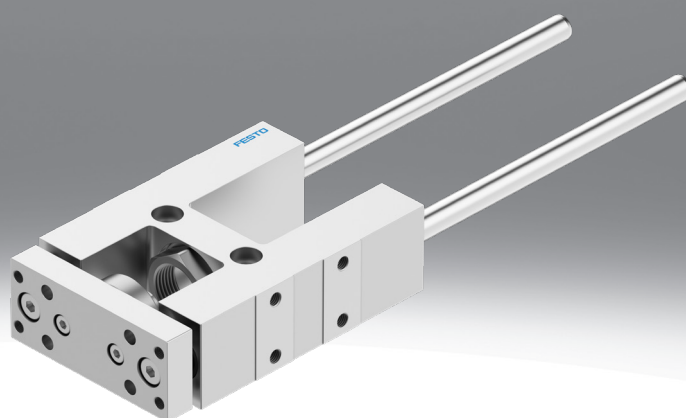


Guide unit, metric FEN

FESTO



Characteristics

At a glance

[Link](#)  [fen](#)

The guide units FEN are used to protect round cylinders DSNU against torsion when these are subjected to high torque loads. They offer a high level of guide precision for workpiece handling and other applications.

There are two guide variants to choose from:

- [GF] Plain-bearing guide
- [KF] Recirculating ball bearing guide

Position sensing:

- By using proximity switches, any position can be detected.
- For round cylinders DSNU, a mounting kit is required to sense the end positions.

Additional documents

[Link](#)  [fen](#)



In the additional document FEN-FENG-ADD you will find calculation examples.

Diagrams

[Link](#)  [fen](#)



The diagrams shown in this document are also available online. These can be used to display precise values.

Type code

001	Series	
FEN	Guide unit for standards-based cylinder to ISO 6432	

002	Size	
12/16	12/16 mm	
20	20 mm	
25	25 mm	

003	Stroke range [mm]	
...	1 ... 250	

004	Guide	
GF	Plain bearing	
KF	Recirculating ball bearing guide	

Datasheet

General technical data

Size	12/16 mm	20 mm	25 mm
Stroke	1 ... 200 mm	2 ... 250 mm	
Design	Guidance		
Guide	Plain-bearing guide Recirculating ball bearing guide		
Displacement force	15 N		
Type of mounting	Via female thread		
Mounting position	optional		
Ambient temperature	-20 ... 80°C		

Weight

Size	12/16 mm		20 mm		25 mm	
Guide	Plain bearing	Recirculating ball bearing guide	Plain bearing	Recirculating ball bearing guide	Plain bearing	Recirculating ball bearing guide
Basic weight for 0 mm stroke	490 g	429 g	873 g	828 g	866 g	813 g
Additional weight per 10 mm stroke	12 g					
Moving mass for 0 mm stroke	161 g		269 g			
Additional moving mass per 10 mm stroke	12 g					

Centre of gravity of the moving mass

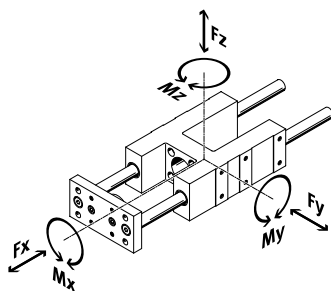
Size	12/16 mm	20 mm	25 mm
Centre of gravity at 0 mm stroke	40 mm	42 mm	
Centre of gravity additional of moving mass per 10 mm	4.9 mm	4.7 mm	

Materials

Size	12/16 mm		20 mm		25 mm	
Guide	Plain bearing	Recirculating ball bearing guide	Plain bearing	Recirculating ball bearing guide	Plain bearing	Recirculating ball bearing guide
Material housing	Anodised wrought aluminium alloy					
Material guide component	High-alloy steel	Tempered steel	High-alloy steel	Tempered steel	High-alloy steel	Tempered steel
Material yoke plate	Anodised wrought aluminium alloy					
Note on materials	RoHS-compliant					
LABS (PWIS) conformity	VDMA24364-B2-L					

Datasheet

Load values



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

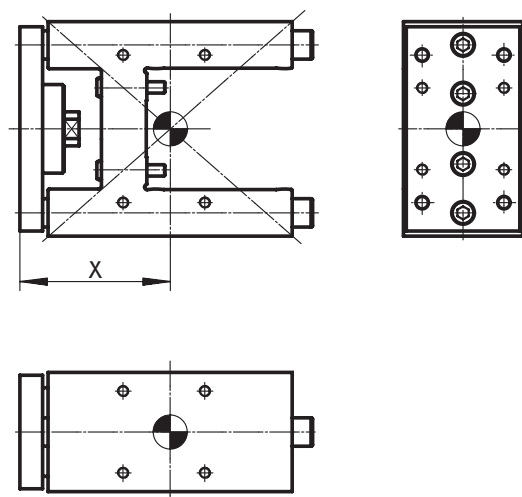
Size	12/16 mm	20 mm	25 mm
Max. force Fy static	830 N		
Max. force Fz static	830 N		
Max. torque Mx static	20 Nm	24 Nm	
Max. torque My static	12 Nm	31 Nm	
Max. torque Mz static	12 Nm	31 Nm	
Max. force Fy	520 N		
Max. force Fz	520 N		
Max. moment Mx	12 Nm	15 Nm	
Max. moment My	7 Nm	20 Nm	
Max. moment Mz	7 Nm	20 Nm	

Load characteristics – Calculation of the load comparison factor

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

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:

Load parameters – position of the centre of the guide

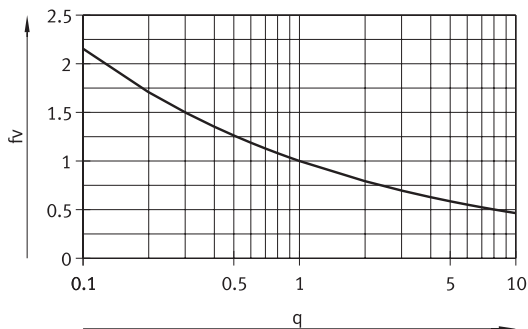


Distance X:

- FEN-12/16-...-KF: 68 mm
- FEN-20 ... 25-...-KF: 69 mm

Datasheet

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 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 :

Where:

Reference service life = 5000 km

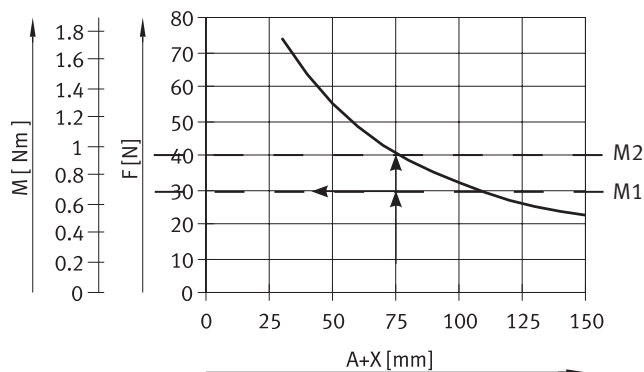
Required service life = 3000 km

$$q = (3000 \text{ km} / 5000 \text{ km}) = 0.6$$

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

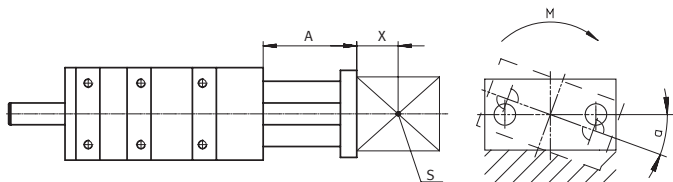
$f_v > 1.5$ are only theoretical comparison values.

Max. payload F and torque M as a function of projection A – Explanation of how to read the graphs in the case of a combined load



- Determine projection (75 mm)
- Enter proportion of payload (30 N)
- Enter distance from curve
- Permitted torque is the difference between M2 and M1

Max. payload F and torque M as a function of projection A – FEN-...-GF



A = projection

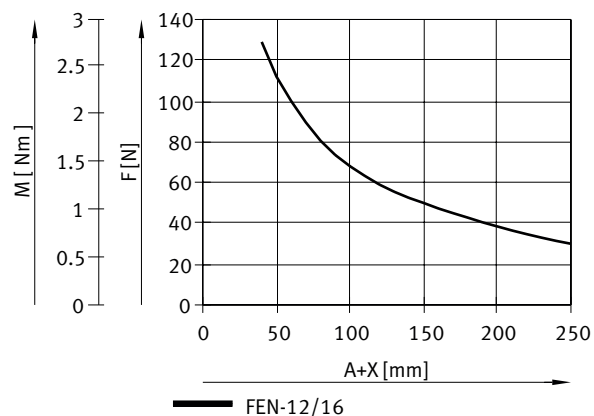
X = distance to the centre of gravity of the payload

S = centre of gravity of the payload

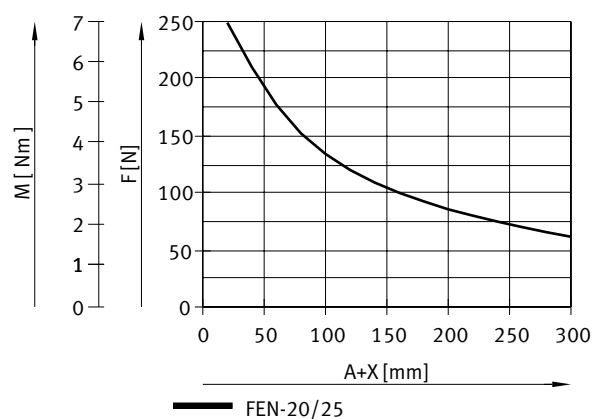
M = torque

Datasheet

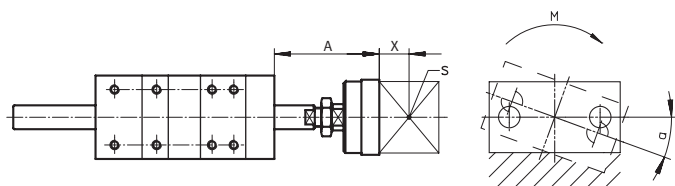
Max. payload F and torque M as a function of projection A – FEN-12 ... 16-GF



Max. payload F and torque M as a function of projection A – FEN-20 ... 25-GF



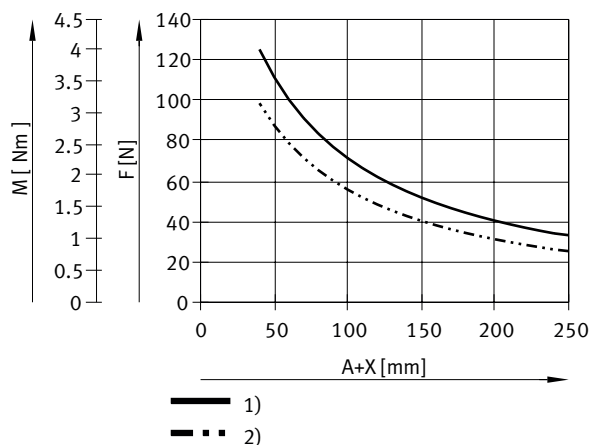
Max. payload F and torque M as a function of projection A – FEN-...-KF



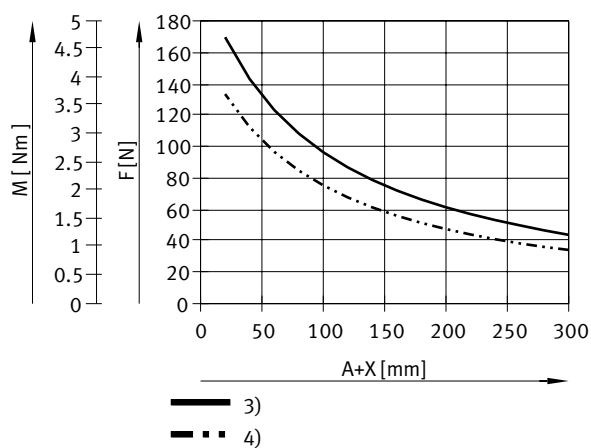
A = projection
 X = distance to the centre of gravity of the payload
 S = centre of gravity of the payload
 M = torque

Datasheet

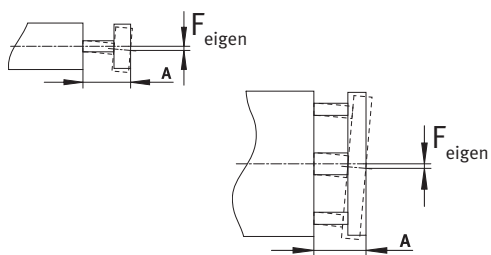
Max. payload F and torque M as a function of projection A - FEN-12 ... 16-KF



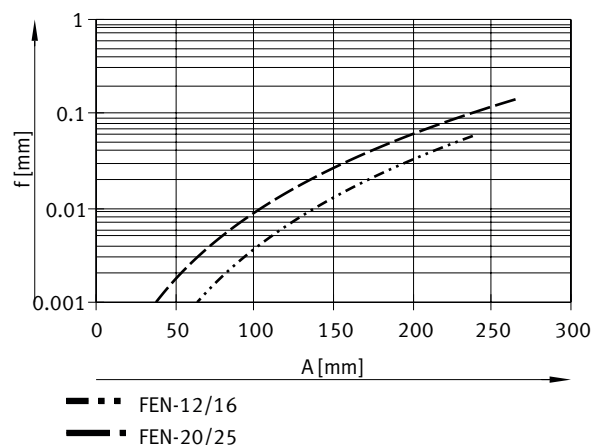
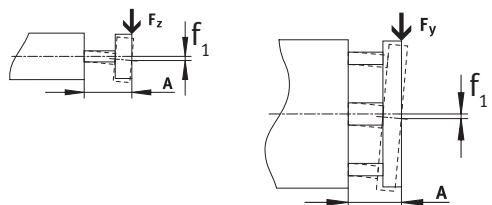
Max. payload F and torque M as a function of projection A - FEN-20 ... 25-KF



Deflection Ftare (due to tare weight) as a function of projection A



Datasheet

Deflection f_{tare} (due to tare weight) as a function of projection A – FEN-12 ... 25-GF/KFDeflection $f_{standard}$ (due to lateral force) as a function of projection A

The maximum permissible lateral force must not be exceeded.

$$f_1 = (F_1/F_2) \cdot f_2$$

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

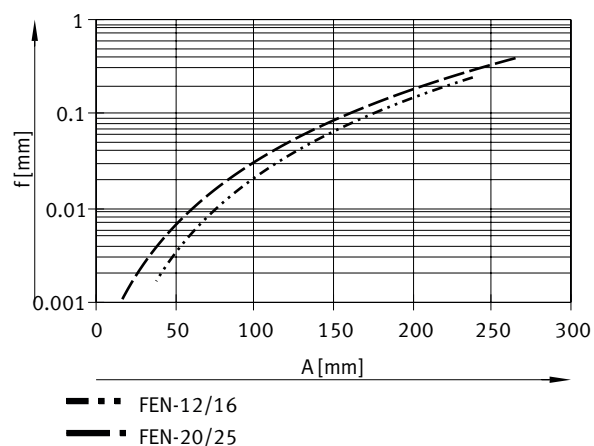
A = projection for guide rod

f_1 = deflection due to lateral force

F_1 = lateral force

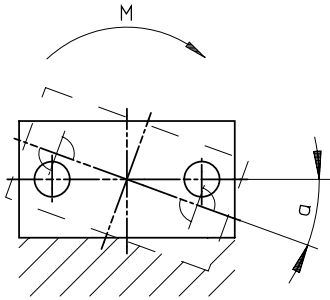
F_2 = standardised lateral force

f_2 = deflection due to standardised lateral force (value from graph)

Deflection $f_{standard}$ (due to lateral force) as a function of projection A – FEN-12 ... 25-GF/KF

Datasheet

Incline a_1 (due to torque) as a function of projection A



$$a_1 = (M_1/M_2) \cdot a_2$$

$$M_2 = 2 \text{ Nm (valid for } \leq 10^\circ \text{)}$$

A = projection for guide rod

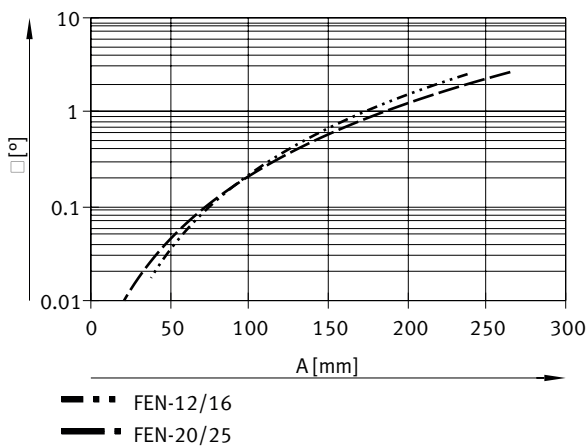
a_1 = incline due to torque

M_1 = torque

M_2 = standardised torque

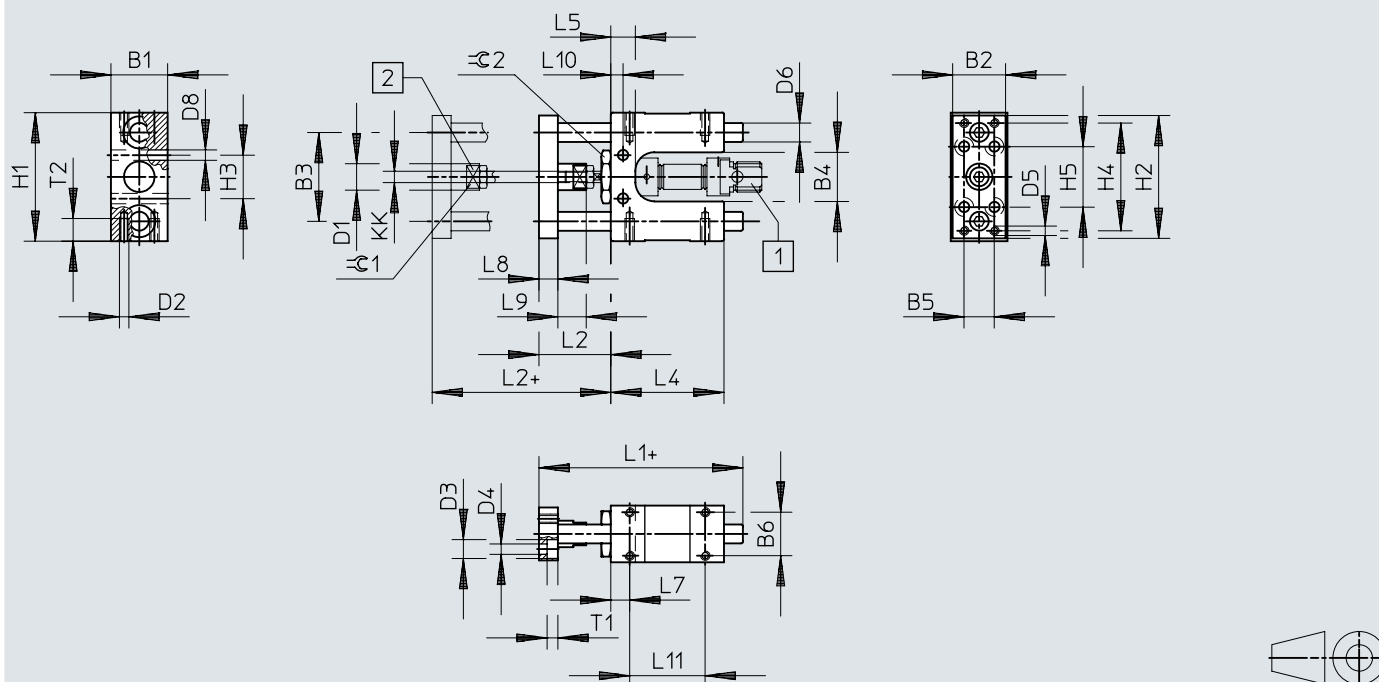
a_2 = deflection due to standardised lateral force

Incline a_1 (due to torque) as a function of projection A – FEN-12 ... 25-GF/KF



Dimensions

Dimensions – FEN-12 ... 16

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


- [1] Cylinder DSNU
 [2] Compensating coupling for radial and axial alignment
 [3] + = plus stroke length

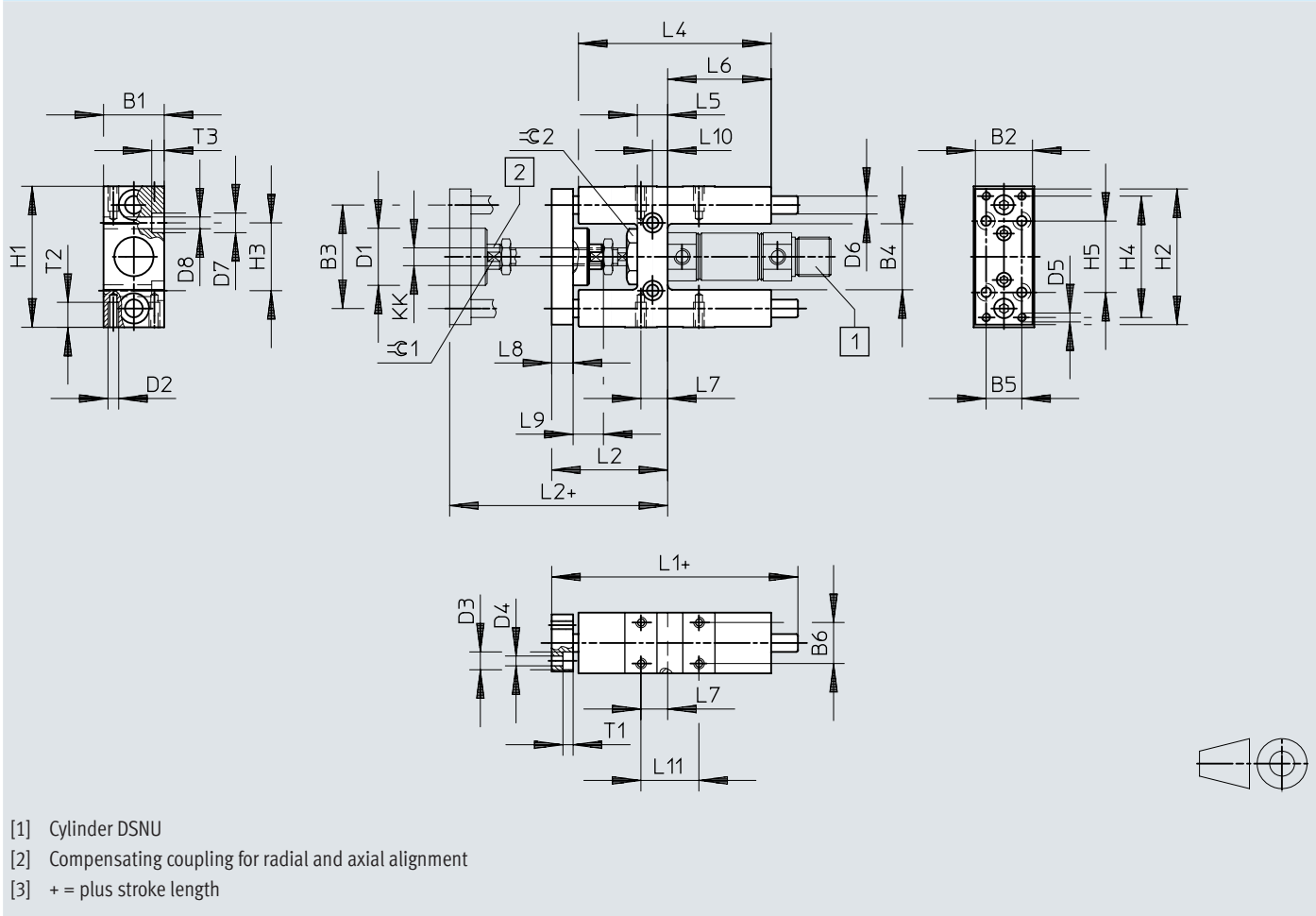
	B1	B2	B3	B4	B5	B6	D1	D2	D3	D4	D5	D6 ¹⁾	D8	H1	H2	H3
	-0,3		±0,15			±0,15	∅		∅	∅		∅	∅	-0,4		±0,15
FEN-12	30	28	47	26	16	23	14	M5	10	5,5	M5	10	5,5	68	65	23
FEN-16																

	H4	H5	KK	L1	L2	L4	L5	L7	L8	L9	L10	L11	T1	T2	≈G1	≈G2
					+5							±0,15				
FEN-12	57	32	M6	108	38	60	13	10	10	15	6,5	40	5,7	12	12	24
FEN-16																

1) FENG-...-GF: Tolerance class h8, FENG-...-KF: Tolerance class h7

Dimensions

Dimensions – FEN-20 ... 25 Download CAD data www.festo.com



	B1	B2	B3	B4	B5	B6	D1 Ø	D2	D3 Ø	D4 Ø	D5	D6 ¹⁾ Ø	D7 Ø	D8 Ø	H1	H2	H3	H4
	-0,3		±0,2												-0,4		±0,2	
FEN-20	34	32	58	37	20	23	32	M6	10	5,5	M5	10	11	6,6	79	76	38	68
FEN-25																		

	H5	KK	L1	L2	L4	L5	L6	L7	L8	L9	L10	L11	T1	T2	T3	≅G1	≅G2
				+5								±0,2					
FEN-20	40	M8	138	65	108	17	58	15	12	22	8,5	32,5	5,7	14	6,8	13	27
FEN-25		M10x1,25								17							

1) FENG-....GF: Tolerance class h8, FENG-....KF: Tolerance class h7

Ordering data

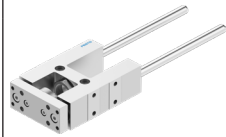
FEN-...-GF – variable strokes				
	Size	Stroke	Part no.	Type
	12/16 mm	1 ... 200 mm	19168	FEN-12/16- -GF
	20 mm	2 ... 250 mm	19169	FEN-20- -GF
	25 mm		19170	FEN-25- -GF

FEN-...-KF – variable strokes				
	Size	Stroke	Part no.	Type
	12/16 mm	1 ... 200 mm	33481	FEN-12/16- -KF
	20 mm	2 ... 250 mm	33482	FEN-20- -KF
	25 mm		33483	FEN-25- -KF

FEN-...-GF – fixed strokes				
	Size	Stroke	Part no.	Type
	12/16 mm	40 mm	8204041	FEN-12/16-40-GF
		80 mm	8204042	FEN-12/16-80-GF
		100 mm	8204043	FEN-12/16-100-GF
		125 mm	8204044	FEN-12/16-125-GF
		160 mm	8208450	FEN-12/16-160-GF
		200 mm	8204045	FEN-12/16-200-GF
	20 mm	50 mm	8204046	FEN-20-50-GF
		100 mm	8204047	FEN-20-100-GF
		125 mm	8204048	FEN-20-125-GF
		160 mm	8204049	FEN-20-160-GF
		200 mm	8204050	FEN-20-200-GF
		250 mm	8204051	FEN-20-250-GF
	25 mm	50 mm	8204052	FEN-25-50-GF
		80 mm	8204053	FEN-25-80-GF
		100 mm	8204054	FEN-25-100-GF
		125 mm	8204055	FEN-25-125-GF
		160 mm	8204056	FEN-25-160-GF
		200 mm	8204057	FEN-25-200-GF
		250 mm	8204058	FEN-25-250-GF

FEN-...-KF – fixed strokes				
	Size	Stroke	Part no.	Type
	12/16 mm	50 mm	8204025	FEN-12/16-50-KF
		80 mm	8204026	FEN-12/16-80-KF
		100 mm	8204027	FEN-12/16-100-KF
		125 mm	8204028	FEN-12/16-125-KF
		160 mm	8204029	FEN-12/16-160-KF
		200 mm	8204030	FEN-12/16-200-KF
	20 mm	50 mm	8204031	FEN-20-50-KF
		250 mm	8204032	FEN-20-250-KF
	25 mm	25 mm	8204033	FEN-25-25-KF
		50 mm	8204034	FEN-25-50-KF
		80 mm	8204035	FEN-25-80-KF
		100 mm	8204036	FEN-25-100-KF
		125 mm	8204037	FEN-25-125-KF
		160 mm	8204038	FEN-25-160-KF

Ordering data

FEN-...-KF – fixed strokes				
	Size	Stroke	Part no.	Type
	25 mm	200 mm	8204039	FEN-25-200-KF
		250 mm	8204040	FEN-25-250-KF

Accessories

Mounting kit SMBR-8-... – for round cylinder DSNU-....-A			
	Size	Part no.	Type
	12	175093	SMBR-8-12
	16	175094	SMBR-8-16
	20	175095	SMBR-8-20
	25	175096	SMBR-8-25