



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

Cylinders with displacement encoder

Product range overview

Function	Type	Brief description
Drives	Rodless	
	DGCI 	 <ul style="list-style-type: none"> • With guide • With contactless displacement measuring encoder • Based on linear drive DGC • Supply ports optionally on end face or front • Wide range of options for attaching drive units • System product for handling and assembly technology
	DGPI/DGPIL	 <ul style="list-style-type: none"> • With or without guide • With contactless displacement measuring encoder, integrated • Wide range of options for attaching drive units • System product for handling and assembly technology
	DGP/DGPL	 <ul style="list-style-type: none"> • With or without guide • With potentiometer or contactless displacement measuring encoder, attached • With clamping unit • Wide range of options for attaching drive units • System product for handling and assembly technology
	With piston rod	
	DNCI	 <ul style="list-style-type: none"> • With contactless displacement measuring encoder • Several piston rod variants • Standards-based cylinders to ISO 15552 <p> DIN </p>
DNCM	 <ul style="list-style-type: none"> • With attached potentiometer • Several piston rod variants • Standards-based cylinders to ISO 15552 <p> DIN </p>	
Semi-rotary drive	Swivel module	
	DSMI	 <ul style="list-style-type: none"> • Based on swivel module DSM • Rotary encoder integrated • Compact design • Wide choice of mounting options

Cylinders with displacement encoder

Product range overview

Piston Ø [mm]	Stroke/swivel angle [mm/°]	Suitable			→ Page
		for positioning with SPC200	for end position controller SPC11	as a measuring cylinder	
Rodless					
18, 25, 32, 40	100, 160, 225, 300, 360, 450, 500, 600, 750, 850, 1000, 1250, 1500, 1750, 2000	■	■	-	LEERER MERKER
25, 32, 40, 50, 63	225, 300, 360, 450, 500, 600, 750, 1000, 1250, 1500, 1750, 2000	■	■	-	LEERER MERKER
25, 32, 40, 50, 63	225, 300, 360, 450, 500, 600, 750, 1000, 1250, 1500, 1750, 2000	■	■	■	Drive: LEERER MERKER Displacement encoder: 5 / 1.2-2
With piston rod					
32, 40, 50, 63	10 ... 2000	■	■	■	4
32, 50	100, 160, 200, 250, 320, 400, 500	■	■	■	22
Swivel module					
25, 40	270	■	■	■	LEERER MERKER

Standard cylinders DNCI, with integrated displacement encoder

Key features



Components for positioning and measuring using the standard cylinder DNCI



Positioning with end-position controller SPC11 or axis controller SPC200

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



Soft Stop
→ 5 / 1.4-2

Closed loop end-position controller
SPC11-INC



Positioning technology
→ 5 / 1.3-2

Axis interface
SPC-AIF-INC



Axis controller
SPC200



Measuring with measuring transducer DADE

Measuring transducer
DADE-...
→ 5 / 1.1-56



PLC controller
e.g. FEC-...
→ Volume 4

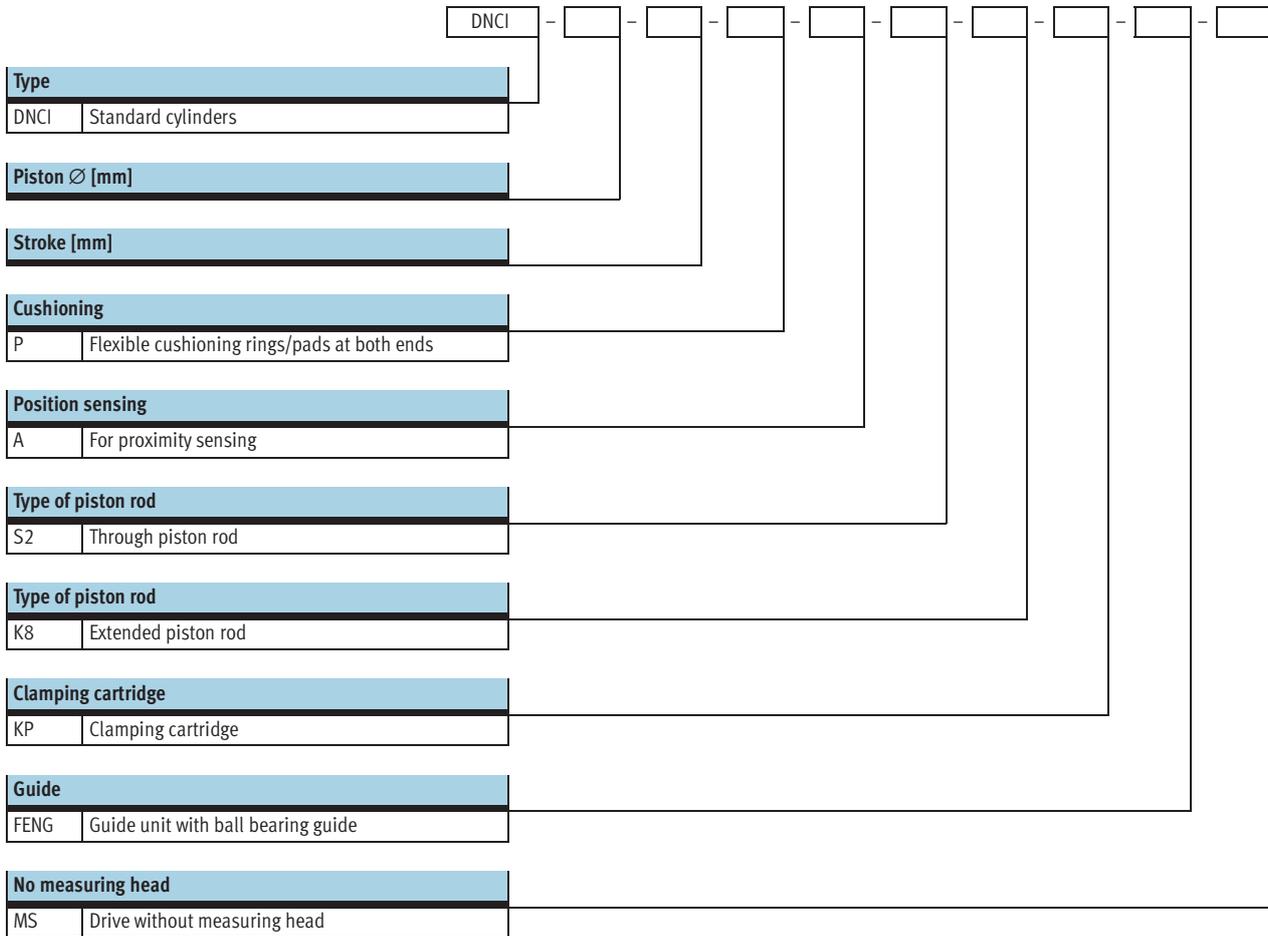


Display and control unit
e.g. FED-...
→ Volume 4



Standard cylinders DNCI, with integrated displacement encoder

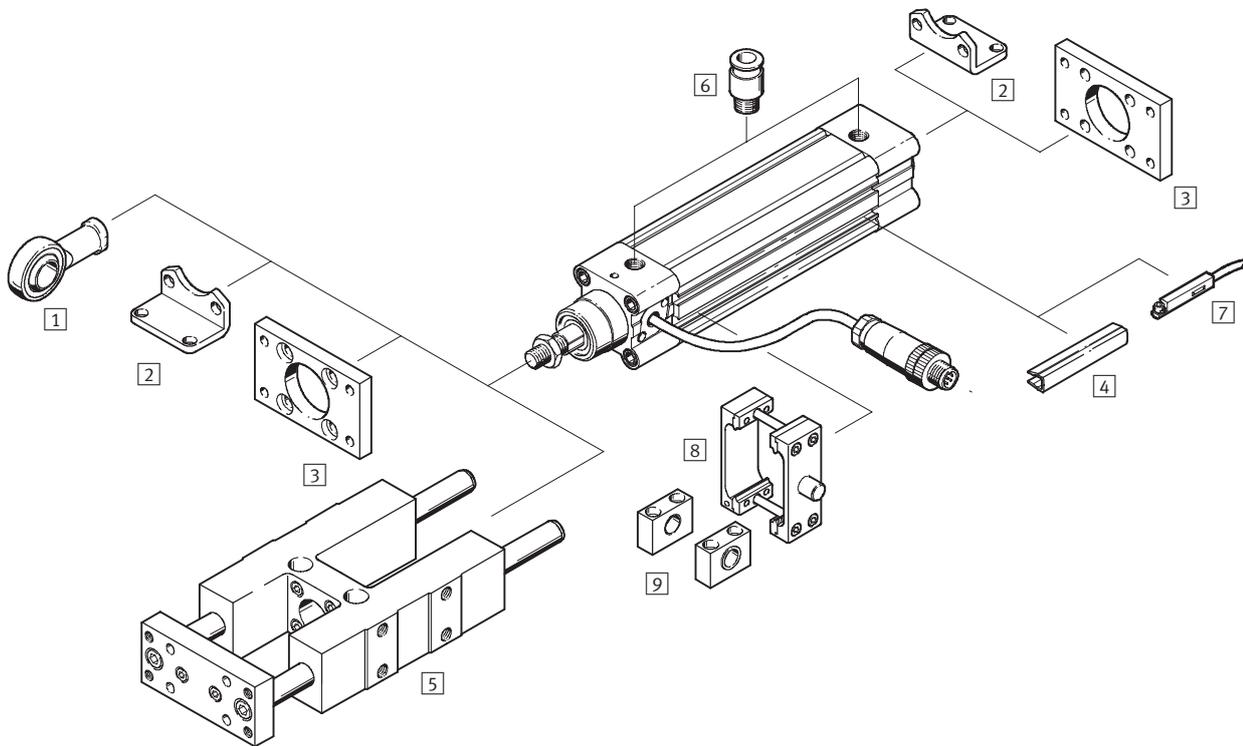
Type code



Standard cylinders DNCI, with integrated displacement encoder

Peripherals overview

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-  - 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

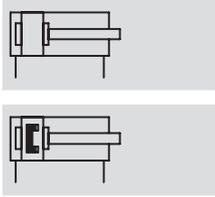
Accessories		
Type	Brief description	→ Page
1 Rod eye SGS	With spherical bearing	19
2 Foot mounting HNC	For mounting the drive on the bearing and end cap	18
3 Flange mounting FNC	For mounting the drive on the bearing and end cap	19
4 Slot cover ABP-5-S	For protecting against ingress of dirt	21
5 Guide unit ¹⁾ FENG-KF	For protecting against torsion at high torque loads	16
6 Push-in fitting QS	For connecting compressed air tubing with standard external diameters	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	20
9 Trunnion support LNZG	For securing the trunnion mounting kit ZNCM	20

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

Standard cylinders DNCI, with integrated displacement encoder

Technical data

Function



- \varnothing - Diameter
32 ... 63 mm
- | - Stroke length
10 ... 2,000 mm

General technical data				
Piston \varnothing	32	40	50	63
Constructional design	Piston Piston rod Profile barrel			
Mode of operation	Double-acting			
Cushioning	Flexible cushioning rings/pads at both ends			
Position sensing	Integrated displacement encoder For proximity sensing ¹⁾			
Measuring principle (displacement encoder)	Digital			
Type of mounting	Foot mounting			
Stroke ²⁾⁴⁾	[mm] 10 ... 2,000			
Torsion protection/Guide ³⁾	Guide rod with yoke, with ball bearing guide			
Stroke	[mm] 100 ... 500			
Piston rod extension	[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) Not included in the scope of delivery, can be ordered as an option
- 2) Note stroke reduction in conjunction with SPC200
- 3) Guide unit FENG-KF must be ordered as an option and will be supplied attached, the max. stroke is reduced
- 4) Can only be used as a positioning drive without reservation in the range from 100 ... 500 mm

Forces [N] and impact energy [Nm]				
Piston \varnothing	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
Impact energy at end positions	0.1	0.2	0.2	0.5

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

Operating and environmental conditions		
Operating pressure ¹⁾	[bar]	4 ... 8
Operating medium ²⁾		Compressed air, filtered and unlubricated, filter unit 5 µm
Ambient temperature ³⁾	[°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 (declaration of conformance)		In accordance with EU EMC Directive
Protection class (displacement encoder)		IP65 to IEC 60 529
Corrosion resistance class CRC ⁴⁾		1

1) Only applies for applications with the Soft Stop end position controller SPC11 and axis controller SPC200

2) The proportional directional control valve MPYE used requires the characteristic values

3) Note operating range of proximity sensors

4) Corrosion resistance class 1 according to Festo standard 940 070

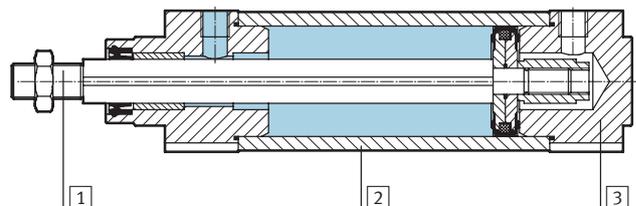
Components requiring low corrosion resistance. Transport and storage protection. Parts that do not have primarily decorative surface requirements, e.g. in internal areas that are not visible or behind covers.

Weights [g] with displacement encoder					
Piston Ø		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

Materials

Sectional view

Standard cylinders	
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	Polyacetate
- Cable sheath	Polyurethane
- Plug housing	Polybuteneterephthalate
- Wall mounting plate	Polyacetate
- Screws for mounting plate	Steel



Standard cylinders DNCI, with integrated displacement encoder

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Technical data

Positioning characteristics with axis controller SPC200						
Piston Ø			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. travel speed		[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			→ 21			

- 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 end position controller SPC11						
Piston Ø			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			→ 21			

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

Electrical data, displacement encoder		
Linearity error ¹⁾	[mm]	±(0.07±0.02xL)
Max. speed of travel	[m/s]	1.5
Ambient temperature	[°C]	-20 ... +80
Max. temperature coefficient	[ppm/°K]	30
Protection class		IP65
CE symbol (declaration of conformance)		In accordance with EU EMC Directive
Max. permitted magnetic disruption field at 100 mm interval from the sensor ²⁾	[kA/m]	10
Electrical connection		Cable with 8-pin plug, round type M12
Cable length	[m]	1.5

- 1) Maximum deviation of the output signal from "best fit" line (characteristic curve with nominal gradient).
L = Length of measuring system in meters
- 2) See also mounting conditions

Standard cylinders DNCI, with integrated displacement encoder

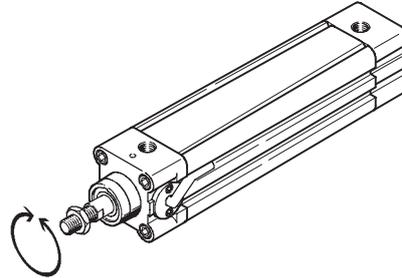
Technical data

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)



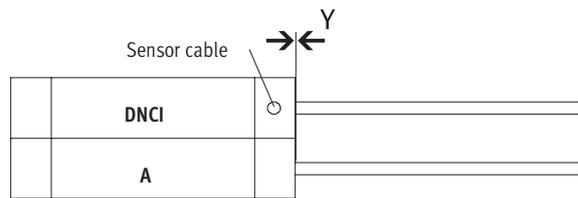
Mounting conditions

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

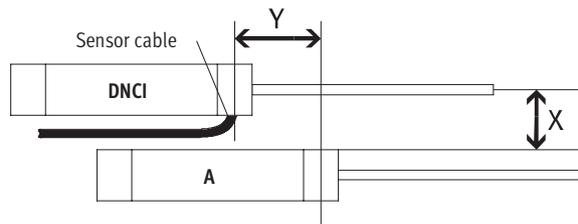
Parallel assembly

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



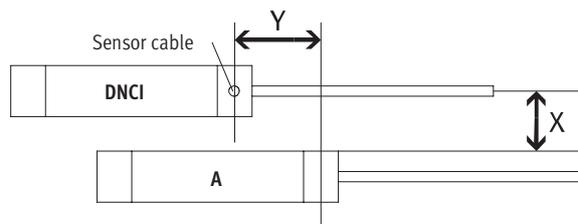
Offset assembly, cable outlet between the drives

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



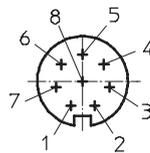
Offset assembly, cable outlet upwards or downwards

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



Pin assignment of plug, view of plug

Pin	Function	Colour
1	5 V	black
2	GND	brown
3	sin+	red
4	sin-	orange
5	cos-	green
6	cos+	yellow
7	Screening	Screening
8	-	-



Standard cylinders DNCI, with integrated displacement encoder

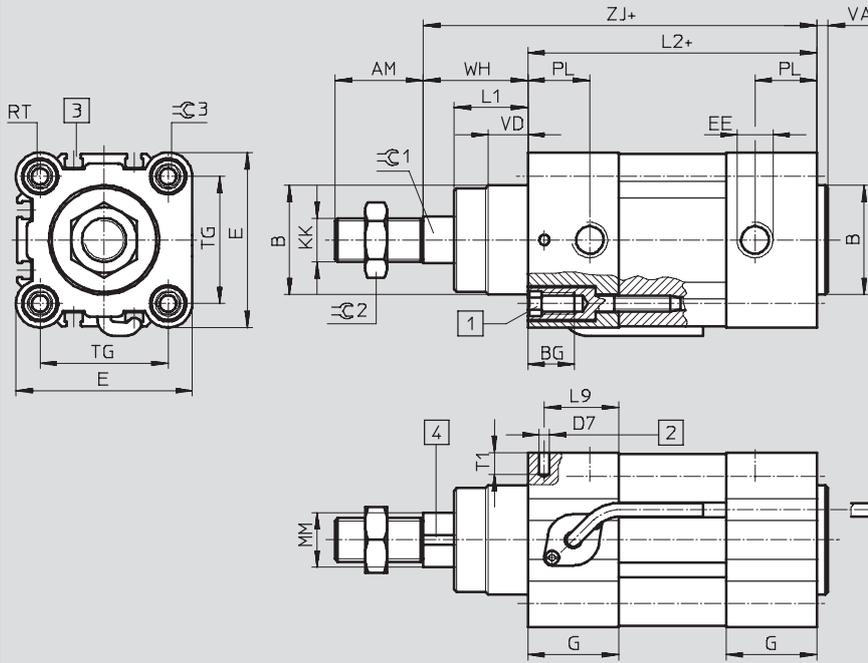
Technical data

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Dimensions

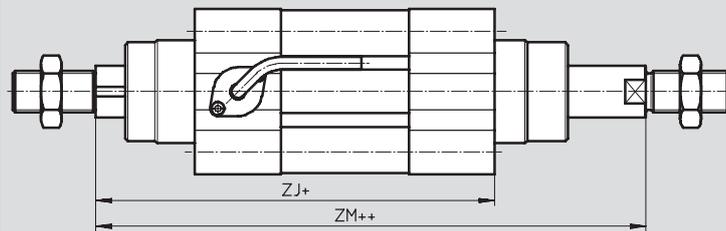
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Basic version



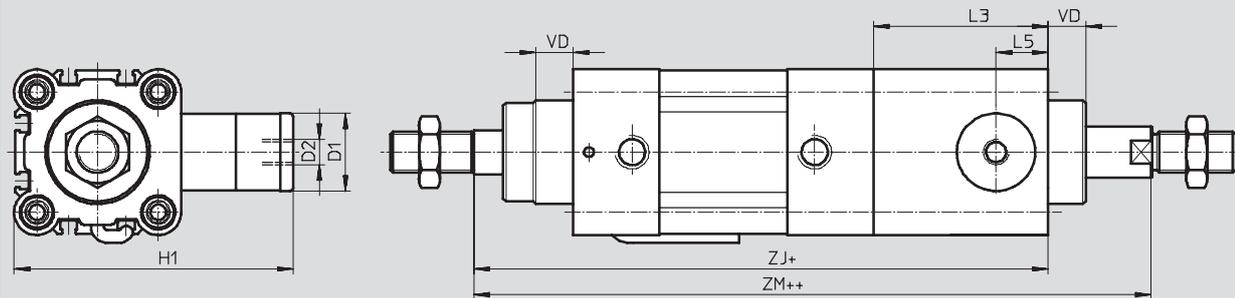
- 1 Socket head screw with female thread for mounting attachments
 - 2 Hole for securing the earthing self-tapping M4 screw according to DIN 7500
 - 3 Sensor slot for proximity sensor SME/SMT-8
 - 4 Magnetic measuring band
- + = plus stroke length
++ = plus 2x stroke length

S2 – Through piston rod

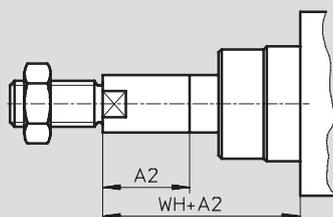


- + = plus stroke length
++ = plus 2x stroke length

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	G ¹ / ₈	28	67
40	24	500	35	16	24	G ¹ / ₈	3.7	54	G ¹ / ₄	33	88
50	32	500	40	17	30	G ¹ / ₈	3.7	64	G ¹ / ₄	33	107
63	32	500	45	17	38	G ¹ / ₈	3.7	75	G ³ / 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]	PI	VD	WH	ZJ		ZM		≈C1	≈C2	≈C3
					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

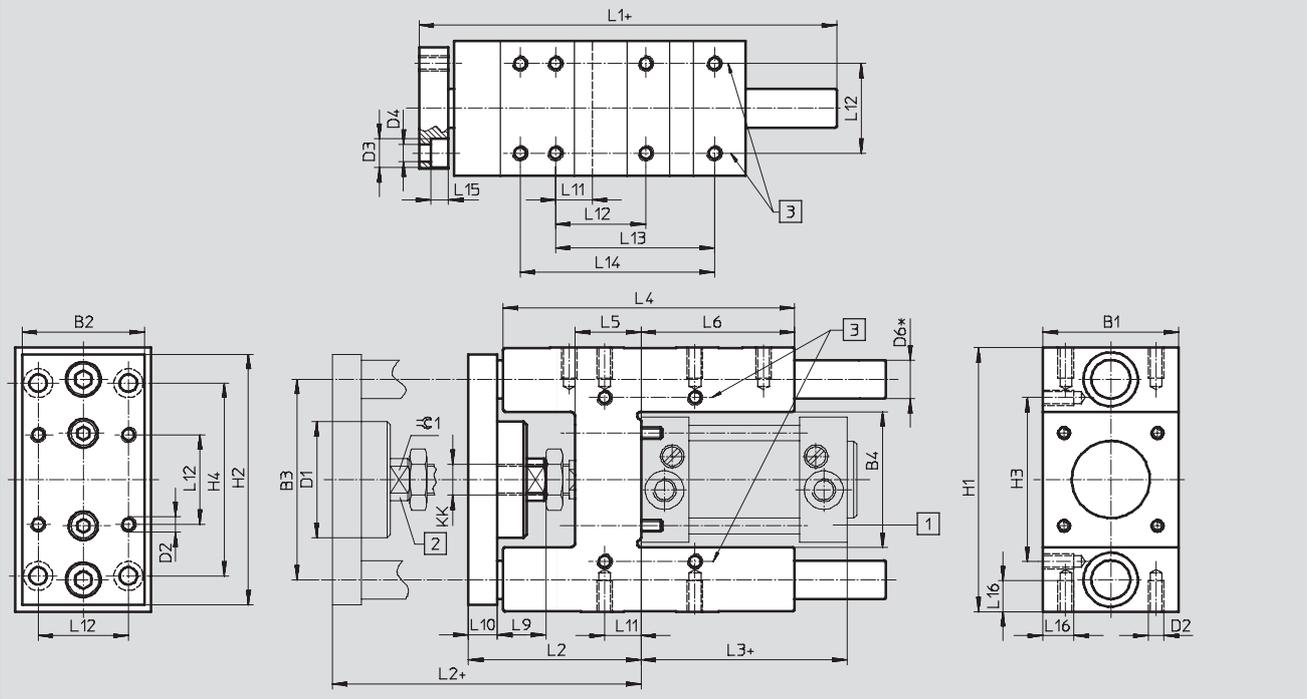
Standard cylinders DNCI, with integrated displacement encoder

Technical data

Dimensions

Download CAD data → www.festo.com/en/engineering

Guide unit FENG-KF



Standard cylinders DNCI, with integrated displacement encoder

Technical data

For Ø	B1	B2	B3	B4	D1 Ø	D2	D3 Ø	D4 Ø	D6 Ø h6	H1
[mm]	-0.3		±0.2	±0.3						
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 Ø	H2	H3	H4	KK	L1	L2	L3	L4	L5	L6
[mm]		±0.2	±0.2							
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 Ø	L9	L10	L11	L12	L13	L14	L15	L16	≙C1
[mm]				±0.2	±0.2	±0.2			
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

M Mandatory data →

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

Ordering table

Piston Ø	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 Ø [mm]	32	40	50	63		-...	
Stroke [mm]	10 ... 2,000				1	-...	
Cushioning	Flexible cushioning rings/pads at both ends					-P	-P
Position sensing	For proximity sensing					-A	-A

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

Transfer order code

-
 -
 -
 -
 -

Standard cylinders DNCl, with integrated displacement encoder

Ordering data – Modular products

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

Ordering table							
Piston Ø	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

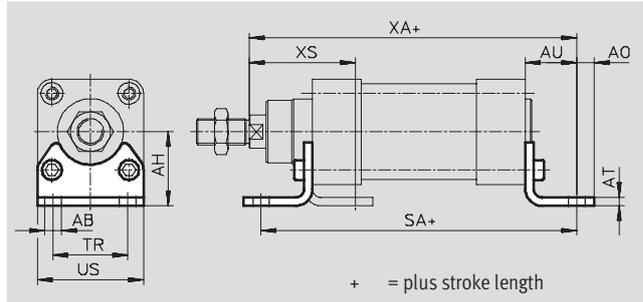
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Standard cylinders DNCI, with integrated displacement encoder

Accessories

Foot mounting HNC

Material:
galvanised steel
Free of copper, PTFE and silicone



Dimensions and ordering data							
For \varnothing	AB \varnothing	AH	AO	AT	AU	SA	
[mm]						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 \varnothing	TR	US	XA		XS	CRC ¹⁾	Weights [g]	Part No.	Type
			Basic cylinder	KP					
[mm]									
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

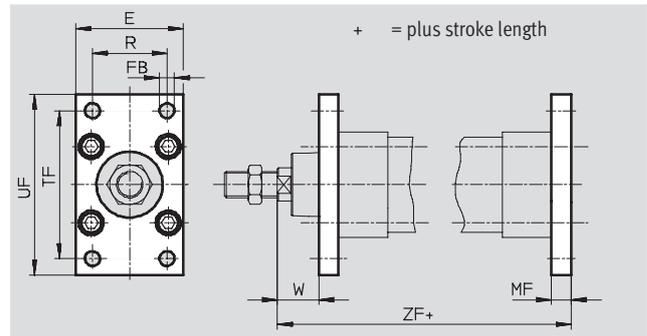
1) Corrosion resistance class 2 according to Festo standard 940 070
Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents

Standard cylinders DNCI, with integrated displacement encoder

Accessories

Flange mounting FNC

Material:
FNC: galvanised steel
Free of copper, PTFE and silicone



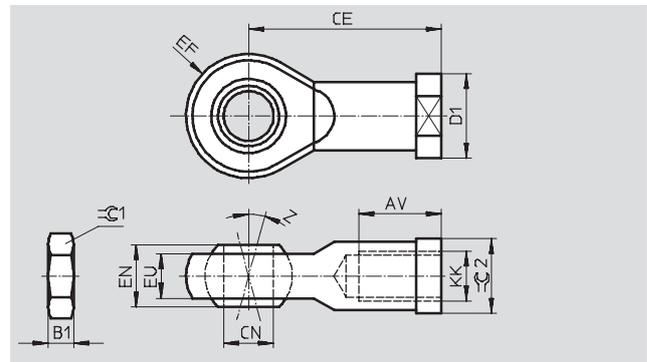
Dimensions and ordering data													
For Ø [mm]	E	TC Ø H13	MF	R	TF	UF	W	ZF		CRC ¹⁾	Weights [g]	Part No.	Type
								Basic cylinder	KP				
32	45	7	10	32	64	80	16	130	175	2	240	174 376	FNC-32
40	54	9	10	36	72	90	20	145	198	2	280	174 377	FNC-40
50	65	9	12	45	90	110	25	155	222	2	520	174 378	FNC-50
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 Ø [mm]	AV	B1	CE	CN Ø H7	D1 Ø	EF ±0.5	EN	Z [°]	≈C1	≈C2	CRC ¹⁾	Weights [g]	Part No.	Type
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

Standard cylinders DNCI, with integrated displacement encoder

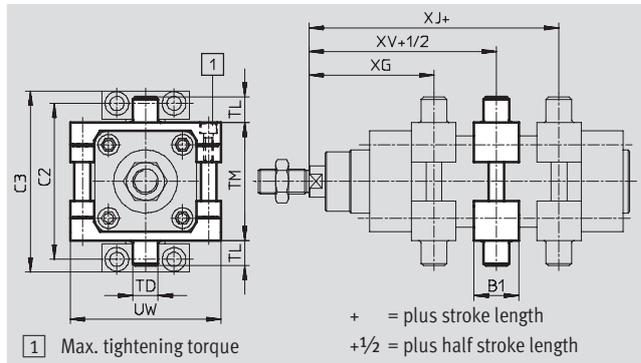
Accessories



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 \varnothing	B1	C2	C3	TD	TL	TM	UW	XG	
[mm]				\varnothing e9				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

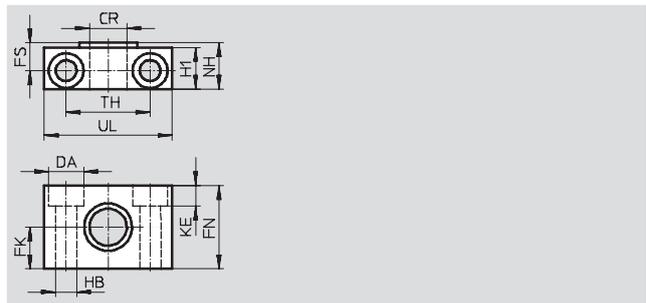
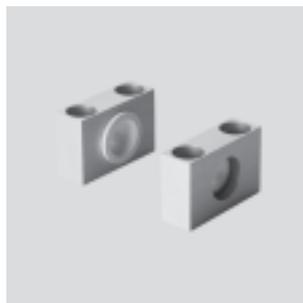
For \varnothing	XJ		XV		Max. tightening torque	CRC ¹⁾	Weights	Part No.	Type
	Basic cylinder	KP	Basic cylinder	KP					
[mm]					[Nm]		[g]		
32	79.9	124.9	73	118	4+1	2	210	163 525	ZNCM-32
40	89.4	142.4	82.5	135.5	8+1	2	385	163 526	ZNCM-40
50	96.4	163.4	90	157	8+2	2	595	163 527	ZNCM-50
63	101.9	177.9	97.5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

Trunnion supports LNZZ

Material:
Trunnion support:
Anodised aluminium
Plain bearing: Plastic

Free of copper, PTFE and silicone



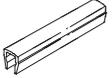
Dimensions and ordering data															
For \varnothing	CR	DA	FK	FN	FS	H1	HB	KE	NH	TH	UL	CRC ¹⁾	Weights	Part No.	Type
[mm]	\varnothing D11	\varnothing H13	\varnothing ± 0.1				\varnothing H13			± 0.2			[g]		
32	12	11	15	30	10.5	15	6.6	6.8	18	32	46	2	125	32 959	LNZZ-32
40, 50	16	15	18	36	12	18	9	9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

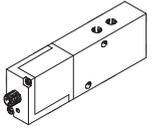
Standard cylinders DNCl, with integrated displacement encoder

FESTO

Accessories

Ordering data					
	For Ø	Remarks	Part No.	Type	PU ¹⁾
Push-in fitting Technical data → Volume 3					
	32	-	186 098	QS-G ¹ / ₈ -8	10
	40		186 099	QS-G ¹ / ₄ -8	10
	50		186 101	QS-G ¹ / ₄ -10	10
	63		186 100	QS-G ³ / ₈ -8	10
			186 102	QS-G ³ / ₈ -10	10
Slot cover Technical data → Volume 1					
	32, 40, 50, 63	every 0.5 m	151 680	ABP-5-S	2

1) Packaging unit quantity

Ordering data – Proportional directional control valves				Technical data → 5 / 1.5-2	
	For Ø [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-5-1/8-LF-010-B	
		> 400	151 693	MPYE-5-1/8-HF-010-B	
	40	50 ... 300	151 692	MPYE-5-1/8-LF-010-B	
		> 300	151 693	MPYE-5-1/8-HF-010-B	
	50	50 ... 200	151 692	MPYE-5-1/8-LF-010-B	
		200 ... 900	151 693	MPYE-5-1/8-HF-010-B	
		> 900	151 694	MPYE-5-1/4-010-B	
	63	50 ... 300	151 693	MPYE-5-1/8-HF-010-B	
		300 ... 1,000	151 694	MPYE-5-1/4-010-B	
		> 1,000	151 695	MPYE-5-3/8-010-B	
	For applications with Soft Stop end position controller SPC11				
	32	100 ... 500	151 692	MPYE-5-1/8-LF-010-B	
		> 500	151 693	MPYE-5-1/8-HF-010-B	
	40	100 ... 320	151 692	MPYE-5-1/8-LF-010-B	
		320 ... 500	151 693	MPYE-5-1/8-HF-010-B	
		> 500	151 694	MPYE-5-1/4-010-B	
	50	100 ... 250	151 692	MPYE-5-1/8-LF-010-B	
		250 ... 400	151 693	MPYE-5-1/8-HF-010-B	
> 500		151 694	MPYE-5-1/4-010-B		
63	100 ... 200	151 692	MPYE-5-1/8-LF-010-B		
	200 ... 400	151 693	MPYE-5-1/8-HF-010-B		
	400 ... 650	151 694	MPYE-5-1/4-010-B		
	> 650	151 695	MPYE-5-3/8-010-B		

 Note
 Recommended proximity sensor
 → Standard cylinder DNC, Volume 1

Standard cylinders 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

End position controller
SPC11-POT-TLF



Positioning technology → 5 / 1.3-2

Axis interface
SPC-AIF-POT

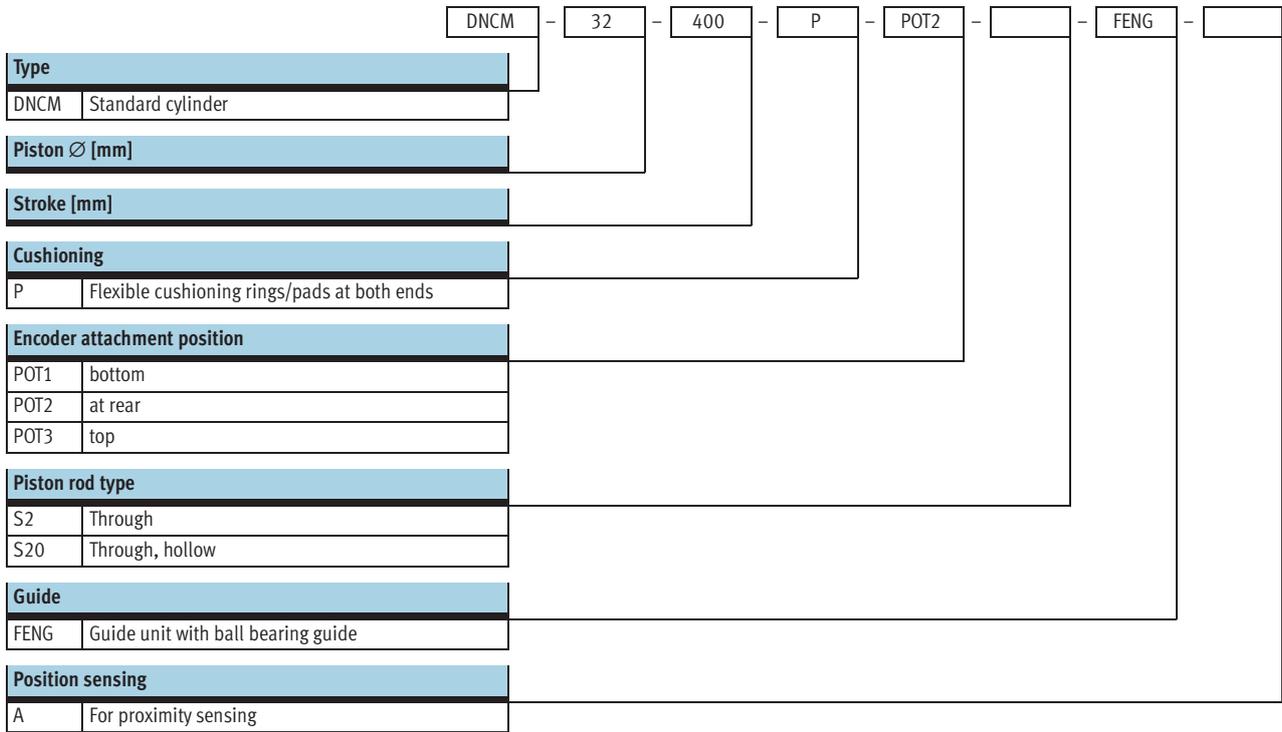


Axis positioning controller
SPC200



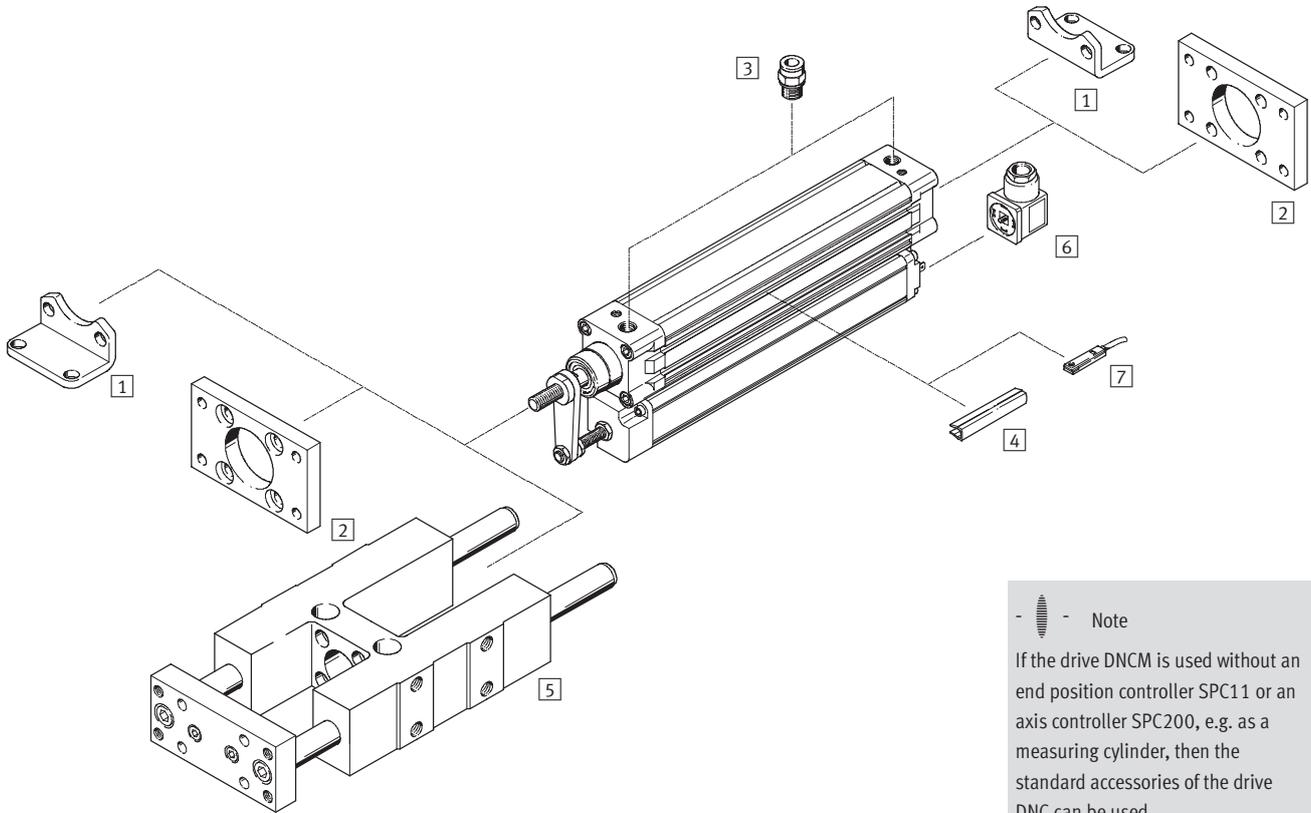
Standard cylinders DNCM, external displacement encoder

Type code



Standard cylinders 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 cylinders DNCM, external displacement encoder

Peripherals overview

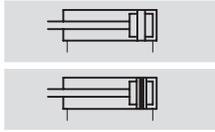
Accessories			
	Type	Brief description	→ Page
1	Foot mounting HNC	to mount the drive on the bearing and end cap	36
2	Flange mounting FNC	to mount the drive on the bearing and end cap	36
3	Push-in fitting QS	for connecting compressed air tubing with standard O.D.	37
4	Slot cover ABP-5-S	to protect against the ingress of dirt	36
5	Guide unit ¹⁾ FENG-KF	to protect against torsion at high torque loads	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	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 cylinders DNCM, external displacement encoder

Technical data

Function



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

General technical data		
Piston Ø	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	Flexible cushioning rings/pads at both ends	
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 Ø	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 cylinders DNCM, external displacement encoder

Technical data

Positioning characteristics with axis controller SPC200			
Piston Ø		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⁾	[mm]	3	3
Stroke reduction ⁵⁾	[mm]	≥ 10	≥ 15
Recommended proportional directional control valve		→ 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 Ø		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		→ 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 Ø		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 marking symbol (see conformity declaration)		As per EU EMC directive	
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								
Piston Ø		Stroke						
		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 cylinders DNCM, external displacement encoder

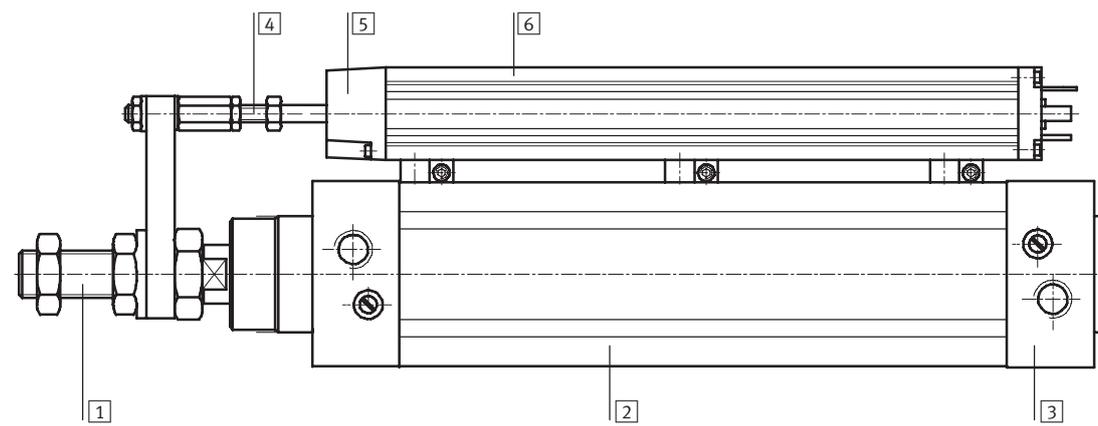
Technical data

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		3	5					
	[kΩ]							
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

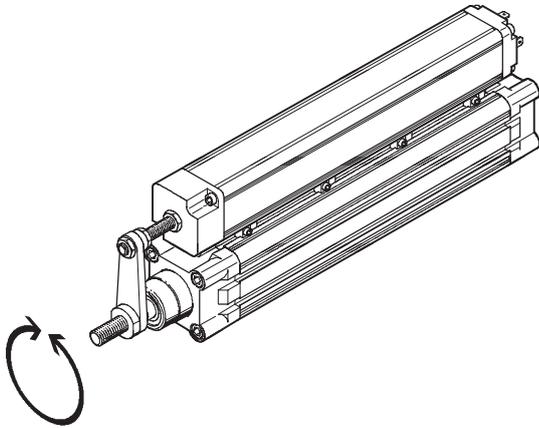


Drive			
1	Piston rod	High-alloy steel	
2	Cylinder barrel	Anodised aluminium	
3	Bearing/end caps	Die-cast aluminium	
-	Dynamic seals	Polyurethane TPE-U	
-	Static seals	Nitrile rubber	
-	Lubricant	Klüberplex BE31-102	
Displacement encoder			
4	Connecting rod	High-alloy steel	
5	Bearing cap	Reinforced 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 cylinders 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 cylinders DNCM, external displacement encoder

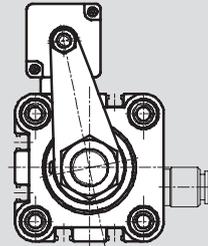
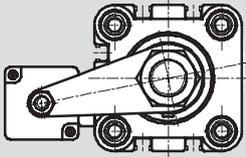
Technical data

Dimensions

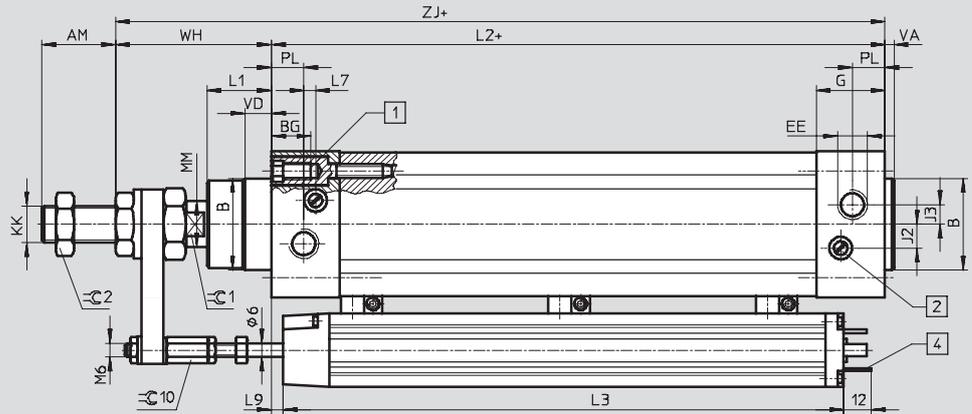
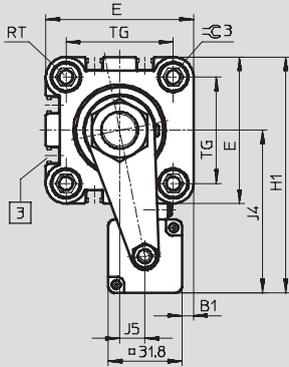
Download CAD data → www.festo.com/en/engineering

DNCM-...-POT2

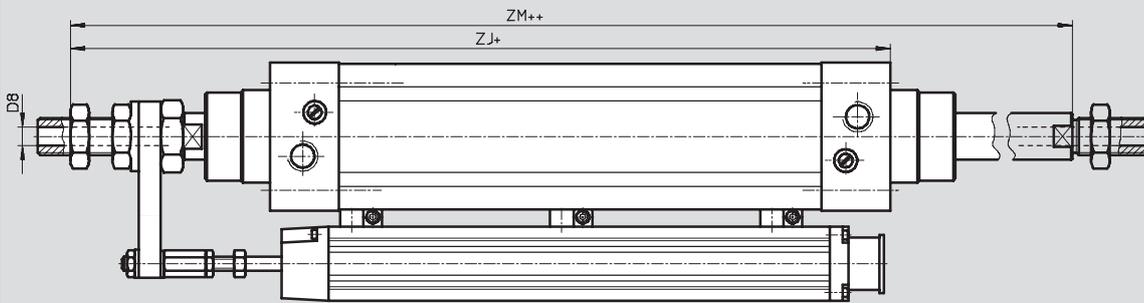
DNCM-...-POT3



DNCM-...-POT1



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 cylinders DNCM, external displacement encoder

Technical data

∅ [mm]	AM	B ∅ d11	BG	B1 ±0.8	D8 ∅	E	EE	G	H1 ±1.5
32	22	30	16	0.24	4.5	45	G $\frac{1}{8}$	25.1	84.4
50	32	40	17	5.6	8	64	G $\frac{1}{4}$	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	≈C1	≈C2	≈C3
32	44.4	138.4	166.4	10	16	6
50	67.4	173.4	213.4	17	24	8

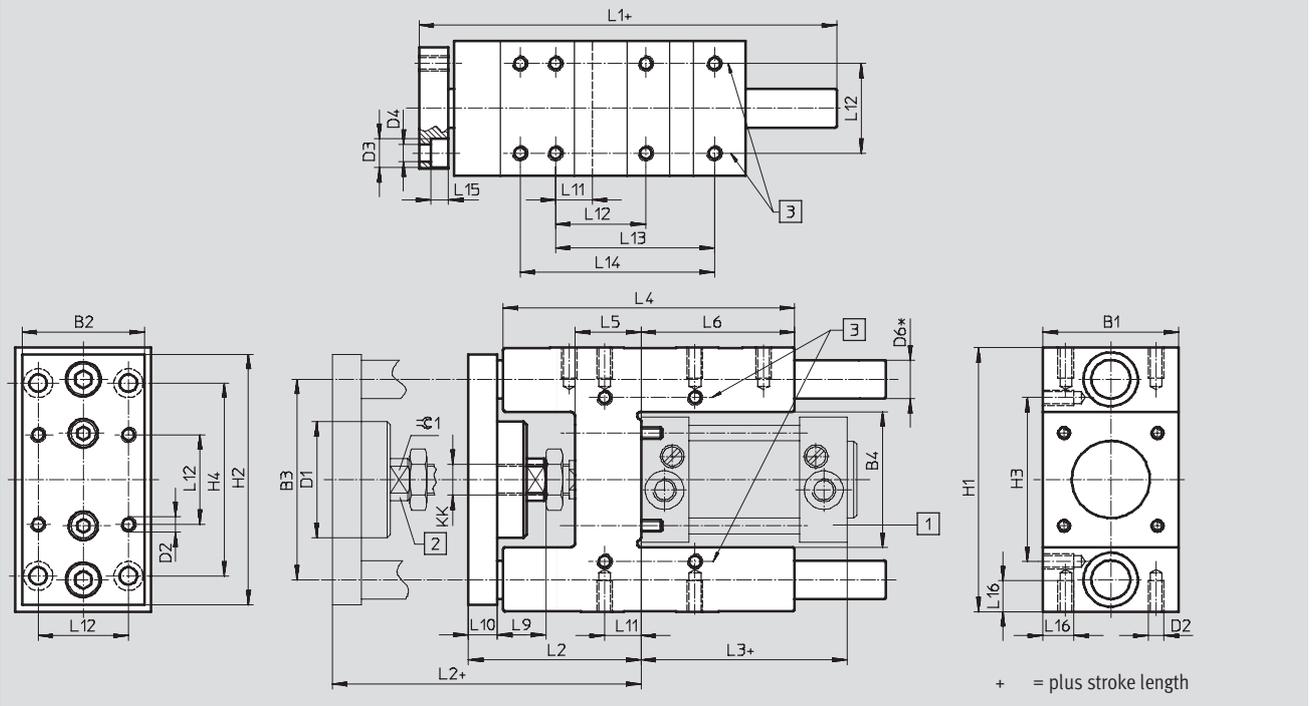
Standard cylinders DNCM, external displacement encoder

Technical data

Dimensions

Download CAD data → www.festo.com/en/engineering

Guide unit FENG-KF



Standard cylinders DNCM, external displacement encoder

Technical data

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

for \varnothing	D6 \varnothing	H1	H2	H3	H4	KK	L1	L2
[mm]	h6			± 0.2	± 0.2			
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 \varnothing	L3	L4	L5	L6	L9	L10	L11	L12
[mm]								± 0.2
32	94	125	24	76	20	12	4.3	32.5
50	106	150	34	79	25	15	18.8	46.5

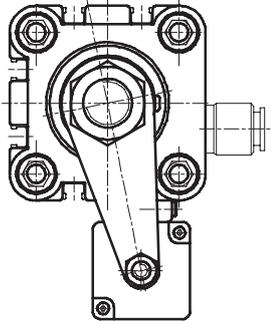
for \varnothing	L13	L14	L15	L16	$\approx \text{C1}$	Stroke	Weight per 10 mm stroke	Weight
[mm]	± 0.2	± 0.2				[mm]	[g]	[g]
32	70.3	78	6.5	12	15	10 ... 500	18	1 530
50	81.8	100	9	16	19	10 ... 500	50	4 030

Standard cylinders DNCM, external displacement encoder

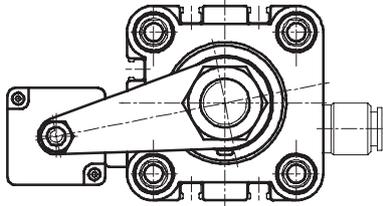
Ordering data – Modular product system

Arrangement of the displacement encoder

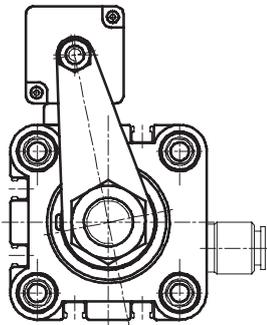
DNCM-...-POT1 (encoder underneath)



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



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



Standard cylinders DNCM, external displacement encoder

Ordering data – Modular product system

M Mandatory data						O Options		
Module No.	Basic function	Size	Stroke	Cushioning	Encoder attachment position	Piston rod type	Guide	Position sensing
528 940	DNCM	32	100	P	POT1 POT2 POT3	S2 S20	FENG	A
528 941		50	160					
			200					
			250					
			320					
			400					
		500						
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			-320	[1]	
	400			-400	[1]	
500			-500	[1]		
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	For proximity sensing				-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	-		-		-		-	
--	-------------	---	--	---	--	---	----------	---	--	---	--	---	--	---	--

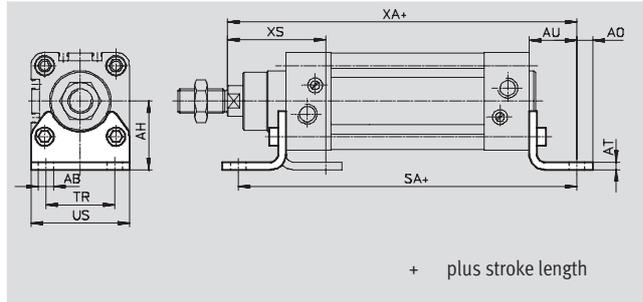
Standard cylinders DNCM, external displacement encoder

Accessories



Foot mounting HNC

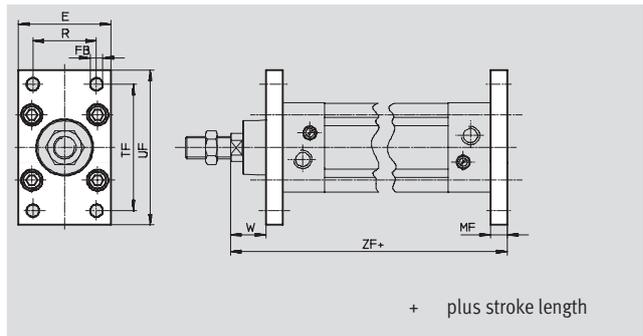
Material:
Galvanised steel
Free of copper, PTFE and silicone



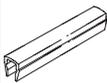
Dimensions and ordering data													
for \varnothing	AB	AH	AO	AT	AU	SA	TR	US	XA	XS	Weight	Part No.	Type
[mm]	\varnothing										[g]		
32	7	32	6.5	4	24	142	32	45	144	45	135	174 369	HNC-32
50	10	45	9.5	5	31	170	45	64	175	62	325	174 371	HNC-50

Flange mounting FNC

Material:
Galvanised steel
Free of copper, PTFE and silicone



Dimensions and ordering data											
for \varnothing	E	FB	MF	R	TF	UF	W	ZF	Weight	Part No.	Type
[mm]		\varnothing H13							[g]		
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 \varnothing	Remarks	Part No.	Type	PU ¹⁾
	[mm]				
Slot cover ABP-S					
	32, 50	0.5 m each	151 680	ABP-5-S	2

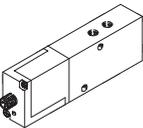
1) Packaging unit quantity

Standard cylinders DNCM, external displacement encoder

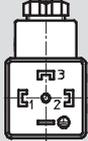
Accessories

Ordering data – Push-in/threaded fittings			Technical data → Volume 3		
	for Ø [mm]	Remarks	Part No.	Type	PU ¹⁾
	32	for connecting compressed air tubing with standard	186 098	QS-G¹/₈-8	10
	50	O.D.	186 099	QS-G¹/₄-8	

1) Packaging unit quantity

Ordering data – Proportional directional control valves			Technical data → 5 / 1.5-2		
	for Ø [mm]	Stroke [mm]	Part No.	Type	
	for applications with axis controller SPC200				
	32	100/160/200/250/320	151 692	MPYE-5-1/8-LF-010-B	
		400/500	151 693	MPYE-5-1/8-HF-010-B	
	50	100/160/200/250/320/400/500	151 693	MPYE-5-1/8-HF-010-B	
	for applications with Soft Stop end position controller SPC11				
	32	100/160/200/250/320/400	151 692	MPYE-5-1/8-LF-010-B	
		500	151 693	MPYE-5-1/8-HF-010-B	
	50	100/160/200/250	151 692	MPYE-5-1/8-LF-010-B	
		320/400	151 693	MPYE-5-1/8-HF-010-B	
		500	151 694	MPYE-5-1/4-010-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