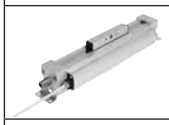
Standards-based cylinders DNCI, with integrated displacement encoder

FESTO

Product range overview

Function	Type	Description
Drives	**Rodless**	
	DDLI 	• Without guide • With displacement encoder for contactless measurement • Based on linear drive DGC-K • Supply ports on end face • System product for handling and assembly technology
	DGCI 	• With guide • With displacement encoder for contactless measurement • Based on linear drive DGC • Supply ports optionally on end face or front • System product for handling and assembly technology
	With piston rod	
	DNCI 	• With displacement encoder for contactless measurement • Various piston rod variants • Standards-based cylinder to ISO 15552
	DDPC 	• With displacement encoder for contactless measurement • Various piston rod variants • Standards-based cylinder to ISO 15552
	DNC/DSBC 	• With attached potentiometer MLO-LWG • Various piston rod variants • Standards-based cylinder to ISO 15552
Semi-rotary drive	**Semi-rotary drive** 	• Based on semi-rotary drive DSM • Integrated rotary potentiometer • Compact design • Wide range of mounting options

Product range overview

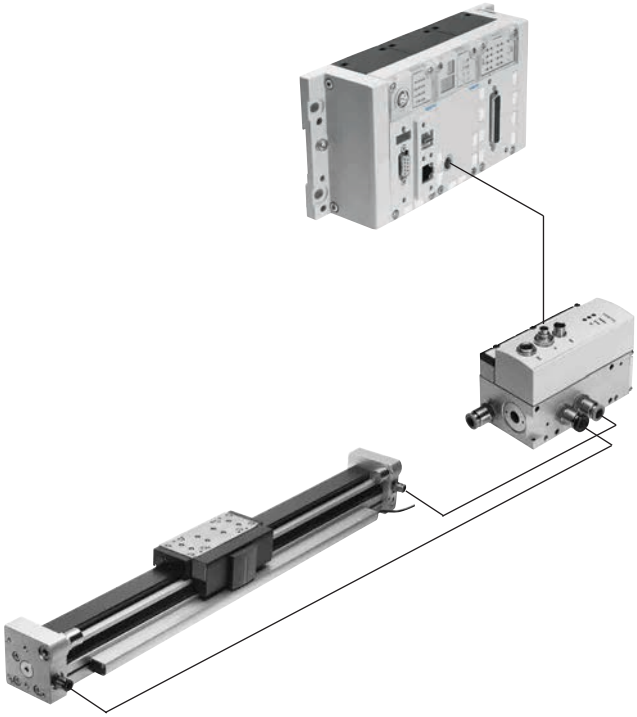
Piston ∅	Stroke/swivel angle	Suitable			
		For positioning with	For end-position controller		For use as a measuring cylinder
	[mm/°]	CPX-CMAX	CPX-CMPX	SPC11	
Rodless					
25, 32, 40, 63	100, 160, 225, 300, 360, 450, 500, 600, 750, 850, 1000, 1250, 1500, 1750, 2000	■	■	■	■
18, 25, 32, 40, 63	100, 160, 225, 300, 360, 450, 500, 600, 750, 850, 1000, 1250, 1500, 1750, 2000	■	■	■	■
With piston rod					
32, 40, 50, 63	10 ... 2000	–	–	–	■
	100 ... 750	■	■	■	–
80, 100	10 ... 2000	–	–	–	■
	100 ... 750	■	■	■	–
32, 40, 50, 63, 80	100, 150, 225, 300, 360, 450, 600, 750	■	■	■	■
Semi-rotary drive					
25, 40, 63	270	■	■	■	■

Key features

Servo-pneumatic drive technology

Positioning and Soft Stop applications as an integral component of the valve terminal CPX – the modular peripheral system for decentralised automation tasks. The modular design means that valves, digital inputs and outputs, positioning modules and end-position controllers, as appropriate to the application, can be combined in almost any way on the CPX terminal.

Benefits:
- Pneumatics and electrics – control and positioning on one platform
- Innovative positioning technology – piston rod drives, rodless drives, rotary drives
- Actuation via fieldbus
- Remote maintenance, remote diagnostics, web server, SMS and e-mail alerts are all possible via TCP/IP
- Modules can be quickly exchanged and expanded without altering the wiring



Axis controller CPX-CMAX

Free choice:
Position and force control, directly actuated or selected from one of 128 configurable position sets.
If you are looking for something more:
The configurable record sequencing function enables simple functional sequences to be realised with the axis controller CPX-CMAX.
Everything is recognisable:
the auto-identification function identifies each participant with its device data on the controller CPX-CMAX.

Also included:
Actuation of a brake or clamping unit via the proportional directional control valve VPWP is also part of the scope of performance of the controller CPX-CMAX.
Up to 8 modules (max. 8 axes) can be operated in parallel and independently of each other.
Commissioning via FCT (Festo configuration software) or via fieldbus:
no programming, only configuration.

Benefits:
- Greater flexibility
- OEM friendly – commissioning also via fieldbus
- Easy installation and fast commissioning
- Cost-effective
- You program the system in your PLC environment

Key features

End-position controller CPX-CMPX

Data sheets ➔ Internet: cpx-cmpx

Fast travel between the mechanical end stops of the cylinder, stopping gently and without impact in the end position.
Fast commissioning via control panel, fieldbus or handheld unit.
Improved downtime control.
Actuation of a brake or clamping unit via the proportional directional control valve VPWP is an integral part of the controller CMPX.

Depending on the fieldbus chosen, up to 9 end-position controllers can be actuated on the CPX terminal.
All system data can be read and written via the fieldbus, including, for example, the mid-positions.

Benefits:
- Greater flexibility
- OEM friendly – commissioning also via fieldbus
- Easy installation and fast commissioning
- Cost-effective
  - Up to 30% faster cycle rates
  - Significantly reduced system vibration
- Improved work ergonomics thanks to significantly reduced noise level
- The extended diagnostics help to reduce the service time of the machine

Proportional directional control valve VPWP

Data sheets ➔ Internet: vpwp

The 5/3-way proportional directional control valve for applications with Soft Stop and pneumatic positioning.
Fully digitalised – with integrated pressure sensors, with new diagnostic functions.
In sizes 4, 6, 8 and 10.
Flow rates of 350, 700, 1400 and 2000 l/min.

With switching output for controlling a brake.
Colour-coded supply ports.
Pre-assembled cables guarantee error-free and fast connection with the controllers CPX-CMPX and CPX-CMAX.

Benefits:
- Easy installation and fast commissioning
- Reduction of system downtimes thanks to the new diagnostic options
- With switching output for controlling a brake/clamping unit

Measuring module CPX-CMIX

Data sheets ➔ Internet: cpx-cmix

Fully digital data acquisition and transmission means that pneumatic cylinders can be used as sensors. With very high repetition accuracy and incorporating both analogue and digital measuring sensors.

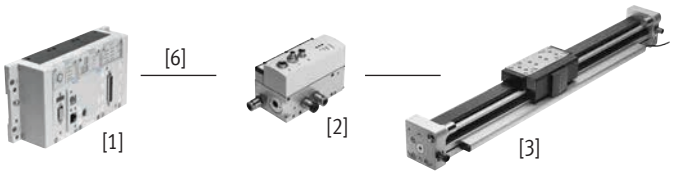
Suitable for the linear drive DGCI with displacement encoder for measuring absolute values, for the piston rod drive DNCI/DDPC with incremental displacement encoder or even for a potentiometer type MLO.

Benefits:
- All process steps can be documented, which improves quality
- An adjustable contact force (via pressure regulator) increases the precision of the "displacement sensor"
- With displacement encoders for measuring absolute values, the actual position is immediately available after the system is switched on

Drive options

System with linear drive DDLI, DGCI

Data sheets ➔ Internet: ddli or dgci



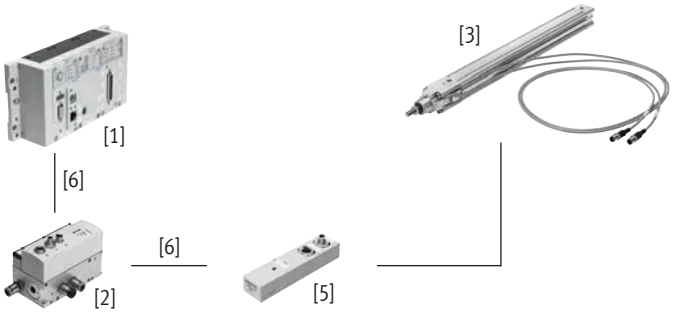
[1] Controller module CPX-CMPX or CPX-CMAX
[2] Proportional directional control valve VPWP
[3] Linear drive DDLI, DGCI with displacement encoder
[6] Connecting cable KVI-CP-3-...

- Pneumatic rodless linear drive with displacement encoder, with or without recirculating ball bearing guide
- Displacement encoder with absolute and contactless measurement
- Diameter:
  – With DGCI: 18 ... 63 mm
  – With DDLI: 25 ... 63 mm
- Stroke: 100 ... 2000 mm in fixed lengths
- Application areas: Soft Stop and pneumatic positioning
- Loads from 1 ... 180 kg
- No sensor interface required

Benefits:
- Complete drive unit
- DDLI for easy connection to customer's guide system
- Excellent running characteristics
- For fast and accurate positioning up to ±0.2 mm (only with axis controller CPX-CMAX)

System with standards-based cylinder DNCI, DDPC

Data sheets ➔ Internet: dnci



[1] Controller module CPX-CMPX or CPX-CMAX
[2] Proportional directional control valve VPWP
[3] Standards-based cylinder DNCI, DDPC with displacement encoder
[5] Sensor interface CASM-S-D3-R7
[6] Connecting cable KVI-CP-3-...

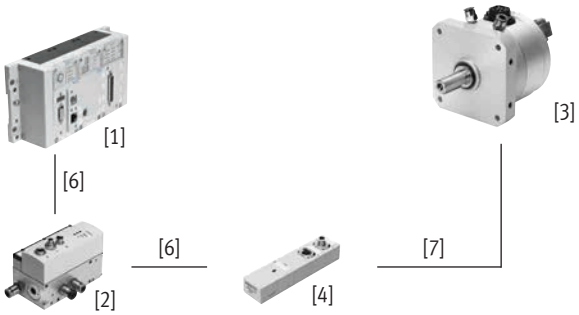
- Standards-based cylinder with integrated displacement encoder, conforms to DIN ISO 6432, VDMA 24 562, NF E 49 003.1 and Uni 10 290
- Displacement encoder with contactless and incremental measurement
- Diameter: 32 ... 100 mm
- Stroke: 100 ... 750 mm
- Application areas: Soft Stop and pneumatic positioning
- Loads from 3 ... 450 kg and the corresponding sensor interface CASM-S-D3-R7
- Pre-assembled cables guarantee error-free and fast electrical connection

Benefits:
- Compact drive unit
- Can be used universally
- Also with guide unit
- For fast and accurate positioning up to ±0.5 mm (only with axis controller CPX-CMAX)

Drive options

System with semi-rotary drive DSMI

Data sheets ➔ Internet: dsmi



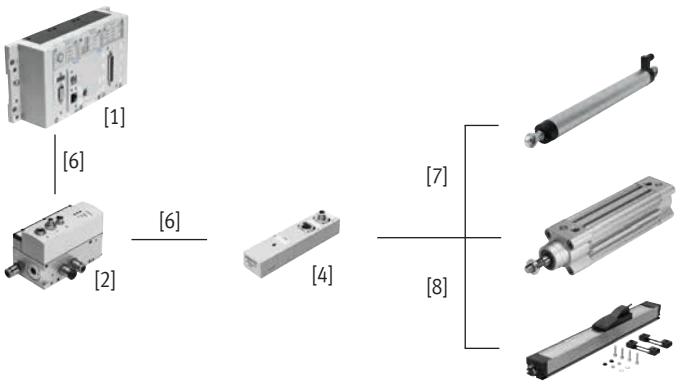
[1] Controller module CPX-CMPX or CPX-CMAX
[2] Proportional directional control valve VPWP
[3] Semi-rotary drive DSMI with displacement encoder
[4] Sensor interface CASM-S-D2-R3
[6] Connecting cable KVI-CP-3-...
[7] Connecting cable NEBC-P1W4-K-0.3-N-M12G5

- Semi-rotary drive DSMI with integrated displacement encoder
- Identical design to pneumatic semi-rotary drive DSM
- Absolute displacement encoder based on a potentiometer
- Swivel range from 0 ... 270°
- Size: 25, 40, 63
- Max. torque: 5 ... 40 Nm
- Application areas: Soft Stop and pneumatic positioning
- Mass moments of inertia of 15 ... 6000 kgcm^2 and the corresponding sensor interface CASM-S-D2-R3
- Pre-assembled cables guarantee error-free and fast connection to the proportional directional control valve VPWP

Benefits:
- Complete drive unit, compact, can be used immediately
- High angular acceleration
- With adjustable fixed stops
- For fast and accurate positioning down to ±0.2° (only with axis controller CPX-CMAX)

System with potentiometer

Data sheets ➔ Internet: casm



[1] Controller module CPX-CMPX or CPX-CMAX
[2] Proportional directional control valve VPWP
[4] Sensor interface CASM-S-D2-R3
[6] Connecting cable KVI-CP-3-...
[7] Connecting cable NEBC-P1W4-K-0.3-N-M12G5
[8] Connecting cable NEBC-A1W3-K-0.4-N-M12G5

- Attachable potentiometers with absolute measurement, with high degree of protection
- With connecting rod or moment compensator
- Measuring range: Connecting rod: 100 ... 750 mm Moment compensator: 225 ... 2000 mm
- Pre-assembled cables guarantee error-free and fast connection with the sensor interface CASM
- Application areas: Soft Stop and pneumatic positioning with cylinder diameters of 25 ... 80 mm
- Loads from 1 ... 300 kg

Benefits:
- Easy installation and fast commissioning
- Cost-effective
- Can also be used in harsh ambient conditions
- Variety of drives: CPX-CMPX and CPX-CMAX also support cylinders with external displacement encoder

Drive options

System components for Soft Stop systems with end-position controller CPX-CMPX

	Linear drive	Standards-based cylinder	Semi-rotary drive	Displacement encoder		→ Page/ Internet
	DDLI/DGCI	DNCI, DDPC	DSMI	MLO-LWG/-TLF	MME-MTS	
End-position controller CPX-CMPX	■	■	■	■	■	cmpx
Proportional directional control valve VPWP	■	■	■	■	■	vpwp
Sensor interface CASM-S-D2-R3	–	–	■	■	–	casm
Sensor interface CASM-S-D3-R7	–	■	–	–	–	casm
Connecting cable KVI-CP-3-...	■	■	■	■	■	kvi
Connecting cable NEBC-P1W4-...	–	–	■	■ / –	–	nebc
Connecting cable NEBC-A1W3-...	–	–	–	– / ■	–	nebc
Connecting cable NEBP-M16W6-...	–	–	–	–	■	vpwp

System components for pneumatic positioning systems with axis controller CPX-CMAX

	Linear drive	Standards-based cylinder	Semi-rotary drive	Displacement encoder		→ Page/ Internet
	DDLI/DGCI	DNCI, DDPC	DSMI	MLO-LWG/-TLF	MME-MTS	
Axis controller CPX-CMAX	■	■	■	■	■	cmax
Proportional directional control valve VPWP	■	■	■	■	■	vpwp
Sensor interface CASM-S-D2-R3	–	–	■	■	–	casm
Sensor interface CASM-S-D3-R7	–	■	–	–	–	casm
Connecting cable KVI-CP-3-...	■	■	■	■	■	kvi
Connecting cable NEBC-P1W4-...	–	–	■	■ / –	–	nebc
Connecting cable NEBC-A1W3-...	–	–	–	– / ■	–	nebc
Connecting cable NEBP-M16W6-...	–	–	–	–	■	vpwp

System components for measuring cylinders with measuring module CPX-CMIX

	Linear drive	Standards-based cylinder	Semi-rotary drive	Displacement encoder		→ Page/ Internet
	DDLI/DGCI	DNCI, DDPC	DSMI	MLO-LWG/-TLF	MME-MTS	
Measuring module CPX-CMIX-M1-1	■	■	■	■	■	cmix
Sensor interface CASM-S-D2-R3	–	–	■	■	–	casm
Sensor interface CASM-S-D3-R7	–	■	–	–	–	casm
Connecting cable KVI-CP-3-...	(■)[1)]	■	■	■	(■)	kvi
Connecting cable NEBC-P1W4-...	–	–	■	■ / –	–	nebc
Connecting cable NEBC-A1W3-...	–	–	–	– / ■	–	nebc
Connecting cable NEBP-M16W6-...	–	–	–	–	■	vpwp

1) As an extension

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	

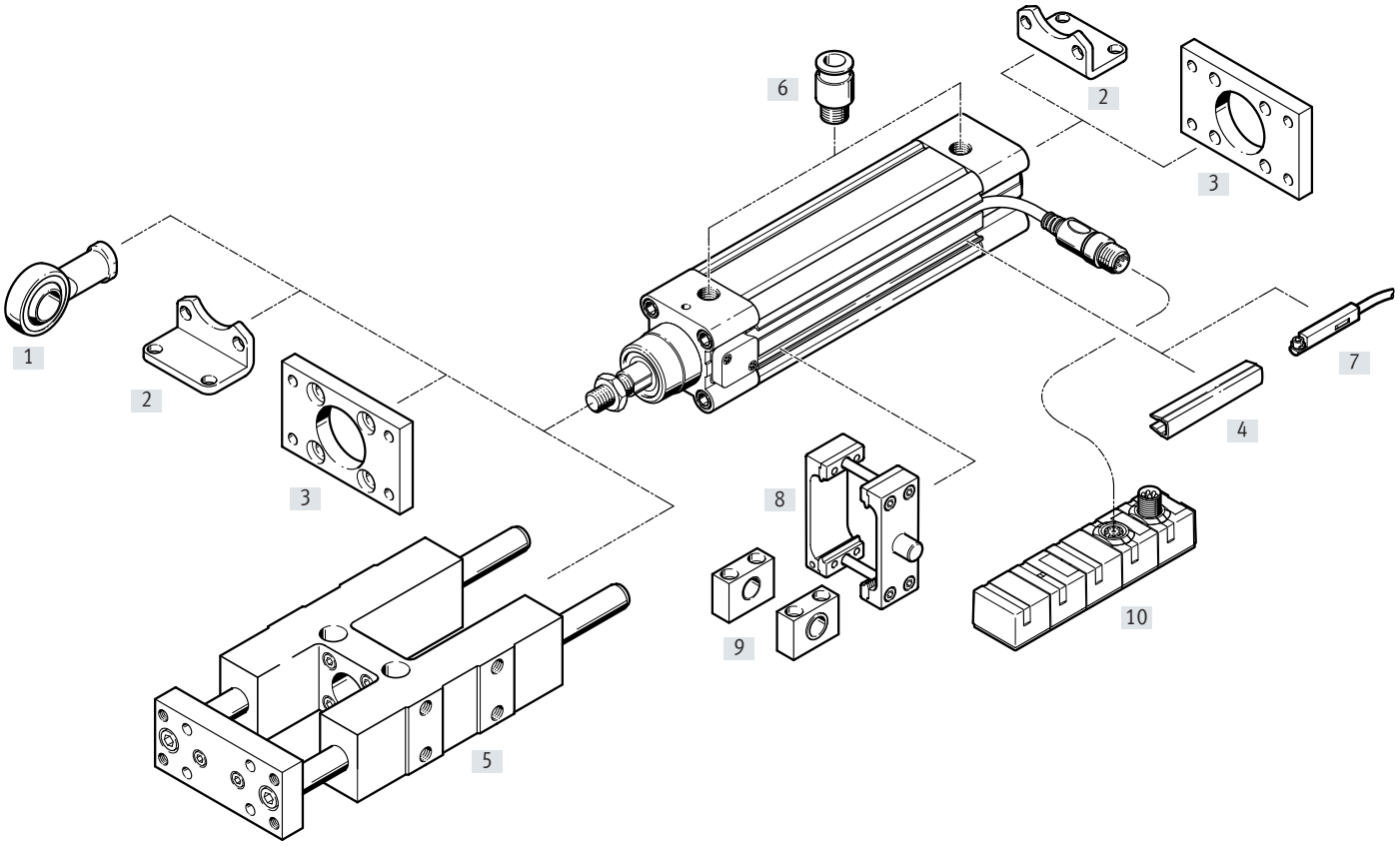
008	Clamping unit	
	None	
KP	Attached	

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



Note

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

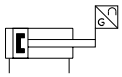
Peripherals overview

Accessories

	Type	Description	→ Page/Internet
[1]	Rod eye SGS	With spherical bearing	25
[2]	Foot mounting HNC	For mounting the drive on the bearing and end caps	24
[3]	Flange mounting FNC	For mounting the drive on the bearing and end caps	25
[4]	Slot cover ABP-5-S	For protection against contamination	27
[5]	Guide unit[1)] FENG-KF	For protecting against rotation at high torque loads	feng
[6]	Push-in fitting QS	For connecting tubing with standard O.D.	27
[7]	Proximity switch 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 system	smt
[8]	Trunnion flange kit DAMT	For swivelling movements of the drive	26
[9]	Trunnion support LNZG	For mounting the trunnion mounting kit DAMT	26
[10]	Sensor interface CASM	Establishes the connection between the displacement encoder and the proportional directional control valve VPWP	casm

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

Data sheet



www.festo.com

- Diameter
  32 and 63 mm
- Stroke length
  10 ... 2000 mm

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		With 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 ... 2000			
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

Data sheet

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		Operation with lubricated medium 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
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 at: 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).

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	Perm. impact velocity
E	Max. impact energy
m1	Moving mass (drive)
m2	Moving payload

Note

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

Data sheet

Positioning characteristics with axis controller CPX-CMAX					
Piston ø		32	40	50	63
Stroke	[mm]	100 ... 750			
Mounting position		Any			
Resolution	[mm]	0.01			
Repetition accuracy	[mm]	≤ ±0.5			
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
Minimum travel speed	[m/s]	0.05			
Max. speed of travel	[m/s]	1.5			
Typical positioning time, long stroke[2)]	[s]	0.45/0.70	0.50/0.75	0.65/0.80	0.55/0.75
Typical positioning time, short stroke[3)]	[s]	0.35/0.55	0.40/0.55	0.45/0.60	0.40/0.55
Minimum positioning stroke[4)]	[%]	≤ 3			
Stroke reduction[5)]	[mm]	10		15	
Recommended proportional directional control valve					
For CPX-CMAX		→ Page 27			

1) Only in combination with an external guide
2) At 6 bar, horizontal mounting position, DNCI-XX-500, 400 mm positioning travel at min./max. load
3) At 6 bar, horizontal mounting position, DNCI-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 reduction must be maintained on each side of the drive, the max. stroke for variable positioning is thus: stroke – 2x stroke reduction

Force control characteristics with axis controller CPX-CMAX					
Piston ø		32	40	50	63
Stroke	[mm]	100 ... 750			
Mounting position		Any			
Max. controllable force[1)]	[N]	435/375	680/570	1060/890	1685/1515
Typical friction forces[2)]	[N]	30	40	70	70
Repetition accuracy of pressure control[3)4)]	[%]	< ±2			

1) Advancing/retracting at 6 bar
2) These values can fluctuate greatly from cylinder to cylinder and are not guaranteed.
These friction forces must also be taken into consideration when using an external guide or when the cylinder is moving other components subject to friction
3) This value defines the repetition accuracy with which the internal pressure differential in the cylinder, that corresponds to the prescribed force setpoint value, is controlled and refers to the maximum controllable force
4) The effective force at the workpiece and its accuracy depends largely on the friction in the system as well as the repetition accuracy of the internal control system. Note that friction forces always work against the direction of movement of the piston. The following formula can be used as a rule of thumb to approximate the force F at the workpiece:
$F = F_{setpoint} \pm F_{friction\ forces} \pm$ repetition accuracy of pressure control

Data sheet

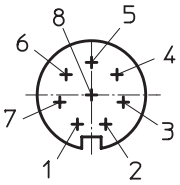
Positioning characteristics with Soft Stop end-position controller CPX-CMPX, SPC11					
Piston ø		32	40	50	63
Stroke	[mm]	100 ... 500			
Mounting position		Any			
Repetition accuracy[1]	[mm]	±2			
Minimum load, horizontal	[kg]	3	5	8	12
Maximum load, horizontal	[kg]	45	75	120	180
Minimum load, vertical[2]	[kg]	3	5	8	12
Maximum load, vertical[2]	[kg]	15	25	40	60
Travel time		→ Soft Stop engineering software: → www.festo.com			
Recommended proportional directional control valve					
For CPX-CMPX		→ Page 27			
For SPC11		→ Page 28			

1) One intermediate position. The accuracy in the end positions depends solely on the stability of the end stops
2) Only in combination with an external guide

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
Max. speed of travel	[m/s]	1.5
Degree of protection		IP65
CE marking (see declaration of conformity)		To EU EMC Directive[1]
Maximum permitted magnetic interference field[2]	[kA/m]	10
Electrical connection		Cable with 8-pin plug, round design, M12
Cable length	[m]	1.5

1) For information about the area of use, see the EC declaration of conformity at: 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.
2) At a distance of 100 mm

Pin allocation for the plug



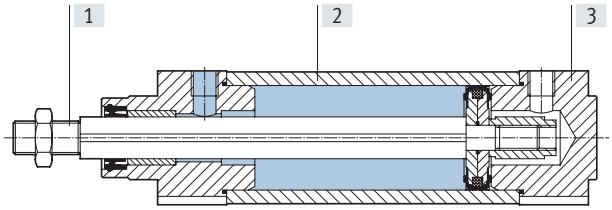
Pin	
1	+ Ub sensor
2	0 V
3	Signal sine +
4	Signal sine –
5	Signal cosine –
6	Signal cosine +
7	Shielding
8	–
Housing	Earth terminal (FE)

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

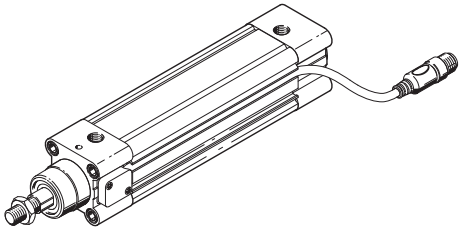


Standards-based cylinder		
[1]	Piston rod	High-alloy steel
[2]	Cylinder barrel	Anodised aluminium
[3]	Bearing/end caps	Die-cast aluminium
–	Dynamic seals	Polyurethane TPE-U
–	Static seals	NBR
	Note on materials	RoHS-compliant
Displacement encoder		
–	Sensor housing	Polyacetal
–	Cable sheath	Polyurethane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

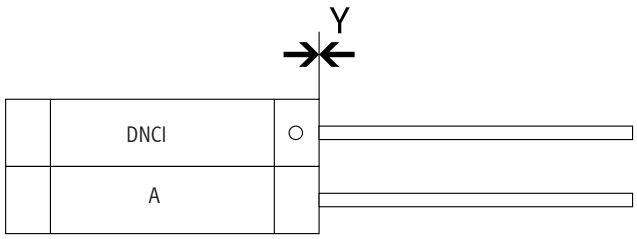
Mounting conditions

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

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

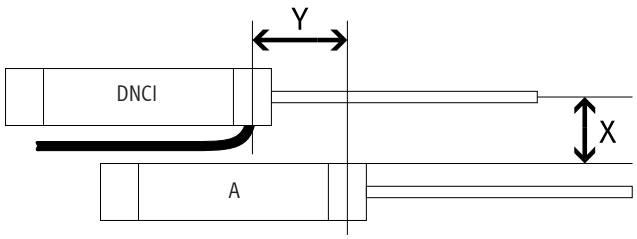
Parallel assembly

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



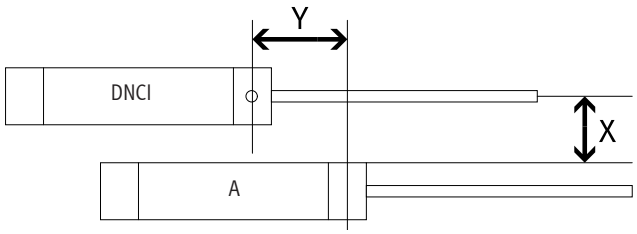
Offset mounting, cable outlet between the drives

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



Off-set mounting, cable outlet upwards or downwards

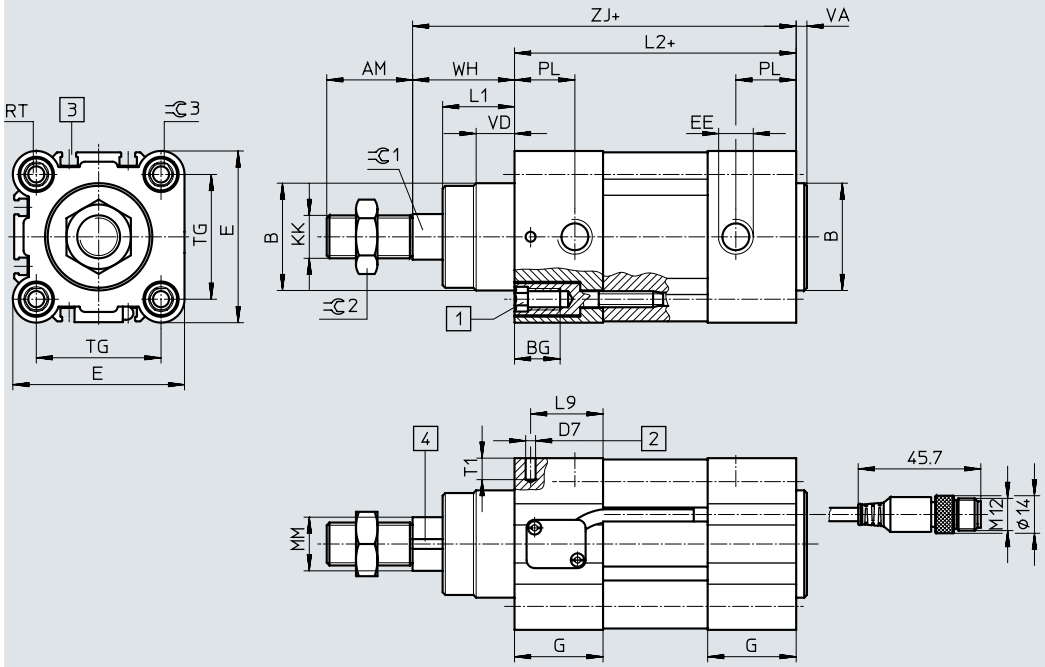
If the offset Y › 0 mm and the cable outlet points up or down, a distance of X › 60 mm must be observed.



Data sheet

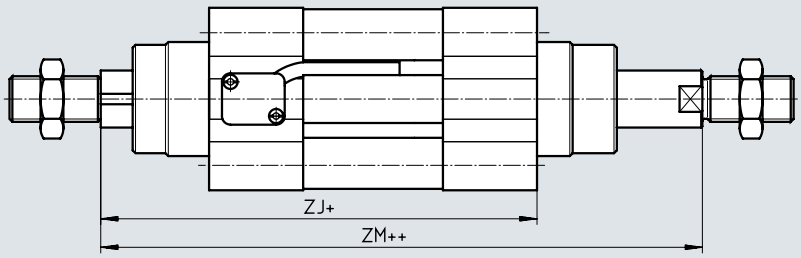
Dimensions Download CAD data ➔ www.festo.com

Basic type



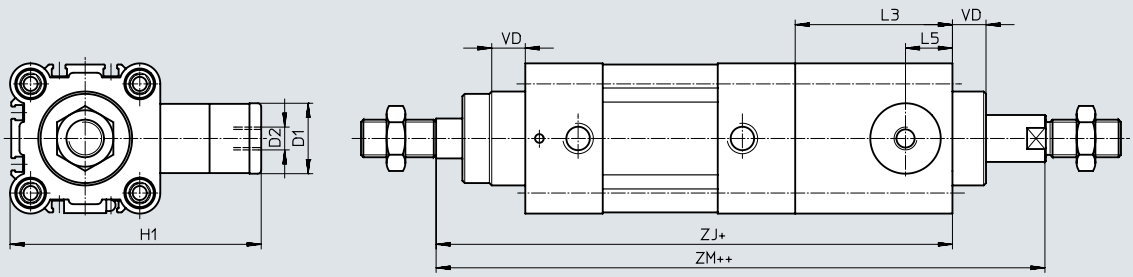
[1] Socket head screw with female thread for mounting components
[2] Hole for securing the earthing for self-tapping M4 screw according to DIN 7500
[3] Sensor slot for proximity switch SME/SMT-8
[4] Magnetic measuring band
\+ = plus stroke length
++ = plus 2x stroke length

S2 – Through piston rod

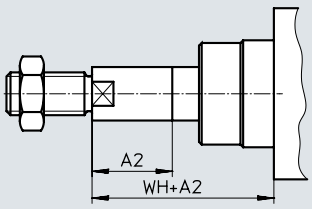


\+ = plus stroke length
++ = plus 2x stroke length

S2/KP – Through piston rod with clamping unit



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

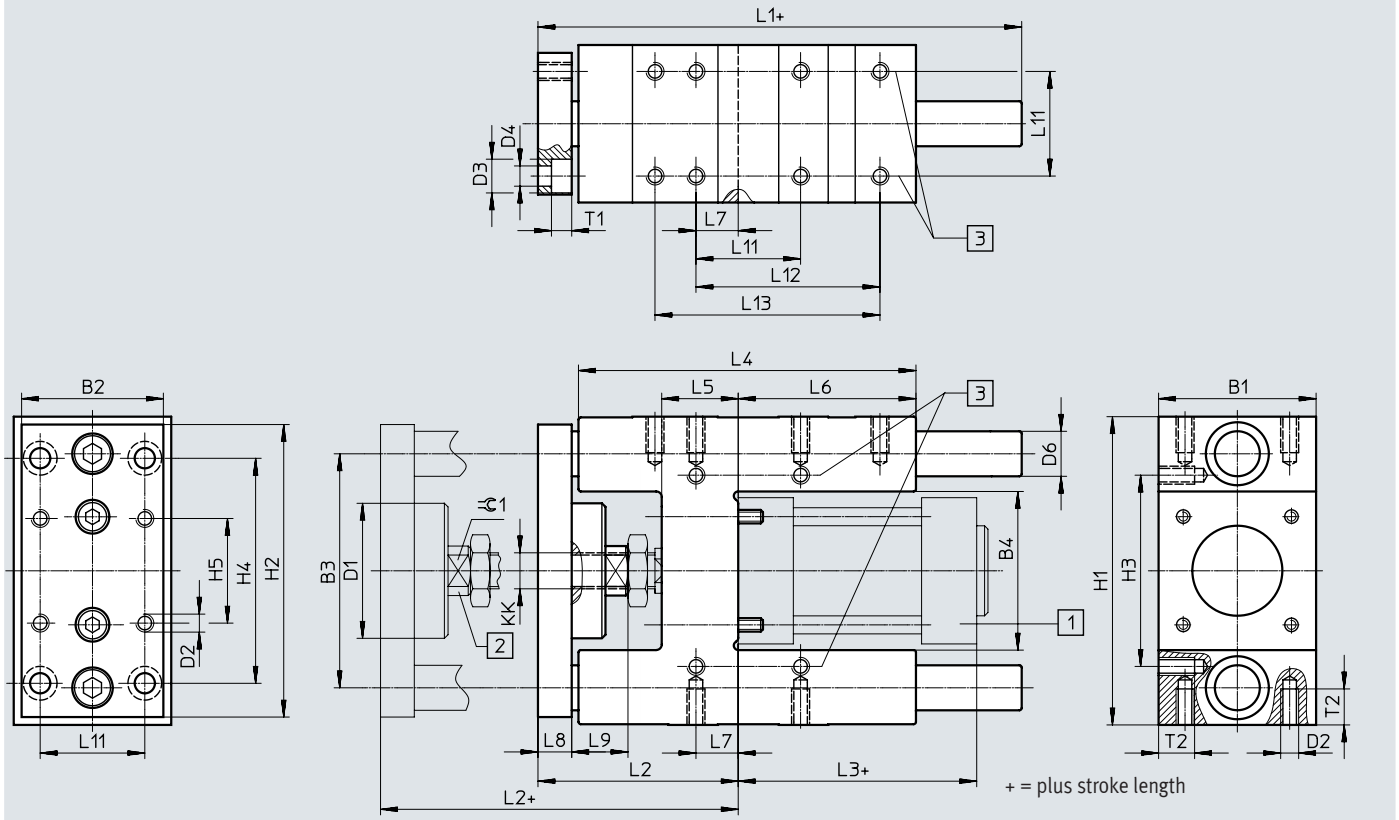
ø [mm]	KK	L1	L2	L3	L5	L9	MM ø f8	PL	RT	T1	TG
32	M10x1.25	18	94	45	14	22.5	12	15.6	M6	8	32.5
40	M12x1.25	21.3	105	53	16	27	16	14	M6	8	38
50	M16x1.5	26.8	106	67	20	27	20	14	M8	8	46.5
63	M16x1.5	27	121	76	24	33	20	17	M8	8	56.5

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



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 ... 2000				[1]	**-...**		
Stroke	[mm]	10 ... 2 000					**-...**		
Cushioning		Elastic cushioning rings/pads at both ends					**-P**		-P
Position sensing		Via proximity switch					**-A**		-A

[1] Stroke Can only be used as a positioning drive without restriction in the range from 100 ... 750 mm.

Ordering data – Modular product system

Ordering table

Piston ø	32	40	50	63	Conditions	Code		Enter code
Piston rod type	Through piston rod					**-S2**		
Piston rod extended at front [mm]	1 ... 500				[2]	**-...K8**		
Clamping unit	Attached				[3]	**-KP**		
Guide	Guide unit with ball guide on the sensor head side				[4]	**-FENG**		
Measured-value transducer	Output 0 ... 10 V					**-MU**		
	Output 4 ... 20 mA					**-MI**		
Measuring head	No measuring head				[5]	**-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] KP Only with piston rod type S2.

[4] FENG Maximum stroke length 500 mm.

Note

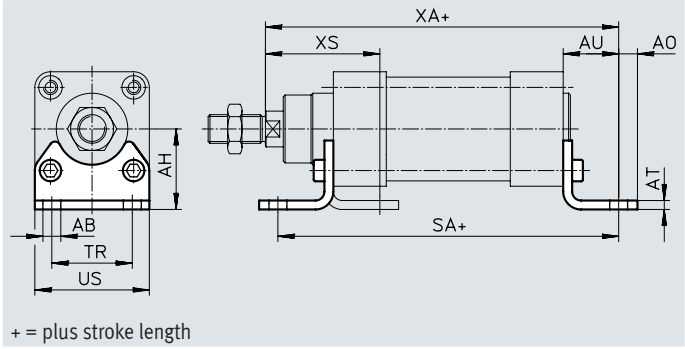
[5] In the case of repairs, the standards-based cylinder can be ordered without a measuring head (code MS).

The existing measuring head can then be installed in the new standards-based cylinder (operating instructions for DNCI).

Accessories

Foot mounting HNC

Material:
Galvanised steel
Free of copper and PTFE



+ = plus stroke length

Dimensions and ordering data

For Ø [mm]	AB Ø	AH	AO	AT	AU	SA	
						Basic cylinder	KP
32	7	32	6.5	4	24	142	187
40	10	36	9	4	28	161	214
50	10	45	9.5	5	32	170	237
63	10	50	12.5	5	32	185	261

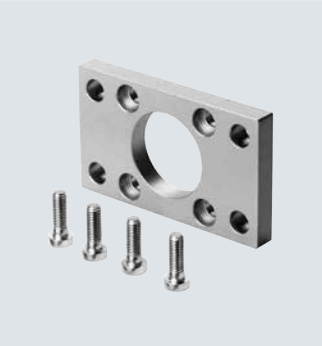
For Ø [mm]	TR	US	XA		XS	CRC[1]	Weight [g]	Part no.	Type
			Basic cylinder	KP					
32	32	45	144	189	45	2	144	**174369**	**HNC-32**
40	36	54	163	216	53	2	193	**174370**	**HNC-40**
50	45	64	175	242	62	2	353	**174371**	**HNC-50**
63	50	75	190	266	63	2	436	**174372**	**HNC-63**

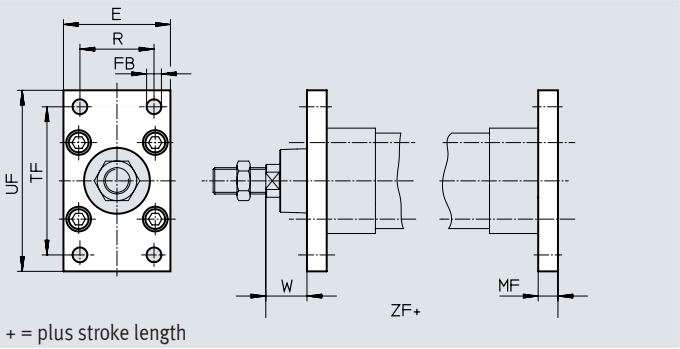
1) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation can occur. External visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment.

Accessories

Flange mounting FNC

Material:
FNC: Galvanised steel
Free of copper and PTFE
RoHS-compliant





Dimensions and ordering data

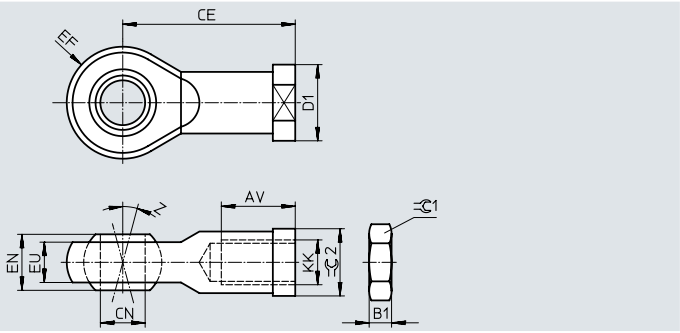
For Ø [mm]	E	FB Ø H13	MF	R	TF	UF	W	ZF Basic cylinder	ZF KP	CRC[1]	Weight [g]	Part no.	Type
32	45	7	10	32	64	80	16	130	175	1	221	**174376**	**FNC-32**
40	54	9	10	36	72	90	20	145	198	1	291	**174377**	**FNC-40**
50	65	9	12	45	90	110	25	155	222	1	536	**174378**	**FNC-50**
63	75	9	12	50	100	120	25	170	246	1	679	**174379**	**FNC-63**

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).

Rod eye SGS

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

Material:
Galvanised steel
RoHS-compliant



Dimensions and ordering data

For Ø [mm]	AV	B1	CE	CN Ø H7	D1 Ø	EF ±0.5	EN	Z [°]	⌀C1	⌀C2	CRC[1] [2]	Weight [g]	Part no.	Type
M10x1.25	20 –2	5	43	10	19	14	14	13	17	17	1	87	**9261**	**SGS-M10x1.25**
M12x1.25	22 –2	6	50	12	22	16	16	13	19	19	1	129	**9262**	**SGS-M12x1.25**
M16x1.5	28 –2	8	64	16	27	21	21	15	24	22	1	259	**9263**	**SGS-M16x1.5**

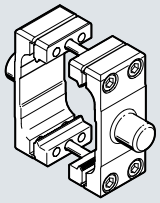
1) Corrosion resistance class CRC 1 to Festo standard FN 940070
Low corrosion stress. Dry indoor application or transport and storage protection. Also applies to parts behind covers, in the non-visible interior area, and parts which are covered in the application (e.g. drive trunnions).
2) In the area of the ball:
Corrosion resistance class CRC 0 to Festo standard FN 940070
No corrosion stress. Applies to small, visually unimportant standards-based parts such as threaded pins, circlips and clamping sleeves which are usually only available on the market in a phosphated or burnished version (and possibly oiled) as well as to ball bearings (for components < CRC 3) and plain bearings.

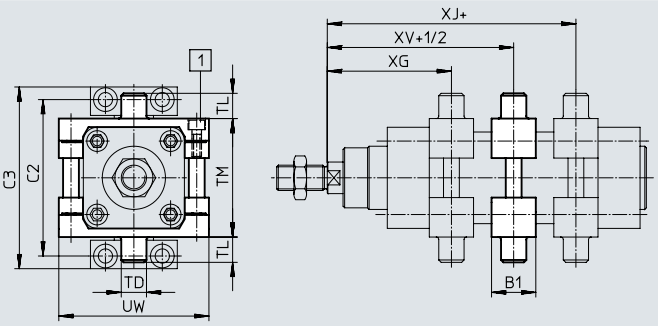
Accessories

Trunnion flange kit DAMT

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

Material:
Galvanised steel
Free of copper and PTFE
RoHS-compliant





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

Dimensions and ordering data

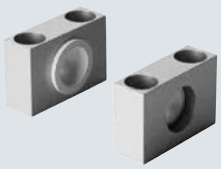
For Ø	B1	C2	C3	TD	TL	TM	UW	XG	
				Ø				Basic cylinder	KP
[mm]				e9					
32	30	71	86	12	12	50	65	66.1	111.1
40	32	87	105	16	16	63	75	75.6	128.6
50	34	99	117	16	16	75	95	83.6	150.6
63	41	116	136	20	20	90	105	93.1	169.1

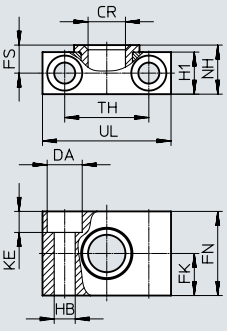
For Ø	XJ		XV		Max. tightening torque	CRC[1]	Weight	Part no.	Type
	Basic cylinder	KP	Basic cylinder	KP					
[mm]					[Nm]		[g]		
32	79.9	124.9	73	118	4+1	1	213	**2213233**	**DAMT-V1-32-A**
40	89.4	142.4	82.5	135.5	8+1	1	388	**2214899**	**DAMT-V1-40-A**
50	96.4	163.4	90	157	8+2	1	608	**2214909**	**DAMT-V1-50-A**
63	101.9	177.9	97.5	173.5	18+2	1	911	**2214971**	**DAMT-V1-63-A**

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).

Trunnion support LNZG

Material:
Trunnion support: Anodised aluminium
Plain bearing: Plastic
Free of copper and PTFE
RoHS-compliant





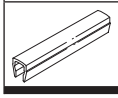
Dimensions and ordering data

For Ø	CR	DA	FK	FN	FS	H1	HB	KE	NH	TH	UL	CRC[1]	Weight	Part no.	Type
	Ø	Ø	Ø				Ø								
[mm]	D11	H13	±0.1				H13			±0.2			[g]		
32	12	11	15	30	10.5	15	6.6	6.8	18	32	46	2	83	**32959**	**LNZG-32**
40, 50	16	15	18	36	12	18	9	9	21	36	55	2	129	**32960**	**LNZG-40/50**
63	20	18	20	40	13	20	11	11	23	42	65	2	178	**32961**	**LNZG-63/80**

1) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation can occur. External visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment.

Accessories

Ordering data

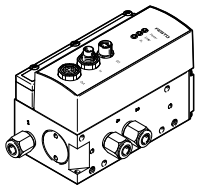
	For Ø	Comment	Part no.	Type	PU[1]
Slot cover				Data sheets ➔ Internet: abp	
	32, 40, 50, 63	Each 0.5 m	**151680**	**ABP-5-S**	2

1) Packaging unit

Note

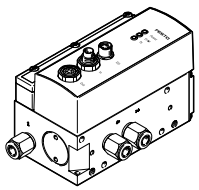
Recommended proximity switch
➔ Internet: dnc

Ordering data – Proportional directional control valves and push-in fittings

	For Ø	Stroke	Proportional directional control valve Data sheets ➔ Internet: vpwp		Push-in fitting for DNCI Data sheets ➔ Internet: qs		PU[1]
	[mm]	[mm]	Part no.	Type	Part no.	Type	
	**For applications with axis controller CPX-CMAX**						
	32	50 ... 150	**550170**	**VPWP-4-L-5-Q6-10-E-...**	**186096**	**QS-G1/8-6**	10
		151 ... 400	**550170**	**VPWP-4-L-5-Q8-10-E-...**	**186098**	**QS-G1/8-8**	
		> 401	**550171**	**VPWP-6-L-5-Q8-10-E-...**	**186098**	**QS-G1/8-8**	
	40	50 ... 250	**550170**	**VPWP-4-L-5-Q8-10-E-...**	**186099**	**QS-G1/4-8**	
		> 251	**550171**	**VPWP-6-L-5-Q8-10-E-...**	**186099**	**QS-G1/4-8**	
	50	50 ... 180	**550170**	**VPWP-4-L-5-Q8-10-E-...**	**186099**	**QS-G1/4-8**	
		181 ... 600	**550171**	**VPWP-6-L-5-Q8-10-E-...**	**186099**	**QS-G1/4-8**	
		> 601	**550172**	**VPWP-8-L-5-Q10-10-E-...**	**186101**	**QS-G1/4-10**	
	63	50 ... 100	**550170**	**VPWP-4-L-5-Q8-10-E-...**	**186100**	**QS-G3/8-8**	
		101 ... 350	**550171**	**VPWP-6-L-5-Q8-10-E-...**	**186102**	**QS-G3/8-10**	
		> 351	**550172**	**VPWP-8-L-5-Q10-10-E-...**	**186102**	**QS-G3/8-10**	

1) Packaging unit

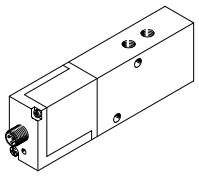
Ordering data – Proportional directional control valves and push-in fittings

	For Ø	Stroke[1]	Proportional directional control valve Data sheets ➔ Internet: vpwp		Push-in fitting for DNCI Data sheets ➔ Internet: qs		PU[2]
	[mm]	[mm]	Part no.	Type	Part no.	Type	
	**For applications with Soft Stop end-position controller CPX-CMPX, horizontal**						
	32	100 ... 400	**550170**	**VPWP-4-L-5-Q8-10-E-...**	**186098**	**QS-G1/8-8**	10
		401 ... 500	**550171**	**VPWP-6-L-5-Q8-10-E-...**	**186098**	**QS-G1/8-8**	
	40	100 ... 250	**550170**	**VPWP-4-L-5-Q8-10-E-...**	**186099**	**QS-G1/4-8**	
		251 ... 500	**550171**	**VPWP-6-L-5-Q8-10-E-...**	**186099**	**QS-G1/4-8**	
	50	100 ... 250	**550170**	**VPWP-4-L-5-Q8-10-E-...**	**186099**	**QS-G1/4-8**	
		251 ... 400	**550171**	**VPWP-6-L-5-Q8-10-E-...**	**186099**	**QS-G1/4-8**	
		500	**550172**	**VPWP-8-L-5-Q10-10-E-...**	**186101**	**QS-G1/4-10**	
	63	100 ... 160	**550170**	**VPWP-4-L-5-Q8-10-E-...**	**186100**	**QS-G3/8-8**	
		161 ... 320	**550171**	**VPWP-6-L-5-Q8-10-E-...**	**186100**	**QS-G3/8-8**	
		321 ... 500	**550172**	**VPWP-8-L-5-Q10-10-E-...**	**186102**	**QS-G3/8-10**	

1) Other stroke lengths on request
2) Packaging unit

Accessories

Ordering data – Proportional directional control valves and push-in fittings

	For Ø	Stroke[1]	Proportional directional control valve Data sheets → Internet: mpye		Push-in fitting for DNCI Data sheets → Internet: qs		
	[mm]	[mm]	Part no.	Type	Part no.	Type	PU[2]
	**For applications with Soft Stop end-position controller SPC11, horizontal**						
	32	100 ... 400	**151692**	**MPYE-5-1/8-LF-010-B**	**186098**	**QS-G1/8-8**	10
		401 ... 500	**151693**	**MPYE-5-1/8-HF-010-B**	**186098**	**QS-G1/8-8**	
	40	100 ... 250	**151692**	**MPYE-5-1/8-LF-010-B**	**186099**	**QS-G1/4-8**	
		251 ... 500	**151693**	**MPYE-5-1/8-HF-010-B**	**186099**	**QS-G1/4-8**	
	50	100 ... 250	**151692**	**MPYE-5-1/8-LF-010-B**	**186099**	**QS-G1/4-8**	
		251 ... 400	**151693**	**MPYE-5-1/8-HF-010-B**	**186099**	**QS-G1/4-8**	
		500	**151694**	**MPYE-5-1/4-010-B**	**186101**	**QS-G1/4-10**	
	63	100 ... 160	**151692**	**MPYE-5-1/8-LF-010-B**	**186100**	**QS-G3/8-8**	
		161 ... 320	**151693**	**MPYE-5-1/8-HF-010-B**	**186100**	**QS-G3/8-8**	
		321 ... 500	**151694**	**MPYE-5-1/4-010-B**	**186102**	**QS-G3/8-10**	

1) Other stroke lengths on request
2) Packaging unit

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Subject to change