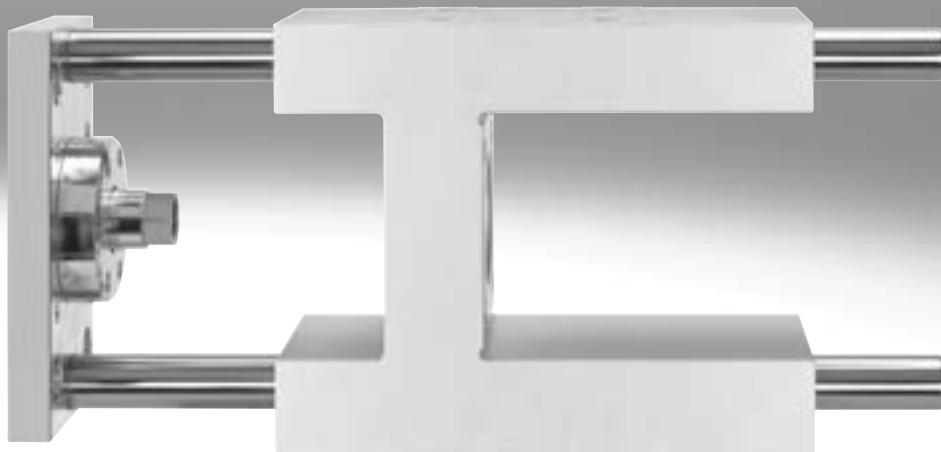


## Guide units EAGF, for electric cylinders

**FESTO**



Festo core product range  
Covers 80% of your automation tasks

Worldwide:

Always in stock

Superb:

Festo quality at an attractive price

Easy:

Simplified procurement and warehousing

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More than 2200 products

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Assembled for you in 4 Service Centres worldwide

Up to  $6 \times 10^{12}$  variants per product family

Just look  
for the  
star!

## Characteristics

### 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 a high level of guide precision for workpiece handling and other applications.

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

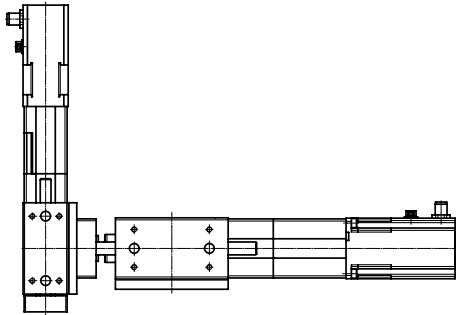
For electric cylinders ESBF → page 4

For electric cylinders EPCO → page 14

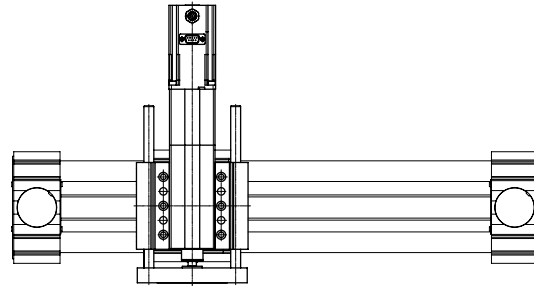


### Application examples

Pick & place with two guide units



Pick & place with guide unit and linear axis



## Type codes

001	Series
<b>EAGF</b>	Guide unit, for electric cylinder

002	Allocation
<b>P1</b>	Version P1
<b>V2</b>	Version V2


003	Guide
<b>KF</b>	Recirculating ball bearing guide

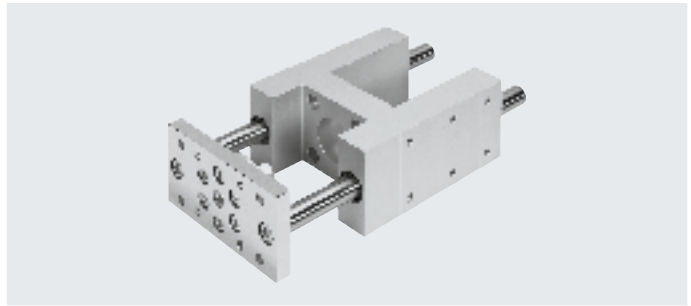
004	Size
<b>16</b>	16
<b>25</b>	25
<b>32</b>	32
<b>40</b>	40
<b>50</b>	50
<b>63</b>	63
<b>80</b>	80
<b>100</b>	100

005	Stroke
<b>50</b>	50
<b>100</b>	100
<b>150</b>	150
<b>200</b>	200
<b>300</b>	300
<b>320</b>	320
<b>400</b>	400

## Data sheet

⊘ Diameter  
32 ... 100 mm

 [www.festo.com](http://www.festo.com)



┆ Stroke length  
1 ... 550 mm

### General technical data

Size	32	40	50	63	80	100
Stroke [mm]	1 ... 500				1 ... 550	
Design	Guide					
Guide	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)

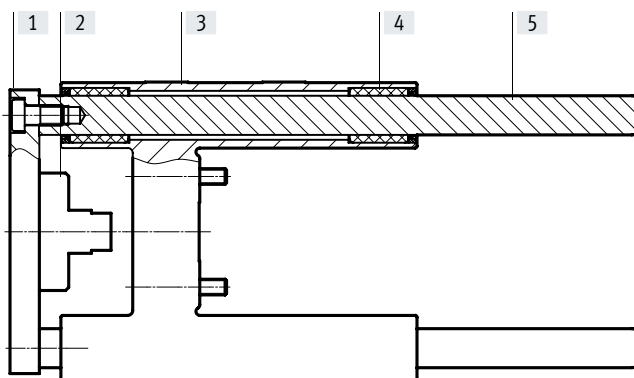
Size	32	40	50	63	80	100
Basic weight with 0 mm stroke	1685	2517	4059	5525	10517	13263
Additional weight per 10 mm stroke	18	32	49	49	76	76
Moving mass at 0 mm stroke	724	1283	2015	2560	5166	6148
Additional mass per 10 mm stroke	18	32	49	49	76	76

### 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

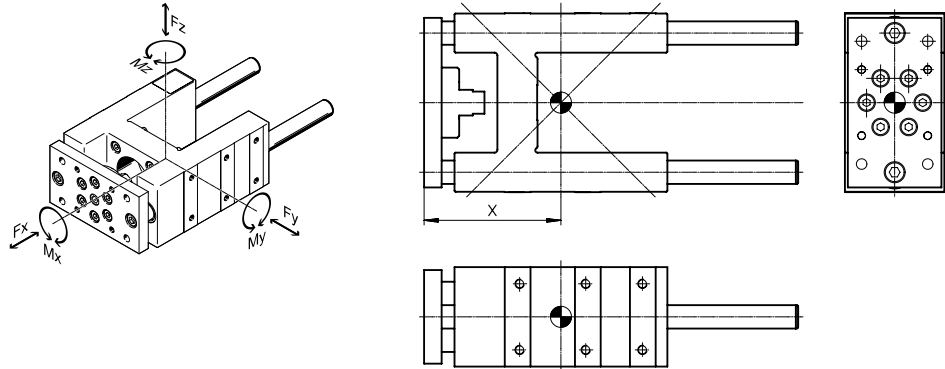


Guide unit	
[1] Yoke plate	Steel
[2] Compensating component	Steel
[3] Housing	Anodised wrought aluminium alloy
[4] Bearing	Steel
[5] Guide rod	Steel
- Note on materials	RoHS-compliant Free of copper and PTFE

## Data sheet

### Characteristic load values

The indicated forces and torques refer to the centre of the guide.



If the guide unit simultaneously subjected to several of the indicated forces and torques, the following equation must be satisfied in addition to the indicated maximum loads:

Calculating the load comparison factor:

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

$F_1/M_1$  = dynamic value  
 $F_2/M_2$  = maximum value

#### 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

## Data sheet

### 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 contact person at Festo for load comparison factors  $f_v$  greater than 1.5.

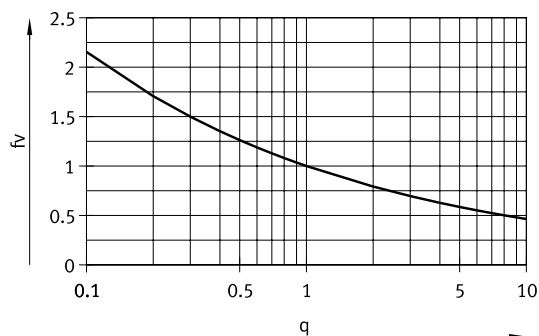
#### Load comparison factor $f_v$ as a function of service life ratio $q$

Example: The effect on the service life, deviating from the specified reference service life, can be determined using the service life ratio  $q$ :

Given: Reference service life = 5000 km  
 Required service life = 3000 km

$$q = \frac{3000 \text{ km}}{5000 \text{ km}} = 0,6$$

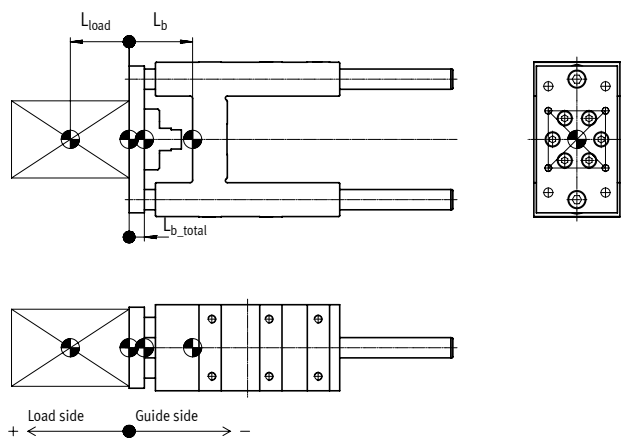
The graph gives a load comparison factor  $f_v$  of 1.2. This means that the permissible total load can be utilised up to 120%.



**Note**  
 Engineering software  
 PositioningDrives  
 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 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:  $H = 200 \text{ mm}$
- Centre of gravity of payload:  $L_{load} = 15 \text{ mm}$
- Payload:  $m_{load} = 5 \text{ kg}$
- 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  $M_{x\_dyn}/M_{y\_dyn}/M_{z\_dyn}$
- Proof of functionality with combined load
- Expected service life

## Data sheet

### Calculation example

Solution:

Moving mass:

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

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

$$L_{b\_ges} = \frac{L_1 \cdot m_1 + L_b \cdot m_b}{m_{b\_ges}} \quad (L_b = L_{0b} + H \times L_{Hb})$$

From table → page 4

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

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

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

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

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

$m_b$  = Moving mass of the guide unit

$L_1$  = Centre of gravity of payload

$m_1$  = 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

$$M_{y\_dyn} = F_{z\_dyn} \times (\text{dimension X} + \text{stroke} + L_{b\_total}) = 60 \text{ N} \times (83 \text{ mm} + 200 \text{ mm} + (-8 \text{ mm})) = 16 \text{ Nm}$$

$$M_{z\_dyn} = F_{y\_dyn} \times (\text{dimension X} + \text{stroke} + L_{b\_total}) = 12 \text{ N} \times (83 \text{ mm} + 200 \text{ mm} + (-8 \text{ mm})) = 3 \text{ Nm}$$

### Proof of functionality with combined load

Max. values from table → page 5

$$F_{y\_max} = 750 \text{ N}$$

$$F_{z\_max} = 750 \text{ N}$$

$$M_{x\_max} = 28 \text{ Nm}$$

$$M_{y\_max} = 34 \text{ Nm}$$

$$M_{z\_max} = 34 \text{ Nm}$$

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

$$f_v = \frac{12 \text{ N}}{750 \text{ N}} + \frac{60 \text{ N}}{750 \text{ N}} + \frac{0 \text{ Nm}}{28 \text{ Nm}} + \frac{16 \text{ Nm}}{34 \text{ Nm}} + \frac{3 \text{ Nm}}{34 \text{ Nm}} = 0,7 \leq 1$$

$F_1/M_1$  = dynamic value

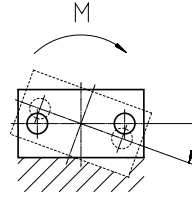
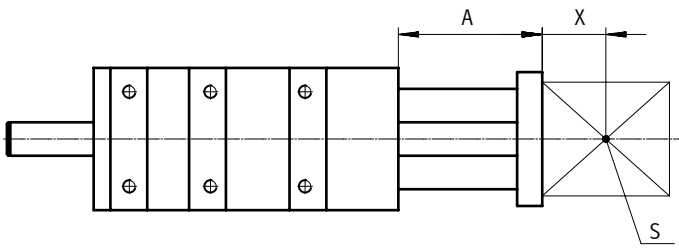
$F_2/M_2$  = maximum value

### Expected service life

$$L = \frac{L_{ref}}{f_v^3} = \frac{5000 \text{ km}}{0,7^3} = 14000 \text{ km}$$

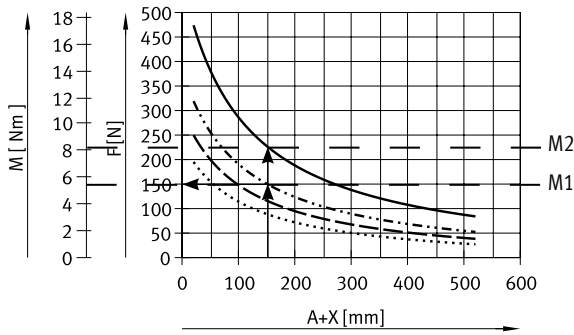
Data sheet

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

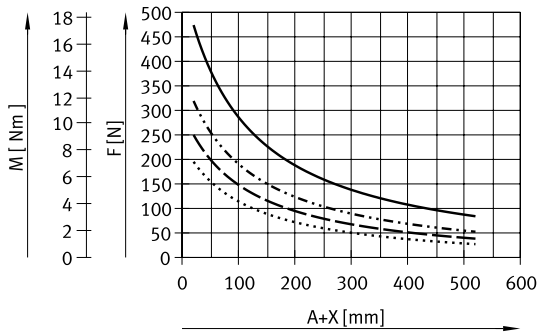
Explanation of how to read graphs in the case of a combined load



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

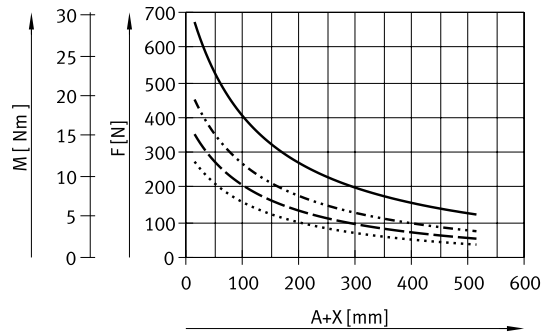
- Running performance of 500 km
- ..... Running performance of 2500 km
- - - Running performance of 5000 km
- ..... Running performance of 10000 km

Size: 32



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

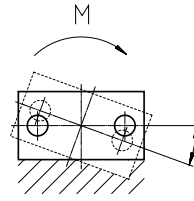
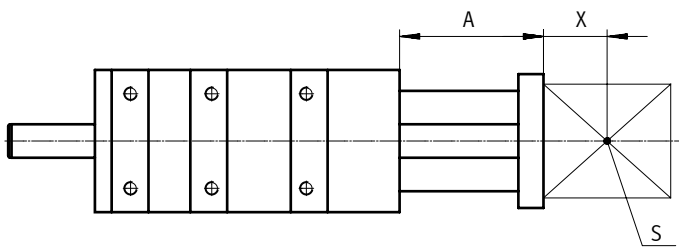
Size: 40





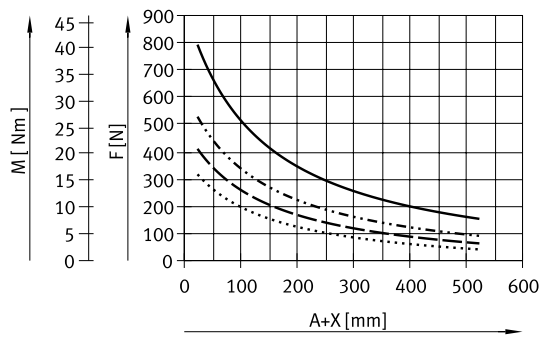
Data sheet

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

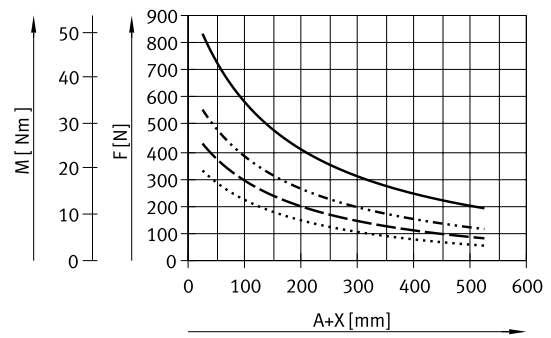


- A = Cantilever load
- X = Distance to centre of gravity of the payload
- S = Centre of gravity of the payload
- M = Torque

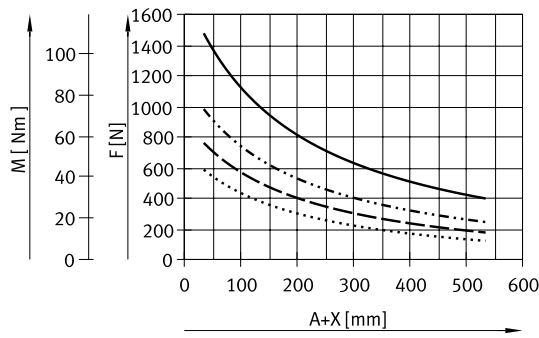
Size: 50



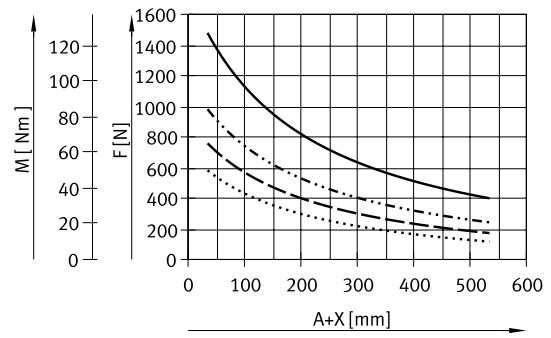
Size: 63



Size: 80



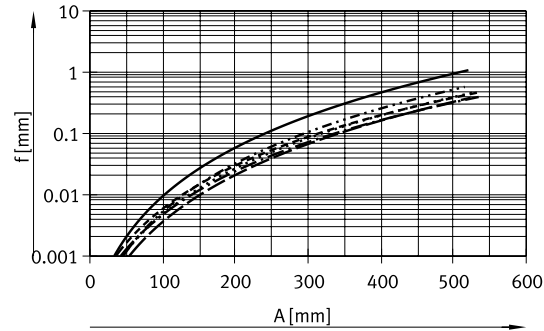
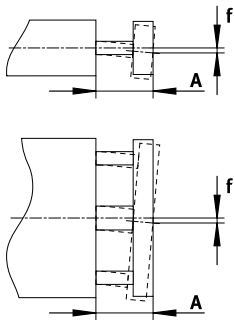
Size: 100



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

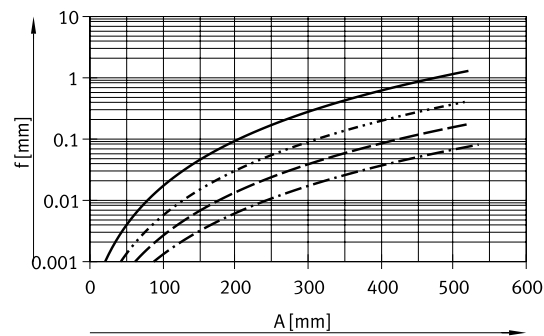
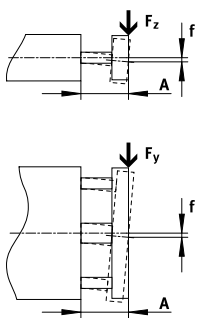
## Data sheet

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



- EAGF-V2-KF-32
- · - · - EAGF-V2-KF-40
- - - EAGF-V2-KF-50
- · · · · EAGF-V2-KF-63
- · - · - EAGF-V2-KF-80
- - - EAGF-V2-KF-100

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



- EAGF-V2-KF-32
- · - · - EAGF-V2-KF-40
- - - EAGF-V2-KF-50/  
EAGF-V2-KF-63
- · - · - EAGF-V2-KF-80/  
EAGF-V2-KF-100

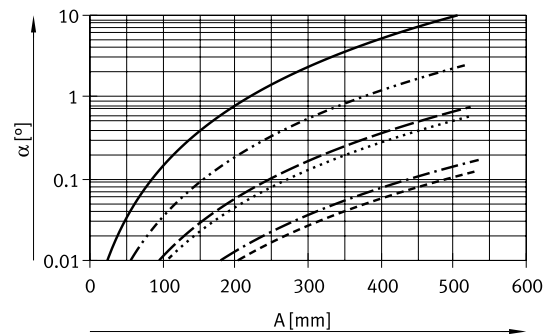
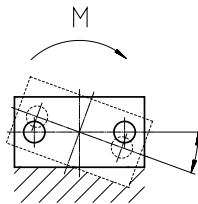
The maximum permissible lateral force must not be exceeded.

$$f_1 = \frac{F_1}{F_2} \cdot f_2$$

$$F_2 = 10 \text{ N}$$

- A = Cantilever load of guide rod
- $f_1$  = Deflection due to lateral force
- $F_1$  = Lateral force
- $F_2$  = Standardised lateral force
- $f_2$  = Deflection due to standardised lateral force (value from graph)

### Incline $\alpha$ (due to torque) as a function of cantilever load A



- EAGF-V2-KF-32
- · - · - EAGF-V2-KF-40
- - - EAGF-V2-KF-50
- · · · · EAGF-V2-KF-63
- · - · - EAGF-V2-KF-80
- - - EAGF-V2-KF-100

$$\alpha_1 = \frac{M_1}{M_2} \cdot \alpha_2$$

$$M_2 = 2 \text{ Nm}$$

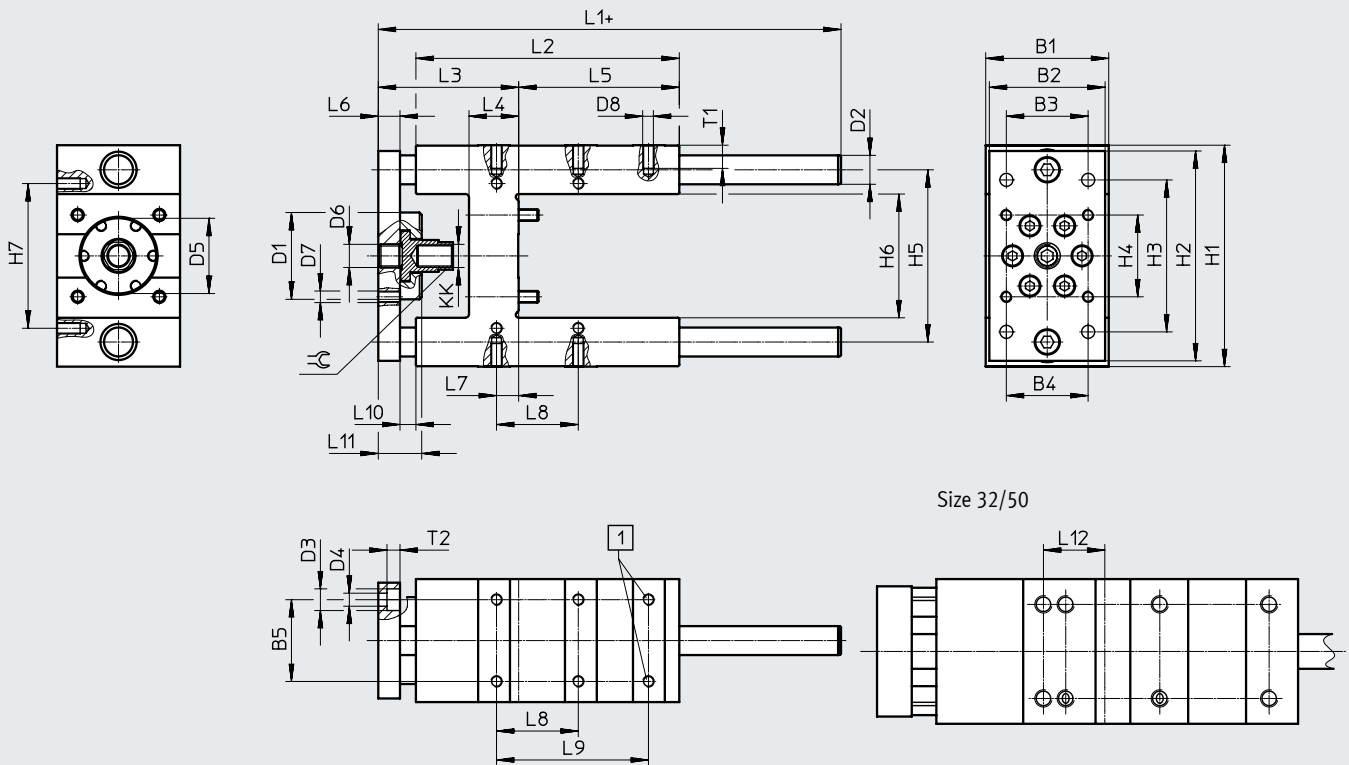
(valid for  $\alpha \leq 10^\circ$ )

- A = Cantilever load of guide rod
- $\alpha_1$  = Incline due to torque
- $M_1$  = Torque
- $M_2$  = Standardised torque
- $\alpha_2$  = Deflection due to standardised torque

Data sheet

Dimensions

Download CAD data → [www.festo.com](http://www.festo.com)



[1] These threads are omitted for sizes 80 and 100.

Size 32/50

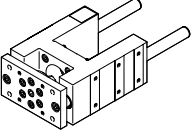
Size	B1	B2	B3	B4	B5	D1	D2	D3	D4	D5	D6	D7
	-0.3		±0.2	±0.2	±0.2	∅	∅ h6	∅	∅	∅ H8		
32	50	45	32.5	32.5	32.5	44	12	11	6.6	34	M6	M6
40	58	54	38	38	38	48	16	11	6.6	39	M8	M6
50	70	63	46.5	46.5	46.5	60	20	15	9	45	M8	M8
63	85	80	56.5	56.5	56.5	60	20	15	9	52	M16	M8
80	105	100	72	72	72	78	25	18	11	60	M18	M10
100	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	152	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	∅G1
						±0.2	±0.2						
32	69.5 <sup>+5</sup>	24	76	12	4.3	32.5	78	-	24	12	14	6.5	15
40	74.5 <sup>+5</sup>	28	81	15	11	38	84	-	27	-	14	6.5	15
50	94.5 <sup>+5</sup>	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

## Data sheet

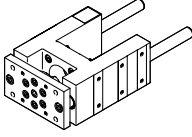
### ★ Core product range

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
	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
	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
	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

Festo core product range


- ★ Generally ready for dispatch from the factory within 24 hours
- ★ Generally ready for dispatch from the factory within 5 days

## Data sheet

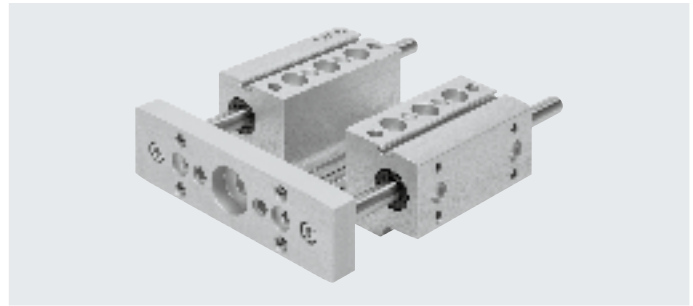
Ordering data Guide unit	Size	Stroke [mm]	Part no.	Type	
	32	1 ... 500	<b>3038083</b>	<b>EAGF-V2-KF-32-</b>	
	40	1 ... 500	<b>3038089</b>	<b>EAGF-V2-KF-40-</b>	
	50	1 ... 500	<b>3038094</b>	<b>EAGF-V2-KF-50-</b>	
	63	1 ... 500	<b>2608521</b>	<b>EAGF-V2-KF-63-</b>	
	80	100		<b>1725846</b>	<b>EAGF-V2-KF-80-100</b>
		200		<b>1725847</b>	<b>EAGF-V2-KF-80-200</b>
		320		<b>1725848</b>	<b>EAGF-V2-KF-80-320</b>
		400		<b>1725849</b>	<b>EAGF-V2-KF-80-400</b>
		1 ... 550		<b>2608528</b>	<b>EAGF-V2-KF-80-</b>
	100	100		<b>1725850</b>	<b>EAGF-V2-KF-100-100</b>
		200		<b>1725851</b>	<b>EAGF-V2-KF-100-200</b>
		320		<b>1725852</b>	<b>EAGF-V2-KF-100-320</b>
		400		<b>1725853</b>	<b>EAGF-V2-KF-100-400</b>
		1 ... 550		<b>2608532</b>	<b>EAGF-V2-KF-100-</b>

## Data sheet

⊘ Diameter  
16, 25, 40 mm

 [www.festo.com](http://www.festo.com)

┆ 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		
Guide		Recirculating ball bearing guide		
Displacement force	[N]	3.2	4	6
Reversing backlash	[μm]	0		
Permissible speed	[m/s]	1		
Permissible acceleration	[m/s <sup>2</sup> ]	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 humidity		0 ... 95 (non-condensing)		
Degree of protection		IP40		
Corrosion resistance class CRC <sup>1)</sup>		1		

1) Corrosion resistance class CRC 1 according to Festo standard FN 940070

Low corrosion stress. Dry indoor application or transport and storage protection. Also applies to parts behind coverings, in the non-visible interior area, and parts which are covered in the application (e.g. drive trunnions).

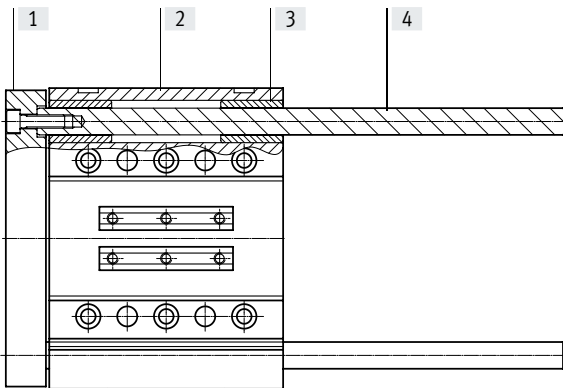
Weight [g] (for calculation → page 16)				
Size		16	25	40
Basic weight with 0 mm stroke		600	1080	1910
Additional weight per 10 mm stroke		8	12	18
Moving mass at 0 mm stroke		160	300	560
Additional mass per 10 mm stroke		8	12	18

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

## Data sheet

### Materials

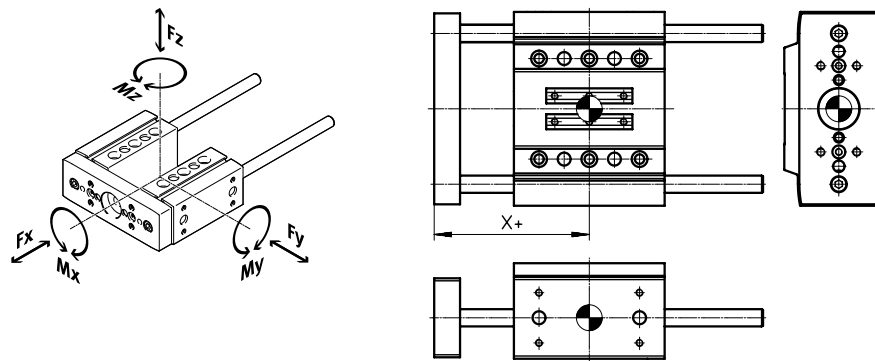
#### Sectional view



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 centre of the guide.



If the guide unit simultaneously subjected to several of the indicated forces and torques, the following equation must be satisfied in addition to the indicated maximum loads:

Calculating the load comparison factor:

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

$F_1/M_1$  = dynamic value

$F_2/M_2$  = maximum value

#### 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
<b>Static</b>			
$F_{Vmax}/F_{Zmax}$ [N]	355	415	510
$M_{Xmax}$ [Nm]	13	19	27
$M_{Ymax}/M_{Zmax}$ [Nm]	9	12	20
<b>Dynamic (for a service life of 5000 km)</b>			
$F_{Vmax}/F_{Zmax}$ [N]	160	320	380
$M_{Xmax}$ [Nm]	6	15	20
$M_{Ymax}/M_{Zmax}$ [Nm]	4	10	15

## Data sheet

### 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 contact person at Festo for load comparison factors  $f_v$  greater than 1.5.

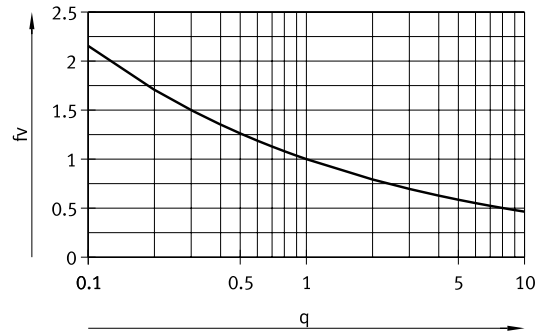
#### Load comparison factor $f_v$ as a function of service life ratio $q$

Example: The effect on the service life, deviating from the specified reference service life, can be determined using the service life ratio  $q$ :

Given: Reference service life = 5000 km  
 Required service life = 3000 km

$$q = \frac{3000 \text{ km}}{5000 \text{ km}} = 0,6$$

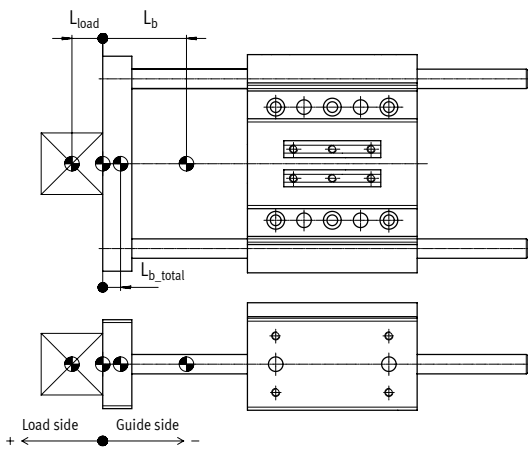
The graph gives a load comparison factor  $f_v$  of 1.2. This means that the permissible total load can be utilised up to 120%.



 **Note**  
 Engineering software  
 PositioningDrives  
[www.festo.com](http://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 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  $M_{x\_dyn}/M_{y\_dyn}/M_{z\_dyn}$
- Proof of functionality with combined load
- Expected service life



## Data sheet

### Calculation example

Solution:

Moving mass:

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

From table → page 14

$$m_{0b} = 0.3 \text{ kg}$$

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

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

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

$m_b$  = Moving mass of the guide unit

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

$m_{Hb}$  = Additional mass per 10 mm stroke

$H$  = Stroke length

### Centre of gravity of the moving mass

$$L_{b\_ges} = \frac{L_1 \cdot m_1 + L_b \cdot m_b}{m_{b\_ges}} \quad (L_b = L_{0b} + H \times L_{Hb})$$

From table → page 14

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

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

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

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

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

$m_b$  = Moving mass of the guide unit

$L_1$  = Centre of gravity of payload

$m_1$  = 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 $M_{x\_dyn}/M_{y\_dyn}/M_{z\_dyn}$

$$F_{y\_dyn} = m_{b\_total} \times a_y = 2.54 \text{ kg} \times 2 \text{ m/s}^2 = 5 \text{ N}$$

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

From table → page 15

Dimension X = 59 mm

$$M_{y\_dyn} = F_{z\_dyn} \times (\text{dimension X} + \text{stroke} + L_{b\_total}) = 25 \text{ N} \times (59 \text{ mm} + 200 \text{ mm} + (-14 \text{ mm})) = 6.1 \text{ Nm}$$

$$M_{z\_dyn} = F_{y\_dyn} \times (\text{dimension X} + \text{stroke} + L_{b\_total}) = 5 \text{ N} \times (59 \text{ mm} + 200 \text{ mm} + (-14 \text{ mm})) = 1.2 \text{ Nm}$$

### Proof of functionality with combined load

Max. values from table → page 15

$$F_{y\_max} = 320 \text{ N}$$

$$F_{z\_max} = 320 \text{ N}$$

$$M_{x\_max} = 15 \text{ Nm}$$

$$M_{y\_max} = 10 \text{ Nm}$$

$$M_{z\_max} = 10 \text{ Nm}$$

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

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

$F_1/M_1$  = dynamic value

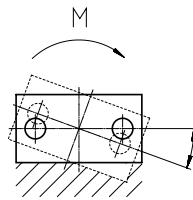
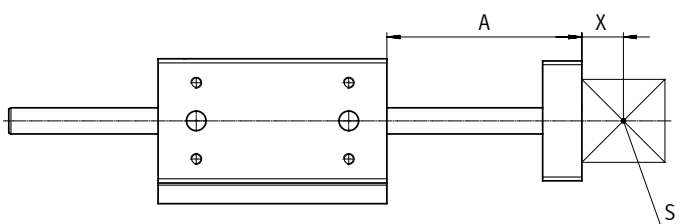
$F_2/M_2$  = maximum value

### Expected service life

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

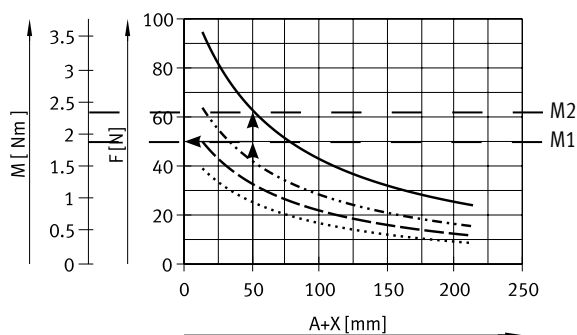
## Data sheet

### 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

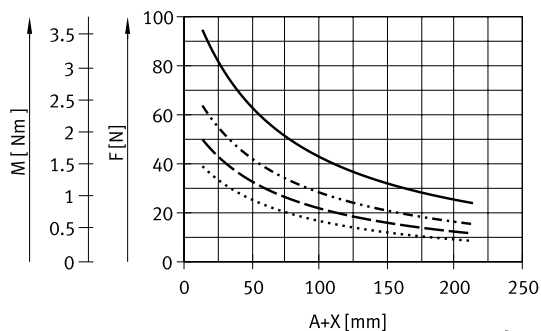
### Explanation of how to read graphs in the case of a combined load



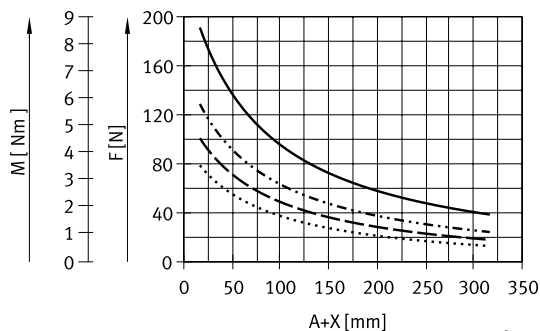
- Determine cantilever load (50 mm)
- Enter lateral force (50 N)
- Enter distance from curve
- Permitted torque is the difference between M2 and M1

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

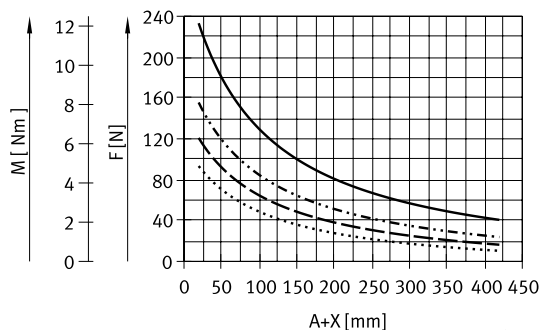
### Size: 16



### Size: 25



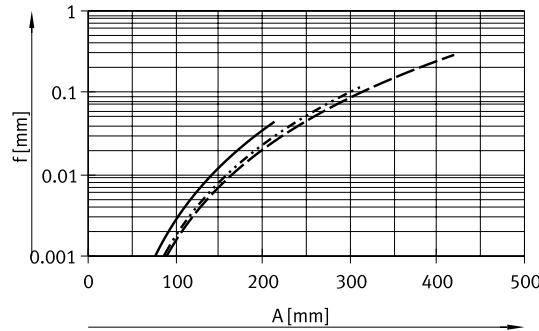
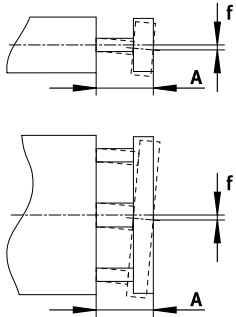
### Size: 40



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

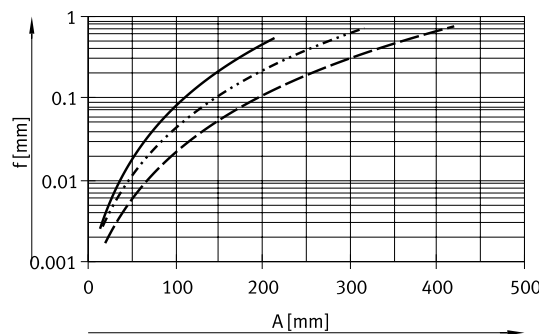
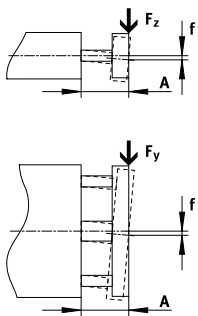
Data sheet

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

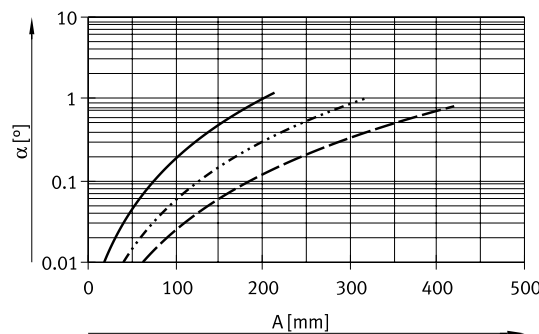
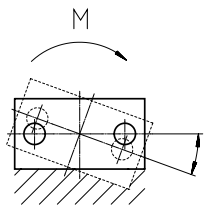
The maximum permissible lateral force must not be exceeded.

$$f_1 = \frac{F_1}{F_2} \cdot f_2$$

$$F_2 = 10 \text{ N}$$

- A = Cantilever load of guide rod
- $f_1$  = Deflection due to lateral force
- $F_1$  = Lateral force
- $F_2$  = Standardised lateral force
- $f_2$  = Deflection due to standardised lateral force (value from graph)

Incline  $\alpha$  (due to torque) as a function of cantilever load A



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

$$\alpha_1 = \frac{M_1}{M_2} \cdot \alpha_2$$

$$M_2 = 2 \text{ Nm}$$

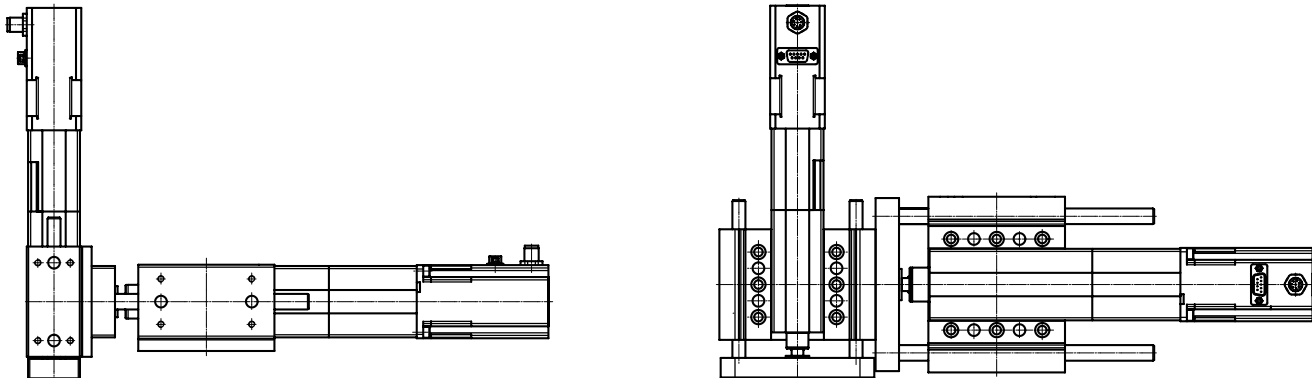
(valid for  $\alpha \leq 10^\circ$ )

- A = Cantilever load of guide rod
- $\alpha_1$  = Incline due to torque
- $M_1$  = Torque
- $M_2$  = Standardised torque
- $\alpha_2$  = Deflection due to standardised torque

## Data sheet

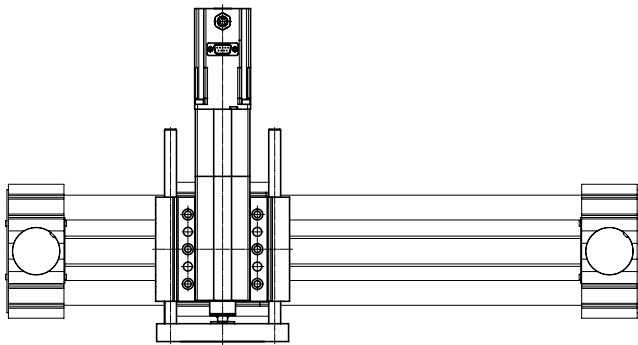
### Possible combinations with other drives/axes via direct mounting

Guide unit EAGF with electric cylinder EPCO and guide unit EAGF



Size	Base axis	
	EAGF-P1-KF-25	EAGF-P1-KF-40
<b>Assembly axis</b>		
EAGF-P1-KF-16	■	-
EAGF-P1-KF-25	-	■

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

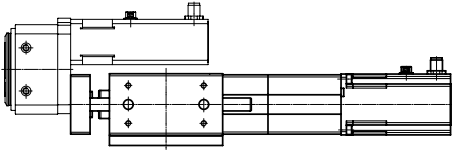


Size	Base axis		
	ELGR-TB-35	ELGR-TB-45	ELGR-TB-55
<b>Assembly axis</b>			
EAGF-P1-KF-16	■	-	-
EAGF-P1-KF-25	-	■	-
EAGF-P1-KF-40	-	-	■

## Data sheet

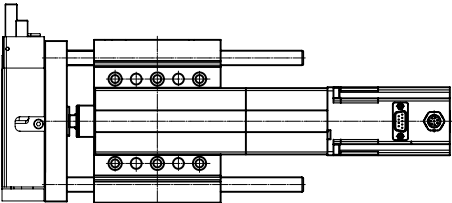
### Possible combinations with other drives/axes via direct mounting

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
<b>Assembly axis</b>			
ERMO-12	■	-	-
ERMO-16	-	■	-
ERMO-25	-	-	■

Mini slide DGSL with electric cylinder EPCO and guide unit EAGF



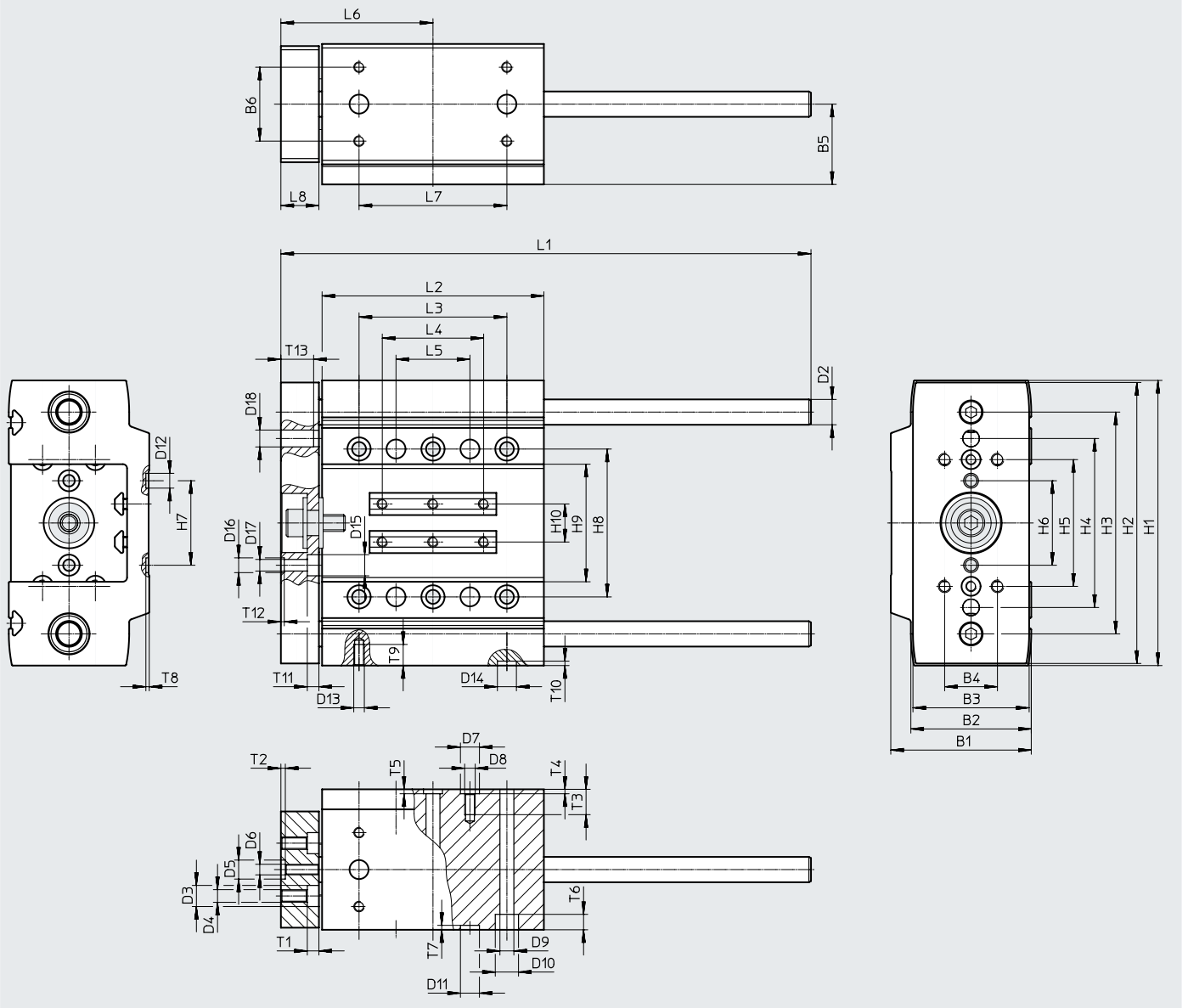
Size	Base axis		
	EAGF-P1-KF-16	EAGF-P1-KF-25	EAGF-P1-KF-40
<b>Assembly axis</b>			
DGSL-8-40 <sup>1)</sup>	■	-	-
DGSL-10-30 <sup>1)</sup>	-	■	-
DGSL-12-40 <sup>1)</sup>	-	-	■

1) Minimal stroke

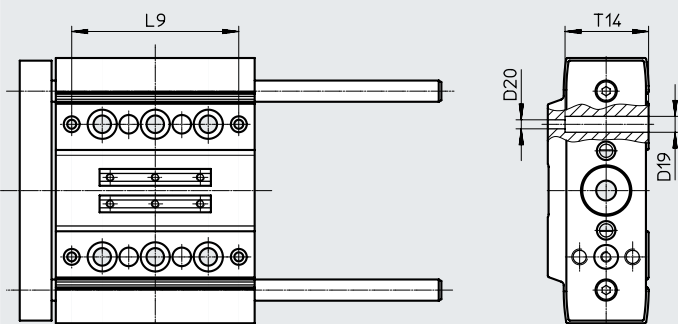
Data sheet

Dimensions

Download CAD data → [www.festo.com](http://www.festo.com)



Size: 16



## Data sheet

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 <sup>H7</sup>	–	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

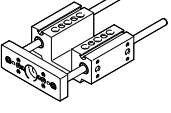
Size	L1	L2	L3 ±0.05	L4	L5 ±0.05	L6	L7 ±0.05	L8	L9 ±0.1	T1	T2 +0.1
16	109 + stroke	75	40	34	20	51	50	12	63	–	2.1
25	124 + stroke	85	50	40	25	59	60	15	–	5.5	2.1
40	151 + stroke	105	70	48	35	72	70	18	–	5.5	2.1

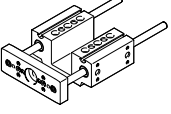
  



Size	T3	T4 +0.1	T5 +0.1	T6	T7 +0.1	T8 +0.1	T9	T10 +0.1	T11	T12 +0.1	T13 ±1	T14
16	15.5	2.1	2.1	6.5	1.6	1.6	8.5 <sub>-0.5</sub>	2.1	4.4	1.6	–	31.5
25	14	2.1	2.1	6.4	2.1	1.6	Min. 10	2.1	5.7	1.6	12.5	–
40	12	2.1	2.1	7.3	2.1	1.6	Min. 10	2.1	5.5	1.6	15.5	–

## Data sheet

### ★ Core product range

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
	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
	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

Ordering data				
Guide unit	Size	Stroke [mm]	Part no.	Type
	16	75, 125, 175	3192939	EAGF-P1-KF-16-
		25	75, 125, 175, 250	3192952
	40	75, 125, 175, 250 350, 400	3192966	EAGF-P1-KF-40-

Accessories					
Ordering data					
	For size	Description	Part no.	Type	PU <sup>1)</sup>
<b>Centring sleeve</b>					
	16, 25, 40	For centring the drive or attachments	186717	ZBH-7	10
			8137184	ZBH-9-B	
<b>Connector sleeve</b>					
	16	For centring the drive or attachments	548805	ZBV-9-7	10

1) Packaging unit