Cylinders with displacement encoder

FESTO

- **Strength in motion**
- **Precision measurement**
- **Two perfect partners – Servo-pneumatic drive technology**

Cylinders with displacement encoder

Key features

At a glance

- Displacement encoder, integrated or attached
- Absolute measurements
- Long service life
- As a measuring cylinder
- For Soft Stop with end position controller SPC11
- For positioning with axis controller SPC200

Standard cylinder DNCI, internal displacement encoder

- Piston ∅ 32 ... 63 mm
- Stroke lengths of 10 ... 2 000 mm
- Encoder integrated
- Various piston rod variants
- Based on standard cylinder DNC

NF E 49 003.1
UNI 10 290

New

Standard cylinder DNCM, external displacement encoder

- Piston ∅ 32 and 50 mm
- Fixed stroke lengths of 100 ... 500 mm
- Encoder attached
- Various piston rod variants
- Based on standard cylinder DNC

NF E 49 003.1
UNI 10 290

Linear drives DGPL, external displacement encoder

- Piston ∅ 25 ... 63 mm
- Stroke lengths of 225 ... 2,000 mm
- With encoder or with contactless measuring displacement encoder
- With or without guide
- With clamping unit
- Wide range of options for mounting on drive units
- System product for handling and assembly technology

Linear drives DGPI/DGPIL, internal displacement encoder

- Piston ∅ 25 ... 63 mm
- Stroke lengths of 225 ... 2,000 mm
- Contactless measuring, integrated displacement encoder
- Compact design
- With or without guide
- With protected version
- Wide range of options for mounting on drive units
- System product for handling and assembly technology

Swivel module DSMI, internal displacement encoder

- Sizes: 25 and 40 mm
- Swivel angle 270°
- Rotary encoder integrated
- Compact design
- Wide choice of mounting options

Cylinders with displacement encoder

Product range overview

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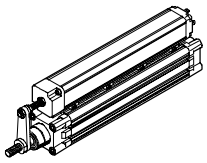
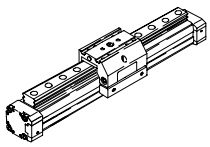
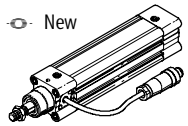
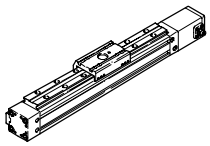
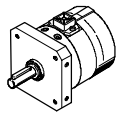
Function	Type	Piston ∅ [mm]	Stroke/Swivel angle [mm/°]	Description	➔ Page
Linear drives	**External displacement encoder**				
	DNCM 	32, 50	100, 160, 200, 250, 320, 400, 500	Piston rod drive, based on standard cylinder DNC, with attached displacement encoder	5 / 1.1-22
	DGP/DGPL 	25, 32, 40, 50, 63	225, 300, 360, 450, 500, 600, 750, 1,000, 1,250, 1,500, 1,750, 2,000	DGP: Linear drive without guide, with external displacement encoder (must be assembled by the customer)	Drive: Volume 1 Displacement encoder: 5 / 1.2-2
				DGPL: Linear drive with guide and attached displacement encoder	5 / 1.1-38
	Internal displacement encoder				
	DNCI New 	32, 40, 50, 63	10 ... 2,000	Piston rod drive, based on standard cylinder DNC, with integrated displacement encoder	5 / 1.1-4
	DGPI/DGPIL 	25, 32, 40, 50, 63	225, 300, 360, 450, 500, 600, 750, 1,000, 1,250, 1,500, 1,750, 2,000	Linear drive, with or without a guide, with integrated displacement encoder	5 / 1.1-56
Swivel modules	**Internal displacement encoder**				
	DSMI 	25, 40	270	Swivel module, based on swivel module DSM, with integrated rotary encoder	5 / 1.1-92

Standard cylinders DNCI, with integrated displacement encoder

Key features

Individual positioning components with standard cylinder DNCI

Proportional directional control valve MPYE-...
➔ 5 / 1.5-2

Soft Stop ➔ 5 / 1.4-2

End position controller SPC11-INC

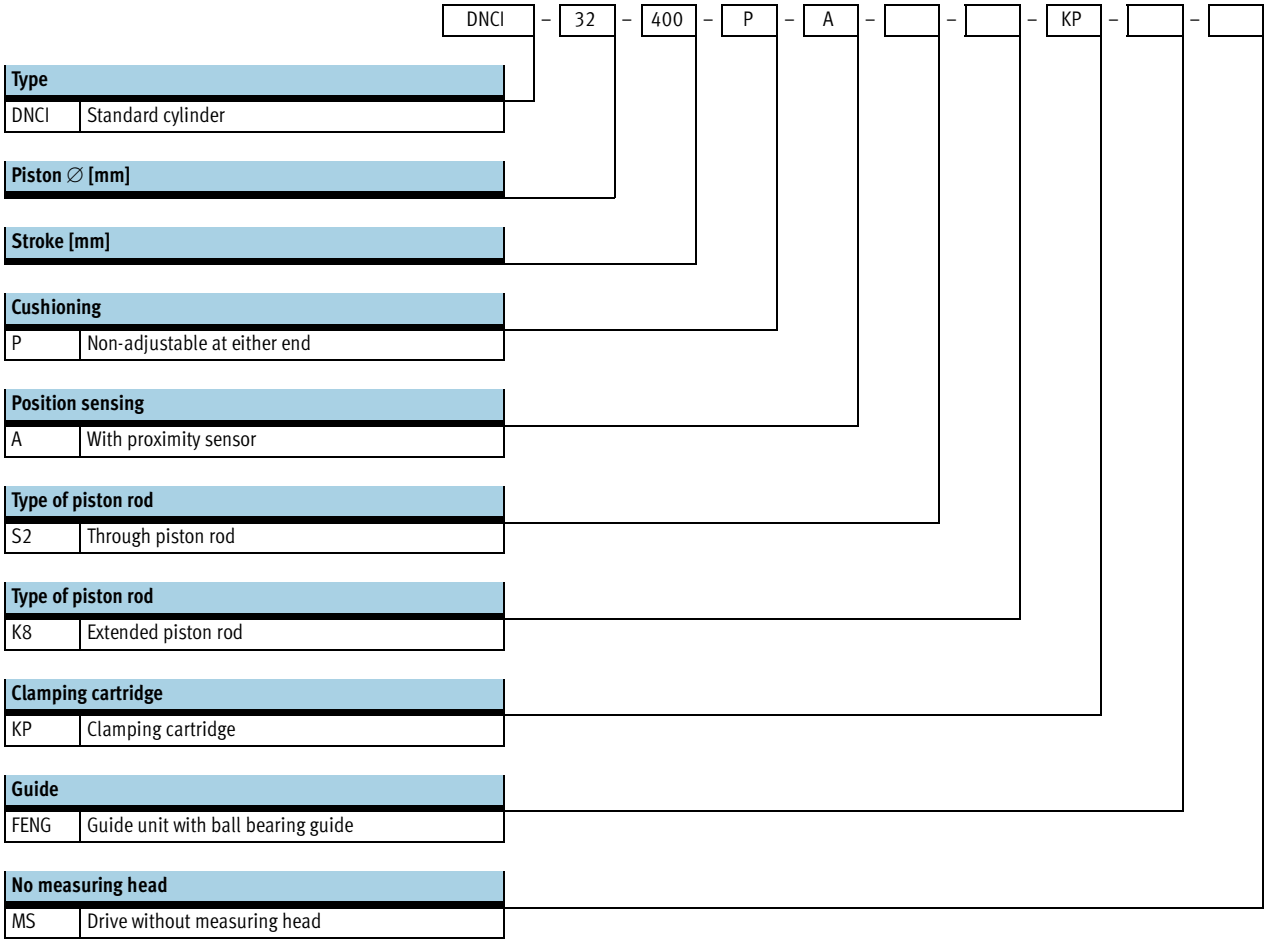
Positioning technology ➔ 5 / 1.3-2

Axis interface SPC-AIF-INC

Axis positioning controller SPC200

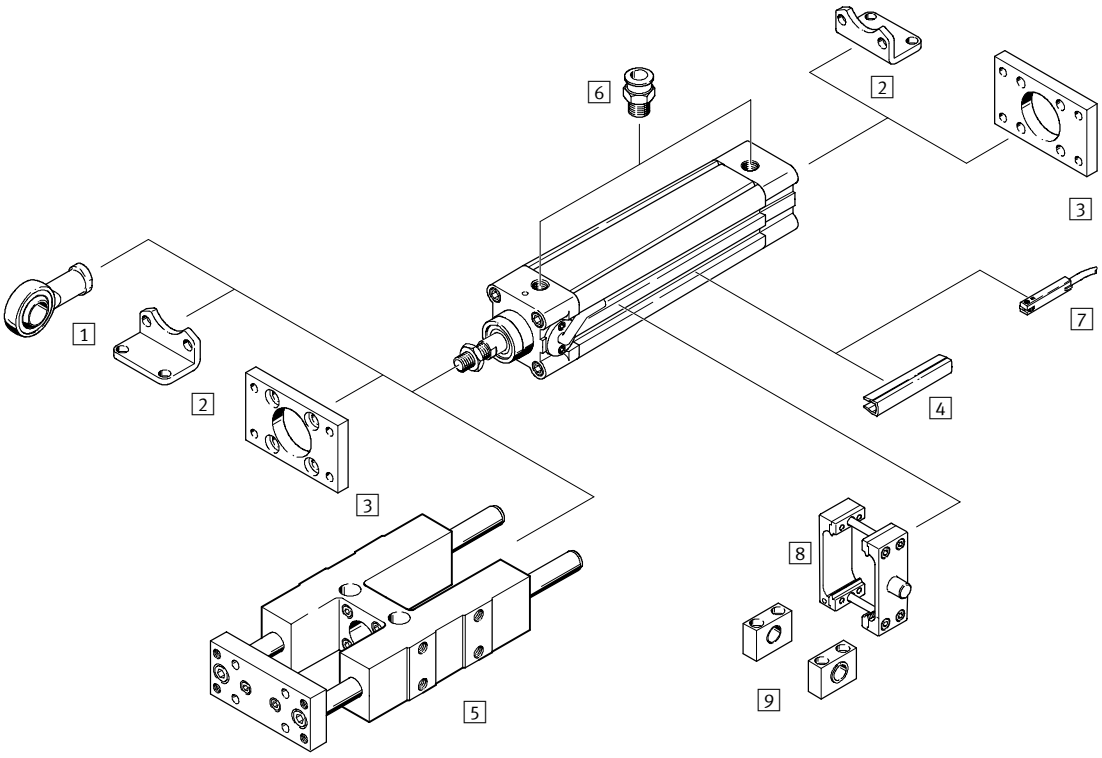
Standard cylinders DNCI, with integrated displacement encoder

Type codes



Standard cylinders DNCI, with integrated displacement encoder

Peripherals overview



Note

If the drive DNCI is used without an end position controller SPC11 or an axis controller SPC200, e.g. as a measuring cylinder, then the standard accessories of the drive DNC can be used.

Standard cylinders DNCI, with integrated displacement encoder

Peripherals overview

Accessories			
	Type	**Brief description**	**➔Page**
1	Rod eye SGS	With spherical bearing	5 / 1.1-19
2	Foot mounting HNC	For mounting the drive on the bearing and end cap	5 / 1.1-18
3	Flange mounting FNC	For mounting the drive on the bearing and end cap	5 / 1.1-19
4	Slot cover ABP-5-S	For protecting against ingress of dirt	5 / 1.1-21
5	Guide unit[1)] FENG-KF	To protect against torsion at high torque loads	5 / 1.1-16
6	Push-in fitting QS	For connecting compressed air tubing with standard external diameters	5 / 1.1-21
7	Proximity sensor SME-/SMT-8	For additional sensing of the piston position, can be ordered optionally, only in conjunction with the order code A in the drive's modular product section.	Volume 1
8	Trunnion mounting kit ZNCM	For swivelling movements of the drive	5 / 1.1-20
9	Trunnion support LNZG	For securing the trunnion mounting kit	5 / 1.1-20

1) FENG-KF must be attached to the piston rod such that backlash is eliminated.

Standard cylinders DNCI, with integrated displacement encoder

Technical data

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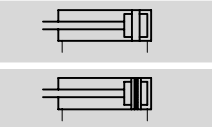
Function



Diameter
32 ... 63 mm

Stroke length
10 ... 2,000 mm

General technical data					
Piston ∅		32	40	50	63
Constructional design		Piston			
		Piston rod			
		Smooth profile barrel			
Mode of operation		Double-acting			
Operating medium[1]		Compressed air, filtered and unlubricated, filter unit 5 µm			
Cushioning		Non-adjustable at either end			
Position sensing		Integrated displacement encoder			
		Proximity sensor[2]			
Measuring principle (displacement encoder)		Digital			
Type of mounting		Foot mounting			
Stroke[3][5]	[mm]	10 ... 2,000			
Torsion protection/Guide[4]		Guide rod with yoke, with ball bearing guide			
Stroke	[mm]	100 ... 500			
Piston rod extended	[mm]	1 ... 500			
Pneumatic connection		G1⁄8	G1⁄4	G1⁄4	G3⁄8
Electrical connection		Cable with 8-pin plug, round type M12			
Cable length	[m]	1.5			

1) The proportional directional control valve MPYE used requires the characteristic values.
2) Not included in the scope of delivery, can be ordered as an option.
3) Note stroke reduction in conjunction with SPC200.
4) FENG-KF guide must be ordered as an option and will be supplied attached, the max. stroke is reduced.
5) Can only be used as a positioning drive without reservation in the range from 100 ... 500 mm.

Forces [N] and impact energy [Nm]				
Piston ∅	32	40	50	63
Theoretical force at 6 bar advancing	483	754	1,178	1,870
Theoretical force at 6 bar retracting	415	633	990	1,682
Max. impact energy at end positions	0.4	0.7	1	1.3

Permissible impact velocity:

$$v_{perm.} = \sqrt{\frac{2 \times E_{perm.}}{m_{dead.} + m_{load}}}$$

Maximum permissible load:

$$m_{load} = \frac{2 \times E_{perm.}}{v^2} - m_{dead.}$$

Note

This data represents the maximum values that can be achieved. Values fluctuate in practice relative to the size of the effective load. Allowance must also be made for the limits of the cushioning capacity of the drive and the permissible impact energy.

Standard cylinders DNCI, with integrated displacement encoder

Technical data

Positioning characteristics with axis controller SPC200						
Piston ∅			32	40	50	63
Repetition accuracy	horizontal	[mm]	< ±0.5			
	vertical	[mm]	< ±0.5			
Assembly position			Any			
Minimum load, horizontal		[kg]	3	5	8	12
Maximum load, horizontal		[kg]	45	75	120	180
Minimum load, vertical[1]		[kg]	3	5	8	12
Maximum load, vertical[1]		[kg]	15	25	40	60
Min. speed of travel		[m/s]	0.05			
Max. speed of travel		[m/s]	1.5			
Typ. positioning time, long stroke[3]		[s]	0.45/0.70	0.50/0.75	0.65/0.80	0.55/0.75
Typ. positioning time, short stroke[4]		[s]	0.35/0.55	0.40/0.55	0.45/0.60	0.40/0.55
Minimum positioning stroke[2]		[%]	< 3			
Stroke reduction[5]		[mm]	10		15	
Recommended proportional directional control valve			→ 5 / 1.1-37			

1) Only in conjunction with an external guide
2) In relation to the maximum stroke of the drive, but never more than 20 mm.
3) At 6 bar, horizontal mounting position, DNCI-XX-500, 400 mm positioning travel at min./max. load
4) At 6 bar, horizontal mounting position, DNCI-XX-500, 100 mm positioning travel at min./max. load
5) The stroke reduction is to be maintained on every side of the drive, the max. positionable stroke is therefore: stroke – 2x stroke reduction

Positioning characteristics with Soft Stop end position controller SPC11					
Piston ∅		32	40	50	63
Repetition accuracy of a mid-position[1]	[mm]	±2			
Assembly position		horizontal			
Minimum load, horizontal[2]	[kg]	3	5	8	12
Maximum load, horizontal[2]	[kg]	45	75	120	180
Travel time		→ Software Tool “SoftStop”: www.festo.com/en/engineering			
Recommended proportional directional control valve		→ 5 / 1.1-37			

1) In the stroke range from 100 ... 500 mm
2) Load = effective load + mass of all moving parts on the drive

Operating and environmental conditions			
Piston ∅		32	50
Operating pressure[1]	[bar]	4 ... 8	
Ambient temperature[2]	[°C]	–20 ... +80	
Vibration resistance		To DIN/IEC 68 Parts 2 -6, severity level 2	
Continuous shock resistance		To DIN/IEC 68 Parts 2 -82, severity level 2	
CE symbol		To 89/336/EEC (EMC regulation)	
Protection class (displacement encoder)		IP65 to IEC 60 529	
Corrosion resistance class CRC[3]		1	

1) Only applies for applications with the Soft Stop end position controller SPC11 and axis controller SPC200.
2) Note operating range of proximity sensors
3) Corrosion resistance class 1 according to Festo standard 940 070
Components requiring low corrosion resistance. Transport and storage protection. Parts that do not have primarily decorative surface requirements, e.g. in internal areas that are not visible or behind covers.

Standard cylinders DNCI, with integrated displacement encoder

Technical data

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Weights [g] with displacement encoder					
		Piston ∅			
Variant		32	40	50	63
Basic drive DNCI-...					
	Product weight with 0 mm stroke	521	853	1,319	1,914
	Additional weight per 10 mm stroke	30	44	62	71
	Moving load with 0 mm stroke	95	175	316	383
	Additional weight per 10 mm stroke	8	14	23	23
Drive with through piston rod DNCI-...-S2					
	Product weight with 0 mm stroke	586	981	1,553	2,165
	Additional weight per 10 mm stroke	39	60	87	96
	Moving load with 0 mm stroke	155	164	297	364
	Additional weight per 10 mm stroke	17	30	48	48
Additional weight with extended piston rod K8					
	Additional weight per 10 mm stroke	8	14	23	23
Additional weight with clamping cartridge KP					
	Product weight	234	394	700	1,147
Additional weight with guide unit FENG-...					
	Product weight with 0 mm stroke	1,530	2,370	4,030	5,410
	Additional weight per 10 mm stroke	18	32	50	62

Electrical data, displacement encoder					
Piston ∅		32	40	50	63
Measuring accuracy	[mm]	±(0.07±0.02/m)			
Resolution	[mm]	0.02			
Max. speed of travel	[m/s]	5			
Ambient temperature	[°C]	–20 ... +80			
Max. temperature coefficient	[ppm/°K]	30			
Protection class		IP65			
CE symbol		To 89/336/EEC (EMC regulation)			
Max. permitted magnetic disruption field at 100 mm interval from the sensor[1)]	[kA/m]	10			
Interface		Analogue			
Electrical connection		Cable with 8-pin plug, round type M12			
Cable length	[m]	1.5			

1) See also mounting conditions

Standard cylinders DNCI, with integrated displacement encoder

Technical data

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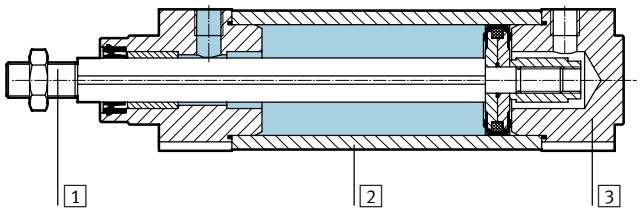
Materials

Sectional view

Drive		
1	Piston rod	High-alloy steel
2	Cylinder barrel	Anodised aluminium
3	Bearing/end caps	Die-cast aluminium
–	Dynamic seals	Polyurethane TPE-U
–	Static seals	Nitrile rubber
–	Lubricant	Klüberplex BE31-102
Displacement encoder		
–	Sensor housing	Polyacetal
–	Cable sheath	Polyurethane
–	Plug housing	Polybutylene terephthalate
–	Mounting plate	Polyacetal
–	Screws for mounting plate	Steel

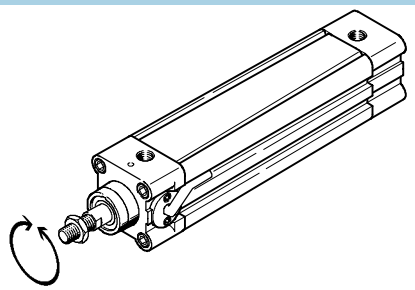


Torques and lateral forces

The piston rod must not absorb any torque. We therefore recommend that an external guide FENG-KF be used with the drive DNCI. The guide unit is delivered installed.

The permissible static and dynamic characteristic load values with and without attached guide as well as with regard to the technical data of the variants (S2, S8, S9)

➔ Volume 1 (standard cylinder DNC)



Mounting conditions

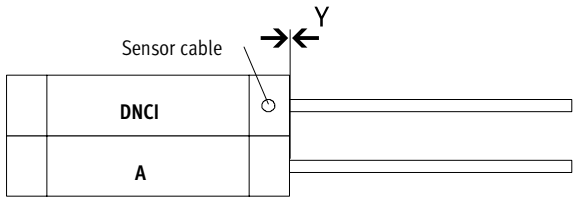
When mounting a drive A with magnet (for position sensing), in addition to a standard cylinder DNCI, the following conditions must be observed:

X Minimum distance between the drives

Y Offset between the drives on the bearing cap

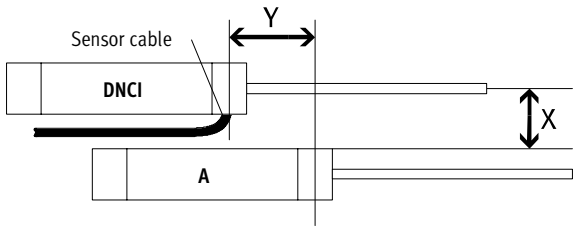
Parallel assembly

If the offset Y = 0 mm, the drives can be assembled directly next to one another.



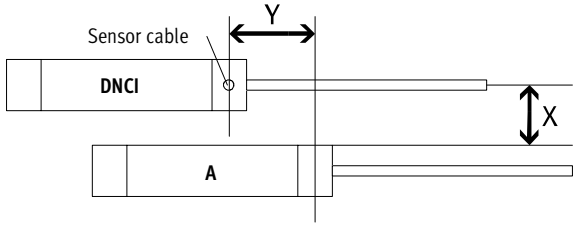
Offset assembly, cable outlet between the drives

If the offset Y > 0 mm and the cable outlet is between the drives, the distance from X > 70 mm must be observed.



Offset assembly, cable outlet upwards or downwards

If the offset Y > 0 mm and the cable outlet is up or down, the distance from X > 60 mm must be observed.



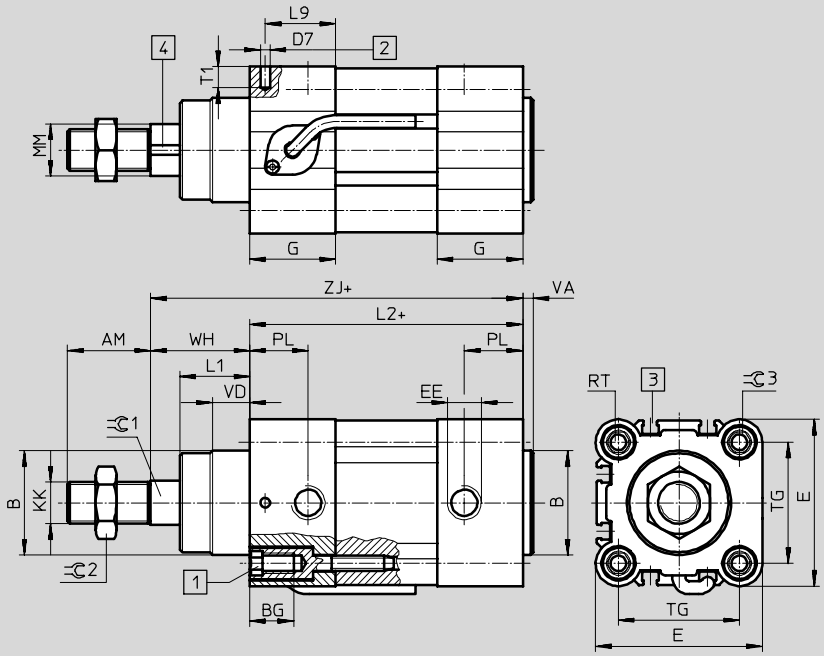
Standard cylinders DNCI, with integrated displacement encoder

Technical data

Dimensions

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

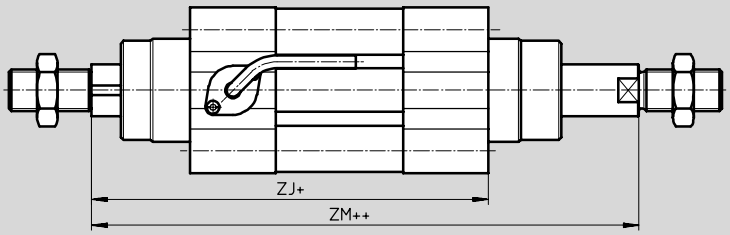
Basic version



1 Socket head screw with female thread for mounting attachments
2 Hole for securing the earthing self-tapping M4 screw according to DIN 7500
3 Sensor slot for proximity sensor SME/SMT-8
4 Magnetic measuring band

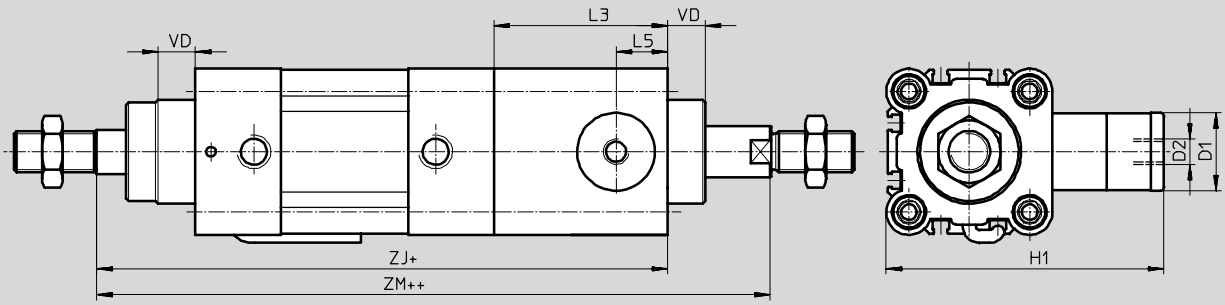
\+ = plus stroke length
++ = plus 2 stroke lengths

S2 – Through piston rod

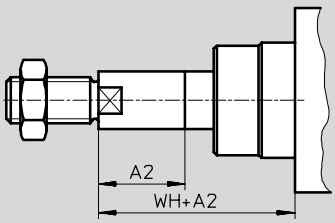


\+ = plus stroke length
++ = plus 2 stroke lengths

S2 / KP – Through piston rod with clamping cartridge



K8 – Extended piston rod



Standard cylinders DNCI, with integrated displacement encoder

Technical data

∅ [mm]	AM	A2 max.	B ∅ d11	BG	D1 ∅ f9	D2	D7 ∅	E	EE	G	H1
32	22	500	30	16	20	M5	3.7	45	G1⁄8	28	67
40	24	500	35	16	24	G1⁄8	3.7	54	G1⁄4	33	88
50	32	500	40	17	30	G1⁄8	3.7	64	G1⁄4	33	107
63	32	500	45	17	38	G1⁄8	3.7	75	G3⁄8	40.5	123

∅ [mm]	KK	L1	L2	L3	L5	L9	MM ∅ f8	PL	RT	T1	TG
32	M10x1.25	18	94	45	14	22.5	12	15.6	M6	8	32.5
40	M12x1.25	21.3	105	53	16	27	16	14	M6	8	38
50	M16x1.5	26.8	106	67	20	27	20	14	M8	8	46.5
63	M16x1.5	27	121	76	24	33	20	17	M8	8	56.5

∅ [mm]	VA	VD	WH	ZJ		ZM		⌀1	⌀2	⌀3
					KP		KP			
32	4	10	26	120	165	148	193	10	16	6
40	4	10.8	30	135	188	167	220	13	18	6
50	4	14.3	37	143	210	183	250	17	24	8
63	4	14.5	37	158	234	199	275	17	24	8

Standard cylinders DNCI, with integrated displacement encoder

Technical data

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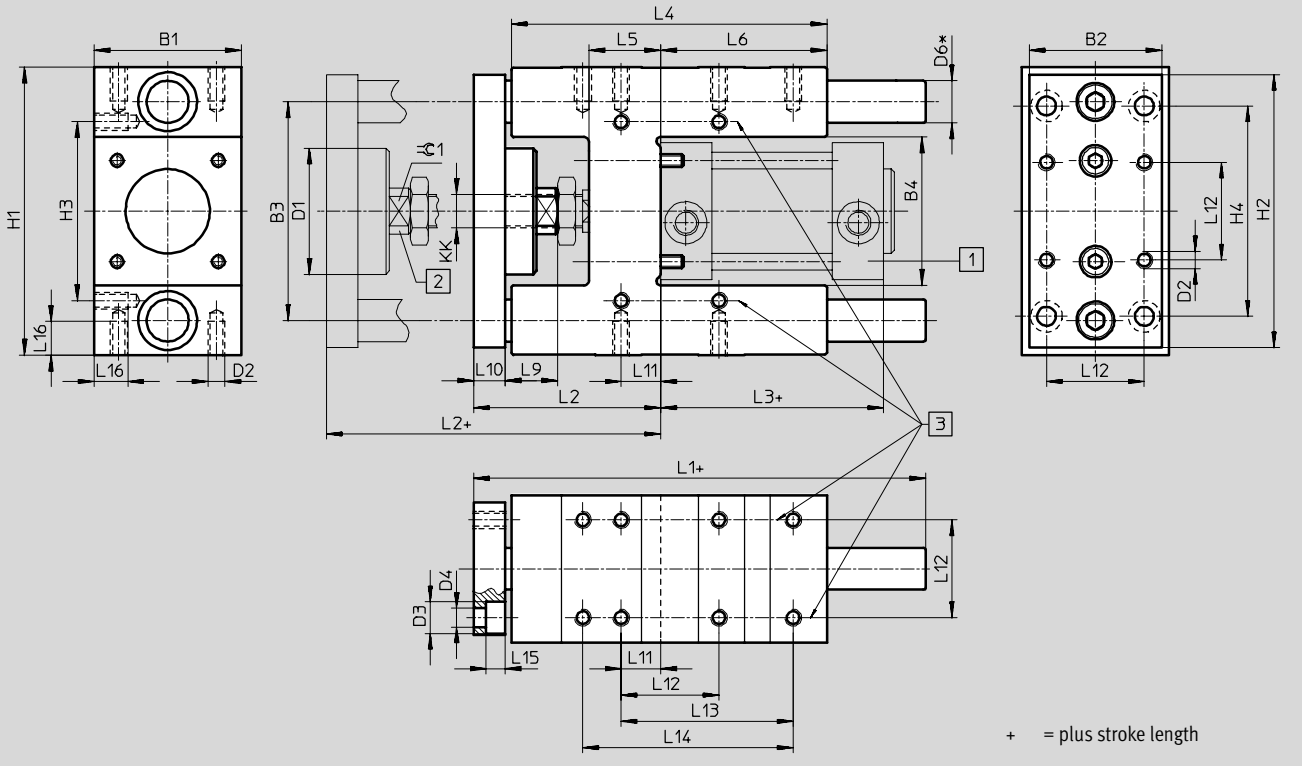
Dimensions Download CAD data ➔ **www.festo.com/en/engineering**

Guide unit FENG-KF



Standard cylinders DNCI, with integrated displacement encoder

Technical data

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for ∅ [mm]	B1 -0.3	B2	B3 ±0.2	B4 ±0.3	D1 ∅	D2	D3 ∅	D4 ∅	D6 ∅ h6	H1
32	50	45	74	50.5	44	M6	11	6.6	12	$97_{-0.4}$
40	58	54	87	58.5	44	M6	11	6.6	16	$115_{-0.4}$
50	70	63	104	70.5	60	M8	15	9	20	$137_{-0.5}$
63	85	80	119	85.5	60	M8	15	9	20	$152_{-0.5}$

for ∅ [mm]	H2	H3 ±0.2	H4 ±0.2	KK	L1	L2	L3	L4	L5	L6
32	90	61	78	M10x1.25	155	67_{+5}	94	125	24	76
40	110	69	84	M12x1.25	170	75_{+5}	105	140	28	81
50	130	85	100	M16x1	188	89_{+10}	106	150	34	79
63	145	100	105	M16x1	220	89_{+10}	121	182	34	111

for ∅ [mm]	L9	L10	L11	L12 ±0.2	L13 ±0.2	L14 ±0.2	L15	L16	⌀1
32	20	12	4.3	32.5	70.3	78	6.5	12	15
40	22	12	11	38	84	–	6.5	14	15
50	25	15	18.8	46.5	81.8	100	9	16	19
63	25	15	15.3	56.5	105	–	9	16	19

Standard cylinders DNCI, with integrated displacement encoder

Ordering data – Modular products

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M Mandatory data

Module No.	Function	Piston ∅	Stroke	Cushioning	Position sensing
535 411	DNCI	32	10 ... 2,000	P	A
535 412		40			
535 413		50			
535 414		63			
Ordering example					
535 411	**DNCI**	– **32**	– **100**	– **P**	– **A** –

Ordering table

	Piston ∅	32	40	50	63	Condi-tions	Code		Enter code
M	Module No.	**535 411**	**535 412**	**535 413**	**535 414**				
	Function	Standard cylinder with integrated displacement encoder, non-rotating piston rod					**DNCI**		DNCI
	Piston ∅ [mm]	32	40	50	63		**-...**		
	Stroke [mm]	10 ... 2,000				1	**-...**		
	Cushioning	Flexible cushioning rings/plates at both ends					**-P**		-P
↓	Position sensing	For proximity sensors					**-A**		-A

1 **Stroke** Can only be used as a positioning drive without reservation in the range from 100 ... 500 mm.

Transfer order code

	DNCI	–		–		–	**P**	–	**A** –

Standard cylinders DNCI, with integrated displacement encoder

Ordering data – Modular products

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0 Options				
Type of piston rod	Piston rod extended	Clamping unit	Guide	Measuring head
S2	...K8	KP	FENG	MS
–	–	–	–	–

Ordering table

Piston ∅		32	40	50	63	Condi-tions	Code		Enter code
0	Type of piston rod	Through piston rod					-S2		
	Piston rod extended [mm]	1 ... 500				2	-...K8		
	Clamping unit	Clamping cartridge				3	-KP		
	Guide	Guide unit with ball bearing guide on the sensor head side				4	-FENG		
	Measuring head	No measuring head					-MS		

2 **K8** In combination with piston rod type S2, the piston rod is only extended at the front (the side facing the measuring head).

3 **K9** Only with piston rod type S2.

4 **FENG** Maximum stroke length 500 mm.

Transfer order code

–		–		–		–		–		–	

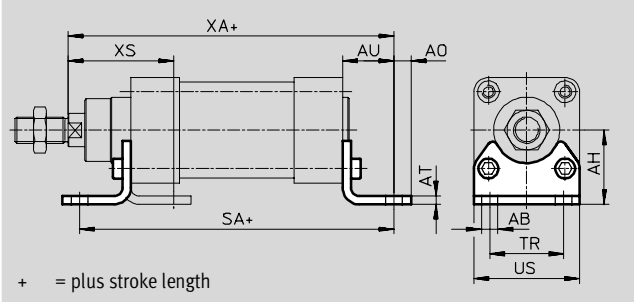
Standard cylinders DNCI, with integrated displacement encoder

Accessories

FESTO

Foot mounting HNC

Material:
Galvanised steel
Free of copper and PTFE



Dimensions and ordering data

For ∅ [mm]	AB ∅	AH	AO	AT	AU	SA	
						Basic cylinder	KP
32	7	32	6.5	5	24	142	187
40	10	36	9	5	28	161	214
50	10	45	10.5	6	32	170	237
63	10	50	12.5	6	32	185	261

For ∅ [mm]	TR	US	XA		XS	CRC[1]	Weight [g]	Part No.	Type
			Basic cylinder	KP					
32	32	45	144	189	45	2	135	**174 369**	**HNC-32**
40	36	54	163	216	53	2	180	**174 370**	**HNC-40**
50	45	64	175	242	62	2	325	**174 371**	**HNC-50**
63	50	75	190	266	63	2	405	**174 372**	**HNC-63**

1) Corrosion resistance class 2 according to Festo standard 940 070
Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

Core Range

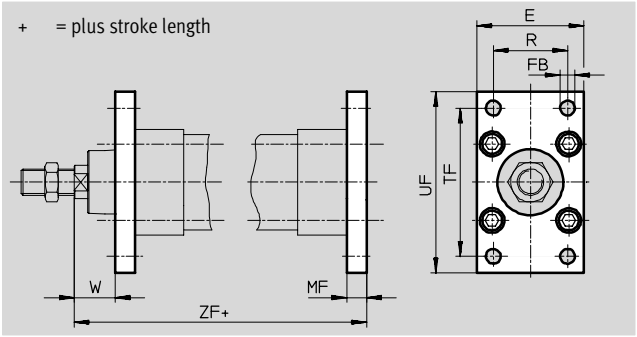
Standard cylinders DNCI, with integrated displacement encoder

Accessories

FESTO

Flange mounting FNC

Material:
FNC: Galvanised steel
Free of copper and PTFE



Dimensions and ordering data

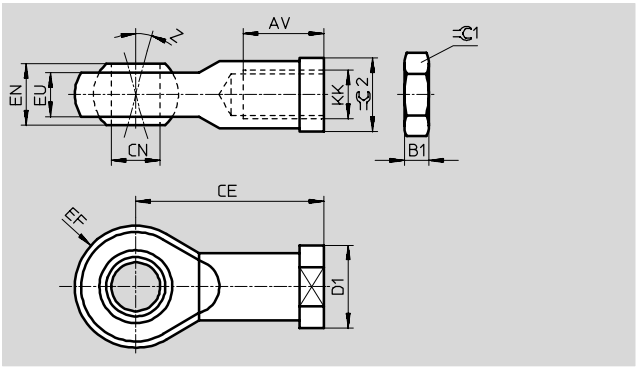
For ∅ [mm]	E	FB ∅ H13	MF	R	TF	UF	W	ZF Basic cylinder	ZF KP	CRC[1]	Weight [g]	Part No.	Type
32	45	7	10	32	64	80	16	130	175	2	240	**174 376**	**FNC-32**
40	54	9	10	36	72	90	20	145	198	2	280	**174 377**	**FNC-40**
50	65	9	12	45	90	110	25	155	222	2	520	**174 378**	**FNC-50**
63	75	9	12	50	100	120	25	170	246	2	690	**174 379**	**FNC-63**

1) Corrosion resistance class 2 according to Festo standard 940 070
Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

Rod eye SGS

Scope of delivery:
1 rod eye, 1 hex nut to DIN 439

Material:
Galvanised steel



Dimensions and ordering data

For ∅	AV	B1	CE	CN ∅ H7	D1 ∅	EF ±0.5	EN	Z [°]	⌀C1	⌀C2	CRC[1]	Weight [g]	Part No.	Type
M10x1.25	20 –2	5	43	10	19	14	14	13	17	17	2	70	**9 261**	**SGS-M10x1,25**
M12x1.25	22 –2	6	50	12	22	16	16	13	19	19	2	105	**9 262**	**SGS-M12x1,25**
M16x1.5	28 –2	8	64	16	27	21	21	15	24	22	2	210	**9 263**	**SGS-M16x1,5**

1) Corrosion resistance class 2 according to Festo standard 940 070
Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

Core Range

Standard cylinders DNCI, with integrated displacement encoder

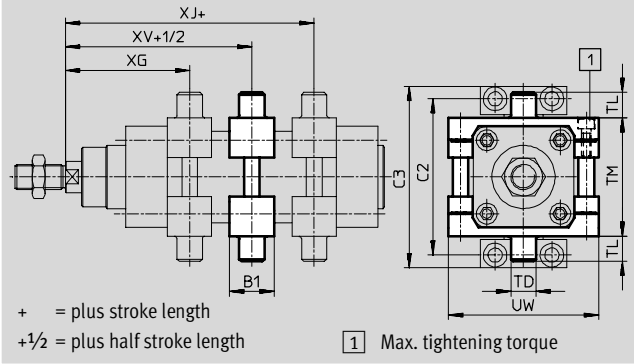
Accessories

FESTO

Trunnion mounting kit ZNCM

The mounting kit can be attached at any position along the profile barrel of a cylinder.

Material:
Tempered steel



Dimensions and ordering data

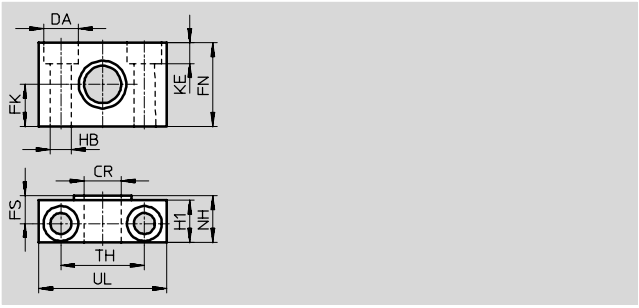
For ∅ [mm]	B1	C2	C3	TD ∅ e9	TL	TM	UW	XG	
								Basic cylinder	KP
32	30	71	86	12	12	50	65	66.1	111.1
40	32	87	105	16	16	63	75	75.6	128.6
50	34	99	117	16	16	75	95	83.6	150.6
63	41	116	136	20	20	90	105	93.1	169.1

For ∅ [mm]	XJ		XV		Max. tightening torque [Nm]	CRC[1]	Weight [g]	Part No.	Type
	Basic cylinder	KP	Basic cylinder	KP					
32	79.9	124.9	73	118	4+1	2	210	**163 525**	**ZNCM-32**
40	89.4	142.4	82.5	135.5	8+1	2	385	**163 526**	**ZNCM-40**
50	96.4	163.4	90	157	8+2	2	595	**163 527**	**ZNCM-50**
63	101.9	177.9	97.5	173.5	18+2	2	890	**163 528**	**ZNCM-63**

1) Corrosion resistance class 2 according to Festo standard 940 070
Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

LNZG trunnion support

Material:
Galvanised steel
Free of copper and PTFE



Dimensions and ordering data

For ∅ [mm]	CR ∅ D11	DA ∅ H13	FK ∅ ±0.1	FN	FS	H1	HB ∅ H13	KE	NH	TH ±0.2	UL	CRC[1]	Weight [g]	Part No.	Type
32	12	11	15	30	10.5	15	6.6	6.8	18	32	46	2	125	**32 959**	**LNZG-32**
40, 50	16	15	18	36	12	18	9	9	21	36	55	2	400	**32 960**	**LNZG-40/50**
63	20	18	20	40	13	20	11	11	23	42	65	2	480	**32 961**	**LNZG-63/80**

1) Corrosion resistance class 2 according to Festo standard 940 070
Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

Core Range

Standard cylinders DNCI, with integrated displacement encoder

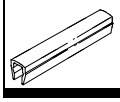
Accessories

Ordering data – Push-in fitting — Technical data ➔ Volume 3

	For ∅ [mm]	Remarks	Part No.	Type	PU[1]
	32		**186 098**	**QS-G⅛-8**	10
	40		**186 099**	**QS-G¼-8**	10
	50		**186 101**	**QS-G¼-10**	10
	63		**186 100**	**QS-G⅜-8**	10
			186 102	**QS-G⅜-10**	10

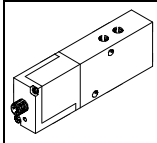
1) Packaging unit quantity

Ordering data – Slot cover — Technical data ➔ Volume 1

	For ∅ [mm]	Remarks	Part No.	Type	PU[1]
	32, 40, 50, 63	every 0.5 m	**151 680**	**ABP-5-S**	2

1) Packaging unit quantity

Ordering data – Proportional directional control valve — Technical data ➔ 5 / 1.5-2

	For ∅ [mm]	Stroke [mm]	Part No.	Type
	For applications with axis controller SPC200			
	32	50... 150	**154 200**	**MPYE-5-M5-010-B**
		150 ... 400	**151 692**	**MPYE-5-⅛-LF-010-B**
		> 400	**151 693**	**MPYE-5-⅛-HF-010-B**
	40	50... 300	**151 692**	**MPYE-5-⅛-LF-010-B**
		> 300	**151 693**	**MPYE-5-⅛-HF-010-B**
	50	50 ... 200	**151 692**	**MPYE-5-⅛-LF-010-B**
		200 ... 900	**151 693**	**MPYE-5-⅛-HF-010-B**
		> 900	**151 694**	**MPYE-5-¼-010-B**
	63	50 ... 300	**151 693**	**MPYE-5-⅛-HF-010-B**
		300 ... 1,000	**151 694**	**MPYE-5-¼-010-B**
		> 1,000	**151 695**	**MPYE-5-⅜-010-B**
	For applications with Soft Stop end position controller SPC11			
	32	100 ... 500	**151 692**	**MPYE-5-⅛-LF-010-B**
		> 500	**151 693**	**MPYE-5-⅛-HF-010-B**
	40	100 ... 320	**151 692**	**MPYE-5-⅛-LF-010-B**
		320 ... 500	**151 693**	**MPYE-5-⅛-HF-010-B**
		> 500	**151 694**	**MPYE-5-¼-010-B**
	50	100 ... 250	**151 692**	**MPYE-5-⅛-LF-010-B**
		250 ... 400	**151 693**	**MPYE-5-⅛-HF-010-B**
		> 500	**151 694**	**MPYE-5-¼-010-B**
	63	100 ... 200	**151 692**	**MPYE-5-⅛-LF-010-B**
		200 ... 400	**151 693**	**MPYE-5-⅛-HF-010-B**
		400 ... 650	**151 694**	**MPYE-5-¼-010-B**
		> 650	**151 695**	**MPYE-5-⅜-010-B**

Note

Recommended proximity sensor
➔ Drive DNC, Volume 1

Core Range

Standard cylinder DNCM, external displacement encoder

Key features

Individual positioning components with standard cylinder DNCM ...

Proportional directional control valve
MPYE-...
➔ 5 / 1.5-2

Soft Stop ➔ 5 / 1.4-2

Positioning technology ➔ 5 / 1.3-2

End position controller
SPC11-POT-TLF

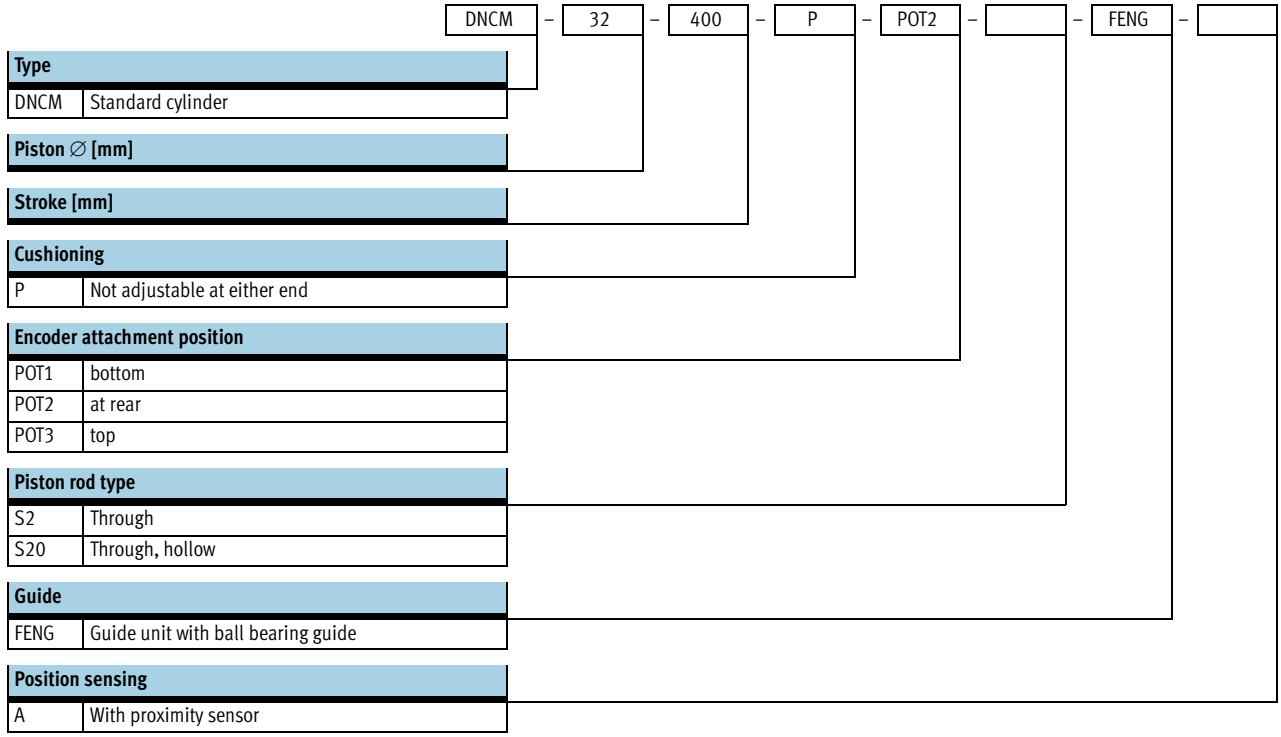
Axis interface
SPC-AIF-POT

Axis positioning controller
SPC200

Standard cylinder DNCM, external displacement encoder

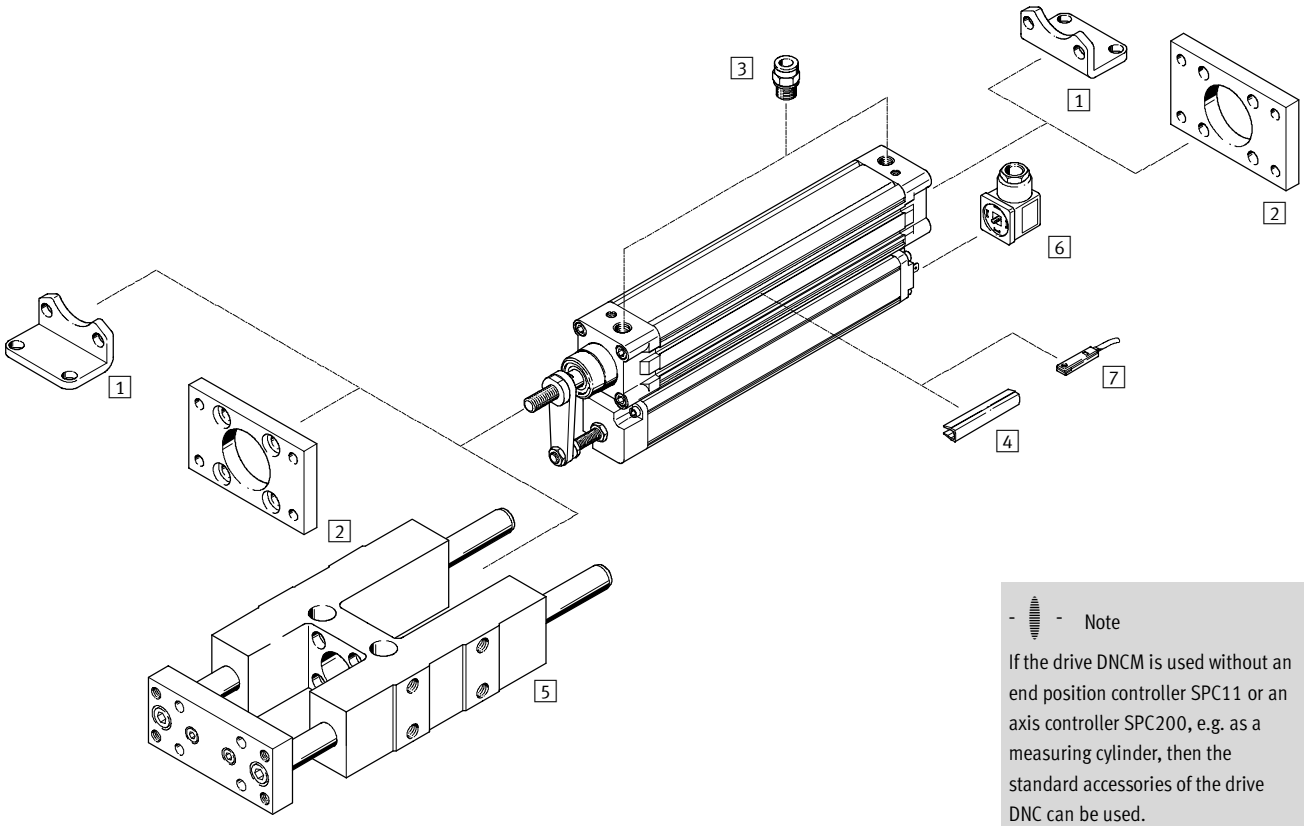
FESTO

Type code



Standard cylinder DNCM, external displacement encoder

Peripherals overview



Note

If the drive DNCM is used without an end position controller SPC11 or an axis controller SPC200, e.g. as a measuring cylinder, then the standard accessories of the drive DNC can be used.

Standard cylinder DNCM, external displacement encoder

Peripherals overview

Accessories			
	Type	**Brief description**	**➔ Page**
1	Foot mounting HNC	to mount the drive on the bearing and end cap	5 / 1.1-36
2	Flange mounting FNC	to mount the drive on the bearing and end cap	5 / 1.1-36
3	Push-in fitting QS	for connecting compressed air tubing with standard O.D.	5 / 1.1-37
4	Slot cover ABP-5-S	to protect against the ingress of dirt	5 / 1.1-36
5	Guide unit[1)] FENG-KF	to protect against torsion at high torque loads	5 / 1.1-36
6	Plug socket MSSD-C-4P	to connect the displacement encoder, is part of the end position controller SPC11 and the axis controller SPC200	5 / 1.1-37
7	Proximity sensors SME-/SMT-8	for additional sensing of the piston position, can be ordered optionally, only in conjunction with the order code A in the drive's modular product section.	Volume 1

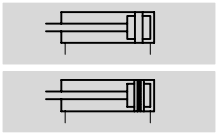
1) FENG-KF must be attached to the piston rod such that backlash is excluded.

Standard cylinder DNCM, external displacement encoder

Technical data

FESTO

Function



- Ø - Diameter
  32 mm and 50 mm
- I - Stroke length
  100 ... 500 mm

General technical data			
Piston ∅		32	50
Design		Piston	
		Piston rod	
		Profile barrel	
Mode of operation		Double-acting	
Operating medium[1]		Compressed air, filtered and unlubricated, filter unit 5 µm	
Cushioning		Non-adjustable at either end	
Position sensing		Displacement encoder, attached externally	
		Proximity sensor[2]	
Measuring principle (displacement encoder)		Analogue with encoder, contacting and absolute measurement	
Type of mounting		Foot mounting	
Stroke[3]	[mm]	100, 160, 200, 250, 320, 400, 500	
Torsion protection/Guide[4]		Guide rod with yoke, with ball bearing guide	
Stroke	[mm]	100, 160, 200, 250	
Pneumatic connection		G1/8	G1/4
Electrical connection		4-pin plug, type A DIN 43 650	

1) The proportional directional control valve MPYE used requires the characteristic values.
2) Not included in the scope of delivery, can be ordered as an option.
3) Note stroke reduction in conjunction with SPC200.
4) FENG-KF guide must be ordered as an option and will be supplied attached, the max. stroke is reduced.

Forces [N] and impact energy [Nm]		
Piston ∅	32	50
Theoretical force at 6 bar advancing	483	1,178
Theoretical force at 6 bar retracting	415	990
Max. impact energy at end positions	0.1	0.2

Permissible impact velocity:

$$v_{perm.} = \sqrt{\frac{2 \times E_{perm.}}{m_{dead} + m_{load}}}$$

Maximum permissible load:

$$m_{load} = \frac{2 \times E_{perm.}}{v^2} - m_{dead}$$

- Note

This data represents the maximum values which can be achieved. Values fluctuate in practice relative to the size of the effective load. Allowance must also be made for the limits of the cushioning capacity of the drive and the permissible impact energy.

Standard cylinder DNCM, external displacement encoder

Technical data

FESTO

Positioning characteristics with axis controller SPC200				
Piston ∅			32	50
Repetition accuracy	horizontal	[mm]	±0.2	
	vertical	[mm]	±0.2 (for stroke 0 ... 200 mm)	
		[mm]	±0.4 (for stroke 200 ... 500 mm)	
Mounting position			Any	
Minimum load, horizontal[1]		[kg]	3	8
Maximum load, horizontal[1)6)]		[kg]	45	120
Minimum load, vertical[1]		[kg]	3	8
Maximum load, vertical[1)6)]		[kg]	15	40
Min. speed of travel		[m/s]	0.05	0.05
Max. speed of travel		[m/s]	2.2	1.7
Typ. positioning time, long stroke[2]		[s]	0.45/0.75	0.65/0.85
Typ. positioning time, short stroke[3]		[s]	0.35/0.55	0.45/0.60
Minimum positioning stroke[4]		[%]	3	3
Stroke reduction[5]		[mm]	≥ 10	≥ 15
Recommended proportional directional control valve			→ 5 / 1.1-37	

1) Load = effective load + mass of all moving parts on the drive
2) At 6 bar, horizontal mounting position, DNCM-XX-500, 400 mm positioning travel at min./max. load
3) At 6 bar, horizontal mounting position, DNCM-XX-500, 100 mm positioning travel at min./max. load
4) In relation to the maximum stroke of the drive, but never more than 20 mm.
5) The stroke reserve is to be maintained on every side of the drive, the max. positionable stroke is therefore: Stroke – 2x stroke reserve
6) With external guide

Positioning characteristics with Soft Stop end position controller SPC11			
Piston ∅		32	50
Repetition accuracy of a mid-position[1]	[mm]	±2	
Mounting position		horizontal	
Minimum load, horizontal[2]	[kg]	3	8
Maximum load, horizontal[2]	[kg]	45	120
Travel time		→ Software Tool “SoftStop”: www.festo.com/en/engineering	
Recommended proportional directional control valve		→ 5 / 1.1-37	

1) In the stroke range from 100 ... 500 mm
2) Load = effective load + mass of all moving parts on the drive

Operating and environmental conditions			
Piston ∅		32	50
Operating pressure[1]	[bar]	4 ... 8	
Ambient temperature[2]	[°C]	–10 ... +80	
Vibration resistance		To DIN/IEC 68 Parts 2 -6, severity level 2	
Continuous shock resistance		To DIN/IEC 68 Parts 2 -27, severity level 2	
CE symbol		To 89/336/EEC (EMC regulation)	
Protection class (displacement encoder)		IP54 to IEC 60 529	
Corrosion resistance class CRC[3]		1	

1) Only applies for applications with the Soft Stop end position controller SPC11 and axis controller SPC200.
2) Note operating range of proximity sensors
3) Corrosion resistance class 1 according to Festo standard 940 070
Components requiring low corrosion resistance. Transport and storage protection.

Weights [g] with displacement encoder								
		Stroke						
Piston ∅		100	160	200	250	320	400	500
32	Product weight	1,160	1,406	1,640	1,990	2,312	2,640	3,190
	Moving load	310	375	430	490	565	660	760
50	Product weight	2,270	2,684	3,030	3,520	4,038	4,590	5,420
	Moving load	850	1,010	1,125	1,265	1,455	1,675	1,935

Standard cylinder DNCM, external displacement encoder

Technical data

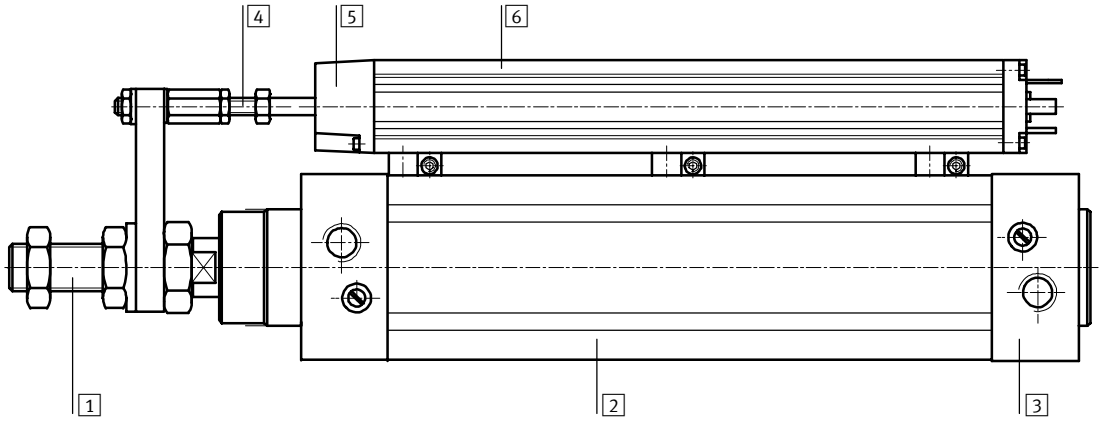
FESTO

Electrical data, displacement encoder									
Stroke			100	160	200	250	320	400	500
Power supply[1]		[V DC]	10						
Max. current consumption		[mA]	4						
Wiper current	recommended	[µA]	< 1						
	maximum[2]	[mA]	10						
Connection resistance		[kΩ]	3	5					
Connection resistance tolerance		[%]	±20						
Resolution		[mm]	≤ 0.01						
Independent linearity	maximum	[%]	0.09	0.08	0.07	0.06	0.05	0.05	0.05
Temperature coefficient		[ppm/°K]	≤ 5						
Interface			Analogue						

1) Stabilised power supply is recommended, max. 42 V DC permissible.
2) Only permissible in the short-term in the event of a fault.

Materials

Sectional view

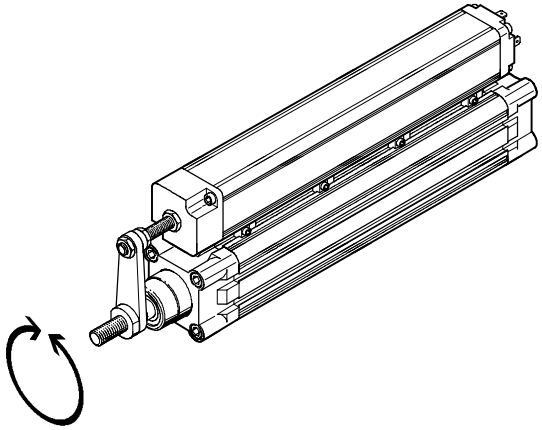


Drive			
1	Piston rod		High-alloy steel
2	Cylinder barrel		Anodised aluminium
3	Bearing/end caps		Die-cast aluminium
–	Dynamic seals		Polyurethane TPE-U
–	Static seals		Nitrile rubber
–	Lubricant		Klüberplex BE31-102
Displacement encoder			
4	Connecting rod		High-alloy steel
5	Bearing cap		Reinforced polyester
6	Profile		Anodised aluminium
–	Resistor element		Conductive plastic
–	Wiper	Contact	Precious metal
		Silencer	Elastomer
–	Cover seal		Nitrile rubber
–	Rod seal		Tetrafluoroethylene
–	Lubricant		ISOFLEX Topas MB52

Standard cylinder DNCM, external displacement encoder

Technical data

Torques and lateral forces



Note

Torques or lateral forces can result in inaccurate measurement results. We therefore recommend that an external guide be used with the drive DNCM.
This must be attached to the piston rod such that backlash is excluded.

Use of the DNCM with the FENG-KF is recommended. The drive is delivered with the guide attached.

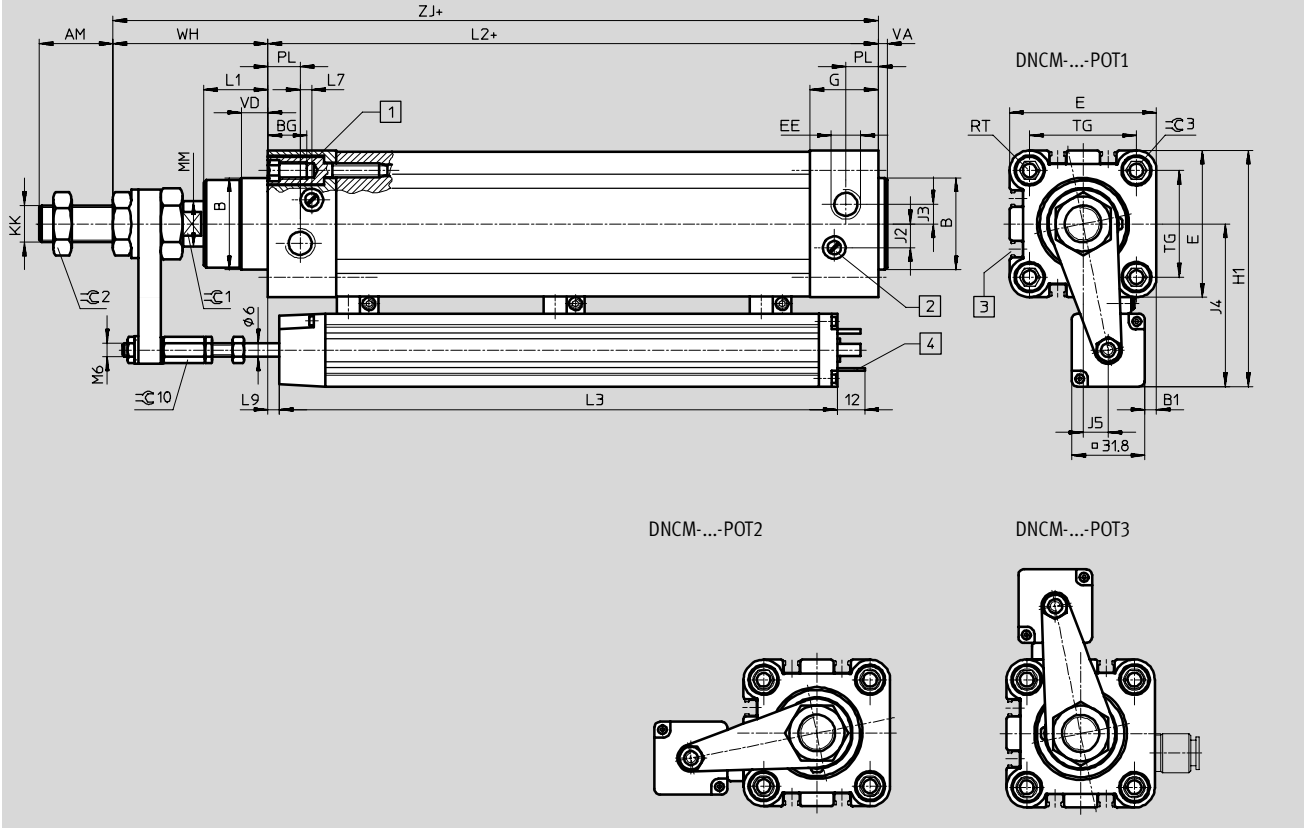
The permissible static and dynamic characteristic load values with and without attached guide
➔ Volume 1 (standard cylinder DNC)

Technical data for the S2 and S20 designs of the piston rod
➔ Volume 1 (standard cylinder DNC)

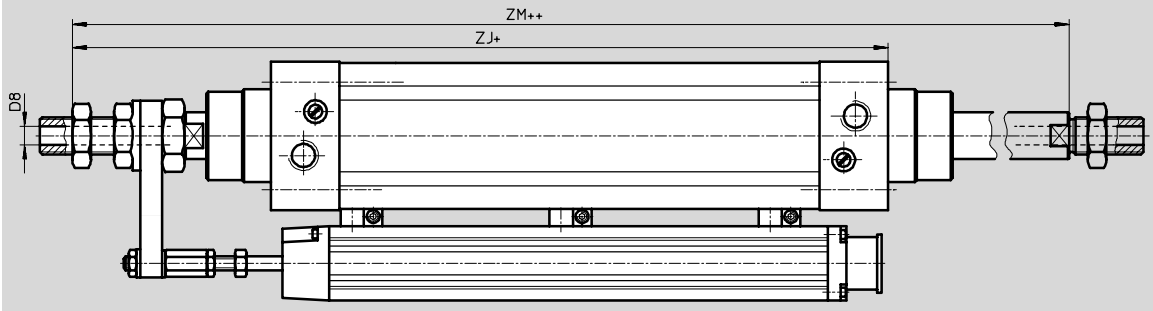
Standard cylinder DNCM, external displacement encoder

Technical data

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



DNCM-...-S2/DNCM-...-S20



1 Socket head screw with female thread for mounting attachments
2 Regulating screw for adjustable end-position cushioning
3 Sensor slot for proximity sensor SME/SMT-8
4 Plug connector to DIN 43 650-A

\+ = plus stroke length
++ = plus 2x stroke length

Standard cylinder DNCM, external displacement encoder

Technical data

FESTO

∅ [mm]	AM	B ∅ d11	BG	B1 ±0.8	D8 ∅	E	EE	G	H1 ±1.5
32	22	30	16	0.24	4.5	45	G1/8	25.1	84.4
50	32	40	17	5.6	8	64	G1/4	29.6	103.4

∅ [mm]	J2	J3	J4 ±1	J5 ±1	KK	L1	L2
32	6	5.2	45.8	6.3	M10x1.25	18	94
50	10.4	8.5	55.3	10.6	M16x1.5	28	106

∅ [mm]	Stroke [mm]	L3	L7	L9	MM ∅ f8	PL	RT	TG	VA	VD
32	100	201	3.3	6.5 ±2	12	15.6	M6	32.5	4	10
	160	248		1 +2/–1						
	200	298		5 ±2						
	250	349		5.5 ±2						
	320	436		13 ±2						
	400	502		6 ±2						
	500	629		20 ±2						
50	100	201	5.1	6.5 ±2	20	14	M8	46.5	4	11.5
	160	248		1 +2/–1						
	200	298		5 ±2						
	250	349		5.5 ±2						
	320	436		13 ±2						
	400	502		6 ±2						
	500	629		0 +2						

∅ [mm]	WH	ZJ	ZM	⌀1	⌀2	⌀3
32	44.4	138.4	166.4	10	16	6
50	67.4	173.4	213.4	17	24	8

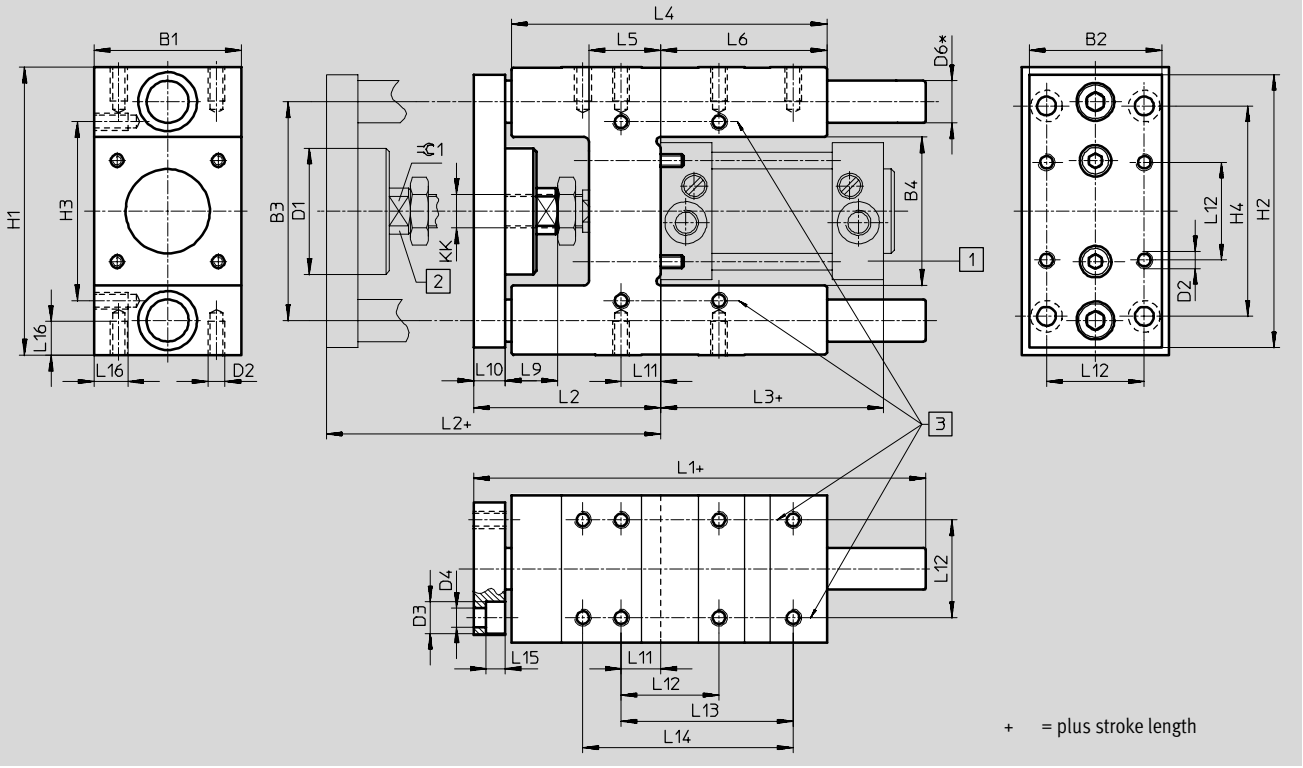
Standard cylinder DNCM, external displacement encoder

Technical data

FESTO

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

Guide unit FENG-KF



Standard cylinder DNCM, external displacement encoder

Technical data

FESTO

for ∅ [mm]	B1 -0.3	B2	B3 ±0.2	B4 ±0.3	D1 ∅	D2	D3 ∅	D4 ∅
32	50	45	74	50.5	44	M6	11	6.6
50	70	63	104	70.5	60	M8	15	9

for ∅ [mm]	D6 ∅ h6	H1	H2	H3 ±0.2	H4 ±0.2	KK	L1	L2
32	12	$97_{-0.4}$	90	61	78	M10x1.25	155	67_{+5}
50	20	$137_{-0.5}$	130	85	100	M16x1.5	188	89_{+10}

for ∅ [mm]	L3	L4	L5	L6	L9	L10	L11	L12 ±0.2
32	94	125	24	76	20	12	4.3	32.5
50	106	150	34	79	25	15	18.8	46.5

for ∅ [mm]	L13 ±0.2	L14 ±0.2	L15	L16	⌀1	Stroke [mm]	Weight per 10 mm stroke [g]	Weight [g]
32	70.3	78	6.5	12	15	10 ... 500	18	1 530
50	81.8	100	9	16	19	10 ... 500	50	4 030

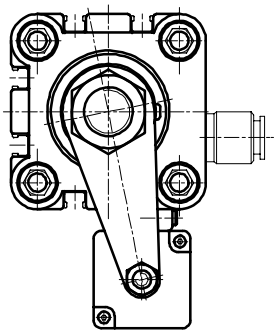
Standard cylinder DNCM, external displacement encoder

Ordering data – Modular product system

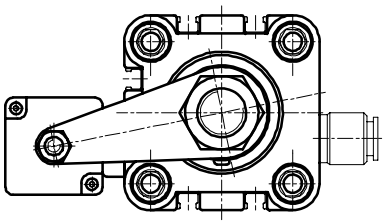
FESTO

Arrangement of the displacement encoder

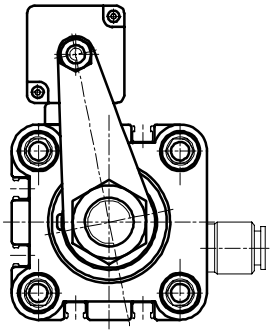
DNCM-...-POT1 (encoder underneath)



DNCM-...-POT2 (encoder at rear)



DNCM-...-POT3 (encoder on top)



Standard cylinder DNCM, external displacement encoder

Ordering data – Modular product system

FESTO

M Mandatory data						O Options		
Module No.	**Basic function**	**Size**	**Stroke**	**Cushioning**	**Encoder attachment position**	**Piston rod type**	**Guide**	**Position sensing**
528 940 528 941	DNCM	32 50	100 160 200 250 320 400 500	P	POT1 POT2 POT3	S2 S20	FENG	A
Ordering example								
528 941	**DNCM**	**50**	**500**	**P**	**POT3**	**S20**		**A**

Ordering table

Size			32	50	Conditions	Code	Enter code
M	Module No.		**528 940**	**528 941**			
	Basic function		Standard cylinder with displacement encoder			**DNCM**	DNCM
	Size	[mm]	32	50		**-...**	
	Stroke	[mm]	100			**-100**	
			160			**-160**	
			200			**-200**	
			250			**-250**	
			320		1	**-320**	
			400		1	**-400**	
			500		1	**-500**	
	Cushioning		Flexible cushioning rings/plates at both ends			**-P**	-P
	Encoder attachment position		Encoder underneath			**-POT1**	
			Encoder at rear			**-POT2**	
			Encoder on top			**-POT3**	
O	Piston rod type		Through piston rod		1	**-S2**	
			Through, hollow piston rod		1	**-S20**	
	Guide		Guide unit with ball bearing guide KF		2	**-FENG**	
	Position sensing		Via proximity sensor			**-A**	

1 **320, 400, 500, S2, S20** Not with guide FENG.

2 **FENG** Only with POT2 encoder. FENG is mounted without backlash.

Transfer order code

	DNCM	–		–		–	**P**	–		–		–		–	

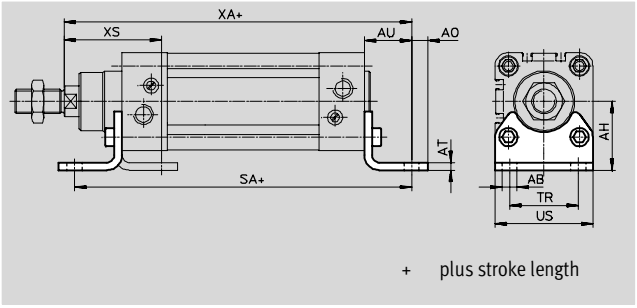
Standard cylinder DNCM, external displacement encoder

Accessories

FESTO

Foot mounting HNC

Material:
Galvanised steel
Free of copper, PTFE and silicone

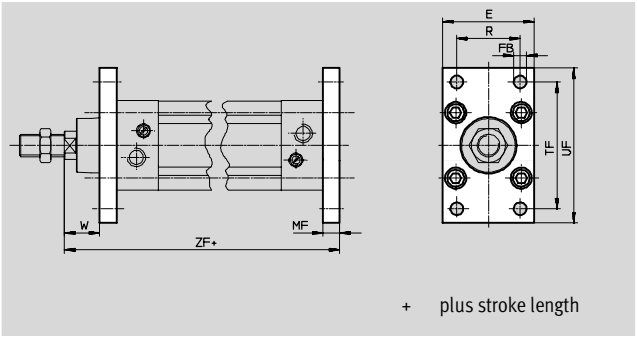


Dimensions and ordering data

for ∅ [mm]	AB ∅	AH	AO	AT	AU	SA	TR	US	XA	XS	Weight [g]	Part No.	Type
32	7	32	6.5	4	24	142	32	45	144	45	135	**174 369**	**HNC-32**
50	10	45	9.5	5	31	170	45	64	175	62	325	**174 371**	**HNC-50**

Flange mounting FNC

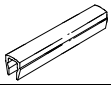
Material:
Galvanised steel
Free of copper, PTFE and silicone



Dimensions and ordering data

for ∅ [mm]	E	FB ∅ H13	MF	R	TF	UF	W	ZF	Weight [g]	Part No.	Type
32	45	7	10	32	64	80	16	130	240	**174 376**	**FNC-32**
50	65	9	12	45	90	110	25	155	520	**174 378**	**FNC-50**

Ordering data – Slot cover Technical data ➔ Volume 1

	for ∅ [mm]	Remarks	Part No.	Type	PU[1]
Slot cover ABP-S					
	32, 50	0.5 m each	**151 680**	**ABP-5-S**	2

1) Packaging unit quantity

Core Range

Standard cylinder DNCM, external displacement encoder

Accessories

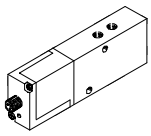
FESTO

Ordering data – Push-in/threaded fitting — Technical data ➔ Volume 3

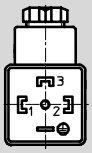
	for ∅ [mm]	Remarks	Part No.	Type	PU[1]
	32	for connecting compressed air tubing with standard O.D.	**186 098**	**QS-G⅛-8**	10
	50		**186 099**	**QS-G¼-8**	

1) Packaging unit quantity

Ordering data – Proportional directional control valve — Technical data ➔ 5 / 1.5-2

	for ∅ [mm]	Stroke [mm]	Part No.	Type
	for applications with axis controller SPC200			
	32	100/160/200/250/320	**151 692**	**MPYE-5-⅛-LF-010-B**
		400/500	**151 693**	**MPYE-5-⅛-HF-010-B**
	50	100/160/200/250/320/400/500	**151 693**	**MPYE-5-⅛-HF-010-B**
	for applications with Soft Stop end position controller SPC11			
	32	100/160/200/250/320/400	**151 692**	**MPYE-5-⅛-LF-010-B**
		500	**151 693**	**MPYE-5-⅛-HF-010-B**
	50	100/160/200/250	**151 692**	**MPYE-5-⅛-LF-010-B**
		320/400	**151 693**	**MPYE-5-⅛-HF-010-B**
		500	**151 694**	**MPYE-5-¼-010-B**

Ordering data – Plug socket



PIN	Pin allocations	Designation	Part No.	Type
1	Power supply	Plug socket	**171 157**	**MSSD-C-4P**
2	Signal			
3	0 V			
PE	PE (yellow), screen			

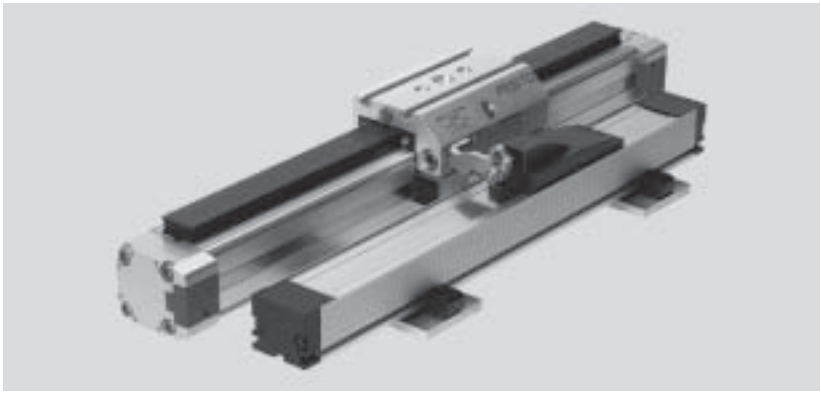
Note

Recommended proximity sensor
➔ Drive DNC, Volume 1

Linear drives DGPL, external displacement encoder

Features

Individual positioning components with linear drive DGPL ...



Proportional directional control valve MPYE-...
➔ 5 / 1.5-2

Soft Stop ➔ 5 / 1.4-2

End position controller SPC11-POT-TLF

Positioning technology ➔ 5 / 1.3-2

Axis interface SPC-AIF-POT

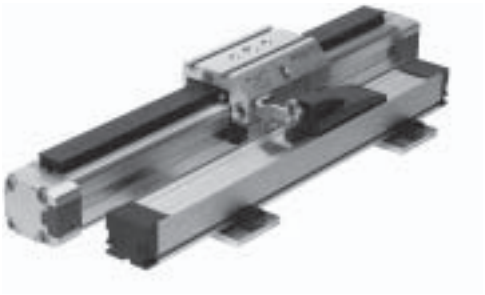
Axis positioning controller SPC200

Linear drives DGPL, external displacement encoder

Features

DGPL, with recirculating ball bearing guide

- Piston ∅ 25 ... 63 mm
- Stroke 225 ... 2,000 mm
- Standard slide or extended slide
- High characteristic load values
- Air connections on both sides

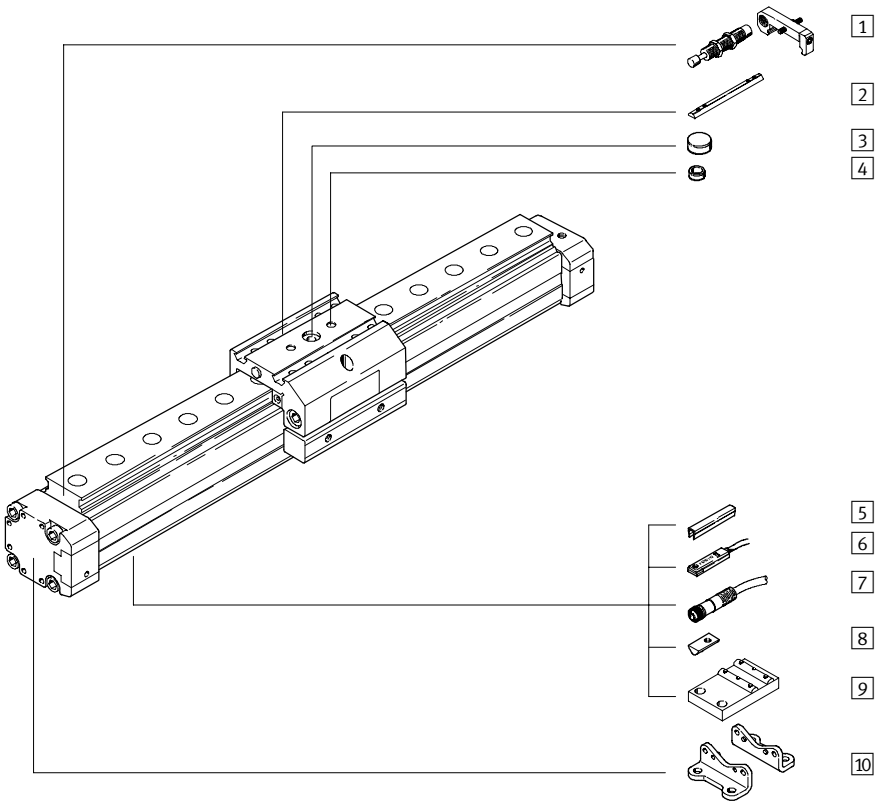


DGPL, with recirculating ball bearing guide and clamping unit

- Piston ∅ 25...40 mm
- Stroke 225 ... 2,000 mm
- Standard slide or extended slide
- In the event of a loss of pressure, the slide can be fixed in vertical operation using the clamping unit.
- High characteristic load values
- Air connections on both sides

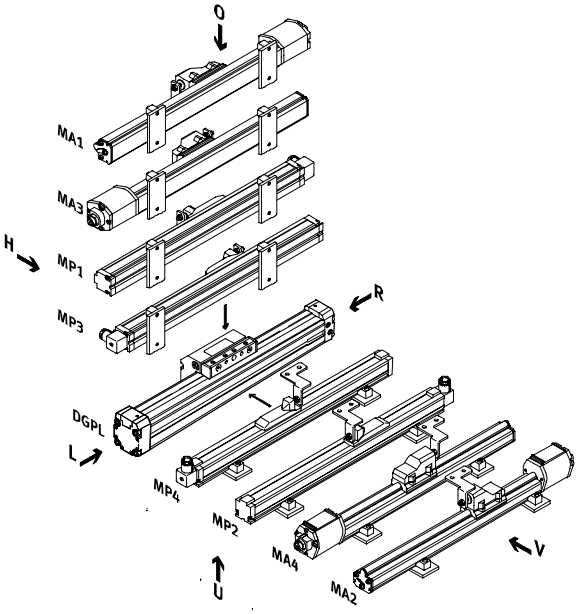
Linear drives DGPL, external displacement encoder

Peripherals overview

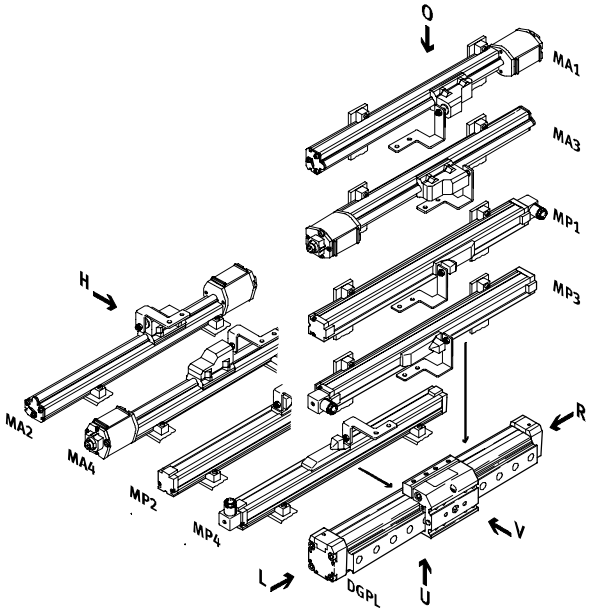


Displacement encoder attachment position 11

Slide at rear (SH)



Slide at front (SV)



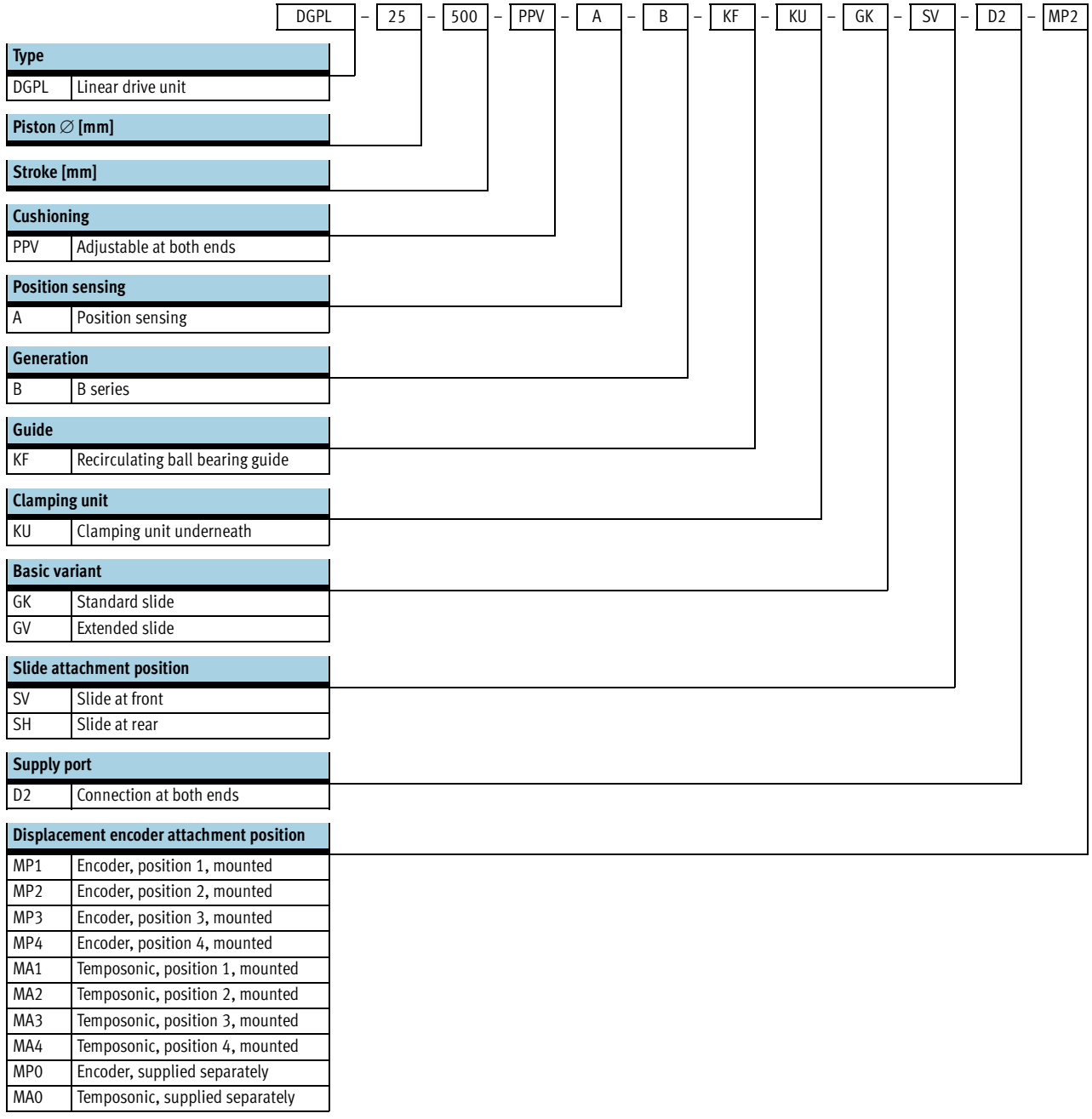
Linear drives DGPL, external displacement encoder

Peripherals overview

Variants and accessories			
	Type	**Brief description**	**➔ Page**
1	Shock absorber kits C	to avoid damage at the end stop, in the event of malfunctions	5 / 1.1-88
2	Slot nut for slide X	for mounting loads and attachments on the slide	5 / 1.1-89
3	Central mounting Q	for centring loads and attachments on the slide	5 / 1.1-89
4	Centring sleeves Z	for centring loads and attachments on the slide	5 / 1.1-89
5	Slot cover B/S	to protect against the ingress of dirt	5 / 1.1-89
6	Proximity sensors G/H/I/J/N	for additional sensing of the piston position, can be ordered optionally, only in conjunction with the order code A in the drive's modular product section.	5 / 1.1-91
7	Plug socket with cable V	for proximity sensor	5 / 1.1-91
8	Slot nut for mounting slot Y	for mounting attachments	5 / 1.1-89
9	Central support M	to mount the axis	5 / 1.1-86
10	Foot mounting F	to mount the axis	5 / 1.1-86
11	Displacement encoder attachment position MA1 ... MA4/MP1 ... MP4	for drive position measurement	5 / 1.1-52

Linear drives DGPL, external displacement encoder

Type codes



Type	
DGPL	Linear drive unit

Piston ∅ [mm]	

Stroke [mm]	

Cushioning	
PPV	Adjustable at both ends

Position sensing	
A	Position sensing

Generation	
B	B series

Guide	
KF	Recirculating ball bearing guide

Clamping unit	
KU	Clamping unit underneath

Basic variant	
GK	Standard slide
GV	Extended slide

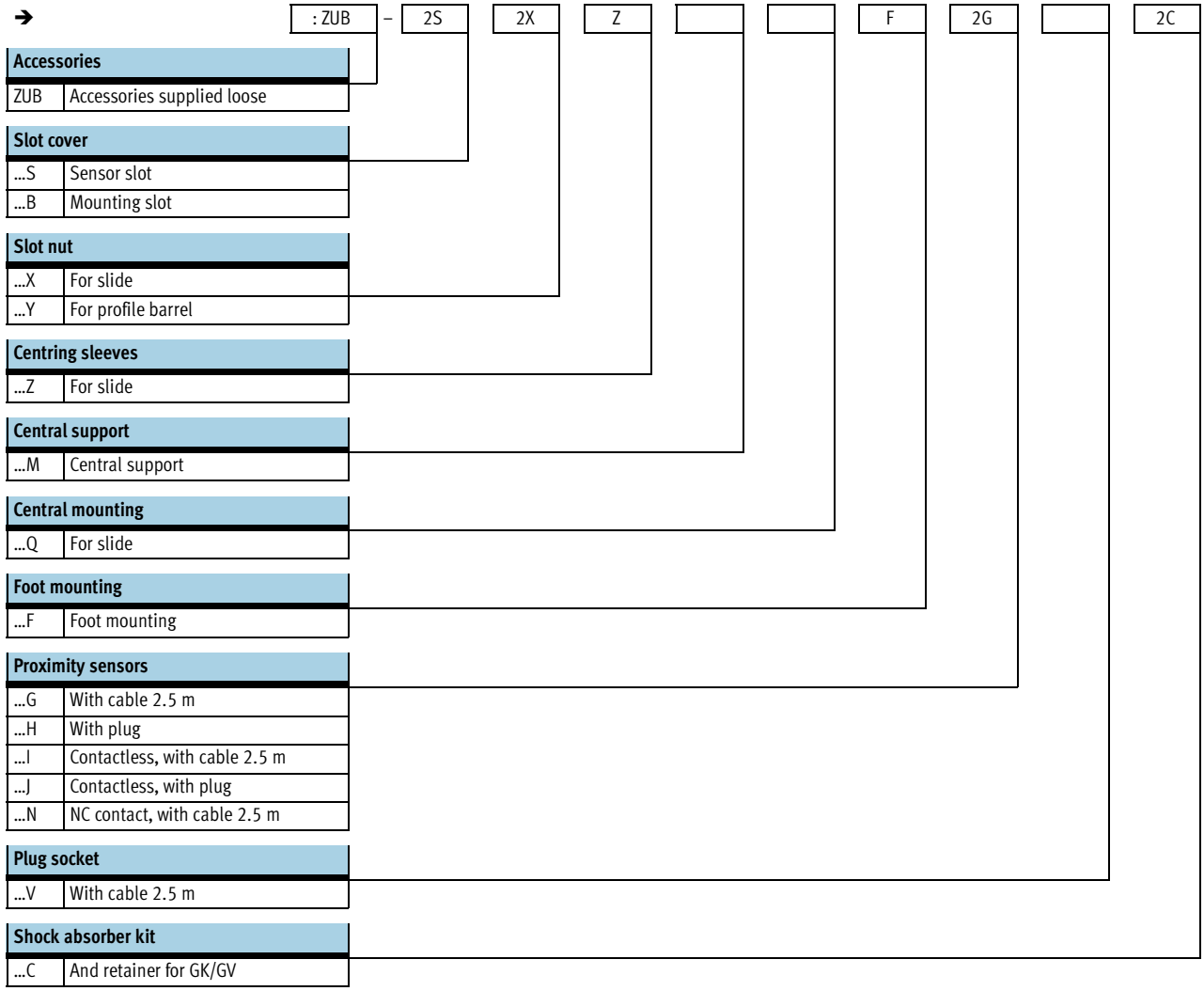
Slide attachment position	
SV	Slide at front
SH	Slide at rear

Supply port	
D2	Connection at both ends

Displacement encoder attachment position	
MP1	Encoder, position 1, mounted
MP2	Encoder, position 2, mounted
MP3	Encoder, position 3, mounted
MP4	Encoder, position 4, mounted
MA1	Temposonic, position 1, mounted
MA2	Temposonic, position 2, mounted
MA3	Temposonic, position 3, mounted
MA4	Temposonic, position 4, mounted
MP0	Encoder, supplied separately
MA0	Temposonic, supplied separately

Linear drives DGPL, external displacement encoder

Type codes

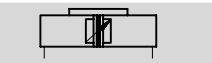


Linear drives DGPL, external displacement encoder

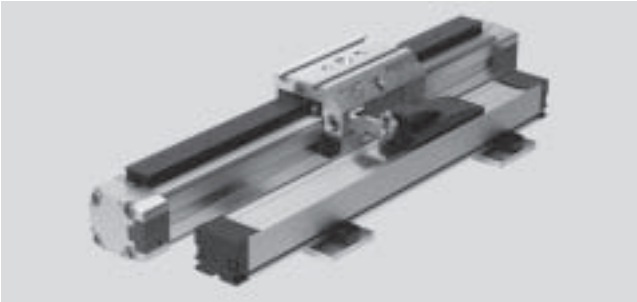
Technical data

FESTO

Function



- Ø - Diameter
  25 ... 63 mm
- l - Stroke length
  225 ... 2,000 mm



General technical data						
Piston ∅		25	32	40	50	63
Design		Piston				
		Driver				
		Profile barrel				
Mode of operation		Double-acting				
Operating medium[1]		Compressed air, filtered and unlubricated, filter unit 5 µm				
Cushioning		Adjustable at both ends				
Cushioning length	[mm]	18	20	30		
Position sensing		Displacement encoder, attached externally				
		Proximity sensors				
Measuring principle (displacement encoder)		➔ 5 / 1.2-3 Displacement encoders				
Type of mounting		Foot mounting				
Stroke[2)3)]	[mm]	225, 300, 360, 450, 500, 600, 750, 1,000, 1,250, 1,500, 1,750, 2,000				
Protection against torsion/guide		Guide rail with slide				
		Recirculating ball bearing				
Clamping unit		➔ Volume 1 (Linear drives DGPL)				
Pneumatic connection		G⅛		G¼		G⅜
Electrical connection		➔ 5 / 1.2-3 Displacement encoders				

1) The proportional directional control valve MPYE used requires the characteristic values.
2) Note stroke reduction in conjunction with SPC200.
3) Supply of compressed air to each end of the cylinder (feature D2) is absolutely essential for Soft Stop SPC11 and axis controller SPC200 as of a length of 500 mm.

Forces [N] and impact energy [Nm]					
Piston ∅	25	32	40	50	63
Theoretical force at 6 bar	295	483	754	1,178	1,870
Max. impact energy at the end positions[1)]	0.1	0.2	0.4	0.8	0.8

1) Cushioning PPV must be completely open for applications with Soft Stop SPC11 and axis controller SPC200.

Permissible impact velocity:

$$v_{perm.} = \sqrt{\frac{2 \times E_{perm.}}{m_{dead} + m_{load}}}$$

Maximum permissible load:

$$m_{load} = \frac{2 \times E_{perm.}}{v^2} - m_{dead}$$

- Note

This data represents the maximum values which can be achieved. Values fluctuate in practice relative to the size of the effective load. Allowance must also be made for the limits of the cushioning capacity of the drive and the permissible impact energy.

Linear drives DGPL, external displacement encoder

Technical data

FESTO

Positioning characteristics with axis controller SPC200						
Piston ∅		25	32	40	50	63
Repetition accuracy	[mm]	➔ 5 / 1.1-46				
Mounting position		Any				
Minimum load, horizontal[1)]	[kg]	2	3	5	8	12
Maximum load, horizontal[1)]	[kg]	30	45	75	120	180
Minimum load, vertical[1)]	[kg]	2	3	5	8	12
Maximum load, vertical[1)]	[kg]	10	15	25	40	60
Min. speed of travel	[m/s]	0.05				
Max. speed of travel	[m/s]	3				
Typ. positioning time, long stroke[2)]	[s]	0.80/1.20	0.90/1.25	0.80/1.20	1.00/1.25	0.95/1.25
Typ. positioning time, short stroke[3)]	[s]	0.50/0.70	0.50/0.65	0.45/0.65	0.55/0.65	0.55/0.65
Minimum positioning stroke[4)]	[%]	3				
Stroke reduction[5)]	[mm]	25		35		
Recommended proportional directional control valve		➔ 5 / 1.1-90				

1) Load = effective load + mass of all moving parts on the drive
2) At 6 bar, horizontal mounting position, DGPL-XX-1250, 1000 mm positioning travel at min./max. load
3) At 6 bar, horizontal mounting position, DNCM-XX-1250, 100 mm positioning travel at min./max. load
4) In relation to the maximum stroke of the drive, but never more than 20 mm.
5) The stroke reserve is to be maintained on every side of the drive, the max. positionable stroke is therefore: Stroke – 2x stroke reserve

Positioning characteristics with end position controller SPC11						
Piston ∅		25	32	40	50	63
Repetition accuracy of a mid-position[1)]	[mm]	±2				
Mounting position		Any				
Minimum load, horizontal[2)]	[kg]	2	3	5	8	12
Maximum load, horizontal[2)]	[kg]	30	45	75	120	180
Minimum load, vertical[2)]	[kg]	2	3	5	8	12
Maximum load, vertical[2)]	[kg]	10	15	25	40	60
Travel time	[s]	➔ Software Tool “SoftStop”: www.festo.com/en/engineering				
Recommended proportional directional control valve		➔ 5 / 1.1-90				

1) In the stroke range from 225 ... 2,000 mm
2) Load = effective load + mass of all moving parts on the drive

Operating and environmental conditions						
Piston ∅		25	32	40	50	63
Operating pressure[1)]	[bar]	4 ... 8				
Ambient temperature[2)]	[°C]	–10 ... +60				
Vibration resistance		To DIN/IEC 68 Parts 2 -6, severity level 2				
Continuous shock resistance		To DIN/IEC 68 Parts 2 -27, severity level 2				
CE symbol		To 89/336/EEC (EMC regulation)				
Protection class (displacement encoder)		➔ 5 / 1.2-3 Displacement encoders				

1) Only applies for applications with Soft Stop SPC11 and axis controller SPC200.
2) Note operating range of proximity sensors.

Linear drives DGPL, external displacement encoder

Technical data

FESTO

Weights [g] without displacement encoder						
Piston ∅		25	32	40	50	63
Basic weight		1,520	2,720	4,480	9,600	15,370
Additional weight per 10 mm stroke		53	69	97	167	236
Clamping unit		714	1,100	1,694	–	–
Additional weight of clamping unit per 10 mm stroke		27	34	42	–	–
Moving load	Standard slide GK	605	895	1,700	3,000	4,990
	Extended slide GV	950	1,375	2,603	4,700	7,860
	Clamping unit	185	250	461	–	–

Note

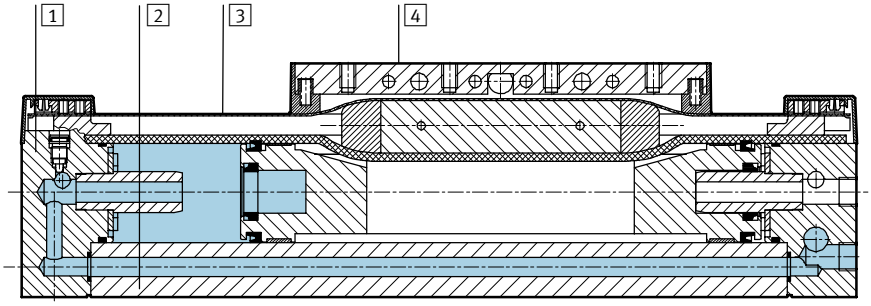
Electrical data, displacement encoder:

Analogue displacement encoder (Order code: MP)
➔ 5 / 1.2-4

Digital displacement encoder (Order code: MA)
➔ 5 / 1.2-8

Materials

Sectional view



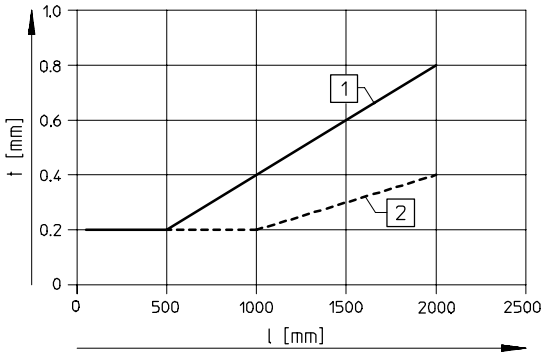
Displacement encoder materials
➔ 5 / 1.2-10

Drive		
1	End cap	Anodised aluminium
2	Profile	Anodised aluminium
3	Cover strip	Steel, corrosion resistant
4	Driver	Anodised aluminium
–	Slide	Anodised aluminium
–	Guide rail	Corrosion resistant steel
–	Seals	Nitrile rubber, polyurethane

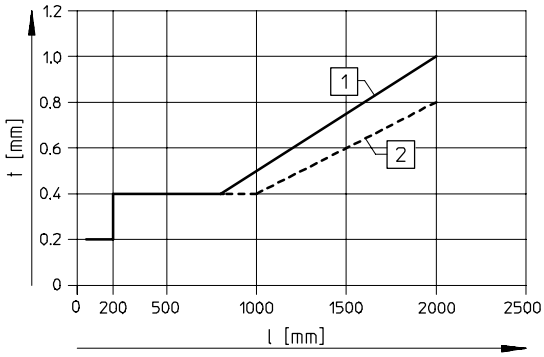
Repetition accuracy

Tolerance t [mm] as a function of the stroke l [mm]

horizontal



vertical



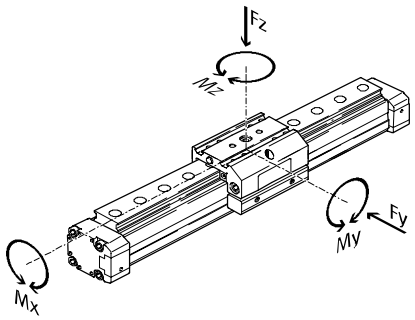
1 with analogue displacement encoder
2 with digital displacement encoder

Linear drives DGPL, external displacement encoder

Technical data

Characteristic load values

The forces and torques specified refer to the centre line of the profile barrel internal diameter.
They must not be exceeded during dynamic operation. Special attention must be paid to the cushioning phase.



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.

$$0,4 \times \frac{Fz}{Fz_{max.}} + \frac{Mx}{Mx_{max.}} + \frac{My}{My_{max.}} + 0,2 \times \frac{Mz}{Mz_{max.}} \leq 1$$

$$\frac{Fz}{Fz_{max.}} \leq 1 \qquad \frac{Mz}{Mz_{max.}} \leq 1$$

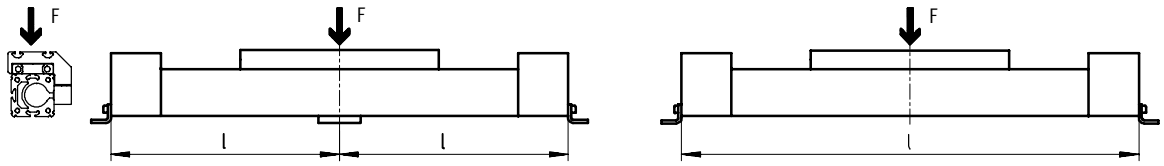
Permissible forces and torques

Piston ∅		25		32		40		50		63	
Variant		GK	GV	GK	GV	GK	GV	GK	GV	GK	GV
$Fy_{max.}$	[N]	3,080	3,080	3,080	3,080	7,300	7,300	7,300	7,300	14,050	14,050
$Fz_{max.}$	[N]	3,080	3,080	3,080	3,080	7,300	7,300	7,300	7,300	14,050	14,050
$Mx_{max.}$	[Nm]	45	45	63	63	170	170	240	240	580	580
$My_{max.}$	[Nm]	85	170	127	250	330	660	460	920	910	1,820
$Mz_{max.}$	[Nm]	85	170	127	250	330	660	460	920	910	1,820

Maximum permissible support span l as a function of the force F

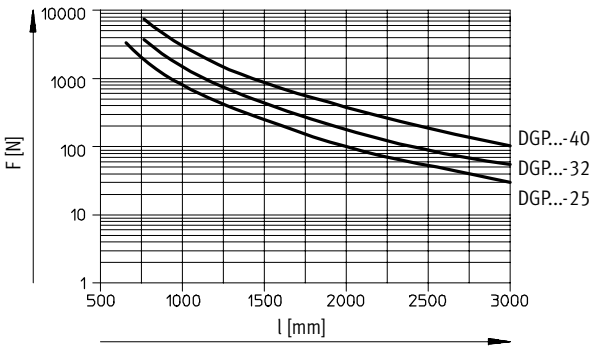
The axis may need to be supported with central supports MUP in order to limit deflection in the case of large strokes. The following diagrams serve to determine the maximum permissible support span l as a function of the force F.

Force on the surface of the slide

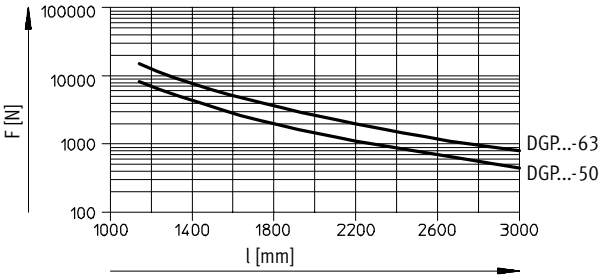


Maximum support span l (without central support) as a function of the force F

Piston ∅ 25 ... 40



Piston ∅ 50/63



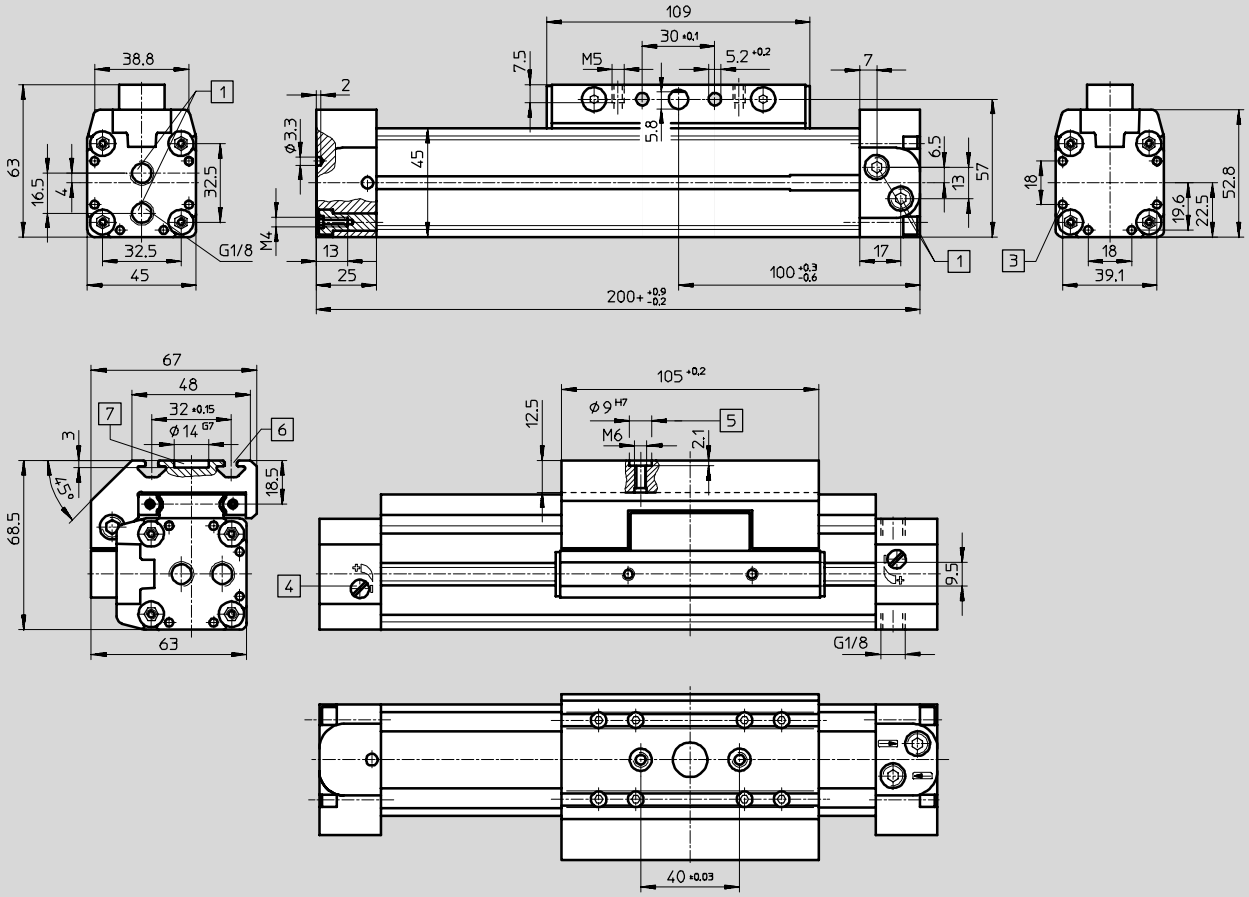
Linear drives DGPL, external displacement encoder

Technical data

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

Standard slide GK

Piston ∅ 25



1 Supply ports at one end, option of three sides of an end cap (D2 variant: supply port at both ends, option of three sides per end cap)

3 Mounting hole for foot mounting HP

4 Regulating screw for adjustable end-position cushioning

5 Hole for centring sleeve ZBH-9

6 Mounting slot for slot nut NSTL

7 Drilled hole for central mounting SLZZ

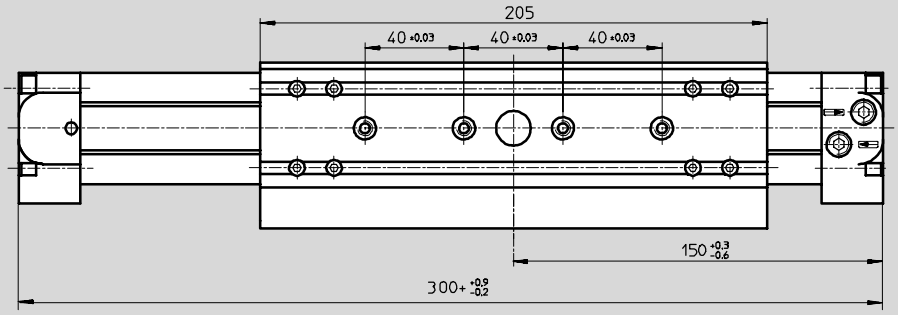
\+ = plus stroke length

Linear drives DGPL, external displacement encoder

Technical data

Extended slide GV

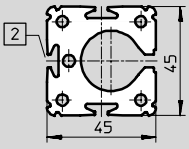
Piston ∅ 25



\+ = plus stroke length

Profile barrel

Piston ∅ 25



2 Sensor slot for proximity sensor

Linear drives DGPL, external displacement encoder

Technical data

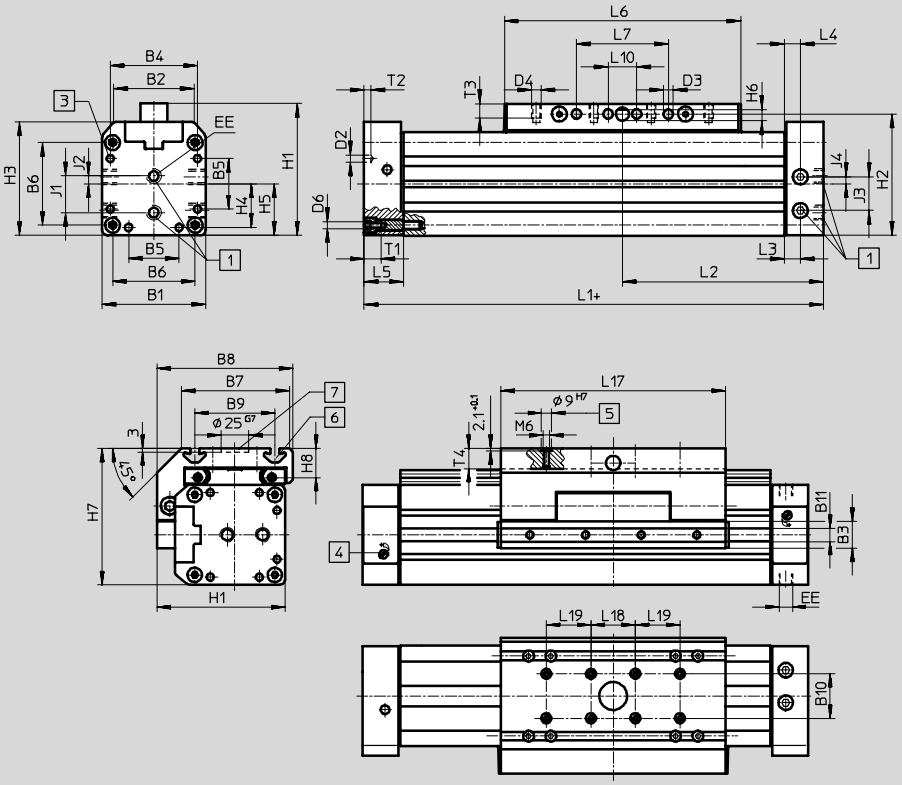
FESTO

Dimensions

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

Standard slide GK

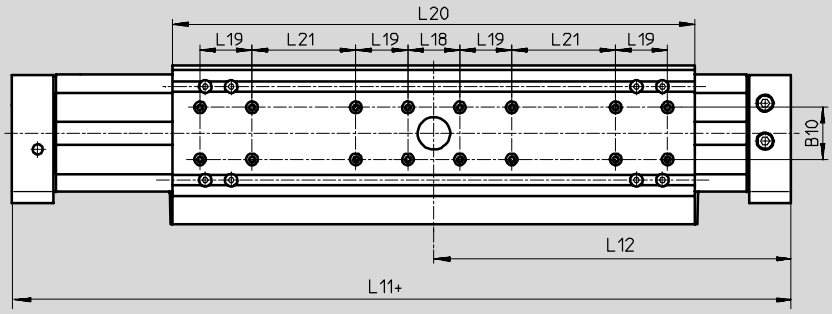
Piston ∅ 32 ... 63



1 Supply ports at one end, option of three sides of an end cap (D2 variant: supply port at both ends, option of three sides per end cap)
3 Mounting hole for foot mounting HP
4 Regulating screw for adjustable end-position cushioning
5 Hole for centring sleeve ZBH-9
6 Mounting slot for slot nut NSTL
7 Drilled hole for central mounting SLZZ
\+ = plus stroke length

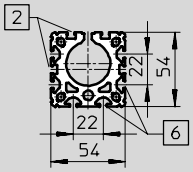
Extended slide GV

Piston ∅ 32 ... 63

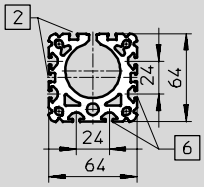


Profile barrel

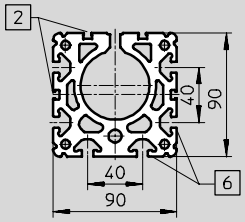
Piston ∅ 32



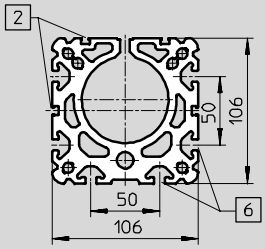
Piston ∅ 40



Piston ∅ 50



Piston ∅ 63



2 Sensor slot for proximity sensor
6 Mounting slot for slot nut NST

Linear drives DGPL, external displacement encoder

Technical data

∅ [mm]	B1	B2	B3 +0.2	B4	B5	B6	B7	B8	B9	B10 ±0.03	B11	D2 ∅
32	54	35.8	19	46	21	40	63	79	47 ±0.15	20	9.5	4.3
40	64	45.7	21	53	28	49	78.5	96.5	55 ±0.2			
50	90	69.2	24	76	44	72	97	122	72 ±0.2	40	12	6.3
63	106	84.8		89		83	121	142	90 ±0.25			

∅ [mm]	D3 ∅ +0.2	D4	D6	EE	H1	H2	H3	H4	H5	H6	H7	H8
32	5.2	M5	M5	G1⁄8	72	66	62	23	27	5.8	77.5	18.5
40	6.5	M6		G1⁄4	86	78	71.8	26.5	32	7.7	90.5	20
50	8.5	M8	M6		115	106	99	36	45	9.7	122.5	26
63			M8	G3⁄8	131	122	115	44.5	53		144.5	30

∅ [mm]	J1	J2	J3	J4	L1 +0.9/–0.2	L2 +0.3/–0.6	L3	L4	L5	L6	L7	L10 ±0.15
32	19	4.2	14	4.7	250	125	17	8.5	31	135	50 ±0.1	–
40	22	5	21	9.1	300	150	11.5	11.5		171	70 ±0.1	
50	31.8	6.8	29.3	6	350	175	14	14	34	206	80 ±0.1	
63	36	8	31	14	400	200				234	110 ±0.1	

∅ [mm]	L11 +0.9/–0.2	L12 +0.3/–0.6	L17	L18 ±0.03	L19 ±0.03	L20	L21 ±0.1	T1	T2	T3	T4 max.
32	380	190	131 +0.2	40	–	261	40	13.2	3	7.5	12.5
40	470	235	167 +0.2		40	337			4	10.5	
50	550	275	202 +0.2			402	80	15.2	6	12.5	18.5
63	650	325	230 +0.2			480	120	21.2			20.5

- Note

Accessories➔ 5 / 1.1-86

Linear drives DGPL, external displacement encoder

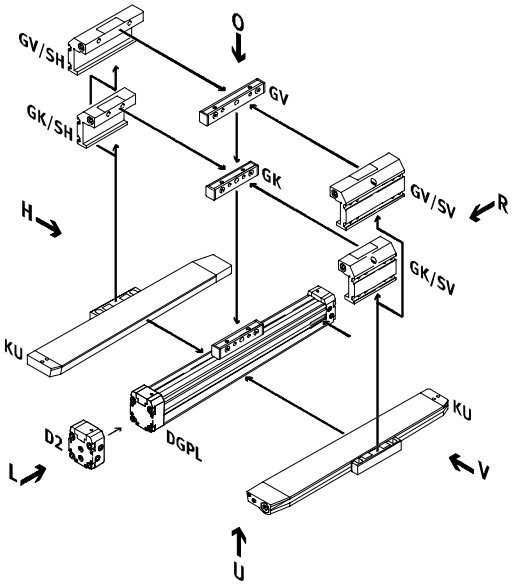
Ordering data – Modular product system

FESTO

Order code

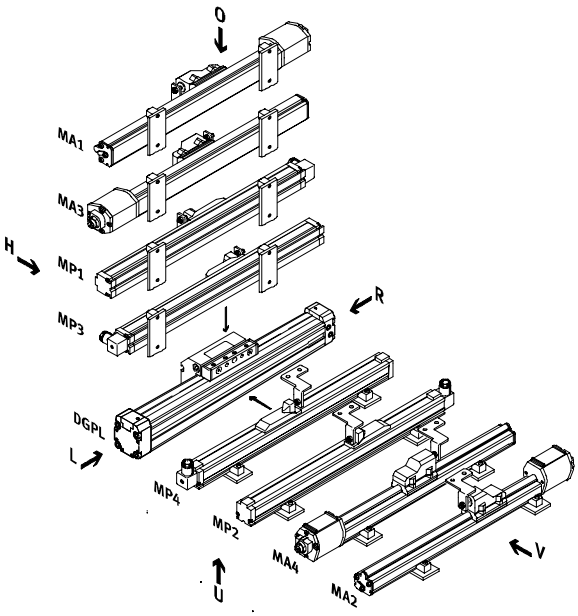
Mandatory data/Options

KU Clamping unit underneath
GK Standard slide
GV Extended slide
SV Slide at rear
SH Slide at front
D2 Air connection at both ends

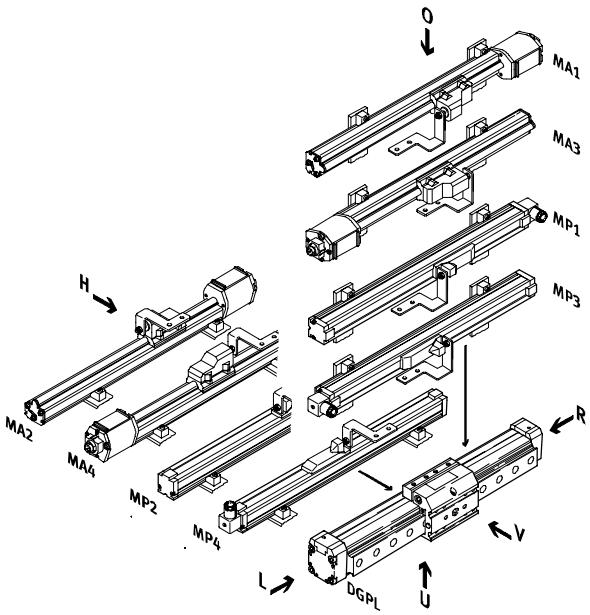


Attachment position for slides at rear (SH)

MP Analogue displacement encoder
MA Digital displacement encoder



Attachment position for slides at front (SV)



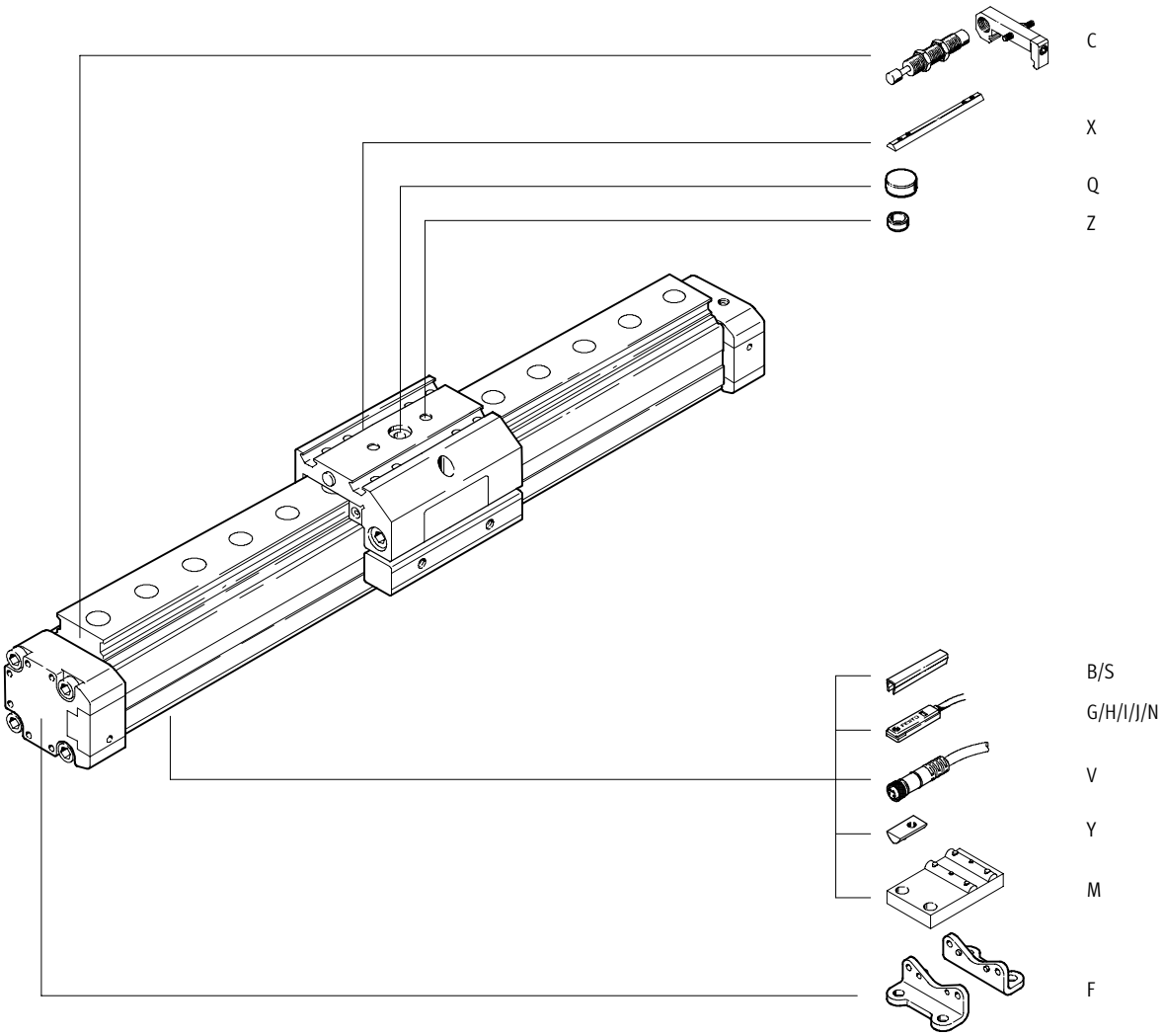
- Note

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

Linear drives DGPL, external displacement encoder

Ordering data – Modular product system

Order code
Options



Linear drives DGPL, external displacement encoder

Ordering data – Modular product system

FESTO

M Mandatory data								O Options				
Module No.	**Drive function**	**Size**	**Stroke**	**Cushioning**	**Position sensing**	**Generation**	**Guide**	**Clamping unit**	**Basic variant**	**Slide attachment position**	**Supply port**	**Displacement encoder**
175 134 175 135 175 136 175 137 175 138	DGPL	25 32 40 50 63	225 ... 2 000	PPV	A	B	KF	KU	GK GV	SV SH	D2	MP1 MP2 MP3 MP4 MA1 MA2 MA3 MA4 MP0 MA0
Ordering example												
175 136	**DGPL**	**40**	**750**	**PPV**	**A**	**B**	**KF**		**GV**	**SH**	**D2**	**MA2**

Ordering table

Size		25	32	40	50	63	Conditions	Code	Enter code
M	Module No.	**175 134**	**175 135**	**175 136**	**175 137**	**175 138**			
	Drive function	Pneumatic linear drive with slide						**DGPL**	DGPL
	Size	25	32	40	50	63		**-...**	
	Stroke [mm]	225, 300, 360, 450, 500, 600, 750, 1 000, 1 250, 1 500,1 750, 2 000						**-...**	
	Cushioning	Pneumatic cushioning adjustable at both ends						**-PPV**	-PPV
	Position sensing	Via proximity sensor						**-A**	-A
	Generation	B series						**-B**	-B
	Guide	Recirculating ball bearing guide						**-KF**	-KF
O	Clamping unit	Underneath			–	–		**-KU**	
	Basic variant	Standard piston/slide					1	**-GK**	
		Extended piston/slide						**-GV**	
	Slide attachment position	Slide at front					2	**-SV**	
		Slide at rear						**-SH**	
	Supply port	at both ends						**-D2**	
	Displacement encoder	Encoder, position 1, mounted						**-MP1**	
		Encoder, position 2, mounted					2	**-MP2**	
		Encoder, position 3, mounted						**-MP3**	
		Encoder, position 4, mounted					2	**-MP4**	
		Temposonic with CAN axis interface, position 1, mounted						**-MA1**	
		Temposonic with CAN axis interface, position 2, mounted					2	**-MA2**	
		Temposonic with CAN axis interface, position 3, mounted						**-MA3**	
		Temposonic with CAN axis interface, position 4, mounted					2	**-MA4**	
		Encoder, supplied separately						**-MP0**	
↓		Temposonic with CAN axis interface, supplied separately						**-MA0**	

1 **GK or GV** Must be selected
2 **SV or SH** Must be selected
3 **MP2, MP4, MA2, MA4** Not with clamping unit KU

Transfer order code

	DGPL	–		–		–	PPV	–	A	–	B	–	KF	–		–		–		–		–	

Linear drives DGPL, external displacement encoder

Ordering data – Modular product system

FESTO

0 Options

Acces-sories	Slot cover	Slot nut	Centring sleeve	Central support	Central mounting	Foot mounting	Proximity sensor, magnetic	Plug socket	Shock absorber kit
ZUB	...S ...B	...X ...Y	...Z	...M	...Q	...F	...G ...H ...I ...J ...N	...V	...C
: **ZUB**	– **2S2B**	**2XY**	**Z**		**Q**	**F**			**2C**

Ordering table

Size			25	32	40	50	63	Condi-tions	Code		Enter code
↓	Accessories		Supplied separately						**:ZUB-**		:ZUB-
0	Slot cover, x2, 0.5 m	Sensor slot	1 ... 10						**...S**		
		Mounting slot	–	1 ... 10					**...B**		
	Slot nut	Slide	1 ... 10						**...X**		
		Mounting slot	–	1 ... 10					**...Y**		
	Centring sleeve (pack of 10)		10, 20, 30, 40, 50, 60, 70, 80, 90						**...Z**		
	Central support		1 ... 10						**...M**		
	Central mounting		1 ... 10						**...Q**		
	Foot mounting		1 ... 10						**...F**		
	Magnetic proximity sensor	With cable 2.5 m	1 ... 10 (SME-8-K-LED-24)						**...G**		
		With plug	1 ... 10 (SME-8-S-LED-24)						**...H**		
	Magnetic proximity sensor, contactless	With cable 2.5 m	1 ... 10 (SMT-8-PS-K-LED-24)						**...I**		
		With plug	1 ... 10 (SMT-8-PS-S-LED-24)						**...J**		
	Magnetic proximity sensor	NC contact, with cable 2.5 m	1 ... 10 (SME-8-O-K-LED-24)						**...N**		
	Plug socket	With cable 2.5 m	1 ... 10 (SIM-M8-3GD-2,5-PU)						**...V**		
	Shock absorber kit		1 ... 10						**...C**		

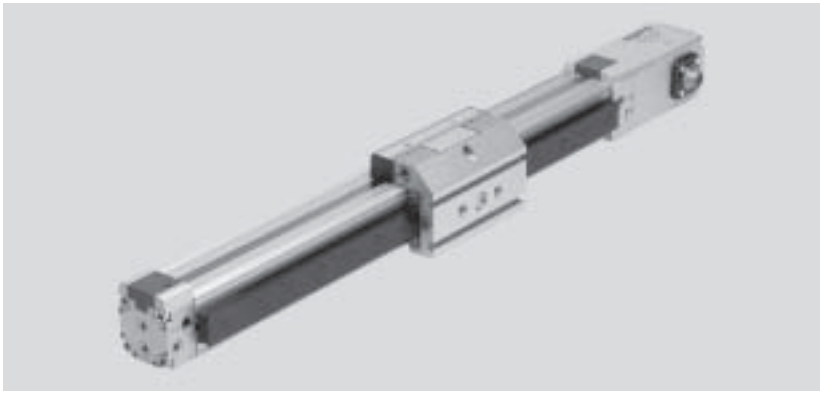
Transfer order code

:	**ZUB**	–								

Linear drives DGPI/DGPIL, integrated displacement encoder

Features

Individual positioning components with linear drive DGPI/DGPIL ...



Proportional directional control valve
MPYE-...
➔ 5 / 1.5-2

Soft Stop ➔ 5 / 1.4-2

Positioning technology ➔ 5 / 1.3-2

End position controller
SPC11-MTS-AIF

Axis interface
SPC-AIF-MTS

Axis positioning controller
SPC200

Linear drives DGPI/DGPIL, integrated displacement encoder

Features

DGPI, without guide

5 / 1.1-58

- Piston ∅ 25 ... 63 mm
- Stroke 225 ... 2,000 mm
- Standard driver
- Low characteristic load values
- Air connections on both sides

DGPIL, with recirculating ball bearing guide

5 / 1.1-72

- Piston ∅ 25 ... 63 mm
- Stroke 225 ... 2,000 mm
- Standard slide
- High characteristic load values
- Air connections on both sides

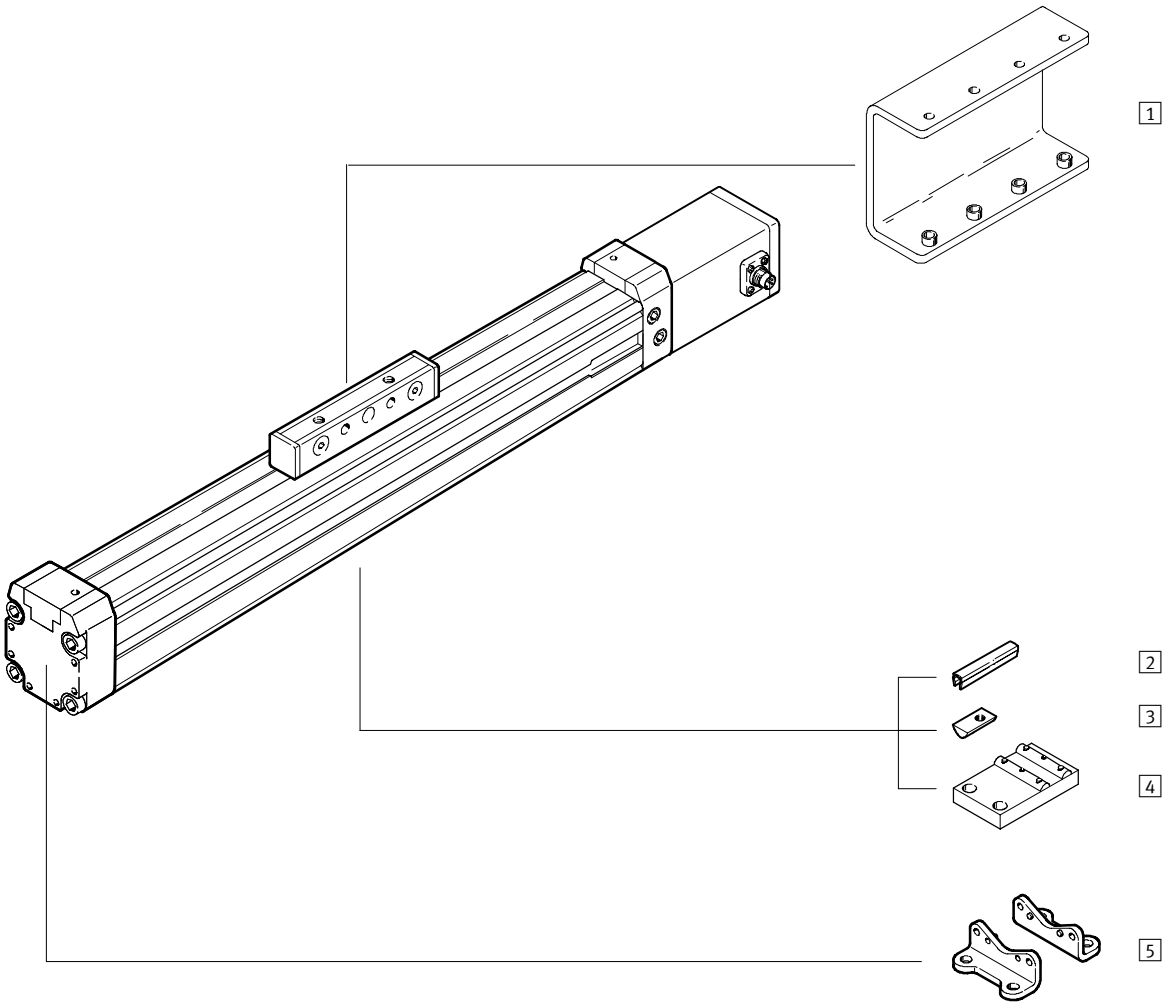
DGPIL, with recirculating ball bearing guide and protected version

5 / 1.1-72

- Piston ∅ 25...40 mm
- Stroke 225 ... 2,000 mm
- Protected from above and the sides against the ingress of particles
- High characteristic load values
- Air connections on both sides

Linear drives DGPI, integrated displacement encoder

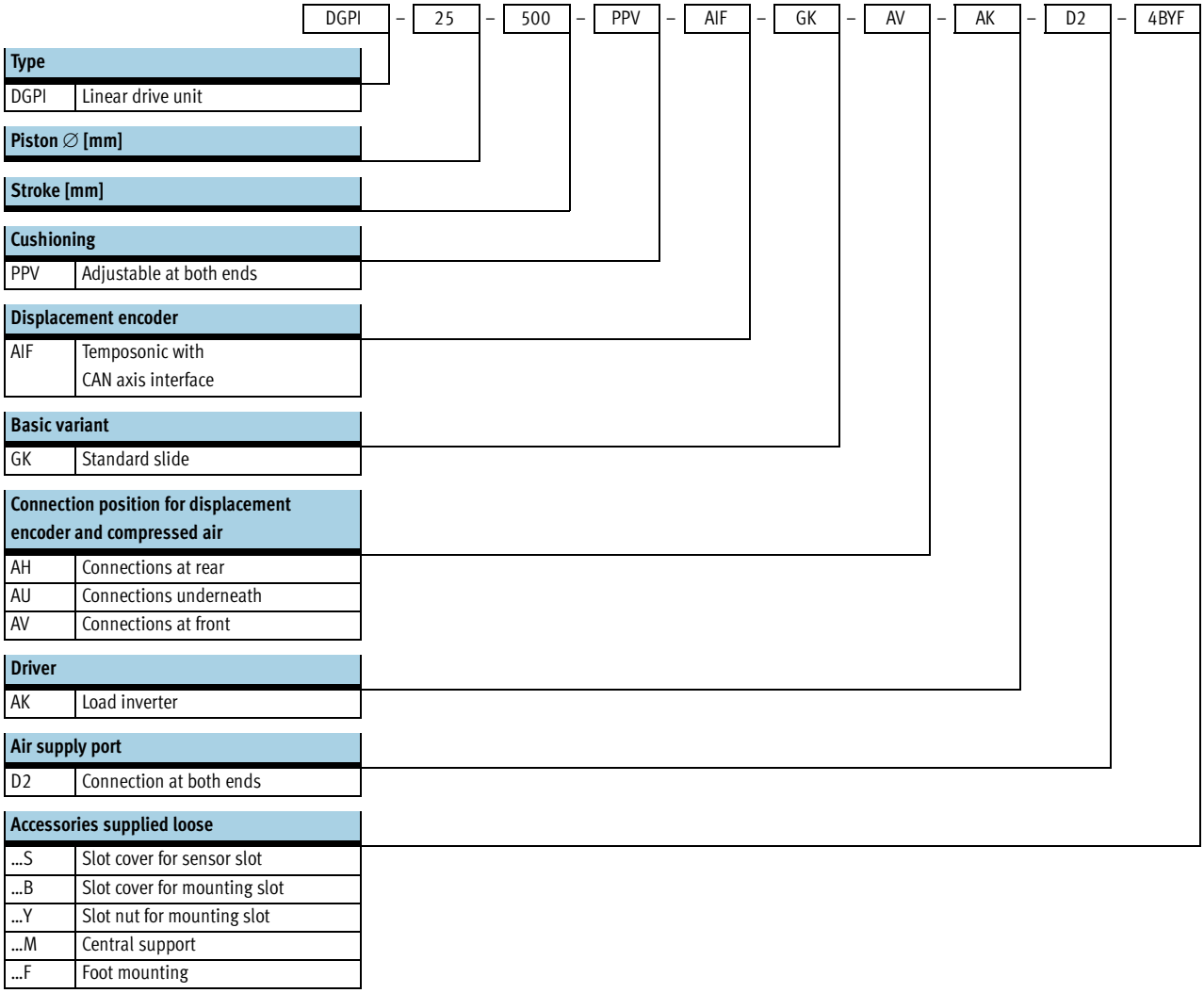
Peripherals overview



Variants and accessories			
	Type	**Brief description**	**➔ Page**
1	Load inverter AK	to secure the load from beneath, is supplied attached	5 / 1.1-87
2	Slot cover B/S	to protect against the ingress of dirt	5 / 1.1-89
3	Slot nut Y	for mounting attachments	5 / 1.1-89
4	Central support M	to mount the axis	5 / 1.1-86
5	Foot mounting F	to mount the axis	5 / 1.1-86

Linear drives DGPI, integrated displacement encoder

Type codes



Type	
DGPI	Linear drive unit

Piston ∅ [mm]	

Stroke [mm]	

Cushioning	
PPV	Adjustable at both ends

Displacement encoder	
AIF	Temposonic with CAN axis interface

Basic variant	
GK	Standard slide

Connection position for displacement encoder and compressed air	
AH	Connections at rear
AU	Connections underneath
AV	Connections at front

Driver	
AK	Load inverter

Air supply port	
D2	Connection at both ends

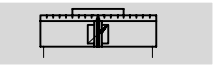
Accessories supplied loose	
...S	Slot cover for sensor slot
...B	Slot cover for mounting slot
...Y	Slot nut for mounting slot
...M	Central support
...F	Foot mounting

Linear drives DGPI, integrated displacement encoder

Technical data

FESTO

Function



- Ø - Diameter
  25 ... 63 mm
- l - Stroke length
  225 ... 2,000 mm

General technical data						
Piston ∅		25	32	40	50	63
Design		Piston				
		Driver				
		Profile barrel				
Mode of operation		Double-acting				
Operating medium[1]		Compressed air, filtered and unlubricated, filter unit 5 µm				
Cushioning		Adjustable at both ends				
Cushioning length	[mm]	18	20	30		
Position sensing		Integrated displacement encoder				
Measuring principle		Digital, magnetostrictive, non-contacting, absolute measurement				
Type of mounting		Foot mounting				
Stroke[2)3)]	[mm]	225, 300, 360, 450, 500, 600, 750, 1,000, 1,250, 1,500, 1,750, 2,000				
Pneumatic connection		G1/8		G1/4		G3/8
Electrical connection		6-pin round plug to DIN 45 322				

1) The proportional directional control valve MPYE used requires the characteristic values.
2) Note stroke reduction in conjunction with SPC200.
3) Supply of compressed air to each end of the cylinder (feature D2) is absolutely essential for Soft Stop SPC11 and axis controller SPC200 as of a length of 500 mm.

Forces [N] and impact energy [Nm]					
Piston ∅	25	32	40	50	63
Theoretical force at 6 bar	295	483	754	1,178	1,870
Max. impact energy at the end positions[1]	0.1	0.2	0.4	0.8	0.8

1) Cushioning PPV must be completely open for applications with Soft Stop SPC11 and axis controller SPC200.

Permissible impact velocity:

$$v_{perm.} = \sqrt{\frac{2 \times E_{perm.}}{m_{dead} + m_{load}}}$$

Maximum permissible load:

$$m_{load} = \frac{2 \times E_{perm.}}{v^2} - m_{dead}$$

- Note

This data represents the maximum values which can be achieved. Values fluctuate in practice relative to the size of the effective load. Allowance must also be made for the limits of the cushioning capacity of the drive and the permissible impact energy.

Linear drives DGPI, integrated displacement encoder

Technical data

Positioning characteristics with axis controller SPC200						
Piston ∅		25	32	40	50	63
Repetition accuracy	[mm]	➔ 5 / 1.1-46				
Mounting position		Any				
Minimum load, horizontal[1)]	[kg]	2	3	5	8	12
Maximum load, horizontal[1)]	[kg]	30	45	75	120	180
Minimum load, vertical[1)]	[kg]	2	3	5	8	12
Maximum load, vertical[1)]	[kg]	10	15	25	40	60
Min. speed of travel	[m/s]	0.05				
Max. speed of travel	[m/s]	3				
Typ. positioning time, long stroke[2)]	[s]	0.75/1.20	0.85/1.20	0.75/1.20	0.95/1.25	0.90/1.20
Typ. positioning time, short stroke[3)]	[s]	0.40/0.60	0.45/0.60	0.40/0.60	0.50/0.65	0.50/0.65
Minimum positioning stroke[4)]	[%]	3				
Stroke reduction[5)]	[mm]	25		35		
Recommended proportional directional control valve		➔ 5 / 1.1-90				

1) Load = effective load + mass of all moving parts on the drive
2) At 6 bar, horizontal mounting position, DGPL-XX-1250, 1000 mm positioning travel at min./max. load
3) At 6 bar, horizontal mounting position, DNCM-XX-1250, 100 mm positioning travel at min./max. load
4) In relation to the maximum stroke of the drive, but never more than 20 mm.
5) The stroke reserve is to be maintained on every side of the drive, the max. positionable stroke is therefore: Stroke – 2x stroke reserve

Positioning characteristics with end position controller SPC11						
Piston ∅		25	32	40	50	63
Repetition accuracy of a mid-position[1)]	[mm]	±2				
Mounting position		Any				
Minimum load, horizontal[2)]	[kg]	2	3	5	8	12
Maximum load, horizontal[2)]	[kg]	30	45	75	120	180
Minimum load, vertical[2)]	[kg]	2	3	5	8	12
Maximum load, vertical[2)]	[kg]	10	15	25	40	60
Travel time	[s]	➔ Software Tool “SoftStop”: www.festo.com/en/engineering				
Recommended proportional directional control valve		➔ 5 / 1.1-90				

1) In the stroke range from 225 ... 2,000 mm
2) Load = effective load + mass of all moving parts on the drive

Operating and environmental conditions						
Piston ∅		25	32	40	50	63
Operating pressure[1)]	[bar]	4 ... 8				
Ambient temperature	[°C]	–10 ... +60				
Vibration resistance		To DIN/IEC 68 Parts 2 -6, severity level 1				
Continuous shock resistance		To DIN/IEC 68 Parts 2 -27, severity level 1				
CE symbol		To 89/336/EEC (EMC regulation)				
Protection class (displacement encoder)		IP65 to IEC 60 529				
Corrosion resistance class CRC[2)]		1				

1) Only applies for applications with Soft Stop SPC11 and axis controller SPC200.
2) Corrosion resistance class 1 according to Festo standard 940 070
Components requiring low corrosion resistance. Transport and storage protection. Parts that do not have primarily decorative surface requirements, e.g. in internal areas that are not visible or behind covers.

Weights [g]						
Piston ∅		25	32	40	50	63
Basic weight		1,540	2,150	3,500	6,980	10,600
Additional weight per 10 mm stroke		38	43	59	130	168
Moving load		180	314	551	1,045	1,775

Linear drives DGPI, integrated displacement encoder

Technical data

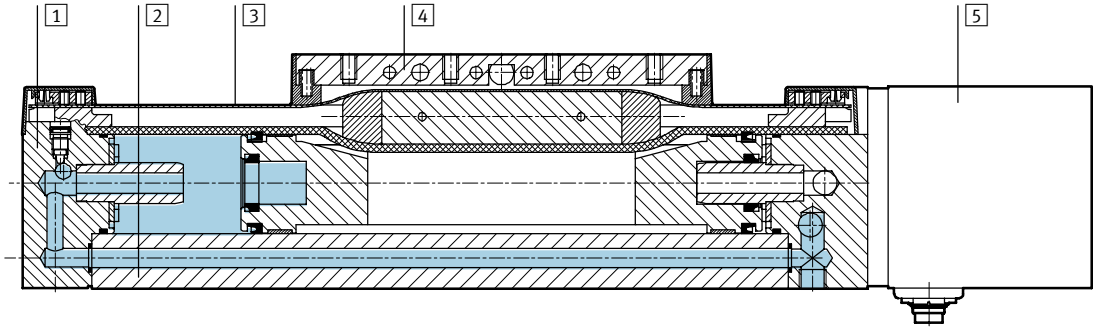
FESTO

Electrical data, displacement encoder			
Power supply		[V DC]	24 (–15/+25%)
Max. current consumption		[mA]	90
Resolution		[mm]	≤ 0.01
Independent linearity[1]	maximum	[%]	0.02
Temperature coefficient		[ppm/°K]	≤ 15
Interface			Digital, CAN with protocol: SPC-AIF

1) Minimum ±50 µm

Materials

Sectional view



Drive		
1	End cap	Anodised aluminium
2	Profile	Anodised aluminium
3	Cover strip	Steel, corrosion resistant
4	Driver	Anodised aluminium
5	Displacement encoder housing	Anodised aluminium
–	Seals	Nitrile rubber, polyurethane

Note

Further technical data

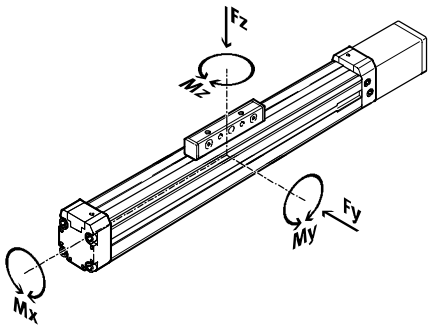
➔ Volume 1 (Linear drives DGPL)

Linear drives DGPI, integrated displacement encoder

Technical data

Characteristic load values

The forces and torques specified refer to the centre line of the profile barrel internal diameter.
They must not be exceeded during dynamic operation. Special attention must be paid to the cushioning phase.



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.

$$0,4 \times \frac{Fz}{Fz_{max.}} + \frac{Mx}{Mx_{max.}} + \frac{My}{My_{max.}} + 0,2 \times \frac{Mz}{Mz_{max.}} \leq 1$$

$$\frac{Fz}{Fz_{max.}} \leq 1 \qquad \frac{Mz}{Mz_{max.}} \leq 1$$

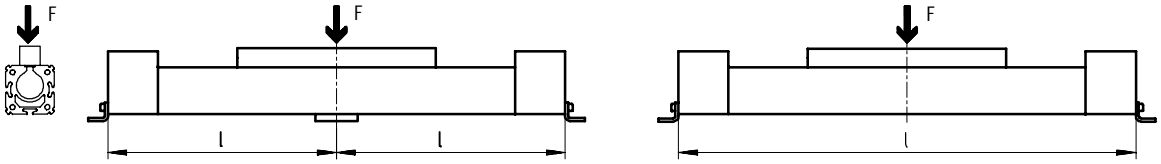
Permissible forces and torques

Piston ∅		25	32	40	50	63
$Fy_{max.}$	[N]	–	–	–	–	–
$Fz_{max.}$	[N]	330	480	800	1,200	1,600
$Mx_{max.}$	[Nm]	1	2	4	7	8
$My_{max.}$	[Nm]	20	40	60	120	120
$Mz_{max.}$	[Nm]	3	5	8	15	24

Maximum permissible support span l as a function of the force F

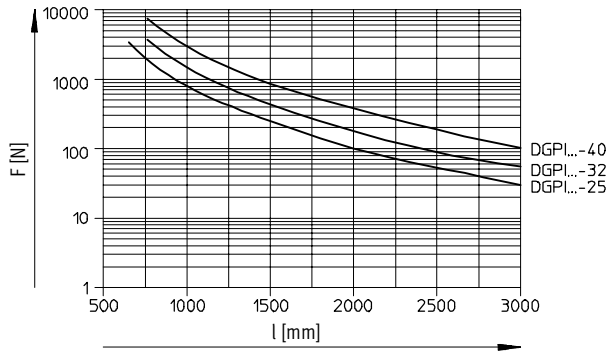
The axis may need to be supported with central supports MUP in order to limit deflection in the case of large strokes. The following diagrams serve to determine the maximum permissible support span l as a function of the force F.

Force on the surface of the slide

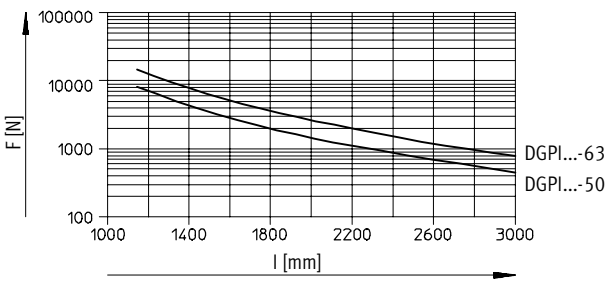


Maximum support span l (without central support) as a function of the force F

Piston ∅ 25 ... 40



Piston ∅ 50/63



Linear drives DGPI, integrated displacement encoder

Technical data

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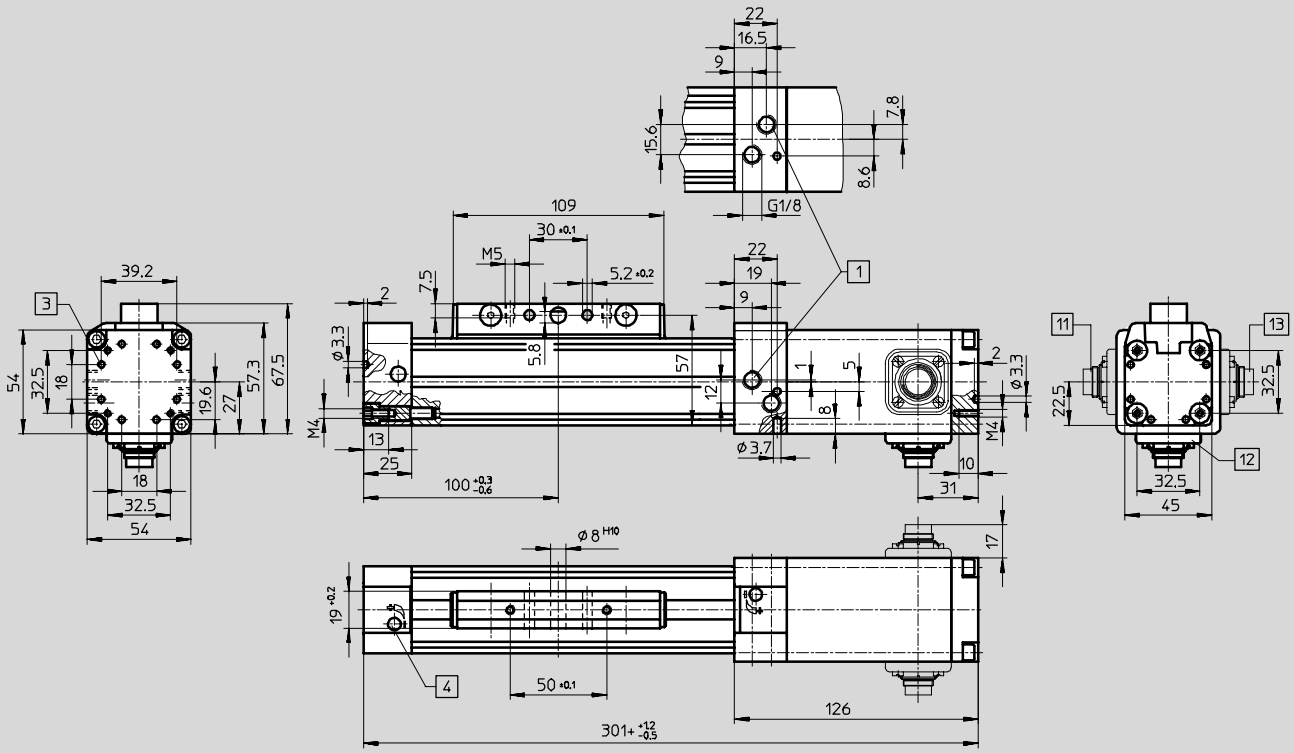
Dimensions Download CAD data ➔ **www.festo.com/en/engineering**

Standard driver GK

Piston ∅ 25



1 Both compressed air connections can be optionally connected to three sides of the right-hand end cap

3 Mounting holes for foot mounting HP

4 Regulating screw for adjustable end-position cushioning

11 Encoder connection at rear

12 Encoder connection underneath

13 Encoder connection at front

\+ = plus stroke length

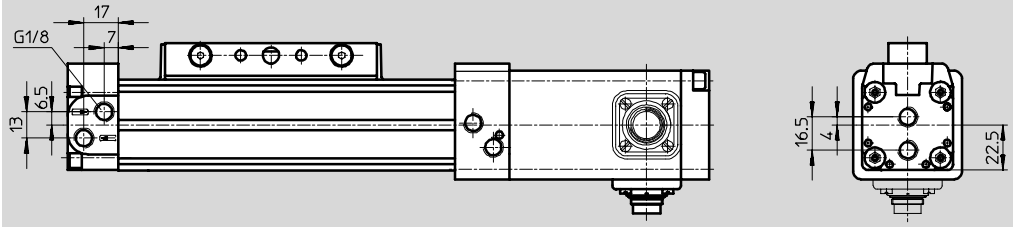
Linear drives DGPI, integrated displacement encoder

Technical data

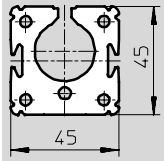
Dimensions Download CAD data ➔ **www.festo.com/en/engineering**

Supply port D2 at both sides

Piston ∅ 25



Profile barrel



Linear drives DGPI, integrated displacement encoder

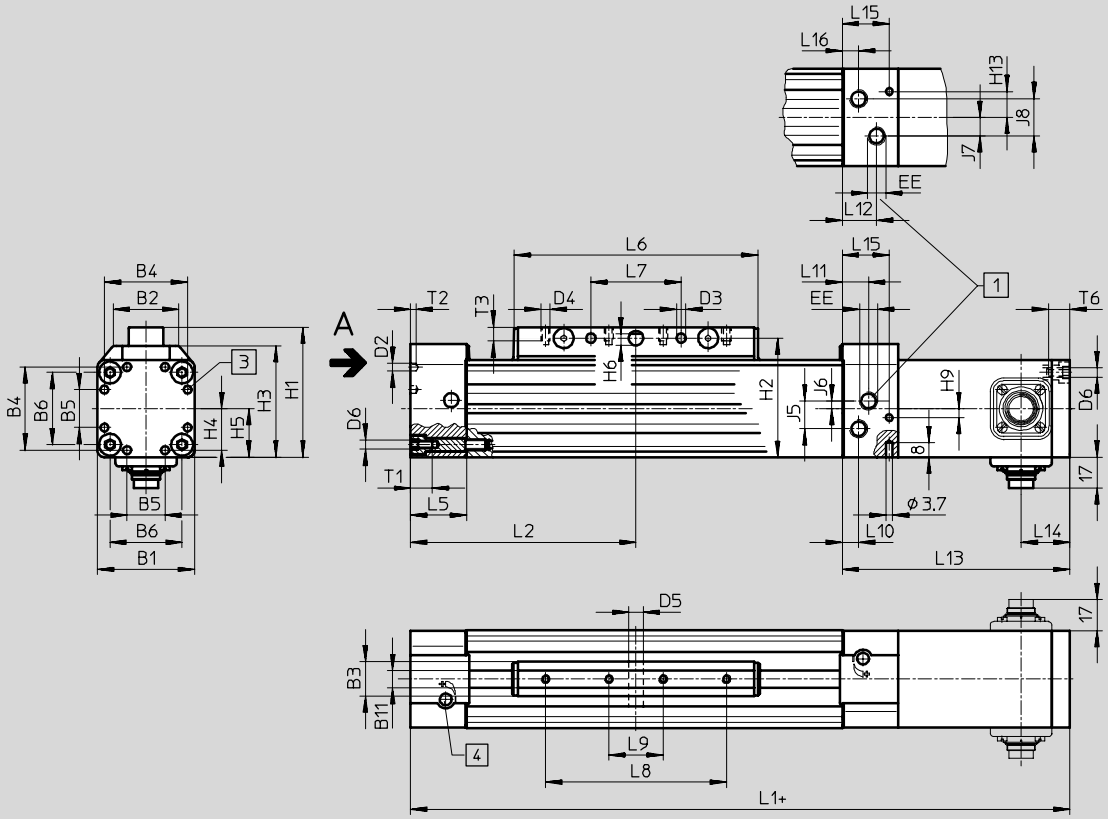
Technical data

FESTO

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

Standard driver GK

Piston ∅ 32 … 63



1 Both compressed air connections can be optionally connected to three sides of the right-hand end cap

3 Mounting holes for foot mounting HP

4 Regulating screw for adjustable end-position cushioning

11 Encoder connection at rear

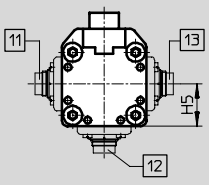
12 Encoder connection underneath

13 Encoder connection at front

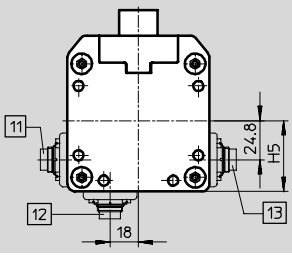
\+ = plus stroke length

View A

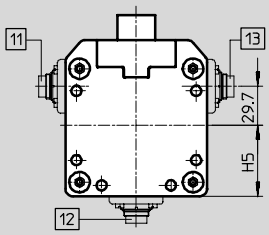
Piston ∅ 32/40



Piston ∅ 50

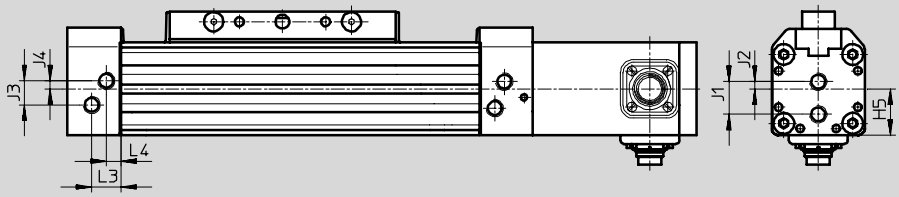


Piston ∅ 63



Supply port D2 at both sides

Piston ∅ 32 … 63



Linear drives DGPI, integrated displacement encoder

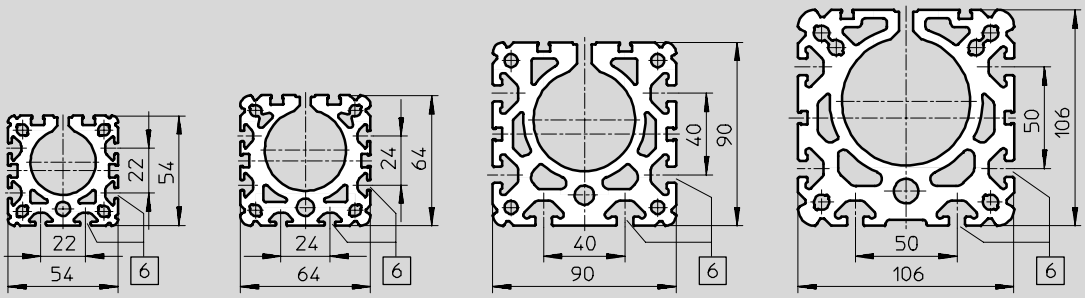
Technical data

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

Profile barrel

Piston ∅ 32 **Piston ∅ 40** **Piston ∅ 50** **Piston ∅ 63**

6 Mounting slot for slot nuts NST



∅ [mm]	B1	B2	B3 +0.2	B4	B5	B6	B11	D2 ∅	D3 ∅ +0.2	D4	D5 ∅ H10	D6
32	54	35.8	19	46	21	40	9.5	4.3	5.2	M5	8	M5
40	64	45.7	21	53	28	49	9.5	4.3	6.5	M6	10	M5
50	90	69.2	24	76	44	72	12	6.3	8.5	M8	12	M6
63	106	84.8	24	89	44	83	12	6.3	8.5	M8	12	M8

∅ [mm]	EE	H1	H2	H3	H4	H5	H6	H9	H13	J1	J2	J3
32	G1/8	72	66	62	23	27	5.8	5	10.3	19	4.2	14
40	G1/4	86	78	71.8	26.5	32	7.7	5	12.75	22	5	21
50	G1/4	115	106	99	36	45	9.7	21.8	16.6	31.8	6.8	29.3
63	G3/8	131	122	115	44.5	53	9.7	–28	30	36	8	31

∅ [mm]	J4	J5	J6	J7	J8	L1 +1.2/–0.5	L2 +0.3/–0.6	L3	L4	L5	L6	L7 ±0.1
32	4.7	15.4	4.2	10.3	20.6	345	125	17	8.5	31	135	50
40	9.1	23	9.1	12.75	25.5	397	150	11.5	11.5	31	171	70
50	6	20.6	6.8	21	21	465	175	14	14	34	206	80
63	14	27	8	25	25	513	200	14	14	34	234	110

∅ [mm]	L8 ±0.1	L9 ±0.1	L10	L11	L12	L13	L14	L15	L16	T1	T2	T3	T6
32	100	30	17	8.5	19	126	27	26	9	13.2	3	7.5	12
40	130	40	10.8	16.5	21	128	29	26	10.8	13.2	4	10.5	12
50	150	50	10.8	18	22.8	149	80	25.2	12	15.2	6	12.5	15
63	190	70	14	24.5	31	147.5	68	16.5	16.5	21.2	6	12.5	20

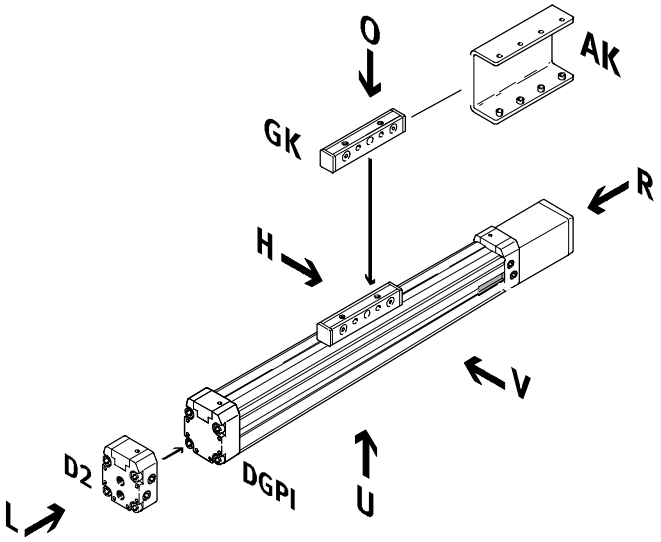
Linear drives DGPI, integrated displacement encoder

Ordering data – Modular product system

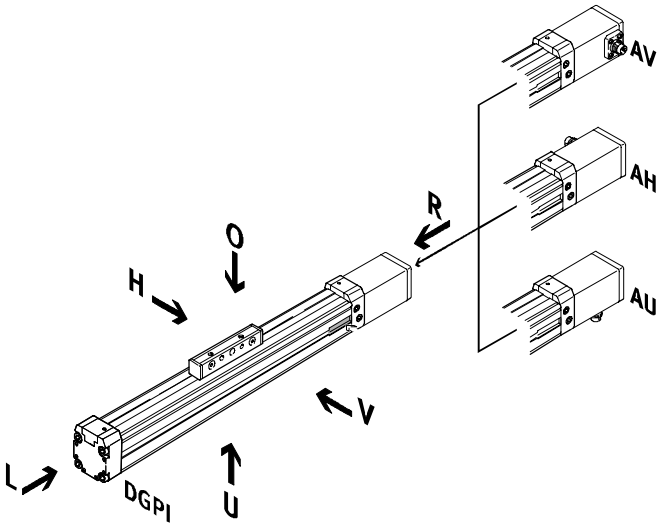
FESTO

Order code
Mandatory data/Options

AK Load inverter
D2 Air connection at both ends
GK Standard slide



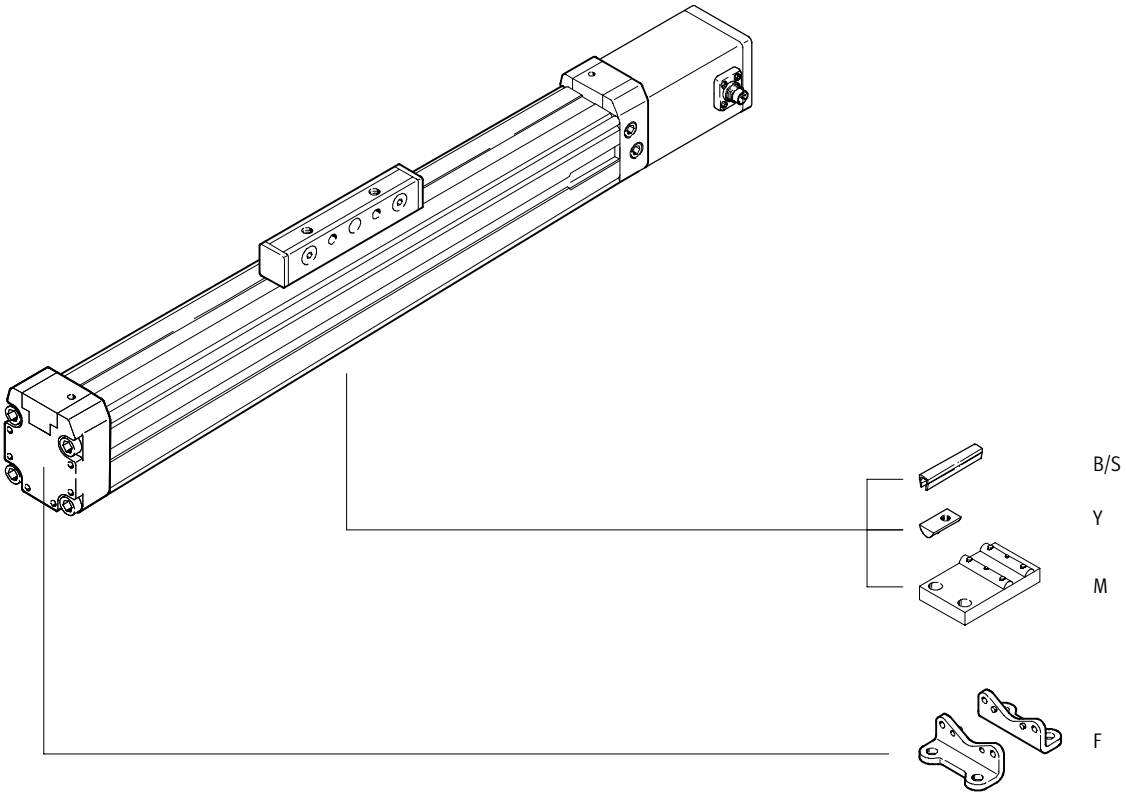
AV Displacement encoder connection to front
AH Displacement encoder connection to rear
AU Displacement encoder connection underneath



Linear drives DGPI, integrated displacement encoder

Ordering data – Modular product system

Order code
Options



Linear drives DGPI, integrated displacement encoder

Ordering data – Modular product system

FESTO

M **Mandatory data** →

Module No.	Drive function		Size		Stroke		Cushioning		Displacement encoder		Basic variant		Connection position for displacement encoder
175 134 175 135 175 136 175 137 175 138	DGPI		25 32 40 50 63		225 ... 2 000		PPV		AIF		GK		AH AU AV
Ordering example													
175 138	**DGPI**	–	**63**	–	**750**	–	**PPV**	–	**AIF**	–	**GK**	–	**AV**

Ordering table

Size		25	32	40	50	63	Conditions	Code		Enter code
M	Module No.	**175 134**	**175 135**	**175 136**	**175 137**	**175 138**				
	Drive function	Pneumatic linear drive with integrated displacement encoder						**DGPI**		DGPI
	Size	25	32	40	50	63		**-...**		
	Stroke [mm]	225, 300, 360, 450, 500, 600, 750, 1 000, 1 250, 1 500,1 750, 2 000						**-...**		
	Cushioning	Pneumatic cushioning adjustable at both ends						**-PPV**		-PPV
	Displacement encoder	Temposonic with CAN axis interface						**-AIF**		-AIF
	Basic variant	Standard piston/slide						**-GK**		-GK
	Connection position for displacement encoder AIF and compressed air	Connection position for displacement encoder and air supply port, rear						**-AH**		
		Connection position for displacement encoder and air supply port, underneath						**-AU**		
		Connection position for displacement encoder and air supply port, front						**-AV**		

Transfer order code

	DGPI	–		–		–	PPV	–	AIF	–	GK	–	

Linear drives DGPI, integrated displacement encoder

Ordering data – Modular product system

FESTO

O Options

Driver/Air supply port	Accessories	Slot cover	Slot nut	Central support	Foot mounting
AK D2	ZUB	...S ...B	...Y	...M	...F
– **AK**	: **ZUB**	– **2B2S**	**10Y**		**F**

Ordering table

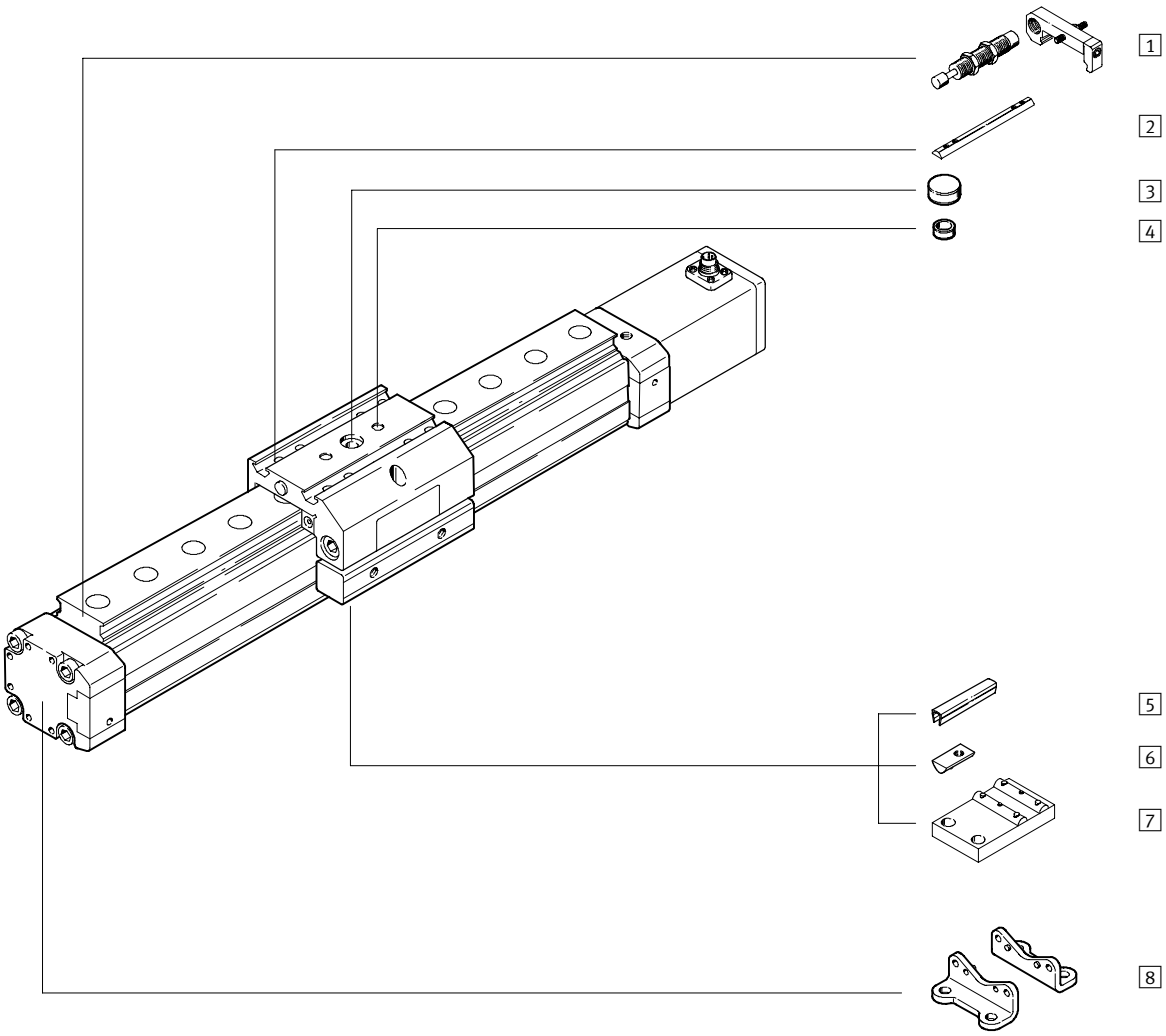
Size		25	32	40	50	63	Conditions	Code		Enter code
↓ Driver		Load inverter						**-AK**		
O Air supply port		at both ends						**-D2**		
Accessories		Supplied separately						**:ZUB-**		:ZUB-
Slot cover, x2, 0.5 m	Sensor slot	1 ... 10						**...S**		
	Mounting slot	–	1 ... 10					**...B**		
Slot nut	Mounting slot	–	1 ... 10					**...Y**		
Central support		1 ... 10						**...M**		
Foot mounting		1 ... 10						**...F**		

Transfer order code

–		: **ZUB**	–			

Linear drives DGPIL, integrated displacement encoder

Peripherals overview



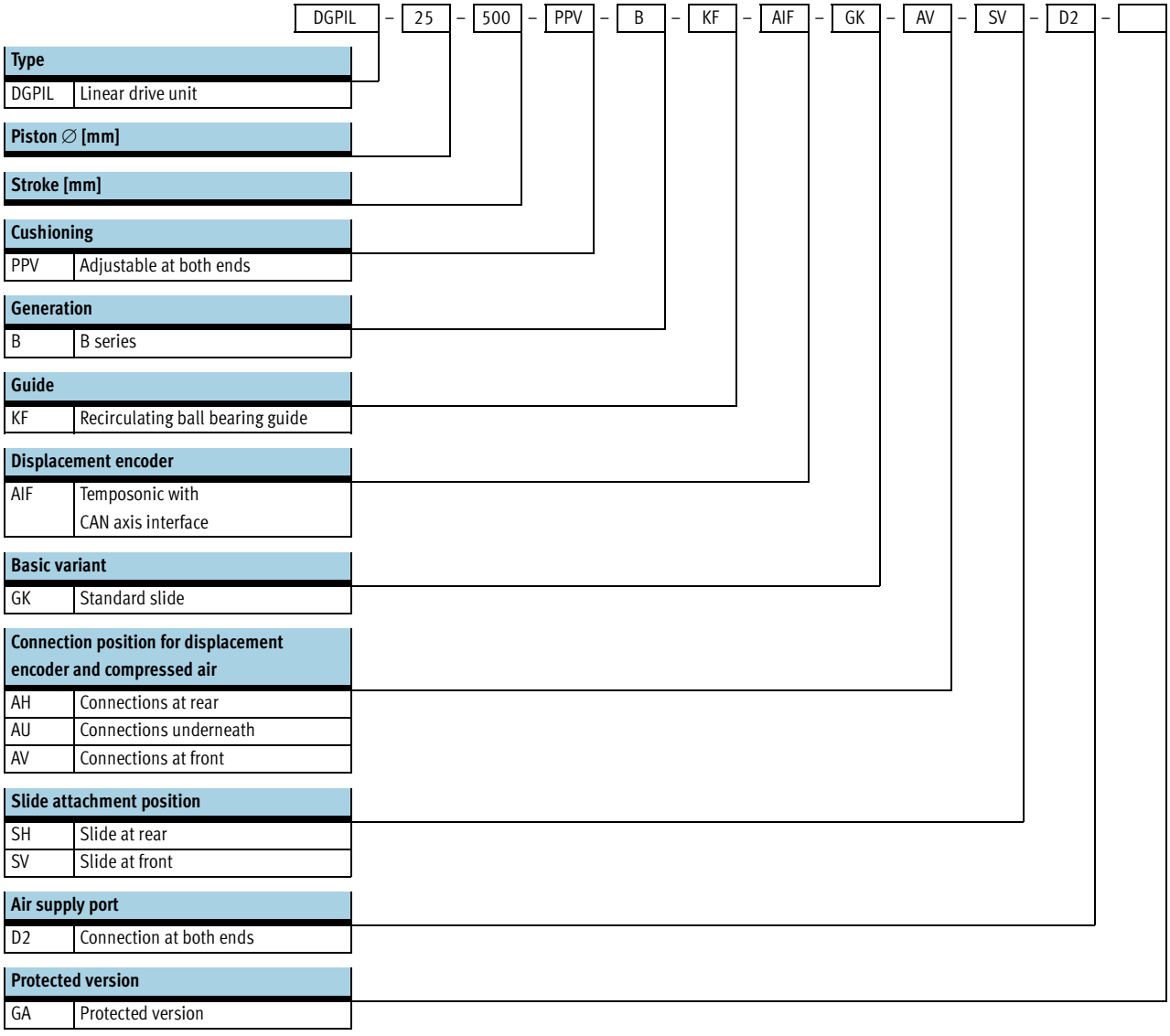
Linear drives DGPIL, integrated displacement encoder

Peripherals overview

Variants and accessories			
	Type	**Brief description**	**➔ Page**
1	Shock absorber kit C/E	to avoid damage at the end stop, in the event of malfunctions	5 / 1.1-88
2	Slot nut for slide X	for mounting loads and attachments on the slide	5 / 1.1-89
3	Central mounting Q	for centring loads and attachments on the slide	5 / 1.1-89
4	Centring sleeves Z	for centring loads and attachments on the slide	5 / 1.1-89
5	Slot cover B/S	to protect against the ingress of dirt	5 / 1.1-89
6	Slot nut for mounting slot Y	for mounting attachments	5 / 1.1-89
7	Central support M	to mount the axis	5 / 1.1-86
8	Foot mounting F	to mount the axis	5 / 1.1-86

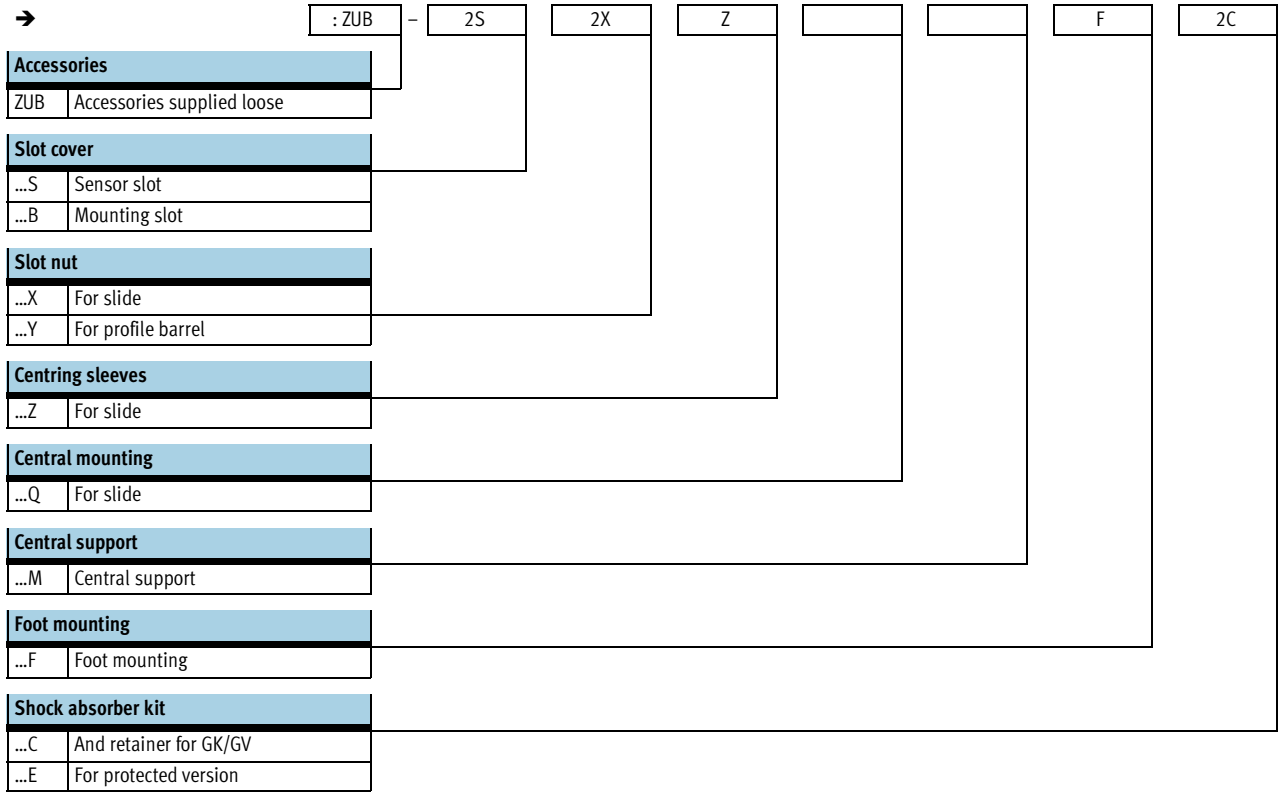
Linear drives DGPIL, integrated displacement encoder

Type codes



Linear drives DGPIL, integrated displacement encoder

Type codes

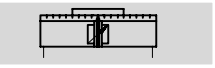


Linear drives DGPIL, integrated displacement encoder

Technical data

FESTO

Function



- Ø - Diameter
  25 ... 63 mm
- l - Stroke length
  225 ... 2,000 mm

General technical data						
Piston ∅		25	32	40	50	63
Design		Piston				
		Driver				
		Profile barrel				
Mode of operation		Double-acting				
Operating medium[1]		Compressed air, filtered and unlubricated, filter unit 5 µm				
Cushioning		Adjustable at both ends				
Cushioning length	[mm]	18	20	30		
Position sensing		Integrated displacement encoder				
Measuring principle		Digital, magnetostrictive, non-contacting, absolute measurement				
Type of mounting		Foot mounting				
Stroke[2)3)]	[mm]	225, 300, 360, 450, 500, 600, 750, 1,000, 1,250, 1,500, 1,750, 2,000				
Protection against torsion/guide		Guide rail with slide				
		Recirculating ball bearing				
Protected version[4]		Optional				
Pneumatic connection		G1/8		G1/4		G3/8
Electrical connection		6-pin round plug to DIN 45 322				

1) The proportional directional control valve MPYE used requires the characteristic values.
2) Note stroke reduction in conjunction with SPC200.
3) Supply of compressed air to each end of the cylinder (feature D2) is absolutely essential for Soft Stop SPC11 and axis controller SPC200 as of a length of 500 mm.
4) Protected from above and the sides against the ingress of particles

Forces [N] and impact energy [Nm]					
Piston ∅	25	32	40	50	63
Theoretical force at 6 bar	295	483	754	1,178	1,870
Max. impact energy at the end positions[1]	0.1	0.2	0.4	0.8	0.8

1) Cushioning PPV must be completely open for applications with Soft Stop SPC11 and axis controller SPC200.

Permissible impact velocity:

$$v_{perm.} = \sqrt{\frac{2 \times E_{perm.}}{m_{dead} + m_{load}}}$$

Maximum permissible load:

$$m_{load} = \frac{2 \times E_{perm.}}{v^2} - m_{dead}$$

- Note

This data represents the maximum values which can be achieved. Values fluctuate in practice relative to the size of the effective load. Allowance must also be made for the limits of the cushioning capacity of the drive and the permissible impact energy.

Linear drives DGPIL, integrated displacement encoder

Technical data

Positioning characteristics with axis controller SPC200						
Piston ∅		25	32	40	50	63
Repetition accuracy	[mm]	➔ 5 / 1.1-46				
Mounting position		Any				
Minimum load, horizontal[1)]	[kg]	2	3	5	8	12
Maximum load, horizontal[1)]	[kg]	30	45	75	120	180
Minimum load, vertical[1)]	[kg]	2	3	5	8	12
Maximum load, vertical[1)]	[kg]	10	15	25	40	60
Min. speed of travel	[m/s]	0.05				
Max. speed of travel	[m/s]	3				
Typ. positioning time, long stroke[2)]	[s]	0.75/1.20	0.85/1.20	0.75/1.20	0.95/1.25	0.90/1.20
Typ. positioning time, short stroke[3)]	[s]	0.40/0.60	0.45/0.60	0.40/0.60	0.50/0.65	0.50/0.65
Minimum positioning stroke[4)]	[%]	3				
Stroke reduction[5)]	[mm]	25		35		
Recommended proportional directional control valve		➔ 5 / 1.1-90				

1) Load = effective load + mass of all moving parts on the drive
2) At 6 bar, horizontal mounting position, DGPL-XX-1250, 1000 mm positioning travel at min./max. load
3) At 6 bar, horizontal mounting position, DNCM-XX-1250, 100 mm positioning travel at min./max. load
4) In relation to the maximum stroke of the drive, but never more than 20 mm.
5) The stroke reserve is to be maintained on every side of the drive, the max. positionable stroke is therefore: Stroke – 2x stroke reserve

Positioning characteristics with end position controller SPC11						
Piston ∅		25	32	40	50	63
Repetition accuracy of a mid-position[1)]	[mm]	±2				
Mounting position		Any				
Minimum load, horizontal[2)]	[kg]	2	3	5	8	12
Maximum load, horizontal[2)]	[kg]	30	45	75	120	180
Minimum load, vertical[2)]	[kg]	2	3	5	8	12
Maximum load, vertical[2)]	[kg]	10	15	25	40	60
Travel time	[s]	➔ Software Tool “SoftStop”: www.festo.com/en/engineering				
Recommended proportional directional control valve		➔ 5 / 1.1-90				

1) In the stroke range from 225 ... 2,000 mm
2) Load = effective load + mass of all moving parts on the drive

Operating and environmental conditions						
Piston ∅		25	32	40	50	63
Operating pressure[1)]	[bar]	4 ... 8				
Ambient temperature	[°C]	–10 ... +60				
Vibration resistance		To DIN/IEC 68 Parts 2 -6, severity level 1				
Continuous shock resistance		To DIN/IEC 68 Parts 2 -27, severity level 1				
CE symbol		To 89/336/EEC (EMC regulation)				
Protection class (displacement encoder)		IP65 to IEC 60 529				

1) Only applies for applications with Soft Stop SPC11 and axis controller SPC200.

Linear drives DGPIL, integrated displacement encoder

Technical data

FESTO

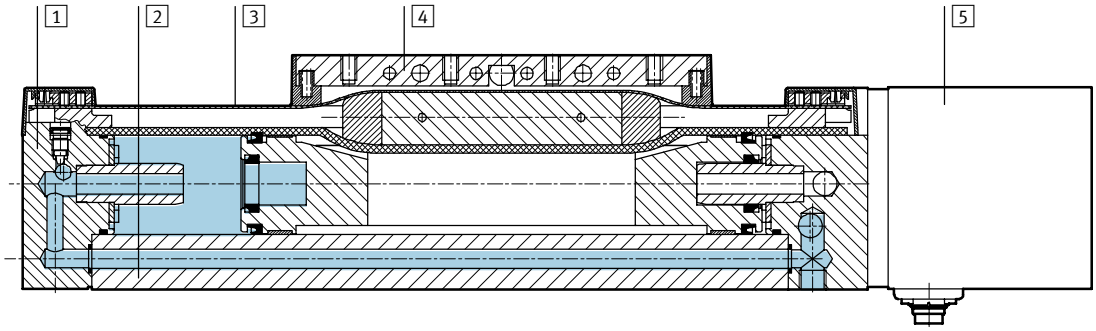
Weights [g]					
Piston ∅	25	32	40	50	63
Standard slide GK					
Basic weight	2,220	3,320	5,330	10,700	16,870
Additional weight per 10 mm stroke	55	71	99	186	256
Moving load	605	895	1,700	3,000	4,990
Additional weights for protected version GA					
Dirt protection cover	1,690	2,500	4,000	–	–
Additional weight per 10 mm stroke	26	42	65	–	–
Moving load	907	1,350	2,550	–	–

Electrical data, displacement encoder			
Power supply		[V DC]	24 (–15/+25%)
Max. current consumption		[mA]	90
Resolution		[mm]	≤ 0.01
Independent linearity[1)]	maximum	[%]	0.02
Temperature coefficient		[ppm/°K]	≤ 15
Interface			Digital, CAN with protocol: SPC-AIF

1) Minimum ±50 µm

Materials

Sectional view



Drive		
1	End cap	Anodised aluminium
2	Profile	Anodised aluminium
3	Cover strip	Steel, corrosion resistant
4	Driver	Anodised aluminium
5	Displacement encoder housing	Anodised aluminium
–	Slide	Anodised aluminium
–	Guide rail	Corrosion resistant steel
–	Seals	Nitrile rubber, polyurethane

Note

Further technical data

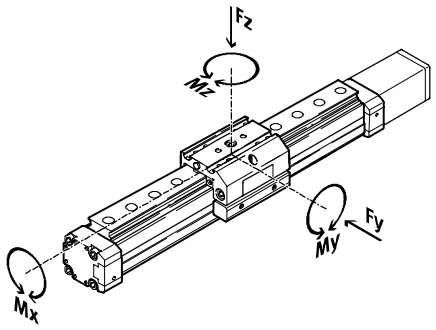
➔ Volume 1 (Linear drives DGPL)

Linear drives DGPIL, integrated displacement encoder

Technical data

Characteristic load values

The forces and torques specified refer to the centre line of the profile barrel internal diameter.
They must not be exceeded during dynamic operation. Special attention must be paid to the cushioning phase.



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.

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

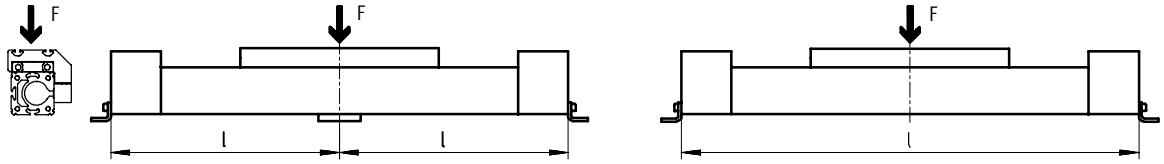
Permissible forces and torques

Piston ∅		25	32	40	50	63
$Fy_{max.}$	[N]	3,080	3,080	7,300	7,300	14,050
$Fz_{max.}$	[N]	3,080	3,080	7,300	7,300	14,050
$Mx_{max.}$	[Nm]	45	63	170	240	580
$My_{max.}$	[Nm]	85	127	330	460	910
$Mz_{max.}$	[Nm]	85	127	330	460	910

Maximum permissible support span l as a function of the force F

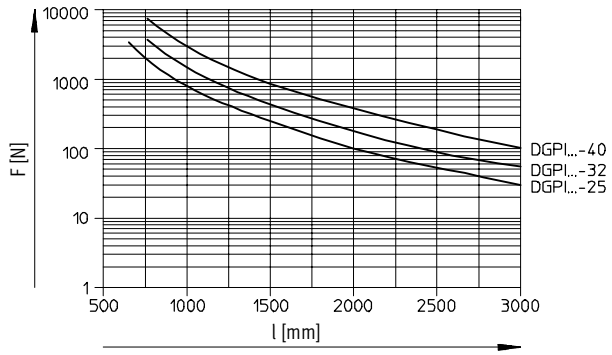
The axis may need to be supported with central supports MUP in order to limit deflection in the case of large strokes. The following diagrams serve to determine the maximum permissible support span l as a function of the force F.

Force on the surface of the slide

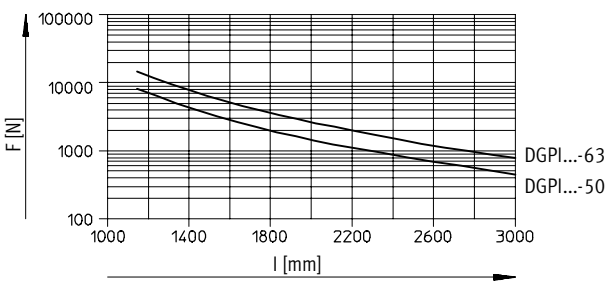


Maximum support span l (without central support) as a function of the force F

Piston ∅ 25 ... 40



Piston ∅ 50/63



Linear drives DGPIL, integrated displacement encoder

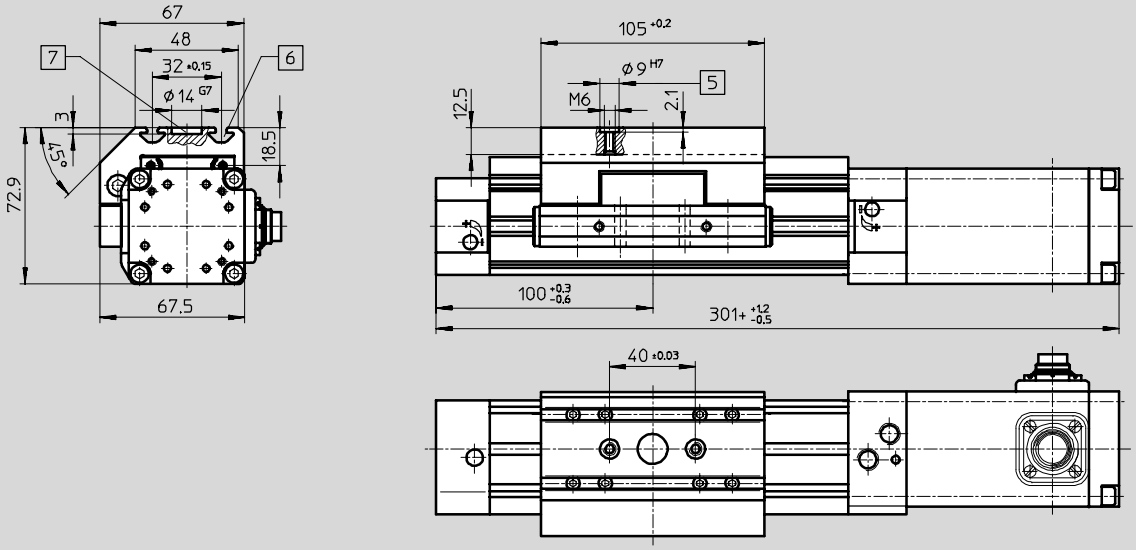
Technical data

FESTO

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

Standard slide GK

Piston ∅ 25

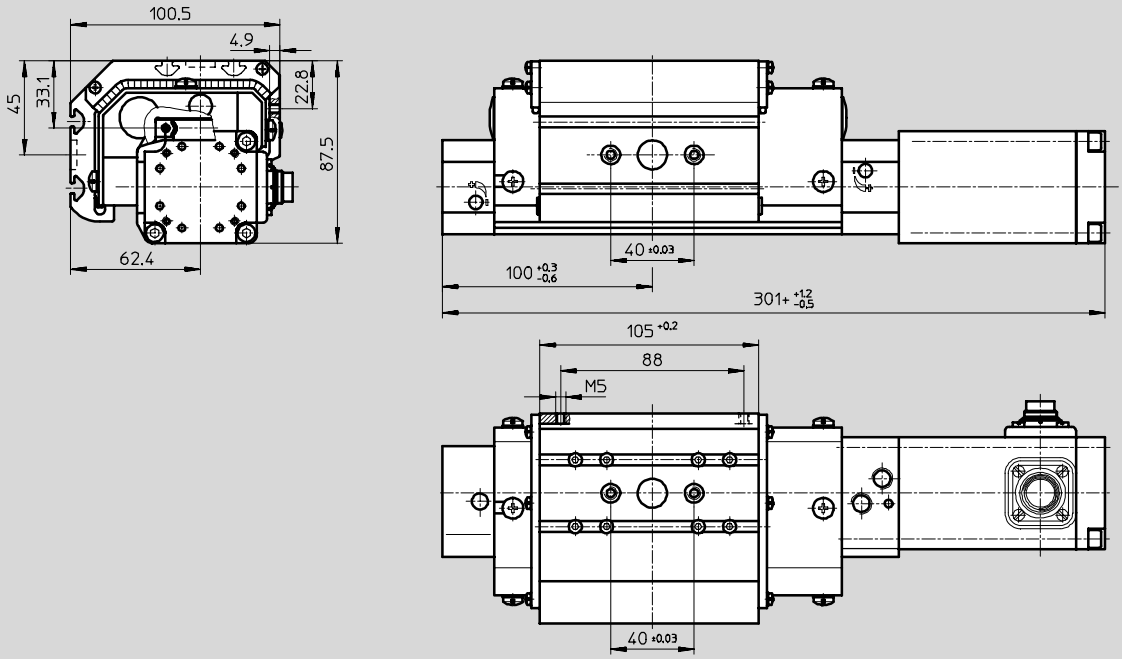


5 Hole for centring sleeve ZBH-9
6 Mounting slot for slot nut NSTL
7 Drilled hole for central mounting SLZZ
\+ = plus stroke length

Basic dimensions
➔ 5 / 1.1-64

Protected version GA

Piston ∅ 25



\+ = plus stroke length

Basic dimensions
➔ 5 / 1.1-64

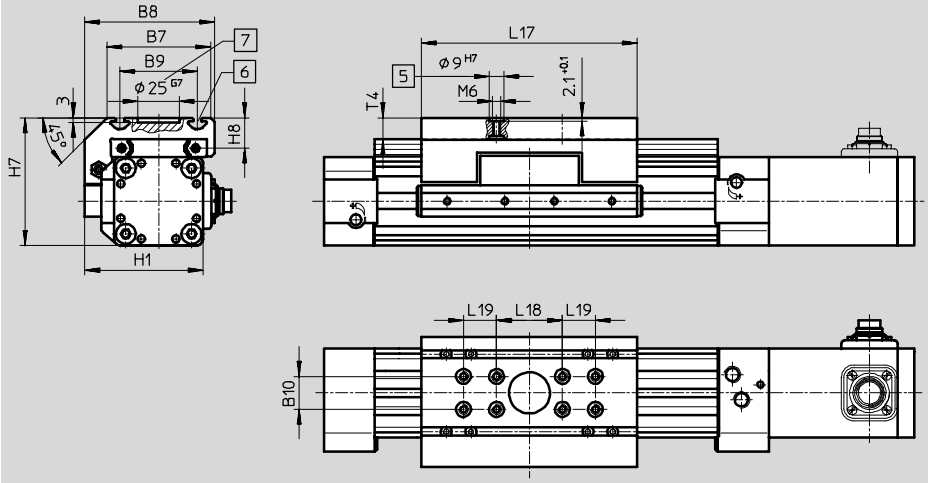
Linear drives DGPIL, integrated displacement encoder

Technical data

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

Standard slide GK

Piston ∅ 32 ... 63

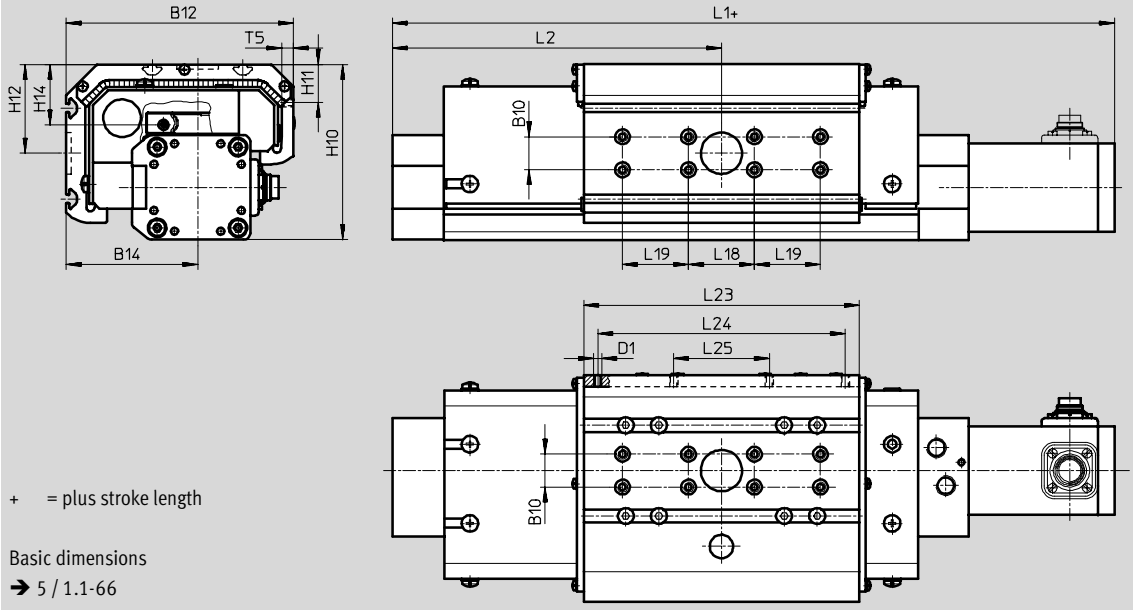


5 Hole for centring sleeve ZBH-9
6 Mounting slot for slot nut NSTL
7 Drilled hole for central mounting SLZZ
\+ = plus stroke length

Basic dimensions
➔ 5 / 1.1-66

Protected version GA

Piston ∅ 32/40



\+ = plus stroke length

Basic dimensions
➔ 5 / 1.1-66

∅ [mm]	B7	B8	B9	B10 ±0.03	B12	B14	D1	H1	H7	H8	H10
32	63	79	47 ±0.15	20	112.1	67.6	–	72	77.5	18.5	93.1
40	78.5	96.5	55 ±0.2	20	137.6	79.6	M5	86	90.5	20	106.6
50	97	122	72 ±0.2	40	–	–	–	115	122.5	26	–
63	121	142	90 ±0.25	40	–	–	–	131	144.5	30	–

∅ [mm]	H11	H12	H14	L1 +1.2/–0.5	L2 +0.3/–0.6	L17 +0.2	L18 ±0.03	L19 ±0.03	L23	L24	L25	T4 max.	T5
32	–	49.5	34.1	345	125	131	40	–	131	–	–	12.5	–
40	23.1	54	36.1	397	150	167	40	40	167	150	58	12.5	7
50	–	–	–	465	175	202	40	40	–	–	–	18.5	–
63	–	–	–	513	200	230	40	40	–	–	–	20.5	–

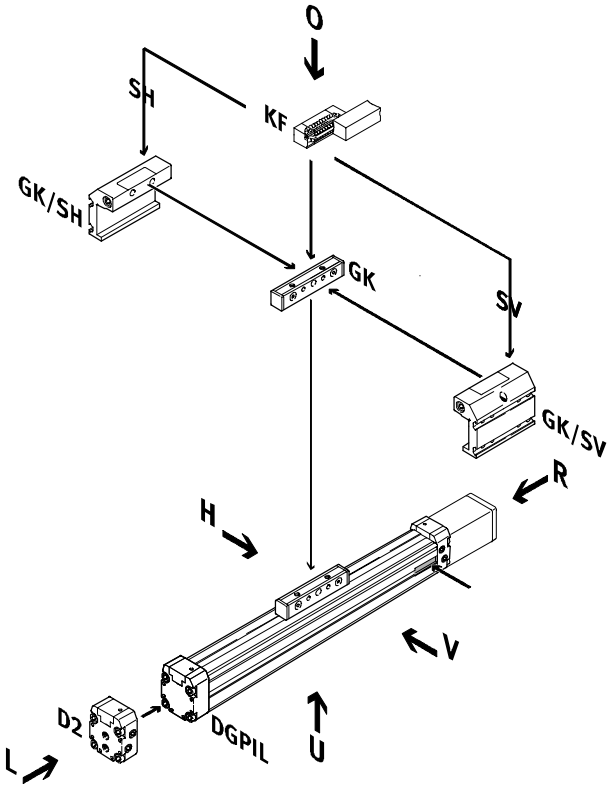
Linear drives DGPIL, integrated displacement encoder

Ordering data – Modular product system

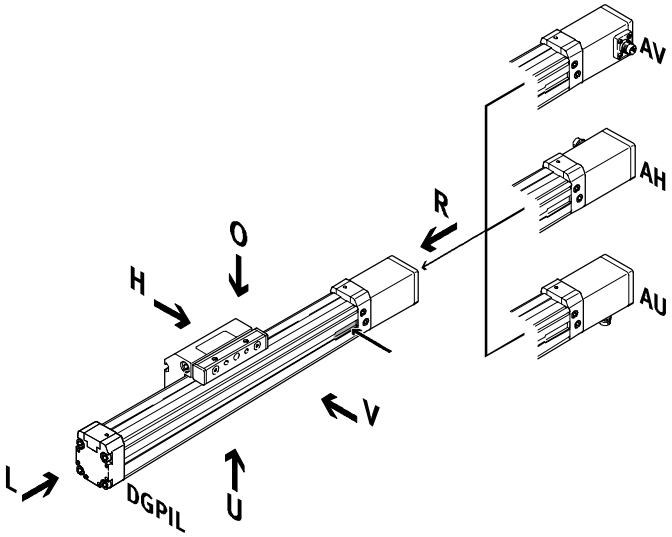
FESTO

Order code
Mandatory data

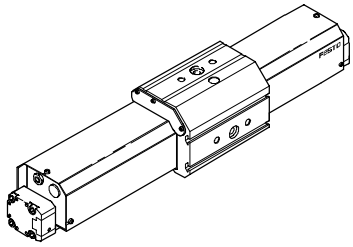
KF Recirculating ball bearing guide
SH Slide at rear
SV Slide at front
D2 Air connection at both ends
GK Standard slide



AV Displacement encoder connection to front
AH Displacement encoder connection to rear
AU Displacement encoder connection underneath



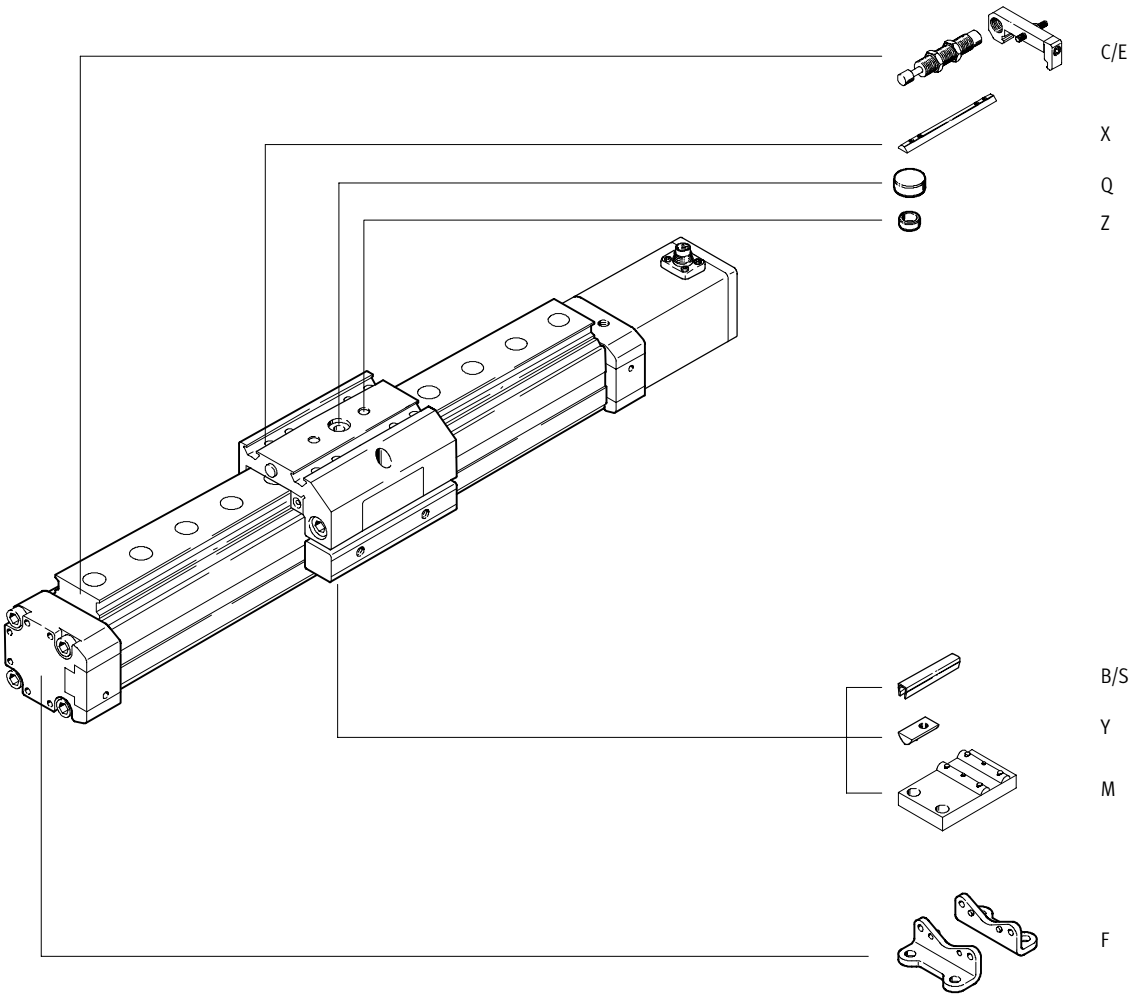
GA Protected version



Linear drives DGPIL, integrated displacement encoder

Ordering data – Modular product system

Order code
Options



Linear drives DGPIL, integrated displacement encoder

Ordering data – Modular product system

FESTO

M **Mandatory data**

Module No.	Drive function	Size	Stroke	Cushioning	Generation	Guide	Displacement encoder	Basic variant	Connection position for displacement encoder	Slide attachment position
175 134	DGPIL	25	225 ...	PPV	B	KF	AIF	GK	AH	SH
175 135		32	2 000						AU	SV
175 136		40							AV	
175 137		50								
175 138		63								
Ordering example										
175 134	**DGPIL**	**25**	**450**	**PPV**	**B**	**KF**	**AIF**	**GK**	**AU**	**SH**

Ordering table

Size		25	32	40	50	63	Conditions	Code		Enter code
M	Module No.	**175 134**	**175 135**	**175 136**	**175 137**	**175 138**				
	Drive function	Pneumatic linear drive with integrated displacement encoder and slide						**DGPIL**		DGPIL
	Size	25	32	40	50	63		**-...**		
	Stroke [mm]	225, 300, 360, 450, 500, 600, 750, 1 000, 1 250, 1 500.1 750, 2 000						**-...**		
	Cushioning	Pneumatic cushioning adjustable at both ends						**-PPV**		-PPV
	Generation	B series						**-B**		-B
	Guide	Recirculating ball bearing guide						**-KF**		-KF
	Displacement encoder	Temposonic with CAN axis interface						**-AIF**		-AIF
	Basic variant	Standard piston/slide						**-GK**		-GK
	Connection position for displacement encoder AIF and compressed air	Connection position for displacement encoder and air supply port, rear						**-AH**		
		Connection position for displacement encoder and air supply port, underneath						**-AU**		
		Connection position for displacement encoder and air supply port, front						**-AV**		
	Slide attachment position	Slide at rear						**-SH**		
↓		Slide at front						**-SV**		

Transfer order code

	DGPIL	–		–		–	PPV	–	B	–	KF	–	AIF	–	GK	–		–	

Linear drives DGPIL, integrated displacement encoder

Ordering data – Modular product system

FESTO

0 Options

Air supply port	Protected version	Acces-sories	Slot cover	Slot nut	Centring sleeve	Central support	Central mounting	Foot mounting	Shock absorber
D2	GA	ZUB	...S ...B	...X ...Y	...Z	...M	...Q	...F	...C ...E
– D2	–	: ZUB	– 2S2B	2X				F	2C

Ordering table

Size		25	32	40	50	63	Condi-tions	Code		Enter code
↓	Air supply port	at both ends						-D2		
0	Protected version	Protected roller bearing design for harsh environment		–	–	–		-GA		
	Accessories	Supplied separately						:ZUB-		:ZUB-
	Slot cover, x2, 0.5 m	Sensor slot	1 ... 10					...S		
		Mounting slot	–	1 ... 10				...B		
	Slot nut	Slide	1 ... 10					...X		
		Mounting slot	–	1 ... 10				...Y		
	Centring sleeve (pack of 10)	10, 20, 30, 40, 50, 60, 70, 80, 90						...Z		
	Central support	1 ... 10						...M		
	Central mounting	1 ... 10						...Q		
	Foot mounting	1 ... 10						...F		
	Shock absorber kit	with retainer, 1-off	1 ... 10					1	...C	
			1 ... 10	–	–	–		2	...E	

1 **C** Not with protected version GA.
2 **E** Only with protected version GA.

Transfer order code

–		–		: ZUB	–							

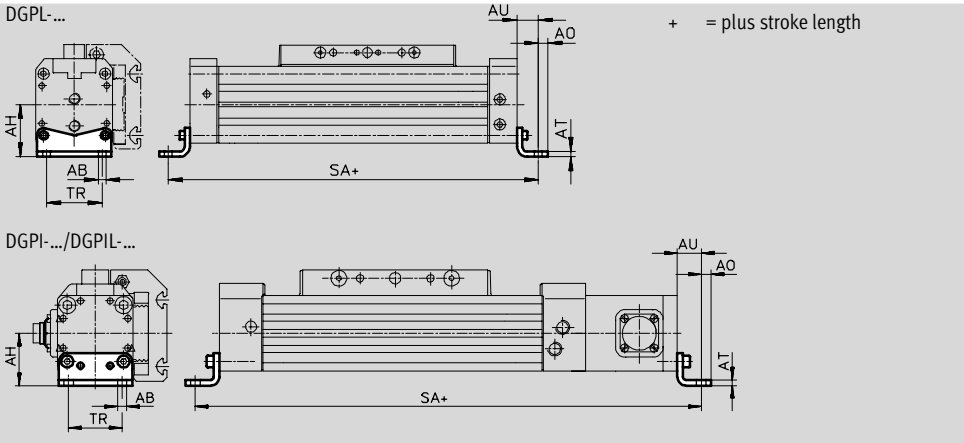
Linear drives DGPL/DGPI/DGPIL

Accessories

Foot mounting HP
(Order code: F)

Material:
Galvanised steel

Free of copper, PTFE and silicone



Dimensions and ordering data

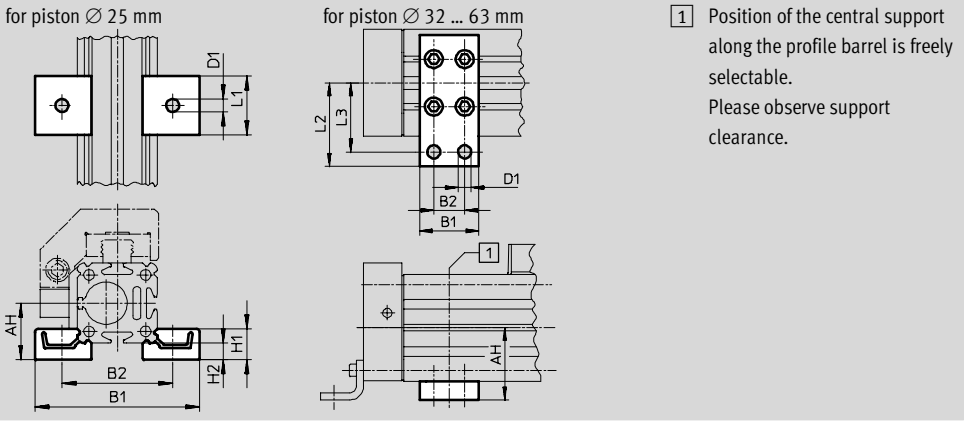
for ∅ [mm]	AB ∅	AH	AO	AT	AU	SA DGPL	SA DGPI(L)	TR	Weight [g]	Part No.	Type
25	5.5	29.5	6	3	13	226	327	32.5	61	**150 731**	**HP-25**
32	6.6	37	7	4	17	284	379	38	117	**150 732**	**HP-32**
40	6.6	46	8.5	5	17.5	335	432	45	188	**150 733**	**HP-40**
50	9	61	11	6	25	400	515	65	243	**150 734**	**HP-50**
63	11	69	13.5	6	28	456	569	75	305	**150 735**	**HP-63**

Central support MUP
(Order code: M)

Material:
Galvanised steel

Free of copper, PTFE and silicone

MUP-40



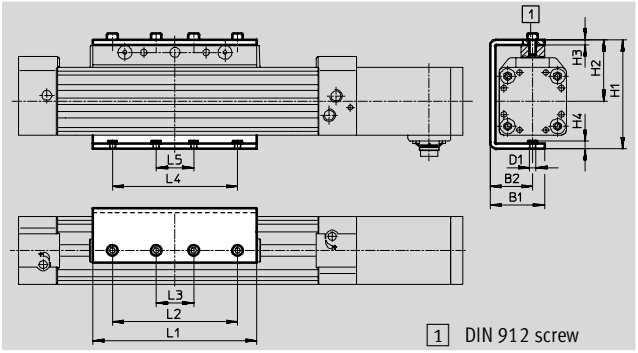
Dimensions and ordering data

for ∅ [mm]	AH	B1	B2	D1 ∅	H1	H2	L1	L2	L3	Weight [g]	Part No.	Type
25	29.5	81	58	5.5	13	7	25	–	–	33	**150 736**	**MUP-18/25**
32	37	35	22	6.6	–	–	–	41.5	35	89	**150 737**	**MUP-32**
40	46	35	22	6.6	–	–	–	47	40	126	**150 738**	**MUP-40**
50	61	50	26	11	–	–	–	70	58	241	**150 739**	**MUP-50**
63	69	50	26	11	–	–	–	77	65	340	**150 800**	**MUP-63**

Core Range

Load inverter AK
for DGPI
(Order code: AK)

Material:
Galvanised steel



Dimensions and ordering data									
for ∅ [mm]	B1	B2	D1	H1	H2	H3	H4	L1	L2
25	39	29.5	M5	76.1	43.5	3	5	105	–
32	43.5	34	M5	87	49	4	6	131	100
40	50.5	40	M6	104	58	4	8.1	167	130
50	67	55	M8	138.5	75	5	10.5	202	150
63	77	65	M8	156.5	84	6	11.5	230	190

for ∅ [mm]	L3	L4	L5	1	CRC[1)]	Weight [g]	Part No.	Type
25	50	50	20	M5x10	2	380	**196 106**	**AK-25**
32	30	100	30	M5x12		690	**196 107**	**AK-32**
40	40	130	40	M6x14		1,050	**196 108**	**AK-40**
50	50	150	50	M8x16		2,080	**196 109**	**AK-50**
63	70	190	70	M8x18		2,820	**196 110**	**AK-63**

1) Corrosion resistance class 2 according to Festo standard 940 070
Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a surrounding industrial atmosphere or media such as cooling or lubricating agents.

Shock absorber DG-GA
for DGPIL
Protected version GA
(Order code: E)

Material:
Housing: Galvanised steel; piston rod: high-alloy steel
Seals: Perbunan, polyurethane
Free of copper, PTFE and silicone

Ordering data			
for ∅ [mm]	Weight [g]	Part No.	Type
25	70	**192 875**	**DG-GA-25-YSR**
32	110	**192 876**	**DG-GA-32-YSR**
40	140	**192 877**	**DG-GA-40-YSR**

Shock absorber YSR-...-C
for DGPL/DGPIL
(Order code: C)

Material:
Housing: Galvanised steel; piston rod: high-alloy steel,
Seals: Perbunan, polyurethane
Free of copper, PTFE and silicone

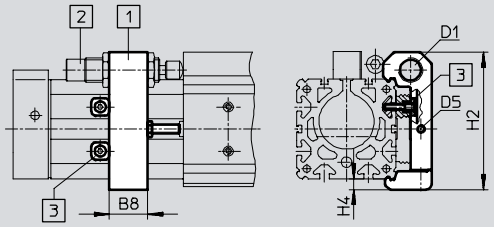
- - Note
Shock absorber YSRW with progressive characteristic
➔ Volume 1

Ordering data

for ∅ [mm]	Weight [g]	Part No.	Type
25	70	**34 572**	**YSR-12-12-C**
32	70	**34 572**	**YSR-12-12-C**
40	140	**34 573**	**YSR-16-20-C**
50	140	**34 573**	**YSR-16-20-C**
63	240	**34 574**	**YSR-20-25-C**

Shock absorber retainer KYP
for DGPL/DGPIL
(Order code: C)

Material:
Retainer: Aluminium
Sleeve: Steel, corrosion resistant



1 Shock absorber retainer KYP (if the retainer is in contact with the front cap, i.e. cap serves to secure the position, the entire stroke length can be utilised)

2 Shock absorber YSR-...-C

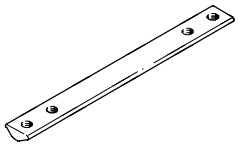
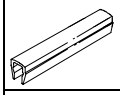
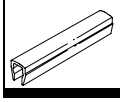
3 Position retainer (included in scope of delivery) either behind or underneath the shock absorber retainer KYP

Dimensions and ordering data

for ∅ [mm]	B8	D1	D5	H2	H4	Weight [g]	Part No.	Type
25	19	M16x1	M5	69.5	6	95	**158 908**	**KYP-25**
32	25	M16x1	M5	80	8	130	**158 909**	**KYP-32**
40	32	M22x1.5	M5	102	8	209	**158 910**	**KYP-40**
50	35	M22x1.5	M8	124	10	415	**158 911**	**KYP-50**
63	44	M26x1.5	M10	152.5	11.5	609	**158 912**	**KYP-63**

Core Range

Ordering data — Technical data ➔ Volume 1

	for ∅ [mm]	Remarks	Order code	Part No.	Type	PU[1]
Slot nut NST						
	25	For mounting slot	Y	**526 091**	**NST-HMV-M4**	1
	32, 40			**150 914**	**NST-5-M5**	1
	50, 63			**150 915**	**NST-8-M6**	1
Slot nut NSTL						
	25	For slide	X	**158 410**	**NSTL-25**	1
	32			**158 411**	**NSTL-32**	1
	40			**158 412**	**NSTL-40**	1
	50			**158 413**	**NSTL-50**	1
	63			**158 414**	**NSTL-63**	1
Centring sleeve ZBH						
	25 ... 63	For slide	Z	**150 927**	**ZBH-9**	10
Central mounting SLZZ						
	25	For slide	Q	**150 900**	**SLZZ-16/10**	1
	32, 40			**150 901**	**SLZZ-25/16**	
	50, 63			**150 904**	**SLZZ-50/40**	1
Slot cover ABP						
	32, 40	For mounting slot 0.5 m each	B	**151 681**	**ABP-5**	2
	50, 63			**151 682**	**ABP-8**	
Slot cover ABP-S						
	25 ... 63	For sensor slot 0.5 m each	S	**151 680**	**ABP-5-S**	2

1) Packaging unit quantity

Ordering data – Push-in/threaded fitting — Technical data ➔ Volume 3

	for ∅ [mm]	Remarks	Part No.	Type	PU[1]
	25, 32	For connecting compressed air tubing	**186 098**	**QS-G⅛-8**	10
	40, 50		**186 099**	**QS-G¼-8**	
			186 101	**QS-G¼-10**	10
	63		**186 100**	**QS-G⅜-8**	10
			186 102	**QS-G⅜-10**	
			186 103	**QS-G⅜-12**	

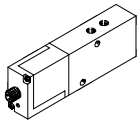
1) Packaging unit quantity

Core Range

Ordering data – Proportional directional control valve Technical data ➔ 5 / 1.5-2

Selection aid

Application	for ∅ [mm]	Stroke [mm]											
		225	300	360	450	500	600	750	1,000	1,250	1,500	1,750	2,000
horizontal/vertical	**For applications with axis controller SPC200**												
	25	1/1	1/1	1/1	1/1	1/1	1/1	1/1	2/2	2/2	2/2	2/2	2/2
	32	1/1	1/1	2/2	2/2	2/2	2/2	2/2	2/2	2/2	2/2	2/2	2/2
	40	1/1	2/2	2/2	2/2	2/2	2/2	2/2	3/3	3/3	3/3	3/3	3/3
	50	2/2	2/2	2/2	2/2	2/2	3/3	3/3	3/3	3/3	3/3	3/3	3/3
	63	3/3	3/3	3/3	3/3	3/3	3/3	3/3	3/3	4/4	4/4	4/4	4/4
	For applications with Soft Stop end position controller SPC11												
	25	1/[1)]	1/1	2/1	2/1	2/1	2/2	2/2	2/3	2/3	2/3	2/3	2/3
	32	1/[1)]	2/1	2/1	2/1	2/1	2/1	3/2	3/3	3/3	3/3	3/3	3/3
	40	2/1	2/1	2/1	2/1	2/2	3/3	3/4	3/4	3/4	3/4	3/4	3/4
	50	1/1	2/1	2/2	3/2	3/3	4/3	4/4	4/4	4/4	4/4	4/4	4/4
	63	2/1	2/2	3/3	3/3	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4

Valve	Selection number	Part No.	Type
	1	**151 692**	**MPYE-5-1⁄8-LF-010-B**
	2	**151 693**	**MPYE-5-1⁄8-HF-010-B**
	3	**151 694**	**MPYE-5-1⁄4-010-B**
	4	**151 695**	**MPYE-5-3⁄8-010-B**

1) On request

- Note

The representation e.g. 2/1 in the columns means:

Selection number 2	Selection number 1
for horizontal application	for vertical application
151 693 MPYE-5-1⁄8-HF-010-B	151 692 MPYE-5-1⁄8-LF-010-B

Ordering data – Proximity sensor for slot type 8, magnetic reed — Technical data ➔ Volume 1

	Mounting	Electrical connection		Cable length [m]	Part No.	Type
		Cable	M8 plug			
NO contact						
	Insertable, flush with the cylinder profile	3-wire	–	2.5	**150 855**	**SME-8-K-LED-24**
		–	3-pin	0.3	**150 857**	**SME-8-S-LED-24**
NC contact						
	Insertable from above	3-wire	–	7.5	**525 906**	**SME-8F-DO-24V-K7,5-OE**

Ordering data – Proximity sensor for slot type 8, magneto-resistive — Technical data ➔ Volume 1

	Mounting	Switch output	Electrical connection		Cable length [m]	Part No.	Type
			Cable	M8 plug			
NO contact							
	Insertable, flush with the cylinder profile	PNP	3-pin	–	2.5	**175 436**	**SMT-8-PS-K-LED-24-B**
			–	3-pin	0.3	**175 484**	**SMT-8-PS-S-LED-24-B**
NC contact							
	Insertable from above	PNP	3-wire	–	7.5	**525 911**	**SMT-8F-PO-24V-K7,5-OE**

Ordering data – Plug sockets — Technical data ➔ Volume 1

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

Core Range

Swivel module DSMI, integrated displacement encoder

Features

Individual positioning components with swivel module DSMI ...

Proportional directional control valve
MPYE-...
➔ 5 / 1.5-2

Soft Stop ➔ 5 / 1.4-2

Positioning technology ➔ 5 / 1.3-2

End position controller
SPC11-POT-LWG

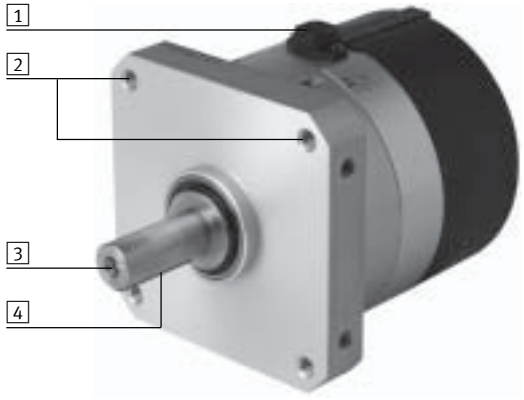
Axis interface
SPC-AIF-POT-LWG

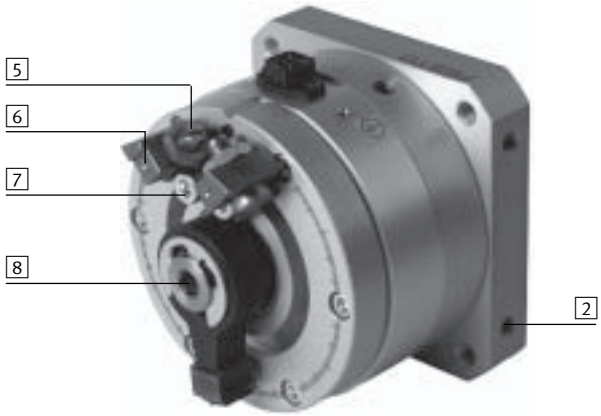
Axis positioning controller
SPC200

Swivel module DSMI, integrated displacement encoder

Features

At a glance

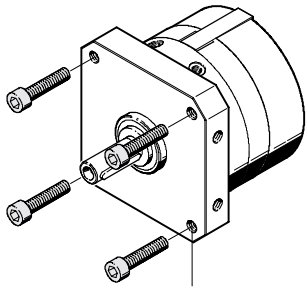




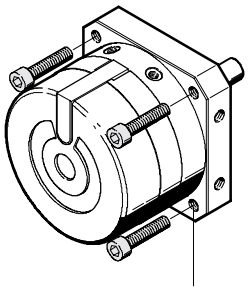
1 Connector plug for displacement encoder
2 Versatile, integrated attachment facilities
3 Customer's own mounting facility on the drive shaft
4 Woodruff key
5 Fixed stop with fine adjustment of the swivel angle
6 Brackets for mounting inductive proximity sensors for contactless position sensing
7 Fixed stop can be set at any point within the swivel angle
8 Manual operation via internal hexagon socket in the drive shaft.

A female thread is included for attachment of an additional drive shaft by the user.

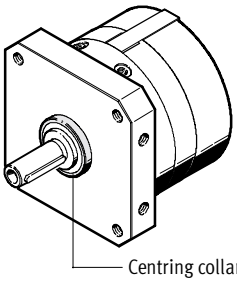
Mounting options



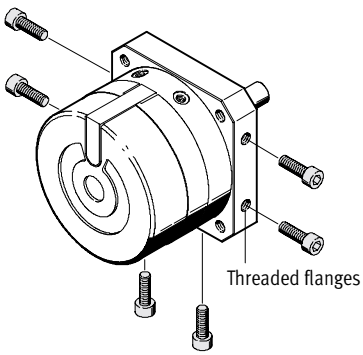
Threaded through-hole



Threaded through-hole



Centring collar

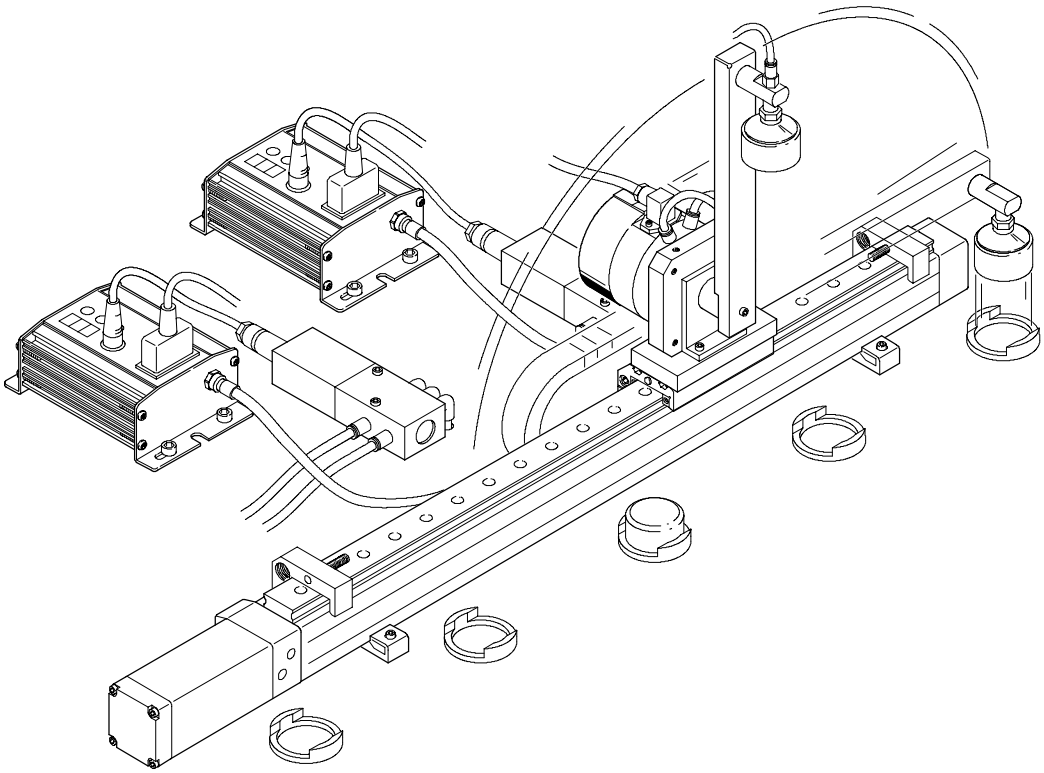


Threaded flanges

Swivel module DSMI, integrated displacement encoder

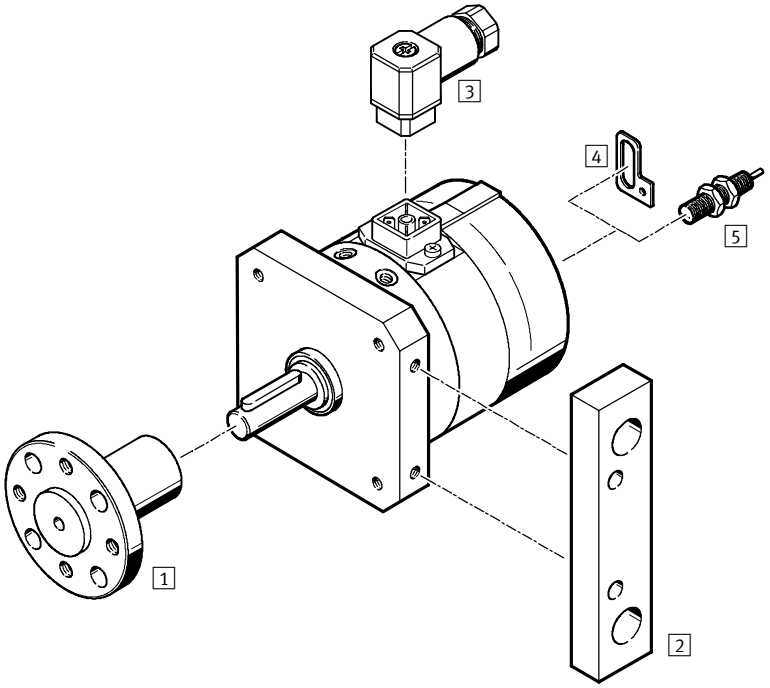
Application example

Combined linear and swivel motion with Soft Stop SPC11 to reposition small parts



Swivel module DSMI, integrated displacement encoder

Peripherals overview



Accessories			
	Type	**Brief description**	**➔ Page**
1	Push-on flange FWSR	for mounting attachments	5 / 1.1-100
2	Mounting plate HSM	adapter plate to mount the drive	5 / 1.1-100
3	Plug socket SD	to connect the displacement encoder, is part of the end position controller SPC11 and the axis controller SPC200	5 / 1.1-101
4	Sensor mounting kit WSM	bracket to mount the inductive proximity sensor	5 / 1.1-100
5	Proximity sensors SIEN	for additional sensing of the swivel position (see SIEN-M8)	Volume 4

DSMI	–	25	–	270

Type	
DSMI	Standard cylinder
Piston ∅ [mm]	
Swivel angle [mm]	

Swivel module DSMI, integrated displacement encoder

Technical data

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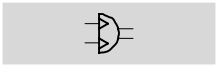
Function



- Diameter
  25 and 40 mm
- Force
  5, 20 Nm

General technical data			
Piston ∅		25	40
Design		Rotary vane	
		Drive shaft	
Mode of operation		Double-acting	
Operating medium[1]		Compressed air, filtered and unlubricated, filter unit 5 µm	
Cushioning		Non-adjustable at either end	
Cushioning angle	[°]	1.1 ... 1.9	1.4 ... 2.1
Position sensing		Integrated angular displacement encoder	
		Proximity sensor[2]	
Measuring principle (angular displacement encoder)		Analogue with rotary encoder, contacting with absolute measurements	
Type of mounting		Direct mounting	
Shaft		Running on ball bearings	
End stops		Adjustable	
Max. swivel angle[3]	[°]	272	
Pneumatic connection		M5	G1⁄8
Electrical connection		4-pin plug, □ 16, DIN 45 322	

1) The proportional directional control valve MPYE used requires the characteristic values.
2) Can be ordered as an option.
3) Note stroke reduction in conjunction with SPC200.

Torque and impact energy [Nm]		
Piston ∅	25	40
Torque[1]	5	20
Max. impact energy at end positions	0.05	0.1

1) Theoretical values, calculated at 6 bar.

Permitted forces and torques on the drive shaft			
Piston ∅		25	40
Max. perm. radial load	[N]	120	350
Max. perm. axial load	[N]	50	120
Max. perm. mass moment of inertia[1]	[10^{-4}kg m^2]	1.1	2.4
Max. operating frequency[2]	[Hz]	2	

1) Unthrottled, for applications with Soft Stop SPC11 and axis controller SPC200 ➔ 5 / 1.1-97
2) For max. permissible mass moment of inertia and a stroke of 270°.

- Note

Further technical data
➔ Volume 1 (Swivel module DSM)

Swivel module DSMI, integrated displacement encoder

Technical data

Positioning characteristics with axis controller SPC200			
Piston ∅		25	40
Repetition accuracy	[°]	±0.3	
Mounting position		Any	
Min. mass moment of inertia, horizontal[1)]	[10^{-4}kg m^2]	15	60
Max. mass moment of inertia, horizontal[1)]	[10^{-4}kg m^2]	300	1,200
Min. mass moment of inertia, vertical[2)]	[10^{-4}kg m^2]	15	60
Max. mass moment of inertia, vertical[2)]	[10^{-4}kg m^2]	300	1,200
Min. speed of travel	[°/s]	50	
Max. speed of travel	[°/s]	2,000	
Typ. positioning time, long stroke[3)]	[s]	0.35/0.60	0.30/0.55
Typ. positioning time, short stroke[4)]	[s]	0.15/0.25	0.25/0.25
Minimum positioning stroke	[°]	5	
Max. swivel stroke[5)]	[°]	260	
Recommended proportional directional control valve		MPYE-5-M5-010-B	MPYE-5-⅛-LF-010-B

1) Must not change during the movement, but may be outside the centre of gravity.
2) Must not change during the movement, must act at the centre of gravity.
3) At 6 bar, vertical mounting position, 260° positioning angle at min./max. mass moment of inertia.
4) At 6 bar, vertical mounting position, 15° positioning angle at min./max. mass moment of inertia.
5) A stroke reduction of 5° on both sides must be observed.

Positioning characteristics with Soft Stop end position controller SPC11			
Piston ∅		25	40
End-position repetition accuracy[1)]	[°]	< 0.2	
Repetition accuracy of a mid-position	[°]	< ±2	
Mounting position		horizontal	
Cushioning[2)]		No	
Min. mass moment of inertia, horizontal[3)]	[10^{-4}kg m^2]	15	60
Max. mass moment of inertia, horizontal[3)]	[10^{-4}kg m^2]	300	1,200
Minimum swivel stroke	[°]	15	
Recommended proportional directional control valve		MPYE-5-M5-010-B	MPYE-5-⅛-LF-010-B

1) When using the DSMI limit stops.
2) The cushioning pad on the stop lever must be removed for applications with Soft Stop. The stop lever may not swivel to the end stop at too great a speed as this could destroy the swivel module.

Operating and environmental conditions			
Piston ∅		25	40
Operating pressure[1)]	[bar]	4 ... 8	
Ambient temperature[2)]	[°C]	–10 ... +60	
Vibration resistance		To DIN/IEC 68 Parts 2 -6, severity level 2	
Continuous shock resistance		To DIN/IEC 68 Parts 2 -27, severity level 2	
CE symbol		To 89/336/EEC (EMC regulation)	
Protection class		IP65 to IEC 60 529	
Corrosion resistance class CRC[3)]		1	

1) Only applies for applications with the Soft Stop end position controller SPC11 and axis controller SPC200.
2) Note operating range of proximity sensors
3) Corrosion resistance class 1 according to Festo standard 940 070
Components requiring low corrosion resistance. Transport and storage protection.

Swivel module DSMI, integrated displacement encoder

Technical data

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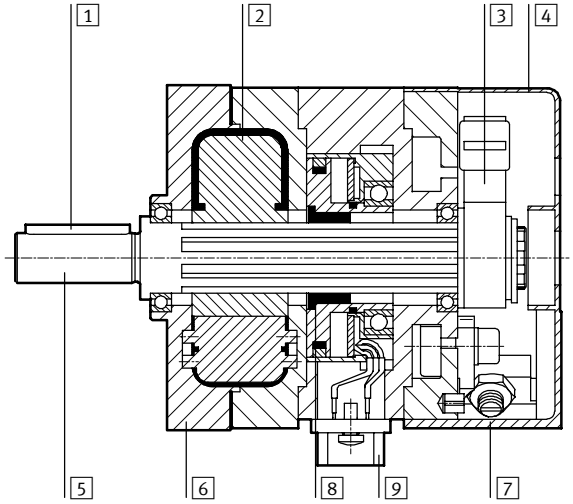
Weights				
Piston ∅			25	40
DSMI		[g]	1,060	3,750

Electrical data, displacement encoder				
Piston ∅			25	40
Power supply[1]		[V DC]	10	
Max. current consumption		[mA]	4	
Wiper current	recommended	[µA]	< 1	
	maximum[2]	[mA]	10	
Connection resistance		[kΩ]	5	
Connection resistance tolerance		[%]	±20	
Angle resolution		[°]	0.1	
Independent linearity		[%]	0.25	
Temperature coefficient		[ppm/°K]	≤ 10	
Interface			Analogue	

1) Stabilised power supply is recommended, max. 42 V DC permissible.
2) Only permissible in the short-term in the event of a fault.

Materials

Sectional view



Cylinder/Displacement encoder		
Cylinder		
1	Woodruff key	Steel
2	Rotary vane	GRP
3	Stop lever	Anodised aluminium
4	Cap	GRP
5	Shaft	Nickel plated steel
6	Housing	Anodised aluminium
7	Fixed stop/Screw	Galvanised steel
	Note on material	Free of copper, PTFE and silicone
Displacement encoder		
8	Coupling	Polyurethane
9	Housing	Anodised aluminium
–	Resistor element	Conductive plastic

Swivel module DSMI, integrated displacement encoder

Technical data

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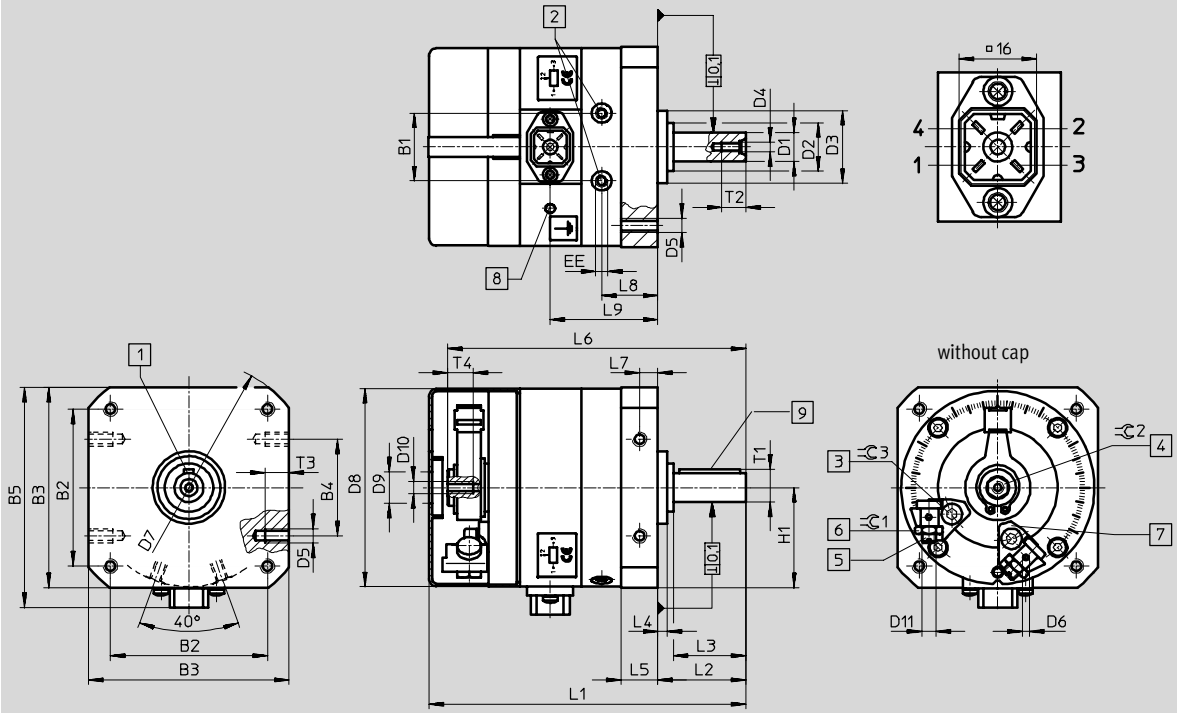
Dimensions Download CAD data ➔ **www.festo.com/en/engineering**



1 Woodruff key position at 0°
2 Compressed air connections
3 Locking screw for clamping the stop
4 Manual operation (internal hex)
5 End-position adjustment
6 Lock nut for end-position adjustment
7 Infinitely adjustable stops
8 Earth connection for self-tapping M4x8 screw
9 Woodruff key per DIN 6885

∅	B1	B2	B3	B4	B5	D1 g7	D2	D3 f8	D4	D5	D6	D7
[mm]	±0.5	±0.3	±0.3		±1	∅	∅	∅				∅
25	28	65	83	40±0.2	91	12	20–0.3	30	M4	M6	M3	106±0.3
40	43.8	105	130	80±0.3	139	20	36–0.4	52	M5	M10	M3	168±0.5

∅	D8	D9 ∅	D10	D11	EE	H1	L1	L2	L3	L4	L5 +0.2	L6
[mm]	∅	+0.5				±0.2			±0.2	±0.4	−0.4	±0.8
25	82±0.2	13	M5	M6x0.5	M5	41.5	131±1.2	36.5+0.6/−0.7	30	4	15.2	123
40	128±0.3	23.5	M6	M10x1	G⅛	65	200±1.5	62+0.7/−0.8	50	8	23.7	184

∅	L7	L8	L9	T1	T2	T3	T4	⊂1	⊂2	⊂3	Woodruff key to
[mm]	±0.2		±1	max.	+2	±0.2			D12		DIN 6885
25	7.5	23.5	44.5	13.5	10	10	10	10	8	4	A4x4x25
40	12	36	64.5	22.5	16	15	10	17	10	8	A6x6x45

Ordering data

Type	Swivel angle [°]	Part No.	Type
DSMI-25-270	270	**192 270**	**DSMI-25-270**
DSMI-40-270	270	**192 271**	**DSMI-40-270**

Swivel module DSMI, integrated displacement encoder

Accessories

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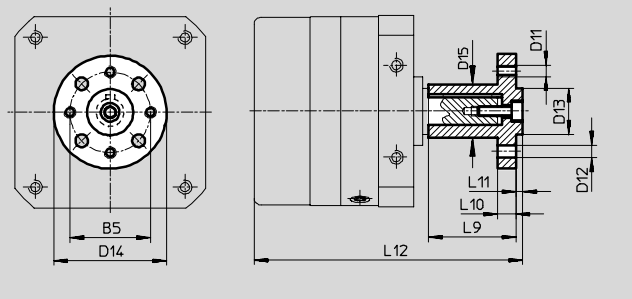
Push-on flange FWSR

Material:
Anodised aluminium
Free of copper, PTFE and silicone

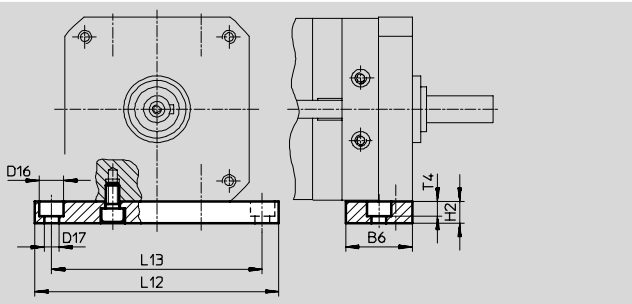


Dimensions and ordering data

for ∅ [mm]	B5	D11	D12 ∅ H13	D13 ∅ g7	D14 ∅	D15 ∅	L9	L10	L11	L12	Weight [g]	Part No.	Type
25	35	M5	5,5	20	50	23	38	8	3	116,5	68	**13 240**	**FWSR-25**
40	54	M8	9	36	70	38	60	11	5	186,5	240	**14 656**	**FWSR-40**

Mounting plate HSM

Material:
Anodised aluminium
Free of copper, PTFE and silicone



Dimensions and ordering data

for ∅ [mm]	B6	D16 ∅	D17 ∅	H2	L12	L13	T4	Weight [g]	Part No.	Type
25	30	11	6,6	10	110	95	6,8	94	**165 573**	**HSM-25**
40	45	18	11	20	180	155	11	459	**165 575**	**HSM-40**

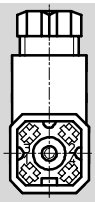
Ordering data – Mounting kit

	for ∅ [mm]	Remarks	Part No.	Type
	25	For inductive proximity sensors SIEN	**161 043**	**WSM-25-JM5**
	40		**161 045**	**WSM-40-JM8**

Ordering data – Push-in/threaded fitting — Technical data ➔ Volume 3

	for ∅ [mm]	Remarks	Part No.	Type
	25	For connecting compressed air tubing with standard O.D.	**153 306**	**QSM-M5-6**
	40		**186 096**	**QS-G-⅛-6**

Ordering data – Plug socket



PIN	Pin allocations	Designation	Part No.	Type
1	Power supply	Plug socket	**194 332**	**SD-4-WD-7**
2	Signal			
3	0 V			
4	PE (yellow), screen			

Note

Recommended proximity sensor
➔ Type SIEN-M8, Volume 4

Core Range