Electrical toothed belt axes with internal roller guide: DGE...-RF

Simply more dynamic!

FESTO

Festo is proud to announce a high-speed addition to the DGE family.
The internal roller guide means that your systems will now be even quieter, but still highly dynamic.

Info 130 →→

Pure dynamism:
The high-speed electrical axis
v_{max} = 10 m/s

The DGE-RF picks up where the electrical axis DGE-KF leaves off:

10 m/s?
The DGE-RF boasts extremely short cycle times, but with a minimum of noise!

10,000 km without lubrication?
The DGE-RF has sufficient grease reserves that can be easily replenished without having to access the housing.

Axes, motors, gearing, coupling and controller?
You get all of these with the DGE-RF – harmonised and of course extensively tested!

Standardised mechanical interfaces?
The DGE-RF adapts easily to the multi-axis modular system thanks to the concept of mounting options on three sides of the main profile.

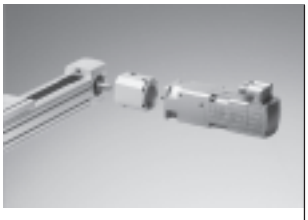
Motors from other suppliers?
The coupling concept supports the attachment of non-Festo drives.

The product advantages at a glance

When you need to up the tempo in production, there is only one choice: DGE-RF.

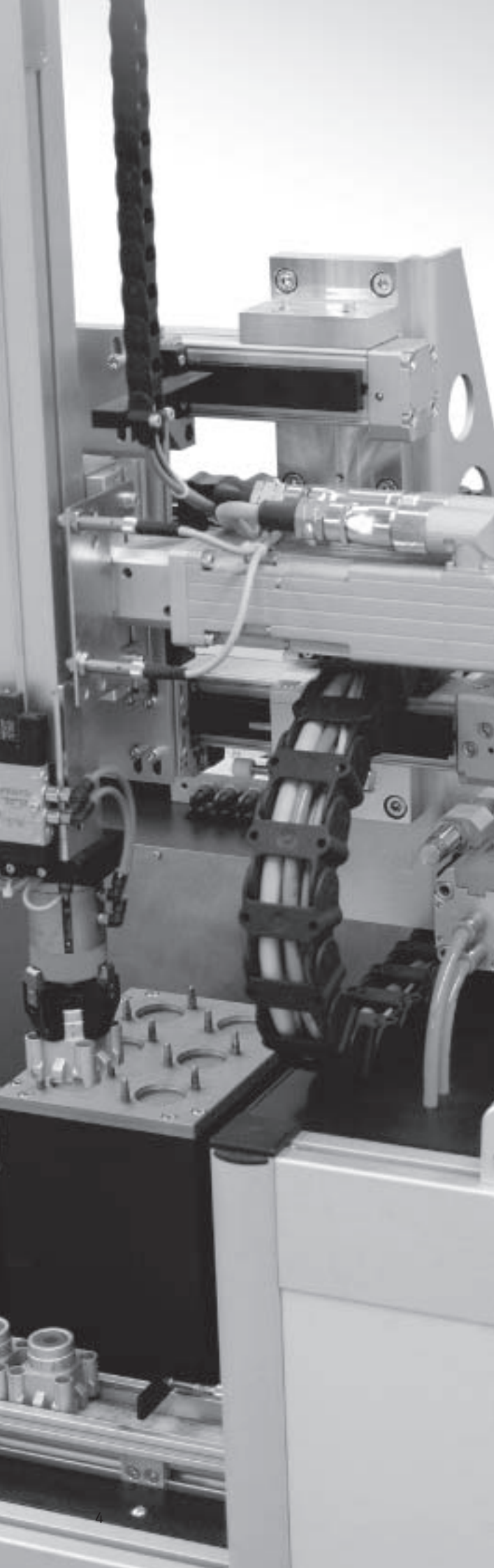
	Advantages for designers	Advantages for buyers
1. Maximum dynamic response, minimum noise	• 10 m/s • Extremely quiet • Extremely low-maintenance, up to 10,000 km without lubrication	• Outstanding economy thanks to higher cycle speeds
2. Member of the DGE family	• Easy planning thanks to harmonised components • Use of tried-and-tested attachments and accessories	• Use of pre-assembled drive packages • Simple warehousing thanks to the interchangeability of the components
3. Integrated in Festo's modular system for handling and assembly	• Easy assembly • Wide range of applications • Modular design • Standardised interfaces • Complete range of axes, motors, gear units and controllers	• Avoidance of costly special designs • High reliability of supply • Excellent worldwide support

Simple,



harmonised,

fits perfectly!



Systematically flexible and dynamic! Festo's electrical drives – setting new standards in motion.

The DGE-RF is just one of the many solutions we can provide to meet your drive requirements. At Festo, the offer of a range of motion options comes as standard.

Decisions about systems are so easy – with a partner who can offer a product range covering an entire motion spectrum and many decades of experience with drives.

So, which will it be?
– Electrical
– Pneumatic
– Servopneumatic

Electrical and pneumatic: A complete product range in terms of motion

Taking the modular handling system as an example:
Ready-to-install triple-axis handling system

- Electrical axes (DGE, DGEA)
  +
- Controllers and motors (SEC, MTR)
  +
- Pneumatic axes (DGPL, HMP, SLT)
  +
- Function units (DRQD, HGPP, HGPT)
  +
- Connectors
  +
- PLC (FEC)

= A ready-to-install multi-axis system

Decisions on systems? No problem!

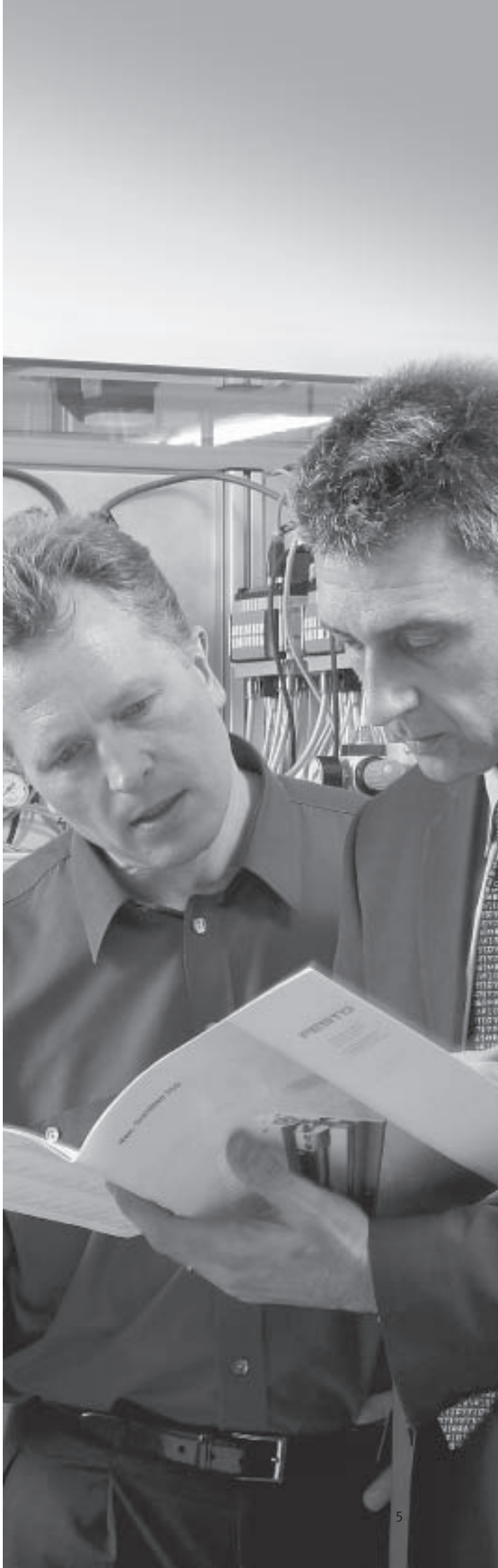
Specific tasks require special solutions. However the chosen solution should remain adaptable to new tasks ... not a problem with Festo thanks to its modular system for handling and assembly tasks. Maximum compatibility even for electrical drives.

Maximum productivity – minimum costs
Anyone with an eye on system costs should look at products and services from Festo.

After all, the only way to make your system truly profitable is through a combination of maximum product quality and first-class services. Through services tailored to your value-added chain as well as a systematic approach to consulting with your objective in mind: Maximum productivity with minimum costs.

Fast, dynamic or precise ...
... Which will it be?
Dynamic: Our electrical toothed belt drives.
Precise: Our electrical axes with spindle drives.
Simple, powerful and cost-effective: Our pneumatic axes.

Incredibly easy:
Multi-axis systems made up of pneumatic, servopneumatic and electrical drives.

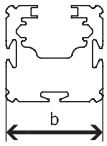


Toothed belt axes DGE-ZR-RF, with roller guide

Key features

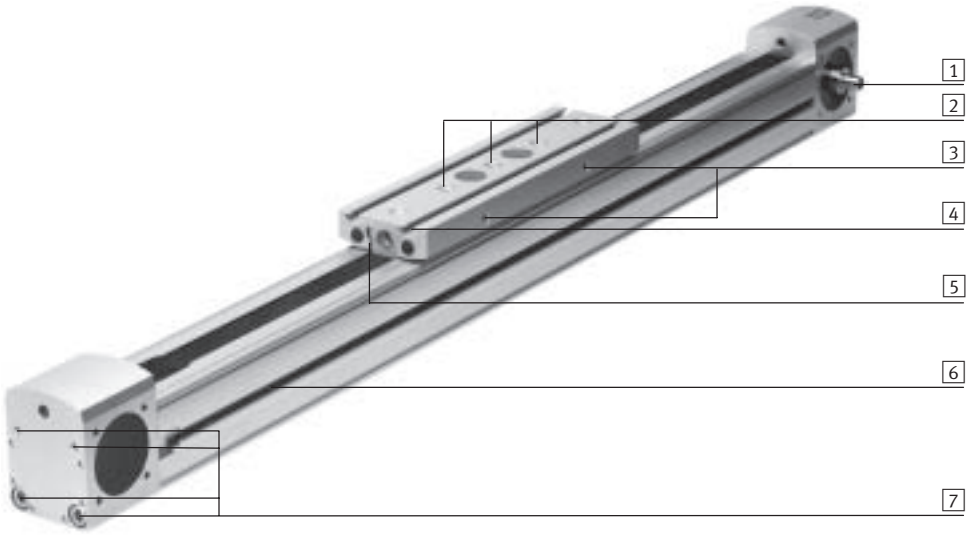
General data

- Internal, protected roller guide
- The roller guide, with its minimal friction, ensures smooth and quiet operation of the axis
- Mounting options on three sides of the profile
- Loads and devices can be directly mounted on the slide
- Slides in two lengths:
  - Standard slide GK
  - Extended slide GV
- Low-maintenance: Relubrication intervals of 10,000 km
- The grease reserves are replenished externally without having to open-up the housing
- Compatible with Festo's multi-axis modular system
- Profile width (see table)



Important data				
Size		25	40	63
Profile width b	[mm]	45	64	106
Max. working stroke	[mm]	5000	5000	5000
Max. working load	[kg]	15	30	60
Max. speed	[m/s]	10	10	10
Max. feed force	[N]	260	610	1500

At a glance



1 Drive shaft
2 Centring recesses and female thread:
Interface for attachments
3 Thread for mounting the switching lug
4 Interface for attachments
5 Lubrication nipple for relubricating the axis, available at both ends of the slide
6 Mounting facility for sensor bracket for inductive sensors
7 Thread for attaching the foot mounting

Toothed belt axes DGE-ZR-RF, with roller guide

Key features

System selection for electromechanical drives

Stepper motor controller
SEC-ST
➔ www.festo.com

Servo motor controller
SEC-AC
➔ www.festo.com

Stepper motor
MTR-ST
➔ www.festo.com

Servo motor
MTR-AC
➔ www.festo.com

Coupling
KSE-...
➔ www.festo.com

Motor flange
MTR-FL-...
➔ www.festo.com

Toothed belt axis
with roller bearing guide
DGE-...-ZR-RF-...

Toothed belt axis
with recirculating ball bearing guide
DGE-...-ZR-KF-...
➔ www.festo.com

Boom axis

DGEA-...-ZR-...
➔ www.festo.com

Spindle axis
with recirculating ball bearing guide
DGE-...-SP-...
➔ www.festo.com

Passive guide axis

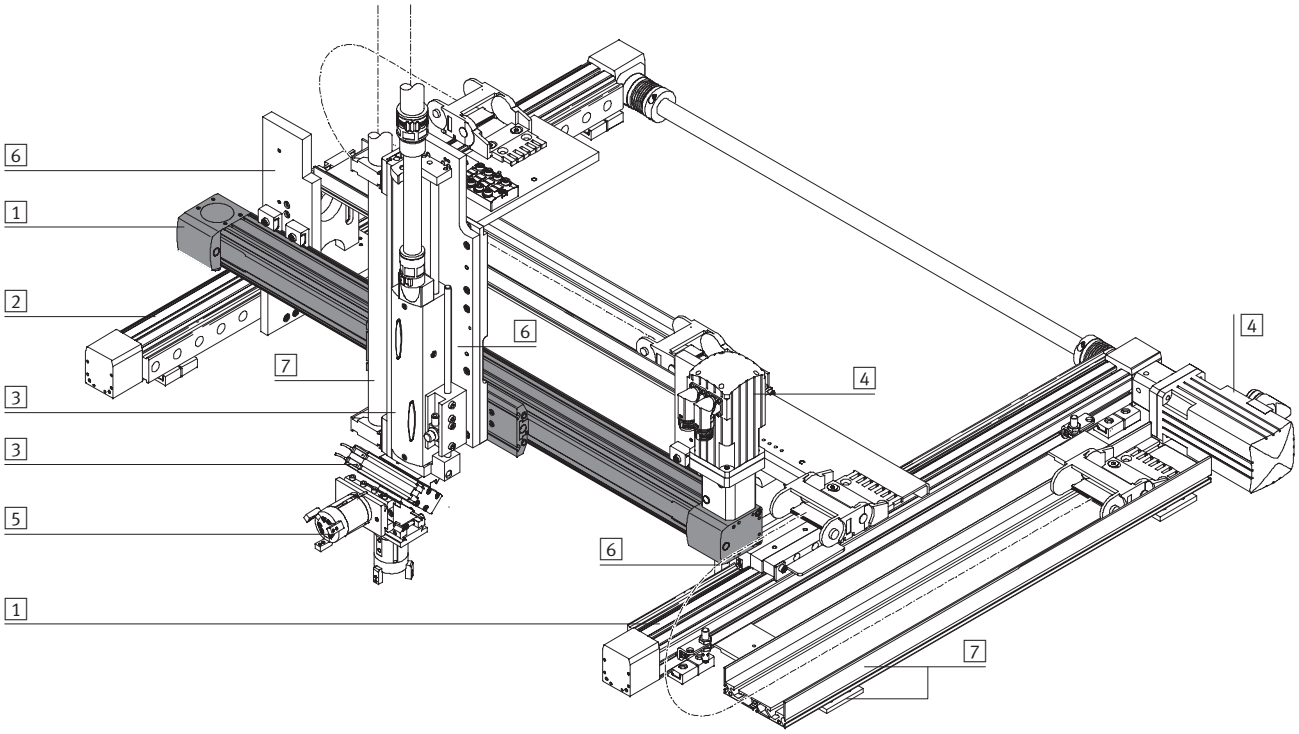
➔ 28

Driveless linear axis with guide and freely movable slide.
The passive guide axis is designed to increase force and torque capacities in multi-axis applications.

Toothed belt axes DGE-ZR-RF, with roller guide

System example

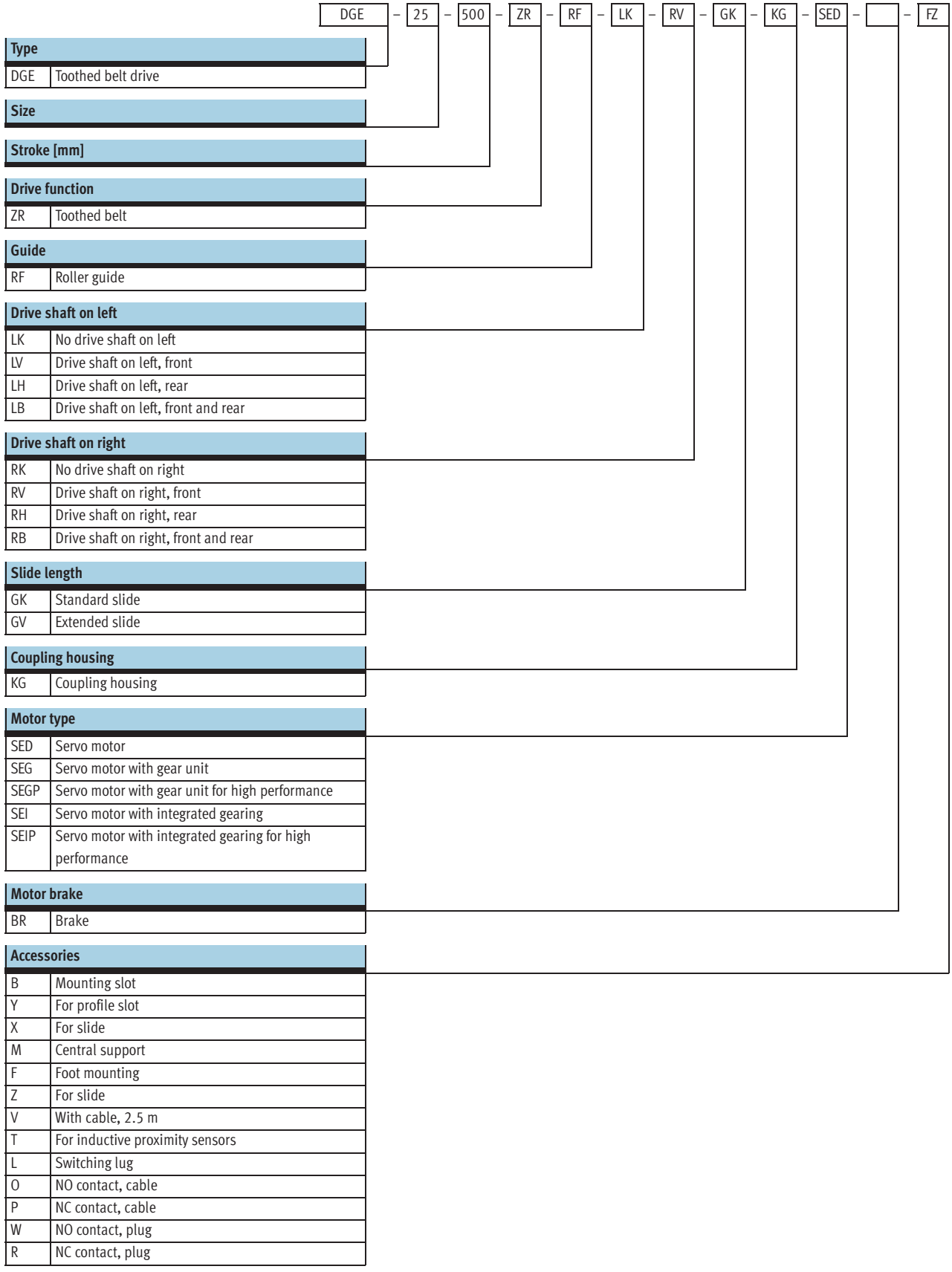
System product for handling and assembly technology



System components and accessories			
	Type	Brief description	➔ Page
1	Axes	Wide range of combination options within handling and assembly technology	www.festo.com
2	Passive guide axes	To sustain forces and torques in multiaxes applications	www.festo.com
3	Drives	Wide range of combination options within handling and assembly technology	www.festo.com
4	Motors	Servo and stepper motors, with or without gearing	www.festo.com
5	Grippers	Wide range of combination options within handling and assembly technology	www.festo.com
6	Adapters	For combining drives with drives and drives with grippers	www.festo.com
7	Installation components	For achieving a clear-cut, safe layout for electrical cables and tubing	www.festo.com

Toothed belt axes DGE-ZR-RF, with roller guide

Type code



Type	
DGE	Toothed belt drive

Size	

Stroke [mm]	

Drive function	
ZR	Toothed belt

Guide	
RF	Roller guide

Drive shaft on left	
LK	No drive shaft on left
LV	Drive shaft on left, front
LH	Drive shaft on left, rear
LB	Drive shaft on left, front and rear

Drive shaft on right	
RK	No drive shaft on right
RV	Drive shaft on right, front
RH	Drive shaft on right, rear
RB	Drive shaft on right, front and rear

Slide length	
GK	Standard slide
GV	Extended slide

Coupling housing	
KG	Coupling housing

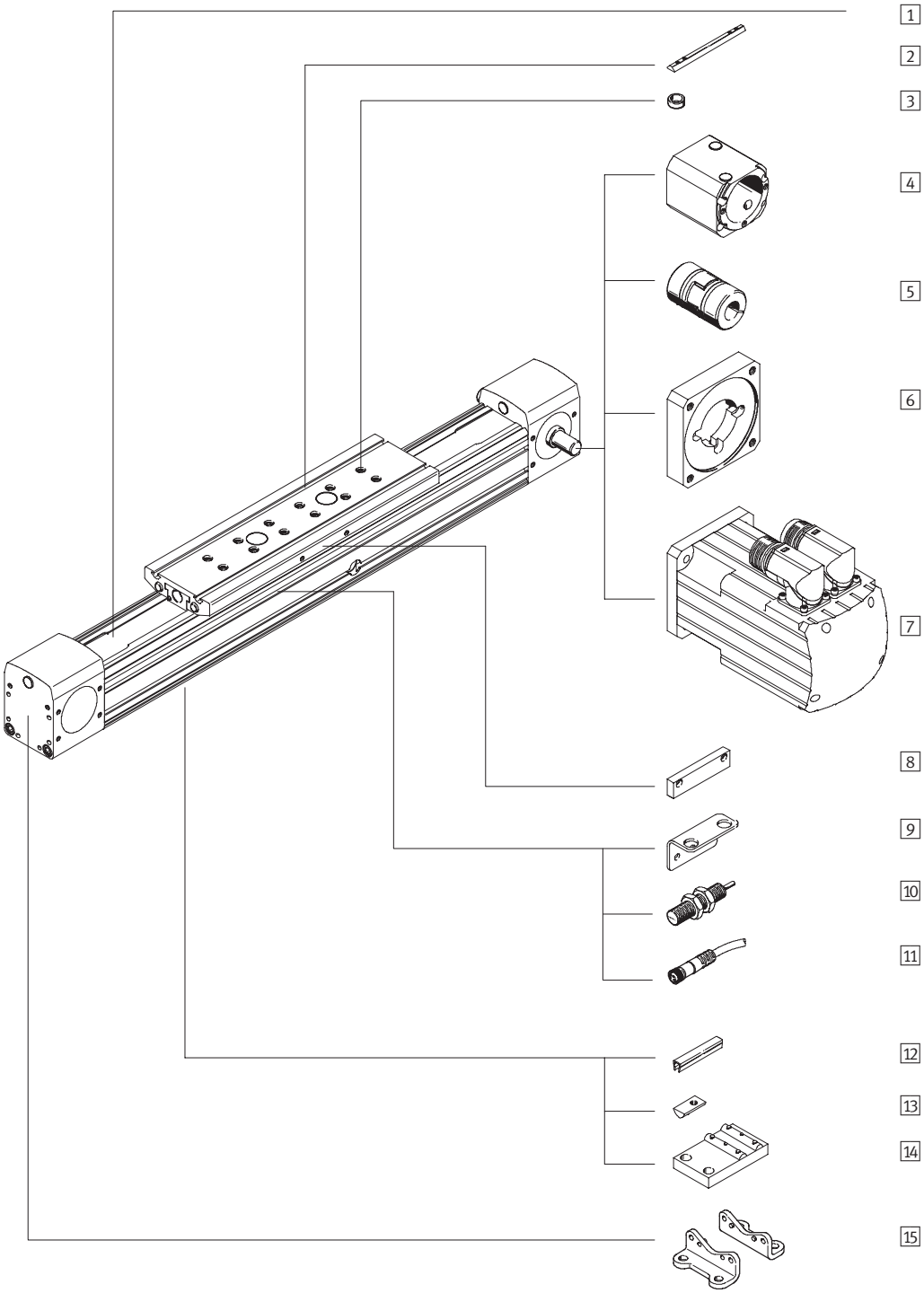
Motor type	
SED	Servo motor
SEG	Servo motor with gear unit
SEGP	Servo motor with gear unit for high performance
SEI	Servo motor with integrated gearing
SEIP	Servo motor with integrated gearing for high performance

Motor brake	
BR	Brake

Accessories	
B	Mounting slot
Y	For profile slot
X	For slide
M	Central support
F	Foot mounting
Z	For slide
V	With cable, 2.5 m
T	For inductive proximity sensors
L	Switching lug
O	NO contact, cable
P	NC contact, cable
W	NO contact, plug
R	NC contact, plug

Toothed belt axes DGE-ZR-RF, with roller guide

Peripherals overview



Toothed belt axes DGE-ZR-RF, with roller guide

Peripherals overview

Variants and accessories			
	Type	**Brief description**	**→ Page**
1	Toothed belt axis DGE-RF	Electromechanical axis with roller guide	12
2	Slot nut for slide X	For mounting loads and attachments on the slide	24
3	Centring sleeve Z	For centring loads and attachments on the slide	24
4	Coupling housing KG	Adapter for mounting the motor on the axis	22
5	Coupling KSE	Connecting element between axis and motor	22
6	Motor flange MTR-FL	Connecting element between coupling housing and motor	22
7	Motor MTR	Motors specially matched to the axis, with or without gearing, with or without brake	22
8	Switching lug L	For sensing the slide position	25
9	Sensor bracket T	Adapter for mounting the sensors on the axis	25
10	Inductive proximity sensor O/P/W/R	For use as a proximity signal and safety monitor	26
11	Plug socket with cable V	For proximity sensors	26
12	Slot cover B	For protecting against the ingress of dirt	24
13	Slot nut for profile slot Y	For mounting attachments	24
14	Central support M	For mounting the axis	23
15	Foot mounting F	For mounting the axis	23

Toothed belt axes DGE-ZR-RF, with roller guide

Technical data

FESTO

- Ø - Size
  25, 40 and 63
- l - Stroke length
  1 ... 5000 mm

General technical data				
Size		25	40	63
Constructional design		Electromechanical axis with toothed belt and internal roller guide		
Guide		Internal roller guide		
Mounting position		Any		
Max. working stroke[1]	[mm]	1 ... 5000	1 ... 5000	1 ... 5000[2]
Max. working load	[kg]	15	30	60
Max. feed force F_x	[N]	260	610	1 500
Max. driving torque	[Nm]	3.7	12.1	55.38
Max. no-load torque	[Nm]	0.5	1.0	4.5
Max. speed	[m/s]	10		
Max. acceleration	[m/s^2]	50	50	50
Repetition accuracy	[mm]	±0.1		

1) Total stroke = working stroke + 2x stroke reserve

2) In the case of the variant with extended slide (-GV), the maximum working stroke is 4,800 mm.

Operating and environmental conditions				
Size		25	40	63
Ambient temperature	[°C]	0 ... +60		
Protection class		IP40		

Weights [kg]							
Size		25		40		63	
Slide design		GK	GV	GK	GV	GK	GV
Basic weight with 0 mm stroke		2.61	3.15	7.75	9.32	29.81	34.91
Additional weight per 100 mm stroke		0.30		0.61		1.44	
Moving load		0,62	0,85	2,00	2,70	5,20	7,00

Mass moment of inertia							
Size		25		40		63	
Slide design		GK	GV	GK	GV	GK	GV
J_O	[kg cm^2]	1.75	2.75	9.89	15.37	108.11	156.71
J_H per metre stroke	[kg cm^2/m]	0.188		0.933		7.605	
J_L per kg working load	[kg cm^2/kg]	2.052		3.958		13.634	

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

$J_A = J_O + J_H \times \text{working stroke [m]} + J_L \times m_{\text{working load}}$ [kg]

Toothed belt axes DGE-ZR-RF, with roller guide

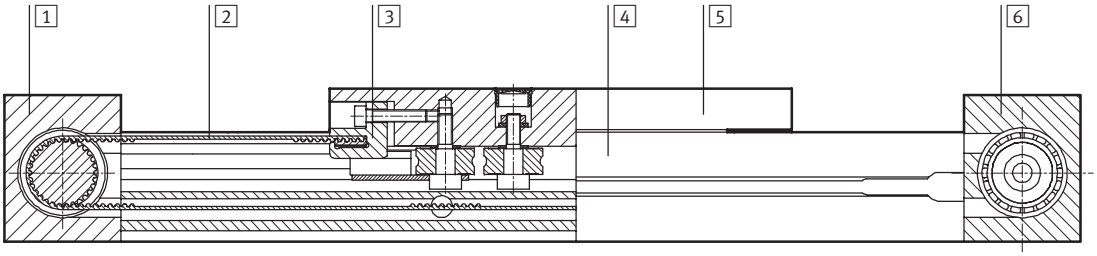
Technical data

Toothed belt				
Size		25	40	63
Tensile stress[1)]	[%]	0.16	0.11	0.15
Pitch	[mm]	3	5	8
Effective radius; effective diameter	[mm]	28.65	39.79	73.85
Feed constant	[mm]	90	125	232

1) At max. feed force

Materials

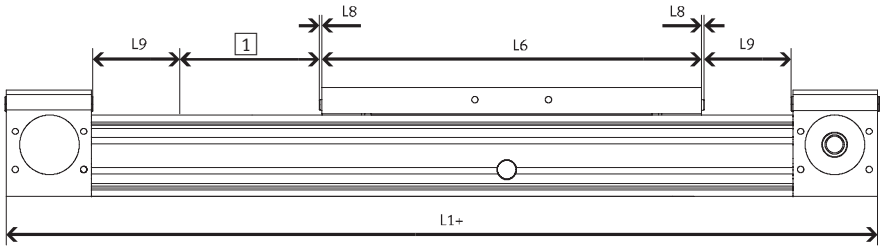
Sectional view



Axis		
1	Return pulley housing	Anodised aluminium
2	Toothed belt	Polychloroprene with Glascord and nylon coating
3	Clamping component	Special steel casting
4	Profile	Anodised aluminium
5	Slide	Anodised aluminium
6	Drive housing	Anodised aluminium

Stroke reserve

L9 The stroke reserve is a safety distance available on both sides of the axis in addition to the stroke.
L6 Slide length
L8 Stop element
L1+ Overall length of axis
1 Working stroke



Size		25	40	63
L9 per end position	[mm]	63	100	172

Example:
Type DGE-25-500-ZR-RF

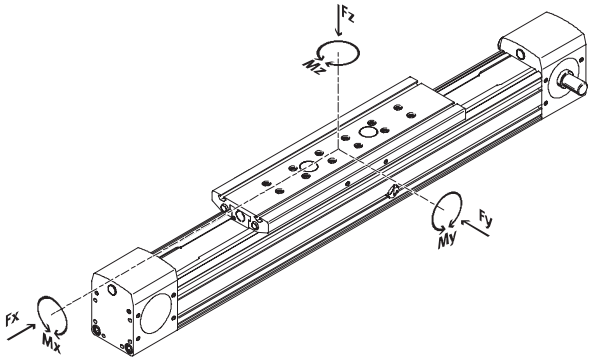
Working stroke = 500 mm
Stroke reserve = (2x 63 mm)
= 126 mm
Total stroke = 500 mm + 126 mm
= 626 mm

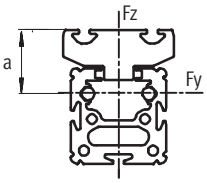
Toothed belt axes DGE-ZR-RF, with roller guide

Technical data

Characteristic load values

The indicated forces and torques refer to the centre of the guide. They must not be exceeded in the dynamic range. Special attention must be paid to the cushioning phase.





Distance a with:
DGE-25: 30 mm
DGE-40: 37 mm
DGE-63: 44.6 mm

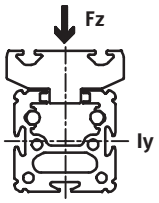
If the drive is subjected to more than two of the indicated forces and torques simultaneously, the following equations must be satisfied in addition to the indicated maximum loads.

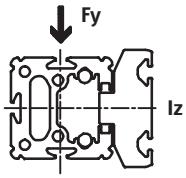
$$\frac{Fy}{Fy_{max.}} + \frac{Fz}{Fz_{max.}} + \frac{Mx}{Mx_{max.}} + \frac{My}{My_{max.}} + \frac{Mz}{Mz_{max.}} \leq 1$$

Permissible forces and torques

Size		25		40		63	
Slide design		GK	GV	GK	GV	GK	GV
$Fx_{max.}$	[N]	260		610		1500	
$Fy_{max.}$	[N]	150		300		600	
$Fz_{max.}$	[N]	150		300		600	
$Mx_{max.}$	[Nm]	7		18		65	
$My_{max.}$	[Nm]	15	30	60	120	170	340
$Mz_{max.}$	[Nm]	15	30	90	180	300	600

2nd moment of area





Size		25	40	63
Iy	[mm^4]	$5.947x10^5$	$2.479x10^6$	$1.664x10^7$
Iz	[mm^4]	$2.372x10^5$	$9.463x10^5$	$5.997x10^6$

Design tool
PtTool
www.festo.com/en/engineering

Toothed belt axes DGE-ZR-RF, with roller guide

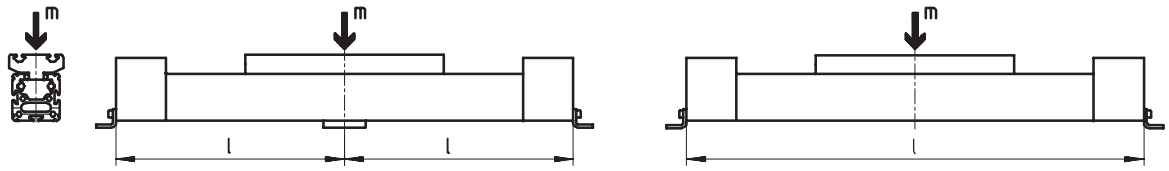
Technical data

Maximum permissible support span l as a function of the applied load m

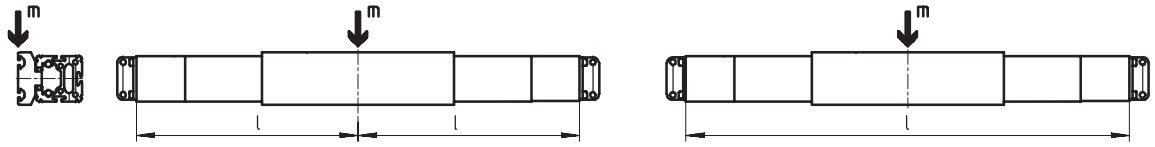
The axis may need to be supported with central supports MUP in order to restrict deflection with long stroke lengths. The following diagrams serve to determine the maximum permissible support span as a function of the applied load acting upon the axis.

A distinction is made here between forces acting upon the surface of the slide and forces acting upon the front of the slide.

1 Load on the surface of the slide

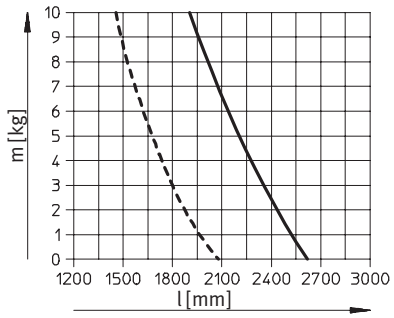


2 Load on the front of the slide

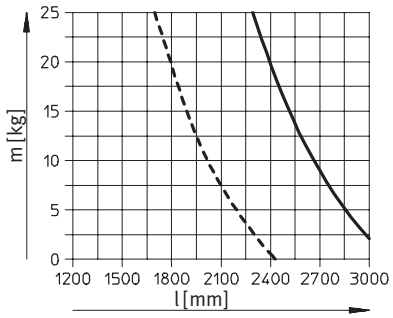


Maximum support span l (without central support) as a function of the applied load m

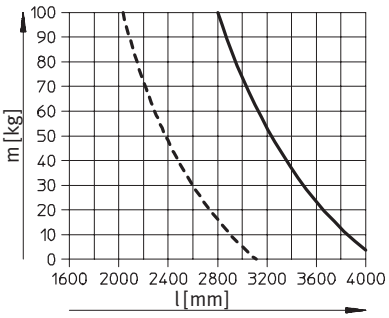
DGE-25-RF



DGE-40-RF



DGE-63-RF

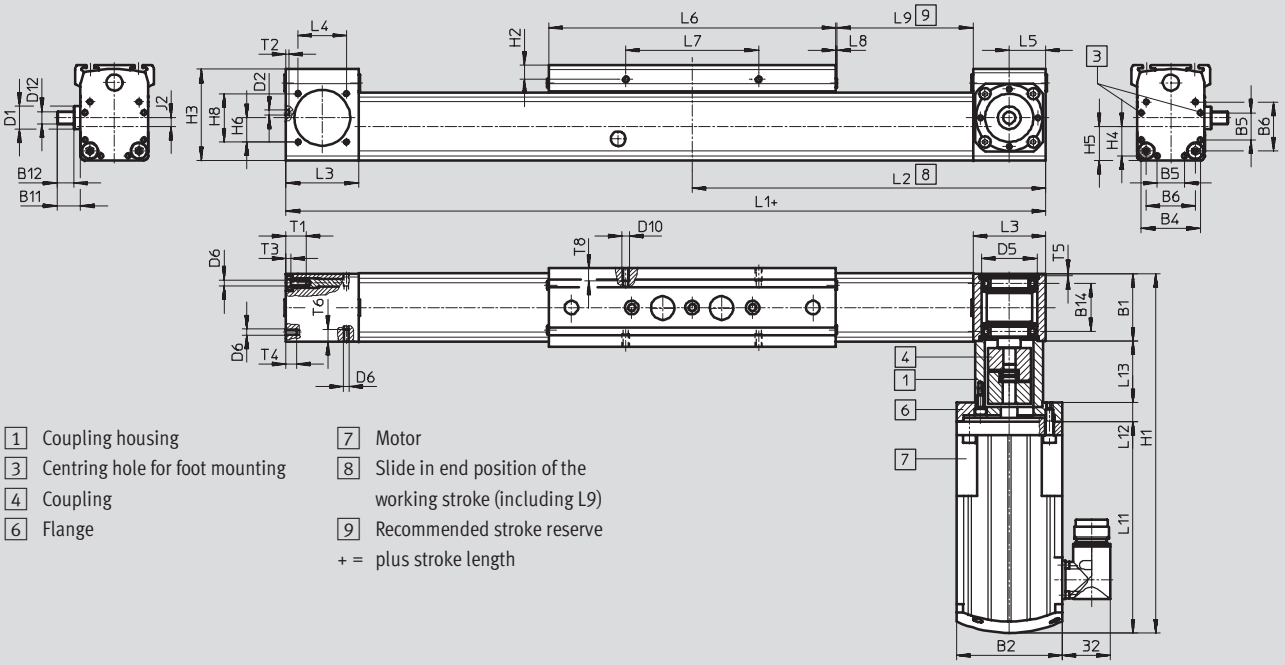


1

2

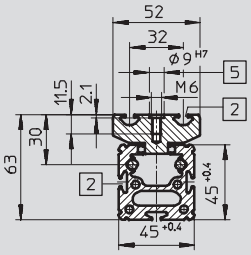
Dimensions Download CAD data ➔ **www.festo.com/en/engineering**

DGE-25/-40/-63

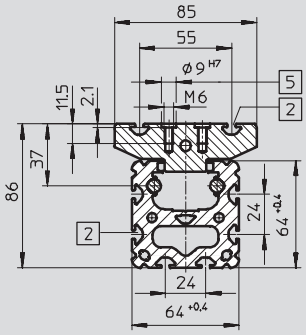


1 Coupling housing
3 Centring hole for foot mounting
4 Coupling
6 Flange
7 Motor
8 Slide in end position of the working stroke (including L9)
9 Recommended stroke reserve
+ = plus stroke length

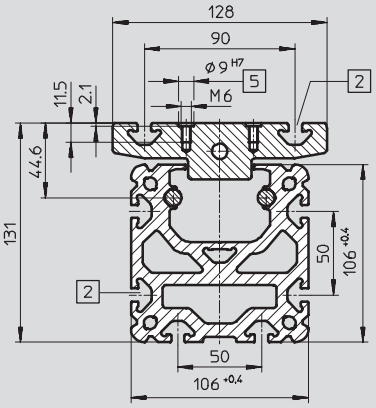
DGE-25



DGE-40

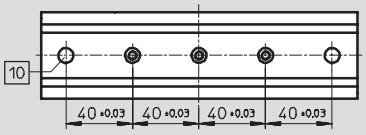


DGE-63

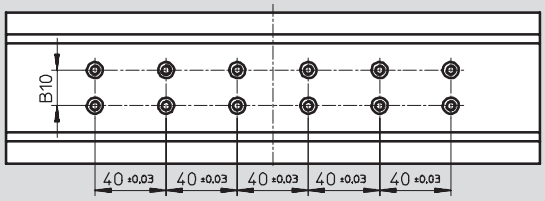


2 Slot for slot nuts
5 Hole for centring sleeve ZBH-9 and mounting thread

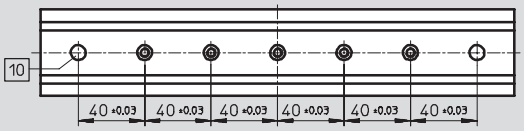
DGE-25-GK



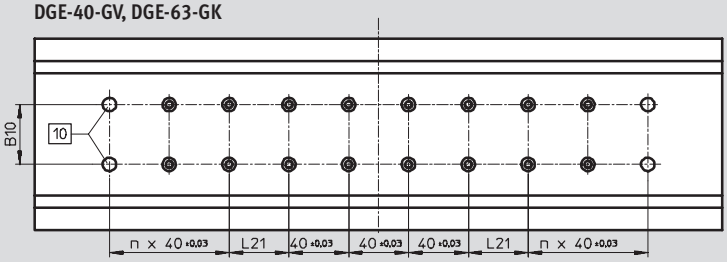
DGE-40-GK



DGE-25-GV



DGE-40-GV, DGE-63-GK

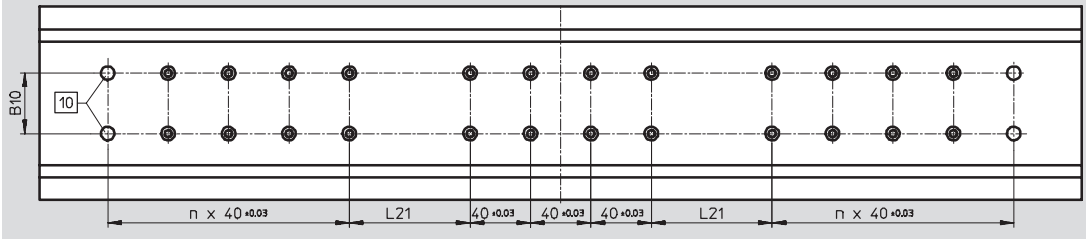


10 Hole for centring sleeve ZBH-9

Toothed belt axes DGE-ZR-RF, with roller guide

Technical data

DGE-63-GV



Size		B1	B4	B5	B6	B10 ±0.03	B11	B12	B14	D1 ∅	D2	D5 H7	D6	D10	D12 ∅ h6
25	GK	45	39.1	18	32.5	–	15.6	11	31.8	15	$3.3_{+0.1}$	37	M4	M5	8
	GV														
40	GK	64	53	28	49	20	29.6	24.5	45.5	20	4.4_{H13}	47	M5	M5	15
	GV														
63	GK	106	89	44	83	40	41.1	35.2	74.3	35	$6.4_{+0.1}$	80	M8	M8	25
	GV														

Size		H2	H3	H4	H5	H6	H8	J2	L1	L2	L3	L4	L5	L6	L7
25	GK	9.3	60.4	19.6	22.5	16	32	5.8	414	207	48	32	24	190	88
	GV								509	254.5				285	
40	GK	9.5	83.8	26.5	32	19.5	30	8.8	638	319	67	54	34	300	58
	GV								778	389				440	
63	GK	10.5	129.3	44.5	52.8	27.5	49	10.1	1020	510	106	84	55	460	72
	GV								1250	625				690	

Size		L8	L9	L13	L21 ±0.03	n	T1	T2	T3	T4	T5	T6	T8
25	GK	1	63	40	–	–	10	2	3	7	< 1.6	8	8.5
	GV												
40	GK	2	100	65	40	–	12	3	5	12	< 2.9	12	8.5
	GV					2							
63	GK	2	172	91	40	2	21	4	6.5	22	< 5.1	15	12
	GV				80	4							

Size	Motor type	B2	H1	L11	L12	L13
25	SEG	55	324	219	20	40
	SEG + BR		341	236		
	SED	70	237.3	139.8	12.5	
	SED + BR		259.3	161.8		
	SEGP		329.3	231.8		
	SEGP + BR		351.3	253.8		
40	SEI	100.5	391.6	241.6	21	65
	SEI + BR		412.7	262.7		
	SED		423.2	273.2		
	SED + BR		444.3	294.3		
63	SEI		463.6	241.6	25	91
	SEI + BR		484.7	262.7		
	SEIP		565.6	343.6		
	SEIP + BR		586.7	364.7		

Toothed belt axes DGE-ZR-RF, with roller guide

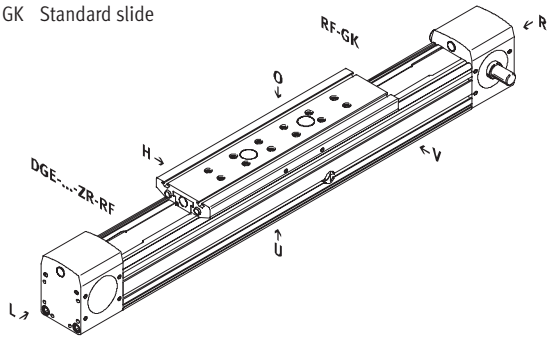
Ordering data – Modular products

FESTO

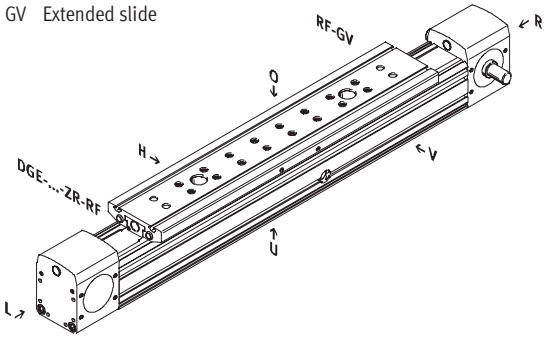
Order code

Mandatory data

GK Standard slide

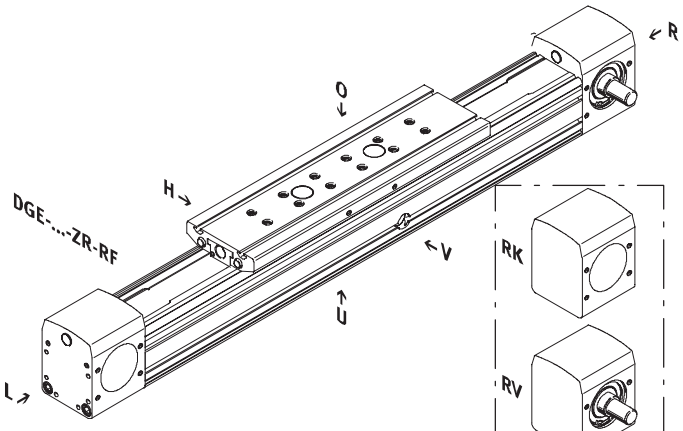


GV Extended slide

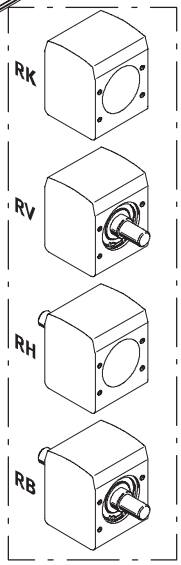


Drive shaft

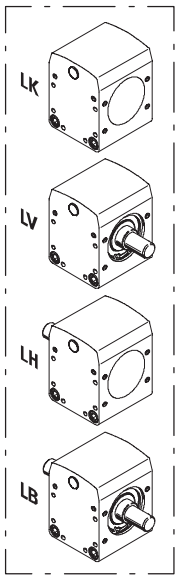
LK No drive shaft on left
LV Drive shaft on left, front
LH Drive shaft on left, rear
LB Drive shaft on left, front and rear
RK No drive shaft on right
RV Drive shaft on right, front
RH Drive shaft on right, rear
RB Drive shaft on right, front and rear



Drive shaft right



Drive shaft left



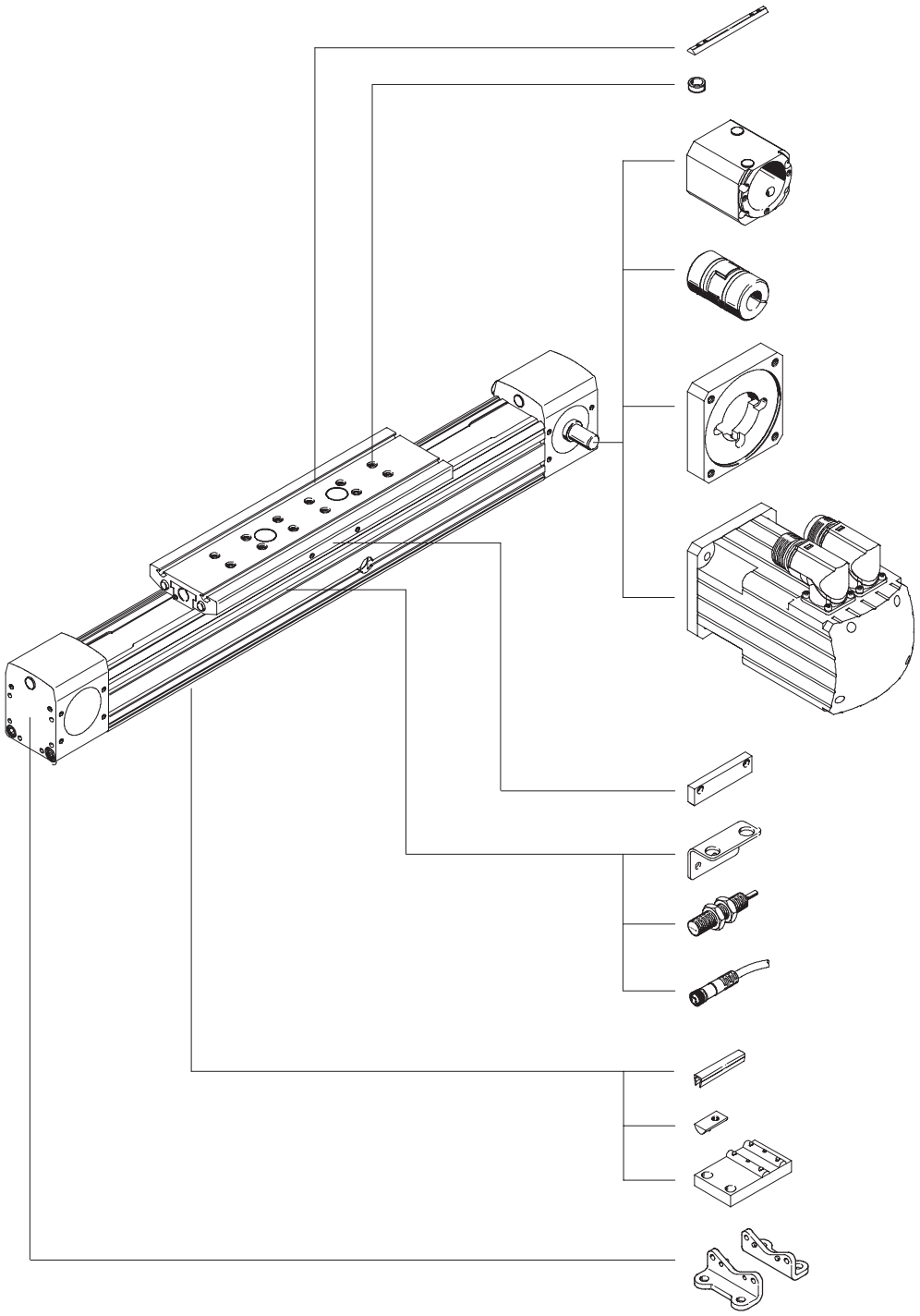
O top
U underneath
R right
L left
V front
H rear

Toothed belt axes DGE-ZR-RF, with roller guide

Ordering data – Modular products

FESTO

Order code
Options



Toothed belt axes DGE-ZR-RF, with roller guide

Ordering data – Modular products

FESTO

M **Mandatory data**

Module No.	Design	Size	Stroke	Drive function	Guide	Drive shaft on left	Drive shaft on right	Slide
534 391 534 392 534 393	DGE	25 40 63	1 … 5 000	ZR	RF	LK LV LH LB	RK RV RH RB	GK GV
Ordering example								
534 391	**DGE**	**25**	**600**	**ZR**	**RF**	**LK**	**RV**	**GK**

Ordering table

Size		25	40	63	Condi-tions	Code		Enter code
M	Module No.	**534 391**	**534 392**	**534 393**				
	Design	Electromechanical linear drive				**DGE**		DGE
	Size	25	40	63		**-...**		
	Stroke [mm]	1 … 5000	1 … 5000	1 … 5000		**-...**		
	Drive function	Electromechanical drive with toothed belt				**-ZR**		-ZR
	Guide	Roller guide				**-RF**		-RF
	Drive shaft on left	No drive shaft on left			1	**-LK**		
		Drive shaft on left, front				**-LV**		
		Drive shaft on left, rear				**-LH**		
		Drive shaft on left, front and rear				**-LB**		
	Drive shaft on right	No drive shaft on right			2	**-RK**		
		Drive shaft on right, front				**-RV**		
		Drive shaft on right, rear				**-RH**		
		Drive shaft on right, front and rear				**-RB**		
	Slide	Standard slide				**-GK**		
		Extended slide			3	**-GV**		

1 **LK** Not with drive shaft on right RK.
2 **RK** Not with drive shaft on left LK.
3 **GV** Maximum stroke: Size 63: 4800 mm

Allocation of order codes to motor types
➔ 22

The motor controller and cable set must be ordered separately.
Servo motor ➔ www.festo.com

Transfer order code

	DGE	–		–		–	ZR	–	RF	–		–		–	

Toothed belt axes DGE-ZR-RF, with roller guide

Ordering data – Modular products

FESTO

[0] Options

	Coupling housing		Motor type		Brake		Accessories
	KG		SED SEG SEGP SEI SEIP		BR		...B ...Y ...X ...M ...F ...Z ...V ...T L ...O ...P ...W ...R
–	**KG**	–	**SEGP**	–	**BR**	+	**2X2T2O2P**

Ordering table

Size			25	40	63	Conditions	Code		Enter code
[0]	Coupling housing		Coupling housing			[4]	**-KG**		
	Motor type		Servo motor		–	[5]	**-SED**		
			Servo motor with gear unit	–	–	[5]	**-SEG**		
			Servo motor with gear unit for high performance	–	–	[5]	**-SEGP**		
			–	Servo motor with integrated gearing		[5]	**-SEI**		
			–	–	Servo motor with integrated gearing for high performance	[5]	**-SEIP**		
	Brake		Motor brake				**-BR**		
	Accessories		Supplied separately				**+**		+
	Slot cover for mounting slot		1 ... 10				**...B**		
	Slot nut	for profile slot	1 ... 10				**...Y**		
		for slide	1 ... 10				**...X**		
	Central support		1 ... 10				**...M**		
	Foot mounting (kit)		1 ... 10				**...F**		
	Centring sleeve (pack of 10)		10, 20, 30, 40, 50, 60, 70, 80, 90				**...Z**		
	Plug socket with cable, 2.5 m		1 ... 10				**...V**		
	Sensor bracket for inductive sensors		1 ... 5				**...T**		
	Switching lug		1				**L**		
	Inductive proximity sensor	NO contact with cable	1 ... 5				**...O**		
		NC contact with cable	1 ... 5				**...P**		
		NO contact with plug	1 ... 5				**...W**		
		NC contact with plug	1 ... 5				**...R**		

[4] **KG** Mounted if only one drive shaft available, otherwise supplied loose.

[5] **SED, SEG, SEGP, SEI, SEIP** Only with coupling housing KG, motor supplied loose.

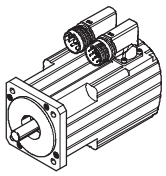
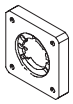
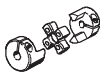
Transfer order code

–		–		–		+	

Toothed belt axes DGE-ZR-RF, with roller guide

Accessories

Permissible axis and motor combinations

Ordering code	Motor		Flange		Coupling		Coupling housing	
								
	Part No.	Type	Part No.	Type	Part No.	Type	Part No.	Type
For DGE-25-ZR-RF								
	without gearing/without brake							
SED	526 727	MTR-AC-70-3S-AA	529 943	MTR-FL-44-AC70	123 042	KSE-30-D08-D11	534 394	DGE-KG-25-ZR-RF-FL44
	without gearing/with brake							
SED + BR	526 728	MTR-AC-70-3S-AB	529 943	MTR-FL-44-AC70	123 042	KSE-30-D08-D11	534 394	DGE-KG-25-ZR-RF-FL44
	with gearing/without brake							
SEG	526 725	MTR-AC-55-3S-GA	529 944	MTR-FL-44-PL60	123 042	KSE-30-D08-D11	534 394	DGE-KG-25-ZR-RF-FL44
SEGP	526 729	MTR-AC-70-3S-GA	529 943	MTR-FL-44-AC70	123 043	KSE-30-D08-D12	534 394	DGE-KG-25-ZR-RF-FL44
	with gearing/with brake							
SEG + BR	526 726	MTR-AC-55-3S-GB	529 944	MTR-FL-44-PL60	123 042	KSE-30-D08-D11	534 394	DGE-KG-25-ZR-RF-FL44
SEGP + BR	526 730	MTR-AC-70-3S-GB	529 943	MTR-FL-44-AC70	123 043	KSE-30-D08-D12	534 394	DGE-KG-25-ZR-RF-FL44
For DGE-40-ZR-RF								
	without gearing/without brake							
SED	526 735	MTR-AC-100-5S-AA	529 947	MTR-FL-64-AC100	123 844	KSE-40-D15-D19	534 395	DGE-KG-40-ZR-RF-FL64
	without gearing/with brake							
SED + BR	526 736	MTR-AC-100-5S-AB	529 947	MTR-FL-64-AC100	123 844	KSE-40-D15-D19	534 395	DGE-KG-40-ZR-RF-FL64
	with gearing/without brake							
SEI	526 733	MTR-AC-100-3S-GA	529 947	MTR-FL-64-AC100	176 033	KSE-40-D15-D24	534 395	DGE-KG-40-ZR-RF-FL64
	with gearing/with brake							
SEI + BR	526 734	MTR-AC-100-3S-GB	529 947	MTR-FL-64-AC100	176 033	KSE-40-D15-D24	534 395	DGE-KG-40-ZR-RF-FL64
For DGE-63-ZR-RF								
	with gearing/without brake							
SEI	526 733	MTR-AC-100-3S-GA	529 949	MTR-FL-118-AC100	123 852	KSE-65-D25-D24	534 396	DGE-KG-63-ZR-RF-FL118
SEIP	526 737	MTR-AC-100-5S-GA	529 949	MTR-FL-118-AC100	123 852	KSE-65-D25-D24	534 396	DGE-KG-63-ZR-RF-FL118
	with gearing/with brake							
SEI + BR	526 734	MTR-AC-100-3S-GB	529 949	MTR-FL-118-AC100	123 852	KSE-65-D25-D24	534 396	DGE-KG-63-ZR-RF-FL118
SEIP + BR	526 738	MTR-AC-100-5S-GB	529 949	MTR-FL-118-AC100	123 852	KSE-65-D25-D24	534 396	DGE-KG-63-ZR-RF-FL118

- Note

The reduction ratio of the gearing is 4 : 1.

Technical data for servo motors
➔ www.festo.com

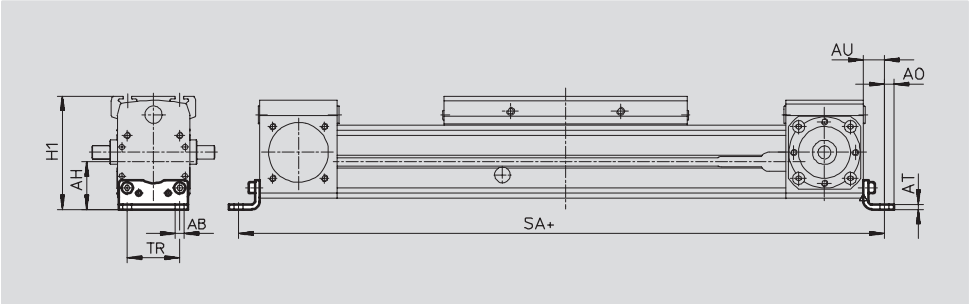
Technical data for motor controllers
➔ www.festo.com

Toothed belt axes DGE-ZR-RF, with roller guide

Accessories

Foot mounting HP
(order code: F)

Material:
Galvanised steel
Free of copper, PTFE and silicone



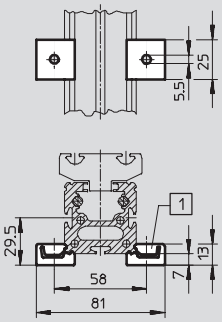
Dimensions and ordering data

for size	AB ∅	AH	AO	AT	AU	SA GK	SA GV	TR	H1	Weight [g]	Part No.	Type
25	5.5	29.5	6	3	13	440	535	32.5	70	61	**150 731**	**HP-25**
40	6.6	46	8.5	5	17.5	673	813	45	100	188	**150 733**	**HP-40**
63	11	69	13.5	6	28	1076	1306	75	147.2	305	**150 735**	**HP-63**

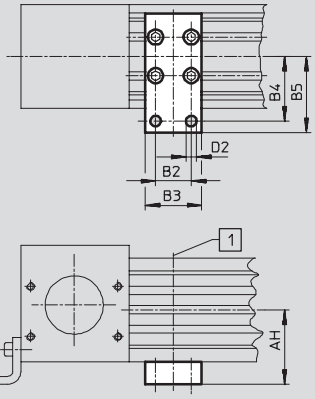
Central support MUP
(order code: M)

Material:
Galvanised steel
Free of copper, PTFE and silicone

for piston ∅ 25 mm



for piston ∅ 40, 63 mm



[1] Position of the central support along the profile barrel is freely selectable

Dimensions and ordering data

for size	AH	B2	B3	B4	B5	D2 ∅	Weight [g]	Part No.	Type
25	–	–	–	–	–	–	33	**150 736**	**MUP-18/25**
40	46	22	35	40	47	6.6	126	**150 738**	**MUP-40**
63	69	26	50	65	77	11	340	**150 800**	**MUP-63**

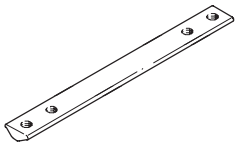
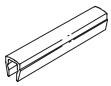
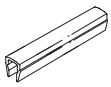
Core Range

Toothed belt axes DGE-ZR-RF, with roller guide

Accessories

FESTO

Ordering data Technical data ➔ www.festo.com

	for size	Remarks	Ordering code	Part No.	Type	PU[1]
Slot nut NST						
	25	For mounting slot/profile slot	Y	**526 091**	**NST-HMV-M4**	1
	40			**150 914**	**NST-5-M5**	1
	63			**150 915**	**NST-8-M6**	1
Slot nut NSTL						
	25	For slide	X	**158 410**	**NSTL-25**	1
	40			**158 412**	**NSTL-40**	1
	63			**158 414**	**NSTL-63**	1
Centring pin/sleeve ZBH						
	25, 40, 63	For slide	Z	**150 927**	**ZBH-9**	10
Slot cover ABP-S						
	25	For mounting slot every 0.5 m	B	**151 680**	**ABP-5-S**	2
Slot cover ABP						
	40	For mounting slot every 0.5 m	B	**151 681**	**ABP-5**	2
	63			**151 682**	**ABP-8**	

1) Packaging unit quantity

Core Range

Toothed belt axes DGE-ZR-RF, with roller guide

Accessories

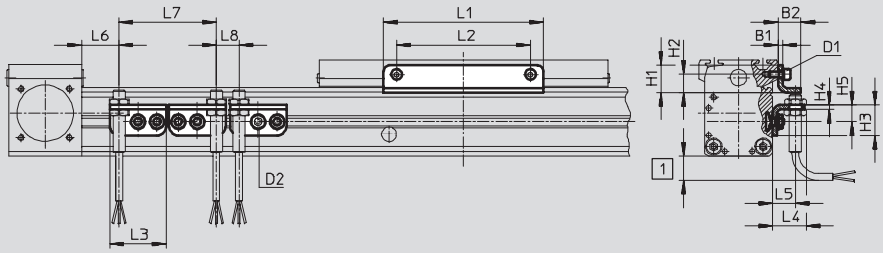
Sensor bracket HWS
for sensors
(order code: T)

Material:
Galvanised steel

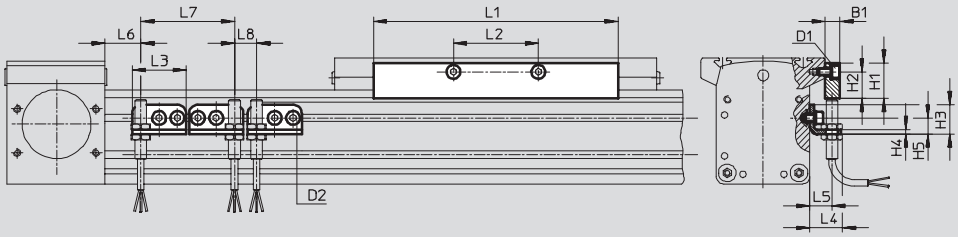
Switching lug SF
(order code: L)

Material:
Galvanised steel

DGE-25-ZR-RF



DGE-40/-63-ZR-RF



1 Protruding sensor cable, ensure sufficient installation space

Dimensions and ordering data

for size [mm]	D1	D2	B1	B2	H1	H2	H3	H4	H5	L1
25	M5	M5	15	3	18	12	20	3	11	105
40	M5	M5	10	–	24	18	20	3	11	167
63	M8	M5	10	–	35	25	20	3	11	230

for size [mm]	L2	L3	L4	L5	L6 GK	L6 GV	L7 min.	L8 min.	Weight [g]	Part No.	Type
25	88	37	22.5	15	43.5	91	64	15	30	**188 968**	**HWS-18/25-M8**
									80	**188 965**	**SF-25**
40	58	37	22.5	15	68.5	138.5	64	15	40	**188 969**	**HWS-40-M8**
									310	**188 966**	**SF-40**
63	72	37	22.5	15	117	232	64	15	40	**188 970**	**HWS-63-M8**
									630	**188 967**	**SF-63**

Ordering data – Inductive proximity sensors M8 Technical data ➔ www.festo.com

	Electrical connection		Switch output	LED	Cable length [m]	Part No.	Type
	Cable	Plug M8					
NO contact							
	3-core	–	PNP	■	2.5	**150 386**	**SIEN-M8B-PS-K-L**
	–	3-pin	PNP	■		**150 387**	**SIEN-M8B-PS-S-L**
NC contact							
	3-core	–	PNP	■	2.5	**150 390**	**SIEN-M8B-PO-K-L**
	–	3-pin	PNP	■		**150 391**	**SIEN-M8B-PO-S-L**

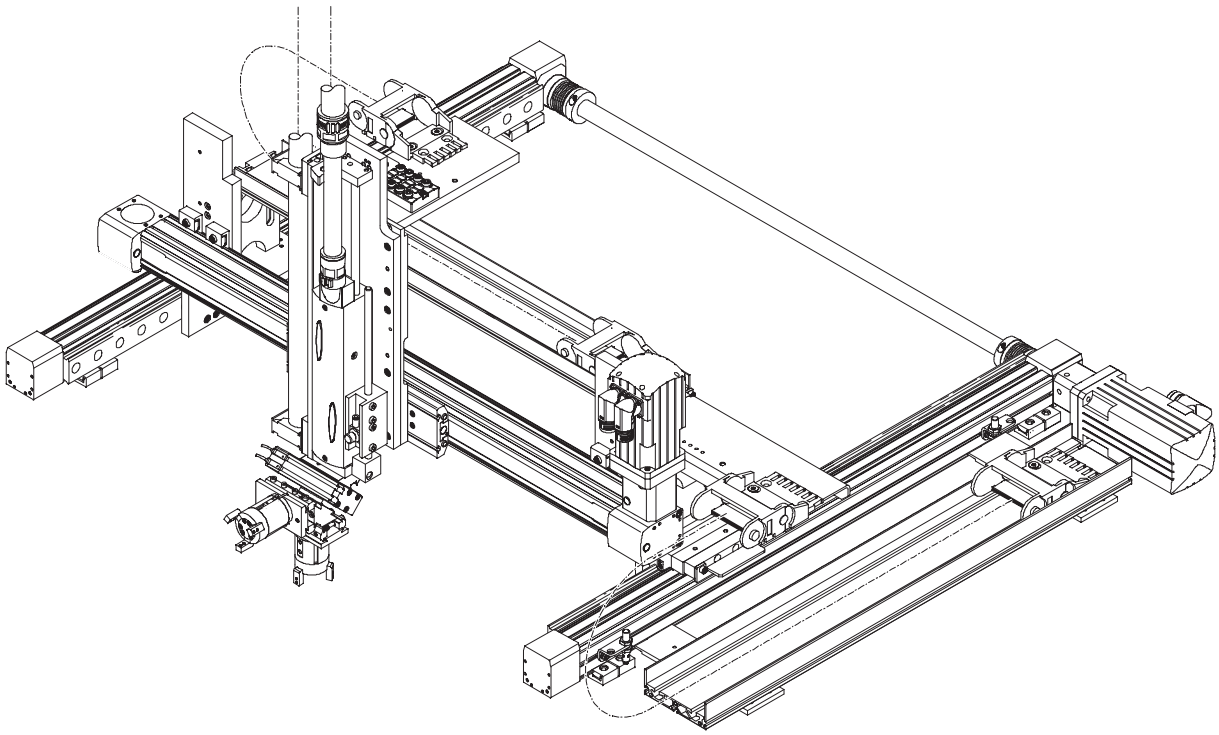
Ordering data – Plug sockets Technical data ➔ www.festo.com

	Assembly	Switch output		Connection	Cable length [m]	Part No.	Type
		PNP	NPN				
Straight socket							
	Union nut M8	■	■	3-pin	2.5	**159 420**	**SIM-M8-3GD-2,5-PU**
					5	**159 421**	**SIM-M8-3GD-5-PU**
Angled socket							
	Union nut M8	■	■	3-pin	2.5	**159 422**	**SIM-M8-3WD-2,5-PU**
					5	**159 423**	**SIM-M8-3WD-5-PU**

Core Range

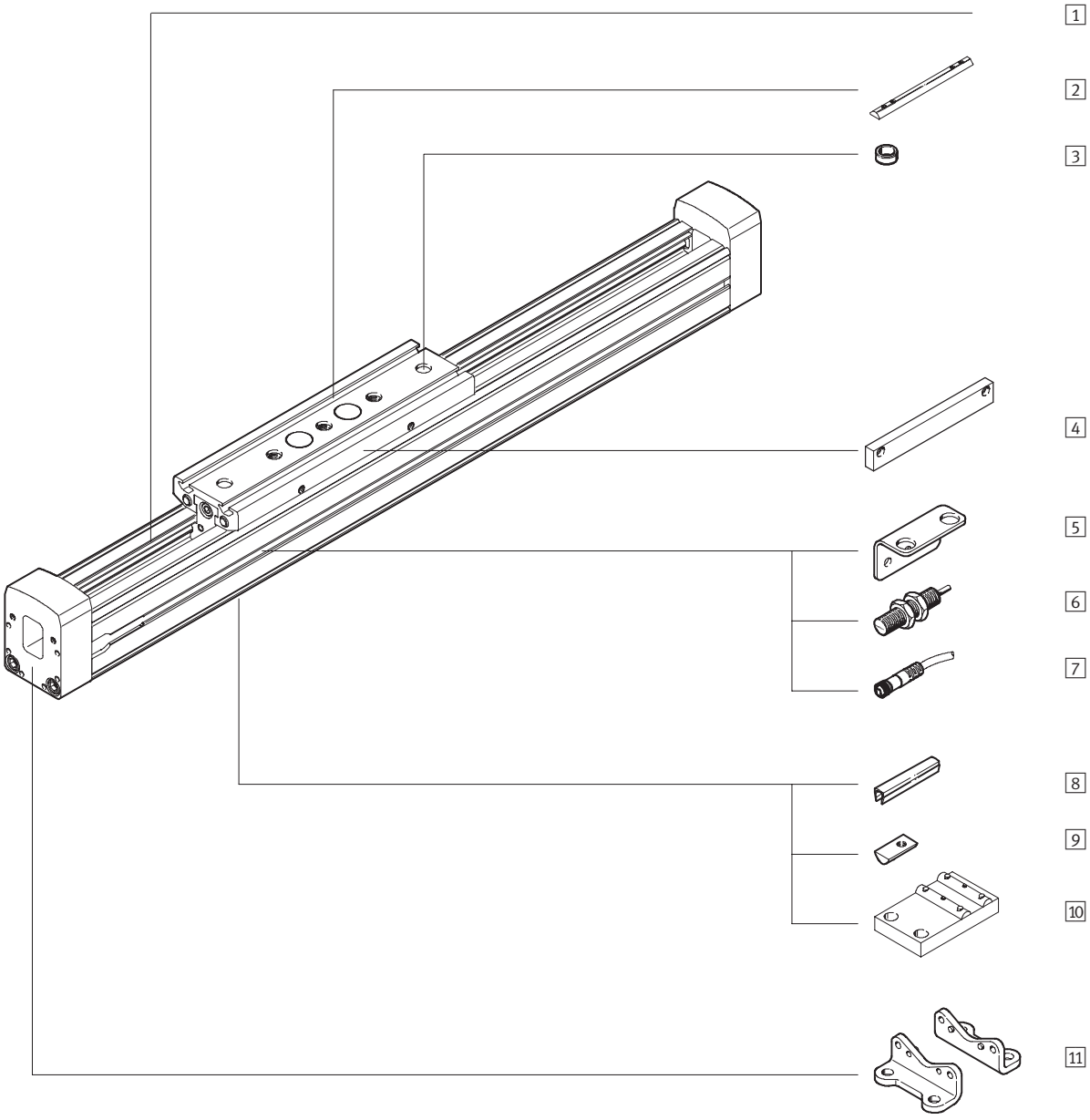
Toothed belt axes DGE-ZR-RF, with roller guide

Application example



Passive guide axes FDG-ZR-RF, without drive

Peripherals overview



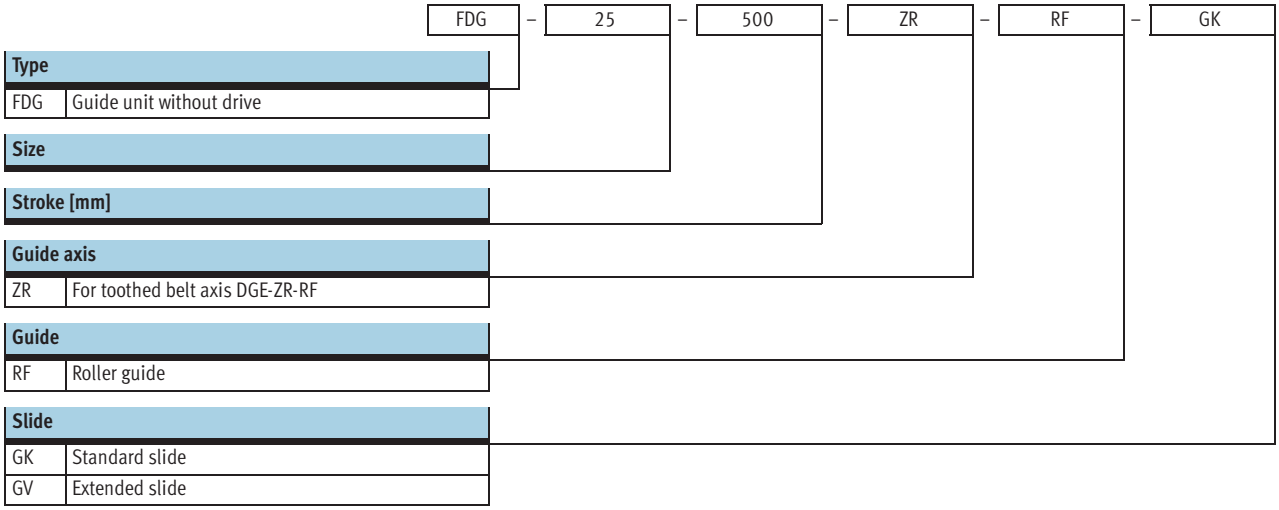
Passive guide axes FDG-ZR-RF, without drive

Peripherals overview

Variants and accessories			
	Type	**Brief description**	**➔ Page**
1	Passive guide axis FDG-ZR-RF	Guide without drive	32
2	Slot nut for slide X	For mounting loads and attachments on the slide	41
3	Centring sleeve Z	For centring loads and attachments on the slide	41
4	Switching lug L	For sensing the slide position	42
5	Mounting bracket T	Adapter for mounting the sensors on the axis	42
6	Inductive proximity sensor O/P/W/R	For use as a proximity signal and safety monitor	43
7	Plug socket with cable V	For proximity sensors	43
8	Slot cover B	For protecting against ingress of dirt	41
9	Slot nut for profile slot Y	For mounting attachments	41
10	Central support M	For mounting the axis	40
11	Foot mounting F	For mounting the axis	40

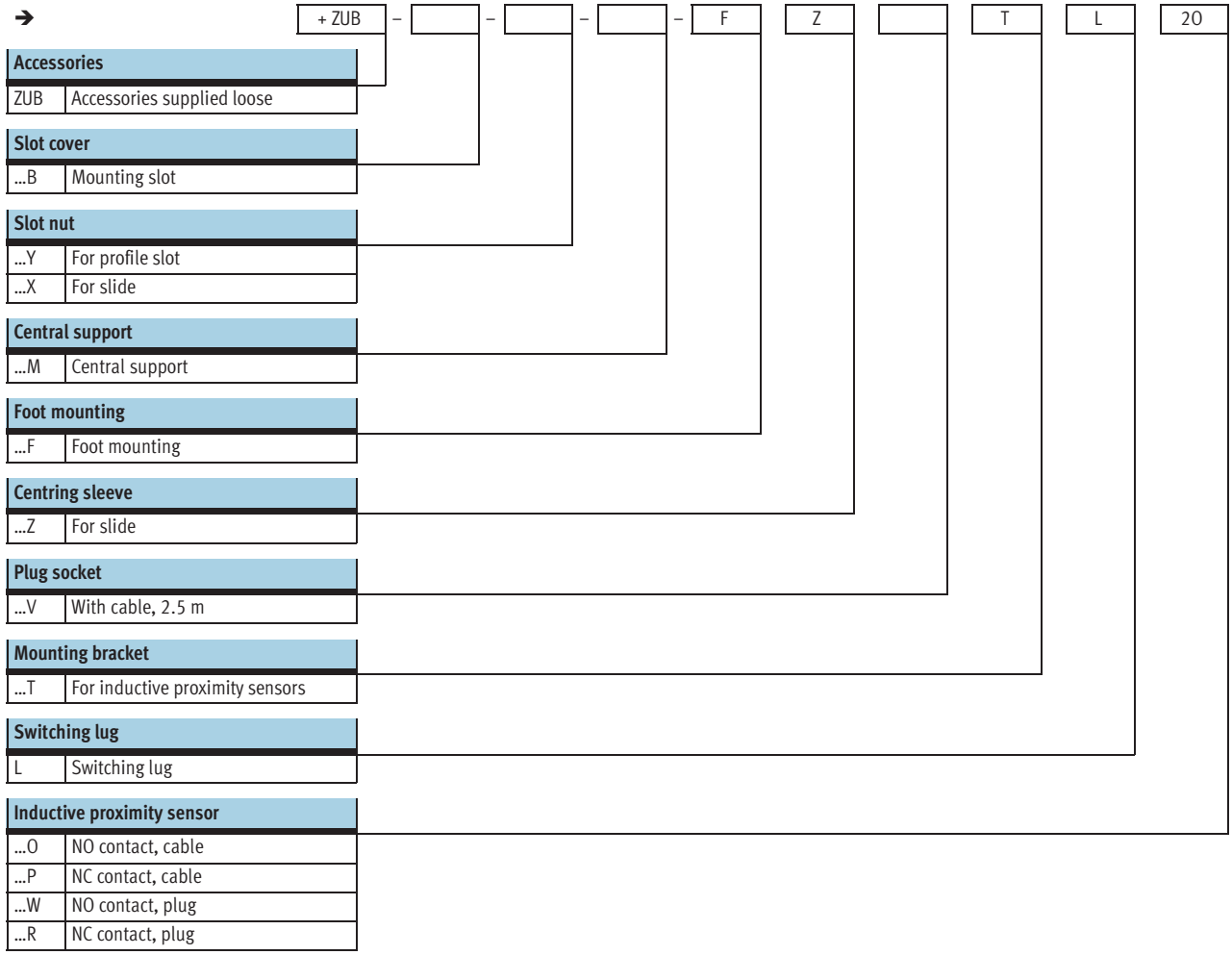
Passive guide axes FDG-ZR-RF, without drive

Type codes



Passive guide axes FDG-ZR-RF, without drive

Type codes



Passive guide axes FDG-ZR-RF, without drive

Technical data

FESTO

- Ø - Size
  25 … 63
- l - Stroke length
  1 … 5000 mm

General technical data				
Size		25	40	63
Design		Guide unit without drive		
Guide		Internal roller guide		
Assembly position		Any		
Max. working stroke[1]	[mm]	1 … 5000	1 … 5000	1 … 5000[2]
Max. working load	[kg]	15	30	60
Thrust	[N]	5 … 12	5 … 35	5 … 30
Max. speed	[m/s]	10		
Max. acceleration	[m/s²]	50		
Ambient temperature	[°C]	0 … +60		

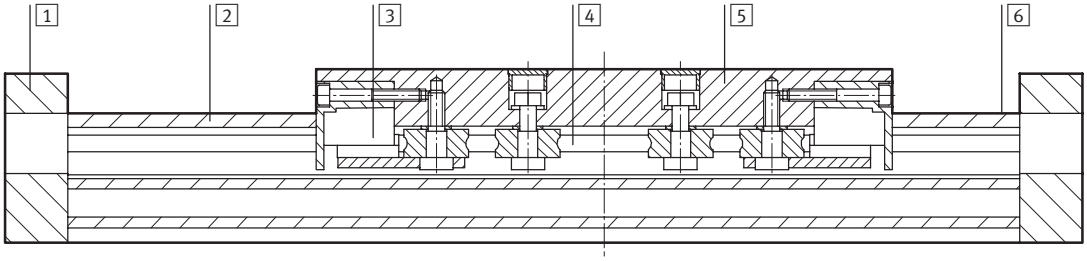
1) Total stroke = working stroke + 2x stroke reserve

2) The max. working stroke for the variant with extended slide (GV) is 4,800 mm.

Weights [kg]						
Size	25		40		63	
Slide design	GK	GV	GK	GV	GK	GV
Basic weight with 0 mm stroke	2.0	2.5	6.1	7.6	20.4	25.4
Additional weight per 100 mm stroke	0.29		0.59		1.38	
Moving load	0.5	0.8	1.8	2.5	4.6	6.4

Materials

Sectional view



Axis		
1	End cap	Anodised aluminium
2	Housing	Anodised aluminium
3	Cover cap	Polyamide
4	Guide rail	Steel
5	Slide	Anodised aluminium
6	Guide element	Steel
–	Note on materials	Free of copper, PTFE and silicone

Passive guide axes FDG-ZR-RF, without drive

Technical data

Stroke reserve

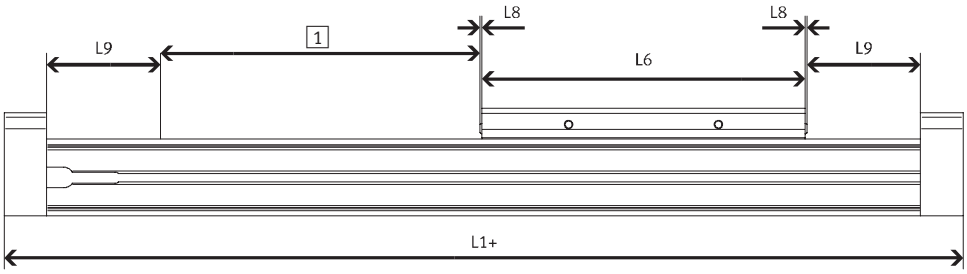
L9 The stroke reserve is a safety distance available on both sides of the axis in addition to the stroke.
The indicated values only apply in combination with the toothed belt axis DGE-ZR-RF.

L6 Slide length

L8 Stop element

L1+ Overall length of axis

1 Working stroke



Example:
Type FDG-25-500-ZR-RF

Working stroke = 500 mm
Stroke reserve = (2x 86 mm)
= 172 mm
Total stroke = 500 mm +172 mm
= 672 mm

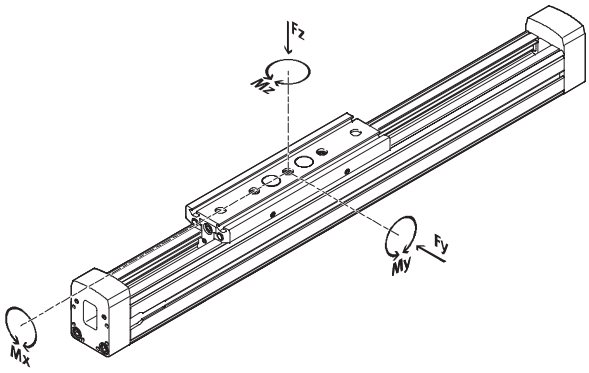
Size		25	40	63
L9 per end position	[mm]	86	136	244

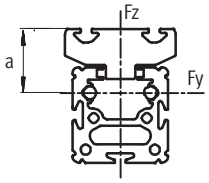
Passive guide axes FDG-ZR-RF, without drive

Technical data

Characteristic load values

The indicated forces and torques refer to the centre of the guide. They must not be exceeded in the dynamic range. Special attention must be paid to the cushioning phase.





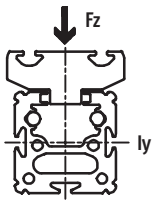
Size	a in [mm]
25	30
40	37
63	44.6

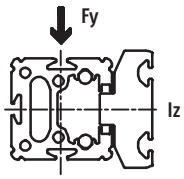
If the drive is subjected to more than two of the indicated forces and torques simultaneously, the following equations must be satisfied in addition to the indicated maximum loads:

$$\frac{Fy}{Fy_{max.}} + \frac{Fz}{Fz_{max.}} + \frac{Mx}{Mx_{max.}} + \frac{My}{My_{max.}} + \frac{Mz}{Mz_{max.}} \leq 1$$

Permissible forces and torques							
Size		25		40		63	
Slide design		GK	GV	GK	GV	GK	GV
$Fy_{max.}$	[N]	150		300		600	
$Fz_{max.}$	[N]	150		300		600	
$Mx_{max.}$	[Nm]	7		18		65	
$My_{max.}$	[Nm]	15	30	60	120	170	340
$Mz_{max.}$	[Nm]	15	30	90	180	300	600

2nd moment of area





Size		25	40	63
Iy	[mm^4]	$5.947x10^5$	$2.479x10^6$	$1.664x10^7$
Iz	[mm^4]	$2.372x10^5$	$9.463x10^5$	$5.997x10^6$

PtTool
design tool
www.festo.com/en/engineering

Passive guide axes FDG-ZR-RF, without drive

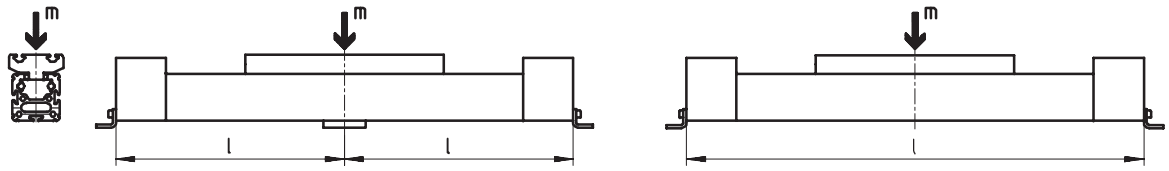
Technical data

Maximum permissible support span l as a function of the applied load m

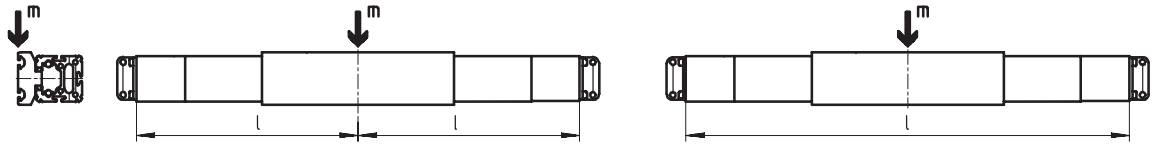
The axis may need to be supported with central supports MUP in order to limit deflection in the case of large strokes. The following diagrams serve to determine the maximum permissible support span as a function of the applied load acting upon the axis.

A distinction is made here between forces acting upon the surface of the slide and forces acting upon the front of the slide.

1 Load on the surface of the slide

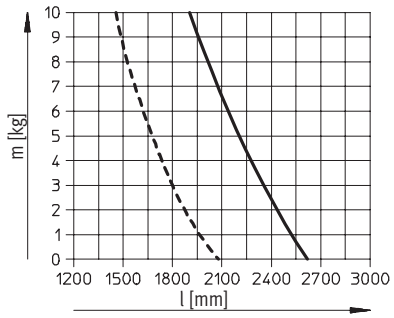


2 Load on the front of the slide

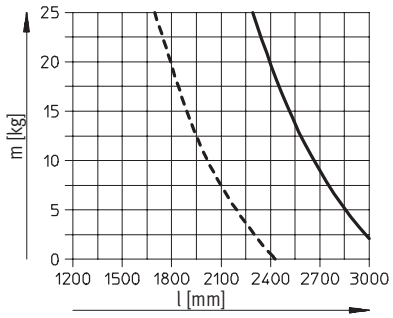


Maximum support span l (without central support) as a function of the applied load m

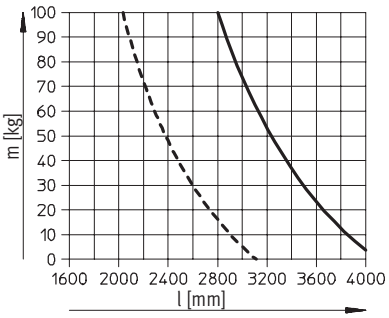
FDG-25



FDG-40



FDG-63



1

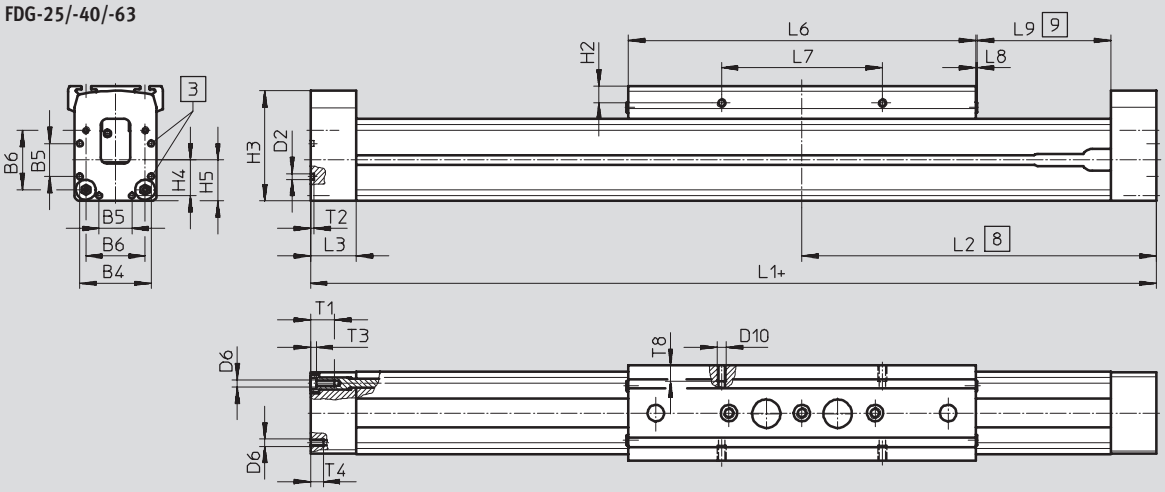
2

Passive guide axes FDG-ZR-RF, without drive

Technical data

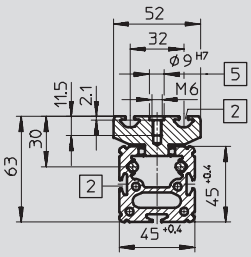
Dimensions Download CAD data ➔ **www.festo.com/en/engineering**

FDG-25/-40/-63

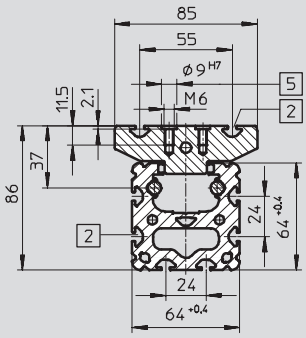


3 Centring hole for foot mounting
8 Driver in end position of the working stroke (including L9)
9 Recommended stroke reserve
+ = plus stroke length

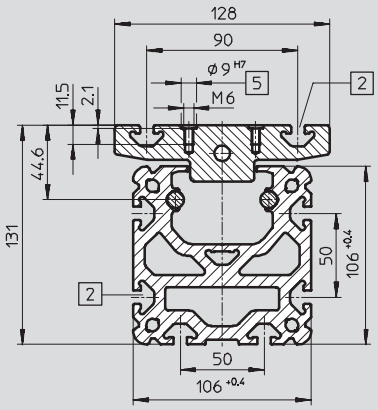
FDG-25



FDG-40

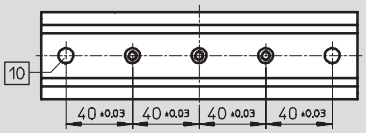


FDG-63

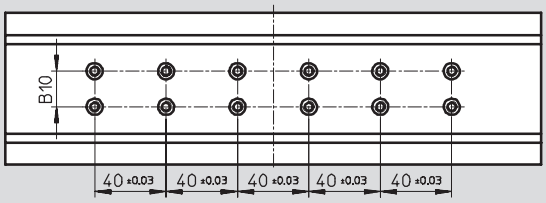


2 Slot for slot nuts
5 Hole for centring sleeve ZBH-9 and mounting thread

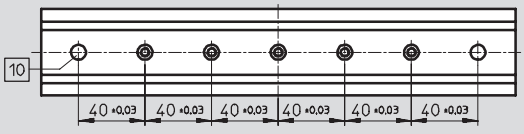
FDG-25-GK



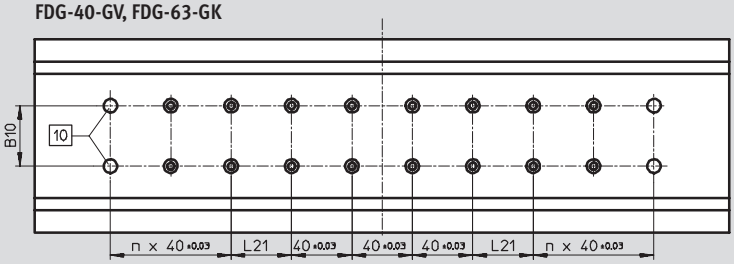
FDG-40-GK



FDG-25-GV



FDG-40-GV, FDG-63-GK

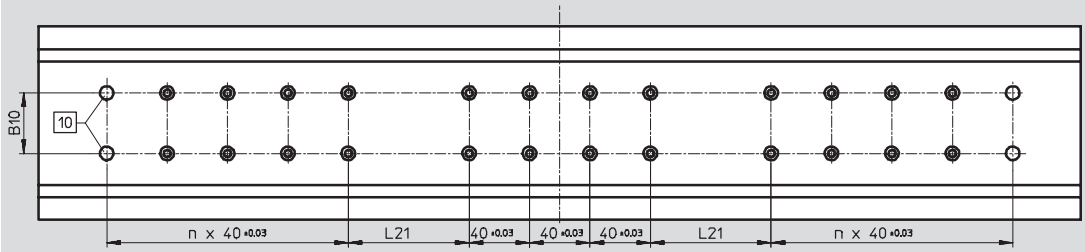


10 Hole for centring sleeve ZBH-9

Passive guide axes FDG-ZR-RF, without drive

Technical data

FDG-63-GV



Size		B4	B5	B6	B10 ±0.03	D2	D6	D10	H2	H3
25	GK	39.1	18	32.5	–	$3.3_{+0.1}$	M4	M5	9.3	60.4
	GV									
40	GK	53	28	49	20	4.4_{H13}	M5	M5	9.5	83.8
	GV									
63	GK	89	44	83	40	$6.4_{+0.1}$	M8	M8	10.5	129.3
	GV									

Size		H4	H5	L1	L2	L3	L6	L7	L8
25	GK	19.6	22.5	414	207	25	190	$88_{\pm 0.2}$	1
	GV			509	254.5		285		
40	GK	26.5	32	638	319	31	300	$58_{\pm 0.1}$	2
	GV			778	389		440		
63	GK	44.5	52.8	1020	510	34	460	$72_{\pm 0.1}$	2
	GV			1250	625		690		

Size		L9	L21 ±0.03	n	T1	T2	T3	T4	T8
25	GK	86	–	–	13	2	3	8	8.5
	GV								
40	GK	136	40	–	13	3	5	12	8.5
	GV			2					
63	GK	244	40	2	21	4	6	–	12
	GV		80	4					

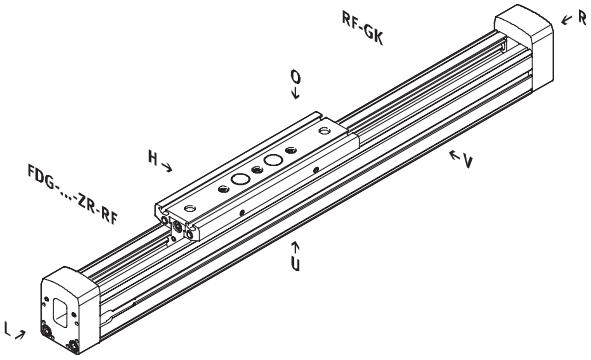
Passive guide axes FDG-ZR-RF, without drive

Ordering data – Modular products

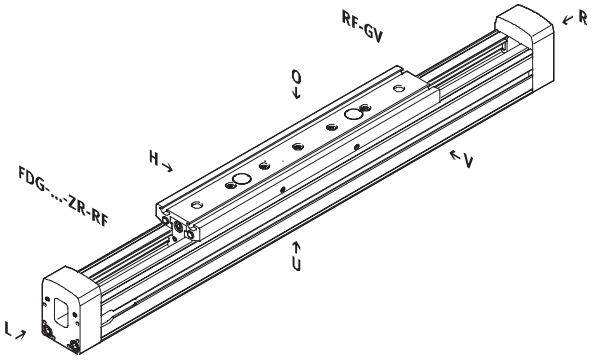
FESTO

Ordering code
Mandatory data

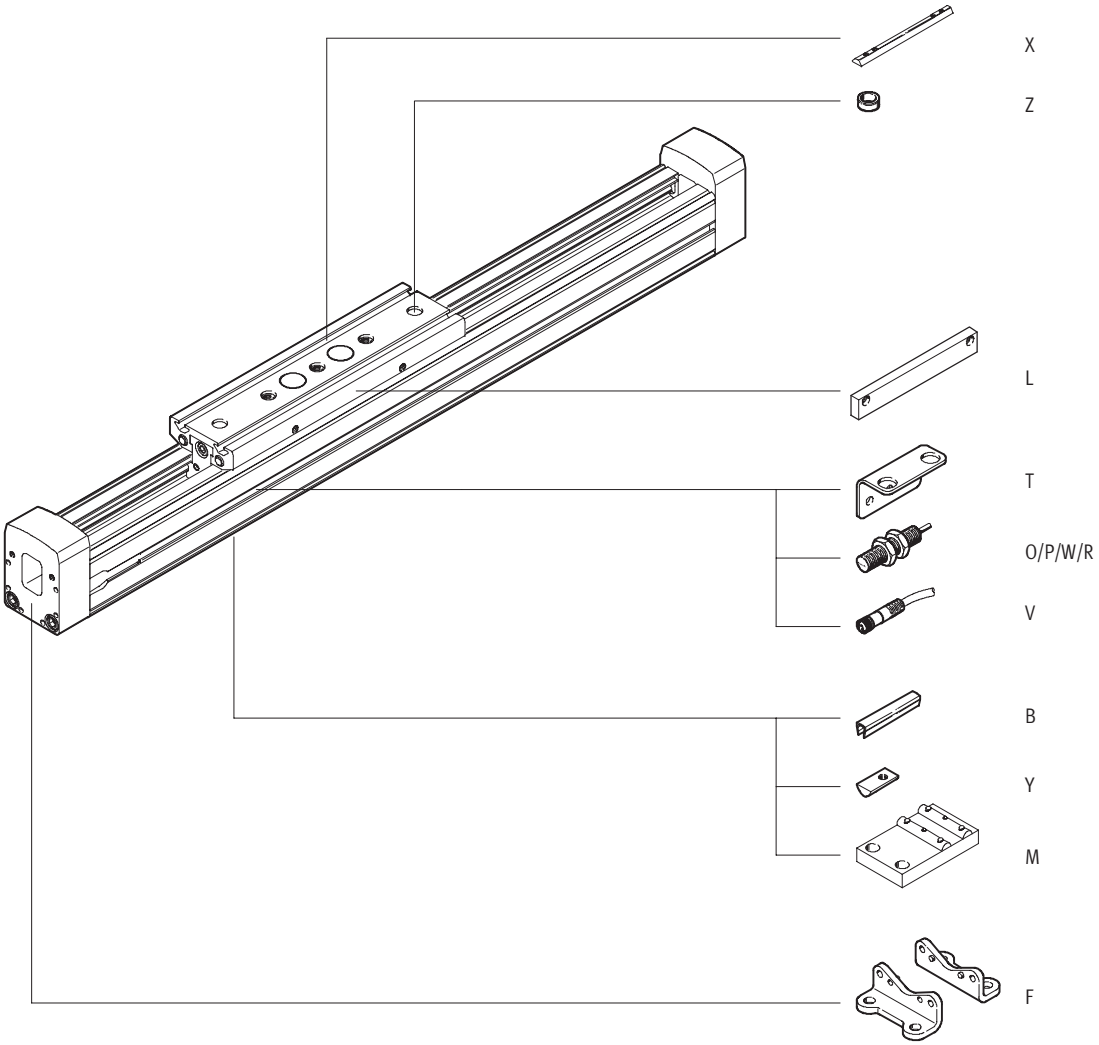
GK Standard slide



GV Extended slide



Ordering code
Options



Passive guide axes FDG-ZR-RF, without drive

Ordering data – Modular products

FESTO

[M] Mandatory data							[O] Options	
Module No.	**Function**	**Size**	**Stroke**	**Guide axis**	**Guide**	**Slide**	**Accessories**	
538 791 538 792 538 793	FDG	25 40 63	1 … 5 000	ZR	RF	GK GV		…B, …Y, …X, …M, …F, …Z, …V, …T, L, …O, …P, …W, …R
Ordering example								
538 791	**FDG**	**25**	**300**	**ZR**	**RF**	**GK**	**ZUB**	**2B**

Ordering table

Size			25	40	63	Conditions	Code		Enter code
[M]	Module No.		538 791	538 792	538 793				
	Function		Guide axis without drive				**FDG**		FDG
	Size		25	40	63		**-…**		
	Stroke	[mm]	1 … 5 000				**-…**		
	Guide axis		for DGE-ZR-RF				**-ZR**		-ZR
	Guide		Roller guide				**-RF**		-RF
	Slide		Standard slide				**-GK**		
			Extended slide			[1]	**-GV**		
[O]	Accessories		Accessories supplied loose				**-ZUB-**		-ZUB-
	Slot cover for mounting slot		1 … 10				**…B**		
	Slot nut	Mounting slot	1 … 10				**…Y**		
		For slide	1 … 10				**…X**		
	Central support		1 … 10				**…M**		
	Foot mounting		1 … 10				**…F**		
	Centring sleeve (pack of 10)		10, 20, 30, 40, 50, 60, 70, 80, 90				**…Z**		
	Plug socket with cable, M8, 2.5 m		1 … 10				**…V**		
	Mounting bracket for inductive proximity sensors		1 … 5				**…T**		
	Switching lug		1				**L**		
	Inductive proximity sensor	NO contact, cable 2.5 m	1 … 5				**…O**		
		NC cable, cable 2.5 m	1 … 5				**…P**		
		NO contact, plug M8	1 … 5				**…W**		
		NC contact, plug M8	1 … 5				**…R**		

[1] **GV** Maximum stroke Size 25: 4 905 mm
Size 40: 4 860 mm
Size 63: 4 770 mm

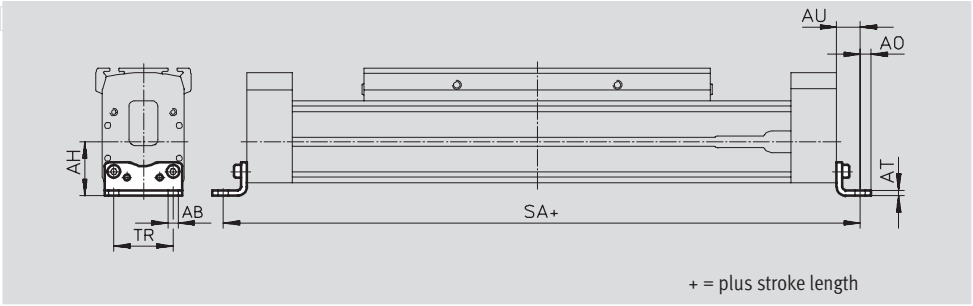
Passive guide axes FDG-ZR-RF, without drive

Accessories

Foot mounting HP
(order code: F)

Material:
Galvanised steel
Free of copper, PTFE and silicone

HP-25



+ = plus stroke length

Dimensions and ordering data					
for size	AB ∅	AH	AO	AT	AU
25	5.5	29.5	6	3	13
40	6.6	46	8.5	5	17.5
63	11	69	13.5	6	28

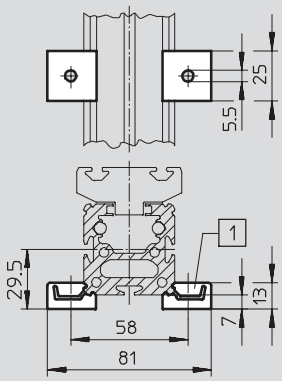
for size	SA		TR	Weight	Part No.	Type
	GK	GV		[g]		
25	440	535	32.5	61	**150 731**	**HP-25**
40	673	813	45	188	**150 733**	**HP-40**
63	1076	1306	75	305	**150 735**	**HP-63**

Central support MUP
(order code: M)

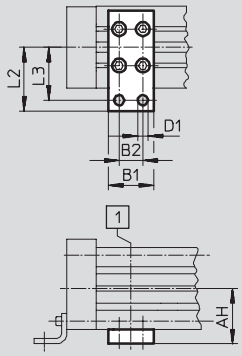
Material:
Galvanised steel
Free of copper, PTFE and silicone

MUP-40

FDG-25



FDG-40 ... 63



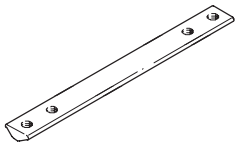
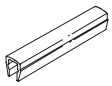
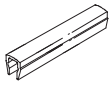
[1] Position of the central support along the profile is freely selectable

Dimensions and ordering data									
for size	AH	B1	B2	D1 ∅	L2	L3	Weight [g]	Part No.	Type
25	–	–	–	–	–	–	33	**150 736**	**MUP-18/25**
40	46	35	22	6.6	47	40	126	**150 738**	**MUP-40**
63	69	50	26	11	77	65	340	**150 800**	**MUP-63**

Passive guide axes FDG-ZR-RF, without drive

Accessories

Ordering data — Technical data ➔ www.festo.com

	for size	Remarks	Ordering code	Part No.	Type	PU[1]
Slot nut NST						
	25	For mounting slot/profile slot	Y	**526 091**	**NST-HMV-M4**	1
	40			**150 914**	**NST-5-M5**	1
	63			**150 915**	**NST-8-M6**	1
Slot nut NSTL						
	25	For slide	X	**158 410**	**NSTL-25**	1
	40			**158 412**	**NSTL-40**	1
	63			**158 414**	**NSTL-63**	1
Centring pin/sleeve ZBH						
	25, 40, 63	For slide	Z	**150 927**	**ZBH-9**	10
Slot cover ABP-S						
	25	For mounting slot every 0.5 m	B	**151 680**	**ABP-5-S**	2
Slot cover ABP						
	40	For mounting slot every 0.5 m	B	**151 681**	**ABP-5**	2
	63			**151 682**	**ABP-8**	

1) Packaging unit quantity

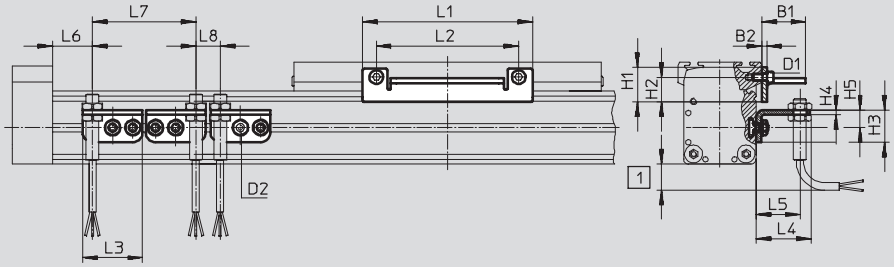
Passive guide axes FDG-ZR-RF, without drive

Accessories

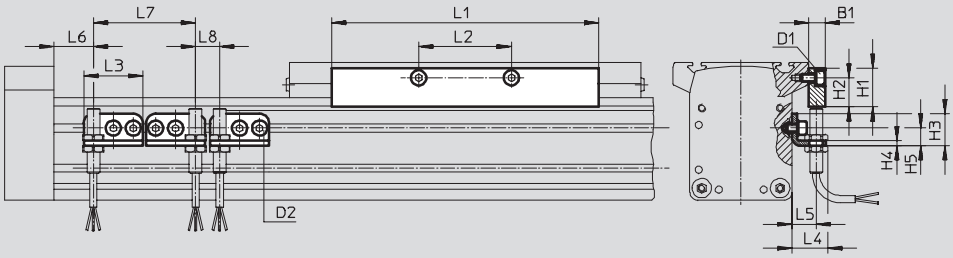
Sensor bracket HWS
for inductive proximity sensors
(order code: T)
Material:
Galvanised steel

Switching lug SF
(order code: L)
Material:
Galvanised steel

FDG-25



FDG-40 ... 63



1 Protruding sensor cable, ensure sufficient installation space

Dimensions and ordering data

for size	D1	D2	B1	B2	H1	H2	H3	H4	H5	L1	L2	L3	L4	L5
25	M5	M5	27	3	20.5	15.3	20	3	11	105	88	37	34.5	27
40	M5	M5	10	–	24	18	20	3	11	167	58	37	22.5	15
63	M8	M5	10	–	35	25	20	3	11	230	72	37	22.5	15

for size	L6		L7	L8	Weight	Part No.	Type
	GK	GV	min.	min.	[g]		
25	43.5	91	64	15	30	**540 780**	**HWS-25-MAB-M8**
					80	**540 430**	**SF-25-MAB**
40	68.5	138.5	64	15	40	**188 969**	**HWS-40-M8**
					310	**188 966**	**SF-40**
63	117	232	64	15	40	**188 970**	**HWS-63-M8**
					630	**188 967**	**SF-63**

Ordering data – Inductive proximity sensors M8 — Technical data ➔ www.festo.com

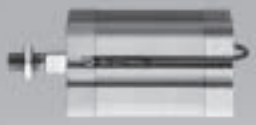
	Electrical connection		Switch output	LED	Cable length [m]	Part No.	Type
	Cable	Plug M8					
NO contact							
	3-core	–	PNP	■	2.5	150 386	SIEN-M8B-PS-K-L
	–	3-pin	PNP	■		150 387	SIEN-M8B-PS-S-L
NC contact							
	3-core	–	PNP	■	2.5	150 390	SIEN-M8B-PO-K-L
	–	3-pin	PNP	■		150 391	SIEN-M8B-PO-S-L

Ordering data – Plug sockets with cable — Technical data ➔ www.festo.com

	Assembly	Switch output		Connection	Cable length [m]	Part No.	Type
		PNP	NPN				
Straight socket							
	Union nut M8	■	■	3-pin	2.5	159 420	SIM-M8-3GD-2,5-PU
					5	159 421	SIM-M8-3GD-5-PU
Angled socket							
	Union nut M8	■	■	3-pin	2.5	159 422	SIM-M8-3WD-2,5-PU
					5	159 423	SIM-M8-3WD-5-PU

Products and services – everything from a single source

Products incorporating new ideas are created when enthusiasm for technology and efficiency come together. Tailor-made service goes without saying when the customer is the focus of attention.



Pneumatic and electrical drives

- Pneumatic cylinders
- Semi-rotary drives
- Handling modules
- Servopneumatic positioning systems
- Electromechanical drives
- Positioning controllers and controllers

Valves and valve terminals

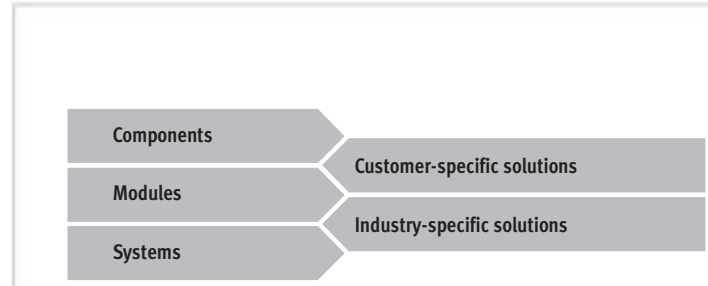
- Standard valves
- Universal and application-optimised valves
- Manually and mechanically actuated valves
- Shut-off, pressure control and flow control valves
- Proportional valves
- Safety valves

Fieldbus systems/ electrical peripherals

- Fieldbus Direct
- Installation system CP/CPI
- Modular electrical terminal CPX

Compressed air preparation

- Service unit combinations
- Filter regulators
- Filters
- Pressure regulators
- Lubricators
- On-off and soft-start valves
- Dryers
- Pressure amplifiers
- Accessories for compressed air preparation



Services from Festo to increase your productivity – across the entire value creation sequence

Engineering – for greater speed in the development process

- CAD models
- 14 engineering tools
- Digital catalogue
- FluidDRAW®
- More than 1,000 technical consultants and project engineers worldwide
- Technical hotlines

Supply chain – for greater speed in the procurement process

- E-commerce and online shop
- Online order tracking
- Euro special manufacturing service
- Logistics optimisation

Gripping and vacuum technology

- Vacuum generators
- Vacuum grippers
- Vacuum security valves
- Vacuum accessories
- Standard grippers
- Micro grippers
- Precision grippers
- Heavy-duty grippers

Sensors and monitoring units

- Proximity sensors
- Pressure and flow sensors
- Display and operating units
- Inductive and optical proximity sensors
- Displacement encoders for positioning cylinders
- Optical orientation detection and quality inspection

Controllers/bus systems

- Pneumatic and electropneumatic controllers
- Programmable logic controllers
- Fieldbus systems and accessories
- Timers/counters
- Software for visualisation and data acquisition
- Display and operating units

Accessories

- Pipes
- Tubing
- Pipe connectors and fittings
- Electrical connection technology
- Silencers
- Reservoirs
- Air guns

All in all, 100% product and service quality

A customer-oriented range with unlimited flexibility:
Components combine to produce ready-to-install modules and systems. Included in this are special designs – since at Festo, most industry-specific products and customer-specific solutions are based on the 23,000 plus catalogue products. Combined with the services for the entire value creation sequence, the end result is unbeatable economy.

Assembly – for greater speed in the assembly/commissioning process

- Prepack
- Preassembly
- Turnkey pneumatics
- Handling solutions

Operation – for greater speed in the operational process

- Spare parts service
- Energy saving service
- Compressed air consumption analysis
- Compressed air quality analysis
- Customer service

What must be observed when using Festo components?

Specified limit values for technical data and any specific instructions must be adhered to by the user in order to ensure recommended operating conditions.
When pneumatic components are used, the user shall ensure that they are operated using correctly prepared compressed air without aggressive media.
When Festo components are used in safety-oriented applications, the user shall ensure that all applicable national and local safety laws and regulations, for example the machine directive, together with the relevant references to standards are observed.
Unauthorised conversions or modifications to products and systems from Festo involve a safety risk and are thus not permissible.
Festo does not accept any liability for resulting damages.
You should contact Festo's advisors if one of the following apply to your application:

- The ambient conditions and conditions of use or the operating medium differ from the specified technical data.
- The product is to perform a safety function.
- A risk or safety analysis is required.
- You are unsure about the product's suitability for use in the planned application.
- You are unsure about the product's suitability for use in safety-oriented applications.