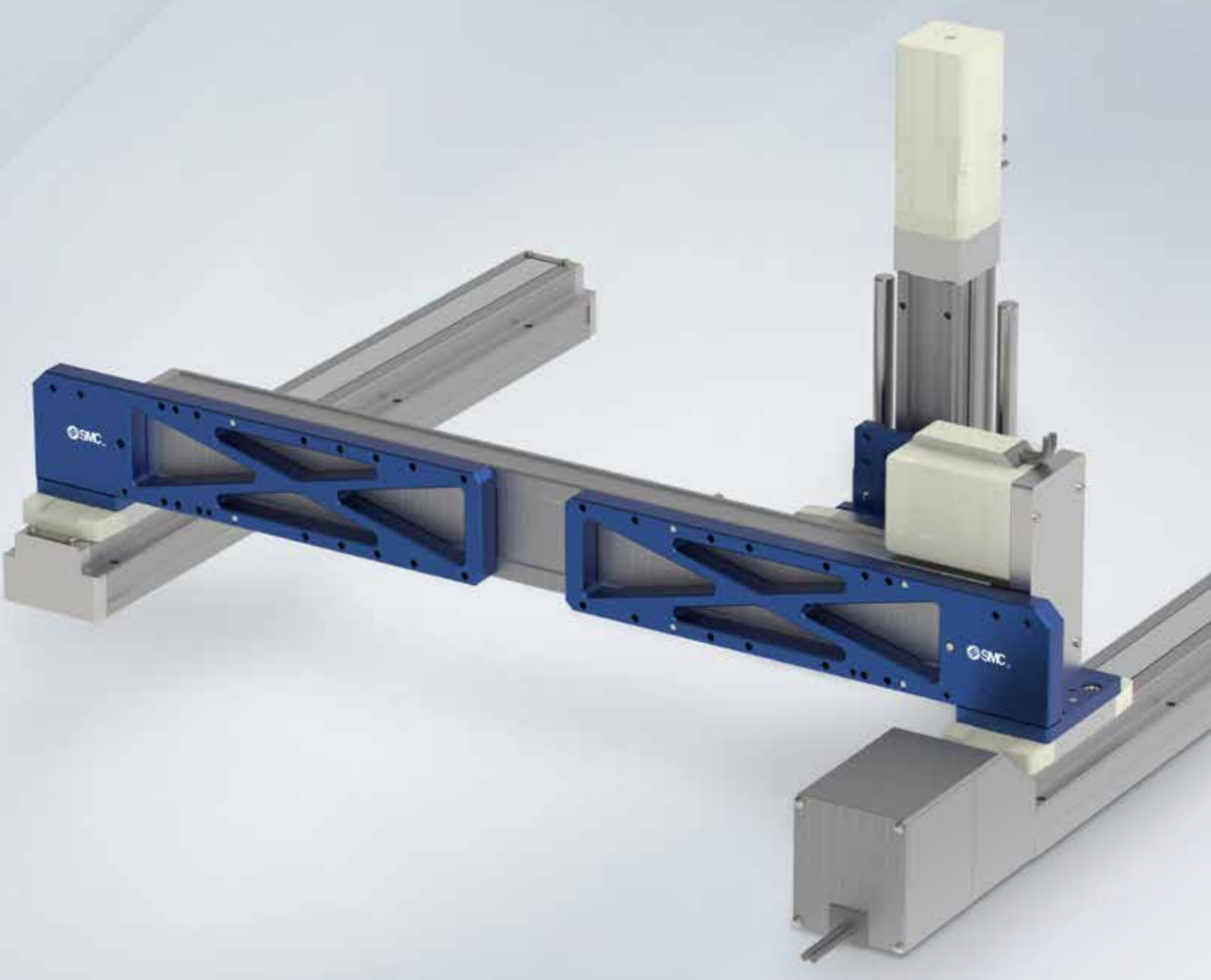
SMC®

Expertise – Passion – Automation



Individual Solutions from a Single Source

SMC multi axis gantries

SMC multi axis gantries

Partner for your special application

As a strong partner for machine and system manufacturers, SMC always focuses on providing the best customer solution. We support you by providing the highest level of expertise and help you continually optimise your processes.

Our latest development: A gantry construction set featuring electric actuators and standardised connection elements from SMC designed for your special applications. We use it to develop an individual gantry solution together with you, which you then install on site.
Maximum efficiency and flexibility
Together, we want to meet your branch's demands for faster and faster production switches and the highest level of productivity. SMC's gantry module makes it possible: Instead of concentrating on your construction process, you can now focus exclusively on
your gantry solution project.
That saves time and money.

Everything from a single source
The construction kit principle guarantees a high level of flexibility. That is because modular components make it easy to implement
subsequent changes as well. Additionally, we guarantee you will be able to install the standard components easily. If customersdesire, we can also map the entire application up to grippers and vacuum pads.

Advantages of SMC actuators:
- Compact design saves valuable installation space
- Electric system provides the highest level of repeat accuracy
- Based on 24 VDC stepper motor technology with rotary encoders for current position recognition
- Pre-configured motor controller for very short commissioning times
- Motor controller can be integrated into all common PLC communication protocols: EtherNet/IP, EtherCAT, PROFINET, DeviceNet and now also with
IO-Link protocol

"Individual solutions for more flexibility – with premium products from SMC.

Our goal: Set standards for pioneering production optimisation."

Our service –
your individual gantry solution

Please contact us;
our application engineers would be happy to arrange an appointment with you.

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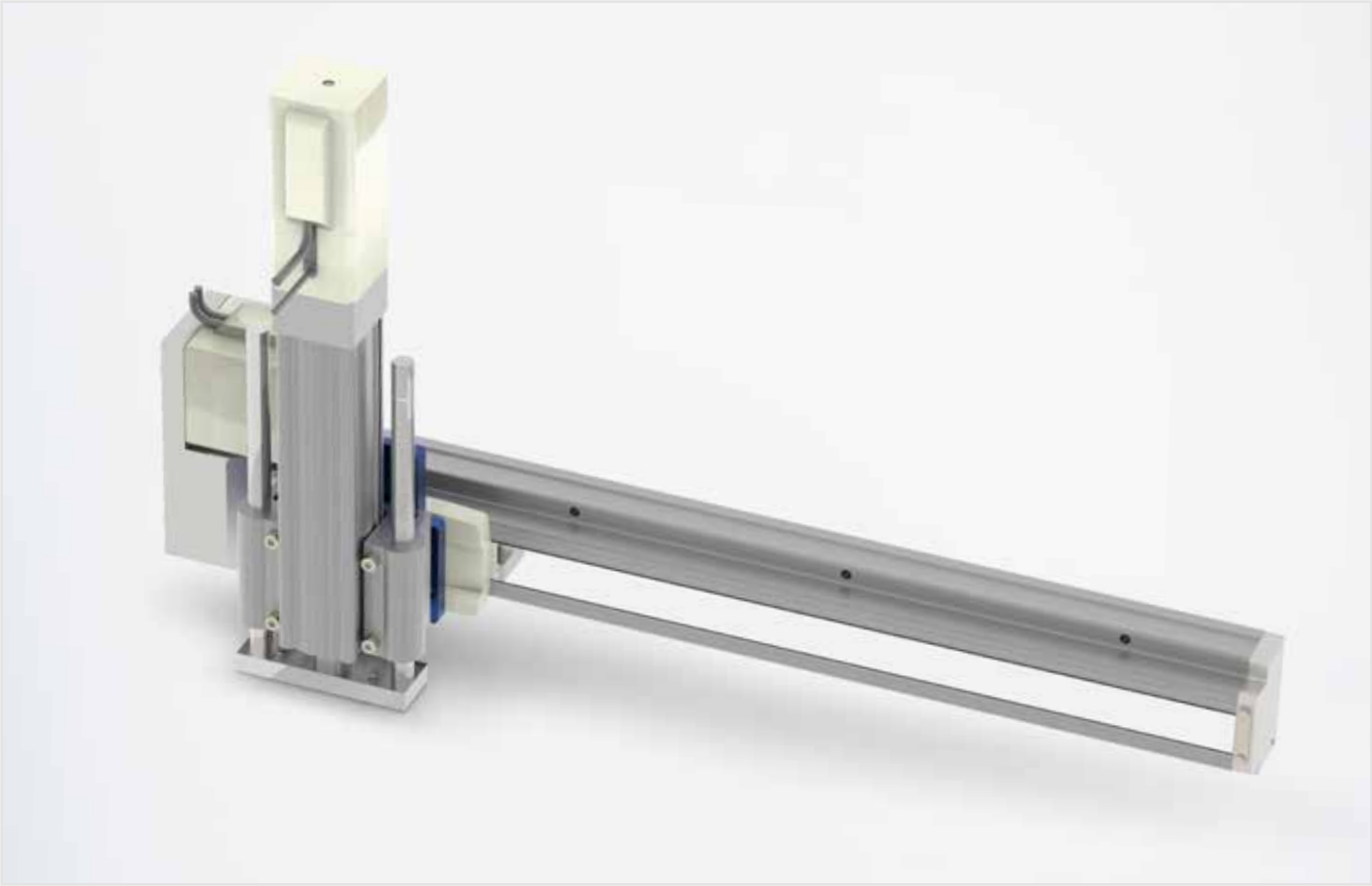
Disclaimer:

- Customers bear responsibility if they design a gantry on their own. We recommend designing gantries together with one of our application engineers.
- This catalogue does not replace the specific information on the intended use or safety information of the individual standard components. In the following, please note the references to the catalogues of the relevant standard components.
- Technical changes reserved.

Performance range
of the SMC multi axis gantries

Comprehensive overview

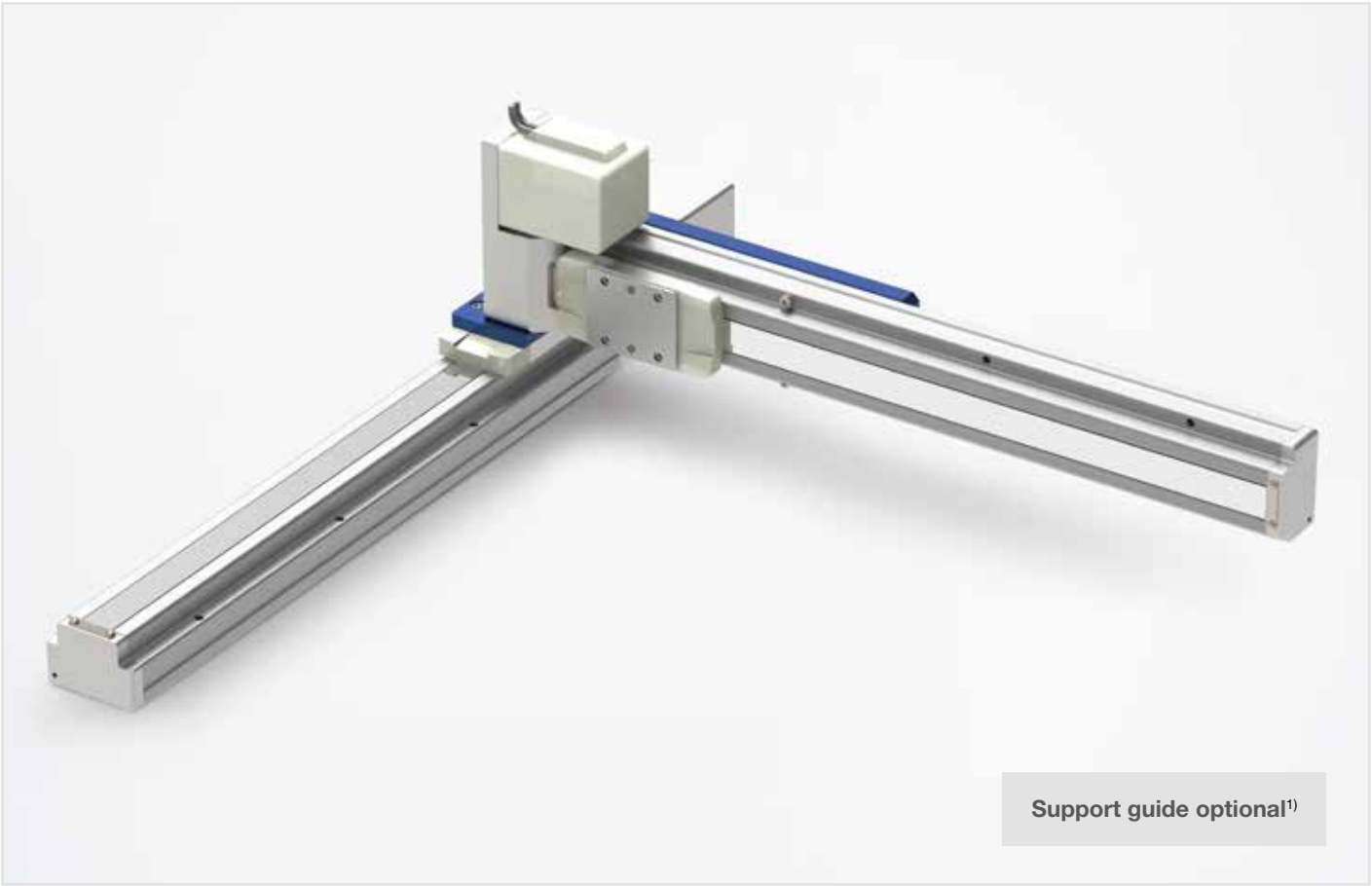
Line gantries (Y-Z)



Application examples

			Example 1	Example 2
Actuators	Y-axis	Type	LEF16	LEF40
		Stroke [mm]	500	1000
	Z-axis	Type	LEYG16	LEYG16
		Stroke [mm]	100	200
Performance	Y-axis speed	[mm/s]	700	1000
	Y-axis acceleration / deceleration	[mm/s^2]	3000	3000
	Max. workload on the Z-axis	[kg]	0.6	3

Area gantries (X-Y)

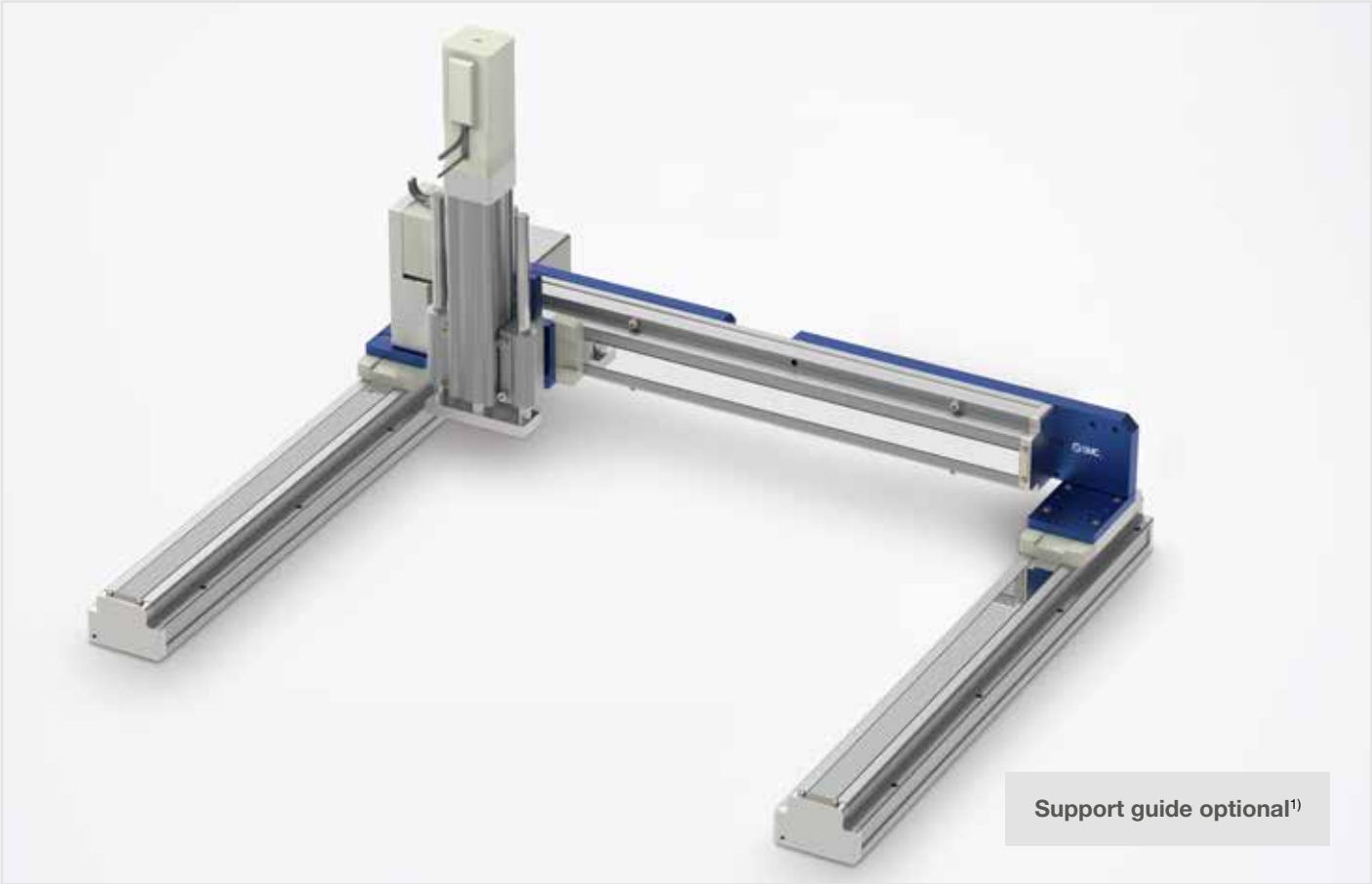


Application examples

			Example 3	Example 4		
				Without support guide	With support guide	Driven support guide[2)]
Actuators	X-axis	Type	LEF25	LEF40		
		Stroke [mm]	800	1000	1000	
	Y-axis	Type	LEF16	LEF32		
		Stroke [mm]	500	500	800	
Performance	Speed X- or Y-axis	[mm/s]	700			
	X- or Y-axis acceleration / deceleration	[mm/s^2]	3000			
	Max. workload on the Y-axis	[kg]	1.5	5	4	10

1) Depending on the application, support guide may be necessary
2) Depending on the controller type chosen

Three-dimensional gantries (X-Y-Z)



Application examples

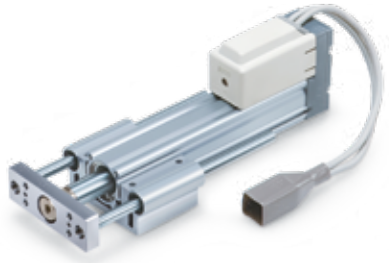
			Example 5	Example 6		
				Without support guide	With support guide	Driven support guide2)
Actuators	X-axis	Type	LEF32	LEF40		
		Stroke [mm]	800	1000	1000	
	Y-axis	Type	LEF25	LEF32		
		Stroke [mm]	500	400	800	
	Z-axis	Type	LEYG16	LEYG25		
		Stroke [mm]	100	200	300	
Performance	Speed X- or Y-axis	[mm/s]	700	600		
	X- or Y-axis acceleration / deceleration	[mm/s^2]	3000			
	Max. workload on the Z-axis	[kg]	1.5	4	3	8

1) Depending on the application, support guide may be necessary
2) Depending on the controller type chosen

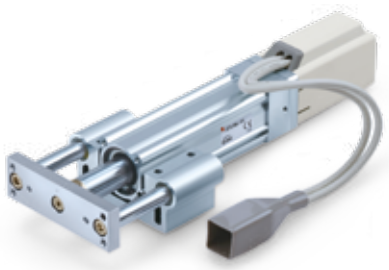
Selecting axes
for handling portals

Actuators from the series
LEYG, LEFS and LEFB

Series LEYG



Parallel motor mounting



In-line motor mounting

Motor	Series	Stroke [mm]	Pushing Force [N]	Workload [kg] Vertical	Speed [mm/s]	Positioning repeatability [mm]
Stepper motor (with encoder / 24 VDC)	**LEYG16**	30 to 200	14 to 38	1.5	15 to 500	± 0.02
			27 to 74	3.5	8 to 250	
			51 to 141	7.5	4 to 125	
	LEYG25	30 to 300	63 to 122	7	18 to 500	
			126 to 238	15	9 to 250	
			232 to 452	29	5 to 125	

Possible size combinations

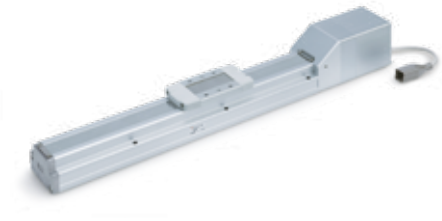
Y-Z combination (line)		Z-axis	
		LEYG16	LEYG25
Y-axis	LEF16	X	
	LEF25	X	X
	LEF32	X	X
	LEF40	X	X

1) For H gantries as well

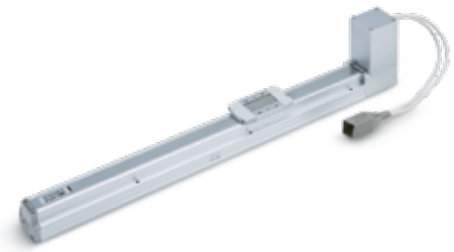
X-Y[1] Combination (surface)		Y-axis			
		LEF16	LEF25	LEF32	LEF40
X-axis	LEF16	X			
	LEF25	X	X		
	LEF32	X	X	X	
	LEF40		X	X	X

You can find information on proper usage and additional information in the complete catalogue for the series concerned on our website www.smc.de.

Series LEF



LEFS
Ball Screw Drive



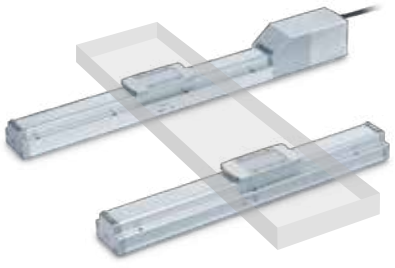
LEFB
Belt Drive

Actuator type	Motor	Series	Stroke [mm]	Workload [kg] Horizontal	Speed [mm/s][1)]	Positioning repeatability [mm]
Ball Screw Drive	Stepper motor (with encoder/ 24 VDC)	**LEFS16**	50 to 500	14	10 to 700	± 0.02
				15	5 to 360	
		LEFS25	50 to 800	12	20 to 1100	± 0.02
				25	12 to 750	± 0.02
				30	6 to 400	
		LEFS32	50 to 1000	20	24 to 1200	± 0.02
				45	16 to 800	± 0.02
				50	8 to 520	
		LEFS40	150 to 1200	25	30 to 1200	± 0.02
				55	20 to 1000	± 0.02
				65	10 to 300	
Belt Drive	Stepper motor (with encoder/ 24 VDC)	**LEFB16**	300 to 1000	1	48 to 1100	± 0.08
		LEFB25	300 to 2000	10	48 to 1400	
		LEFB32		19	48 to 1500	

1) The maximum value depends on the stroke range

Series LEFG

Design	Series	Stroke [mm]
Ball Screw Drive	**LEFG16-S**	50 to 500
	LEFG25-S	50 to 800
	LEFG32-S	50 to 1000
	LEFG40-S	150 to 1200
Belt Drive	**LEFG16-BT**	300 to 1000
	LEFG25-BT	300 to 2000
	LEFG32-BT	



LEFG
Support guide

Standard connection elements
Complete connection kits

Simply order the proper connection kit for your SMC multi axis gantry for the actuators you have selected. The scope of delivery of the connection kits contains the required connection elements and all required cylinder pins and screws, as well as installation instructions.

Connection kit type codes for SMC multi axis gantries

Depending on the gantry type, specify only the parts of the type code required.

Line gantry (parts Y + Z)

Area gantry (parts X + Y)

Three-dimensional gantry (parts X + Y + Z)

	Part X			Part Y			Part Z					
EA	-	LEF	X	16	-	LEF	Y	16	-	LEYG	Z	16	-	H	1

Size
16
25
32
40

Size
16
25
32
40

Size
16
25[4]

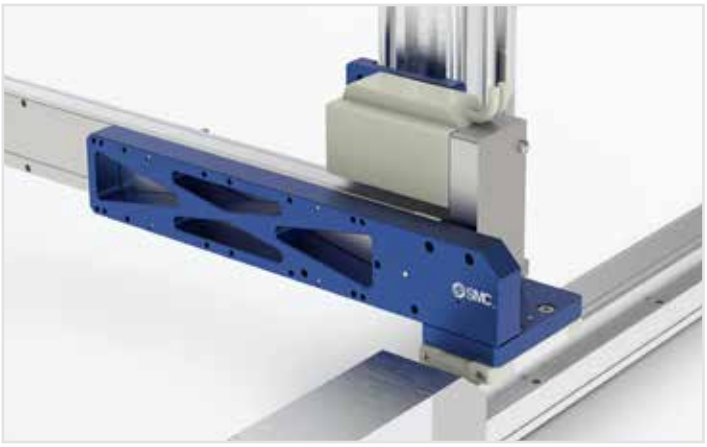
Guide[1]	
–	None
H	Support guide

Attaching parts	
–	None
1	Drag chain fastening[2] [3]

1) Guide possible only for area and three-dimensional gantries
2) Scope of delivery: Connection elements for actuator chains from the company IGUS GmbH (see page 13) for all axes
3) Line gantries (part Y+ Z) cannot be designed with drag chain fastening
4) Connection kit for LEYG25 stroke <40 mm upon request

Sample order for the connection kit for an area gantry with fastening elements for drag chains:

EA - LEFX25 - LEFY16 - 1



Overview of standard connection elements

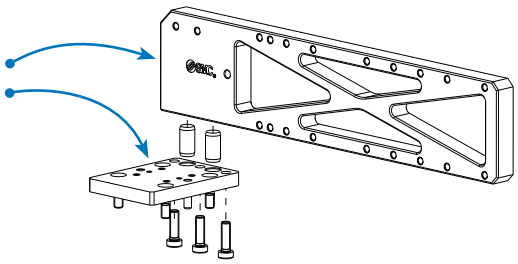
If you want to order the standard connection elements individually, you can find the ordering codes for the actuator combinations in question here.

The scope of delivery of the connection elements contains the required cylinder pins and screws as well as installation instructions.

X-Y combination[1]		Y-axis			
		LEF16	LEF25	LEF32	LEF40
X-axis	LEF16	EA-LEF-X16 EA-LEF-Y16			
	LEF25	EA-LEF-X25 EA-LEF-Y16	EA-LEF-X25 EA-LEF-Y25		
	LEF32	EA-LEF-X32 EA-LEF-Y16	EA-LEF-X32 EA-LEF-Y25	EA-LEF-X32 EA-LEF-Y32	
	LEF40		EA-LEF-X40 EA-LEF-Y25	EA-LEF-X40 EA-LEF-Y32	EA-LEF-X40 EA-LEF-Y40

1) You need 2 of each of the connection elements listed for H-gantries

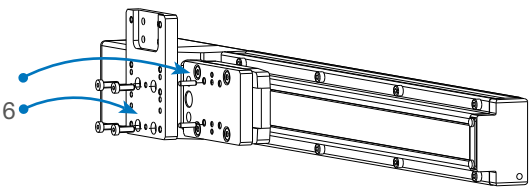
Example:
EA-LEF-Y25
EA-LEF-X32



Y-Z combination		Z-axis	
		LEYG16	LEYG25[1]
Y-axis	LEF16	EA-LEYG-Z16	
	LEF25	EA-LEF-X25 EA-LEYG-Z16	EA-LEF-X25 EA-LEYG-Z25
	LEF32	EA-LEF-X32 EA-LEYG-Z16	EA-LEF-X32 EA-LEYG-Z25
	LEF40	EA-LEF-X40 EA-LEYG-Z16	EA-LEF-X40 EA-LEYG-Z25

1) Connection element for Z-axis LEYG25 series with stroke <40 mm upon request

Example:
EA-LEF-X25
EA-LEYG-Z16



Controller
for SMC actuators

Stepper motor controller – Series JXC91/E1/P1/D1/L1

JXC91
EtherNet/IP

JXCE1
EtherCAT

JXCP1
PROFINET

JXCD1
DeviceNet

JXCL1
IO-Link

- **Compatible with the actuator series: LEF, LEY/LEYG, LES, LEP, LER, LEH, LEL, LEM**
- **Direct communication with the control and transfer of numerical data due to communication with a high transfer rate (10/100 Mbps)**
- **Dual-port connection (IN and OUT) makes it possible to construct linear and DLR topologies:**
  - Less cabling
  - Redundant communication in DLR
  - Easy to identify the splitting point
- **Parametrisation using software or teaching box**

Three-axis/four-axis stepper motor controller – Series JXC73/83/92/93

JXC73/83
Parallel I/O design

JXC92
EtherNet/IP

JXC93
EtherNet/IP

- **Compatible with the actuator series: LEF, LEY/LEYG, LES, LEP, LER, LEH**
- **Step data entry with max. 2048 positions:**
  - Coordinate instructions for absolute/relative position
  - Positioning/thrust operation
- **Linear and circular interpolation**
- **3-axis/4-axis synchronous control**
- **Parametrisation via software**

You can find information on proper usage and additional information in the complete catalogue for the series concerned on our website www.smc.de.

Drag chain design assistance

Below you will find general calculation formulas and information for designing suitable drag chains[1] for your SMC multi axis gantry.

$$\text{Number of parts } G^{2)} = \frac{(\text{Stroke}/2 + K + dM)}{\text{Partition}}$$

SMC			IGUS E4.21			
Size	Travel	dM (Fixed point offset)	K	Partition	recommended inner widths Bi	Bending radius of the chain
LEFS16	Stroke	$\frac{(\text{Stroke} + 80)}{2} - 131$	225	30.5	030	48
LEFS25		$\frac{(\text{Stroke} + 110)}{2} - 116$	225		030	
LEFS32		$\frac{(\text{Stroke} + 130)}{2} - 154$	233		040	
LEFS40		$\frac{(\text{Stroke} + 178)}{2} - 170$	225		040	
LEFB16		$\frac{(\text{Stroke} + 135)}{2} - 120$	225		030	
LEFB25		$\frac{(\text{Stroke} + 167)}{2} - 116$	225		030	
LEFB32		$\frac{(\text{Stroke} + 189)}{2} - 154$	233		040	

For drag chains from IGUS GmbH from the series E4.21, we offer standard mounting brakets[3] for the SMC multi axis gantries.

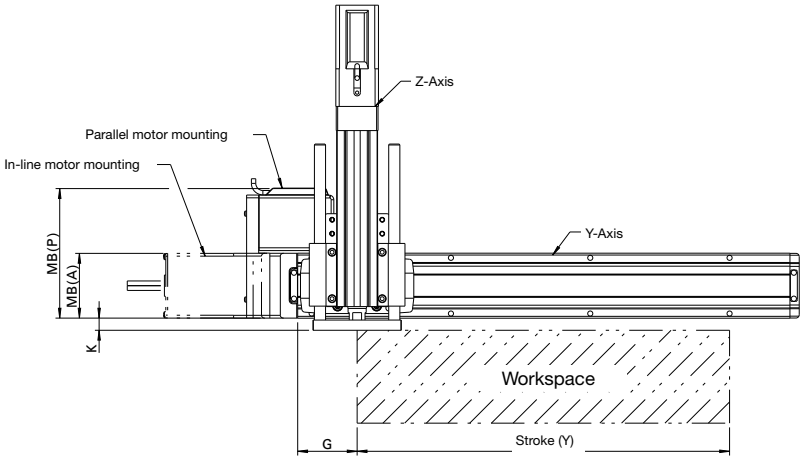
Designation	Size	Ordering code
X-axis carrier mounting braket	16, 25, 32, 40	EA-EC-X-M1
X-axis fixed-point mounting braket	Must be constructed in an application-specific manner	
Y-axis carrier mounting braket	16, 25	EA-EC-Y-M1
	32, 40	EA-EC-Y-M2
Y-axis fixed-point mounting braket	16, 25	EA-EC-Y-F1
	32, 40	EA-EC-Y-F2

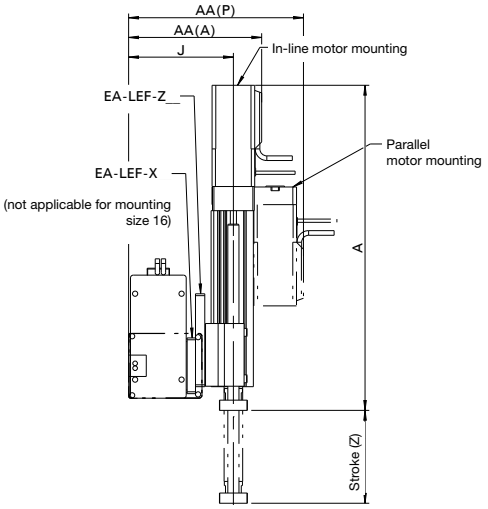
You can order the mounting brakets for mounting drag chains from IGUS GmbH individually or in complete connection kits (page 10).

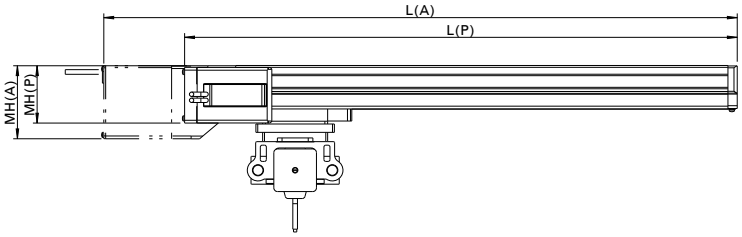
1) SMC's scope of delivery does not include drag chains
2) Value must be rounded up to the next odd number, e.g.: 13.2 --> 15 parts
3) The scope of delivery includes both the required screws and installation instructions

You can find information on proper usage and additional information on the series E4.21 drag chains on IGUS GmbH's website www.igus.de.

Dimensions
Line gantries (Y-Z)







- The evenness of the installation surface may deviate a maximum of 0.1 mm.
- The drawing shows the motors with covers.
- The designations (A) and (P) stand for axial or parallel motor design, respectively.
- The designations (X), (Y) and (Z) indicate the referenced axis.
- You can find the connection sizes of the individual actuators and additional information in the complete catalogue for the series concerned on our website www.smc.eu.

Line gantry (Y-Z) combined values

Y-axis	Z-axis	AA (A)		AA (P)		J
		Standard	Cover	Standard	Cover	
16	16	100.5	108	132.5	140	83
	25	112.5	120	158	165.5	90
25	16	108.5	116	140.5	148	91
	25	120.5	128	166	17 3.5	98
32	16	120.5 (123.5)	128 (131)	152.5 (155.5)	160 (163)	103 (106)
	25	132.5 (135.5)	140 (143)	178 (181)	185.5 (188.5)	110 (113)
40	16	128.5	136	160.5	168	111
	25	140.5	148	186	193.5	118

Values in parentheses indicate parallel motor design

Measurement tables for the individual axes

X- or Y-axis

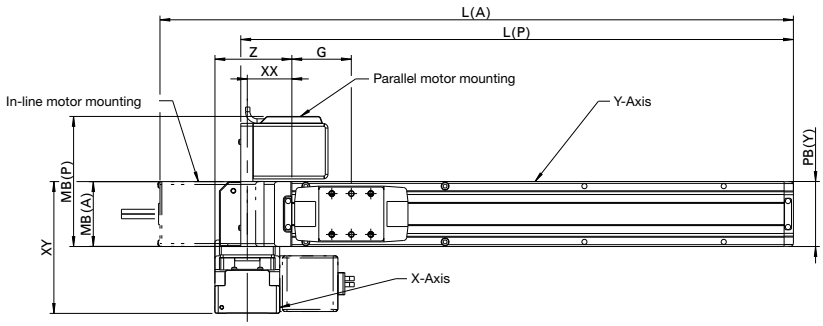
Actuator	B	G	PB	In-line motor mounting				Parallel motor mounting		
				L		MH	MB	L	MH	MB
				Without brake	With brake					
LEFS16	Stroke + 80	39	40	Stroke + 197	Stroke + 239	46	40	Stroke + 116.5	40	77.5
LEFS25	Stroke + 110	54	58	Stroke + 235.5	Stroke + 280.5	57.5	58	Stroke + 160.5	48	106
LEFS32	Stroke + 130	64	70	Stroke + 282	Stroke + 334	79	70	Stroke + 195	63	132.5
LEFS40	Stroke + 178	88	90	Stroke + 356	Stroke + 405	68	90	Stroke + 253.4	64	153
LEFB16	Stroke + 135	39	40	Stroke + 195.5	Not applicable	94.7 [142.2]	40	Not applicable		
LEFB25	Stroke + 167	54	58	Stroke + 241.8		115.8 [158.8]	58			
LEFB32	Stroke + 189	64	70	Stroke + 285.6		140.3 [185.4]	70			

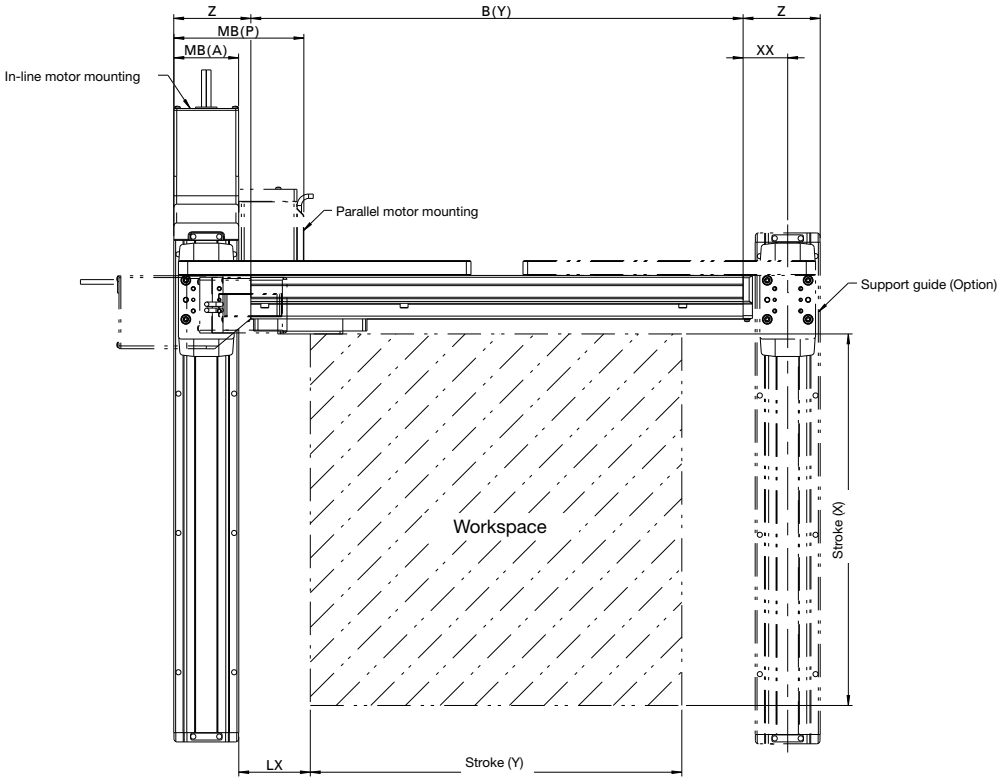
Values in [ ] correspond to the brake with LEFB

Z-axis

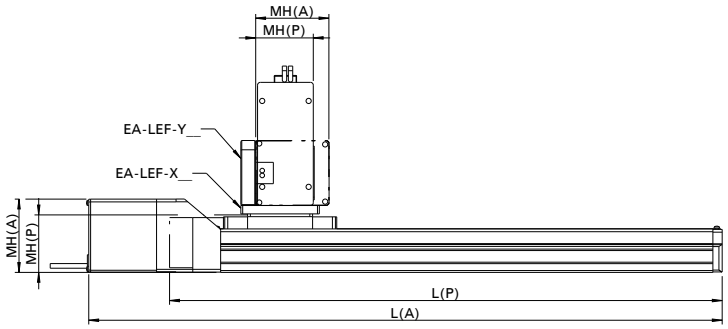
Actuator	Stroke	In-line motor mounting				Parallel motor mounting
		A				A
		Standard	Cover	Brake	Cover and brake	
LEYG16	Up to 100	174.3	177	207.8	210.5	109
	101 - 200	194.3	197	227.8	231.5	129
LEYG25	Up to 100	206.4	209.5	246.9	239	141.5
	101 - 300	231.4	234.5	271.9	264	166.5

Dimensions
Area gantry (X-Y)





- The evenness of the installation surface may deviate a maximum of 0.1 mm.
- The drawing shows the motors with covers.
- The designations (A) and (P) stand for axial or parallel motor design, respectively.
- The designations (X), (Y) and (Z) indicate the referenced axis.
- You can find the connection sizes of the individual actuators and additional information in the complete catalogue for the series concerned on our website www.smc.eu.



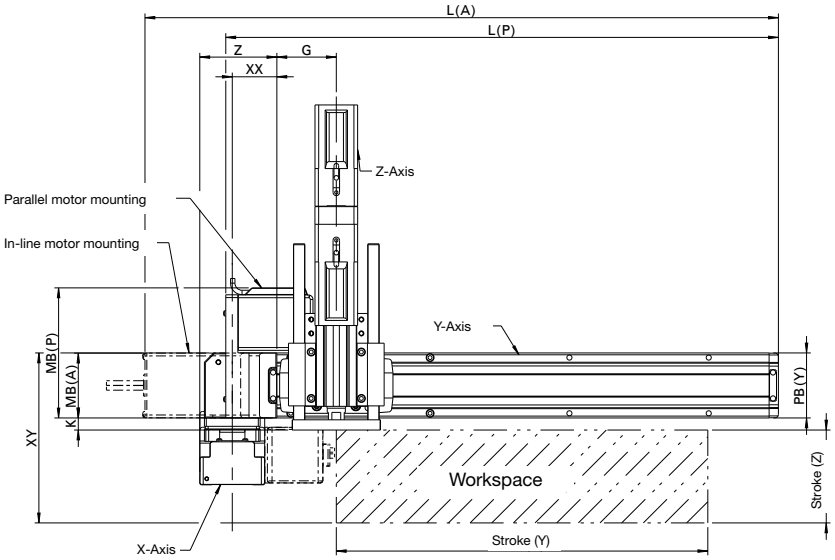
View left side

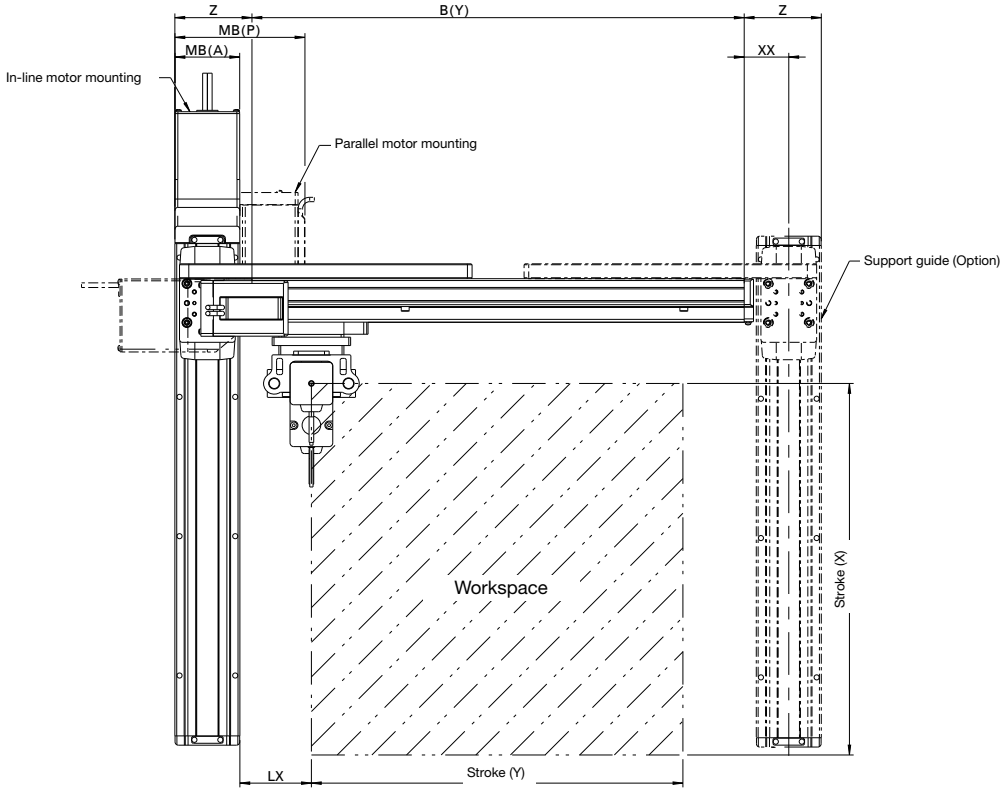
Area gantry (X-Y) combined values

X-axis	Y-axis	Z	XX	XY	LX
16	16	55	35	89	54
	25	70	50	107	84
	32	80	60	119	104
	40	82	62	139	130
25	16	64	35	97	45
	25	79	50	115	75
	32	89	60	127	95
	40	91	62	147	121
32	16	82	47	109 (112)	51
	25	73	38	127 (130)	57
	32	83	48	139 (142)	77
	40	85	50	159 (162)	103
40	16	92	47	117	41
	25	107	62	135	71
	32	93	48	147	67
	40	95	50	167	93

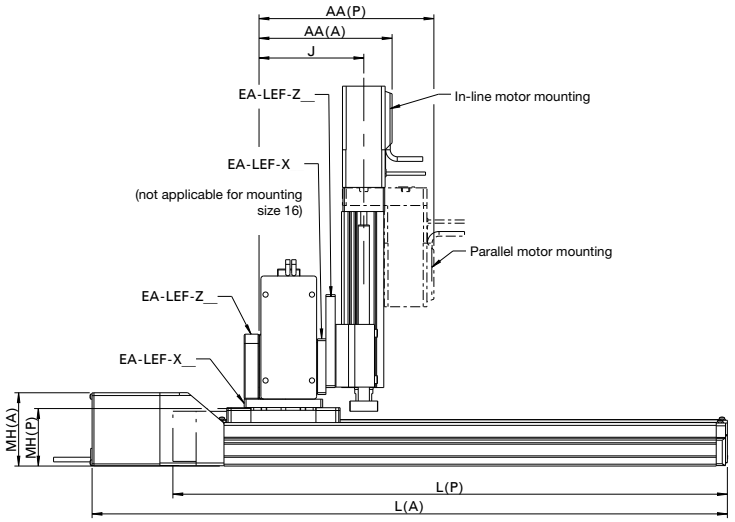
Values in parentheses indicate parallel motor mounting

Dimensions
Three-dimensional gantries (X-Y-Z)





- The evenness of the installation surface may deviate a maximum of 0.1 mm.
- The drawing shows the motors with covers.
- The designations (A) and (P) stand for axial or parallel motor design, respectively.
- The designations (X), (Y) and (Z) indicate the referenced axis.
- You can find the connection sizes of the individual actuators and additional information in the complete catalogue for the series concerned on our website www.smc.eu.



Three-dimensional gantry (X-Y-Z) combined values

X-axis	Y-axis	Z-axis	Z	XX	XY	LX	AA (A)		AA (P)		J
							Standard	Cover	Standard	Cover	
16	16	16	55	35	89	54	100.5	108	132.5	140	83
		25					112.5	120	158	165.5	90
	25	16	70	50	107	84	108.5	116	140.5	148	91
		25					120.5	128	166	173.5	98
	32	16	80	60	119	104	120.5 (123.5)	128 (131)	152.5 (155.5)	160 (163)	103 (106)
		25					132.5 (135.5)	140 (143)	178 (181)	185.5 (188.5)	110 (113)
	40	16	82	62	139	130	128.5	136	160.5	168	111
		25					140.5	148	186	193.5	118
25	16	16	64	35	97	45	100.5	108	132.5	140	83
		25					112.5	120	158	165.5	90
	25	16	79	50	115	75	108.5	116	140.5	148	91
		25					120.5	128	166	173.5	98
	32	16	89	60	127	95	120.5 (123.5)	128 (131)	152.5 (155.5)	160 (163)	103 (106)
		25					132.5 (135.5)	140 (143)	178 (181)	185.5 (188.5)	110 (113)
	40	16	91	62	147	121	128.5	136	160.5	168	111
		25					140.5	148	186	193.5	118
32	16	16	82	47	109 (112)	51	100.5	108	132.5	140	83
		25					112.5	120	158	165.5	90
	25	16	73	38	127 (130)	57	108.5	116	140.5	148	91
		25					120.5	128	166	173.5	98
	32	16	83	48	139 (142)	77	120.5 (123.5)	128 (131)	152.5 (155.5)	160 (163)	103 (106)
		25					132.5 (135.5)	140 (143)	178 (181)	185.5 (188.5)	110 (113)
	40	16	85	50	159 (162)	103	128.5	136	160.5	168	111
		25					140.5	148	186	193.5	118
40	16	16	92	47	117	41	100.5	108	132.5	140	83
		25					112.5	120	158	165.5	90
	25	16	107	62	135	71	108.5	116	140.5	148	91
		25					120.5	128	166	173.5	98
	32	16	93	48	147	67	120.5 (123.5)	128 (131)	152.5 (155.5)	160 (163)	103 (106)
		25					132.5 (135.5)	140 (143)	178 (181)	185.5 (188.5)	110 (113)
	40	16	95	50	167	93	128.5	136	160.5	168	111
		25					140.5	148	186	193.5	118

Values in parentheses indicate parallel motor mounting

Specification for
the SMC multi axis gantry:

Check list

Axis systems

- ☐ Y-Z line gantry
- ☐ X-Y area gantry
- ☐ X-Y-Z three-dimensional gantry
- ☐ X-Y-Z with support guide
- ☐ X-Y with support guide

Accessories

Cable length from the X-axis in m:

- ☐ 1.5
- ☐ 3.0
- ☐ 5.0
- ☐ 8.0
- ☐ 10
- ☐ 15
- ☐ 20

Holding brake:

- ☐ None
- ☐ Vertical axis
- ☐ Horizontal and vertical axis

Add-on modules[1)]

Gripper (G):

- ☐ Electric gripper
- ☐ Pneumatic gripper

Rotation module (R):

- ☐ Electric rotation module
- ☐ Pneumatic rotation module
- ☐ Other: .....

1) Connection elements for add-on modules upon request

Electric connection controller

- ☐ PROFINET
- ☐ EtherCAT
- ☐ EtherNet/IP
- ☐ IO-Link
- ☐ None
- ☐ digital I/O's
- ☐ 4-axle controller
- ☐ 3-axle controller

Information on the load/dynamics

Stroke lengths:

X-axis stroke: ..... mm

Y-axis stroke: ..... mm

Z-axis stroke: ..... mm

Gripper stroke: ..... mm

Rotation angle: ..... Degree

Shortest time for travel distances:

Travel time X: ..... ms

Travel time Y: ..... ms

Travel time Z: ..... ms

Travel time G: ..... ms

Rotation R: ..... ms

Payload:

Weight: ..... kg

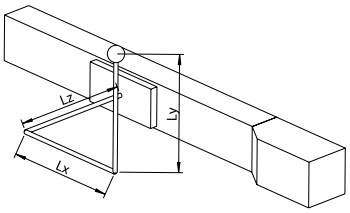
Coordinates of the centre of mass at the connection axis

Without Z-axis:

Lx: ..... mm

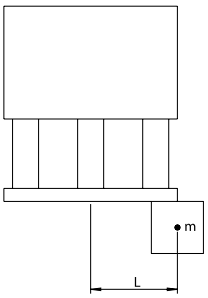
Ly: ..... mm

Lz: ..... mm



With Z-axis:

L: ..... mm



Comments/sketch

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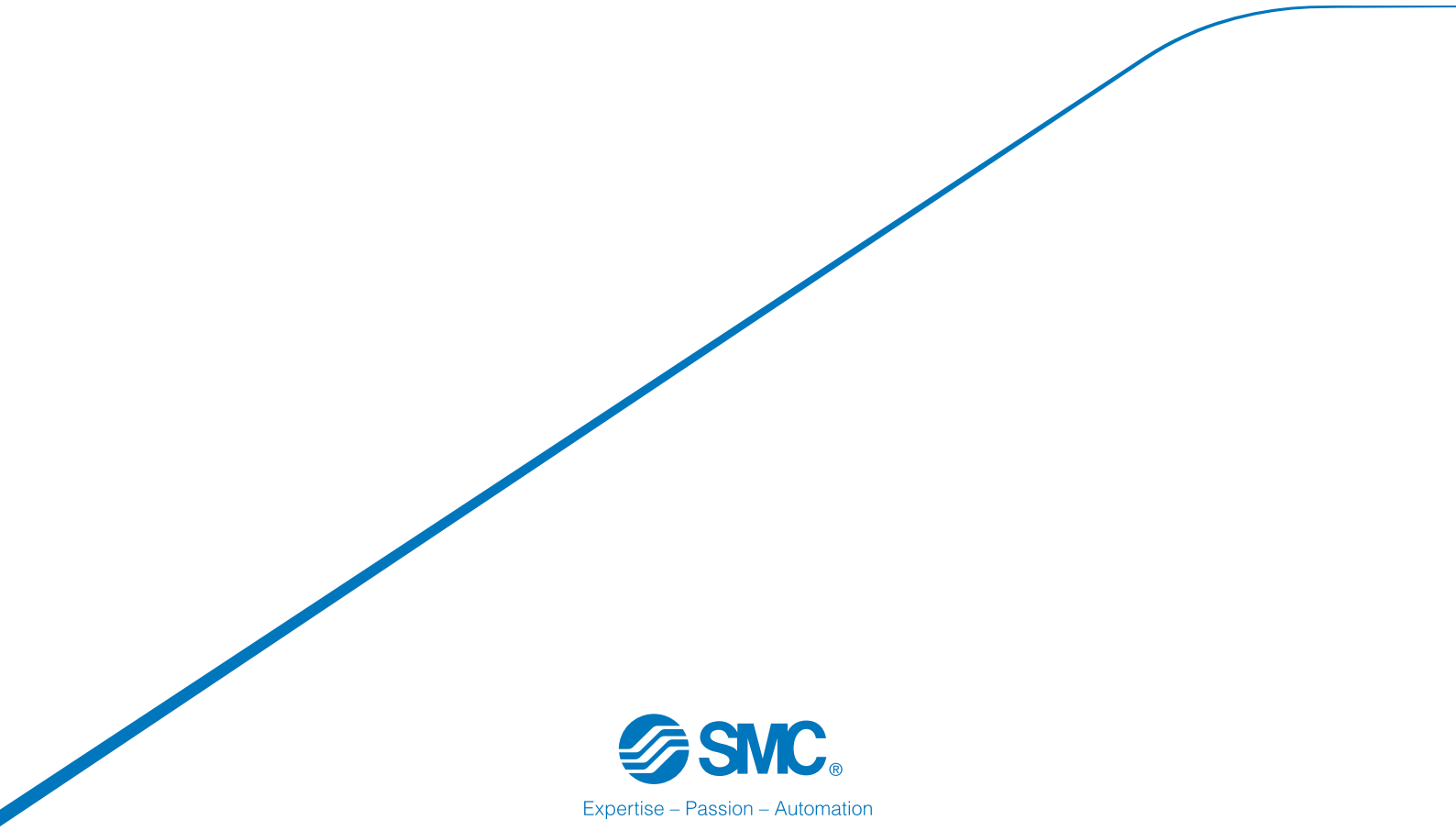

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