

Guide units EAGF, for electric cylinders

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Guide units EAGF, for electric cylinders

Key features

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At a glance

The guide unit EAGF is used to protect electric cylinders against torsion when these are subjected to high torque loads.

It offers high precision guiding for workpiece handling and other applications.

The interface enables quick and easy installation on many Festo drives/axes.

For electric cylinder ESBF → page 4

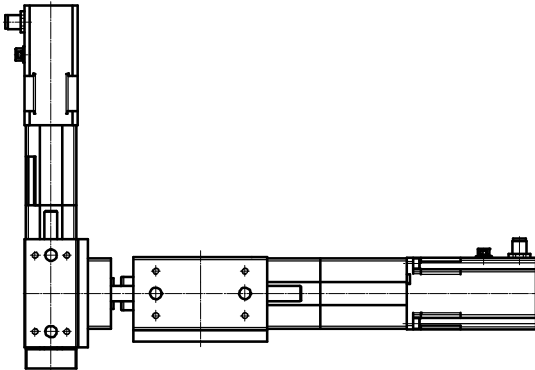


For electric cylinder EPCO → page 14

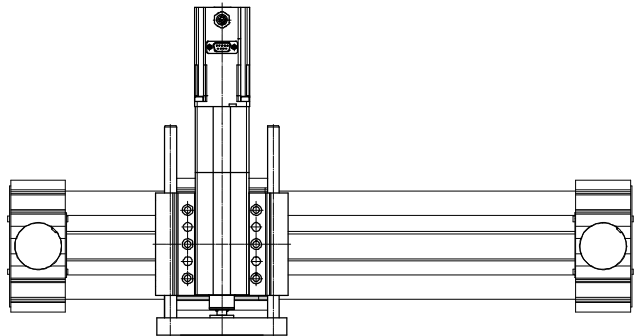


Sample applications

Pick & place with two guide units



Pick & place with guide unit and linear axis



Guide units EAGF, for electric cylinders ESBF

Type codes



		EAGF	–	V2	–	KF	–	63	–	100
Type										
EAGF	Guide unit									
Designation										
V2	For electric cylinder ESBF									
Guidance										
KF	Recirculating ball bearing guide									
Size										
32	32 mm									
40	40 mm									
50	50 mm									
63	63 mm									
80	80 mm									
100	100 mm									
Stroke [mm]										
100	100 mm									
200	200 mm									
320	320 mm									
400	400 mm									
...	1 ... 500 mm									

Guide units EAGF, for electric cylinders ESBF

Technical data

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⌀ - Diameter
32 ... 100 mm

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┌ - Stroke length
1 ... 500 mm



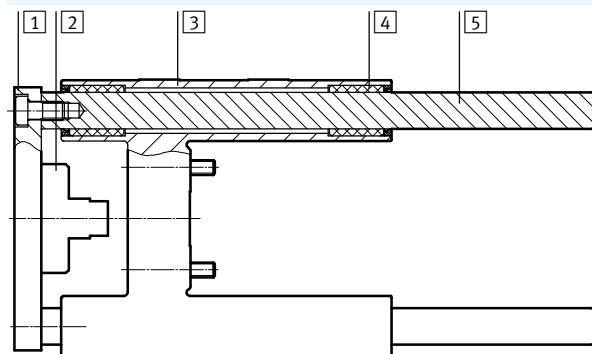
General technical data						
Size	32	40	50	63	80	100
Stroke [mm]	1 ... 500					
Design	Guide					
Guidance	Recirculating ball bearing guide					
Displacement force [N]	15				40	
Reversing backlash [μm]	0					
Type of mounting	Via female thread					
Mounting position	Any					
Ambient temperature [°C]	-20 ... +80 °C					

Weight [g] (for calculation example → page 6)						
Size	32	40	50	63	80	100
Basic weight with 0 mm stroke	1685	2517	4059	5525	10517	13263
Additional weight per 10 mm stroke	18	32	49	49	76	76
Moving mass with 0 mm stroke	724	1283	2015	2560	5166	6148
Additional mass per 10 mm stroke	18	32	49	49	76	76

Centre of gravity of the moving mass [mm] (for calculation example → page 6)						
Size	32	40	50	63	80	100
With 0 mm stroke	30	38	46	48	54	47
Supplement per 10 mm stroke	4.1	4.2	4.3	4.1	3.8	3.6

Materials

Sectional view



Guide unit	
1	Yoke plate Steel
2	Compensating component Steel
3	Housing Anodised wrought aluminium alloy
4	Bearing Steel
5	Guide rod Steel
-	Note on materials RoHS compliant Free of copper and PTFE

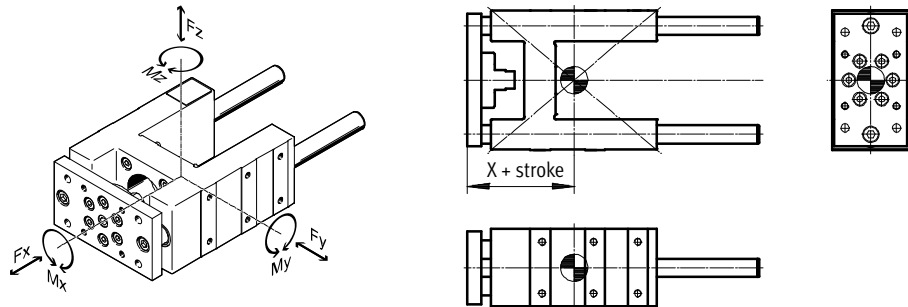
Guide units EAGF, for electric cylinders ESBF

Technical data

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Characteristic load values

The indicated forces and torques refer to the guide centre.



If the guide unit 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:

$$f_v = \frac{|F_y|}{F_{y,max}} + \frac{|F_z|}{F_{z,max}} + \frac{|M_x|}{M_{x,max}} + \frac{|M_y|}{M_{y,max}} + \frac{|M_z|}{M_{z,max}} \leq 1$$

Distance X (for calculation example → page 6)

Size	32	40	50	63	80	100
Dimension X [mm]	83	85	99	117	142	145

Max. permissible forces and torques

Size	32	40	50	63	80	100
Static						
F _{y,max.} /F _{z,max.} [N]	1020	1260	1600	1600	3120	3120
M _{x,max.} [Nm]	38	55	83	95	231	268
M _{y,max.} /M _{z,max.} [Nm]	46	65	89	115	259	267
Dynamic (for a service life of 5000 km)						
F _{y,max.} /F _{z,max.} [N]	750	1000	1260	1260	2300	2300
M _{x,max.} [Nm]	28	44	65	75	170	198
M _{y,max.} /M _{z,max.} [Nm]	34	52	70	90	191	197

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Calculating the service life

The service life of the guide depends on the load. To provide a rough indication of the service life of the guide,

the graph below plots the load comparison factor f_v against the service life ratio q .

These values are only theoretical. You must consult your local Festo contact for load comparison factors f_v greater than 1.5.

Load comparison factor f_v as a function of service life ratio q

Example:

The effect on the service life, deviating from the specified reference service

life, can be determined by means of the service life ratio q :

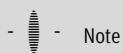
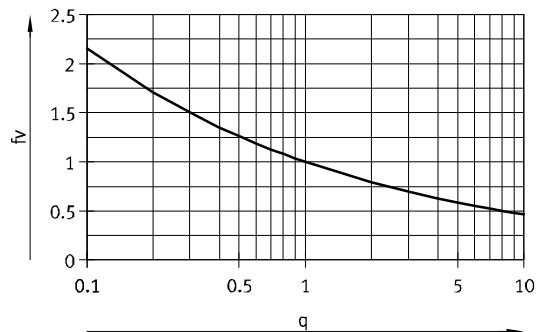
Given:

Reference service life = 5000 km

Required service life = 3000 km

$$q = \frac{3000 \text{ km}}{5000 \text{ km}} = 0.6$$

The graph gives a load comparison factor f_v of 1.2. This means that the permissible resultant load can be utilised up to 120%.

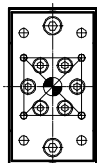
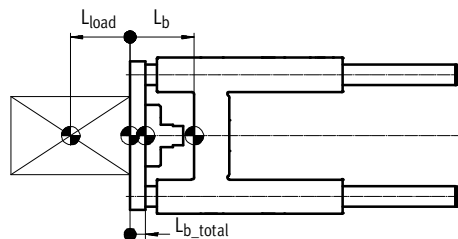


Note

PositioningDrives
engineering software
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$f_v > 1.5$ are only theoretical comparison values.

Calculation example



L_b = Centre of gravity of the moving mass of the guide unit

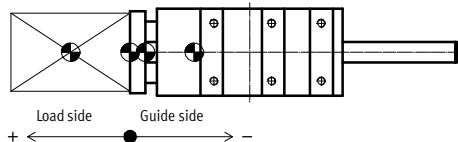
L_{load} = Centre of gravity of the payload

L_{b_total} = Centre of gravity of the total moving mass

Length measurements should be provided with plus/minus signs as shown in the figure:

$L_{b_total} > 0$ = Centre of gravity of the moving mass is on the payload side

$L_{b_total} < 0$ = Centre of gravity of the moving mass is on the guide side



Given:

- Guide unit: EAGF-V2-KF-32-200
- Stroke length $H = 200$ mm
- Centre of gravity of payload $L_{load} = 15$ mm
- Payload: $m_{load} = 5$ kg
- Acceleration: $a_x = a_y = 2 \text{ m/s}^2$, $a_z = 0 \text{ m/s}^2$

To be calculated:

- Loads F_{y_dyn}/F_{z_dyn} and $M_{x_dyn}/M_{y_dyn}/M_{z_dyn}$
- Verification of operation with combined load
- Expected service life

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Technical data

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Calculation example

Solution:

Moving load:

$$m_{b_total} = m_b + m_{load} \quad (m_b = m_{0b} + H \times m_{Hb})$$

From table → page 4

$$m_{0b} = 0.724 \text{ kg}$$

$$m_{Hb} = 0.018 \text{ kg/10 mm}$$

$$m_b = 0.724 \text{ kg} + 200 \text{ mm} \times 0.018 \text{ kg/10 mm} = 1.084 \text{ kg}$$

$$m_{b_total} = 1.084 \text{ kg} + 5 \text{ kg} = 6.084 \text{ kg}$$

m_b = Moving mass of the guide unit

m_{0b} = Moving mass with 0 mm stroke

m_{Hb} = Additional mass per 10 mm stroke

H = Stroke length

Centre of gravity of the moving mass

$$L_{b_total} = \frac{L_{load} \times m_{load} + L_b \times m_b}{m_{b_total}} \quad (L_b = L_{0b} + H \times L_{Hb})$$

From table → page 4

$$L_{0b} = 30 \text{ mm}$$

$$L_{Hb} = 4.1 \text{ mm/10 mm}$$

$$L_b = 30 \text{ mm} + 200 \text{ mm} \times 4.1 \text{ mm/10 mm} = 112 \text{ mm}$$

$$L_{b_total} = \frac{(+15 \text{ mm}) \times 5 \text{ kg} + (-112 \text{ mm}) \times 1.084 \text{ kg}}{6.084 \text{ kg}} = -8 \text{ mm}$$

L_b = Centre of gravity of the moving mass of the guide unit

m_b = Moving mass of the guide unit

L_{load} = Centre of gravity of the payload

m_{load} = Payload

L_{0b} = Centre of gravity of the moving mass with 0 mm stroke

L_{Hb} = Additional centre of gravity of the moving mass per 10 mm stroke

Length measurements should be provided with plus/minus signs as shown in the figure:

$L_{b_total} > 0$ = Centre of gravity of the moving mass is on the payload side

$L_{b_total} < 0$ = Centre of gravity of the moving mass is on the guide side

Loads F_{y_dyn}/F_{z_dyn} and $M_{x_dyn}/M_{y_dyn}/M_{z_dyn}$

$$F_{y_dyn} = m_{b_total} \times a_y = 6.084 \text{ kg} \times 2 \text{ m/s}^2 = 12 \text{ N}$$

$$F_{z_dyn} = m_{b_total} \times (g + a_z) = 6.084 \text{ kg} \times (9.81 \text{ m/s}^2 + 0 \text{ m/s}^2) = 60 \text{ N}$$

From table → page 5

Dimension X = 83 mm

$$M_{y_dyn} = F_{z_dyn} \times (\text{dimension X} + \text{stroke} + L_{b_total}) = 60 \text{ N} \times (83 \text{ mm} + 200 \text{ mm} + (-8 \text{ mm})) = 16 \text{ Nm}$$

$$M_{z_dyn} = F_{y_dyn} \times (\text{dimension X} + \text{stroke} + L_{b_total}) = 12 \text{ N} \times (83 \text{ mm} + 200 \text{ mm} + (-8 \text{ mm})) = 3 \text{ Nm}$$

Verification of operation with combined load

Max values from table → page 5

$$F_{y_dyn} = 750 \text{ N} \quad M_{x_dyn} = 28 \text{ Nm}$$

$$F_{z_dyn} = 750 \text{ N} \quad M_{y_dyn} = 34 \text{ Nm}$$

$$M_{z_dyn} = 34 \text{ Nm}$$

$$f_v = \frac{|F_y|}{F_{y,max}} + \frac{|F_z|}{F_{z,max}} + \frac{|M_x|}{M_{x,max}} + \frac{|M_y|}{M_{y,max}} + \frac{|M_z|}{M_{z,max}} \leq 1$$

$$f_v = \frac{12 \text{ N}}{750 \text{ N}} + \frac{60 \text{ N}}{750 \text{ N}} + \frac{0 \text{ Nm}}{28 \text{ Nm}} + \frac{16 \text{ Nm}}{34 \text{ Nm}} + \frac{3 \text{ Nm}}{34 \text{ Nm}} = 0.7 \leq 1$$

Expected service life

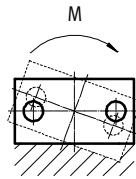
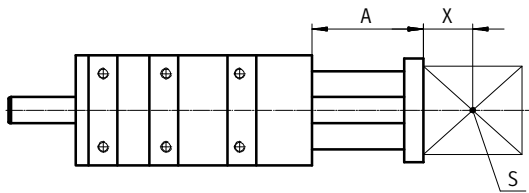
$$L_{calc} = \frac{L_{ref}}{f_v^3} = \frac{5000 \text{ km}}{0.7^3} = 14000 \text{ km}$$

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Technical data

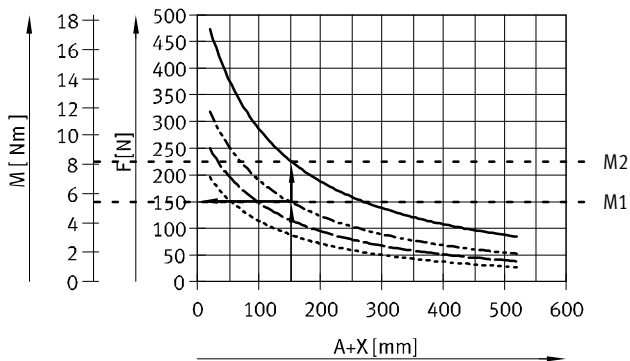
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Max. payload F and torque M as a function of cantilever load A



A = Cantilever load
X = Distance to centre of gravity of the payload
S = Centre of gravity of the payload
M = Torque

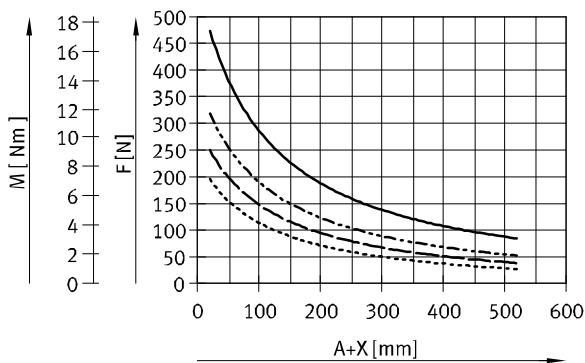
Explanation of how to read the graphs in the case of a combined load



- Determine cantilever load (150 mm)
- Enter lateral force (150 N)
- Enter distance from curve
- Permitted torque is the difference between M2 and M1

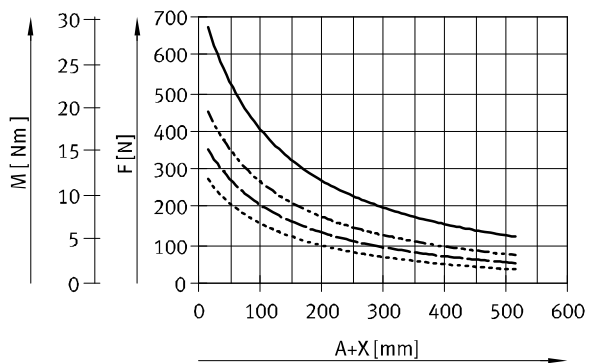
— Running performance of 500 km
- - - Running performance of 2500 km
- - - Running performance of 5000 km
- - - Running performance of 10000 km

Size 32



— Running performance of 500 km
- - - Running performance of 2500 km
- - - Running performance of 5000 km
- - - Running performance of 10000 km

Size 40

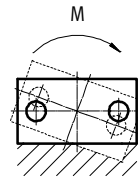
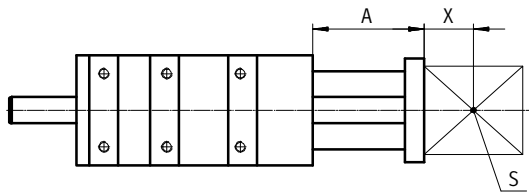


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Technical data

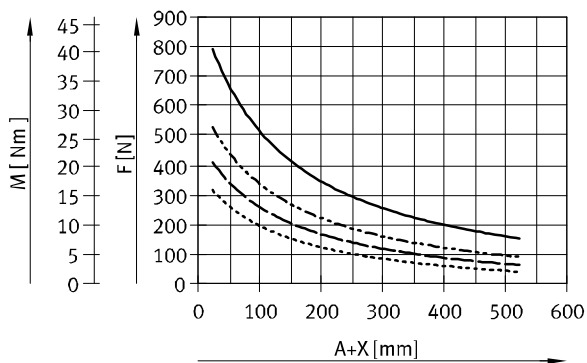
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Max. payload F and torque M as a function of cantilever load A

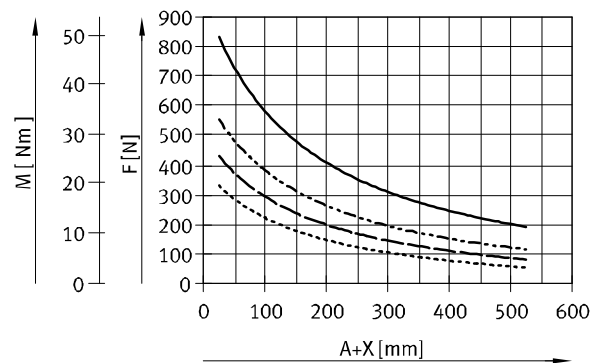


A = Cantilever load
X = Distance to centre of gravity of the payload
S = Centre of gravity of the payload
M = Torque

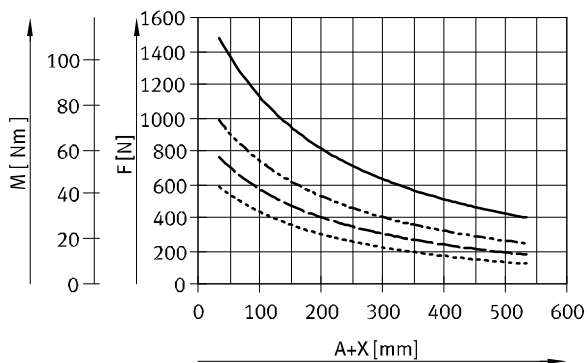
Size 50



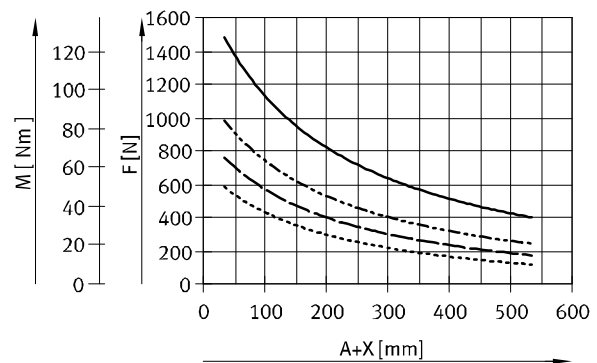
Size 63



Size 80



Size 100



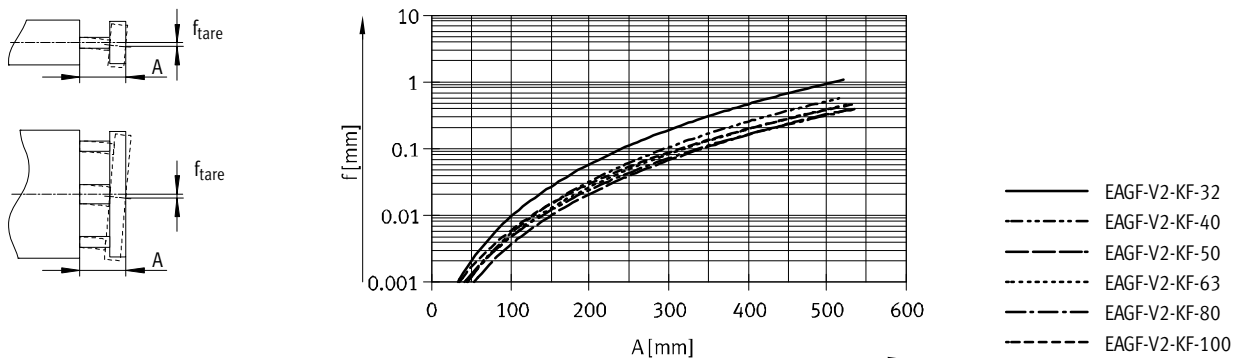
- Running performance of 500 km
- - - Running performance of 2500 km
- · - Running performance of 5000 km
- · · Running performance of 10000 km

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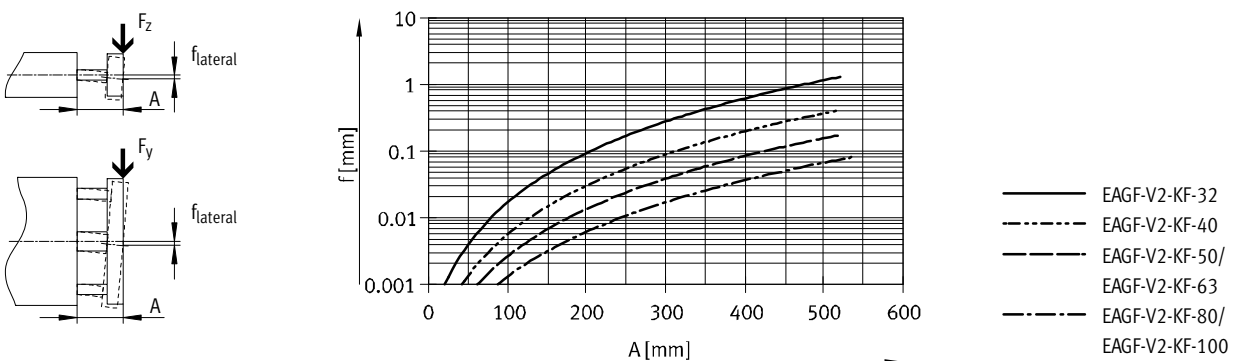
Technical data

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Deflection f_{tare} (due to tare weight) as a function of cantilever load A



Deflection $f_{standard}$ (due to lateral force) as a function of cantilever load A



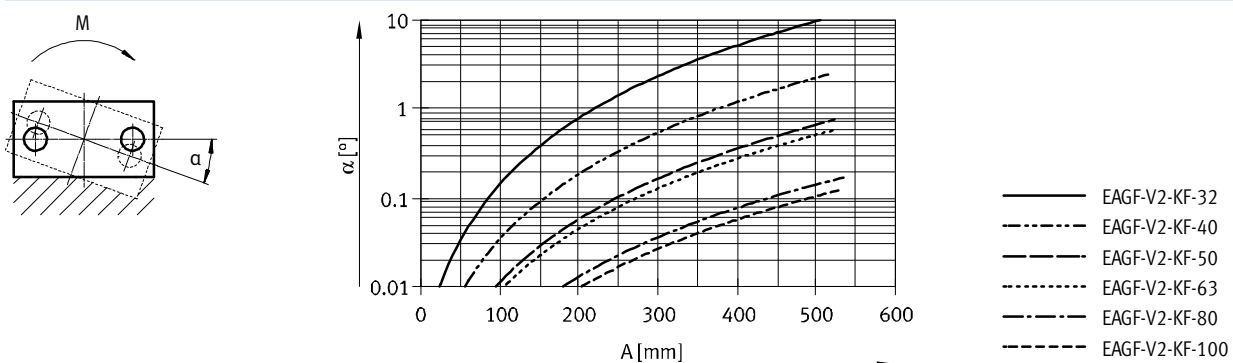
The maximum permissible lateral force must not be exceeded.

$$f_{lateral} = \frac{F_{lateral}}{F_{standard}} \times f_{standard}$$

$$F_{standard} = 10 \text{ N}$$

A = Cantilever load of guide rod
 $f_{lateral}$ = Deflection due to lateral force
 $F_{lateral}$ = Lateral force
 $F_{standard}$ = Standardised lateral force
 $f_{standard}$ = Deflection due to standardised lateral force (value from graph)

Inclination α (due to torque) as a function of cantilever load A



$$\alpha = \frac{M}{M_{standard}} \times \alpha_{standard}$$

$$M_{standard} = 2 \text{ Nm}$$

(valid for $\alpha \leq 10^\circ$)

A = Cantilever load of guide rod
 α = Inclination due to torque
M = Torque
 $M_{standard}$ = Standardised torque
 $\alpha_{standard}$ = Deflection due to standardised torque

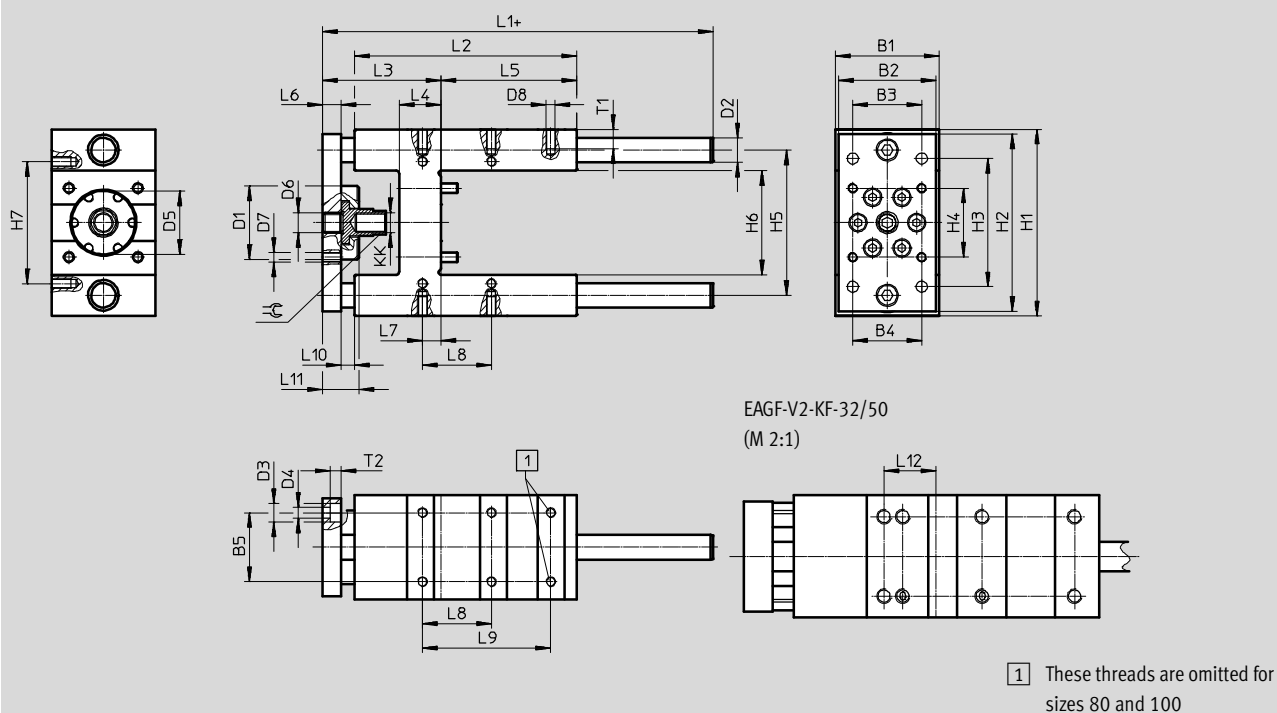
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Dimensions

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Size	B1	B2	B3	B4	B5	D1 Ø	D2 Ø H6	D3 Ø	D4 Ø	D5 Ø H8	D6	D7
	-0.3		±0.2	±0.2	±0.2							
32	50	45	32.5	32.5	32.5	44	12	11	6.6	34	M6	M6
40	58	54	38	38	38	48	16	11	6.6	39	M8	M8
50	70	63	46.5	46.5	46.5	60	20	15	9	45	M8	M8
63	85	80	56.5	56.5	56.5	60	20	15	9	52	M16	M8
80	105	100	72	72	72	78	25	18	11	60	M18	M10
100	130	120	89	89	89	78	25	18	11	70	M18	M10

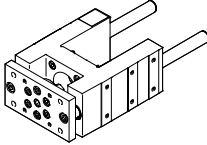
Size	D8	H1	H2	H3	H4	H5	H6	H7	KK	L1	L2
		-0.5		±0.2	±0.2	±0.2		±0.2		±1	
32	M6	97	90	78	32.5	74	50.5±0.3	61	M10x1.25	154.8	125
40	M6	115	110	84	38	87	58.5±0.3	69	M12x1.25	172.8	140
50	M8	137	130	100	46.5	104	70.5±0.3	85	M16x1.5	187.8	150
63	M8	153	145	105	56.5	119	85.5±0.3	100	M16x1.5	219.8	182
80	M10	189	180	130	72	148	106+1/-0.6	130	M20x1.5	257.8	215
100	M10	213	200	150	89	172	131+1/-0.6	150	M20x1.5	262.8	220

Size	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	T1	T2	≤C1
						±0.2	±0.2						
32	69.5 ⁺⁵	24	76	12	4.3	32.5	78	-	24	12	12	6.5	15
40	74.5 ⁺⁵	28	81	15	11	38	84	-	27	-	14	6.5	15
50	94.5 ⁺⁵	34	79	15	18.8	46.5	100	-	30	37	16	9	19
63	96.6	34	111	15	15.3	56.5	105	11	30	-	16	9	19
80	121.6	40	128	20	21	72	-	15	39	-	20	11	27
100	126.6	40	128	20	24.5	89	-	15	39	-	20	11	27

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Technical data

Ordering data				
Guide unit	Size	Stroke [mm]	Part No.	Type
	32	100	2782679	EAGF-V2-KF-32-100
		200	2782818	EAGF-V2-KF-32-200
		320	2782885	EAGF-V2-KF-32-320
		400	2782923	EAGF-V2-KF-32-400
		1 ... 500	3038083	EAGF-V2-KF-32-
	40	100	2782939	EAGF-V2-KF-40-100
		200	2782976	EAGF-V2-KF-40-200
		320	2783047	EAGF-V2-KF-40-320
		400	2783080	EAGF-V2-KF-40-400
		1 ... 500	3038089	EAGF-V2-KF-40-
	50	100	2783639	EAGF-V2-KF-50-100
		200	2784152	EAGF-V2-KF-50-200
		320	2784164	EAGF-V2-KF-50-320
		400	2784184	EAGF-V2-KF-50-400
		1 ... 500	3038094	EAGF-V2-KF-50-
	63	100	1725842	EAGF-V2-KF-63-100
		200	1725843	EAGF-V2-KF-63-200
		320	1725844	EAGF-V2-KF-63-320
		400	1725845	EAGF-V2-KF-63-400
		1 ... 500	2608521	EAGF-V2-KF-63-
	80	100	1725846	EAGF-V2-KF-80-100
		200	1725847	EAGF-V2-KF-80-200
		320	1725848	EAGF-V2-KF-80-320
		400	1725849	EAGF-V2-KF-80-400
		1 ... 500	2608528	EAGF-V2-KF-80-
	100	100	1725850	EAGF-V2-KF-100-100
		200	1725851	EAGF-V2-KF-100-200
		320	1725852	EAGF-V2-KF-100-320
		400	1725853	EAGF-V2-KF-100-400
		1 ... 500	2608532	EAGF-V2-KF-100-

Guide units EAGF, for electric cylinders EPCO

Type codes



EAGF	—	P1	—	KF	—	16	—	100
Type								
EAGF	Guide unit							
Designation								
P1	For electric cylinder EPCO							
Guidance								
KF	Recirculating ball bearing guide							
Size								
16	16 mm							
25	25 mm							
40	40 mm							
Stroke [mm]								
50	50 mm							
75	75 mm							
100	100 mm							
125	125 mm							
150	150 mm							
175	175 mm							
200	200 mm							
250	250 mm							
300	300 mm							
350	350 mm							
400	400 mm							

Guide units EAGF, for electric cylinders EPCO

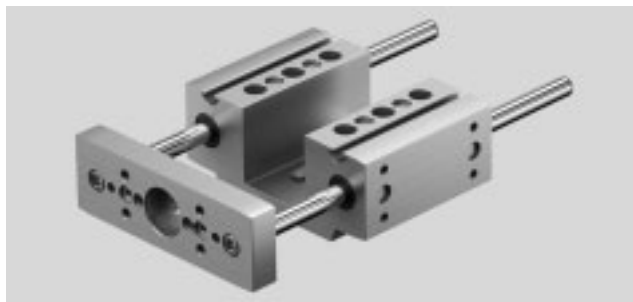
Technical data

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 Diameter
16, 25, 40 mm

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 Stroke length
50 ... 400 mm



General technical data				
Size	16	25	40	
Stroke [mm]	50, 75, 100, 125, 150, 175, 200	50, 75, 100, 125, 150, 175, 200, 250, 300	50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400	
Design	Guide			
Guidance	Recirculating ball bearing guide			
Displacement force [N]	3.2	4	6	
Reversing backlash [μm]	0			
Permissible speed [m/s]	1			
Permissible acceleration [m/s ²]	25			
Type of mounting	Via female thread			
Mounting position	Any			

Operating and environmental conditions				
Size	16	25	40	
Ambient temperature [°C]	0 ... +50			
Storage temperature [°C]	-20 ... +60			
Relative air humidity	0 ... 95 (non-condensing)			
Degree of protection	IP40			
Corrosion resistance class CRC ¹⁾	1			

- 1) Corrosion resistance class CRC 1 to Festo standard FN 940070
Low corrosion stress. For dry indoor applications or transport and storage protection. Also applies to parts behind covers, in the non-visible interior area, and parts which are covered in the application (e.g. drive trunnions).

Weight [g] (for calculation → page 16)				
Size	16	25	40	
Basic weight with 0 mm stroke	600	1080	1910	
Additional weight per 10 mm stroke	8	12	18	
Moving mass with 0 mm stroke	160	300	560	
Additional mass per 10 mm stroke	8	12	18	

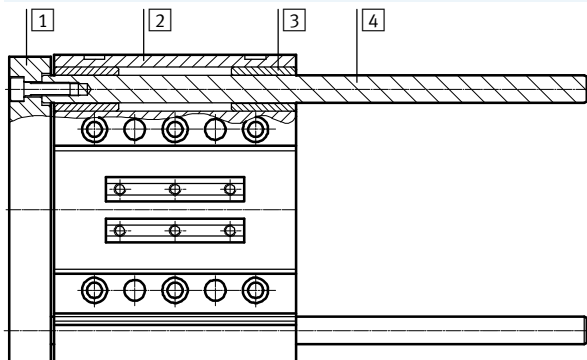
Centre of gravity of the moving mass [mm] (for calculation → page 16)				
Size	16	25	40	
With 0 mm stroke	29	30	36	
Supplement per 10 mm stroke	4.5	4.5	4.5	

Guide units EAGF, for electric cylinders EPCO

Technical data

Materials

Sectional view

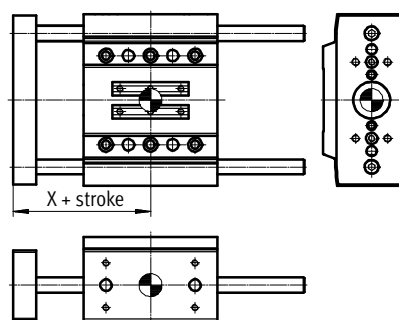
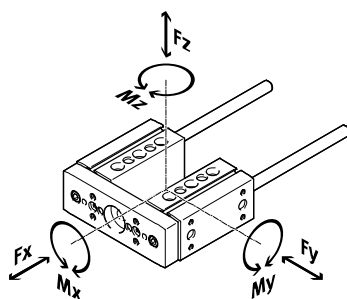


Guide unit

1	Yoke plate	Anodised wrought aluminium alloy
2	Housing	Anodised wrought aluminium alloy
3	Bearing	Steel
4	Guide rod	Hard-chromium plated tempered steel
– Note on materials		RoHS compliant
		Free of copper and PTFE

Characteristic load values

The indicated forces and torques refer to the guide centre.



If the guide unit 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:

$$f_v = \frac{|F_y|}{F_{y,max}} + \frac{|F_z|}{F_{z,max}} + \frac{|M_x|}{M_{x,max}} + \frac{|M_y|}{M_{y,max}} + \frac{|M_z|}{M_{z,max}} \leq 1$$

Distance X (for calculation → page 16)

Size	16	25	40
Dimension X [mm]	51	59	72

Max. permissible forces and torques

Size	16	25	40
Static			
$F_{y,max.}/F_{z,max.}$ [N]	355	415	510
$M_{x,max.}$ [Nm]	13	19	27
$M_{y,max.}/M_{z,max.}$ [Nm]	9	12	20
Dynamic (for a service life of 5000 km)			
$F_{y,max.}/F_{z,max.}$ [N]	160	320	380
$M_{x,max.}$ [Nm]	6	15	20
$M_{y,max.}/M_{z,max.}$ [Nm]	4	10	15

Guide units EAGF, for electric cylinders EPCO

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Calculating the service life

The service life of the guide depends on the load. To provide a rough indication of the service life of the guide,

the graph below plots the load comparison factor f_v against the service life ratio q .

These values are only theoretical. You must consult your local Festo contact

for load comparison factors f_v greater than 1.5.

Load comparison factor f_v as a function of service life ratio q

Example:

The effect on the service life, deviating from the specified reference service

life, can be determined by means of the service life ratio q :

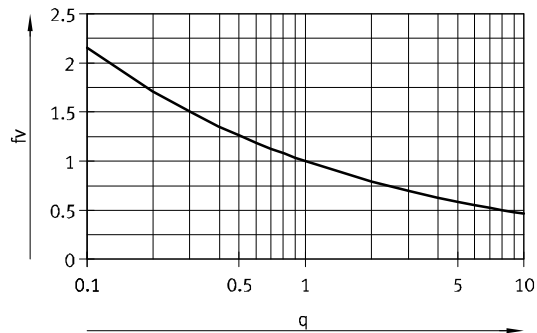
Given:

Reference service life = 5000 km

Required service life = 3000 km

$$q = \frac{3000 \text{ km}}{5000 \text{ km}} = 0.6$$

The graph gives a load comparison factor f_v of 1.2. This means that the permissible resultant load can be utilised up to 120%.

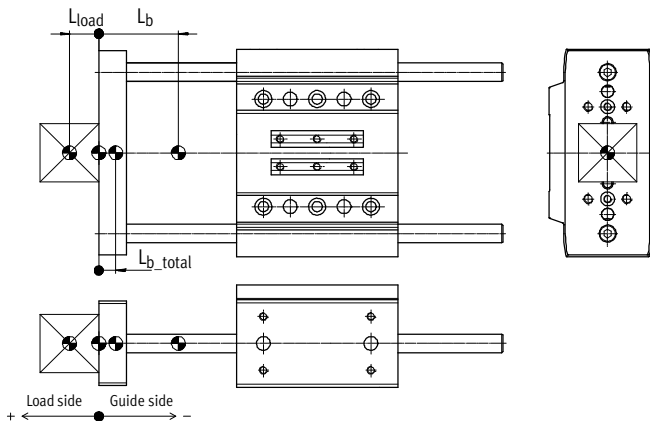


Note

PositioningDrives
engineering software
www.festo.com

$f_v > 1.5$ are only theoretical comparison values.

Calculation example



L_b = Centre of gravity of the moving mass of the guide unit

L_{load} = Centre of gravity of the payload

L_{b_total} = Centre of gravity of the total moving mass

Length measurements should be provided with plus/minus signs as shown in the figure:

$L_{b_total} > 0$ = Centre of gravity of the moving mass is on the payload side

$L_{b_total} < 0$ = Centre of gravity of the moving mass is on the guide side

Given:

- Guide unit: EAGF-P1-KF-25-200
- Stroke length: $H = 200 \text{ mm}$
- Centre of gravity of payload $L_{load} = 15 \text{ mm}$
- Payload: $m_{load} = 2 \text{ kg}$
- Acceleration: $a_x = a_y = 2 \text{ m/s}^2$, $a_z = 0 \text{ m/s}^2$

To be calculated:

- Loads F_{y_dyn}/F_{z_dyn} and $M_{x_dyn}/M_{y_dyn}/M_{z_dyn}$
- Verification of operation with combined load
- Expected service life

Guide units EAGF, for electric cylinders EPCO

Technical data

Calculation example

Solution:

Moving load:

$$m_{b_total} = m_b + m_{load} \quad (m_b = m_{ob} + H \times m_{Hb})$$

From table → page 14

$$m_{ob} = 0.3 \text{ kg}$$

$$m_{Hb} = 0.012 \text{ kg/10 mm}$$

$$m_b = 0.3 \text{ kg} + 200 \text{ mm} \times 0.012 \text{ kg/10 mm} = 0.54 \text{ kg}$$

$$m_{b_total} = 0.54 \text{ kg} + 2 \text{ kg} = 2.54 \text{ kg}$$

m_b = Moving mass of the guide unit

m_{ob} = Moving mass with 0 mm stroke

m_{Hb} = Additional mass per 10 mm stroke

H = Stroke length

Centre of gravity of the moving mass

$$L_{b_total} = \frac{L_{load} \times m_{load} + L_b \times m_b}{m_{b_total}} \quad (L_b = L_{ob} + H \times L_{Hb})$$

From table → page 14

$$L_{ob} = 30 \text{ mm}$$

$$L_{Hb} = 4.5 \text{ mm/10 mm}$$

$$L_b = 30 \text{ mm} + 200 \text{ mm} \times 4.5 \text{ mm/10 mm} = 120 \text{ mm}$$

$$L_{b_total} = \frac{(+ 15 \text{ mm}) \times 2 \text{ kg} + (- 120 \text{ mm}) \times 0.54 \text{ kg}}{2.54 \text{ kg}} = - 14 \text{ mm}$$

L_b = Centre of gravity of the moving mass of the guide unit

m_b = Moving mass of the guide unit

L_{load} = Centre of gravity of the payload

m_{load} = Payload

L_{ob} = Centre of gravity of the moving mass with 0 mm stroke

L_{Hb} = Additional centre of gravity of the moving mass per 10 mm stroke

Length measurements should be provided with plus/minus signs as shown in the figure:

$L_{b_total} > 0$ = Centre of gravity of the moving mass is on the payload side

$L_{b_total} < 0$ = Centre of gravity of the moving mass is on the guide side

Loads F_{y_dyn}/F_{z_dyn} and $M_{x_dyn}/M_{y_dyn}/M_{z_dyn}$

$$F_{y_dyn} = m_{b_total} \times a_y = 2.54 \text{ kg} \times 2 \text{ m/s}^2 = 5 \text{ N}$$

$$F_{z_dyn} = m_{b_total} \times (g + a_z) = 2.54 \text{ kg} \times (9.81 \text{ m/s}^2 + 0 \text{ m/s}^2) = 25 \text{ N}$$

From table → page 15

Dimension X = 59 mm

$$M_{y_dyn} = F_{z_dyn} \times (\text{dimension X} + \text{stroke} + L_{b_total}) = 25 \text{ N} \times (59 \text{ mm} + 200 \text{ mm} + (-14 \text{ mm})) = 6.1 \text{ Nm}$$

$$M_{z_dyn} = F_{y_dyn} \times (\text{dimension X} + \text{stroke} + L_{b_total}) = 5 \text{ N} \times (59 \text{ mm} + 200 \text{ mm} + (-14 \text{ mm})) = 1.2 \text{ Nm}$$

Verification of operation with combined load

Max values from table → page 15

$$F_{y_dyn} = 320 \text{ N}$$

$$M_{x_dyn} = 15 \text{ Nm}$$

$$F_{z_dyn} = 320 \text{ N}$$

$$M_{y_dyn} = 10 \text{ Nm}$$

$$M_{z_dyn} = 10 \text{ Nm}$$

$$f_v = \frac{|F_y|}{F_{y,max}} + \frac{|F_z|}{F_{z,max}} + \frac{|M_x|}{M_{x,max}} + \frac{|M_y|}{M_{y,max}} + \frac{|M_z|}{M_{z,max}} \leq 1$$

$$f_v = \frac{5 \text{ N}}{320 \text{ N}} + \frac{25 \text{ N}}{320 \text{ N}} + \frac{0 \text{ Nm}}{15 \text{ Nm}} + \frac{6.1 \text{ Nm}}{10 \text{ Nm}} + \frac{1.2 \text{ Nm}}{10 \text{ Nm}} = 0.8 \leq 1$$

Expected service life

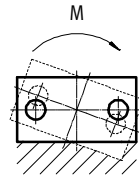
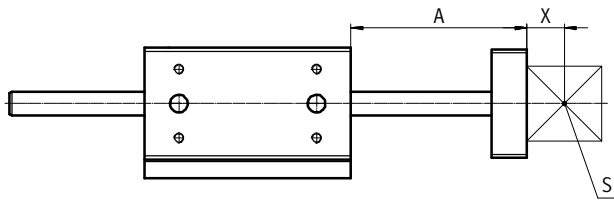
$$L_{calc} = \frac{L_{ref}}{f_v^3} = \frac{5000 \text{ km}}{0.8^3} = 9000 \text{ km}$$

Guide units EAGF, for electric cylinders EPCO

Technical data

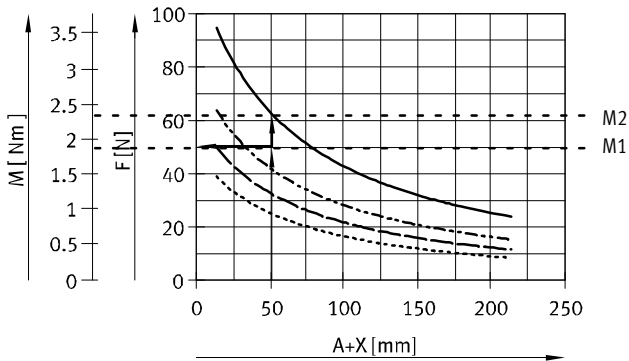
FESTO

Max. payload F and torque M as a function of cantilever load A



A = Cantilever load
X = Distance to centre of gravity of the payload
S = Centre of gravity of the payload
M = Torque

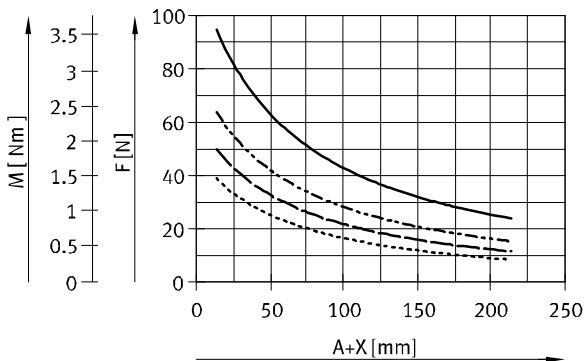
Explanation of how to read graphs in the case of a combined load



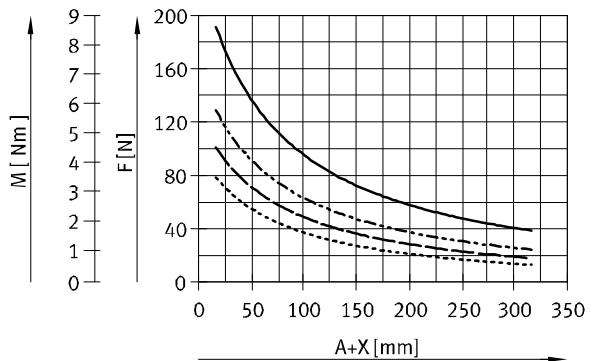
- Determine cantilever load (50 mm)
- Enter lateral force (50 N)
- Enter distance from curve
- Permitted torque is the difference between M2 and M1

— Running performance of 500 km
- - - Running performance of 2500 km
- . - Running performance of 5000 km
..... Running performance of 10000 km

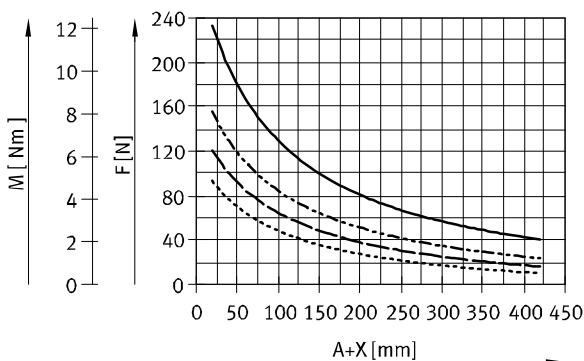
Size 16



Size 25



Size 40

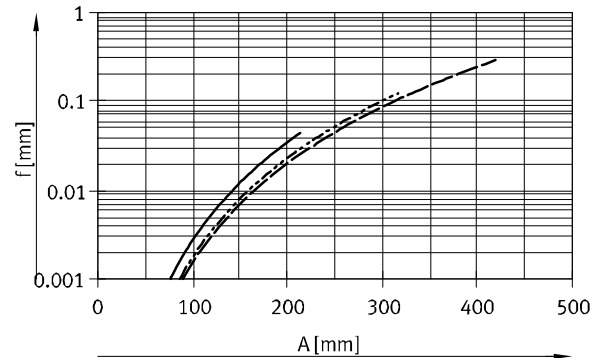
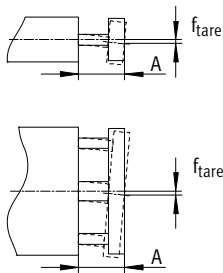


— Running performance of 500 km
- - - Running performance of 2500 km
- . - Running performance of 5000 km
..... Running performance of 10000 km

Guide units EAGF, for electric cylinders EPCO

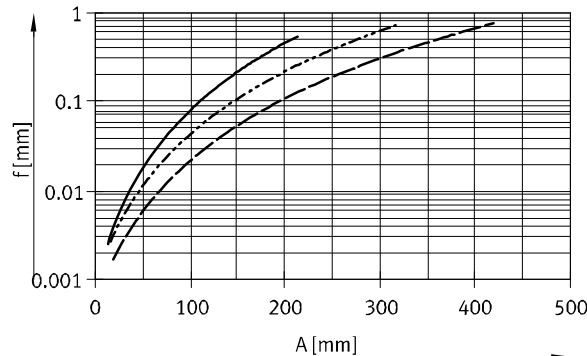
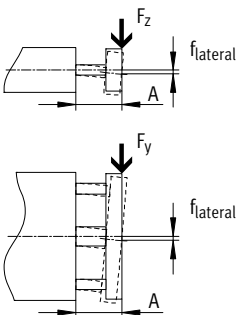
Technical data

Deflection f_{tare} (due to tare weight) as a function of cantilever load A



— EAGF-P1-KF-16
 - - - EAGF-P1-KF-25
 - · - EAGF-P1-KF-40

Deflection $f_{standard}$ (due to lateral force) as a function of cantilever load A



— EAGF-P1-KF-16
 - - - EAGF-P1-KF-25
 - · - EAGF-P1-KF-40

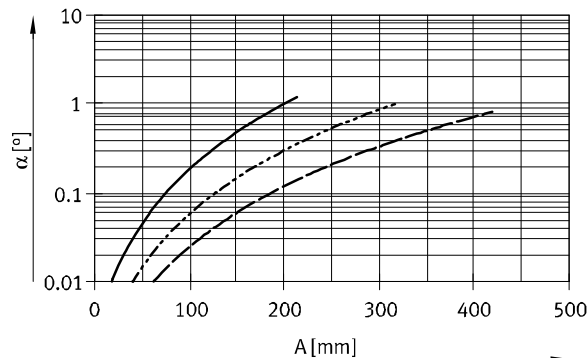
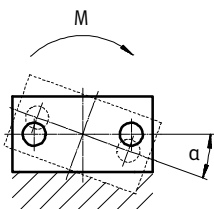
The maximum permissible lateral force must not be exceeded.

$$f_{lateral} = \frac{F_{lateral}}{F_{standard}} \times f_{standard}$$

$$F_{standard} = 10 \text{ N}$$

A = Cantilever load of guide rod
 $f_{lateral}$ = Deflection due to lateral force
 $F_{lateral}$ = Lateral force
 $F_{standard}$ = Standardised lateral force
 $f_{standard}$ = Deflection due to standardised lateral force (value from graph)

Inclination α (due to torque) as a function of cantilever load A



— EAGF-P1-KF-16
 - - - EAGF-P1-KF-25
 - · - EAGF-P1-KF-40

$$\alpha = \frac{M}{M_{standard}} \times \alpha_{standard}$$

$$M_{standard} = 2 \text{ Nm}$$

(valid for $\alpha \leq 10^\circ$)

A = Cantilever load of guide rod
 α = Inclination due to torque
 M = Torque
 $M_{standard}$ = Standardised torque
 $\alpha_{standard}$ = Deflection due to standardised torque

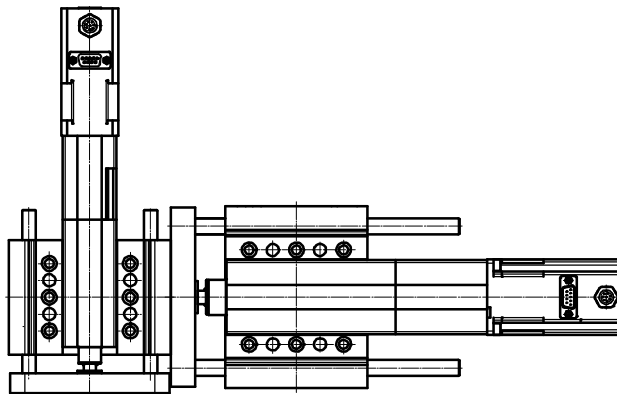
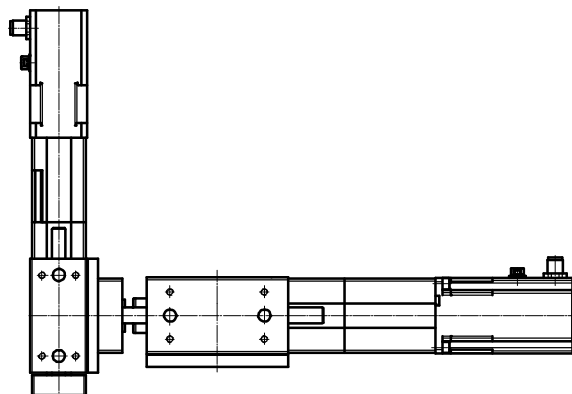
Guide units EAGF, for electric cylinders EPCO

Technical data

FESTO

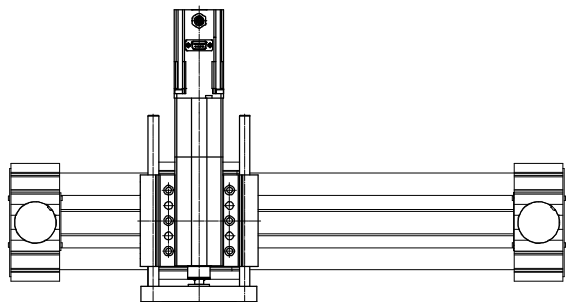
Possible combinations with other drives/axes via direct mounting

Guide unit EAGF with electric cylinder EPCO and guide unit EAGF



Size	Base axis	
	EAGF-P1-KF-25	EAGF-P1-KF-40
Assembly axis		
EAGF-P1-KF-16	■	–
EAGF-P1-KF-25	–	■

Toothed belt axis ELGR with electric cylinder EPCO and guide unit EAGF



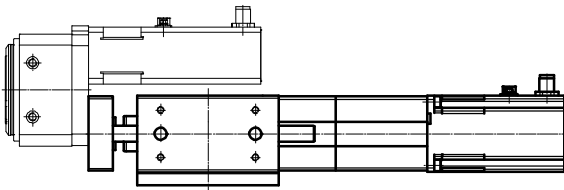
Size	Base axis		
	ELGR-TB-35	ELGR-TB-45	ELGR-TB-55
Assembly axis			
EAGF-P1-KF-16	■	–	–
EAGF-P1-KF-25	–	■	–
EAGF-P1-KF-40	–	–	■

Guide units EAGF, for electric cylinders EPCO

Technical data

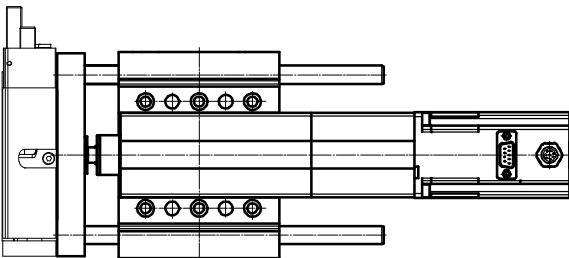
Possible combinations with other drives/axes via direct mounting

Rotary drive ERMO with electric cylinder EPCO and guide unit EAGF



Size	Base axis		
	EAGF-P1-KF-16	EAGF-P1-KF-25	EAGF-P1-KF-40
Assembly axis			
ERMO-12	■	–	–
ERMO-16	–	■	–
ERMO-25	–	–	■

Mini slide DGSL with electric cylinder EPCO and guide unit EAGF



Size	Base axis		
	EAGF-P1-KF-16	EAGF-P1-KF-25	EAGF-P1-KF-40
Assembly axis			
DGSL-8-40 ¹⁾	■	–	–
DGSL-10-30 ¹⁾	–	■	–
DGSL-12-40 ¹⁾	–	–	■

1) Minimal stroke

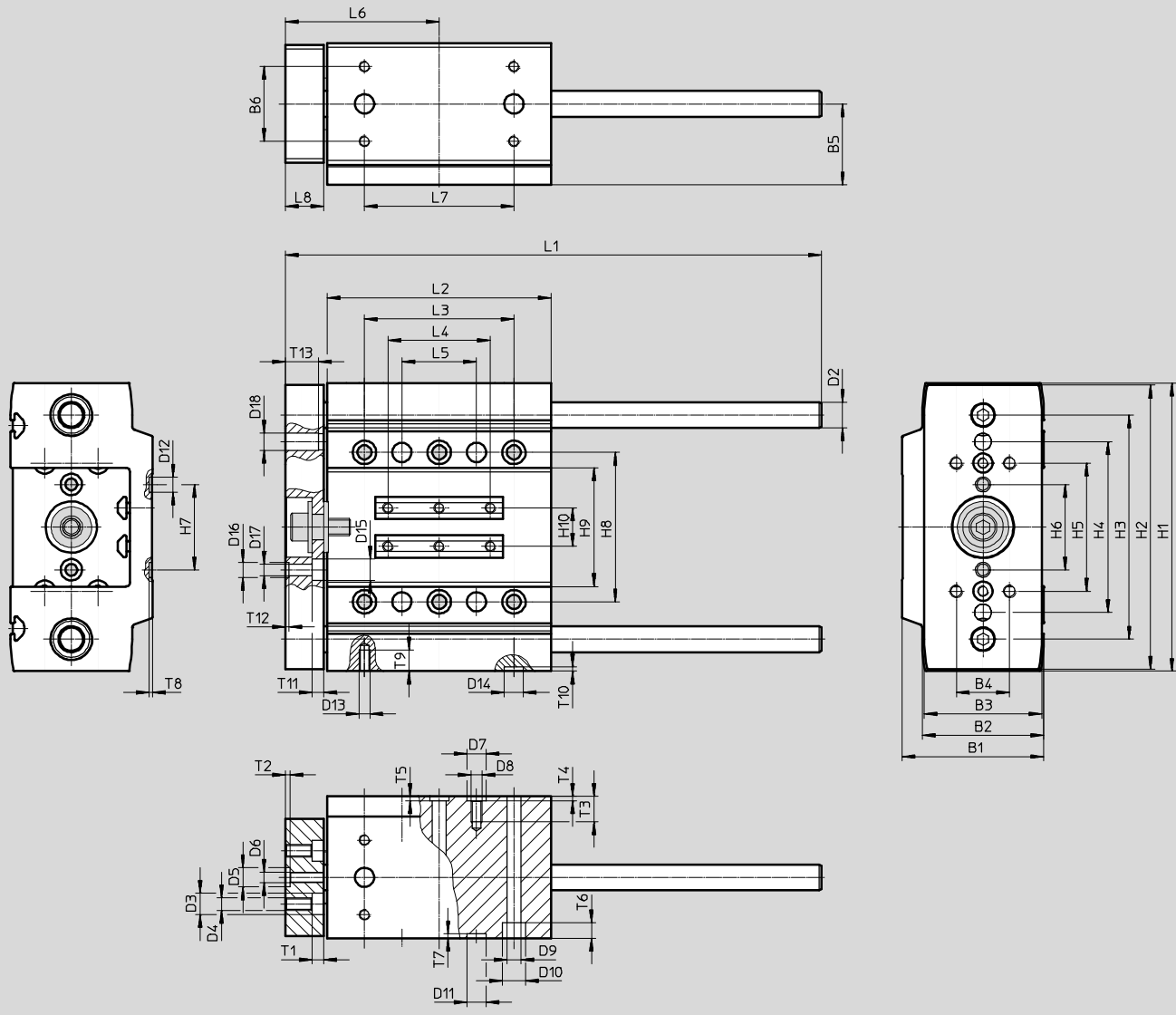
Guide units EAGF, for electric cylinders EPCO

Technical data

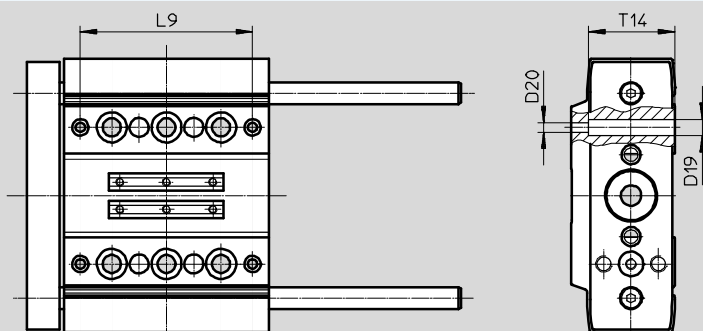
FESTO

Dimensions

Download CAD data → www.festo.com



Size 16



Guide units EAGF, for electric cylinders EPCO

Technical data

Size	B1	B2	B3	B4 ±0.05	B5	B6 ±0.05	D2 ∅ h7	D3 ∅	D4 ∅	D5 ∅ H8	D6	D7 ∅ H8
16	38	32	30	20	22	20	8	–	M6	9	M4	9
25	50	42	40	20	29	25	10	10	M6	9	M4	9
40	66.5	57	55	25	38	35	12	10	M6	9	M5	9

Size	D8	D9 ∅	D10 ∅	D11 ∅ H8	D12 ∅ H8	D13	D14 ∅ H8	D15 ∅	D16 ∅ H8	D17 ∅	D18 ∅ H7	D19 ∅
16	M5	6.6	11	7	7	M5	9	8	7	5 ^{H7}	–	6
25	M5	6.6	11	9	7	M5	9	10	7	5.5	5	–
40	M5	6.6	11	9	7	M5	9	10	7	5.5	8	–

Size	D20 ∅	H1	H2	H3	H4 ±0.05	H5 ±0.05	H6 ±0.05	H7 ±0.05	H8 ±0.05	H9	H10
16	3.4	100	98	75	–	50	30	30	50	30.7	10
25	–	120	118	90	70	50	33	40	60	40.7	14
40	–	135	133	105	80	60	40	40	70	55.7	18

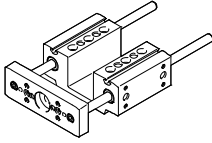
Size	L1	L2	L3 ±0.05	L4	L5 ±0.05	L6	L7 ±0.05	L8	L9 ±0.1	T1	T2 +0.1
16	109 + stroke	75	40	34	20	51	50	12	63	–	2.1
25	124 + stroke	85	50	40	25	59	60	15	–	5.5	2.1
40	151 + stroke	105	70	48	35	72	70	18	–	5.5	2.1

Size	T3	T4 +0.1	T5 +0.1	T6	T7 +0.1	T8 +0.1	T9	T10 +0.1	T11	T12 +0.1	T13 ±1	T14
16	15.5	2.1	2.1	6.5	1.6	1.6	8.5–0.5	2.1	4.4	1.6	–	31.5
25	14	2.1	2.1	6.4	2.1	1.6	Min. 10	2.1	5.7	1.6	12.5	–
40	12	2.1	2.1	7.3	2.1	1.6	Min. 10	2.1	5.5	1.6	15.5	–

Guide units EAGF, for electric cylinders EPCO

Technical data

FESTO

Ordering data					
Guide unit	Size	Stroke [mm]	Part No.	Type	
	16	50	3192932	EAGF-P1-KF-16-50	
		100	3192934	EAGF-P1-KF-16-100	
		150	3192936	EAGF-P1-KF-16-150	
		200	3192938	EAGF-P1-KF-16-200	
		75, 125, 175	3192939	EAGF-P1-KF-16-	
	25	50	3192943	EAGF-P1-KF-25-50	
		100	3192945	EAGF-P1-KF-25-100	
		150	3192947	EAGF-P1-KF-25-150	
		200	3192949	EAGF-P1-KF-25-200	
		300	3192951	EAGF-P1-KF-25-300	
		75, 125, 175, 250	3192952	EAGF-P1-KF-25-	
	40	50	3192955	EAGF-P1-KF-40-50	
		100	3192957	EAGF-P1-KF-40-100	
		150	3192959	EAGF-P1-KF-40-150	
		200	3192961	EAGF-P1-KF-40-200	
		300	3192963	EAGF-P1-KF-40-300	
		75, 125, 175, 250 350, 400	3192966	EAGF-P1-KF-40-	

Accessories					
Ordering data					
	For size	Description	Part No.	Type	PU ¹⁾
Centring sleeve					
	16, 25, 40	For centring the drive or attachments	186717	ZBH-7	10
			150927	ZBH-9	
Connector sleeve					
	16	For centring the drive or attachments	548805	ZBV-9-7	10

1) Packaging unit