Measuring transducer DADE-MVC





Moving and measuring – with an accuracy of ±0.1 mm

Measuring transducer DADE-MVC: Moving and measuring combined!

Where is the piston rod? This is the critical question for many joining, adhesive and measuring tasks involving pneumatic cylinders. It determines the quality and the process reliability of manufacturing. The answer is simple: the measuring transducer DADE-MVC. Combined with the standard cylinder DNCI it enables movement and measurement - with an accuracy of ±0.1 mm.



Move

Measure

±0.1 mm repetition accuracy

The advantages of the DADE-MVC:

Easy to use

With the DADE-MVC, work steps such as clamping and measuring can be combined, while the pre-assembled cables make child's play of commissioning and installation.

Precise

The MVC converts the sensor signal from the standard cylinder DNCI into an analogue voltage or current signal, using an integrated displacement encoder. With a stroke of 400 mm, a repetition accuracy of ±0.1 mm is guaranteed.

Cost-effective

The combination of the DNCI and DADE-MVC makes sense from the point of view of price as well - particularly in comparison to external displacement encoders which are also more prone to interference.



Further application examples

11 1	
Clamping and measuring	╘═══┚╾┨┥┩┥╢
Application of position-dependent adhesive or fluid	
Press-fitting with check of the press-in depth	
Testing surface finishes	
Bending	

Application example

The combination of standard cylinder DNCI and transducer DADE-MVC is used where up-to-date information on the position of the drive must always be available. Example: A workpiece is braced against a stop, the clamped part is to

against a stop, the clamped part is to be checked simultaneously for size.

Advantages of the solution using DADE-MVC:

- What was previously realised in two work steps and with two components is now combined into just one step
- Easy commissioning and handling without software



FESTO

Type code



Standard cylinders DNCI, with measuring transducer DADE Peripherals overview



Accessories								
	Туре	Brief description	→ Page					
1	Adapter kit ¹⁾ DPNC	For connecting two cylinders with identical piston $arnothing$ to form a multi-position cylinder	www.festo.com					
2	Foot mounting HNC	For mounting the drive on the bearing and end cap	www.festo.com					
3	Flange mounting FNC	For mounting the drive on the bearing and end cap	www.festo.com					
4	Trunnion mounting ZNCF/CRZNG	For swivelling movements of the drive on the bearing or end caps	www.festo.com					
5	Trunnion support LNZG/CRLNZG	-	www.festo.com					

Standard cylinders DNCI, with measuring transducer DADE Peripherals overview

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FK Converts sensor signals of the standard cylinder DNCI into one voltage signal of 0 10 V and/or 22 Adapter AD For a vacuum suction cup AD www.festo.com 23 Guide unit FENG For protecting standard cylinders from torsion at high torque loads FENG 16 24 Mounting kit SMB-8-FENG For mounting proximity sensors SME/SMT-8 in combination with guide unit FENG SMB-8-FENG www.festo.com 25 Slot cover ABP- 5-S To protect the sensor cable and keep dirt out of the sensor slots ABP- 5-S www.festo.com 26 Proximity sensor SME/SMT-8 Can be integrated in the cylinder profile barrel www.festo.com 27 Push-in fitting QS For connecting compressed air tubing with standard external diameters www.festo.com 28 Measuring transducer DADE-MVC Converts sensor signals of the standard cylinder DNCI into one voltage signal of 0 10 V and/or 18	21	Self-aligning rod coupler	For compensating radial and angular deviations	www.festo.com
Image: Second		FK		
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23 Guide unit FENG For protecting standard cylinders from torsion at high torque loads 16 24 Mounting kit SMB-8-FENG For mounting proximity sensors SME/SMT-8 in combination with guide unit FENG www.festo.com 25 Slot cover ABP-5-S To protect the sensor cable and keep dirt out of the sensor slots www.festo.com 26 Proximity sensor SME/SMT-8 Can be integrated in the cylinder profile barrel www.festo.com 27 Push-in fitting QS For connecting compressed air tubing with standard external diameters QS www.festo.com 28 Measuring transducer DADE-MVC Converts sensor signals of the standard cylinder DNCI into one voltage signal of 0 10 V and/or 18		AD		
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24 Mounting kit SMB-8-FENG For mounting proximity sensors SME/SM1-8 in combination with guide unit FENG www.festo.com 25 Slot cover ABP-5-S To protect the sensor cable and keep dirt out of the sensor slots www.festo.com 26 Proximity sensor SME/SMT-8 Can be integrated in the cylinder profile barrel www.festo.com 27 Push-in fitting QS For connecting compressed air tubing with standard external diameters www.festo.com 28 Measuring transducer DADE-MVC Converts sensor signals of the standard cylinder DNCI into one voltage signal of 0 10 V and/or 18		FENG		<u> </u>
Image: SMB-8-FENG To protect the sensor cable and keep dirt out of the sensor slots ABP-5-S www.festo.com Image: SMB-S-FS Can be integrated in the cylinder profile barrel SME/SMT-8 www.festo.com Image: SMB-S-FS Can be integrated in the cylinder profile barrel SME/SMT-8 www.festo.com Image: SMB-S-FS For connecting compressed air tubing with standard external diameters QS www.festo.com Image: SMB-SMT-8 For connecting compressed air tubing with standard external diameters www.festo.com Image: SMB-SMT-8 For connecting compressed air tubing with standard external diameters www.festo.com Image: SMB-SMT-8 For connecting compressed air tubing with standard external diameters Image: SMB-SMT-8 Image: SMB-SMT-8 Converts sensor signals of the standard cylinder DNCI into one voltage signal of 0 10 V and/or 18 Image: SMB-SMT-8 Current signal of 0 20 mA Image: SMB-SMT-8 Image: SMB-SMT-8	24		For mounting proximity sensors SME/SMI-8 in combination with guide unit FENG	www.festo.com
ABP-5-S Can be integrated in the cylinder profile barrel www.lestb.com SME/SMT-8 For connecting compressed air tubing with standard external diameters www.festb.com Image: Smeasuring transducer Converts sensor signals of the standard cylinder DNCI into one voltage signal of 0 10 V and/or 18 Image: SME/SMT-8 Converts sensor signals of the standard cylinder DNCI into one voltage signal of 0 10 V and/or 18	25	SIMB-8-FEING	To protect the concer cable and keep dirt out of the concer clote	www.facto.com
Abit 3/S Can be integrated in the cylinder profile barrel www.festo.com 20/S Push-in fitting QS For connecting compressed air tubing with standard external diameters www.festo.com 20/S Measuring transducer Converts sensor signals of the standard cylinder DNCI into one voltage signal of 0 10 V and/or 18 28/DADE-MVC Current signal of 0 20 mA 20 mA 18	25			www.iesto.com
SME/SMT-8 Converts sensor signals of the standard cylinder DNCl into one voltage signal of 0 10 V and/or www.lesto.com Image: SME/SMT-8 Converts sensor signals of the standard cylinder DNCl into one voltage signal of 0 10 V and/or 18	26	Proximity sensor	Can be integrated in the cylinder profile barrel	www.festo.com
Image: Sintegram of the standard external diameters Www.festo.com Image: Sintegram of the standard external diameters Image: Sintegram of the standard external diameters Image: Sintegram of the standard external diameters Image: Sintegram of the standard external diameters Image: Sintegram of the standard external diameters Image: Sintegram of the standard external diameters Image: Sintegram of the standard external diameters Image: Sintegram of the standard external diameters Image: Sintegram of the standard external diameters Image: Sintegram of the standard external diameters Image: Sintegram of the standard external diameters Image: Sintegram of the standard external diameters Image: Sintegram of the standard external diameters Image: Sintegram of the standard external diameters Image: Sintegram of the standard external diameters Image: Sintegram of the standard external diameters Image: Sintegram of the standard external diameters Image: Sintegram of the standard e	20	SMF/SMT-8		*******.iC3t0.C0III
QS Converts sensor signals of the standard cylinder DNCI into one voltage signal of 0 10 V and/or 18 DADE-MVC current signal of 0 20 mA 18	27	Push-in fitting	For connecting compressed air tubing with standard external diameters	www.festo.com
28 Measuring transducer Converts sensor signals of the standard cylinder DNCI into one voltage signal of 0 10 V and/or 18 DADE-MVC current signal of 0 20 mA		0S		
DADE-MVC current signal of 0 20 mA	28	Measuring transducer	Converts sensor signals of the standard cylinder DNCI into one voltage signal of 0 10 V and/or	18
		DADE-MVC	current signal of 0 20 mA	

Not with variants S2
 Guide unit FENG-KF must be attached to the piston rod such that backlash is eliminated



Technical data

Function



- Ø -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 sensor ¹⁾				
Measuring principle (displacement encoder)		Digital				
Type of mounting		Foot mounting				
Stroke	[mm]	10 2,000				
Torsion protection/Guide ³⁾		Guide rod with yoke, with	ı 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				

Not included in the scope of delivery, can be ordered as an option
 Guide unit FENG-KF 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	40	50	63			
Theoretical force at 6 bar	483	754	1,178	1,870			
advancing							
Theoretical force at 6 bar	415	633	990	1,682			
retracting							
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:

 $m_{load} = \frac{2 \text{ x } \text{E}_{perm.}}{v^2} - m_{dead}$

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.

Operating and environmental conditions						
Operating pressure	[bar]	0.6 12				
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				

The proportional directional control valve MPYE used requires the characteristic values
 Note operating range of proximity sensors
 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 DNCIS2				
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	<u>.</u>			
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

Stan	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					
Disp	lacement encoder						
-	Sensor housing	Polyacetate					
-	Cable sheath	Polyurethane					
-	Plug housing	Polybuteneterephthalate					
-	Wall mounting plate	Polyacetate					
-	Screws for mounting plate	Steel					



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Electrical data, displacement encoder		
Measuring accuracy	[mm]	±(0.07±0.02/m)
Resolution	[mm]	0.02
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	[kA/m]	10
100 mm interval from the sensor ¹⁾		
Output signal		Analogue
Electrical connection		Cable with 8-pin plug, round type M12
Cable length	[m]	1.5

1) See also mounting conditions

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 (standard cylinder DNC) The permissible static and dynamic characteristic load values with and without attached guide → Volume 1 (standard cylinder DNC) 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) → www.festo.com under standard cylinder DNC		
Mounting conditions		
When mounting a drive A with magnet	Parallel assembly	
(for position sensing), in addition to a standard cylinder DNCI, the following conditions must be observed:	If the offset Y = 0 mm, the drives can be assembled directly next to one another.	Sensor cable \rightarrow \leftarrow DNCI

- drives Offset between the drives on the Υ
- bearing cap



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	-	-



Technical data



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WH+A2

Ø	AM	A2	В	BG	D1	D2	D7	E	EE	G	H1
		max.	Ø		Ø		Ø				
[mm]			d11		f9						
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	KK	L1	L2	L3	L5	L9	MM	PL	RT	T1	TG
							Ø				
[mm]							f8				
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	PI	VD	WH	Z	J	ZI	N	=©1	=©2	=0	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	





For \varnothing	B1	B2	B3	B4	D1	D2	D3	D4	D6	H1
					Ø		Ø	Ø	Ø	
[mm]	-0.3		±0.2	±0.3					h6	
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 \varnothing	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 \varnothing	L9	L10	L11	L12	L13	L14	L15	L16	=0	:1
[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	1	9
63	25	15	15.3	56.5	105	-	9	16	1	9

Standard cylinders DNCI, with measuring transducer DADE Ordering data – Modular products

M Mandatory data								
Module No.	Function	Piston \varnothing	Stroke	Cushioning	Position sensing			
]]					
535 411	DNCI	32	10 2,000	Р	А			
535 412		40						
535 413		50						
535 414		63						
Order								
example								
535 411	DNCI	- 32	- 100	– P	– A –			

Ordering table

Pis	ston Ø		32	40	50	63	Condi- tions	Code	Enter code
Μ	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							
	Cushioning Flexible cushioning rings/pads at both ends				-Р	-P			
¥	Position sensing Via proximity sensor					-A	-A		

Transfer order code – P - A DNCI - [- [

-

Standard cylinders DNCI, with measuring transducer DADE Ordering data – Modular products

O Options							
Type of piston rod	Piston rod extended at front	Clamping unit	Guide	Measuring head			
S2	К8	КР	FENG	MS			
-] -		-	-			

Ordering table

Pis	ston 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					K8		
	Clamping unit	Clamping cartridge					-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 from (3 K9 (the side facing the measuring head) (4 FENG

_

Only with piston rod type S2 Maximum stroke length 500 mm

- [

-

Transfer order code

Standard cylinder DNCI, with transducer DADE

Technical data

Measuring transducer DADE-MVC-010 DADE-MVC-420 The transducer converts sensor signals of the DNCI standard cylinder into a voltage signal of 0 ... 10 V or a current signal of 0 ... 20 mA. These signals can be evaluated by a PLC with an appropriate signal input.



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General Technical data				
Type of mounting		Via through holes		
Mounting position		Any		
Repetition accuracy in relation to ≤ 400		±0.1 mm		
effective stroke	≤ 750	±0.2 mm		
	≤1,200	±0.3 mm		
	≤1,600	±0.4 mm		
	≤ 2,000	±0.5 mm		
Protection against short circuit		Yes		
Protection against polarity reversal		Yes		
Diagnostic function		Display via LED		

General electrical data				
Analogue output	[V]	0 10 (as per EN 61131-2)		
	[mA]	0 20 (as per EN 61131-2)		
Nominal operating voltage	[V DC]	24 ±25%		
Residual ripple	[V _{pp}]	4 (at 50 Hz)		
Current consumption at nominal	[mA]	20 30		
operating voltage				
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		
Protection class		IP65		
Relative air humidity		95% non-condensing		
CE symbol (see conformity declaration)		As per EU EMC directive		
Corrosion resistance class CRC ¹⁾		1		
Product weight	[g]	128		
Note on material for housing		Polybutylene terephthalate		

1) Corrosion resistance class 1 as per 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



Pin allocation PLC interface





Measuring system interface

Pin	Function	Cable colour
1	24 V	white
2	Measured signal (analogue)	brown
3	Reference output	green
4	0 V measured signal	yellow
5	Reference input	grey
6	Calibration input	pink
7	Ready output	blue
8	0 V power supply and inputs/	red
	outputs	

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.	Туре					
Measuring transducer									
	With voltage signal	0 10 V	542 117	DADE-MVC-010					
	With current signal	0 20 mA	542 118	DADE-MVC-420					
			•						
Accessories									
	Plug socket with cable	Connecting cable to PLC (length 2 m)	525 616	SIM-M12-8GD-2-PU					
		Connecting cable to PLC (length 5 m)	525 618	SIM-M12-8GD-5-PU					

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■ Handling modules

systems

controllers

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- Pressure and flow sensors
- Display and operating units
- Inductive and optical proximity
- sensors

 Displacement encoders for
- positioning cylindersOptical orientation detection and
- quality inspection

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

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- Pipe connectors and fittings
- Electrical connection technology
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- Air guns

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- The product is to perform a safety function.
- A risk or safety analysis is required.
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