FESTO



Key features

At a glance

ELGD-TB (standard design)

• Profile with a square cross section and sturdy drive elements for high feed forces

ELGD-TB-WD (wide design)

- Reduced profile height offers smaller installation dimensions for handling systems and applications that do not require such high feed forces
- 30% lighter, while rigidity and guide load capacity are still similar to the axis in standard design

Innovative guide technology

- Excellent rigidity and load capacity of the guide for higher loads in the same installation space
- Less vibration and smoother slide movement protect sensitive workpieces
- · High speeds ensure short cycle times and a very long service life minimises downtime

Powerful drive elements

- High feed forces and acceleration for shorter process times
- Long service life and increased reliability reduce TCO

Innovative stainless steel cover strip solution

- Abrasion-free and clean surface protects workpieces from particles
- Minimised number of particles for use in cleanrooms
- Reduced ingress of dirt for use in harsh ambient conditions

Options:

- Extended or additional slide for higher axial and lateral torques and higher loads
- Two freely selectable motor positions at one end of the axis

Sealing air connection:

- Air is exchanged between the interior of the cylinder and the environment via the sealing air connection. This prevents negative pressure or excess pressure from building up inside the cylinder.
- Application of slight negative pressure prevents the emission of particles
- Application of slight excess pressure prevents the ingress of particles

Engineering tools

More information → electric-motion-sizing



Save time with smart engineering tools for the optimal solution. Our goal is to increase your productivity. Our engineering tools play an integral part in this. They help you size your system correctly, tap into unimagined productivity reserves and generate additional productivity along the entire value chain. In every phase of your project, from the initial contact to the modernisation of your machine, you will come across a number of different tools which will be of use to you.

Electric Motion Sizing

• Create the optimum drive package quickly and reliably. Electric Motion Sizing calculates suitable combinations of electric axis, electric motor and servo drive using just a few application details. It provides all the relevant data including the bill of materials and documentation for your selected combination. This avoids design errors and results in significantly improved energy efficiency for the system. A seamless connection to the Festo Automation Suite also makes commissioning easier for you.

Icons More information → elgd-tb



The icons shown in this document are also available online. There, precise values can be displayed.

Key features

Drive system

[TB] Toothed belt

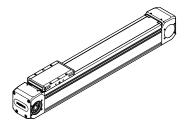
- For applications requiring a high dynamic response and short positioning times
- For long strokes

Stroke reserve

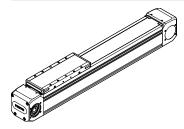
- The stroke reserve is a safety distance from the mechanical end position and is not used in normal operation.
- The sum of the stroke length and 2x stroke reserve must not exceed the maximum working stroke.

Slide design

[] Standard

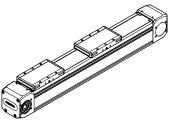


[L] Long

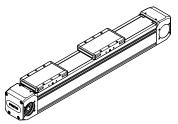


Additional slide

[ZL] Lef



[ZR] Right



The additional slide is always a standard slide

Lubrication

[] Standard

With lifetime lubrication. Lubrication nipple not included in delivery.

[GN] Lubrication nipple

- The lubrication adapters enable the guide to be permanently lubricated using semi- or fully automatic relubrication devices
- The adapters are suitable for oils and greases

Toothed belt material

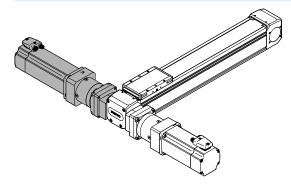
[PU2] Coated PU

- With steel reinforcements for high rigidity
- Fabric coating for a long service life and low abrasion
- Polyurethane material for resistance to many cooling lubricants

[PU1] Uncoated PU, FDA-compliant

- With steel reinforcements for high rigidity
- Blue, FDA-compliant polyurethane for use in the food industry

Motor attachment



- The motor can be attached to the left end of the axis at the front or rear.
- The position of the motor does not have to be specified when ordering and can be changed later
- Note: Unlike other Festo axes, the motor for the ELGD can only be mounted on the left hand end of the axis, as this is the location of the drive pulley. However, the mechanical axis has a symmetrical design so that the axis can be rotated and the motor can be mounted in the required location.

Type codes

001	Series
ELGD	Gantry axis
002	Drive system
ТВ	Toothed belt
003	Guide
KF	Recirculating ball bearing guide
004	Size
60	60
80	80
005	Stroke [mm]
200	200
300	300
500	500
600	600
800	800
1000	1000
1200	1200
1500	1500
1800	1800
2000	2000
	50 2850

006	Stroke reserve
OH	None
Н	0 999 mm
007	Slide design
	Standard
L	Slide, long
008	Additional slide
	None
ZL	1 slide left
ZR	1 slide right
009	Lubrication
	Standard
GN	Lubrication nipple
010	Material of toothed belt
PU1	Uncoated PU, FDA-compliant
PU2	Coated PU

General technical data						
Size		60		80		
Slide design			L		L	
Design		Electromechanical axi	s with toothed belt			
Guide		Recirculating ball bea	ring guide			
Mounting position		Any				
Working stroke	[mm]	50 2850	50 2800	50 2850	50 2750	
Max. feed force F _x [N]		350		800	800	
Max. no-load torque ¹⁾				·		
ELGDPU1	[Nm]	0.5		1		
ELGDPU2	[Nm]	0.5		1.2		
Max. no-load resistance to shifting ¹⁾	[N]	29.8		55.8		
Max. driving torque	[Nm]	5.5		17.2		
Max. speed	[m/s]	3				
Max. acceleration	[m/s ²]	50		•		
Repetition accuracy	[mm]	±0.04				
Position sensing		For inductive sensors				

1) At 0.2 m/s

Operating and environmental conditions				
Ambient temperature ¹⁾	[°C]	0 +60		
Storage temperature	[°C]	-20 +60		
Degree of protection		IP40		
Duty cycle	[%]	100		
Maintenance interval		Lifetime lubrication		

1) Note operating range of proximity switches

Weight [g]						
Size	60		80			
Slide design		L		L		
Basic weight with 0 mm stroke ¹⁾	2486	2909	4715	6030		
Additional weight per 10 mm stroke	49	49	79	79		
Additional weight per 10 min Stroke	72	7/	1 / /	' '		

1) Including slide

Toothed belt			
Size		60	80
Pitch	[mm]	3	5
Effective diameter	[mm]	31.51	42.97
Feed constant	[mm/rev]	99	135

Mass moments of inertia							
Size		60		80			
Slide design			L	L			
J ₀	[kg mm ²]	210.16	267.49	752.16	1056.47		
J _H per metre stroke	[kg mm ² /m]	31.28	31.28	112.63	112.63		
J _L per kg payload	[kg mm ² /kg]	248.22	248.22	461.61	431.61		

The mass moment of inertia J_A of the entire axis is calculated as follows:

 $J_A = J_0 + J_H x$ working stroke [m] + $J_L x$ m_{payload} [kg]

Homing

Homing can be carried out in two ways:

- Against a fixed stop
- Using a reference switch

The following values must be observed:

Size		60	80
Max. impact energy	[J]	0.125	0.25
Note on the impact energy in the end posi-	[m/s]	At maximum homing speed of 0.01 m/s	
tions			

Materials

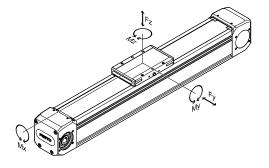
Axis	
Drive cover	Gravity die-cast aluminium, painted
Slide	Wrought aluminium alloy
Cover strip	High-alloy stainless steel
Toothed belt	
ELGDPU2	Polyurethane with steel cord and nylon cover
ELGDPU1	Polyurethane with steel cord
Guide	Steel
Profile	Anodised wrought aluminium alloy
Belt	High-alloy stainless steel
Note on materials	RoHS-compliant
LABS (PWIS) conformity	VDMA24364 zone III

Datasheet

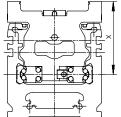
Load values

The indicated forces and torques refer to the centre of the guide. The point of application of force is the point where the centre of the guide and the longitudinal centre of the slide intersect. The appropriate size is selected using the following three steps:

- 1. Check the maximum permissible values (must not be exceeded)
- 2. Calculate the load comparison factor
- 3. Determine the service life



Distance from the slide surface to the centre of the guide



Distance from the slide surface to the centre of the guide					
Size		60	80		
Dimension x	[mm]	49	62		

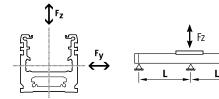
1. Check the maximum permissible values

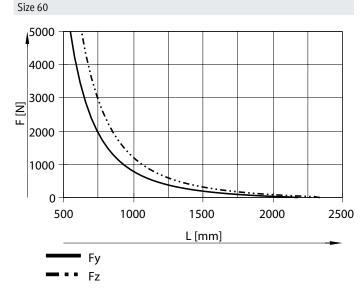
Max. permissible forces and torques for the overall axis (strength limits)							
Size		60		80			
Slide design			L		L		
Max. force Fy, overall axis	[N]	1513	3026	2291	4581		
Max. force Fz, overall axis	[N]	2200	3200	3500	5600		
Max. torque Mx, overall axis	[Nm]	38	75	109	200		
Max. torque My, overall axis	[Nm]	15	128	42	356		
Max. torque Mz, overall axis	[Nm]	15	133	42	294		

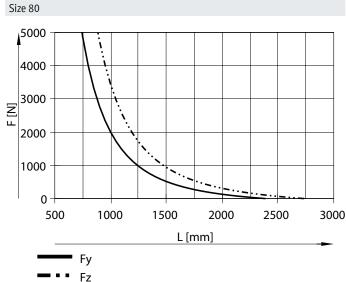
Maximum permissible support spacing L as a function of force F

In order to limit deflection in the case of large strokes, the axis may need to be supported.

The following graphs can be used to determine the maximum permissible support spacing L as a function of force F acting on the axis. The deflection is f = 0.5 mm.







2. Calculate the load comparison factor



- Note

For a guide system to have a service life of 5000 km, the load comparison factor must have a value of $fv \le 1$, based on the maximum permissible forces and torques for a service life of 5000 km.

This formula can be used to calculate a guide value.

The engineering software "Electric Motion Sizing" is available

for more precise calculations → www.festo.com/x/electric-motion-sizing

If the axis is subjected to two or more 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:

$$f_v = \frac{\left|F_{y1}\right|}{F_{y2}} + \frac{\left|F_{z1}\right|}{F_{z2}} + \frac{\left|M_{x1}\right|}{M_{x2}} + \frac{\left|M_{y1}\right|}{M_{y2}} + \frac{\left|M_{z1}\right|}{M_{z2}} \leq 1$$

 F_1/M_1 = values occurring in the application

 F_2 = Permissible values at 5000 km from the graph of support spacing over load

M₂ = maximum permissible values (see table)

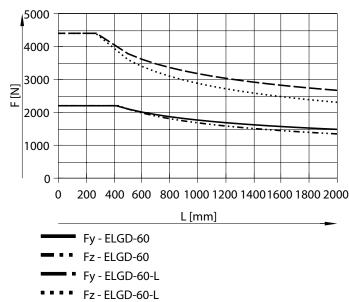
Max. permissible torques for the guide calculation with reference service life							
Size		60		80			
Slide design			L		L		
Reference service life	[km]	5000					
Max. torque Mx	[Nm]	38	75	106	200		
Max. torque My	[Nm]	15	150	42	390		
Max. torque Mz	[Nm]	15	140	42	390		

Max. permissible support spacing L as a function of the force F

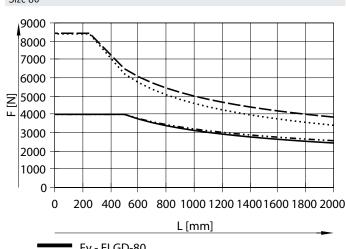
Depending on how firmly the axis is supported, the maximum permissible forces vary due to the design of the guide system.

If the axis is used as a cantilever or in yoke operation, the values for a support spacing of 2000 mm can be selected.





Size 80



Fy - ELGD-80
Fz - ELGD-80

• • • • Fz - ELGD-80-L

Datasheet

3. Determine the service life

The service life of the guide depends on the load. To be able to provide an indication of the service life of the guide, the graph below plots the load comparison factor fv against the service life.

These values are only theoretical. You must consult your local Festo contact for a load comparison factor fv greater than 1.3.

Load comparison factor f_v as a function of service life l

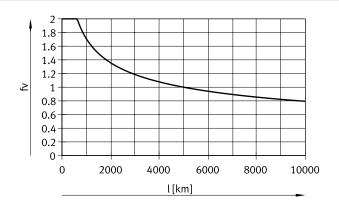
Example:

A user wants to move an x kg load. Using the formula (\rightarrow page 8) gives a value of 1.3 for the load comparison factor f_v . According to the graph, the guide would have a service life of approx. 2500 km. Reducing the acceleration reduces the Mz and My values. A load comparison factor f_v of 1 now gives a service life of 5000 km.

Note:

If the application has been calculated using "Electric Motion Sizing", the average guide comparison index represents the workload of the guide.

(100% average guide comparison index corresponds to fv = 1). With this value, the service life can be estimated using the service life graph



Comparison of the characteristic load values for 100 km with dynamic forces and torques of recirculating ball bearing guides

The characteristic load values of the bearing guides are standardised to ISO and JIS using dynamic and static forces and torques. These forces and torques are based on an expected service life of the guide system of 100 km to ISO or 50 km to IIS.

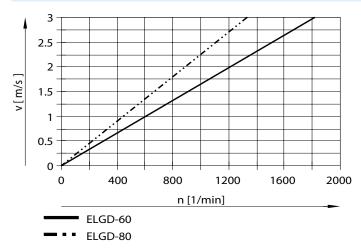
As the characteristic load values are dependent on the service life, the maximum permissible forces and torques for a 5000 km service life cannot be compared with the dynamic forces and torques of bearing guides to ISO/JIS.

To make it easier to compare the guide capacity of linear axes ELGD with bearing guides, the table below lists the theoretically permissible forces and torques for a calculated service life of 100 km. This corresponds to the dynamic forces and torques to ISO.

These 100 km values have been calculated mathematically and are only to be used for comparing with dynamic forces and torques to ISO. The drives must not be loaded with these characteristic values as this could damage the axes.

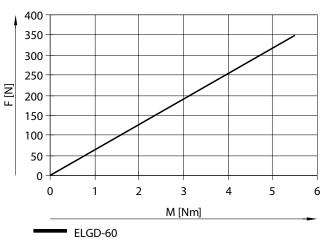
Max. permissible force	Max. permissible forces and torques for a theoretical service life of 100 km (from a guide perspective only)									
Size		60		80						
Slide design			L		L					
Fy _{max} .	[N]	9208	18415	17576	35153					
Fz _{max}	[N]	9208	18415	17576	35153					
Mx _{max} .	[Nm]	157	314	422	844					
My _{max.}	[Nm]	60	500	162	1356					
Mz _{max} .	[Nm]	60	500	162	1356					

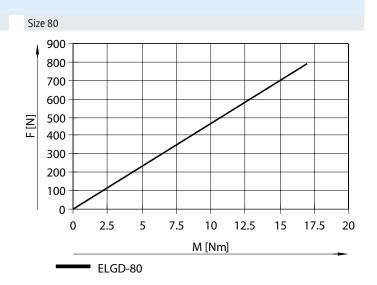
Speed v as a function of rotational speed n



Feed force F as a function of input torque M







2nd moment of area



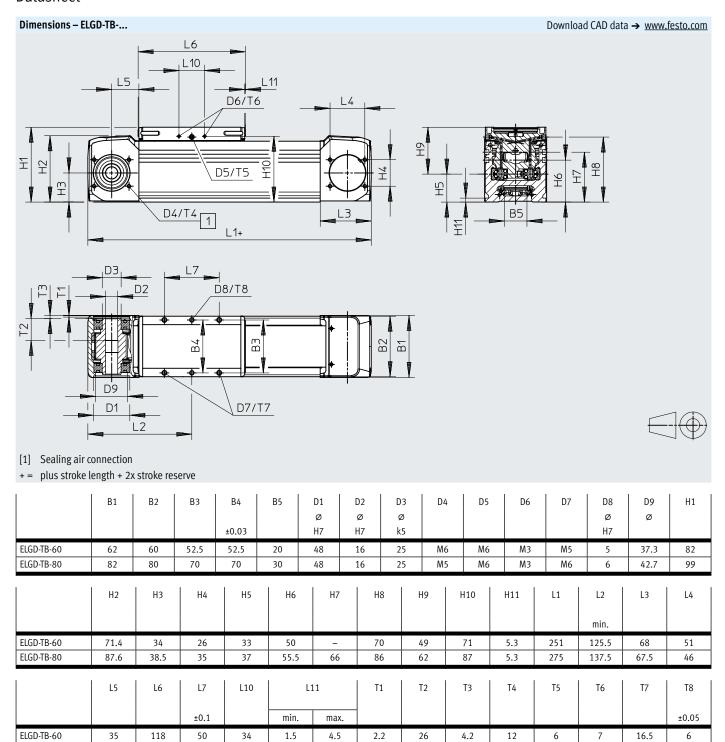
Size		60	80
ly	[mm ⁴]	0.485×10^6	1.213 x 10 ⁶
Iz	[mm ⁴]	0.731 x 10 ⁶	2.052 x 10 ⁶

Recommended deflection limits

To avoid impairing the functionality of the axes, we recommend that the following deflection limits are observed. Greater deformation can result in increased friction, greater wear and reduced service life.

Size	Dynamic deflection (moving load)	Static deflection (stationary load)		
60,80	0.05% of the axis length, max. 0.5 mm	0.1% of the axis length		

Datasheet



ELGD-TB-80

36

72.5

34

1

29

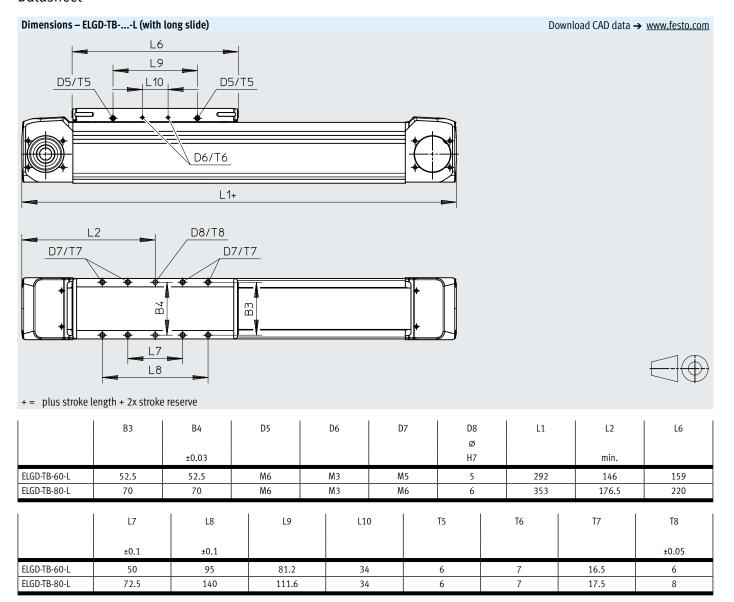
4

12

6

17.5

8

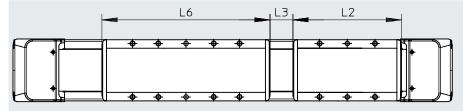


Datasheet

NEW

Dimensions – ELGD-TB-...-ZL/-ZR (with additional slide)

Download CAD data → www.festo.com

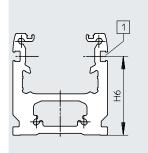


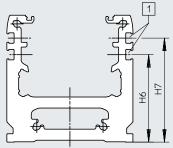
	L2	L3	L6
ELGD-TB-60	118	50	118
ELGD-TB-80	142	50	142
ELGD-TB-60-L	118	50	159
ELGD-TB-80-L	142	50	220

Dimensions - ELGD-TB-...- (profile)

ELGD-TB-60

Download CAD data → www.festo.com





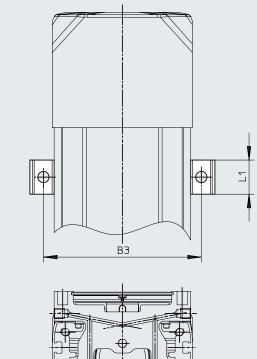
ELGD-TB-80

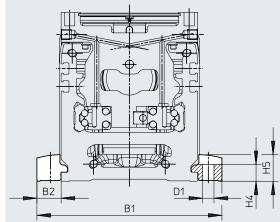
[1] Sensor slot for proximity switch

	H6	Н7
ELGD-TB-60	50	-
ELGD-TB-80	55.5	66

Dimensions – Profile mounting EAHF-E24-60-P-S

Download CAD data → www.festo.com





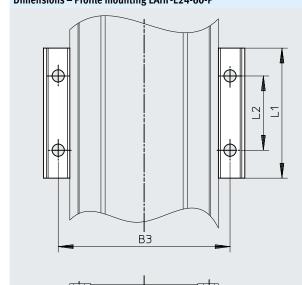


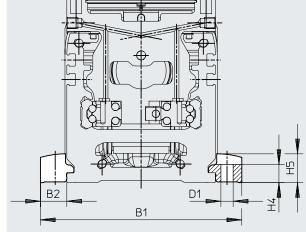
		B1	B2	B3	D1	H4	H5	L1
					Ø			
					H13	±0.1		
EAHF-E24-60-P-S	ELGD-TB-60	88.4	14.2	72.5	6.6	9.8	15.5	20
EARIT-E24-00-F-3	ELGD-TB-80	108.4	14.2	92.5	6.6	9.8	15.5	20

Datasheet



Download CAD data \rightarrow www.festo.com



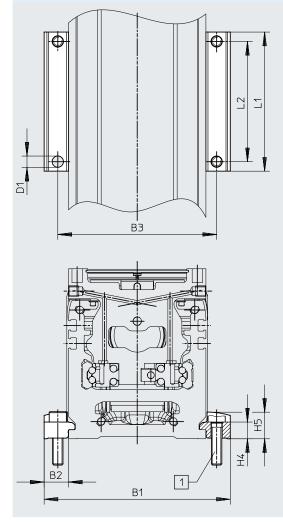




		B1	B2	В3	D1	H4	H5	L1	L2
					Ø				
					H13	±0.1			
EAHF-E24-60-P	ELGD-TB-60	88.4	14.2	72.5	6.6	9.8	15.5	70	40
EARIF-E24-00-P	ELGD-TB-80	108.4	14.2	92.5	6.6	9.8	15.5	70	40

Dimensions – Profile mounting EAHF-E24-60-P-D

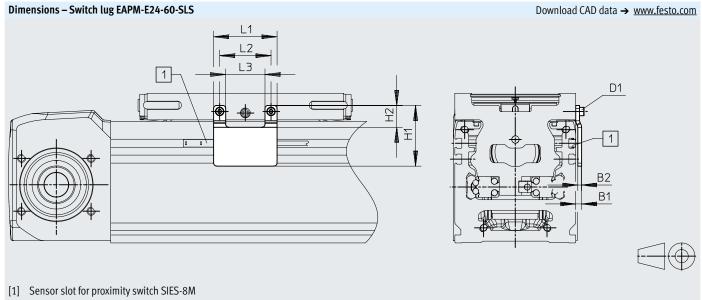






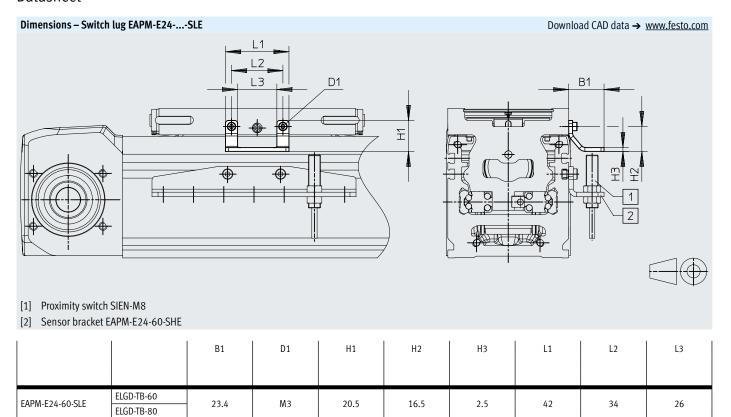
		B1	B2	В3	D1	H4	H5	L1	L2
					Ø				
					H13	±0.1			
EAHF-E24-60-P-D5	ELGD-TB-60	88.4	14.2	72.5	5.5	9.8	15.5	62	52.5
EAHF-E24-60-P-D4	ELGD-TB-80	108.4	14.2	92.5	6.6	9.8	15.5	81	70
EAHF-E24-60-P-D6	ELGD-TB-100	128.4	14.2	112.5	5.5	9.8	15.5	102	91

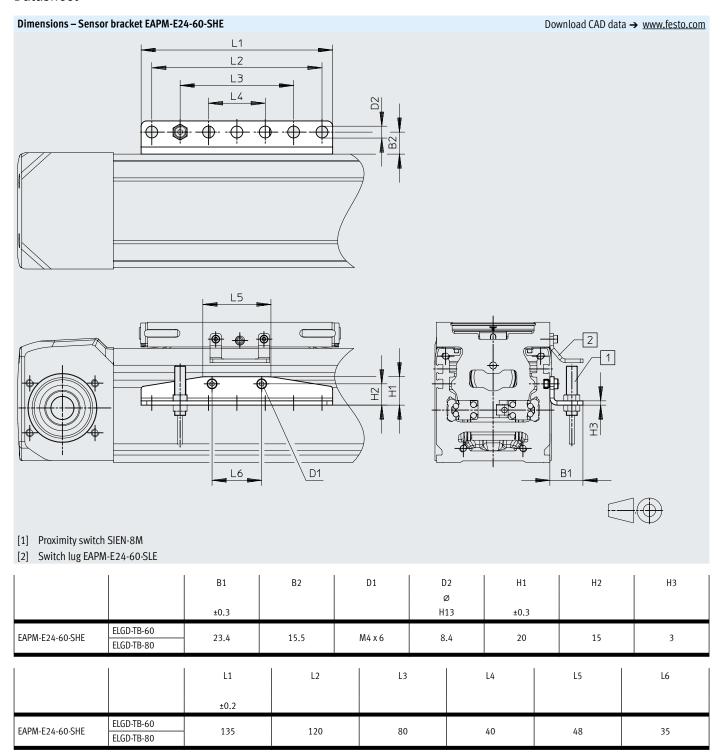
Datasheet

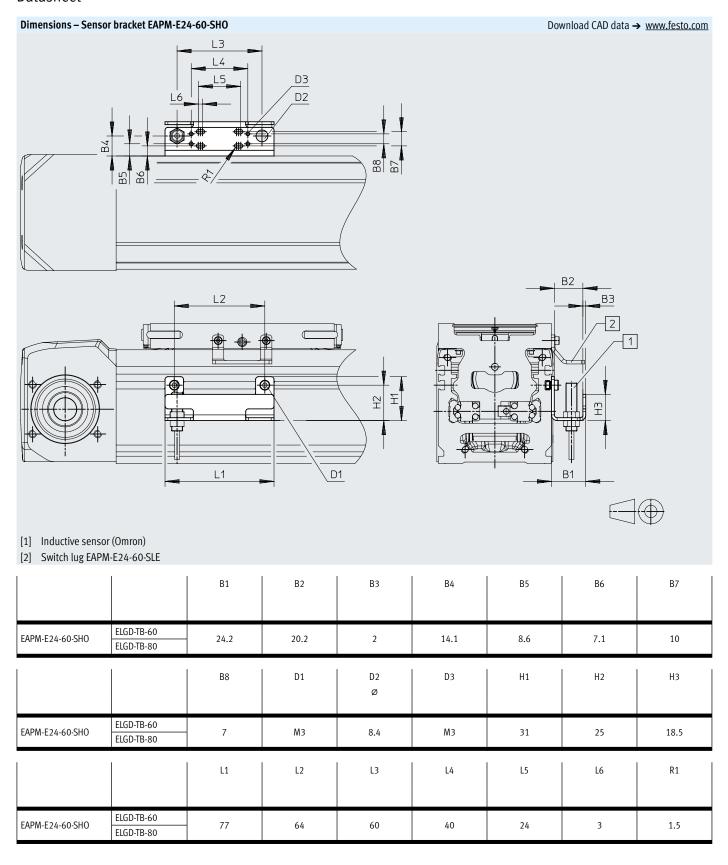


[2] Distance sleeve

		B1	B2	В3		D1	H1	H2	L1	L2	L3
					With distance sleeve	Without dis- tance sleeve					
EAPM-E24-60-SLS	ELGD-TB-60 ELGD-TB-80	3.8	2.5	11.9	M3 x 20	M3 x 8	40.2	14.5	42	34	26







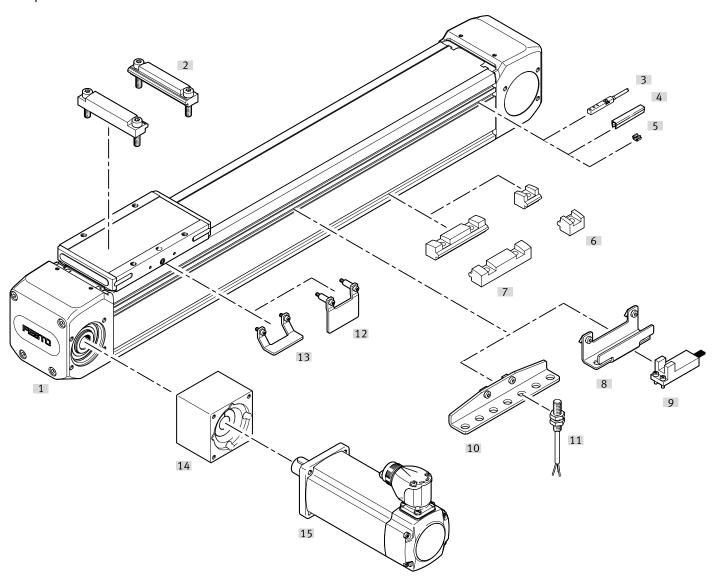
Datasheet

Ordering data					
	Size	Stroke	Part no.	Туре	
		[mm]			
	60	200	8192344	ELGD-TB-KF-60-200-0H-PU2	
		300	8192345	ELGD-TB-KF-60-300-0H-PU2	
		500	8192346	ELGD-TB-KF-60-500-0H-PU2	
		600	8192347	ELGD-TB-KF-60-600-0H-PU2	
		800	8192348	ELGD-TB-KF-60-800-0H-PU2	
10		1000	8192349	ELGD-TB-KF-60-1000-0H-PU2	
		1200	8192350	ELGD-TB-KF-60-1200-0H-PU2	
		1500	8192351	ELGD-TB-KF-60-1500-0H-PU2	
		1800	8192352	ELGD-TB-KF-60-1800-0H-PU2	
		2000	8192353	ELGD-TB-KF-60-2000-0H-PU2	
	80	200	8192354	ELGD-TB-KF-80-200-0H-PU2	
		300	8192355	ELGD-TB-KF-80-300-0H-PU2	
		500	8192356	ELGD-TB-KF-80-500-0H-PU2	
		600	8192357	ELGD-TB-KF-80-600-0H-PU2	
		800	8192358	ELGD-TB-KF-80-800-0H-PU2	
		1000	8192359	ELGD-TB-KF-80-1000-0H-PU2	
		1200	8192360	ELGD-TB-KF-80-1200-0H-PU2	
		1500	8192361	ELGD-TB-KF-80-1500-0H-PU2	
		1800	8192362	ELGD-TB-KF-80-1800-0H-PU2	
		2000	8192363	ELGD-TB-KF-80-2000-0H-PU2	
Ordering data – Modular product system	1	1	1		More information → elgd-tb
	Size	Stroke	Part no.	Туре	
		[mm]			
	60	50 2850	8176884	ELGD-TB-KF-60	
	80	50 2850	8176885	ELGD-TB-KF-80	

2024/06 – Subject to change →Internet: www.festo.com/catalogue/...

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Peripherals overview



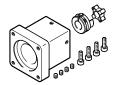


Peripherals overview

Acces	sories		
	Туре	Description	→ Page/Internet
[1]	Toothed belt axis ELGD-TB	Electric drive	elgd-tb
[2]	Profile mounting EAHF-E24D	For axis/axis mounting with adapter plate	24
[3]	Proximity switch, T-slot SIES-8M	Inductive proximity switch, for T-slot	25
[4]	Slot cover ABP-S	For protection against contamination	26
[5]	Clip SMBK	For mounting the proximity switch cable in the slot	26
[6]	Profile mounting EAHF-E24S	For mounting the axis on the side of the profile	24
[7]	Profile mounting EAHF-E24	For mounting the axis on the side of the profile	24
[8]	Sensor bracket EAPM-E24-SHO	For mounting third-party sensors on the axis	25
[9]	Sensor OMRON	Third-party sensor OMRON, EE-SX674 series	-
[10]	Sensor bracket EAPM-E24-SHE	For mounting the inductive proximity switches SIEN-M8 (round design) on the axis	25
[11]	Proximity switch, M8 SIEN-M8	Inductive proximity switch, round design	26
[12]	Switch lug EAPM-E24-SLS	For sensing the slide position via inductive proximity switch SIES-8M or for optical sensors (Omron) with sensor bracket EAPM-E24-SHO	24
[13]	Switch lug EAPM-E24-SLE	For sensing the slide position via inductive proximity switch SIEN-M8 (round design) and sensor bracket EAPM-E24-SHE	25
[14]	Axial kit EAMM	For axial motor mounting	eamm-a
[15]	Motor EMMT	Motors and kits specially matched to the axis Detailed information: www.festo.com/catalogue/eamm Engineering tool: www.festo.com/x/electric-motion-sizing	emmt

Accessories

Permissible axis/motor combinations for axial assembly kits



Below are the links where you can find all the information about:

- Axis/motor combinations
- Permissible external motors
- Technical data
- Dimensions

For axial assembly kits → Internet: eamm-a

Connecting shaft KSK



For the synchronization of two base axes in portal systems
 You will find all the information about at the following link:
 Connecting shaft → ksk

Profile m	Profile mounting EAHF-E24P-S										
		Description	Material	Product weight	Part no.	Туре					
		For size 60, 80	Anodised wrought alumini-	18 g	8197128	EAHF-E24-60-P-S					
			um alloy								

Profile mounting EAHF-E24	Р				
	Description	Material	Product weight	Part no.	Туре
	For size 60, 80	Anodised wrought aluminium alloy	71 g	8197132	EAHF-E24-60-P

Profile mounting EAHF-E24	P-D				
	Description	Material	Product weight	Part no.	Туре
	ELGD-60 to ELGD-60	Anodised wrought alumini-	87 g	8197131	EAHF-E24-60-P-D5
	ELGD-60 to ELGD-80	um alloy	119 g	8197129	EAHF-E24-60-P-D4
	ELGD-80 to ELGD-100		133 g	8197130	EAHF-E24-60-P-D6

Switch lug EAPM-E24SLS					
	Description	Material	Product weight	Part no.	Туре
	F	a			
	For size 60, 80	Steel	32 g	8197117	EAPM-E24-60-SLS

25



Accessories

Switch lug EAPM-E24SLE					
	Description	Material	Product weight	Part no.	Туре
	For size 60, 80	Steel	20 g	8197116	EAPM-E24-60-SLE

Sensor bracket EAPM-E24	SHE				
	Description	Material	Product weight	Part no.	Туре
	For size 60, 80	Steel	103 g	8197123	EAPM-E24-60-SHE

Sensor bracket EAPM-E24	SHO				
	Description	Material	Product weight	Part no.	Туре
46	For size 60, 80	Steel	67 g	8197121	EAPM-E24-60-SHO

Proximity switch	n for T-slot, inductive					Datasheets → Internet: sies
	Type of mounting	Switching output	Electrical connection	Cable length [m]	Part no.	Туре
N/O						
	Inserted in the slot from above, flush with	PNP	Cable, 3-wire	7.5	551386	SIES-8M-PS-24V-K-7.5-OE
	the cylinder profile		Plug M8x 1, 3-pin	0.3	551387	SIES-8M-PS-24V-K-0.3-M8D
		NPN	Cable, 3-wire	7.5	551396	SIES-8M-NS-24V-K-7.5-OE
			Plug M8x 1, 3-pin	0.3	551397	SIES-8M-NS-24V-K-0.3-M8D
N/C						
	Inserted in the slot from above, flush with	PNP	Cable, 3-wire	7.5	551391	SIES-8M-PO-24V-K-7.5-0E
	the cylinder profile		Plug M8x 1, 3-pin	0.3	551392	SIES-8M-PO-24V-K-0.3-M8D
6		NPN	Cable, 3-wire	7.5	551401	SIES-8M-NO-24V-K-7.5-OE
			Plug M8x 1, 3-pin	0.3	551402	SIES-8M-NO-24V-K-0.3-M8D

2024/06 − Subject to change →Internet: www.festo.com/catalogue/...

Accessories

ximity swi	1	design), inductive	1							Datasheets → Internet
	Switching or	utput	Electrical conne	ction		le length		Part	no.	Туре
					[m]					
1										
	PNP		Cable, 3-wire		2.5			150	386	SIEN-M8B-PS-K-L
	NPN				2.5			150	384	SIEN-M8B-NS-K-L
	PNP		Plug M8x 1, 3-p	in	_			150	387	SIEN-M8B-PS-S-L
	NPN				-			150	385	SIEN-M8B-NS-S-L
			-							
I/C PNP			Cable, 3-wire		2.5			150	390	SIEN-M8B-PO-K-L
	NPN	NPN			2.5	2.5		150388		SIEN-M8B-NO-K-L
	PNP		Plug M8x 1, 3-p	Plug M8x 1, 3-pin		-		150391		SIEN-M8B-PO-S-L
	NPN				-			150389		SIEN-M8B-NO-S-L
										1
cover AB	P-5-S1	l	1	1		la	la .		I _	
		Description	Material	Pack size		Product weight	Part no.		Туре	
	<u> </u>	For size 60, 80	ABS	2 every 0.5 m	١	13 g	563360		ABP-5	S1
TARK .			·	:		:				
SMBK		Description	Pack size		Produ	ct weight	Part no.		Туре	
		For size 60, 80	10		1g		534254		SMBK-	8