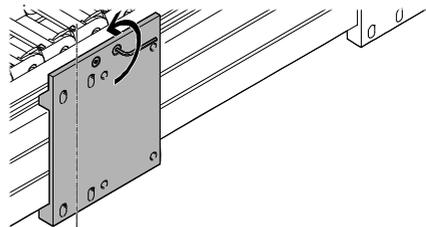
#### Note

In order to move the mounting kit, the screws 3 on the support profile of the energy chain must be accessible from the reverse side after mounting.

- Mount Y-module to a machine frame correspondingly.

On the reverse side:

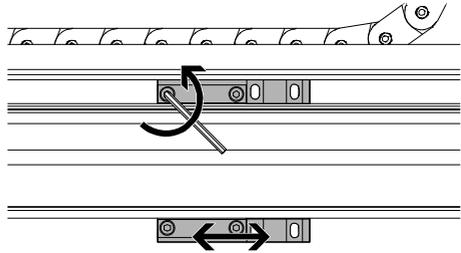
1. Unscrew screws on the support profile of the energy chain.



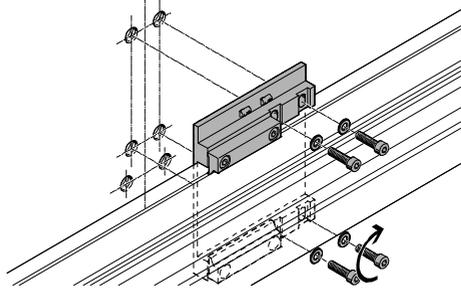
#### 4 Installation of the single-axis systems and the linear gantries

On the front:

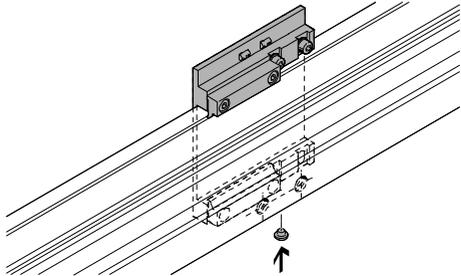
2. Unscrew screws on the upper parts.
3. Position lower part.



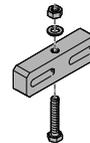
4. Place washers underneath the screws.
5. Using suitable screws<sup>1)</sup>, lightly clamp lower part to the mounting surface.



6. Press bolt from below into the intended hole in the lower part.



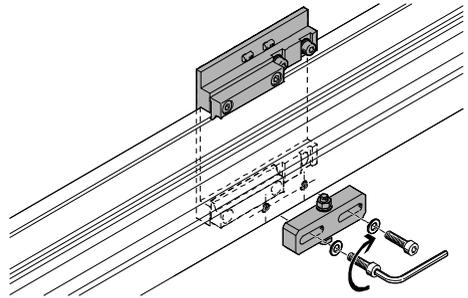
7. Turn screw into the adjusting piece.
8. Place washer below the nut.
9. Screw nut onto the screw.



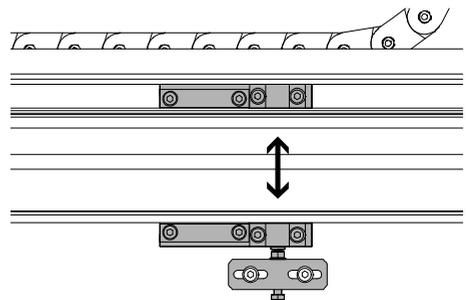
1) The accompanying screw and tightening torque are designed for mounting on steel.

4 Installation of the single-axis systems and the linear gantries

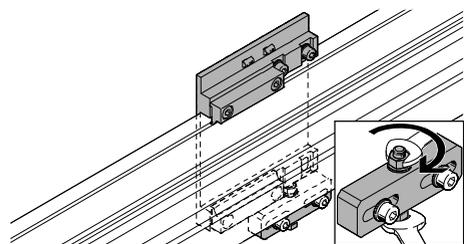
10. Fasten adjusting piece to the mounting surface with suitable screws.



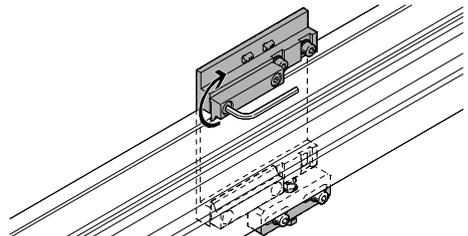
11. Align Y-module horizontally as follows:  
 – Screw the screw on the adjusting piece in or out.



12. Screw nut in tightly. Apply counter pressure to screw. (Tightening torque 2.5 ... 10 Nm)  
 Check:  
 – The screw has not twisted.  
 – The alignment has been maintained.



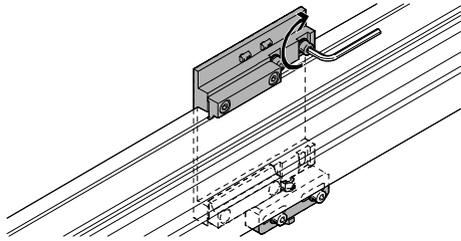
13. Evenly tighten screws.



Screw size and tightening torque	EHMY-LP-EGC-...-KF				EHMY-LP-EGC-...-HD		
	50	80	120	185	125	160	220
	M3x8	M5x16	M8x20		M5x16		M8x20
[Nm]	1.7	5.9	20		5.9		20

4 Installation of the single-axis systems and the linear gantries

14. Evenly tighten appropriate screws<sup>1)</sup>.



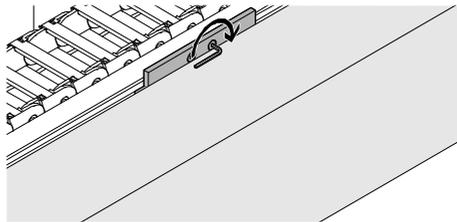
Screw size and tightening torque <sup>1)</sup>	EHMY-LP-EGC-...-KF				EHMY-LP-EGC-...-HD		
	50	80	120	185	125	160	220
	M4x16	M6x20	M8x30		M6x20	M8x30	
[Nm]	2.9	14	20		14	20	

1) Accompanying screw and tightening torque are designed for mounting on steel.

On the reverse side:

For mounting onto a machine frame:

15. Evenly tighten screw on the support profile of the energy chain.



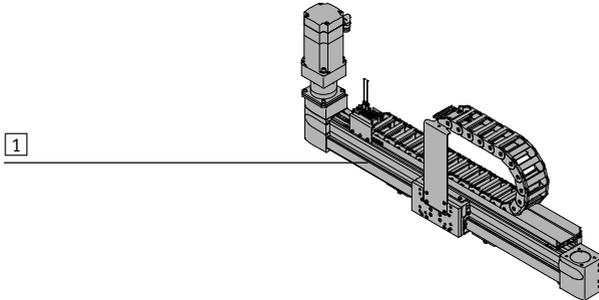
Screw size and tightening torque	EHMY-LP-EGC-...-KF				EHMY-LP-EGC-...-HD		
	50	80	120	185	125	160	220
	M5x8	M5x8	M5x12	M5x12	M5x10	M5x10	M5x10
[Nm]	8.3				8.3		

## 4.3 Installation of single-axis system and linear gantry

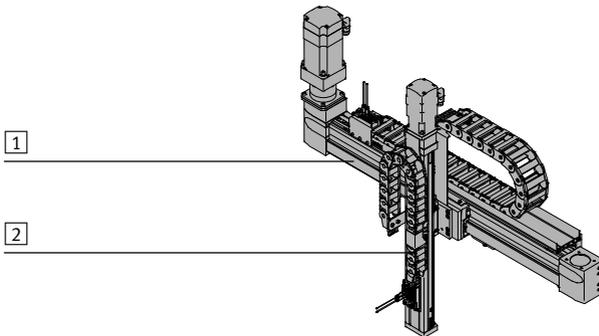
### 4.3.1 Installation YXCS/YXCL

#### Structure

#### Single-axis system YXCS



#### Linear gantry YXCL



1 Y-module

2 Z-module

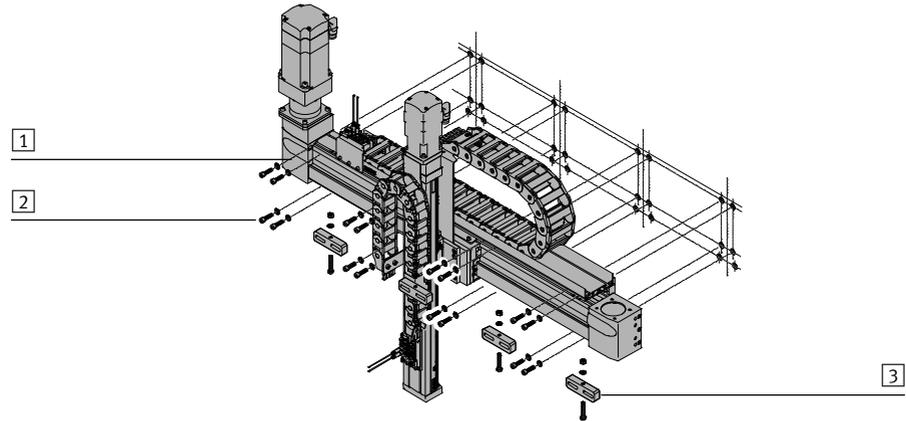
#### Requirements

- Mounting surface is prepared (→ 4.1.3 Preparation of the mounting surface).
- Transport protection in the shipping crate is removed (→ 2.4.1 Securing in the transport protection crate).
- Transport protection for lifting is mounted (→ 2.4.2 Securing when lifting).
- Function of the mounting components is known (→ 4.2.1 Mounting kit with adjustment possibility).

#### 4 Installation of the single-axis systems and the linear gantries

##### Installation

- Place handling system slowly and carefully onto the prepared mounting surface.
- Align Y-module (base module) horizontally and fasten it.



- 1 Y-axis
- 2 Screw set

- 3 Adjusting piece

## 5 Installation of the planar surface gantries and the three-dimensional gantries

- Observe safety instructions and notes on installation.
- Pay attention to transport protection (→ 2.4 Transport protection aids).

### 5.1 Preparation

#### 5.1.1 Installation space

The installation space required depends on the order.

- Take dimensions from the CAD model (→ 1.1 Technical data).

#### 5.1.2 Number n of mounting components

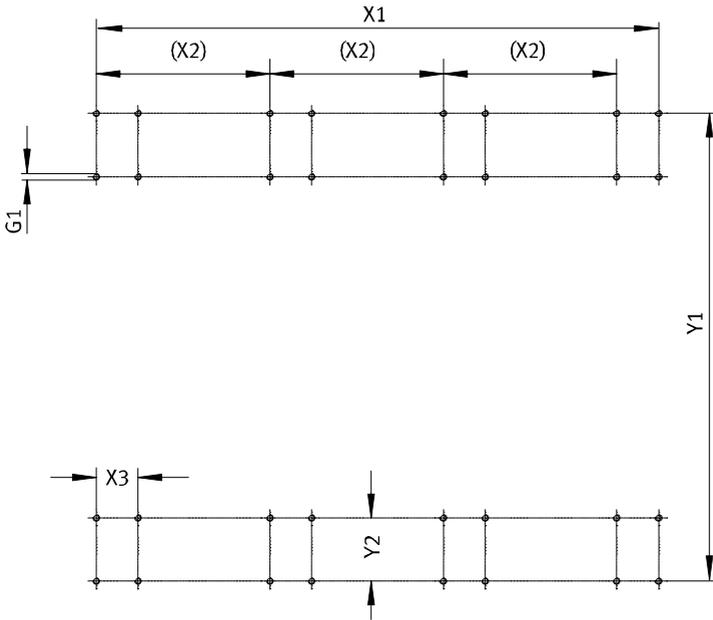
EHMx-EGC-	50	80	120/185	n <sup>2)</sup>
Hx <sup>1)</sup> [mm]	≤ 475	≤ 400	≤ 450	4
	476 ... 950	401 ... 1100	451 ... 1100	6
	951 ... 1425	976 ... 1550	1101 ... 1750	8
	1426 ... 1900	1551 ... 2125	1751 ... 2400	10
	–	2126 ... 2700	2401 ... 3050	12
	–	2701 ... 3275	3051 ... 3700	14
	–	3276 ... 3850	3701 ... 4350	16
	–	3851 ... 4425	4351 ... 4500	18
	–	4426 ... 4500	–	20

1) Hx = stroke in X-direction (→ 1.1 Technical data)

2) n = total number of mounting components for both X-axes

### 5.1.3 Preparation of the mounting surface

#### For mounting kit without adjustment possibility



- Ensure mounting surface is flat and horizontal:  
The required flatness depends on the size of the handling system.

Flatness		Y1 [mm]		
		≤ 1000	1001 ... 2000	2001 ... 3000
X1 [mm]	≤ 1000	0.1	0.2	0.3
	1001 ... 2000	0.2	0.4	0.6
	2001 ... 3000	0.3	0.6	0.9
	3001 ... 4000	0.4	0.8	1.2
	4001 ... 5000	0.5	1.0	1.5

5 Installation of the planar surface gantries and the three-dimensional gantries

- Prepare mounting option on mounting surface.  
Mounting kit is movable. If required, change dimension X2.

EHMX-EGC-		50	80	120	185
Dimensions [mm]	Y1 <sup>1)</sup>	By + 108	By + 182	By + 280	By + 386
	Y2	60	100	160	200
	X1 <sup>2)</sup>	Hx + 51	Hx + 146	Hx + 224	Hx + 310
	X2 <sup>3)</sup>	$(X1 - X3) / [(n / 2) - 1]$			
	X3	50	68	106	106
	G1	M3	M5	M8	M8
	Depth of thread	≥ 6	≥ 8	≥ 13	≥ 13

1) By = width in Y-direction (→ 1.1 Technical data)

2) Hx = stroke in X-direction (→ 1.1 Technical data)

3) n = total number of mounting components for both X-axes (→ 5.1.2 Number n of mounting components)

For X-module with motor position in the middle:



**Caution**

Unfastened motor in the middle turns with the shaft.

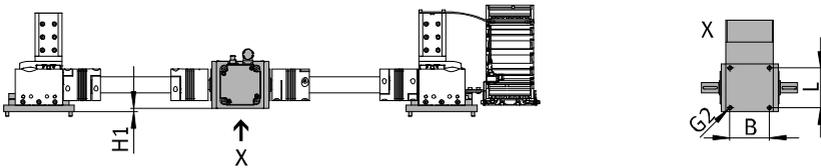
Injury due to impacts or pinching. Damage to the product.

- Place motor outside the movement range.
- Fasten motor sufficiently.

- Prepare mounting option.

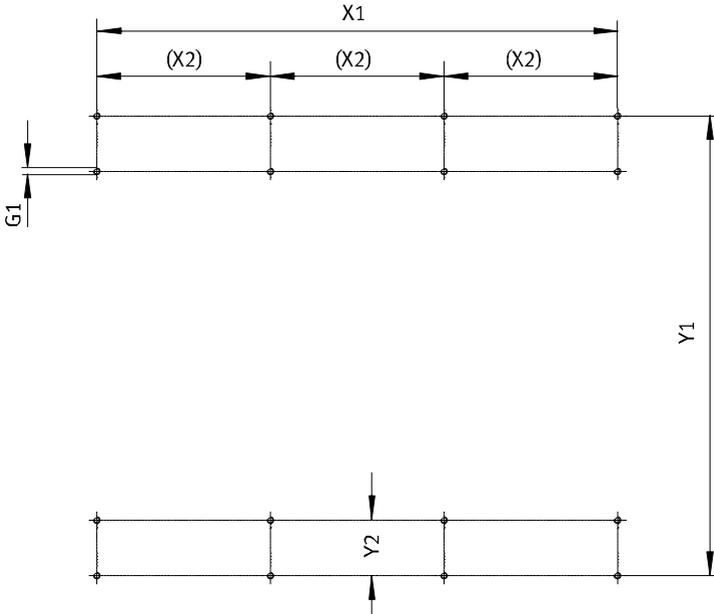
The drive shafts of the gear units and the hollow shafts must be sufficiently aligned

(→ 5.5.2 Mounting of the connecting shaft).



EHMX-EGC-...-M		80	120	185
Dimensions [mm]	H1	- 0.5	7.6	26.5
	L	70	100	110
	B			
	G2	M8	M10	M10
	Depth of thread G2	14	16	20

**For adjusting kit**



- Ensure flat and horizontal mounting surface: flatness 2 mm
- Prepare mounting option on mounting surface.

Adjusting kit is movable. If required, change dimension X2.

<b>EHMx-EGC-</b>		<b>50</b>	<b>80</b>	<b>120</b>	<b>185</b>
Dimensions [mm]	Y1 <sup>1)</sup>	By + 110	By + 186	By + 260	By + 395
	Y2	62	104	140	209
	X1 <sup>2)</sup>	Hx + 1	Hx + 78	Hx + 118	Hx + 204
	X2 <sup>3)</sup>	$(X1) / [(n / 2) - 1]$			
	G1	M8			
Depth of thread G1		≥ 13			

- 1) By = width in Y-direction (→ 1.1 Technical data)
- 2) Hx = stroke in X-direction (→ 1.1 Technical data)
- 3) n = total number of mounting components for both X-axes (→ 5.1.2 Number n of mounting components)

5 Installation of the planar surface gantries and the three-dimensional gantries

For X-module with motor position in the middle:



**Caution**

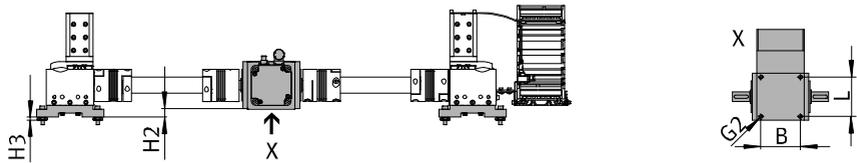
Unfastened motor in the middle turns with the shaft.  
Injury due to impacts or pinching. Damage to the product.

- Place motor outside the movement range.
- Fasten motor sufficiently.

- Prepare adjustable mounting option.

The drive shafts of the gear units and the hollow shafts must be sufficiently aligned

(→ 5.5.2 Mounting of the connecting shaft).



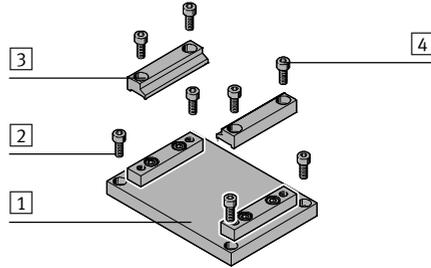
EHMX-EGC-...-M		80	120	185
Dimensions [mm]	H2	18.5	20.6	39.5
	H3	8 ± 3	8 ± 3	8 ± 3
	L	70	100	110
	B			
	G2	M8	M10	M10
	Depth of thread G2	14	16	20

## 5.2 Mounting components

### 5.2.1 Mounting kit without adjustment possibility

#### Structure

1	Lower part	(1x)
2	Screw, lower part <sup>1)</sup>	(2x)
3	Upper part	(4x)
4	Screw, upper part	(4x)



1) Screw and tightening torque are designed for mounting on steel.

#### Requirements

- Number n of mounting components is known (→ 5.1.2 Number n of mounting components).
- Mounting surface is prepared (→ 5.1.3 Preparation of the mounting surface).

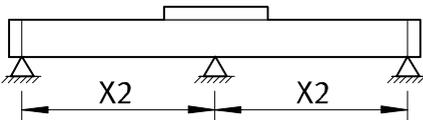
#### Mounting



#### Warning

Incorrect mounting. Entire product moves uncontrollably. Injury due to impacts or pinching. Damage to the product.

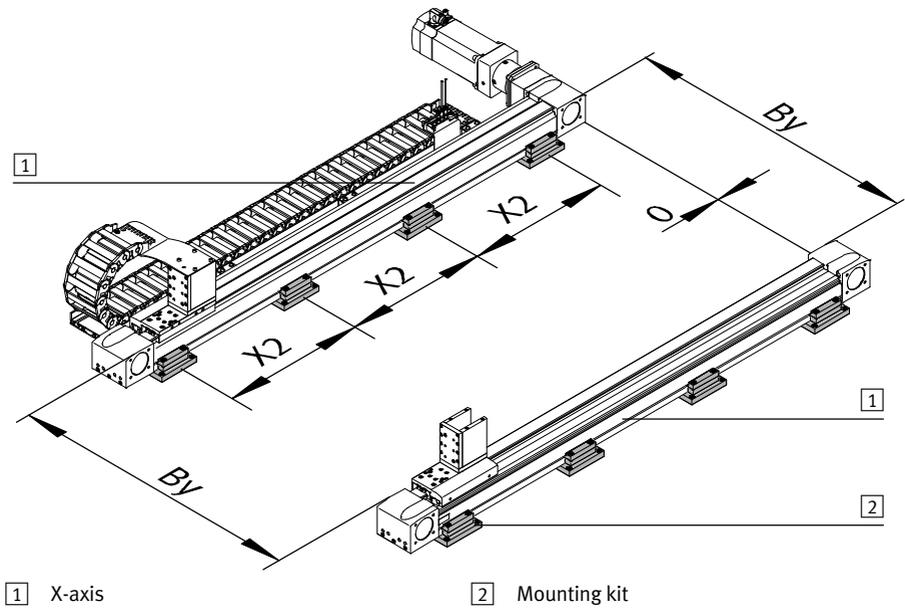
- Use screws **2** with strength class of at least 8.8.
- Select screws **2** suitable for the installation situation.
- Mount product free of distortion.
- Use only the mounting kits supplied.
- Secure threaded connections.
- Make sure the mounting surface is sufficiently strong to absorb the maximum forces.



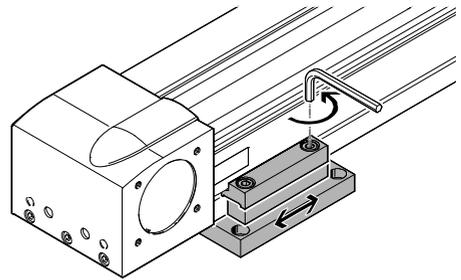
The mounting kits are pre-mounted to the X-axes.

- Check number n and support spacing X2.
- Place X-axes  
(→ 5.3.1 Installation YXCF/YXCR).

5 Installation of the planar surface gantries and the three-dimensional gantries

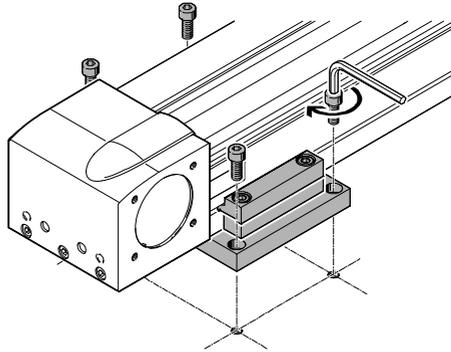


1. Unscrew the screws of the upper part slightly.
2. Position mounting kit.



5 Installation of the planar surface gantries and the three-dimensional gantries

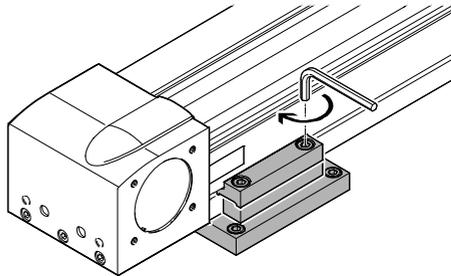
3. Fasten lower part to the mounting surface with suitable screws<sup>1)</sup>.
4. Align X-axes exactly with each other (→ 5.3.1 Installation YXCF/YXCR).



Screw size and tightening torque	EHMX-EGC-			
	50	80	120	185
	M3x10	M5x12	M8x20	M8x20
[Nm]	1.2	5.9	20	20

1) Accompanying screws and tightening torque are designed for mounting on steel.

5. Evenly tighten screws of the upper part.

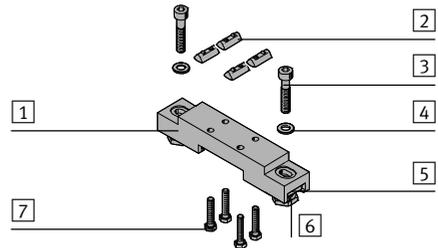


Screw size and tightening torque	EHMX-EGC-			
	50	80	120	185
	M3x7	M5x16	M8x20	M8x20
[Nm]	1.2	5.9	20	20

### 5.2.2 Adjusting kit

#### Structure

1	Adjusting plate	(1x)
2	Slot nut	(4x)
3	Screw <sup>1)</sup>	(2x)
4	Washer	(2x)
5	Square nut	(2x)
6	Adjusting bolt	(2x)
7	Screw	(4x)



1) Screw and tightening torque are designed for mounting on steel.

#### Requirements

- Number n of mounting components is known (→ 5.1.2 Number n of mounting components).
- Mounting surface is prepared (→ 5.1.3 Preparation of the mounting surface).

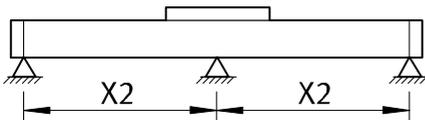
#### Mounting



#### Warning

Incorrect mounting. Entire product moves uncontrollably. Injury due to impacts or pinching. Damage to the product.

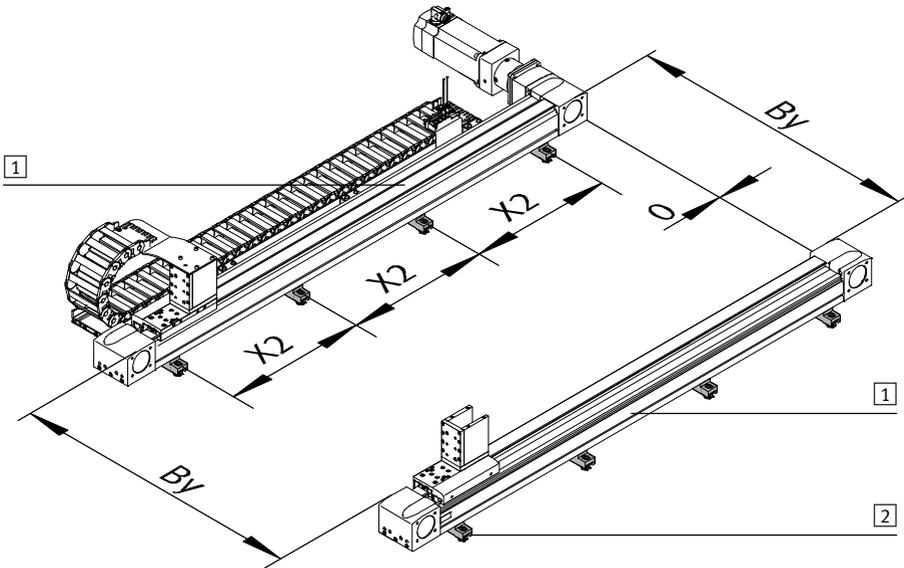
- Use screws 3 with strength class of at least 8.8.
- Select screws 3 suitable for the installation situation.
- Mount product free of distortion.
- Use only the mounting kits supplied.
- Secure threaded connections.
- Make sure the mounting surface is sufficiently strong to absorb the maximum forces.



The adjusting kits are pre-mounted to the X-axes.

- Check number n and support spacing X2.
- Place X-axes (→ 5.3.1 Installation YXCF/YXCR)

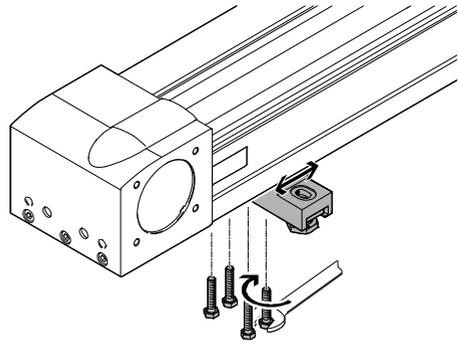
5 Installation of the planar surface gantries and the three-dimensional gantries



1 X-axis

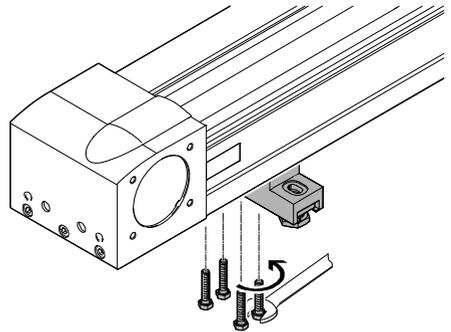
2 Adjusting kit

1. Slightly unscrew the screws on the underside.
2. Position adjusting plate.



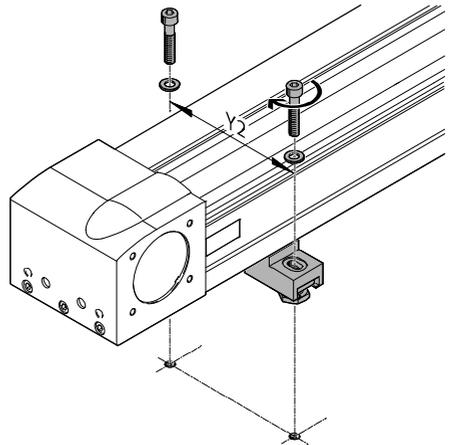
5 Installation of the planar surface gantries and the three-dimensional gantries

3. Tighten screws on the underside.

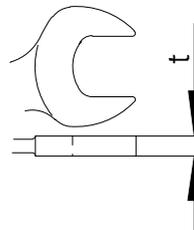


Screw size and tightening torque	EHMX-EGC-			
	50	80	120	185
	M3x16	M5x25	M6x30	M6x30
[Nm]	1.2	5.9	9.9	9.9

4. Place washers under screws.
5. Place screws in the centre of the elongated hole.
6. Lightly clamp the adjusting plate to the mounting surface with the screws.

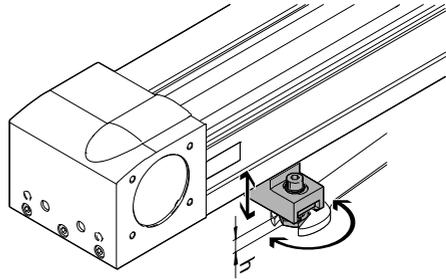


7. Use spanner with  $t < 5$  mm.  
If  $t > 5$  mm, the maximum height compensator is smaller by the difference  $(t - 5)$  mm.



5 Installation of the planar surface gantries and the three-dimensional gantries

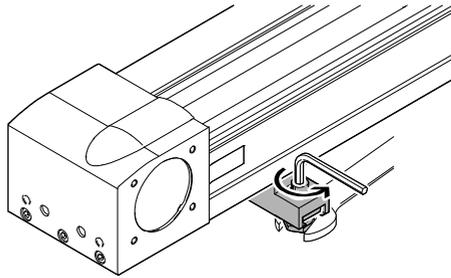
8. Align X-axes exactly with each other  
 (→ 5.3.1 Installation YXCF/YXCR).
9. Screw adjusting bolts in or out  
 (maximum height compensator → Table).



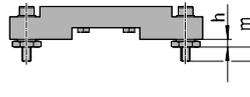
10. Tighten screws. Apply counter pressure to the adjusting bolt.

Check:

- The adjusting bolt has not twisted.
- The alignment has been maintained.



11. Make sure there is sufficient screw-in depth  $m$  of the screw (→ Table).



Screw size and tightening torque <sup>1)</sup>	EHMX-EGC-			
	50	80	120	185
	M5x30	M8x40		
$M_A$ [Nm]	5.9	34		
$m$ [mm]	$\geq 12$	$\geq 15$		
$h$ [mm]	$7 \pm 2$	$8 \pm 3$		
Max. height compensator [mm]	4	6		

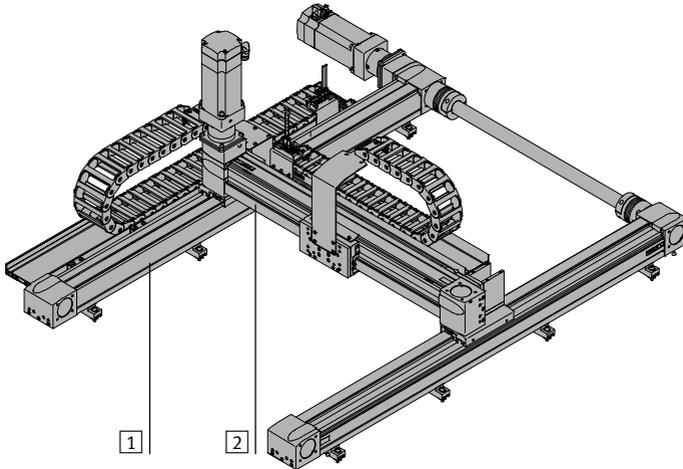
1) Screw, tightening torque and screw-in depth are designed for mounting on steel.

### 5.3 Completely mounted handling system

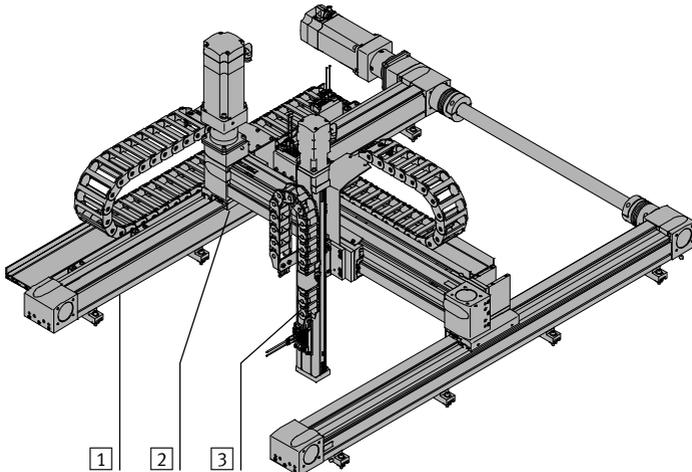
#### 5.3.1 Installation YXCF/YXCR

##### Structure

##### Planar surface gantry YXCF



##### Three-dimensional gantry YXCR



- 1 X-module
- 2 Y-module

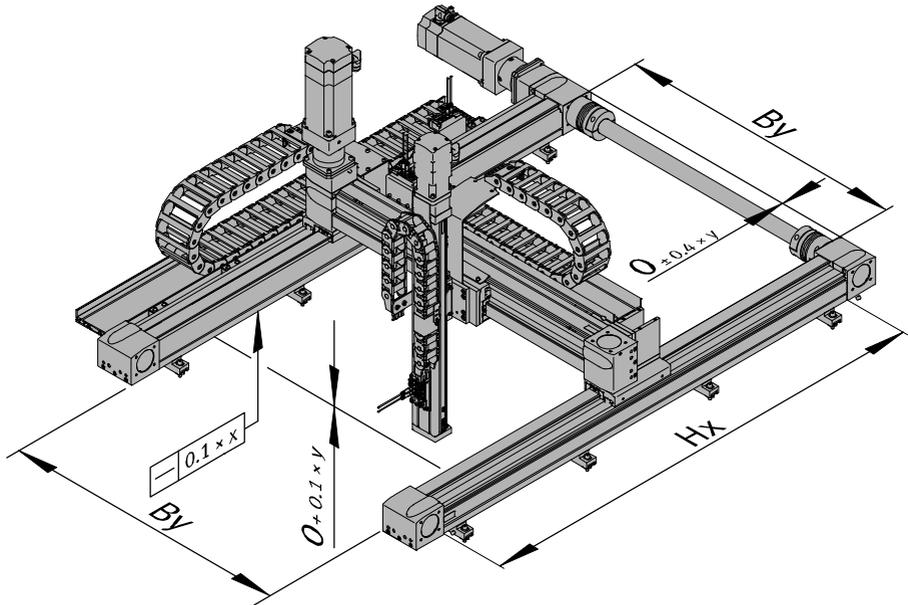
- 3 Z-module

### Requirements

- Mounting surface is prepared (→ 4.1.3 Preparation of the mounting surface).
- Transport protection in the shipping crate is removed (→ 2.4.1 Securing in the transport protection crate).
- Transport protection for lifting is mounted (→ 2.4.2 Securing when lifting).
- Function of the mounting components is known (→ 5.2.1 Mounting kit without adjustment possibility/5.2.2 Adjusting kit).

### Installation

1. Place handling system slowly and carefully onto the prepared mounting surface.



$$x = H_x/1000$$

$$y = B_y/1000$$

2. Lightly clamp X-axis with energy chain to the mounting surface.



Straightness can be adjusted with adjusting kits. For mounting kits without adjustment possibilities, the mounting surface must be correspondingly flat.

3. Align X-axis with energy chain to the underside.  
Check: straightness  $0.1 \text{ mm} \times (H_x/1000)$
4. Fasten X-axis with energy chain to the mounting surface.
5. Align second X-axis flush with the mounted X-axis.
  - Length offset  $\pm 0.4 \text{ mm} \times (B_y/1000)$
6. Lightly clamp second X-axis to the mounting surface.

5 Installation of the planar surface gantries and the three-dimensional gantries

7. Align underside of the second X-axis parallel in height to the mounted X-axis.

Check: height offset + 0.1 mm × (By/1000)



The height offset can be adjusted with adjusting kits. For mounting kits without adjustment possibilities, the mounting surface must be correspondingly flat.

8. Fasten second X-axis to the mounting surface.

9. Check alignment.

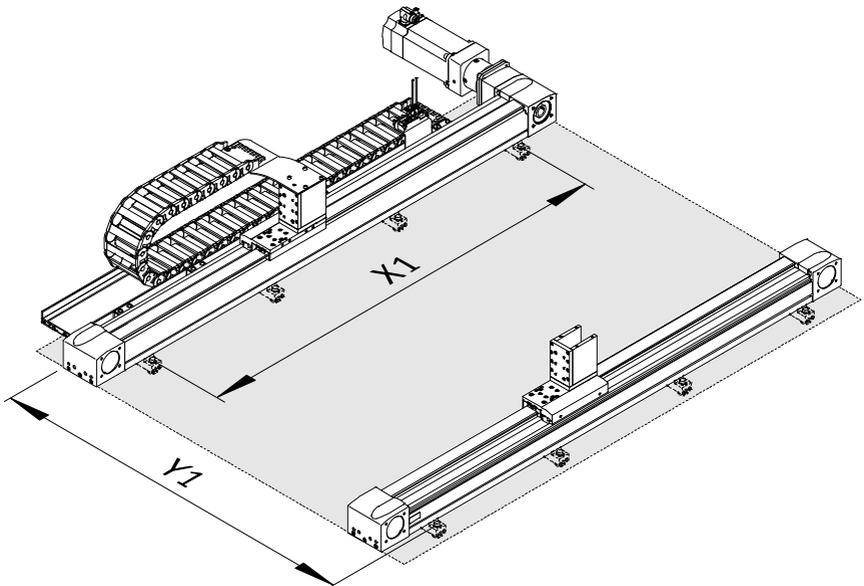
Check:

- The undersides of the X-axes must lie entirely in a theoretical plane with the required flatness.

The required flatness depends on the size.

Flatness		Y1 <sup>1)</sup> [mm]		
		≤ 1000	1001 ... 2000	2001 ... 3000
X1 <sup>1)</sup> [mm]	≤ 1000	0.1	0.2	0.3
	1001 ... 2000	0.2	0.4	0.6
	2001 ... 3000	0.3	0.6	0.9
	3001 ... 4000	0.4	0.8	1.2
	4001 ... 5000	0.5	1.0	1.5

1) Calculation of the dimensions Y1 and X1, depending on the mounting component (→ 5.1.3 Preparation of the mounting surface)



## 5 Installation of the planar surface gantries and the three-dimensional gantries



The height offset can be adjusted with adjusting kits. For mounting kits without adjustment possibilities, the mounting surface must be correspondingly flat.



### Note

Incorrect mounting can cause material damage and malfunction.  
Collision between Z-module and transport protection aids.

- Remove all transport protection aids (→ 2.4 Transport protection aids).

To take tension out of the system:



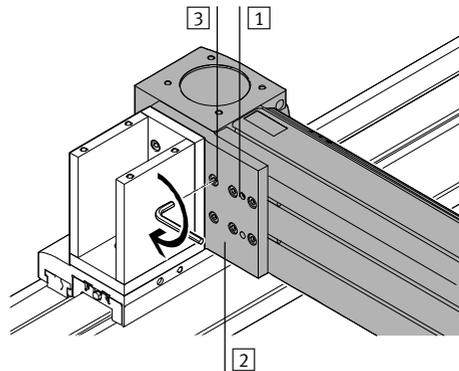
The bolts define the position of the Y-module in the Z-direction.

- Have the premounted bolt **1** fastened. Do not unscrew it!

On one side of the Y-module:

10. Unscrew screws **3** at the adapter

- The adapter is movable.

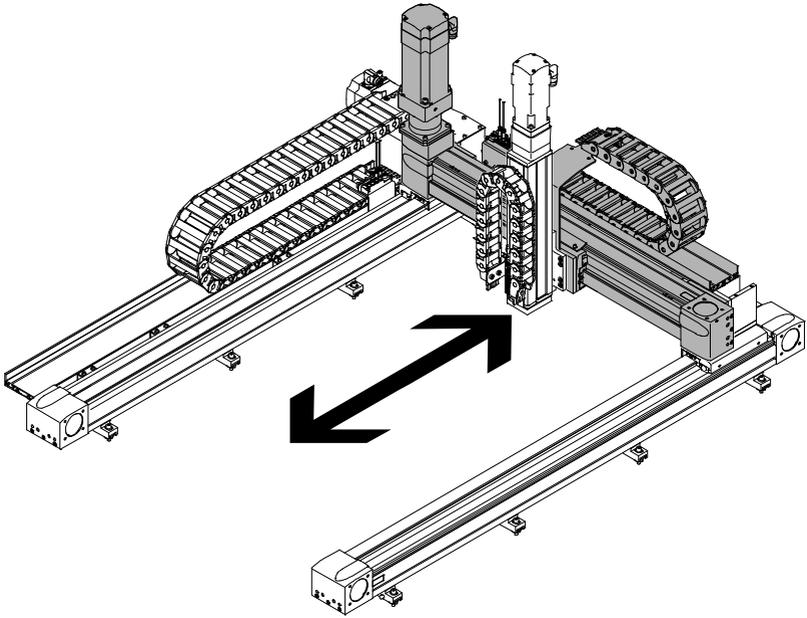


<b>1</b>	Bolt	(1x)
<b>2</b>	Adapter	(1x)
<b>3</b>	Screw	(6x ... 8x)

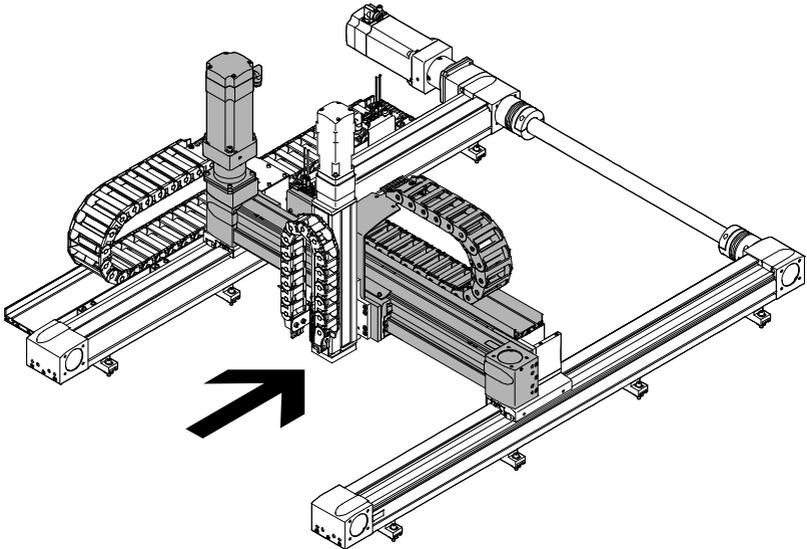
11. The slides of the X-module are blocked with motor position left/right. To be able to move the slides for alignment:

- For motor with brake.  
Remove motor (→ 5.6 Motor with brake (EMMS-...-RSB/RMB)).
- For motor without brake  
Remove jumper at the end of the respective motor cable.

12. Move Y-module back and forth on the X-module one time.

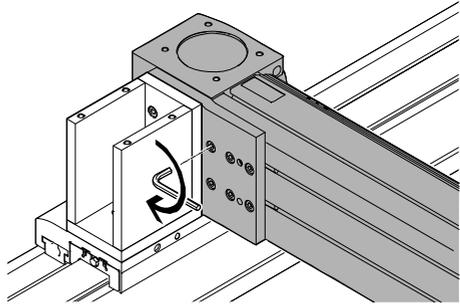


13. Move Y-module into the middle of the X-axes.



5 Installation of the planar surface gantries and the three-dimensional gantries

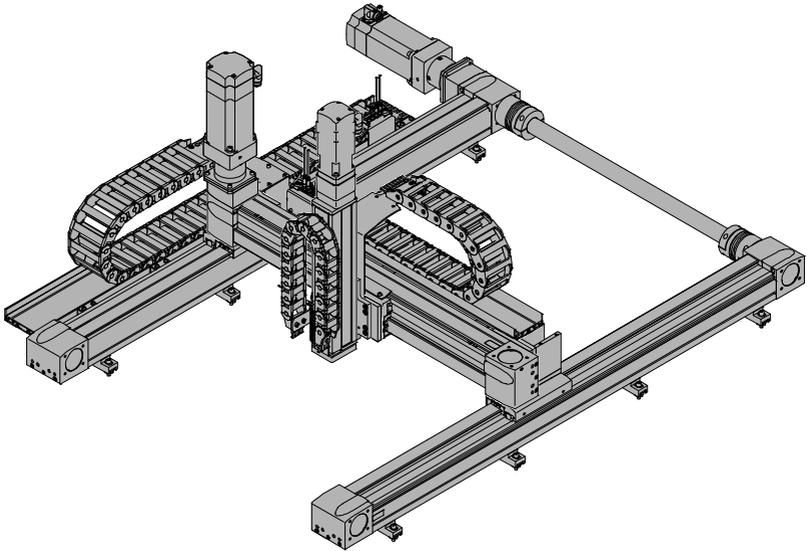
14. Evenly tighten screws.



Screw size and tightening torque	EHMY-EGC-						
	50	80	120	125	160	185	220
	M3x8	M5x12	M6x16	M5x12	M6x16		
[Nm]	1.7	8.3	14	8.3	14		

15. Check mechanical alignment and structure (→ 5.4 Check the alignment and structure).

## 5.4 Check the alignment and structure



### 1. Check mechanical alignment and structure.

Check:

- All components are fastened (exception: motor with brake).
- The Y- and Z-axes can be moved by hand. Difficulty of movement, at individual points or constantly, due to misalignment, offset or tension, cannot be felt. Align handling system again, if necessary.

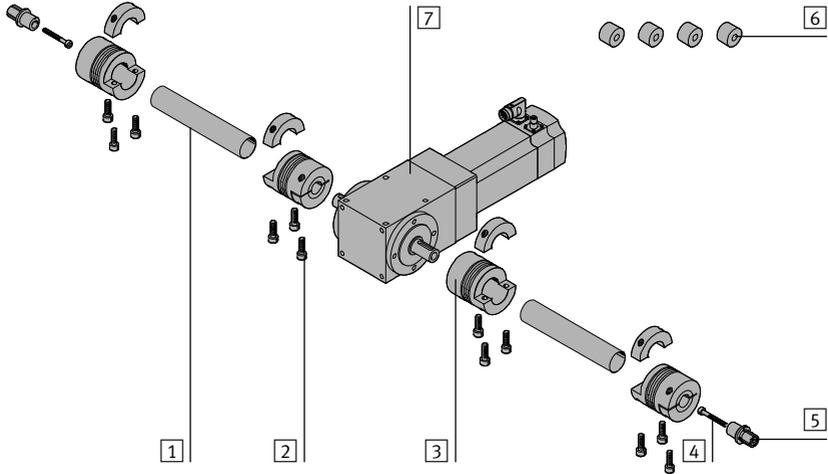
For motor with brake:

2. Mount motor (→ 5.6 Motor with brake (EMMS-...-RSB/RMB))/(→ 5.5 Connecting shaft).
3. Execute test run (→ 8 Commissioning).

## 5.5 Connecting shaft

### 5.5.1 Structure

#### For motor position in the middle



- 1 Connecting tube (2x)
- 2 Screw (12x)
- 3 Coupling (4x)
- 4 Clamping screw (2x)

- 5 Drive shaft (2x)
- 6 Plug (4x)<sup>1)</sup>
- 7 Gear unit/motor

1) Plug only for size 185

### 5.5.2 Mounting of the connecting shaft

#### Requirements

- X-axes of the X-module are mounted and aligned  
(→ 5.3.1 Installation YXCF/YXCR).
- Y-module is mounted and aligned  
(→ 5.3.1 Installation YXCF/YXCR).
- Hollow shafts are aligned.



**Note**

Incorrect mounting can cause material damage and malfunction. Collision with Y-module or Z-module if the connecting shaft is mounted to the wrong side.

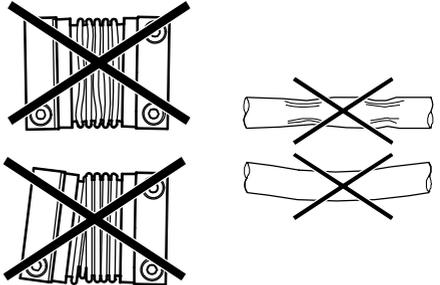
- Mount connecting shaft only to the drive side (→ 5.3.1 Installation YXCF/YXCR).

Couplings slide if the contact surfaces are not dry and free of grease.

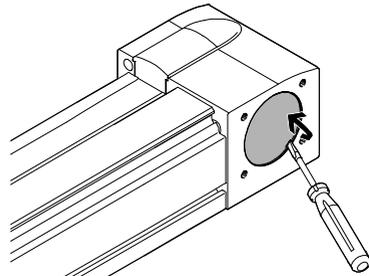
- Clean contact surfaces on the following components:
  - Connecting tube
  - Couplings
  - Drive shafts (leave expanding mandrel cone greased on the inside).
  - Hollow shafts on the X-axes
  - Drive shafts on the gear unit

1. Check connecting tube and couplings for excellent condition.

Check: no kinks, dents, deflections.



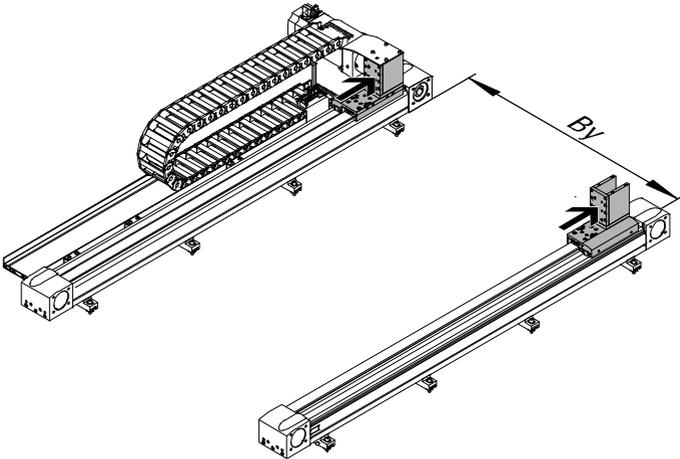
2. Insert a screwdriver into the cut-out.
3. Lift off covers at the hollow shafts.



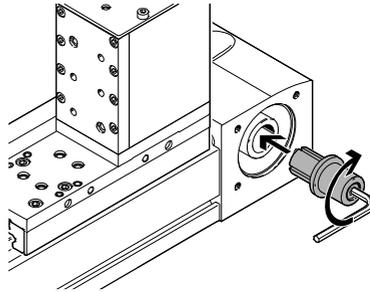
5 Installation of the planar surface gantries and the three-dimensional gantries

4. Push slide into the corresponding end position:

- The hollow shafts no longer turn when the clamping screws are tightened.



5. Push the drive shaft with the expanding mandrel as far as possible into the hollow shaft.
6. Tighten clamping screws.

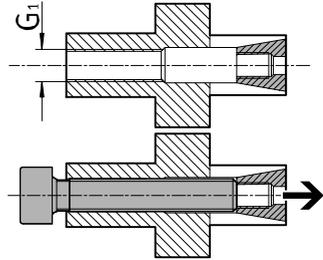


Screw size and tightening torque	EHMX-EGC-			
	50	80	120	185
	M3	M5	M8	M10
[Nm]	1	7	14	60



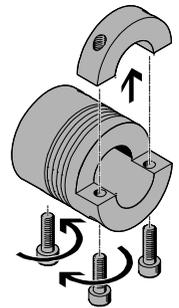
If the expanding mandrel cone is stuck, mounting is not possible. The drive shaft has a forcing thread  $G_1$ .

- Turn screw into the thread  $G_1$ .
- Push out expanding mandrel cone.

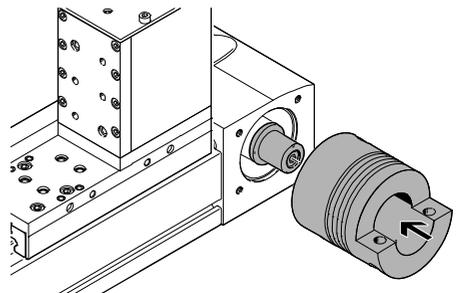


Thread size	EHMX-EGC-			
	50	80	120	185
$G_1$	M4	M6	M10	M12

7. Unscrew the screws.
8. Lift off half-shell.



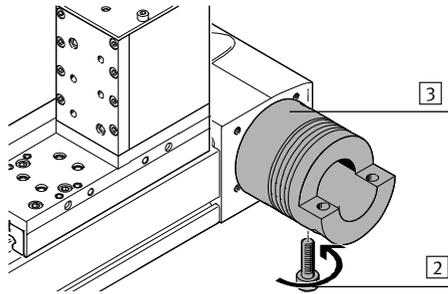
9. Push couplings as far as possible onto the drive shafts.



5 Installation of the planar surface gantries and the three-dimensional gantries

10. Tighten screw slightly:

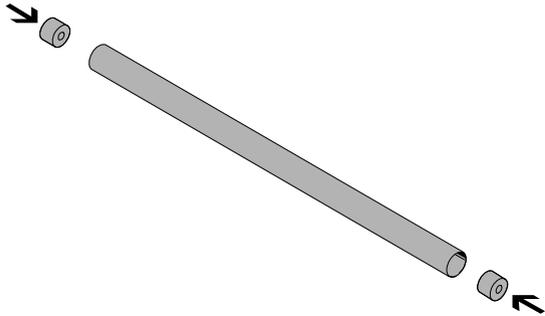
- All couplings are fixed.



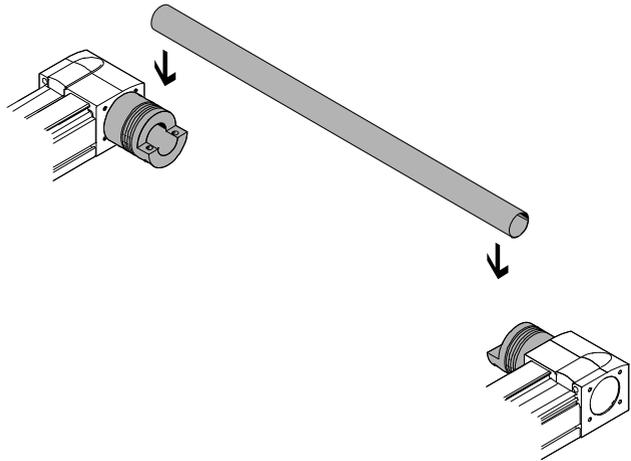
**For motor position left/right**

**Only for EHM 185**

1. Push the plugs into the connecting tube.



2. Place connecting tube into the couplings.



3. Continue with point 6. (→ Page 65).

### For motor position in the middle

Otherwise with point 6. (→ Page 65).



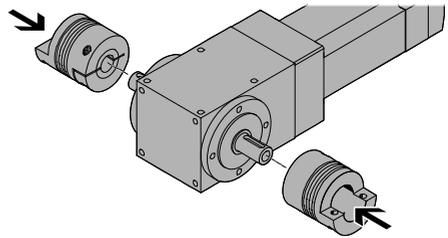
#### Caution

Unfastened motor in the middle turns with the connecting shaft.  
Injury due to impacts or pinching. Damage to the product.

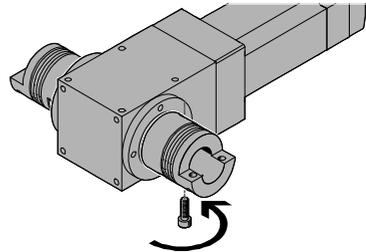
- Place motor outside the movement range.
- Fasten motor sufficiently (→ 5.1.3 Preparation of the mounting surface).

If feather keys are pressed into the drive shaft of the gear unit:

1. Remove feather keys.
2. Place motor outside the movement range.
3. Push couplings as far as possible onto the drive shafts.

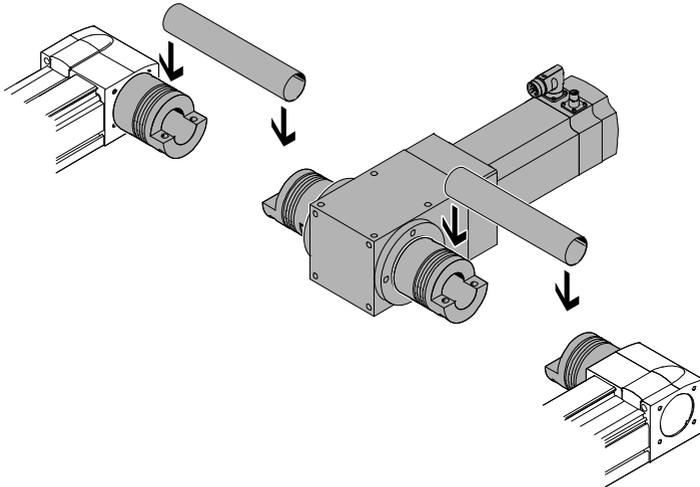


4. Tighten the screws lightly.  
Check: The couplings are fixed on both sides.

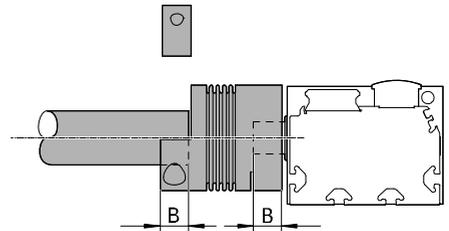


5 Installation of the planar surface gantries and the three-dimensional gantries

5. Place connecting tube into the coupling.



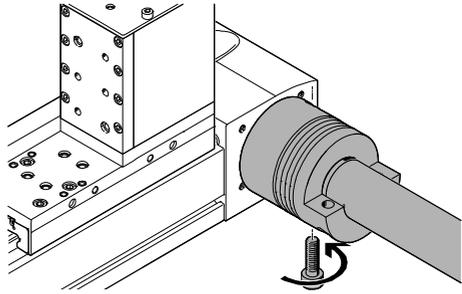
6. Unscrew the coupling screws slightly.
7. Align couplings in the middle.
8. Observe push-in depth B of the shaft.



Push-in depth	EHMX-EGC-			
	50	80	120	185
B [mm]	≥ 10.2	≥ 13.1	≥ 21.6	≥ 26

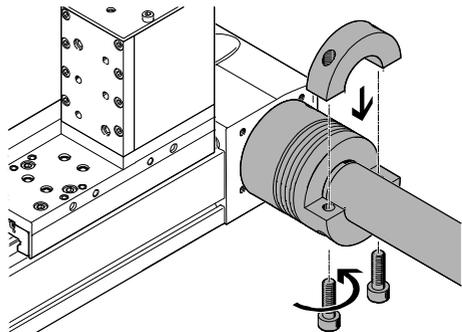
5 Installation of the planar surface gantries and the three-dimensional gantries

9. Tighten screws.



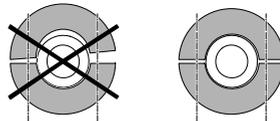
Screw size and tightening torque	EHMX-EGC-			
	50	80	120	185
	M4x16	M5x18	M10x30	M12x40
[Nm]	2.9	8	50	120

10. Place half shells. Tighten screws only lightly at first.



11. Clamp connecting tube to the half shell evenly and symmetrically.

12. Tighten screws.



Screw size and tightening torque	EHMX-EGC-			
	50	80	120	185
	M4x16	M5x18	M10x30	M12x40
[Nm]	2.9	8	50	120

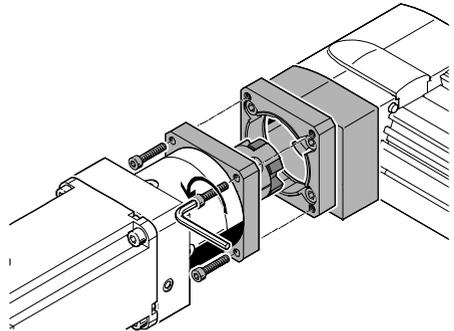
## 5.6 Motor with brake (EMMS-...-RSB/RMB)

Dismantling is required only for a motor with brake in order to push the slide for alignment of the system. A motor without brake can remain mounted.

### 5.6.1 Dismantling

For motor position left/right, the motor is located on an X-axis.

- Unscrew screws.
- Remove motor from the X-axis.



### 5.6.2 Mounting

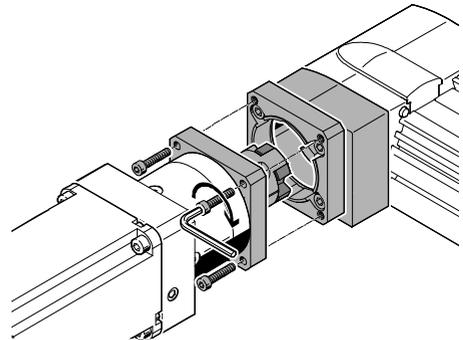
- Push motor onto the X-axis.  
Check: correct position of the coupling hubs in relation to each other.
- Connect motor flanges together.

Tightening torques

M4: 3 Nm

M6: 10 Nm

M8: 18 Nm



## 6 Attachment components

### 6.1 Mounting to the Y-module

For single-axis system and planar surface gantry:

- Mount attachment components to the Y-module. The corresponding interface is taken from the CAD model (➔ 1.1 Technical data).
- Connect attachment components to the earth potential (➔ 7.2 Earthing).

### 6.2 Mounting to the Z-module

For linear gantry and three-dimensional gantry:

- Mount attachment components to the Z-module. The corresponding interface is taken from the CAD model (➔ 1.1 Technical data).
- Connect attachment components to the earth potential (➔ 7.2 Earthing).

## 7 Installation

### 7.1 Safety instructions

**Note**

A prerequisite for the electrical installation is a completely mounted and aligned handling system.

**Note**

The power supply is not switched off.

Damage to the product from incorrect handling.



- Never pull the plug connectors and electrical interfaces when powered.
- Never connect the plug connectors and electrical interfaces when powered.
- Observe the handling specifications for electrostatically sensitive devices.

**Warning**

Faulty installation of electrical components.

Injury due to electric shock. Damage to the product.

Installation may only be performed by qualified specialized personnel who are familiar with:

- installation and operation of electrical control systems
- the documentation for the product.

**Danger**

Injury (death) due to electric shock.

- Switch off all supply lines and verify they are free of voltage prior to mounting, installation and/or maintenance work and secure them from being switched back on.
- Only use power sources which guarantee reliable electrical isolation of the operating voltage in accordance with EN 60204-1 (PELV).
- Connect all PE protective conductors before commissioning.
- Observe the regulations of EN 50178 and EN 60204-1 for protective earthing in installation.
- After the supply voltage is switched off:  
Start work on plug connectors and interfaces only when the residual voltage has fallen to a harmless level (→ Documentation of the controller used).
- Switch the power supply back on only after completion of work.



**Danger**

If there is an error, conducting parts are touched.

Injury (death) due to electric voltage.

- Observe requirements for the electrical equipment in accordance with EN 60204-1.
- Include the handling system in the system potential equalisation at the protective earth connection.



**Note**

Installation of the pneumatic components may only be performed by qualified specialized personnel who are familiar with:

- installation and operation of pneumatic systems.



**Caution**

Compressed air tubing is not mounted properly. Product is pressurised. Compressed air tubing gets loose and lashes out.

Injury due to whipping.

- Cut hoses off at right angles.
- Push hoses into the fitting up to the stop.
- Check hoses for tight fit.

## 7.2 Earthing

### 7.2.1 Earthing points

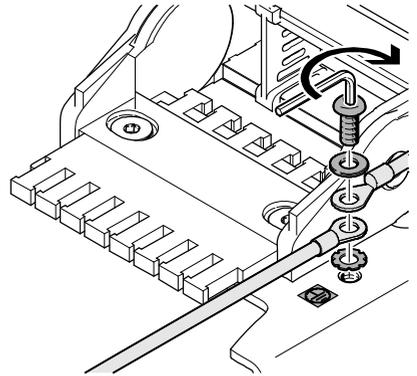
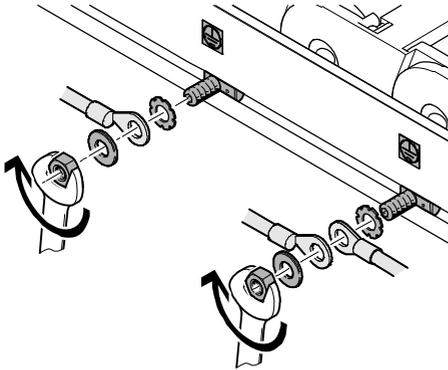
There are labelled earthing points on the handling system for earthing.



#### Note

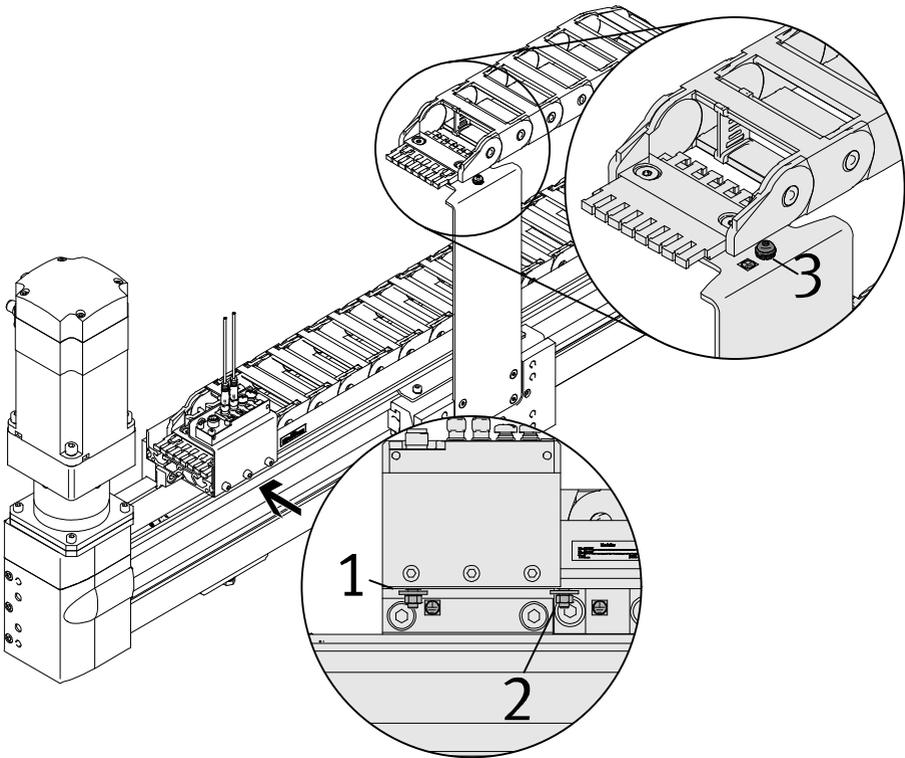
- Observe national regulations.
- Pay attention to installation of the earthing cables in energy chains (→ 7.3 Cables and hoses).

- Place cable lugs of the earthing cables between serrated washer and washer.
- Tighten nut or bolt (tightening torque 4 Nm).



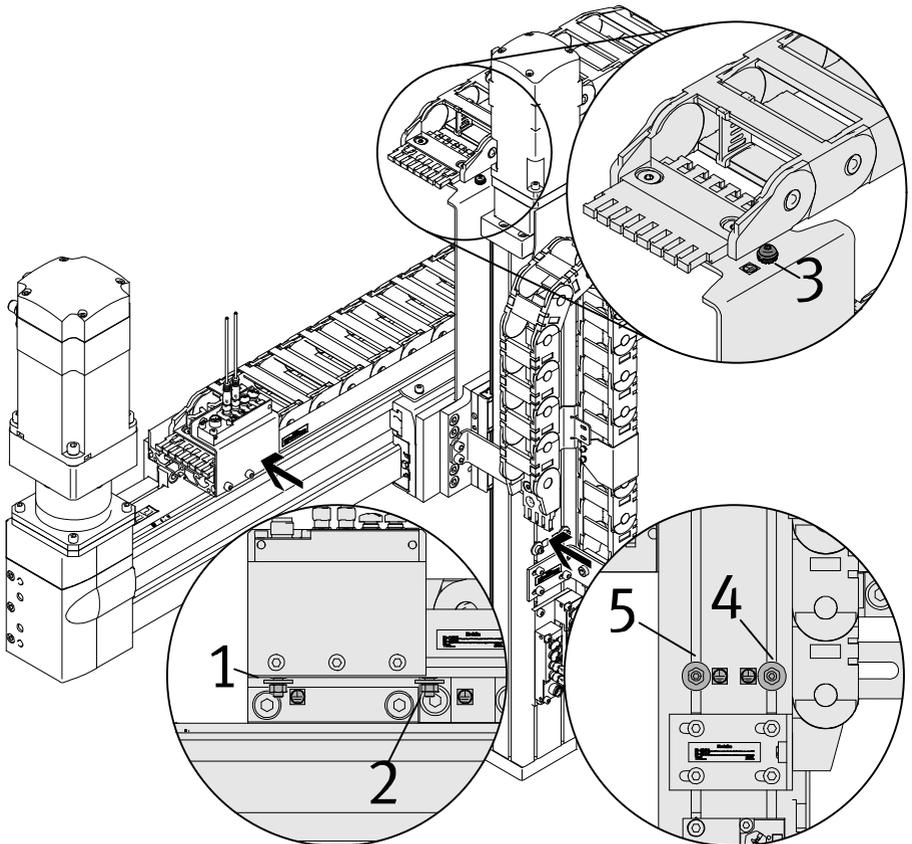
### 7.2.2 Earthing points at the single-axis system

- Connect earthing point 1 (protective earth connection) with low impedance to the earth potential of the system.
- Connect earthing point 2 of the Y-module with low impedance to earthing point 3 at the moment compensator.
- Connect attachment components with low impedance to earthing point 3 at the moment compensator.



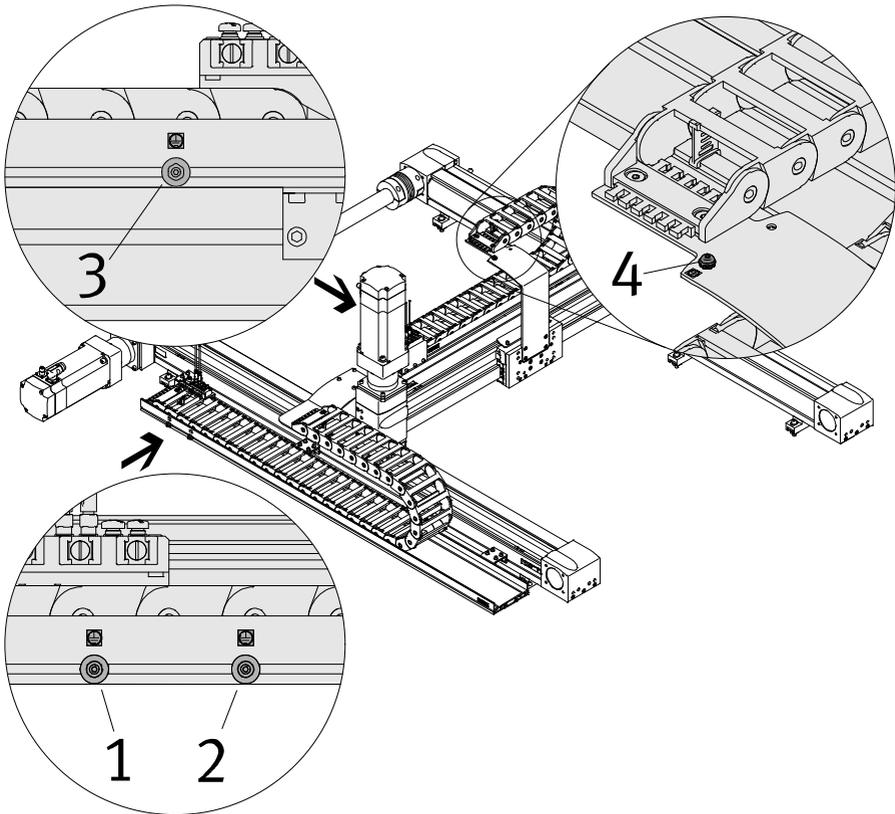
### 7.2.3 Earthing points at the linear gantry

- Connect earthing point 1 (protective earth connection) with low impedance to the earth potential of the system.
- Connect earthing point 2 of the Y-module with low impedance to earthing point 3 at the moment compensator.
- Connect earthing point 3 at the moment compensator with low impedance to earthing point 4 of the Z-module
- Connect attachment components with low impedance to earthing point 5.



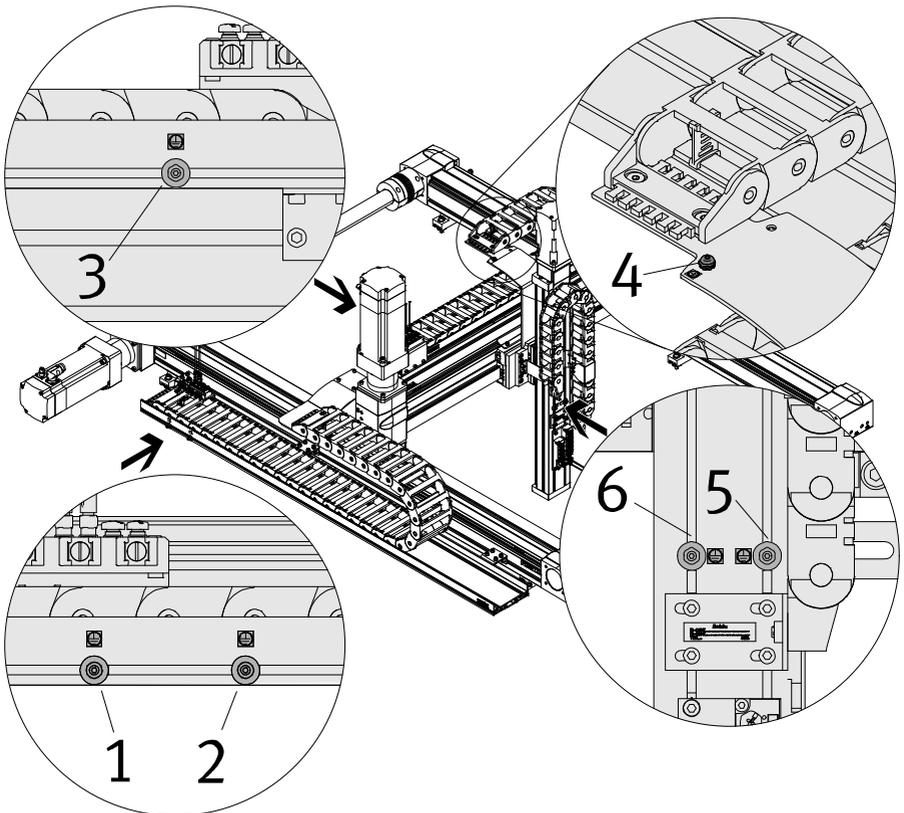
### 7.2.4 Earthing points at the planar surface gantry

- Connect earthing point 1 (protective earth connection) with low impedance to the earth potential of the system.
- Connect earthing point 2 of the X-module with low impedance to earthing point 3 of the Y-module.
- Connect earthing point 3 of the Y-module with low impedance to earthing point 4 at the moment compensator.
- Connect attachment components with low impedance to earthing point 4 at the moment compensator.



### 7.2.5 Earthing points at the three-dimensional gantry

- Connect earthing point 1 (protective earth connection) with low impedance to the earth potential of the system.
- Connect earthing point 2 of the X-module with low impedance to earthing point 3 of the Y-module.
- Connect earthing point 3 of the Y-module with low impedance to earthing point 4 at the moment compensator.
- Connect earthing point 4 at the moment compensator with low impedance to earthing point 5 of the Z-module.
- Connect attachment component with low impedance to earthing point 6.



## 7.3 Cables and hoses

Cables and hoses are sized so that, at a minimum, the connection length specified when ordering is available at the end of the energy chain.



### Information

The cables are available only in fixed lengths.

The connection lengths at the end of the energy chain of the various cables may be different.

### 7.3.1 Completely mounted handling system

Cables and hoses are installed in the energy chains.

The energy chains are subdivided by separators into chambers. Each chamber is intended for a specific application.

- Install additionally required cables and hoses in accordance with the following instructions.



Later installation and connection to the control components may be carried out only by a specialist with corresponding training.

### 7.3.2 Cables

Cables must be uniquely identifiable.

- Label additional cables prior to installation.
- Attach one inscription label each at the beginning and end of the cable, near the plug connector.
- Inscription labels of the mounted cables are attached using the following system.

Cable	EHMx	EHMy	EHMz
Motor cable	-1M1	-2M1	-3M1
Encoder cable	-1B1	-2B1	-3B1
Multi-pin plug 1	-1X1	-2X1	-3X1
Multi-pin plug 2 (optional)	-	-	-3X2

### 7.3.3 Hoses

Hoses must be uniquely identifiable.

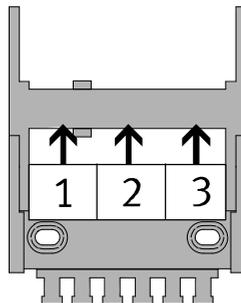
Hose colour	Function
Black	Extend pneumatic drive
Silver	Retract pneumatic drive
Blue	For customer-specific applications

Hose size	Minimum bending radius	DHMZ-DGSL-				
		6	12	16	20	25
PUN-3x0,5	12 mm	x	-	-	-	-
PUN-4x0,75	17 mm	-	x	x	-	-
PUN-6x1	26.5 mm	-	-	-	x	x

### 7.3.4 Energy chain subdivision Z-modules

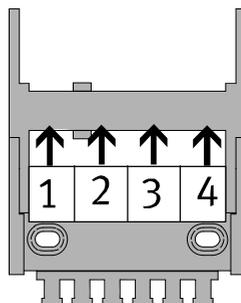
Chambers for EHMZ-EGC <sup>1)</sup>	
1	For customer-specific allocation
2	Encoder cable and plug socket with cable
3	Motor cable (servo motor) and earthing cable

1) View of open end of the energy chain, Z-module to the left beside the energy chain



Chambers for EHMZ-DGEA or EHMZ-EGSL <sup>1)</sup>	
1	For customer-specific allocation
2	For customer-specific allocation
3	Plug sockets with cable
4	Earthing cable

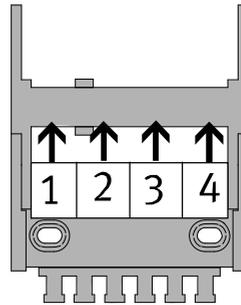
1) View of open end of the energy chain, Z-module to the left beside the energy chain



### 7.3.5 Energy chain subdivision Y-modules

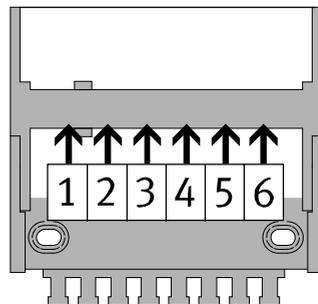
Chambers for EHYM-LP-EGC-50 <sup>1)</sup>	
1	Motor cable (stepper motor) or hoses for pneumatic drive
2	Plug sockets with cable and earthing cable
3	For customer-specific allocation
4	For customer-specific allocation

1) View of open end of the energy chain



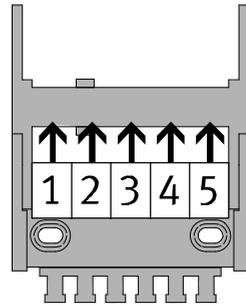
Chambers for EHYM-RP-EGC-50, EHYM-LP/RP-EGC-80 or EHYM-RP-EGC-125-TB-HD <sup>1)</sup>	
1	Motor cable (servo motor)
2	Motor cable (servo motor) or hoses for pneumatic drive
3	Encoder cable and earthing cable
4	Plug sockets with cable
5	For customer-specific allocation
6	For customer-specific allocation

1) View of open end of the energy chain



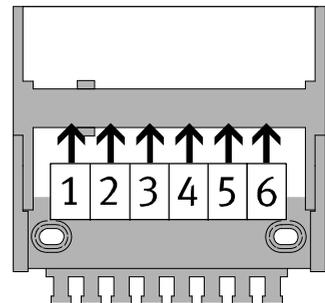
<b>Chambers for EHYM-LP-EGC-125-TB-HD<sup>1)</sup></b>	
1	Motor cable (servo motor)
2	Encoder cables and earthing cable
3	Plug socket with cable
4	For customer-specific allocation or hoses
5	For customer-specific allocation

1) View of open end of the energy chain



<b>Chambers for EHYM-LP/RP-EGC-120/-160/-185/-220<sup>1)</sup></b>	
1	Motor cable (servo motor) or hoses for pneumatic drive
2	Encoder cable and earthing cable
3	Plug sockets with cable
4	For customer-specific allocation
5	For customer-specific allocation
6	For customer-specific allocation

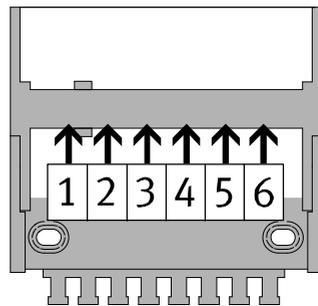
1) View of open end of the energy chain



### 7.3.6 Energy chain subdivision X-modules

Chambers for EHMx-EGC-50/-80/-120/-185 <sup>1)</sup>	
1	For customer-specific allocation
2	For customer-specific allocation
3	Plug socket with cable
4	Encoder cables and earthing cable
5	Motor cable (servo motor) or hoses for pneumatic drive
6	Motor cable (servo motor)

1) View of open end of the energy chain



### 7.3.7 Installation



#### Note

Hoses that are permanently in contact with cables can react negatively to their material.

- Install hoses separately from the cables.

- Install cables and hoses separately from each other. If required, add additional separators.
- Do not put motor cables together with encoder cables or plug sockets with cables in one chamber.
- Install cables and hoses twist-free and without mechanical tension. Cables and hoses must be able to move freely within the curvature radius of the energy chain.
- Attach cables and hoses to the chambers of the energy chain end pieces with cable ties.

#### Energy chain Z-module

1. Place customer-specific cables and hoses of the mounting parts into the corresponding chambers of the energy chain Z.

#### Energy chain Y-module

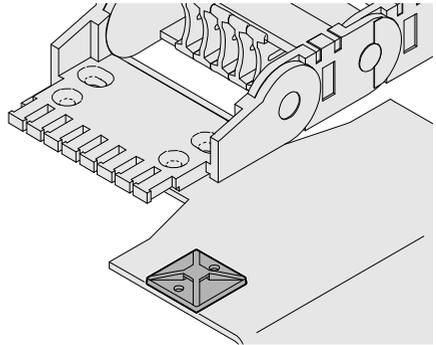
1. Push the slide of the Y-module up to the end stop so that the maximum possible length of the energy chain Y lies flat.
2. Place customer-specific cables and hoses from the energy chain Z into the energy chain Y.

### Energy chain X-module

1. Push the slide of the X-module up to the end stop so that the maximum possible length of the energy chain lies flat.
2. Place customer-specific cables and hoses from the energy chain Y into the energy chain X.

### Between the energy chains

- Tie together cables using cable binders.
- Tie hoses separately from the cables.
- Observe minimum bending radius of the cables and hoses.
- Attach the cable bundle or hose bundle to the cable base with cable ties.



### 7.3.8 Checking the energy chain

- Perform movement of the energy chains over the respective entire stroke.
  - The energy chain must be able to move without hindrance.

## 8 Commissioning

The following applies for commissioning of a system into which this handling system is integrated.

### 8.1 Safety instructions



#### Note

Guides of the handling system can be damaged.

The planar surface gantry or three-dimensional gantry may only be placed in operation after it is aligned and checked

(→ 5 Installation of the planar surface gantries and the three-dimensional gantries).



#### Note

The following conditions must be fulfilled for commissioning:

- The handling system is completely mounted.
- The handling system is aligned and checked.
- The electrical installation is complete and checked.
- The pneumatic installation is complete and checked.

Commissioning may only be performed by qualified specialized personnel who are familiar with:

- the Festo Configuration Tool (FCT)
- installation and operation of electrical control systems
- installation and operation of pneumatic systems
- installation and operation of handling systems
- the documentation for the product.

For support:

- Contact your regional Festo contact person.  
Further information → [www.festo.com/sp](http://www.festo.com/sp).



#### Note

The power supply is not switched off.

Damage to the product from incorrect handling.

- Never pull the plug connectors and electrical interfaces when powered.
- Never connect the plug connectors and electrical interfaces when powered.
- Observe the handling specifications for electrostatically sensitive devices.



#### Warning

The danger zone of the system is not sufficiently secured against access and contact with moving parts.

Injury due to impact or pinching.

- Before commissioning, take corresponding safeguarding measures, in order to fulfil fundamental safety and health protection requirements.



**Danger**

Switching on the energy supply as well as restoring it after an interruption or power failure can result in uncontrolled movement.

Injury (death) due to impact or pinching. Damage to the product.

- Before commissioning, take corresponding safeguarding measures, in order to fulfil fundamental safety and health protection requirements.



**Danger**

Unpressurized pneumatic drives can move unthrottled and at high speed into the end position when pneumatically actuated.

Injury (death) due to impact or pinching. Damage to the product.

- Build pressure up slowly when switching on the compressed air supply.
- Run pneumatic drives with reduced pressure into the end positions.



**Caution**

Narrow gaps between movable parts. Hair or loose clothing can get into the gaps and be drawn in.

Injury from tearing, being pulled in, constriction.

- Take corresponding safeguarding measures, e.g. hair nets, tight clothing.



**Caution**

Marked surfaces get very hot.

Injury from burns.

- Before commissioning, take corresponding safeguarding measures, in order to fulfil fundamental safety and health protection requirements.



**Warning**

Exposed, rotating connecting shaft.

Injury from being drawn in and burns.

- Install safe protection devices, e.g. protective guards, covers.

## 8.2 Proximity sensors

Proximity sensors are mounted as limit switches.

If the proximity sensors need to be moved, the following must be observed:

- Mark position of the proximity sensors before moving, so the normal position can be reset if required.
- Adjust the slot covers correspondingly.
- Check handling system for collisions.
- Check correct position of proximity sensors in a test run.
- Observe the tightening torques (→ Accompanying operating instructions for the proximity sensors).

## 8.3 Test run

Before final commissioning, the commissioner must perform a test run.

- Remove remaining safety components of the moving components (→ 2.4.3 Securing during transport and mounting).
- Start test run at crawling speed.
- Check function of the limit switches.
- Increase speed step by step up to the maximum necessary travel speed.
- Eliminate malfunctions that occur (→ 12 Fault clearance).
- End the test run.

## 9 Operation

The following applies for operation of a system into which this handling system is integrated.

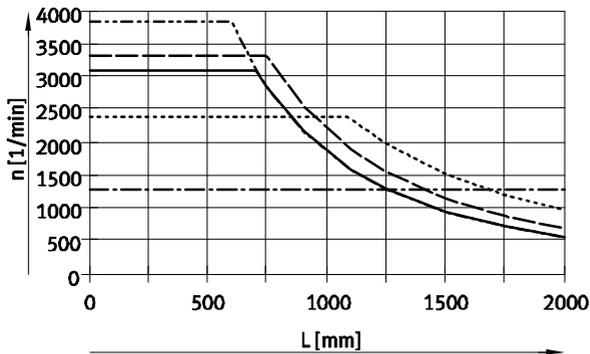
### 9.1 Safety instructions

- Observe additional safety instructions in the following chapters:
  - → 1 Safety and requirements for product use
  - → 2 Conveying and storage
  - → 8 Commissioning

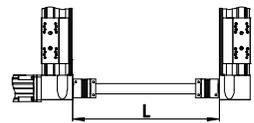
### 9.2 Characteristic curve of the connecting shaft

- The permitted limit speed depends on the order (→ 1.1 Technical data).  
If the conditions in real operation change:
- Take into account the limit speed of the connecting shaft (KSK).

Maximum permitted speed  $n$  dependent on the length  $L$ .



- KSK-50
- - - KSK-70
- · - KSK-80
- · · KSK-120
- - - KSK-185



## 10 Maintenance and care

### 10.1 Safety instructions



#### Note

Maintenance and care may only be performed by qualified specialized personnel who are familiar with:

- installation and operation of electrical control systems
- installation and operation of pneumatic systems
- installation and operation of handling systems
- the documentation for the product.

For support:

- Contact your regional Festo contact person.  
Additional information → [www.festo.com](http://www.festo.com).



#### Note

The power supply is not switched off.

Damage to the product from incorrect handling.

- Never pull the plug connectors and electrical interfaces when powered.
- Never connect the plug connectors and electrical interfaces when powered.
- Observe the handling specifications for electrostatically sensitive devices.



#### Danger

Injury (death) due to electric shock.

- Switch off all supply lines prior to mounting, installation and/or maintenance work and secure them from being switched back on.
- After the supply voltage is switched off:  
Start work on plug connectors and interfaces only when the residual voltage has fallen to a harmless level (→ Documentation of the controller used).
- Switch the power supply back on only after completion of work.



#### Warning

Moving parts are not secured. Components are installed vertically or diagonally. Moving parts run uncontrollably into the lower end position from their own dead weight.

Injury due to impact or pinching. Damage to the product.

Before mounting and before the power supply is switched off:

- Bring vertically or diagonally moving parts into the lower end position in a controlled manner.
- Secure vertically or diagonally moving parts.

**Warning**

Compressed air tubing or attachments are set free under pressure. Movable parts move uncontrollably.

Injury (death) due to impact or pinching.

- Switch off the compressed air supply prior to mounting work.
- Support movable pneumatic components, if needed.
- Vent all pneumatic components completely, e.g. through appropriate components, such as non-return valves, service unit.

## 10.2 Cleaning

- Use non-abrasive cleaning agents.
- Clean the handling system as required with a soft cloth.

## 10.3 Lubrication

The handling system is lubricated initially.

**Note**

Trouble-free operation and a long service life require regular relubrication.

- Lubricate axes properly.
- Observe specifications for lubrication.
- Use appropriate grease gun. Accessories (→ [www.festo.com/catalogue](http://www.festo.com/catalogue)).

Requirements		
Lubrication interval	[km]	2500
Lubricating grease		See documentation for the axes (→ <a href="http://www.festo.com/sp">www.festo.com/sp</a> )
Amount of lubricant		See documentation for the axes (→ <a href="http://www.festo.com/sp">www.festo.com/sp</a> )

## 11 De-commissioning, dismantling, disposal

### 11.1 Safety instructions

#### 11.1.1 General

- Observe additional safety instructions in the following chapters:
  - → 1 Safety and requirements for product use
  - → 2 Conveying and storage
  - → 8 Commissioning
  - → 10 Maintenance and care

#### 11.1.2 Dismantling



##### Warning

Modules are dismantled without securing movable parts. Movable parts move uncontrollably.

Injury due to impact or pinching.

- Secure movable parts prior to dismantling using cable ties and supplied components (→ 2.4.3 Securing during transport and mounting).

#### 11.1.3 Disposal



Incorrect disposal is harmful to the environment.

- Observe the local regulations for disposal of modules.
- Process lubricants (greases/oils) in accordance with the applicable regulations for health and safety and hazardous substances.
- Observe the local regulations regarding waste disposal and the environment.

## 12 Fault clearance

### 12.1 Malfunctions and remedy

Malfunction	Cause	Remedy
Jerkling travel Y-module tilted Y-module does not move	Overloading	<ul style="list-style-type: none"> <li>Reduce mass of the moving load/travel speed.</li> <li>Comply with limit value.</li> </ul>
	Connecting tube slips through	Correct mounting of the connecting shaft: <ul style="list-style-type: none"> <li>Clean contact surfaces.</li> <li>Comply with dimension B.</li> <li>Tighten screws.</li> </ul>
	Tension	<ul style="list-style-type: none"> <li>Check permitted flatness of the mounting surface.</li> <li>Align axes/slides.</li> <li>Lubricate axes.</li> <li>Change travel speed.</li> </ul>
	Incorrect controller settings	<ul style="list-style-type: none"> <li>Change controller parameters.</li> </ul>
Motor does not rotate	Controller has not yet been enabled	<ul style="list-style-type: none"> <li>Check controller signal.</li> </ul>
	Holding brake active (for motor with brake)	<ul style="list-style-type: none"> <li>Release brake.</li> </ul>
Motor turns in the wrong direction or vibrates	Cabling error	<ul style="list-style-type: none"> <li>Check and correct cabling.</li> </ul>
	Incorrect controller settings	<ul style="list-style-type: none"> <li>Change controller parameters.</li> </ul>
Y-module travels over end position	Proximity sensors do not operate	<ul style="list-style-type: none"> <li>Check proximity switch, connections and controller.</li> </ul>
Connecting shaft makes scraping noise	Too much offset	<ul style="list-style-type: none"> <li>Align axes/slides.</li> </ul>
Coupling broken at connecting shaft	Overloading	<ul style="list-style-type: none"> <li>Replace coupling.</li> </ul>
	Too much offset	<ul style="list-style-type: none"> <li>Observe limit values.</li> </ul>
	Tension	<ul style="list-style-type: none"> <li>Align axes/slides.</li> </ul>

If the remedy does not result in fault clearance (→ 12.2 Repair).

## 12.2 Repair

- Contact Festo Service.

This way the required fine tuning and tests will be taken into special consideration.

Information about spare parts and accessories (➔ [www.festo.com/spareparts](http://www.festo.com/spareparts)).

## A Technical appendix

### A.1 Technical data



**Note**

The technical data depend on the configuration and are contained in a separate data sheet.

Damage to the product from incorrect use and non-compliance with the technical data. The separate data sheet is a component of the product documentation.

- Determine order ID of the handling system (→ Product labelling on the Y-module).
- Download data sheet from the Festo Support Portal by specifying the order ID (→ [www.festo.com](http://www.festo.com)).
- Print out data sheet and store it together with this description at the product.

#### A.1.1 Certifications

Declaration of incorporation (→ <a href="http://www.festo.com">www.festo.com</a> )	in accordance with Machinery Directive 2006/42/EC
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#### A.1.2 Materials

Component	
Profiles of the axes	Aluminium
Drive cover	
End cap	
Adapter plates	
Energy chain support profile	
Slide	
Coupling	Aluminium with elastomer ring gear
Guide	Steel
Screws and centring pins	
Ball bearings	
Toothed belt pulleys/flanged pulleys	High-alloy steel
Multiple connector plate holder	
Moment compensator	
Energy chains	Plastic
Buffer	NBR
Cover caps	POM
Toothed belt	Polychloroprene with glass cord and nylon coating

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