Standards-based cylinders DNCI, with measured-value transducer DADE

Key features

Components for positioning and measuring using the standards-based cylinder DNCI

Measuring
With measured-value transducer DADE

Measured-value transducer
DADE

Controller
e.g. CECC

Operator unit
e.g. CDPX

Positioning
With end-position controller SPC11 or controller module CPX-CMAX/-CMPX

Proportional directional control valve
MPYE

End-position controller
SPC11-INC

Proportional directional control
valve VPWP

Sensor interface
CASM

Controller module
CPX-CMAX, CPX-CMPX

Type codes

001	Series	
DNCI	Standards-based cylinder, integrated displacement encoder	

002	Piston diameter	
32	32	
40	40	
50	50	
63	63	

003	Stroke	
...	10 ... 2000	

004	Cushioning	
P	Elastic cushioning rings/plates on both sides	

005	Position sensing	
A	For proximity sensor	

006	Piston rod type	
	At one end	
S2	Through piston rod	

007	Piston rod extension	
...K8	1 ... 500 mm	

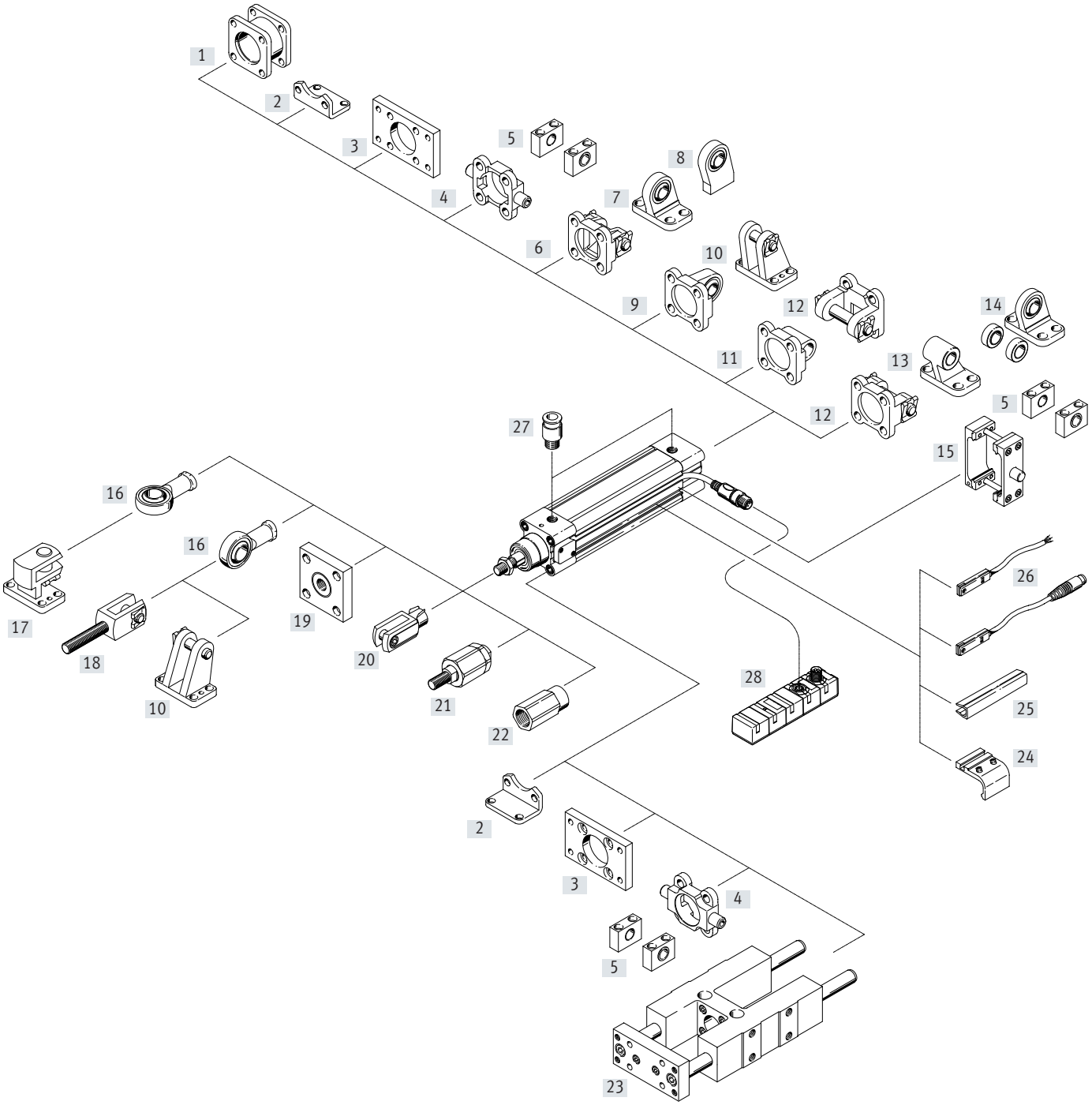
008	Clamping unit	
	None	
KP	Attached	

009	Guide	
	None	
FENG	Guide unit with recirculating ball bearing guide	

010	Measured-value transducer	
	None	
MU	Output 0 ... 10 V	
MI	Output 4 ... 20 mA	

011	Measuring head	
	With measuring head	
BA	Two measuring heads	
MS	No measuring head	

Peripherals overview



Accessories

	Type	Description	→ Page/Internet
[1]	Adapter kit[1)] DPNC	For connecting two cylinders with identical piston diameter to form a multi-position cylinder	dpnc
[2]	Foot mounting HNC	For mounting the drive on the bearing and end caps	hnc
[3]	Flange mounting FNC	For mounting the drive on the bearing and end caps	fnc
[4]	Trunnion flange ZNCF/CRZNG	For swivelling movements of the drive on the bearing or end caps	trunnion flange
[5]	Trunnion support LNZG/CRLNZG	–	lnzg

1) Not with variant S2

Peripherals overview

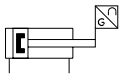
Accessories

	Type	Description	→ Page/Internet
[6]	Swivel flange[1)] SNC	For swivelling movements of the drive on the end cap	snc
[7]	Clevis foot[1)] LSNG	With spherical bearing	lsng
[8]	Clevis foot[1)] LSNSG	Weld-on, with spherical bearing	lsnsg
[9]	Swivel flange[1)] SNCS	For swivelling movements of the drive on the end cap, with spherical bearing	sncs
[10]	Clevis foot[1)] LBG	–	lbg
[11]	Swivel flange[1)] SNCL	For swivelling movements of the drive on the end cap	sncl
[12]	Swivel flange[1)] SNCB	For swivelling movements of the drive on the end cap	sncb
[13]	Clevis foot[1)] LNG/CRLNG	–	lng
[14]	Clevis foot[1)] LSN	With spherical bearing	lsn
[15]	Trunnion flange kit DAMT	For swivelling movements of the drive	damt
[16]	Rod eye SGS/CRSGS	With spherical bearing	sgs
[17]	Right-angle clevis foot LQG	–	lqg
[18]	Rod clevis SGA	With male thread	sga
[19]	Coupling piece KSG	To compensate for radial deviations	ksg
	Coupling piece KSZ	For cylinders with a non-rotating piston rod to compensate for radial deviations	ksz
[20]	Rod clevis SG/CRSG	Permits a swivelling movement of the cylinder in one plane	sg
[21]	Self-aligning rod coupler FK/CRFK	To compensate for radial and angular deviations	fk
[22]	Adapters AD	For a suction cup with connection attachments	ad
[23]	Guide unit[2)] FENG	For protecting standards-based cylinders against rotation at high torques	12
[24]	Mounting kit SMB-8-FENG	For mounting proximity switches SME/SMT-8 in combination with guide unit FENG	smb-8-feng
[25]	Slot cover ABP-5-S	For protecting the sensor cables and the sensor slots from contamination	abp
[26]	Proximity switch SME/SMT-8	Can be integrated in the cylinder profile barrel	proximity switch
[27]	Push-in fitting QS	For connecting tubing with standard O.D.	qs
[28]	Measured-value transducer MU, MI	Converts sensor signals of the standards-based cylinder DNCI into a voltage signal of 0 ... 10 V and/or a current signal of 4 ... 20 mA	15

1) Not with variant S2

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

Data sheet



- Ø - Diameter
  32 and 63 mm
- I - Stroke length
  10 ... 1250 mm

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General technical data					
Piston ø		32	40	50	63
Based on standard		ISO 15552			
Design		Piston			
		Piston rod			
		Profile barrel			
Mode of operation		Double-acting			
Guide[1]		Guide rod with yoke, with ball bearing guide			
Mounting position		Any			
Type of mounting		Via accessories			
Cushioning		Elastic cushioning rings/pads at both ends			
Position sensing		Integrated displacement encoder			
		Via proximity switch[2]			
Measuring principle (displacement encoder)		Encoder, contactless and relative measurement			
Pneumatic connection		G1/8	G1/4	G1/4	G3/8
Stroke					
DNCI-...[3]	[mm]	10 ... 1250			
DNCI-...-FENG	[mm]	100 ... 500			
Extended piston rod	[mm]	1 ... 500			

1) Guide unit FENG-KF can be ordered via the modular product system (feature FENG) and is supplied attached. The maximum stroke is restricted.
2) Not included in the scope of delivery, can be ordered as an option
3) Can only be used as a positioning drive without restriction in the range from 100 ... 750 mm.
Note stroke reduction in combination with CPX-CMAX

Operating and environmental conditions		
Operating pressure	[bar]	0.6 ... 12
Operating pressure[1]	[bar]	4 ... 8
Operating medium[2]		Compressed air to ISO 8573-1:2010 [6:4:4]
Note on the operating/pilot medium		Lubricated operation not possible Pressure dew point 10°C below ambient/medium temperature
Ambient temperature[3]	[°C]	–20 ... +80
Vibration resistance to DIN/IEC 68, Part 2-6		Severity level 2
Continuous shock resistance to DIN/IEC 68, Part 2-82		Severity level 2
CE marking (see declaration of conformity)[4]		To EU EMC Directive
		To EU RoHS Directive
UKCA marking (see declaration of conformity)[4]		To UK instructions for EMC
		To UK RoHS instructions
Corrosion resistance class CRC[5]		1

1) Only applies to applications with end-position controller CPX-CMPX, SPC11 and axis controller CPX-CMAX
2) The proportional directional control valve VPWP, MPYE used requires these characteristic values
3) Note operating range of proximity switches
4) For information about the area of use, see the EC declaration of conformity: www.festo.com/sp → Certificates.
If the devices are subject to usage restrictions in residential, commercial or light-industrial environments, further measures for the reduction of the emitted interference may be necessary.
5) Corrosion resistance class CRC 1 to Festo standard FN 940070
Low corrosion stress. Dry indoor application or transport and storage protection. Also applies to parts behind covers, in the non-visible interior area, and parts which are covered in the application (e.g. drive trunnions).

Data sheet

Forces [N] and impact energy [Nm]					
Piston ø		32	40	50	63
Theoretical force at 6 bar		483	754	1178	1870
Advancing	S2	415	633	990	1682
Theoretical force at 6 bar		415	633	990	1682
Retracting	S2	415	633	990	1682
Impact energy at the end positions		0.1	0.2	0.2	0.5

Permissible impact velocity:

$$v = \sqrt{\frac{2 \cdot E}{m_1 + m_2}}$$

Maximum permissible mass:

$$m_2 = \frac{2 \cdot E}{v^2} - m_1$$

v	Permissible impact velocity
E	Max. impact energy
m_1	Moving mass (drive)
m_2	Moving payload

Note

These specifications represent the maximum values that can be achieved. The maximum permissible impact energy must be observed.

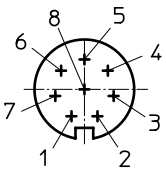
Electrical data – Displacement encoder		
Output signal		Analogue
Linearity error		
Strokes up to 500 mm	[mm]	< ±0.08
Strokes up to 1000 mm	[mm]	< ±0.09
Strokes over 1000 mm	[mm]	< ±0.11
Resolution[1]	[%]	≤ 0.025
Repetition accuracy		
≤ 400	[mm]	±0.1
≤ 500	[mm]	±0.13
≤ 750	[mm]	±0.19
≤ 1200	[mm]	±0.3
≤ 1250	[mm]	±0.4
Max. speed of travel	[m/s]	1.5
Degree of protection		IP65
CE marking (see declaration of conformity)[2]		To EU EMC Directive
Max. permitted magnetic interference field[3]	[kA/m]	10
Electrical connection		Cable with 8-pin plug, round design, M12
Cable length	[m]	1.5

1) Always refers to max. stroke

2) For information about the area of use, see the EC declaration of conformity: www.festo.com/sp → Certificates.
If the devices are subject to usage restrictions in residential, commercial or light-industrial environments, further measures for the reduction of the emitted interference may be necessary.

3) At a distance of 100 mm

Pin allocation for the plug



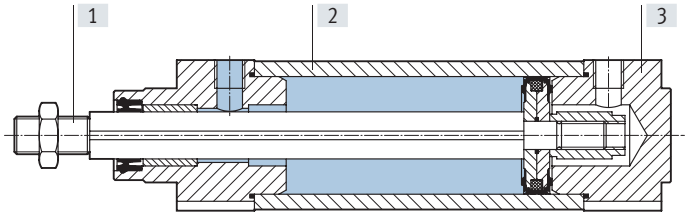
Pin	Function	Colour
1	5 V	Black
2	GND	Brown
3	sin+	Red
4	sin–	Orange
5	cos–	Green
6	cos+	Yellow
7	Shielding	Shielding
8	n.c.	–

Data sheet

Weight [g]					
Piston ø		32	40	50	63
DNCI-...					
	Product weight with 0 mm stroke	521	853	1319	1914
	Additional weight per 10 mm stroke	30	44	62	71
	Moving mass with 0 mm stroke	95	175	316	383
	Additional weight per 10 mm stroke	8	14	23	23
DNCI-...-S2 – Through piston rod					
	Product weight with 0 mm stroke	586	981	1553	2165
	Additional weight per 10 mm stroke	39	60	87	96
	Moving mass with 0 mm stroke	155	164	297	364
	Additional weight per 10 mm stroke	17	30	48	48
DNCI-...-K8 – Additional weight with piston rod extension					
	Additional weight per 10 mm stroke	8	14	23	23
DNCI-...-KP – Additional weight with clamping unit					
	Product weight	234	394	700	1147
DNCI-...-FENG – Additional weight with guide unit					
	Product weight with 0 mm stroke	1530	2370	4030	5410
	Additional weight per 10 mm stroke	18	32	50	62

Materials

Sectional view



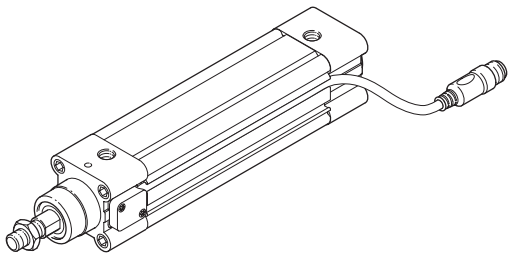
Standards-based cylinder		
[1]	Piston rod	High-alloy steel
[2]	Cylinder barrel	Anodised aluminium
[3]	Bearing/end caps	Die-cast aluminium
–	Dynamic seals	Polyurethane TPE-U
–	Static seals	NBR
	Note on materials	RoHS-compliant
Displacement encoder		
–	Sensor housing	Polyacetal
–	Cable sheath	Polyurethane
–	Plug housing	Polybutylene terephthalate
–	Mounting plate	Polyacetal
–	Screws for mounting plate	Steel

Data sheet

Torques and lateral forces

The piston rod must not absorb any torque. We therefore recommend using an external guide unit FENG-KF with the drive DNCI. The guide unit is supplied attached.

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)
➔ Internet: dnc



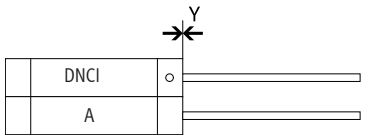
Mounting conditions

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

X Minimum distance between the drives
Y Offset between the drives on the bearing cap

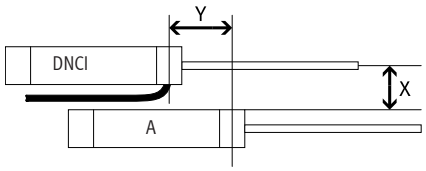
Parallel assembly

The drives can be mounted directly next to one another if the offset Y = 0 mm.



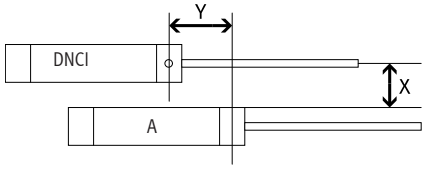
Offset mounting, cable outlet between the drives

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



Offset mounting, cable outlet upwards or downwards

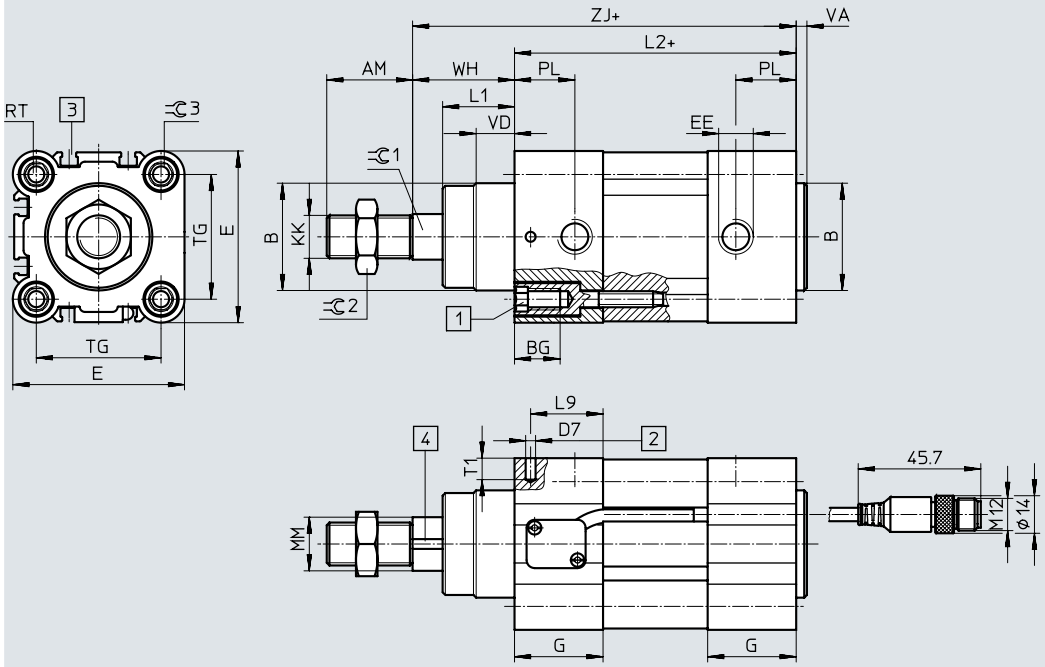
If the offset is Y > 0 mm and the cable outlet is up or down, a distance of X > 60 mm must be observed.



Data sheet

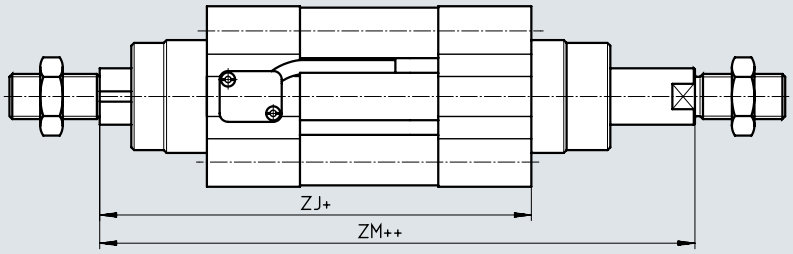
Dimensions Download CAD data ➔ www.festo.com

Basic version



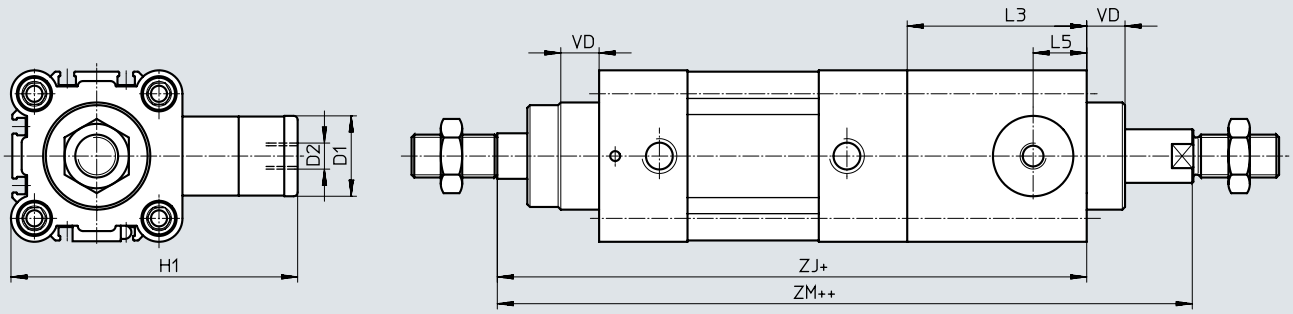
[1] Socket head screw with female thread for mounting components
[2] Hole for securing the earthing for self-tapping M4 screw according to DIN 7500
[3] Sensor slot for proximity switch SME/SMT-8
[4] Magnetic measuring band
\+ = plus stroke length

S2 – Through piston rod



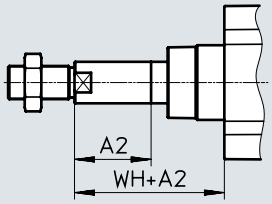
\+ = plus stroke length
++ = plus 2x stroke length

S2/KP – Through piston rod with clamping unit



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

K8 – Extended piston rod



Data sheet

ø [mm]	AM	A2 max.	B ø d11	BG	D1 ø f9	D2	D7 ø	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

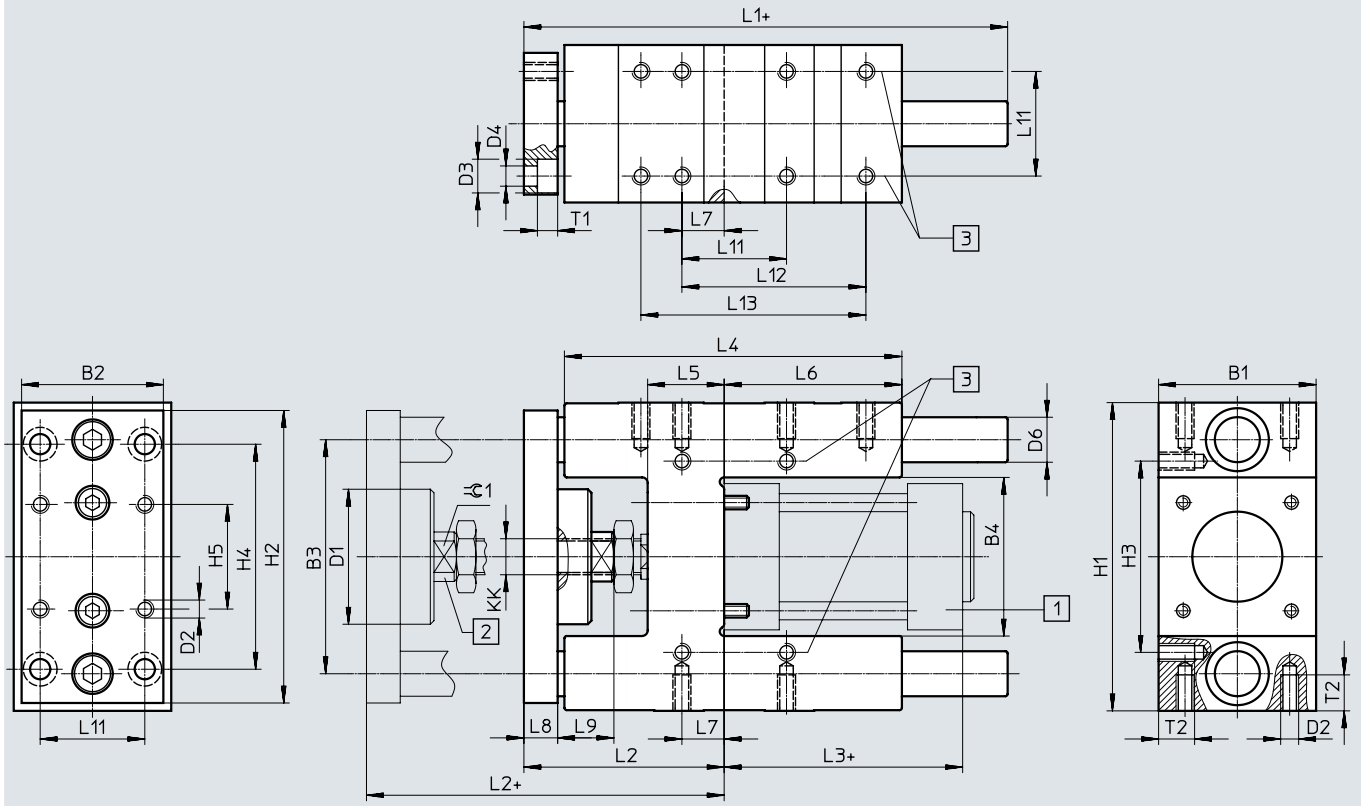
ø [mm]	KK	L1	L2	L3	L5	L9	MM ø f8	PL	RT	T1	TG
32	M10x1.25	18	94	45	14	22.5	12	15.6	M6	8	32.5
40	M12x1.25	21.3	105	53	16	27	16	14	M6	8	38
50	M16x1.5	26.8	106	67	20	27	20	14	M8	8	46.5
63	M16x1.5	27	121	76	24	33	20	17	M8	8	56.5

ø	VA	VD	WH	ZJ		ZM		=⊂1	=⊂2	=⊂3
[mm]					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

Data sheet

Dimensions Download CAD data ➔ www.festo.com

Guide unit FENG-KF



[1] Standards-based cylinder DNCI
[2] Compensating coupling
[3] Customers can drill additional mounting holes here as required
+ = plus stroke length

Data sheet

For Ø [mm]	B1 -0.3	B2	B3 ±0.2	B4 ±0.3	D1 Ø	D2	D3 Ø	D4 Ø	D6 Ø 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 Ø [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 Ø [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

Ordering data – Modular product system

Ordering table

Piston ø		32	40	50	63	Conditions	Code		Enter code
Module no.		**535411**	**535412**	**535413**	**535414**				
Function		Standards-based cylinder with integrated displacement encoder, non-rotating piston rod					**DNCI**		DNCI
Piston ø	[mm]	32	40	50	63		**-...**		
Stroke	[mm]	10 ... 1250					**-...**		
Cushioning		Elastic cushioning rings/pads at both ends					**-P**		-P
Position sensing		Via proximity switch					**-A**		-A
Piston rod type		Through piston rod					**-S2**		
Piston rod extended at front	[mm]	1 ... 500				[1]	**-...K8**		
Clamping unit		Attached				[2]	**-KP**		
Guide		Guide unit with ball guide on the sensor head side				[3]	**-FENG**		
Measured-value transducer		Output 0 ... 10 V					**-MU**		
		Output 4 ... 20 mA					**-MI**		
Measuring head		No measuring head				[4]	**-MS**		

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

[2] KP Can only be combined with piston rod type S2.

[3] FENG Maximum stroke length 500 mm.

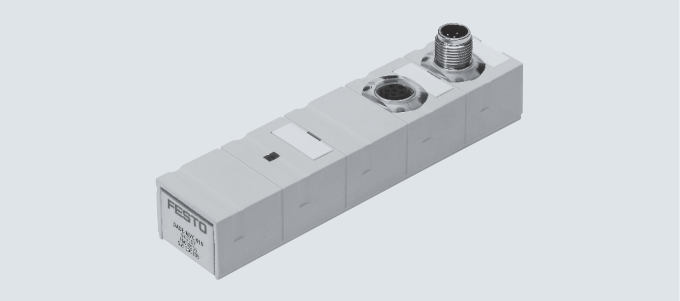
Note

[4] In the case of repairs, the standards-based cylinder can be ordered without a measuring head (code MS). The existing measuring head can then be installed in the new standards-based cylinder (operating instructions for DNCI).

Data sheet

Measured-value transducer
DADE-MVC-010
DADE-MVC-420
(Order code MU, MI)

The measured-value transducer converts sensor signals of the standards-based cylinder DNCI into a voltage signal of 0 ... 10 V and/or a current signal of 4 ... 20 mA. These signals can be evaluated by a PLC with an appropriate signal input.



General technical data		
Type of mounting		With through-hole
Mounting position		Any
Short circuit current rating		Yes
Reverse polarity protection		Yes
Diagnostic function		Display via LED

General electrical data		
Analogue output	[V]	0 ... 10 (as per EN 61131-2)
	[mA]	4 ... 20 (as per EN 61131-2)
Nominal operating voltage	[V DC]	24 ±25%
Residual ripple	[%]	4 (at 50 Hz)
Current consumption at nominal operating voltage	[mA]	20 ... 30
Switching logic at outputs		PNP
Switching logic at inputs		PNP
Debounce time at inputs	[ms]	3
Linearity error FS		0.2%

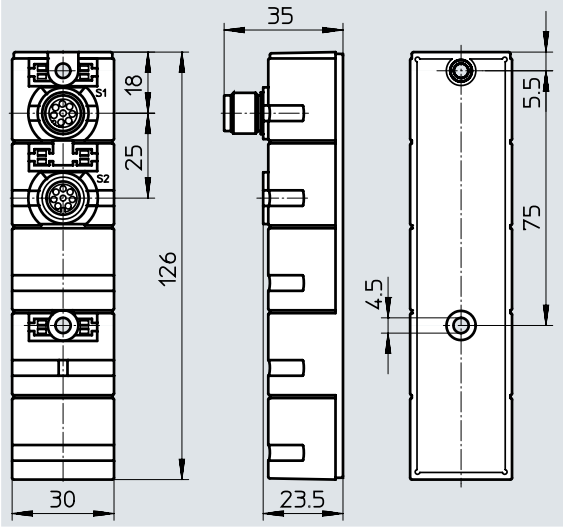
Operating and environmental conditions		
Ambient temperature	[°C]	0 ... 55
Degree of protection		IP65
Relative humidity		95% non-condensing
CE marking (see declaration of conformity)		To EU EMC Directive
		To EU RoHS Directive
KC marking		KC EMC
Corrosion resistance class CRC[1)]		1
Product weight	[g]	128
Note on material for housing		Polybutylene terephthalate

1) Corrosion resistance class CRC 1 to Festo standard FN 940070
Low corrosion stress. Dry indoor application or transport and storage protection. Also applies to parts behind covers, in the non-visible interior area, and parts which are covered in the application (e.g. drive trunnions).

Data sheet

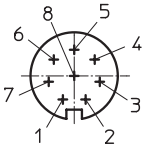
Dimensions

Download CAD data ➔ www.festo.com



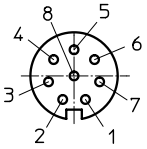
Pin allocation

PLC interface



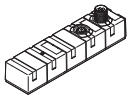
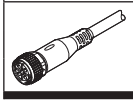
Pin	Function	Cable colour
1	24 V	White
2	Analogue measurement signal	Brown
3	Reference output	Green
4	0 V measurement signal	Yellow
5	Reference input	Grey
6	Calibration input	Pink
7	Ready output	Blue
8	0 V power supply and inputs/outputs	Red

Measuring system interface



Pin	Function
1	Ub
2	0 V
3	Signal sine +
4	Signal sine -
5	Signal cosine -
6	Signal cosine +
7	Screening / earth
8	–

Ordering data

		Description	Part no.	Type
Measured-value transducer				
	With voltage signal	0 ... 10 V	**542117**	**DADE-MVC-010**
	With current signal	4 ... 20 mA	**542118**	**DADE-MVC-420**
Accessories				Data sheets ➔ Internet: sim
	Connecting cable	PLC connecting cable (length 2 m)	**525616**	**SIM-M12-8GD-2-PU**
		PLC connecting cable (length 5 m)	**525618**	**SIM-M12-8GD-5-PU**

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