Planar surface gantries

FESTO

Planar surface gantries

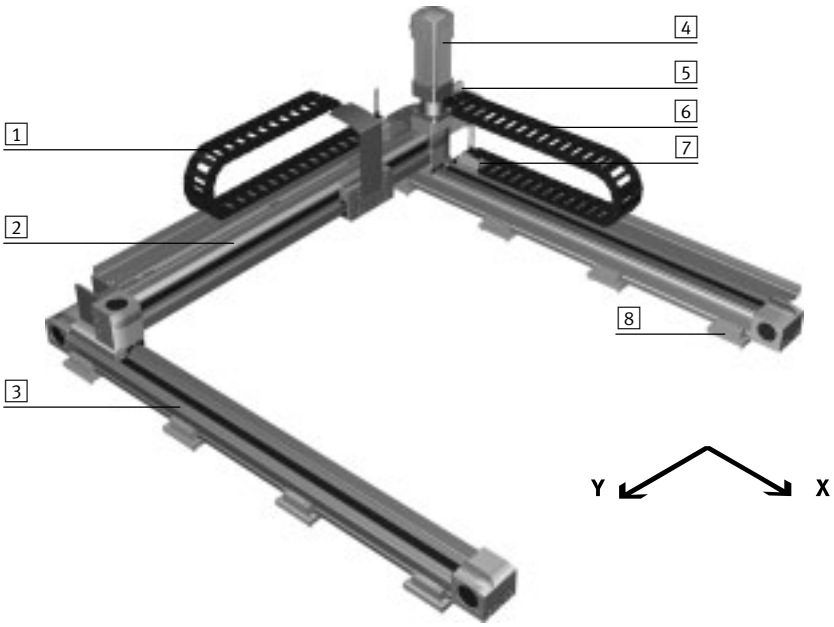
Key features

At a glance

The planar surface gantry facilitates movement in 2D space.
Depending on the requirements, the gantry is either composed of several axis modules (YXCF) or using the planar surface gantries EXCM or EXCH (YXMF). All of these are tried-and-tested components from Festo.

- Can be used universally for handling light to very heavy workpieces or high payloads
- Especially suitable for very long strokes
- High mechanical rigidity and sturdy design
- Freely positionable/any intermediate positions

Range of application:
- For any movements in 2D space
- Very high requirements for precision and/or very heavy workpieces combined with long strokes



1 Energy chain for Y-module
2 Y-axis
3 X-axis
4 Servo motor for Y-module
5 Servo motor for X-module
6 Energy chain for X-module
7 Multi-pin plug distributor which transfers all electrical signals such as for end-position sensing
8 Profile mounting/adjusting kit

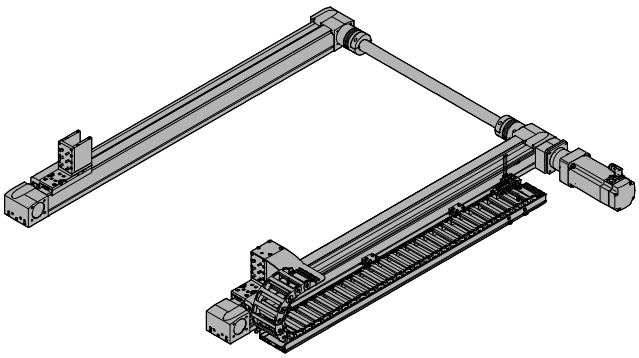
Description of the modules

X-module

Configuration:

The X-module EHMX comprises two parallel toothed belt axes which are connected by a connecting shaft. They are powered by a servo motor.
Adapters are installed on the slides of the X-axes to connect the Y-module.
The position of the motor and energy chain can be selected using the configurator.
The following components are located on the motor side:
- Energy chain
- Multi-pin plug distributor for proximity sensor (if sensor package has been selected)

Sample image:



Planar surface gantries

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Description of the modules

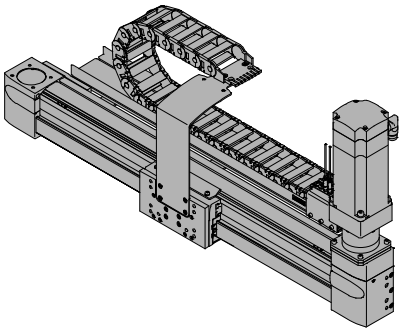
Y-module

Configuration:

The Y-module EHMY comprises a linear axis which is powered by a servo motor. The position of the motor and energy chain is dependent on the position of the motor on the X-module.
The following components are located on the motor side:

- Energy chain
- Multi-pin plug distributor for proximity sensor (if sensor package has been selected)

Sample image:

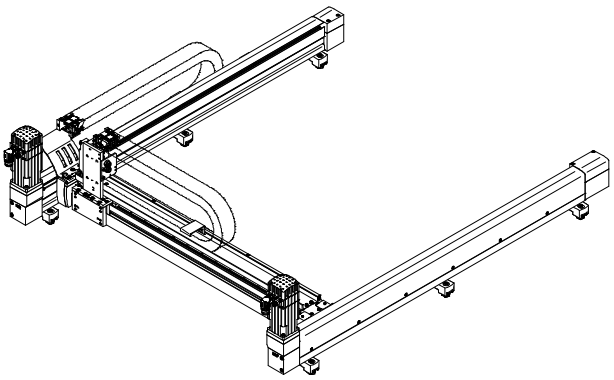


XY-module (EXCM, EXCH)

Configuration:

A slide is moved in a two-dimensional space (X-axis/Y-axis) via a toothed belt. The system is powered by two fixed motors. The motors are coupled to the toothed belt. The belt is guided via pulleys so that the slide can move to any position in a working space when the motors are actuated.
When using attachment components, additional processes can be carried out by independent Z-axes.

Sample image:



Dispatch options

Fully assembled:

The planar surface gantry is fully assembled. All cables are installed and connected. The system is already set up on delivery, but must be adapted to the particular mounting surface during installation.
Note flatness ➔ table below.

Partially assembled:

The planar surface gantry is delivered partially assembled. This means that both axis modules (X-/Y-axis) are assembled, each with optional motors. The partially assembled system must be completed by the customer. Help can be found in the assembly instructions provided.
Optional accessories (➔ page 9) are enclosed.
Note flatness ➔ table below.

System overview[1)]

Size	YXCF-1	YXCF-2	YXCF-3	YXCF-4	YXMF-1	YXMF-2	YXMF-3
Max. working stroke	X: 1900 mm Y: 1900 mm	X: 3000 mm Y: 2000 mm	X: 3000 mm Y: 2000 mm	X: 3000 mm Y: 2000 mm	X: 700 mm Y: 510 mm	X: 2000 mm Y: 1000 mm	X: 2500 mm Y: 1500 mm
Max. payload	Dependent on the selected dynamic response						
Required flatness of the mounting surface	≤ 0.1 mm/m						
Mounting position	Horizontal						

1) Drive package depending on configuration selected.

Planar surface gantries

Key features

Configurator: Handling Guide Online (HGO)

Selecting a handling system

Planning complex handling systems takes a lot of time. You can use the configurator "Handling Guide Online" (HGO) to design a customised handling system for your application in just a few steps.

You can choose from the following systems:

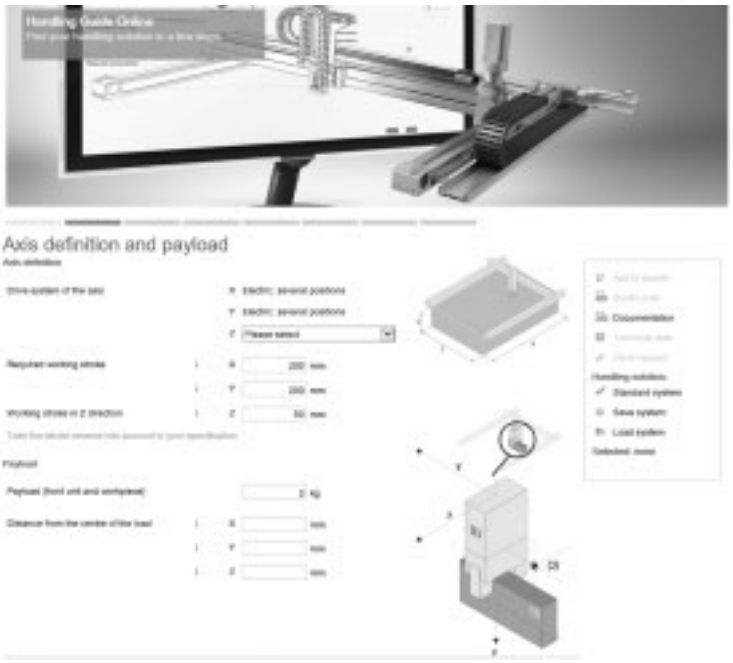
- Single-axis system
- 2D linear gantry
- 2D planar surface gantry
- 3-dimensional gantry

Advantages:

- Automatic selection of all relevant components
- Automatic design and calculation of workload
- Quote created automatically
- CAD model available immediately
- Fully automated processing
- You can order fully or partially assembled systems through the Online Shop
- Lots of possible options

Entering the application data

- Payload
- Drive system of the axis
- Distance from the centre of the load
- Working stroke
- Reference cycle



Planar surface gantries

Key features

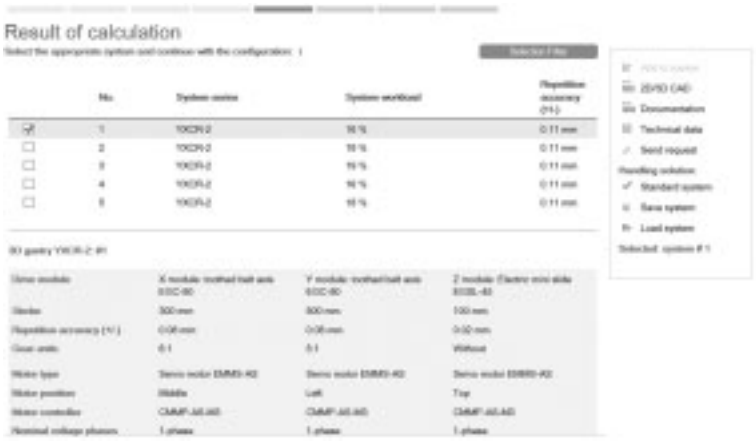
Configurator: Handling Guide Online (HGO)

Result of calculation

You will be offered a selection of systems calculated based on the application data you entered.

The following are available immediately:

- CAD model
- Data sheet of the selected system
- Price information



System overview

You will be given an overview of the whole system.
You will also have the following options:

- Request price
- Send request
- Add to basket

Planar surface gantries

Key features

Standard components within the handling system

The handling system comprises a number of tried-and-tested standard components from Festo. Different components are used depending on the configuration. The single axes installed will be displayed in the configurator HGO on the "Result of calculation" page.

Drives/axes

X-axis

Toothed belt axis EGC-TB-KF

- Electric
- Rigid, closed profile
- Recirculating ball bearing guide for high loads and torques
- High dynamic response and minimum vibration

Y-axis

Toothed belt axis EGC-TB-KF

- Electric
- Rigid, closed profile
- Recirculating ball bearing guide for high loads and torques
- High dynamic response and minimum vibration

Toothed belt axis EGC-HD-TB

- Electric
- Flat drive unit with rigid, closed profile
- Duo guide rail
- For maximum loads and torques, high feed forces and speeds and long service life

Possible axis combinations[1)]

Size	X-module	Y-module
YXCF-1	• Toothed belt axis EGC-50-TB-KF	• Toothed belt axis EGC-50-TB-KF
YXCF-2	• Toothed belt axis EGC-80-TB-KF	• Toothed belt axis EGC-80-TB-KF • Toothed belt axis with heavy-duty guide EGC-HD-125-TB
YXCF-3	• Toothed belt axis EGC-120-TB-KF	• Toothed belt axis EGC-120-TB-KF • Toothed belt axis with heavy-duty guide EGC-HD-160-TB
YXCF-4	• Toothed belt axis EGC-185-TB-KF	• Toothed belt axis EGC-185-TB-KF • Toothed belt axis with heavy-duty guide EGC-HD-220-TB
YXMF-1	• Planar surface gantry EXCM-30	• Planar surface gantry EXCM-30
YXMF-2	• Planar surface gantry EXCM-40, EXCH-40	• Planar surface gantry EXCM-40, EXCH-40
YXMF-3	• Planar surface gantry EXCH-60	• Planar surface gantry EXCH-60

1) Drive package depending on configuration selected.

Planar surface gantries

Key features

Standard components within the handling system

The handling system comprises a number of tried-and-tested standard components from Festo. Different components are used depending on the configuration. You can alter the scope and design of the drive package in the configurator HGO on the "System configuration" page.

Motors and controllers

Servo motors EMMS-AS

- Dynamic, brushless, permanently excited servo motor
- Digital absolute displacement encoder in single-turn or multi-turn version
- With optional brake

Servo motors EMME-AS

- Dynamic, brushless, permanently excited servo motor
- Digital absolute displacement encoder in single-turn or multi-turn version
- With optional brake

Stepper motors EMMS-ST

- 2-phase hybrid technology
- Step angle 1.8°
- With optional brake

Gear unit EMGA

- Low-backlash planetary gear
- Gear ratio
  i = 3 and 5
- Life-time lubrication

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Standard components within the handling system

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Motor controller CMMP-AS for servo motor

- Complete integration of all components for controller and power section, including USB interface
- Integrated brake chopper
- Integrated EMC filters
- Automatic activation for a brake

Selectable:

- Safety function: safe torque off (STO)/category 4, Performance level e
- Additional digital inputs and outputs

- Bus protocols
  - CANopen
  - DeviceNet®
  - EtherCAT®
  - EtherNet/IP
  - PROFIBUS DP
  - PROFINET

Motor controller CMMS-ST for stepper motor

- Complete integration of all components for controller and power section, including RS232 interface
- Integrated brake chopper
- Integrated EMC filters
- Automatic activation for a brake

Selectable:

- Safety function: safe torque off (STO)/category 3, Performance level d

- Bus protocols
  - CANopen
  - DeviceNet®
  - PROFIBUS DP

Controller CMXH-ST2 for stepper motor

- The controller controls two stepper motors in servo mode which drive an H-shaped rotating toothed belt. The toothed belt moves a slide whose position is calculated by the controller from the encoder signals of the motors

Selectable:

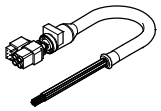
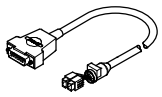
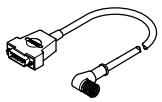
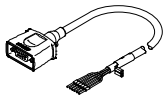
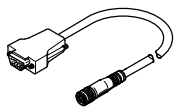
- Safety function: safe torque off (STO)/category 3, Performance level e

- Bus protocols
  - I/O interface
  - CAN interface
  - Ethernet TCP/IP

Module/motor combinations

We recommend that the planar surface gantry is operated with the proposed motors from Festo. These precisely match the mechanical system. When using third-party motors, it is essential that the technical limits are observed.

Module	Motor		
	Servo motor	Servo motor	Stepper motor
X-module			
EHMX-EGC-50-TB-KF	–	EMME-AS-40-M-LV-...	EMMS-ST-42-S-...
EHMX-EGC-80-TB-KF	EMMS-AS-70-M-LS-...	EMME-AS-60-M-LS-...	EMMS-ST-57-S-...
EHMX-EGC-120-TB-KF	EMMS-AS-100-M-HS-...	EMME-AS-80-S-LS-...	–
EHMX-EGC-185-TB-KF	EMMS-AS-140-L-HS-...	–	–
Y-module			
EHMY-...-EGC-50-TB-KF	–	EMME-AS-40-S-LV-...	EMMS-ST-57-M-...
EHMY-...-EGC-80-TB-KF	EMMS-AS-55-S-LS-...	EMME-AS-60-M-LS-...	EMMS-ST-57-S-...
EHMY-...-EGC-120-TB-KF	EMMS-AS-100-S-HS-...	EMME-AS-80-S-LS-...	EMMS-ST-87-S-...
EHMY-...-EGC-125-TB-HD	EMMS-AS-70-S-LS-...	EMME-AS-60-M-LS-...	EMMS-ST-57-S-...
EHMY-...-EGC-160-TB-HD	EMMS-AS-100-S-HS-...	EMME-AS-80-S-LS-...	EMMS-ST-87-S-...
EHMY-...-EGC-185-TB-KF	EMMS-AS-100-M-HS-...	EMME-AS-100-M-HS-...	–
	EMMS-AS-140-S-HS-...		
EHMY-...-EGC-220-TB-HD	EMMS-AS-100-M-HS-...	EMME-AS-100-M-HS-...	–
	EMMS-AS-140-S-HS-...		
XY-module (EXCM, EXCH)			
EXCM-30	–	–	EMMS-ST-42-S-...
EXCM-40	–	–	EMMS-ST-57-M-...
EXCH-40	EMMS-AS-70-M-LS-...	–	–
EXCH-40	EMMS-AS-100-S-HS-...	–	–
EXCH-60	EMMS-AS-100-M-HS-...	–	–
EXCH-60	EMMS-AS-140-S-HV-...	–	–

Designation	Description	Cable length	Part no.	Type
For servo motor				
Motor cable[1)]				
	• For servo motor EMMS-AS-40-M-LS-...	5 m	**550306**	**NEBM-T1G8-E-5-Q7N-LE8**
		10 m	**550307**	**NEBM-T1G8-E-10-Q7N-LE8**
		15 m	**550308**	**NEBM-T1G8-E-15-Q7N-LE8**
Motor cable[1)]				
	• For servo motor EMMS-AS-70-S-LS-.../ EMMS-AS-70-M-LS-.../EMMS-AS-100-S-HS-.../ EMMS-AS-100-M-HS-.../EMMS-AS-140-S-HS-.../ EMMS-AS-140-L-HS-...	5 m	**550310**	**NEBM-M23G8-E-5-Q9N-LE8**
		10 m	**550311**	**NEBM-M23G8-E-10-Q9N-LE8**
		15 m	**550312**	**NEBM-M23G8-E-15-Q9N-LE8**
Encoder cable[1)]				
	• For servo motor EMMS-AS-40-M-LS-...	5 m	**550314**	**NEBM-T1G8-E-5-N-S1G15**
		10 m	**550315**	**NEBM-T1G8-E-10-N-S1G15**
		15 m	**550316**	**NEBM-T1G8-E-15-N-S1G15**
Encoder cable[1)]				
	• For servo motor EMMS-AS-70-S-LS-.../ EMMS-AS-70-M-LS-.../EMMS-AS-100-S-HS-.../ EMMS-AS-100-M-HS-.../EMMS-AS-140-S-HS-.../ EMMS-AS-140-L-HS-...	5 m	**550318**	**NEBM-M12W8-E-5-N-S1G15**
		10 m	**550319**	**NEBM-M12W8-E-10-N-S1G15**
		15 m	**550320**	**NEBM-M12W8-E-15-N-S1G15**
For stepper motor				
Motor cable[1)]				
	• For stepper motor EMMS-ST-42-S-.../EMMS-ST-57-M-...	2.5 m	**1450369**	**NEBM-S1G9-E-2.5-Q5-LE6**
		5 m	**1450370**	**NEBM-S1G9-E-5-Q5-LE6**
Encoder cable[1)]				
	• For stepper motor EMMS-ST-42-S-.../EMMS-ST-57-M-... and motor controller CMMS-ST	5 m	**550748**	**NEBM-M12G8-E-5-S1G9**
		10 m	**550749**	**NEBM-M12G8-E-10-S1G9**
		15 m	**550750**	**NEBM-M12G8-E-15-S1G9**

1) Cables especially suitable for the motor controller and motor.
Degree of protection to IP65 (in assembled state)

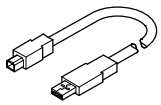
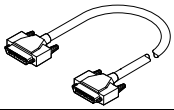
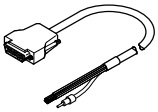
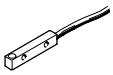
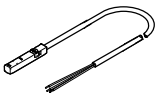
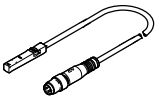
Possible cable lengths

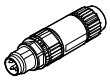
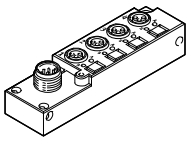
- Cables are selected so that the length specified when ordering will be the minimum connection length from the energy chain output.
- Cables are only available in fixed lengths as stated in the table below. This can mean that the plug connectors of the different cables do not end at the same point.

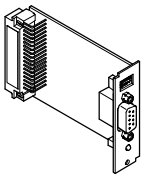
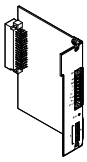
Length	2 m	5 m	7 m	10 m
Motor cable	■	■	■	■
Encoder cable	■	■	■	■
Multi-pin plug connecting cable	■	■	■	■

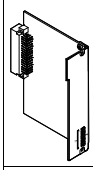
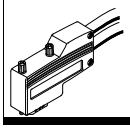
Standard components within the handling system

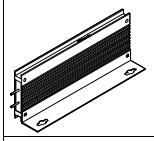
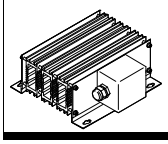
The handling system comprises a number of tried-and-tested standard components from Festo. Different components are used depending on the configuration. You can alter the scope and design of the accessories in the configurator HGO on the "System configuration" page.

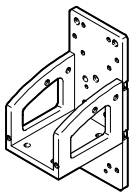
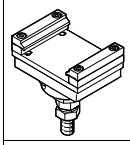
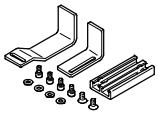
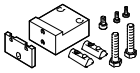
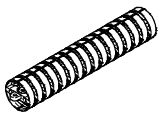
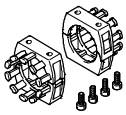
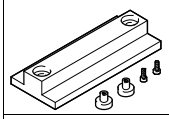
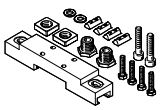
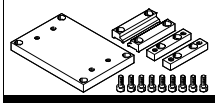
Designation	Description		Cable length	Part no.	Type
Programming cable					
	• High-speed USB 2.0 connecting cable • For controller CMMP-AS		1.8 m	**1501332**	**NEBC-U1G4-K-1.8-N-U2G4**
	• For controller CMMS-ST		2 m	**160786**	**PS1-ZK11-NULLMODEM-2,0M**
Control cable (for I/O interface to any controller)					
	• For controller CMMP-AS, CMMS-ST		2.5 m	**552254**	**NEBC-S1G25-K-2.5-N-LE26**
	• For controller CMXH-ST2		2.5 m	**2052917**	**NEBC-S1H15-E-2.5-N-LE15**
Proximity sensor for sensing the position of the slide on the X-axis					
	• For EXCM-40, EXCH-40, EXCH-60	N/O contact	–	**150491**	**SIES-V3B-PS-S-L**
	• For EXCM-40, EXCH-40, EXCH-60	N/C contact	–	**174552**	**SIES-Q8B-PO-K-L**
Proximity sensor (inductive) for sensing the position of the slide on the X-axis					
	Cable with open end				
	• For toothed belt axis EGC-TB	PNP, N/C contact	7.5 m	**551391**	**SIES-8M-PO-24V-K-7,5-OE**
	• For direct voltage	PNP, N/O contact	7.5 m	**551386**	**SIES-8M-PS-24V-K-7,5-OE**
	Included if "Festo sensor package" is	NPN, N/C contact	7.5 m	**551401**	**SIES-8M-NO-24V-K-7,5-OE**
	selected:	NPN, N/O contact	7.5 m	**551396**	**SIES-8M-NS-24V-K-7,5-OE**
	• 2 pieces				
Proximity sensor (inductive) for sensing the position of the slide on the Y-axis					
	Cable with plug				
	• For toothed belt axis EGC-TB, EGC-HD-TB	PNP, N/C contact	0.3	**551392**	**SIES-8M-PO-24V-K-0,3-M8D**
		PNP, N/C contact	2.5	**551393**	**SIES-8M-PO-24V-K-2,5-M8D**
	• For direct voltage	PNP, N/O contact	0.3	**551387**	**SIES-8M-PS-24V-K-0,3-M8D**
	Included if "Festo sensor package" is	PNP, N/O contact	2.5	**551388**	**SIES-8M-PS-24V-K-2,5-M8D**
	selected:	NPN, N/C contact	0.3	**551402**	**SIES-8M-NO-24V-K-0,3-M8D**
	• 2 pieces	NPN, N/C contact	2.5	**551403**	**SIES-8M-NO-24V-K-2,5-M8D**
		NPN, N/O contact	0.3	**551397**	**SIES-8M-NS-24V-K-0,3-M8D**
		NPN, N/O contact	2.5	**551398**	**SIES-8M-NS-24V-K-2,5-M8D**

Designation	Description	Cable length	Part no.	Type
Plug socket with cable				
	• Connection between multi-pin plug distributor and control cabinet	5 m	**525618**	**SIM-M12-8GD-5-PU**
		10 m	**570008**	**SIM-M12-8GD-10-PU**
Plug				
	• For connection to the multi-pin plug distributor	–	**562024**	**NECU-S-M8G3-HX**
Multi-pin plug distributor				
	• With the help of the multi-pin plug distributor, all electrical signals such as for end-position sensing can be transferred Selectable: – 4 individual connections – 6 individual connections	–	**574586**	**NEDU-L4R1-M8G3L-M12G8**
			574587	**NEDU-L6R1-M8G3L-M12G8**

Designation	Description	Part no.	Type
Interface			
	For additional I/Os	**567855**	**CAMC-D-8E8A**
	For DeviceNet®	**547451**	**CAMC-DN**
	For EtherCAT®	**567856**	**CAMC-EC**
	For EtherNet/IP	**1911917**	**CAMC-F-EP**
	For PROFINET RT	**1911916**	**CAMC-F-PN**
	For PROFIBUS DP	**547450**	**CAMC-PB**
Safety module			
	For safe torque off (STO)	**1501330**	**CAMC-G-S1**

Designation	Description	Part no.	Type
Switch module			
	If the safety module CAMC-G-S1 is not used, the switch module is absolutely essential for operating the motor controller CMMP-AS-...-M3	**1501329**	**CAMC-DS-M1**
Bus connection			
	For DeviceNet interface	**525635**	**FBSD-KL-2X5POL**
Plug			
	For CANopen interface	**533783**	**FBS-SUB-9-WS-CO-K**
	For PROFIBUS interface	**533780**	**FBS-SUB-9-WS-PB-K**

Designation	Description	Part no.	Type
Braking resistor			
	• For EXCH-40 • Essential for a vertical mounting position	**2882342**	**CACR-LE2-50-W500**
	• For EXCH-60 • Essential for a vertical mounting position	**2882343**	**CACR-KL2-40-W2000**

Designation	Description		Part no.	Type
Mounting kit				
	• Mounting kit for the energy chain and a Z-axis, like EGSL, DGSL	EXCM-30	**4070088**	**EAHT-E9-FB-3D-30**
Adjusting kit				
	• Height-adjustable mounting kit	EXCM-30	**4070088**	**EADC-E11-30**
Sensor mounting				
	• For homing in combination with third-party motors	EXCM-30	**4070088**	**EAPR-E11-30**
Sensor mounting				
	• For mounting the proximity sensors SIES-Q8B, SIES-V3B on the X-axis	EXCM-40, EXCH-40	**2536353**	**EAPR-E12-40**
		EXCH-60	**2478805**	**EAPR-E12-60**
Energy chain				
	• As a cable guide for the Z-axis	EXCM-30	**8059999**	**EADH-U-3D-30**
			8060324	**EADH-U-3D-40**
Connector set				
	• Holder for mounting the energy chain	EXCM-30	**8060325**	**EAHT-AE-3D-30**
			8060326	**EAHT-AE-3D-40**
Adjusting tool				
	• For aligning and checking the flatness of the planar surface gantry		**3197697**	**EADT-W-E12**
Adjusting kit				
	• Used to mount the handling system on the bearing surface • Can be used to easily compensate for any unevenness in the bearing surface	EHMY-...-EGC-50-TB-KF	**8047565**	**EADC-E15-50-E7**
		EHMY-...-EGC-80-TB-KF	**8047566**	**EADC-E15-80-E7**
		EHMY-...-EGC-120-TB-KF	**8047567**	**EADC-E15-120-E7**
		EHMY-...-EGC-185-TB-KF	**8047568**	**EADC-E15-185-E7**
Profile mounting				
	• Used to mount the handling system on the bearing surface • It is not height-adjustable		–	

Planar surface gantries

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