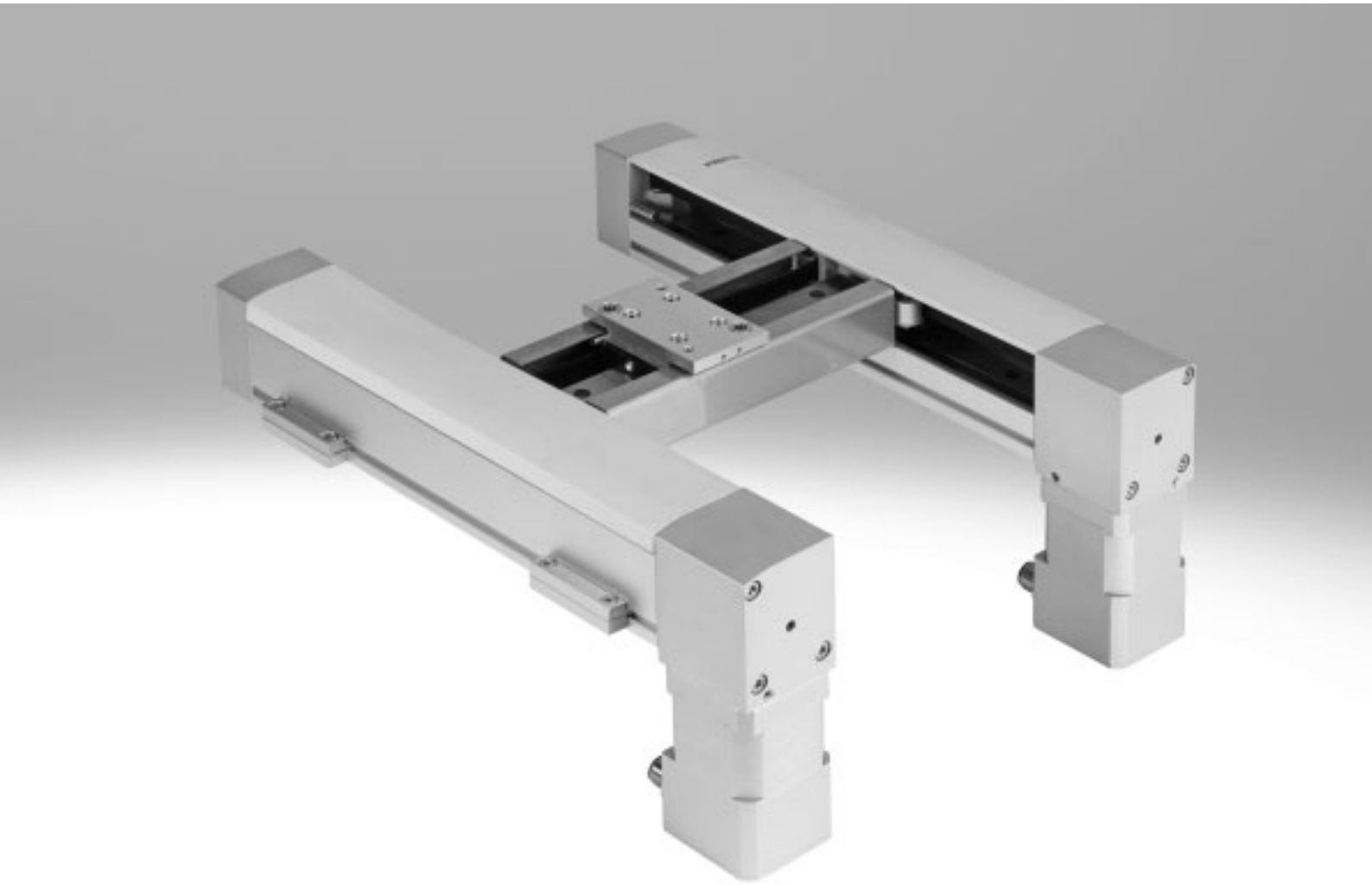
Planar surface gantries EXCM



New

Planar surface gantries EXCM

Key features

At a glance

General

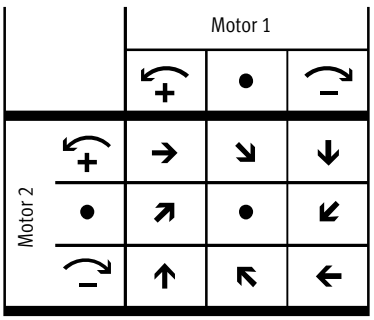
- Compact gantry distinguished by its high level of functionality in a very small installation space
- The drive design minimises the moving mass
- A perfectly matched drive and controller
- The kinematic system is actuated via 2 stepper motors with integrated optical encoder (closed loop) and one matching two-axis controller
- Can be actuated using two operating modes:
  - Direct mode via Ethernet and CAN
  - Record selection via digital I/O, Ethernet and CAN
- EXCM-30 permits flexible motor mounting

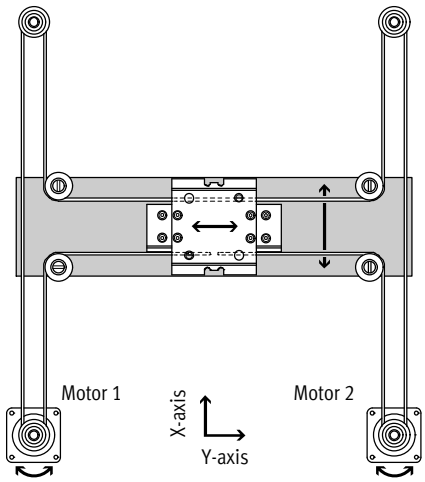
Application examples

- Feeding, pressing, joining components
- Dispensing liquids
- Mounting electronic components

Functional principle

A slide is moved in a two-dimensional space (X-axis/Y-axis) via a toothed belt. The system is powered via 2 fixed motors in position-controlled mode (closed loop). The motors are coupled to the toothed belt. The belt is guided via pulleys in such a way that the slide can approach any position in a working space when the motors are actuated accordingly.





Planar surface gantry

EXCM-10

EXCM-30

Type		EXCM-10	EXCM-30
Guide		Plain-bearing guide	Recirculating ball bearing guide
Stroke of the			
X-axis	[mm]	150, 260, 300, 360, 460, 700	90 ... 700
Y-axis	[mm]	110	110, 160, 210, 260, 310, 360
Effective load	[kg]	0.5	3
Repetition accuracy	[mm]	±0.1	±0.05
Controller		Attached	Separate

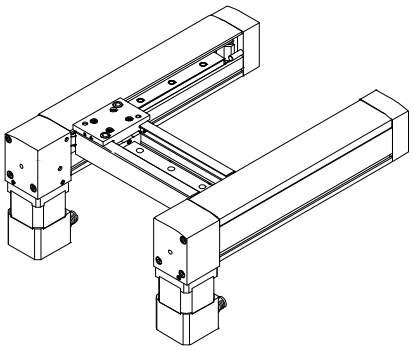
Planar surface gantries EXCM

Key features

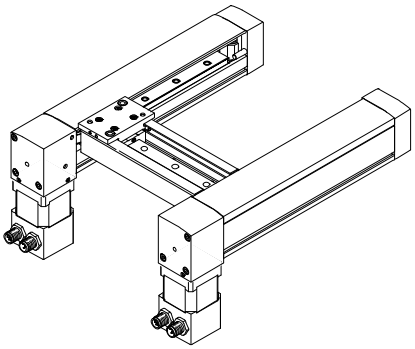
EXCM-30 – Motor mounting variants

Underneath

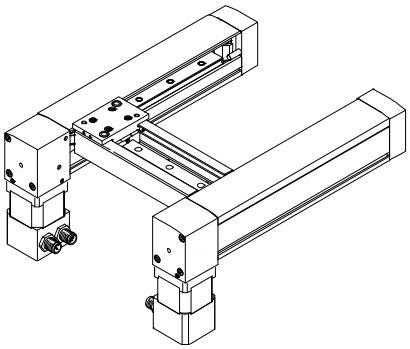
EXCM-30-...-B1 – Cable outlet at front



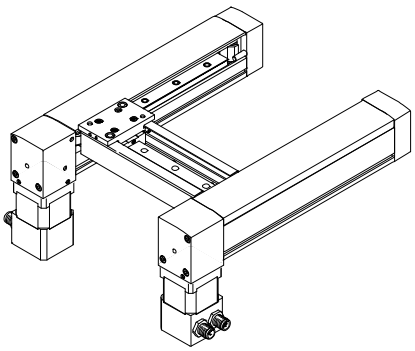
EXCM-30-...-B2 – Cable outlet at rear



EXCM-30-...-B3 – Cable outlet inside

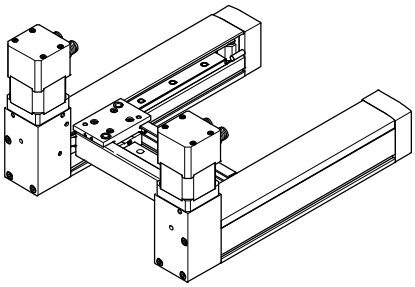


EXCM-30-...-B4 – Cable outlet outside

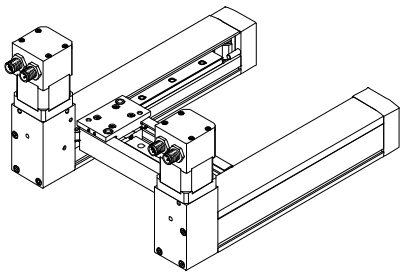


On top

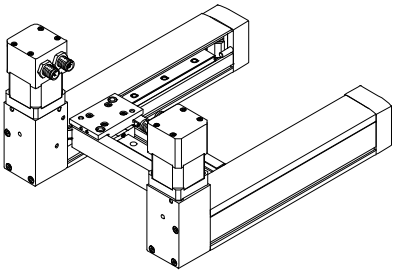
EXCM-30-...-T1 – Cable outlet at front



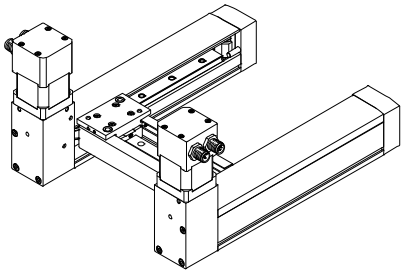
EXCM-30-...-T2 – Cable outlet at rear



EXCM-30-...-T3 – Cable outlet inside



EXCM-30-...-T4 – Cable outlet outside

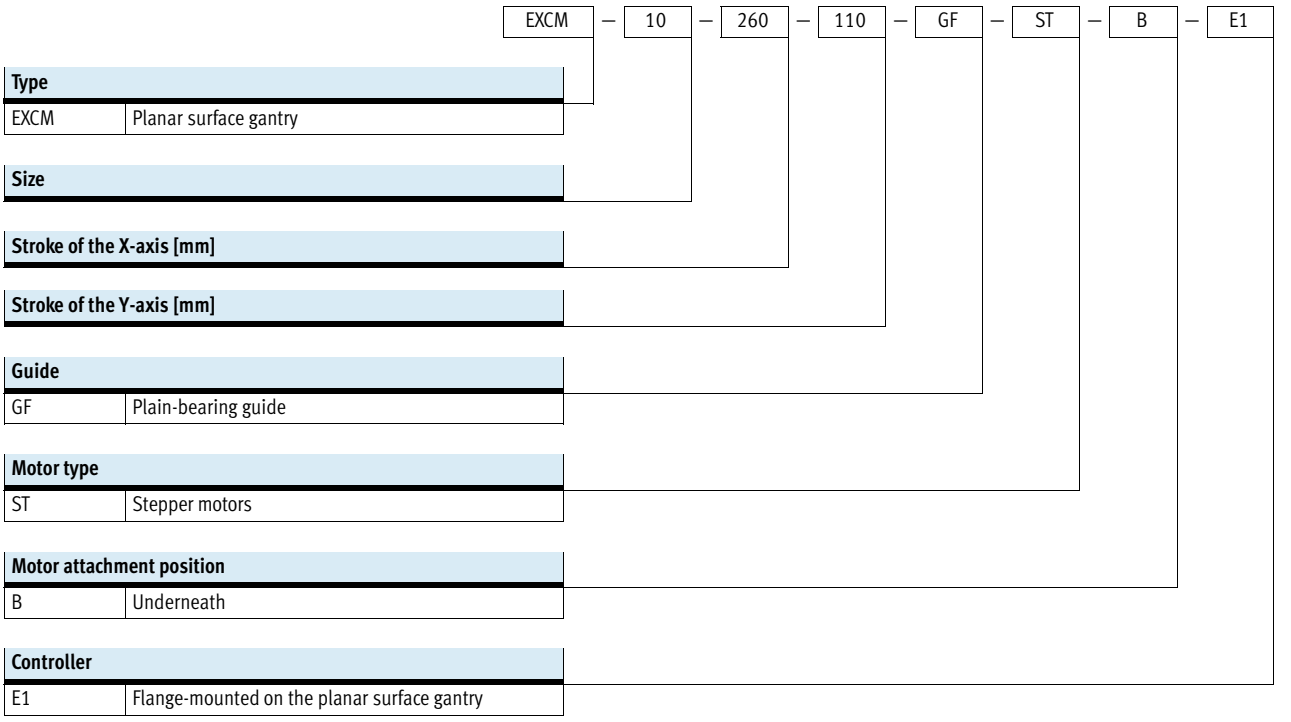


New

Planar surface gantries EXCM

Type codes

EXCM-10



Note

Ordering data ➔ 20

Planar surface gantries EXCM

Type codes

EXCM-30

EXCM – 30 – 300 – 210 – KF – ST – B1 – E3 – DE

Type	
EXCM	Planar surface gantry

Size

Stroke of the X-axis [mm]

Stroke of the Y-axis [mm]

Guide	
KF	Recirculating ball bearing guide

Motor type	
ST	Stepper motors
SB	Stepper motors with brake
W	Without stepper motors

Motor attachment position	
B	Underneath
B1	Underneath, cable outlets to front
B2	Underneath, cable outlets to rear
B3	Underneath, cable outlets inside
B4	Underneath, cable outlets outside
T	On top
T1	On top, cable outlets to front
T2	On top, cable outlets to rear
T3	On top, cable outlets inside
T4	On top, cable outlets outside

Controller	
–	Without controller
E2	With controller, motor and encoder cable (0.5 m)
E3	With controller, motor and encoder cable (1 m)
E4	With controller, motor and encoder cable (1.5 m)
E5	With controller, motor and encoder cable (2 m)

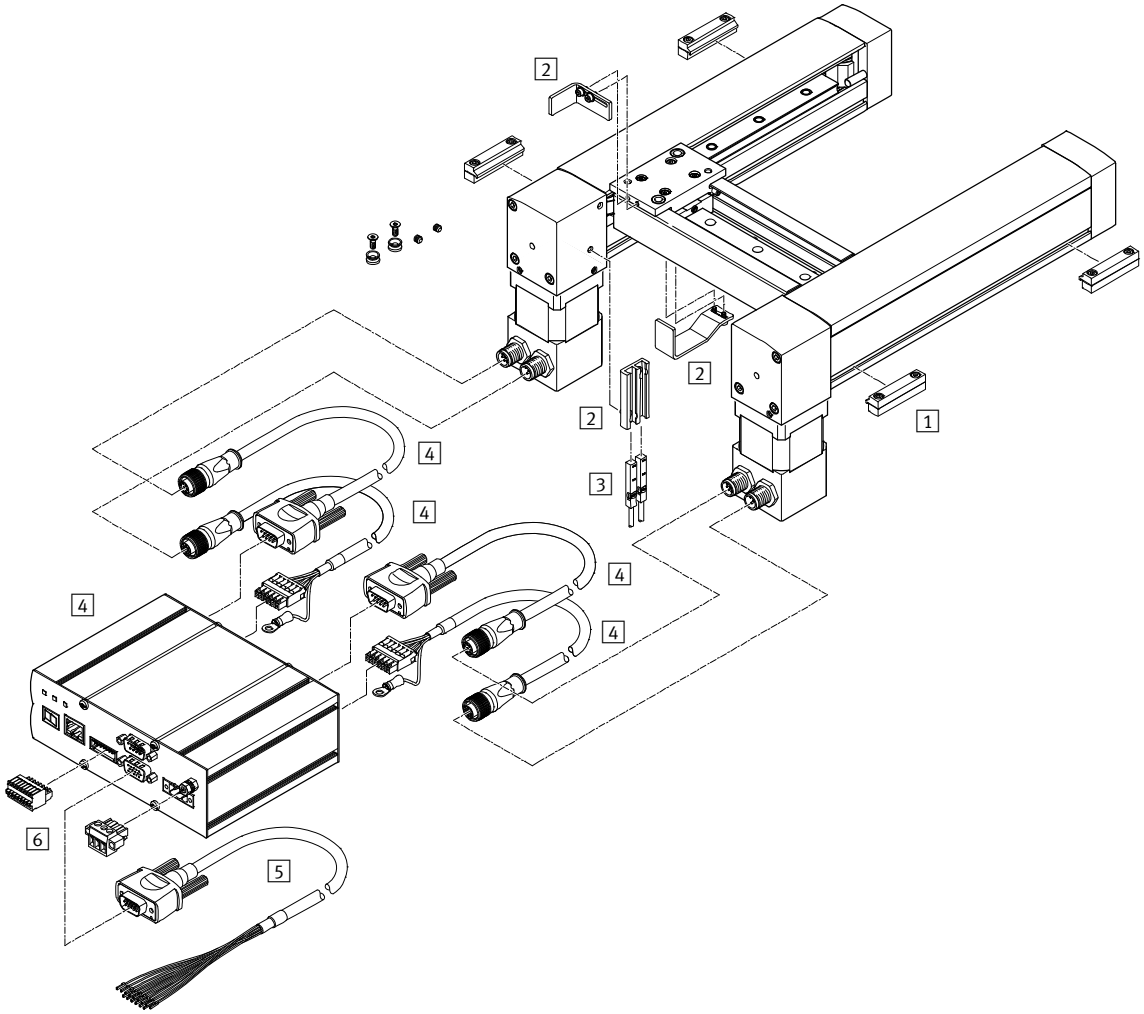
Language of documentation	
DE	German
EN	English
ES	Spanish
FR	French
IT	Italian
RU	Russian
SV	Swedish
ZH	Chinese

Note

Ordering data ➔ 21

Planar surface gantries EXCM

Peripherals overview



Attachments and accessories			
Type	Description		➔ Page/Internet
	For EXCM-10	For EXCM-30	
1 Profile mounting MUE	–	Included in the scope of delivery: • X stroke < 500 mm: 2 pairs • X stroke ≥ 500 mm: 3 pairs	23
2 Sensor mounting EAPR	–	For homing in combination with third-party motors	22
3 Proximity sensor SIES-8M	–		23
4 Drive package comprising controller, motor, motor cable	Included in the scope of delivery of the planar surface gantry	Available with or without drive package	11
5 Pilot line NEBC-S1H15	For I/O interface to any controller	For I/O interface to any controller	23
6 Plug	Included in the scope of delivery of the planar surface gantry	Included in the scope of delivery of the drive package	–

Note

Homing is always carried out using the mechanical stop in combination with the drive package from Festo; the sensor mounting and proximity sensor are not required in this case.

Planar surface gantries EXCM

Technical data

Size
10, 30

EXCM-10

EXCM-30

Controller for EXCM-30

General technical data			
Size		10	30
Design		Planar surface gantry	
Guide		Plain-bearing guide	Recirculating ball bearing guide
Stroke of the			
X-axis	[mm]	150, 260, 300, 360, 460, 700	100, 150, 200, 300, 400, 500
		–	90 ... 700
Y-axis	[mm]	110	110, 160, 210, 260, 310, 360
Effective load at max. dyn. rsp.	[kg]	0.5	2/3[1]
Max. driving torque	[Nm]	–	0.2
Max. no-load torque	[Nm]	–	0.04[2]
Max. acceleration	[m/s²]	3	10
Max. speed	[m/s]	0.3	0.5
Repetition accuracy	[mm]	±0.1	±0.05
Mounting position		Horizontal	Any[3]
Type of mounting			
Planar surface gantry		Via through-hole and screw	Via profile mounting
Controller		–	Via H-rail, on connecting plate

1) Vertical/horizontal mounting position
2) At v=0.2 m/s and 45° diagonal travel
3) Motors with brake must be used in the case of vertical installation

Operating and environmental conditions			
Size		10	30
Characteristics of digital logic outputs		Not galvanically isolated	
Characteristics of logic inputs		Galvanically connected to logic potential	
Logic input specification		Based on IEC 61131-2	
Protection class		IP20	
Protective function		I²t monitoring, following error monitoring, software end-position detection, voltage failure detection, current monitoring, temperature monitoring	
Ambient temperature	[°C]	+10 ... +45	
Storage temperature	[°C]	–10 ... +60	
Relative air humidity		0 ... 90 (non-condensing)	
Noise level	dB(A)	38	52
Duty cycle	[%]	100	
CE marking (see declaration of conformity)		In accordance with EU EMC Directive[1]	

1) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com ➔ Support ➔ User documentation.
If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

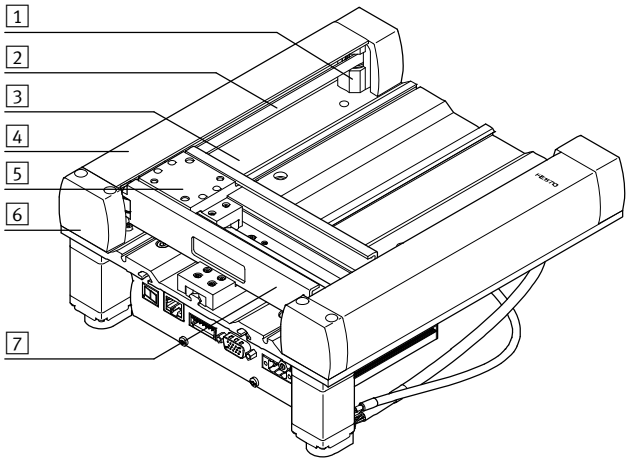
Planar surface gantries EXCM

Technical data

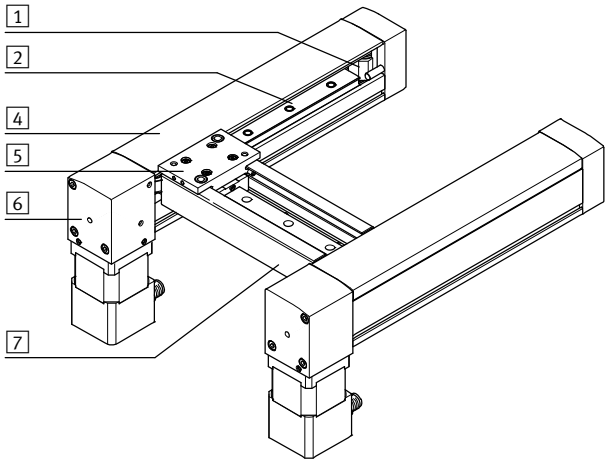
FESTO

Materials

EXCM-10



EXCM-30



Materials			
Size		10	30
1	Guide pulley	Aluminium	
2	Toothed belt	Polychloroprene with glass cord	
3	Base plate	Aluminium	–
4	Cover		
	X-axis	Plastic	
	Y-axis	Plastic	Stainless steel
5	Slide	Aluminium	
6	End cap	Aluminium	
7	Y-traverse	Aluminium	
–	Guide	Aluminium	Steel
	Ball bearings	Steel	
	Note on materials	RoHS-compliant	

Weight [g]		
Size		10
Product weight with stroke (with motors and controller)		
X-axis	Y-axis	
150	110	3,300
260	110	3,800
300	110	4,000
360	110	4,200
460	110	4,700
700	110	5,700
Size		30
Product weight with stroke (without motors and controller)		
X-axis	Y-axis	
150	110	2,700
Additional weight per 50 mm stroke		
X-axis		237
Y-axis		132
Weight		
2 motors		900
2 motors with brake		1,500
Controller		650

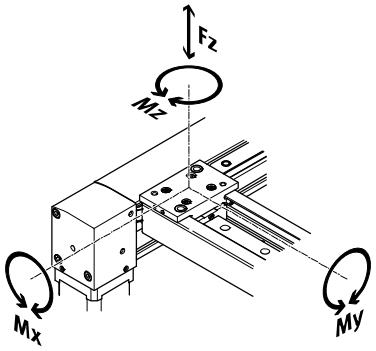
Planar surface gantries EXCM

Technical data

FESTO

Characteristic load values

The indicated forces and torques refer to the slide surface. The point of application of force is the point where the centre of the guide and the longitudinal centre of the slide intersect.
They are valid for v = 0.2 m/s.
These values must not be exceeded during dynamic operation. Special attention must be paid to the cushioning phase.



If the axis is subjected to more than two of the indicated forces and torques simultaneously, the following equation must be satisfied in addition to the indicated maximum loads:

Calculating the load comparison factor:

$$f_v = \frac{|F_{z,dyn}|}{F_{z,max}} + \frac{|M_{x,dyn}|}{M_{x,max}} + \frac{|M_{y,dyn}|}{M_{y,max}} + \frac{|M_{z,dyn}|}{M_{z,max}} \leq 1$$

Permissible forces and torques			
Size		10	30
$Fz_{max.}$	[N]	5	100
$Mx_{max.}$	[Nm]	2	34
$My_{max.}$	[Nm]	0.5	67
$Mz_{max.}$	[Nm]	2	34

Feed forces [N]							
Size		30					
Stroke of the Y-axis	[mm]	110	160	210	260	310	360
Travel in X direction		55	55	55	50	40	34
Travel in Y direction		55	55	46	38	32	28
Travel 45° diagonal		35	35	35	30	25	23

Weight of the Y-traverse [g]							
Size		30					
Stroke of the Y-axis	[mm]	110	160	210	260	310	360
Y-traverse		670	800	930	1,070	1,200	1,330

Note

The weight forces due to load when the gantry is mounted vertically must be taken into consideration in the feed force. This is done by adding the weight of the Y-traverse to the load when the X-axis is vertical. The feed force is reduced by the value of the weight force with vertical travel upwards and increased with vertical travel downwards.

Planar surface gantries EXCM

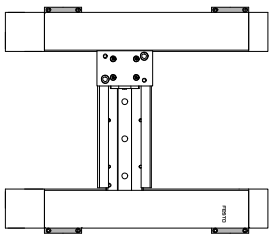
Technical data

EXCM-30 – Number of profile mountings

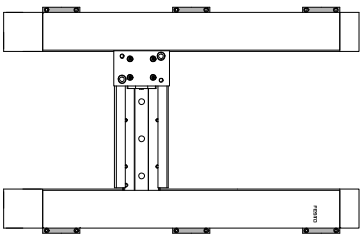
Different numbers of profile mountings must be used depending on the mounting position and stroke of the X-axis.

Horizontal mounting position

Stroke < 500 mm

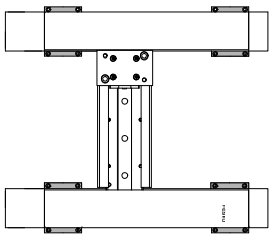


Stroke ≥ 500 mm

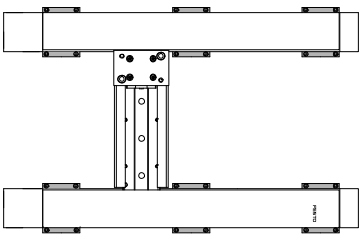


Vertical mounting position

Stroke < 500 mm



Stroke ≥ 500 mm



Stroke of the X-axis [mm]	Number of profile mountings	
	Horizontal mounting position	Vertical mounting position
100 … 500	2 per profile, inside or outside	4 per profile, inside and outside
500 … 700	3 per profile, inside or outside	6 per profile, inside and outside

Planar surface gantries EXCM

Technical data

Technical data – Controller		
Functional principle		Cascade controller with P position controller, PI speed controller, PI current controller; Current control, within the cascade controller
		PWM MOSFET power end stage
Operating mode		Direct mode
		Record selection
Rotary position encoder		Optical encoder, 2,000 steps/rev.
Display		7-segment display
Input encoder interface		RS422
Adjustable current reduction		Via software
Nominal current setting		Via software
Step adjustment		Via software
Switching logic		NPN (negative switching)
Braking resistor	[Ω]	15
Mains filter		Integrated

Electrical data – Controller			
For EXCM size		10	30
Max. intermediate circuit voltage	[V DC]	28	
Nominal current per phase, effective	[A]	1.4	3
Load supply			
Nominal voltage	[V DC]	24	
Nominal current	[A]	2.8	6
Peak current	[A]	8	
Logic supply			
Nominal voltage	[V DC]	24 ±15%	
Nominal current	[A]	0.3	
Max. current of digital logic outputs	[mA]	100	

Technical data – Fieldbus interface				
Interfaces		I/O	CANopen	Ethernet
Number of digital logic outputs		5		
Number of digital logic inputs		9		
Operating range of logic inputs	[V DC]	8 ... 30		
Process coupling		31 positioning records		
Communication profile		–	FHPP	TCP/IP, FHPP
Max. fieldbus transmission rate	[Mbps]	–	1	100

Mechanical data – Motor			
Size		10	30
Nominal torque	[Nm]	0.009	0.04
Holding torque	[Nm]	0.009	0.04

Planar surface gantries EXCM

Technical data

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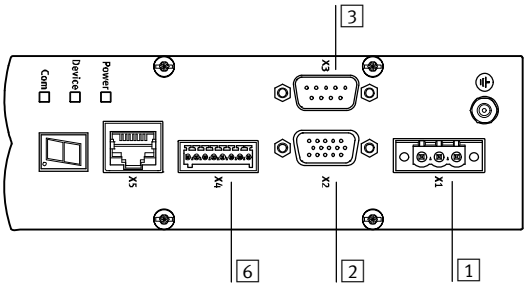
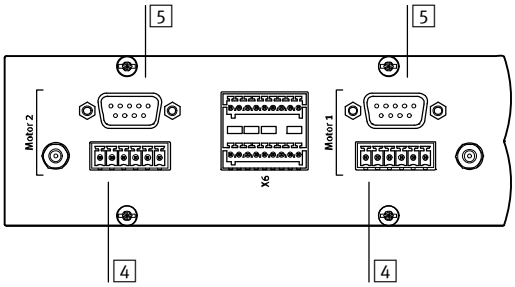
Pin allocation

Front plate



Reverse side



1 X1 Power supply

Pin	Function	
1	+24 V logic	Logic supply
2	+24 V load	Load supply
3	0 V	Reference potential

2 X2 I/O interface

Pin	Function	
1	+24 V Ready	Ready for communication
2	In 1	Positioning record bit 1
3	In 2	Positioning record bit 2
4	In 3	Positioning record bit 3
5	In 4	Positioning record bit 4
6	In 5	Positioning record bit 5
7	In 6	Not used
8	Start	Start input
9	Enable	Enable input
10	Reset	Reset input
11	Ready	Ready output
12	Fault	Fault output
13	Acknowledge	Acknowledge output
14	MC	Motion complete
15	0 V	Reference potential

Planar surface gantries EXCM

Technical data

FESTO

[3] X3 CAN interface

Pin	Function	
1	n.c.	
2	CAN_L	CAN low
3	GND	Reference potential
4	n.c.	
5	n.c.	
6	n.c.	
7	CAN_H	CAN high
8	n.c.	
9	n.c.	

[4] Motor connection – supply

Pin	Function	
1	A	String A
2	A/	String A/
3	B	String B
4	B/	String B/
5	BR+	24 V brake connection
6	BR–	0 V brake connection

[5] Motor connection – encoder

Pin	Function	
1	A	
2	B	
3	N	
4	0 V	Reference potential for encoder
5	5 V	Auxiliary supply for encoder
6	A/	
7	B/	
8	N/	
9	n.c.	

[6] X4 Emergency stop interface

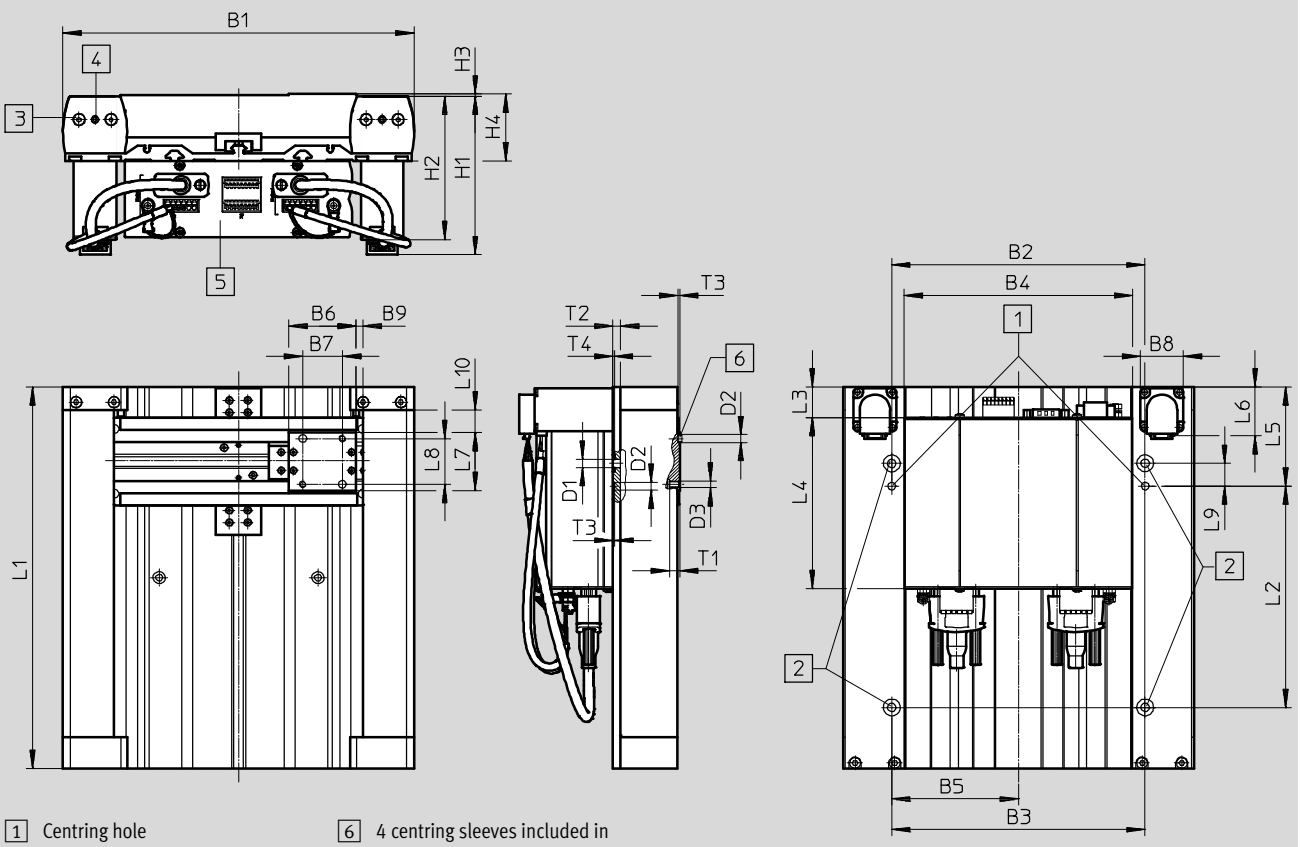
Pin	Function	
1	+24 V logic	Logic supply
2	TO	Interrupt motor voltage (at 0 V)
3	ES	Trigger braking ramp (at 0 V)
4	RB	Release brake (at 24 V)
5	FAULT	Fault
6	DIAG1	
7	DIAG2	
8	0 V	Reference potential

Planar surface gantries EXCM

Technical data

Dimensions Download CAD data ➔ **www.festo.com**

EXCM-10



1 Centring hole
2 Mounting hole
3 Screw for setting the toothed belt tension
4 Threaded pin for securing the adjusting screws
5 Controller
6 4 centring sleeves included in the scope of delivery of the planar surface gantry
– 2 centring sleeves for the mounting hole
– 2 centring sleeves for mounting on the slide

Planar surface gantries EXCM

Technical data

Type	B1	B2 ±0.03	B3 ±0.2	B4	B5 ±0.2	B6	B7 ±0.03	B8	B9
EXCM-10-...	230	166	166	149	83	44	26	28	4.7

Type	D1 ∅	D2 ∅ H7	D3	H1 +1.35/–1.15	H2	H3	H4 ±1	L3	L4
EXCM-10-...	5.5	5	M4	103.7	93.2	1.6	44.8	0 ... 50	112

Type	L5 ±0.1	L6	L7	L8 ±0.03	L9 ±0.1	L10	T1	T2	T3	T4
EXCM-10-...	65	32	38	30	15	14.8	6.7	5	1.2	1

Stroke-dependent dimensions

Type	L1 +0.4	L2 ±0.2
EXCM-10-150-110-...	250	145
EXCM-10-260-110-...	360	255
EXCM-10-300-110-...	400	295
EXCM-10-360-110-...	460	355
EXCM-10-460-110-...	560	455
EXCM-10-700-110-...	800	695

Planar surface gantries EXCM

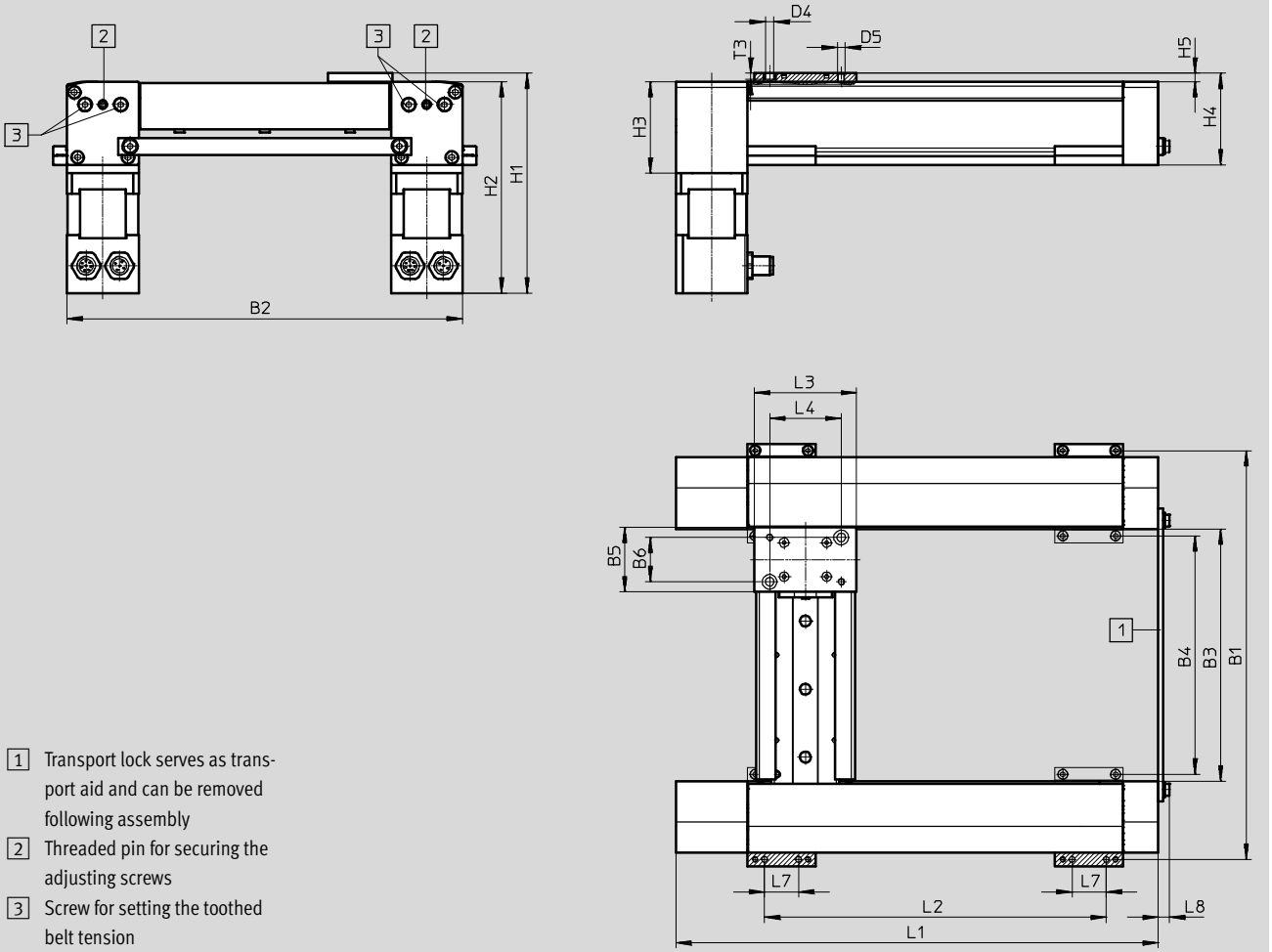
Technical data

FESTO

Dimensions Download CAD data ➔ **www.festo.com**

EXCM-30

Motor attachment position – Underneath

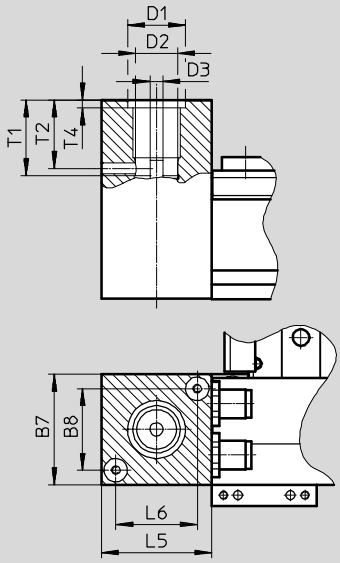


1 Transport lock serves as transport aid and can be removed following assembly

2 Threaded pin for securing the adjusting screws

3 Screw for setting the toothed belt tension

Motor interface



Planar surface gantries EXCM

Technical data

Type	B5	B6 ±0.03	B7	B8 ±0.1	D1 ∅ H7	D2 ∅	D3 ∅ f8	D4 ∅ H8	D5
EXCM-30-...	38	26	42	31	22	16	5	5	M4

Type	H1		H2		H3	H4	H5	L3
	EXCM-...-ST	EXCM-...-SB	EXCM-...-ST ±0.7	EXCM-...-SB				
EXCM-30-...	129.2	186.2	124.2	181.2	53.8	54	5	60

Type	L4 ±0.03	L5	L6 ±0.1	L7	L8	T1	T2	T3	T4
EXCM-30-...	42	42	31	20	6.6	28.7	26	3.7	3

Stroke-dependent dimensions

Stroke of the X-axis	L1	L2 ±0.2
100	233	150.5
150	283	200.5
200	333	250.5
300	433	350.5
400	533	450.5
500	633	550.5
90 ... 700	133 + stroke	50.5 + stroke

Stroke of the Y-axis	B1	B2	B3	B4
110	240	232	148	140
160	290	282	198	190
210	340	332	248	240
260	390	382	298	290
310	440	432	348	340
360	490	482	398	390

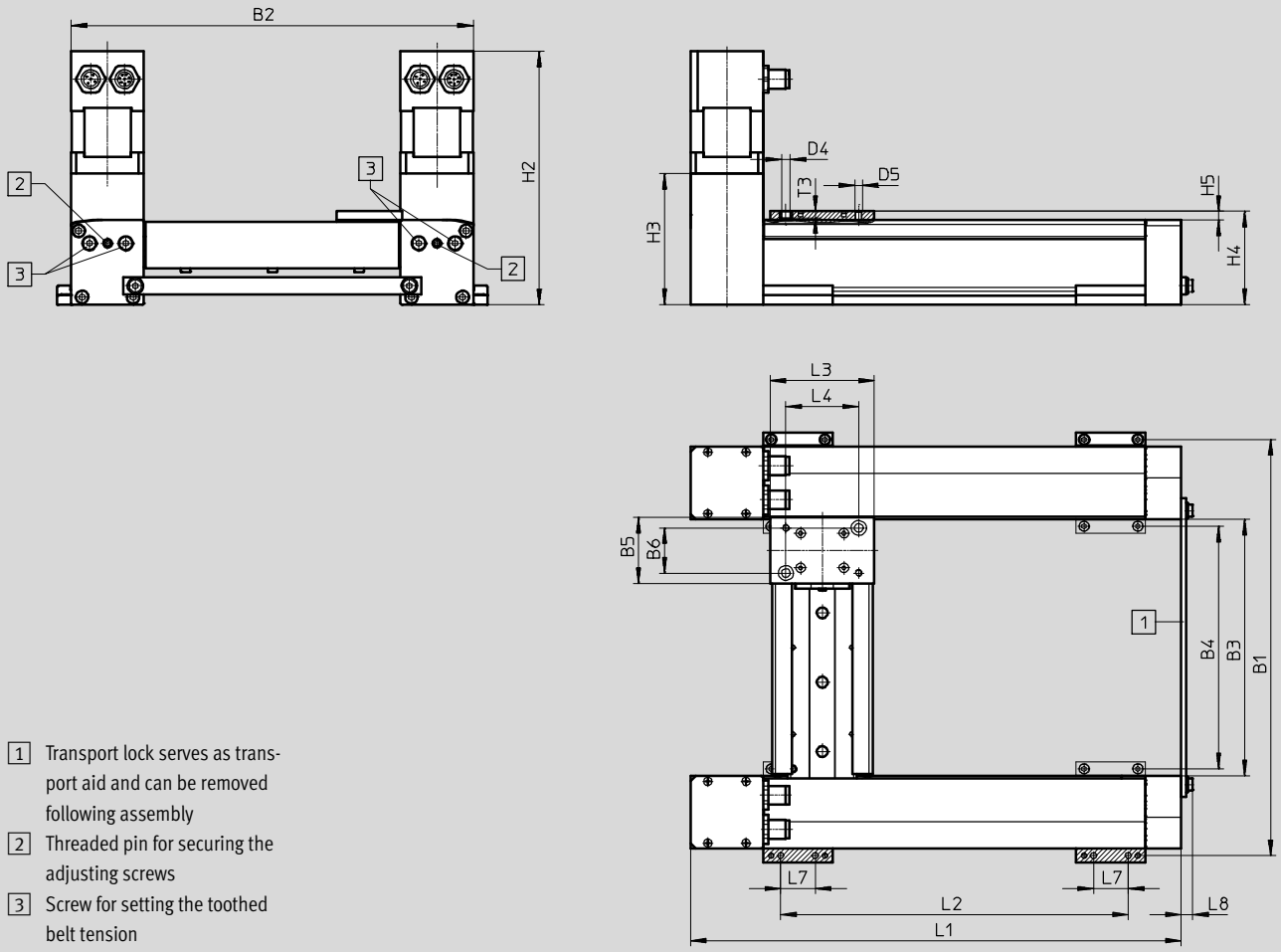
Planar surface gantries EXCM

Technical data

Dimensions Download CAD data ➔ **www.festo.com**

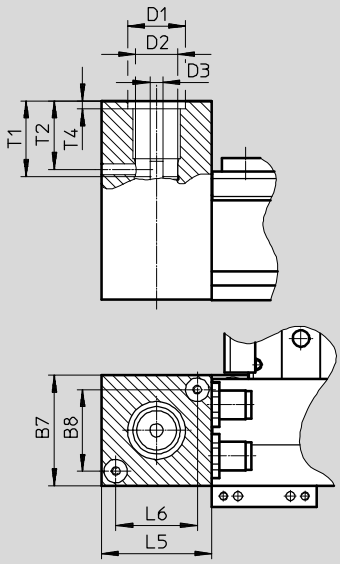
EXCM-30

Motor attachment position – On top



1 Transport lock serves as transport aid and can be removed following assembly
2 Threaded pin for securing the adjusting screws
3 Screw for setting the toothed belt tension

Motor interface



Planar surface gantries EXCM

Technical data

Type	B5	B6 ±0.03	B7	B8 ±0.1	D1 ∅ H7	D2 ∅	D3 ∅ f8	D4 ∅ H8
EXCM-30-...	38	26	42	31	22	16	5	5

Type	D5	H2		H3	H4	H5	L3	L4
		EXCM-...-ST ±1	EXCM-...-SB					±0.03
EXCM-30-...	M4	146.2	203.2	75.6	54	5	60	42

Type	L5	L6 ±0.1	L7	L8	T1	T2	T3	T4
EXCM-30-...	42	31	20	6.6	28.7	26	3.7	3

Stroke-dependent dimensions

Stroke of the X-axis	L1	L2 ±0.2
100	233	150.5
150	283	200.5
200	333	250.5
300	433	350.5
400	533	450.5
500	633	550.5
90 ... 700	133 + stroke	50.5 + stroke

Stroke of the Y-axis	B1	B2	B3	B4
110	240	232	148	140
160	290	282	198	190
210	340	332	248	240
260	390	382	298	290
310	440	432	348	340
360	490	482	398	390

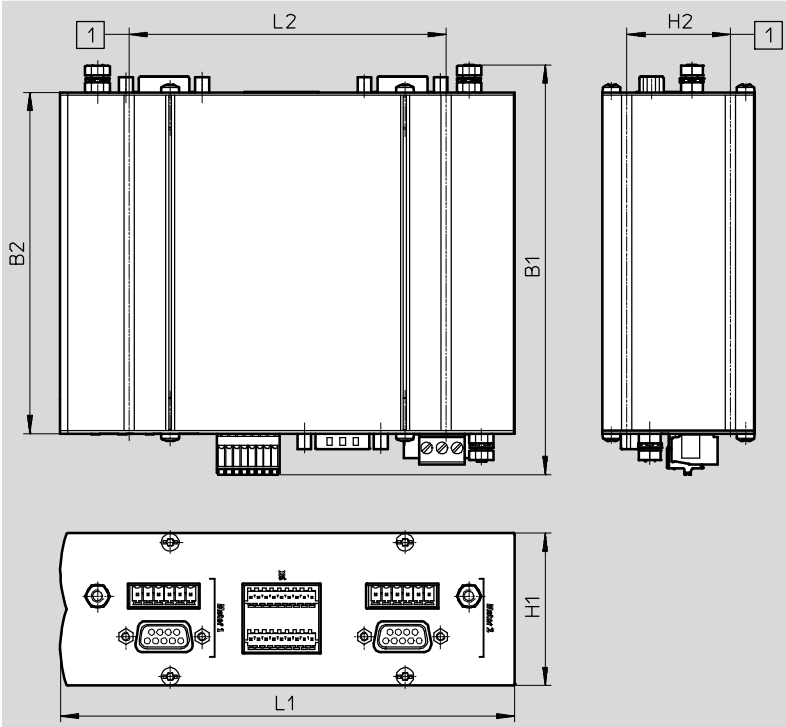
Planar surface gantries EXCM

Technical data

FESTO

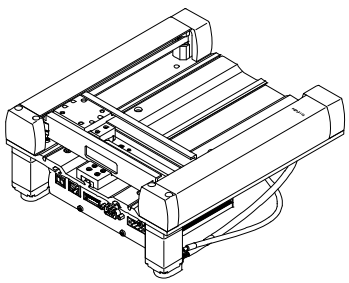
Dimensions Download CAD data ➔ **www.festo.com**

Controller



B1	B2	H1	H2	L1	L2
134.4	112	50	32	149	104

Ordering data

EXCM-10	Stroke (X-axis) [mm]	Part No.	Type
	150	**1801920**	**EXCM-10-150-110-GF-ST-B-E1**
	260	**1801915**	**EXCM-10-260-110-GF-ST-B-E1**
	300	**1801917**	**EXCM-10-300-110-GF-ST-B-E1**
	360	**1801918**	**EXCM-10-360-110-GF-ST-B-E1**
	460	**1801916**	**EXCM-10-460-110-GF-ST-B-E1**
	700	**1801919**	**EXCM-10-700-110-GF-ST-B-E1**

Planar surface gantries EXCM

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Ordering data – Modular products

Ordering table

Size		30	Conditions	Code	Enter code
M	Module No.	**2226101**			
	Product type	EXCM series M		**EXCM**	EXCM
	Size	30		**-30**	30
	Stroke of the X-axis [mm]	100		**-100**	
	[mm]	150		**-150**	
	[mm]	200		**-200**	
	[mm]	300		**-300**	
	[mm]	400		**-400**	
	[mm]	500		**-500**	
	[mm]	90 ... 700		**-...**	
	Stroke of the Y-axis [mm]	110		**-110**	
	[mm]	160		**-160**	
	[mm]	210		**-210**	
	[mm]	260		**-260**	
	[mm]	310		**-310**	
	[mm]	360		**-360**	
	Guide	Recirculating ball bearing guide		**-KF**	KF
	Motor type	Stepper motors		**-ST**	
		Stepper motors with brake		**-SB**	
		Without stepper motors	1	**-W**	
	Motor attachment position	Underneath	2	**-B**	
		Underneath, cable outlets to front		**-B1**	
		Underneath, cable outlets to rear		**-B2**	
		Underneath, cable outlets inside		**-B3**	
		Underneath, cable outlets outside		**-B4**	
		On top	2	**-T**	
		On top, cable outlets to front		**-T1**	
		On top, cable outlets to rear		**-T2**	
		On top, cable outlets inside		**-T3**	
		On top, cable outlets outside		**-T4**	
	Controller	Without controller		**–**	
		With controller, motor and encoder cable (0.5 m)		**-E2**	
		With controller, motor and encoder cable (1 m)		**-E3**	
		With controller, motor and encoder cable (1.5 m)		**-E4**	
		With controller, motor and encoder cable (2 m)		**-E5**	
	Language of documentation	German		**-DE**	
		English		**-EN**	
		Spanish		**-ES**	
		French		**-FR**	
		Italian		**-IT**	
		Russian		**-RU**	
		Swedish		**-SV**	
		Chinese		**-ZH**	

1 **W** The controller E2, E3, E4, E5 is omitted in combination with "Without stepper motors" W

2 **B, T** Not in combination with stepper motors ST and SB. Option if third-party motors are mounted

Transfer order code

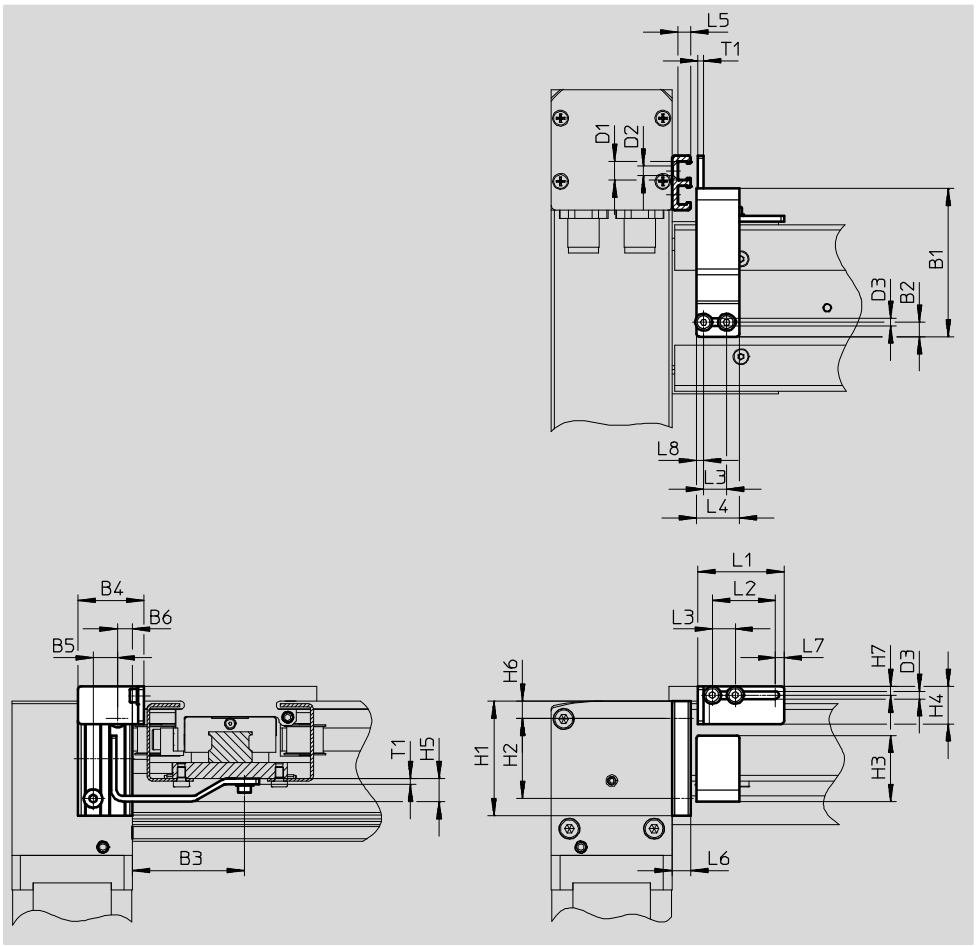
	EXCM	–	30	–		–		–	KF	–		–		–		–	

Planar surface gantries EXCM

Accessories

Sensor mounting EAPR
(incl. switch lug)

Materials:
Bracket: Wrought aluminium alloy
Switch lug: Steel
RoHS-compliant



Dimensions and ordering data

For size	B1	B2	B3	B4	B5	B6	D1 ∅	D2 ∅	D3 ∅	H1
30	51.5	5	39	23	8.4	5.3	6.5	3.4	2.6	40

For size	H2	H3	H4	H5	H6	H7	L1	L2	L3	L4
30	28	23	13	8	6	3	30	22	8	15

For size	L5	L6	L7	L8	T1	Weight [g]	Part No.	Type
30	4.5	6.5	3	2.5	2	330	**2319236**	**EAPR-E11-30**

Planar surface gantries EXCM

Accessories

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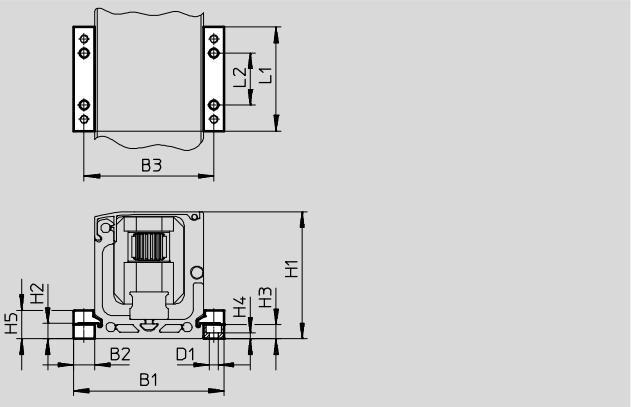
Profile mounting MUE

Material:
Anodised aluminium
RoHS-compliant

Scope of delivery:
1 pair

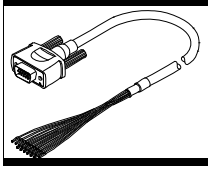


Dimensions and ordering data

For size	B1	B2	B3	D1 ∅	H1	H2	H3
30	58	8	50	3.4	49	6	5.5

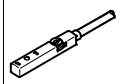
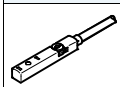
For size	H4	H5	L1	L2	Weight [g]	Part No.	Type
30	2.3	11	40	20	20	**558042**	**MUE-50**

Ordering data – Cables

	Brief description	Cable length [m]	Part No.	Type
	Control cable, for I/O interface to any controller	1	**2307459**	**NEBC-S1H15-E-1.0-N-LE15**
		2.5	**2052917**	**NEBC-S1H15-E-2.5-N-LE15**
		5	**2052918**	**NEBC-S1H15-E-5.0-N-LE15**
		10	**2052919**	**NEBC-S1H15-E-10.0-N-LE15**

Ordering data – Proximity sensor for T-slot, inductive

Technical data ➔ Internet: sies

	Type of mounting	Electrical connection	Switching output	Cable length [m]	Part No.	Type
N/O contact						
	Insertable in the slot from above, flush with the cylinder profile	Cable, 3-wire	PNP	7.5	**551386**	**SIES-8M-PS-24V-K-7,5-OE**
		Plug M8x1, 3-pin		0.3	**551387**	**SIES-8M-PS-24V-K-0,3-M8D**
		Cable, 3-wire	NPN	7.5	**551396**	**SIES-8M-NS-24V-K-7,5-OE**
		Plug M8x1, 3-pin		0.3	**551397**	**SIES-8M-NS-24V-K-0,3-M8D**
N/C contact						
	Insertable in the slot from above, flush with the cylinder profile	Cable, 3-wire	PNP	7.5	**551391**	**SIES-8M-PO-24V-K-7,5-OE**
		Plug M8x1, 3-pin		0.3	**551392**	**SIES-8M-PO-24V-K-0,3-M8D**
		Cable, 3-wire	NPN	7.5	**551401**	**SIES-8M-NO-24V-K-7,5-OE**
		Plug M8x1, 3-pin		0.3	**551402**	**SIES-8M-NO-24V-K-0,3-M8D**