Linear drives DDLI, with integrated displacement encoder

FESTO

Cylinders with displacement encoder

Product range overview

Function	Type	Brief description
Drives	**Rodless**	
	DDLI 	• Without guide • With contactless measuring displacement encoder • Based on linear drive DGC-K • Supply ports on end face • System product for handling and assembly technology
	DGCI 	• With guide • With contactless measuring displacement encoder • Based on linear drive DGC • Supply ports optionally on end face or front • System product for handling and assembly technology
	DGPI/DGPIL 	**Do not use for new projects!** • With or without guide • With contactless measuring displacement encoder, integrated • Wide range of options for mounting on drives • System product for handling and assembly technology
	DGP/DGPL 	**Do not use for new projects!** • With or without guide • With potentiometer or contactless measuring displacement encoder, attached • With clamping unit • Wide range of options for mounting on drives
	With piston rod	
	DNCI 	• With contactless measuring displacement encoder • Various piston rod variants • Standards-based cylinder to ISO 15552 ISO DIN VDMA
	DDPC 	• With contactless measuring displacement encoder • Various piston rod variants • Standards-based cylinder to ISO 15552 ISO DIN VDMA
	DNC/DSBC 	• With attached potentiometer MLO-LWG • Various piston rod variants • Standards-based cylinder to ISO 15552 ISO DIN VDMA
Swivel modules	**Swivel modules**	
	DSMI 	• Based on swivel modules DSM • Integrated rotary potentiometer • Compact design • Wide range of mounting options

Cylinders with displacement encoder

Product range overview

FESTO

Piston ∅	Stroke/swivel angle [mm/°]	Suitable for positioning with CPX-CMAX	Suitable for positioning with SPC200	Suitable for end-position controller CPX-CMPX	Suitable for end-position controller SPC11	Suitable for use as a measuring cylinder
Rodless						
25, 32, 40	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	■	■	■	■	■
25, 32, 40, 50, 63	225, 300, 360, 450, 500, 600, 750, 1000, 1250, 1500, 1750, 2000	■	■	■	■	■
25, 32, 40, 50, 63	225, 300, 360, 450, 500, 600, 750, 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	■	■	■	■	■
Swivel modules						
25, 40, 63	270	■	■	■	■	■

Cylinders with displacement encoder

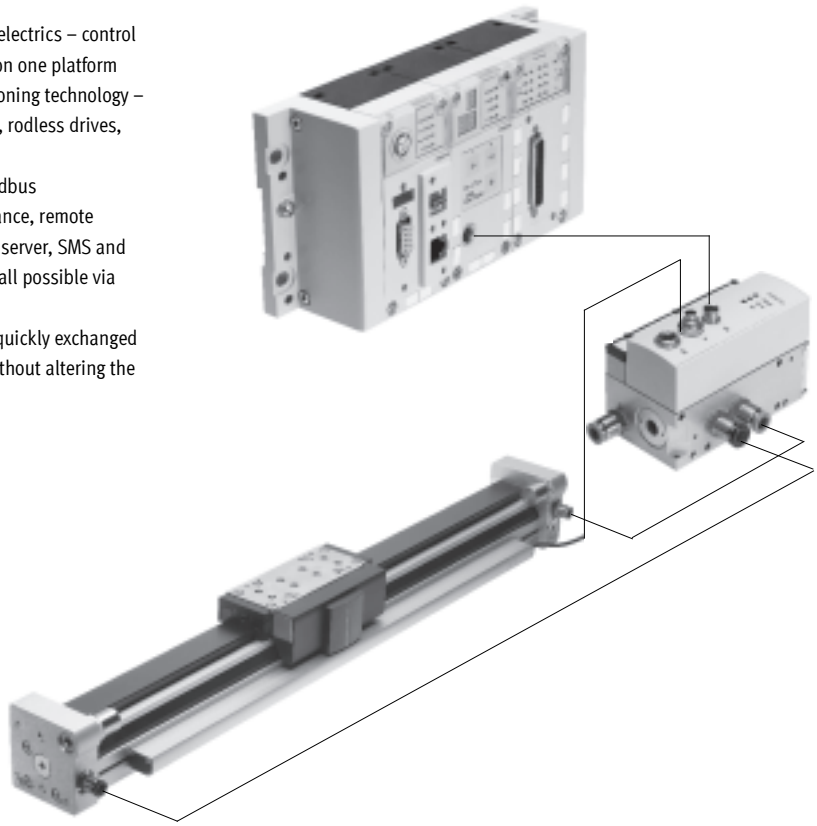
Features

Servopneumatic 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.

Advantages:

- 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

Technical data ➔ Internet: cpx-cmax

Free choice:
Position and force control, directly actuated or selected from one of 64 configurable position sets.
If you are looking for something more: the configurable function for switching to the next set enables simple functional sequences to be realised with the axis controller CPX-CMAX.
All stations are recognised as: the auto-identification function identifies each participant with its device data on the controller CPX-CMAX.

Also included:
The functional scope of the controller CPX-CMAX includes actuation of a brake or clamping unit via the proportional directional control valve VPWP.
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.

Advantages:

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

Cylinders with displacement encoder

Features

End-position controller CPX-CMPX

Technical data ➔ 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 control of downtime.
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.

Advantages:
- 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

Technical data ➔ 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 rate of 350, 700, 1400 and 2000 l/min.

With switching output for actuating a brake.
Coloured supply ports.
Pre-assembled cables guarantee faultless and fast connection with the controllers CPX-CMPX and CPX-CMAX.

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

Measuring module CPX-CMIX

Technical data ➔ 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 of the type MLO.

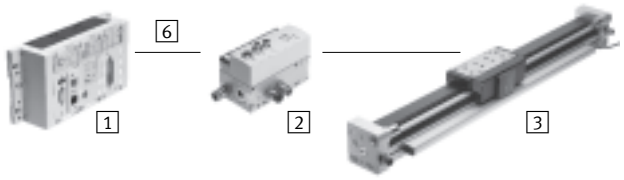
Advantages:
- All process steps can be documented, which improves quality
- An adjustable contact force (via pressure regulator) increases the precision of the "displacement sensor"
- With displacement encoders for measuring absolute values, the actual position is immediately available after the system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

Cylinders with displacement encoder

Drive options

System with linear drive DDLI, DGCI

Technical data ➔ Internet: ddli or dgci



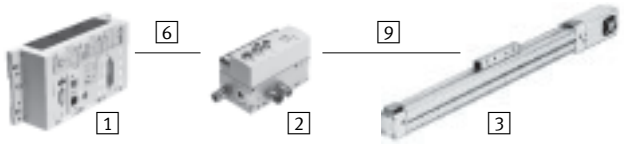
1 Controller module CPX-CMPX or CPX-CMAX
2 Proportional directional control valve VPWP
3 Linear drive DDLI, DGCI with displacement encoder
6 Connecting cable KVI-CP-3-...

- Pneumatic rodless linear drive with displacement encoder, with or without recirculating ball bearing guide
- Displacement encoder with absolute and contactless measurement
- Diameters:
  - DGCI: 18 ... 63 mm
  - DDLI: 25 ... 40 mm
- Stroke: 100 ... 2000 mm in fixed lengths
- Range of applications: Soft Stop and pneumatic positioning
- Loads from 1 ... 180 kg
- No sensor interface required

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

System with linear drive DGPI, DGPIL or displacement encoder MME-MTS

Technical data ➔ Internet: dgpi



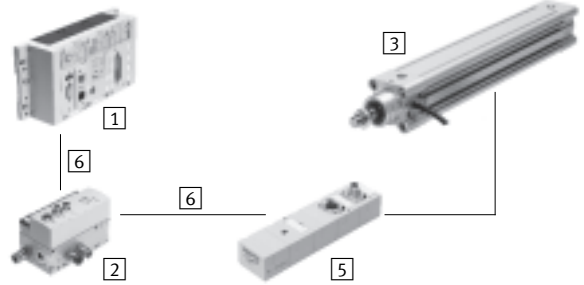
1 Controller module CPX-CMPX or CPX-CMAX
2 Proportional directional control valve VPWP
3 Linear drive DGPI, DGPIL with displacement encoder
6 Connecting cable KVI-CP-3-...
9 NEBP-M16W6-K-2-M9W5

- Pneumatic rodless linear drive with displacement encoder, with or without recirculating ball bearing guide
- Displacement encoder with absolute and contactless measurement
- Diameter: 25 ... 63 mm
- Stroke: 225 ... 2000 mm in fixed lengths
- Range of applications: Soft Stop and pneumatic positioning
- Loads from 2 ... 180 kg
- No sensor interface required

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

System with standard cylinder DNCI, DDPC

Technical data ➔ Internet: dnci



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

- Standard 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 measuring
- Diameter: 32 ... 100 mm
- Stroke: 100 ... 750 mm
- Range of applications: Soft Stop and pneumatic positioning
- Loads from 3 ... 450 kg and a matching sensor interface CASM-S-D3-R7
- Pre-assembled cables guarantee faultless and fast electrical connection

Advantages:
- 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)

Cylinders with displacement encoder

Drive options

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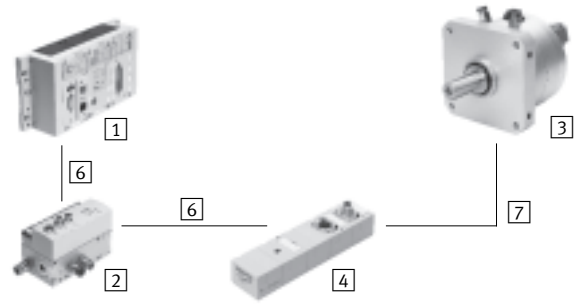
System with swivel module DSMI

Technical data ➔ Internet: dsmi



1 Controller module CPX-CMPX or CPX-CMAX
2 Proportional directional control valve VPWP
3 Swivel module 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

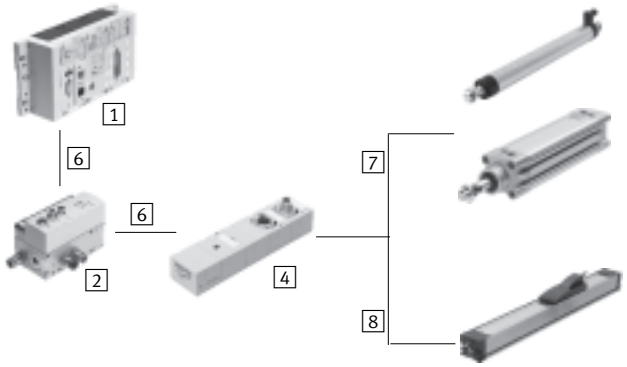
- Swivel module DSMI with integrated displacement encoder
- Identical design to pneumatic swivel module DSM
- Absolute displacement encoder based on a potentiometer
- Swivel range of 0 ... 270°
- Size: 25, 40, 63
- Max. torque: 5 ... 40 Nm
- Range of applications: Soft Stop and pneumatic positioning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

Advantages:

- 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

Technical data ➔ 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: 100 ... 2000 mm
- Pre-assembled cables guarantee faultless and fast connection with the sensor interface CASM
- Range of applications: Soft Stop and pneumatic positioning with cylinder ∅ 25 ... 80 mm, e.g. DNC or DSBC
- Loads from 1 ... 300 kg

Advantages:

- 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

Cylinders with displacement encoder

Drive options

System components for Soft Stop systems with end-position controller CPX-CMPX							
	Linear drive		Standard cylinder	Swivel module	Displacement encoder		→ Page/ Internet
	DDLI/DGCI	DGPI	DNCI, DDPC	DSMI	MLO-LWG/-TLF	MME-MTS	
End-position controller CPX-CMPX	■	■	■	■	■	■	cmpx
Prop. 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-...	–	■	–	–	–	■	nebp

System components for pneumatic positioning systems with axis controller CPX-CMAX							
	Linear drive		Standard cylinder	Swivel module	Displacement encoder		→ Page/ Internet
	DDLI/DGCI	DGPI	DNCI, DDPC	DSMI	MLO-LWG/-TLF	MME-MTS	
Axis controller CPX-CMAX	■	■	■	■	■	■	cmax
Prop. 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-...	–	■	–	–	–	■	nebp

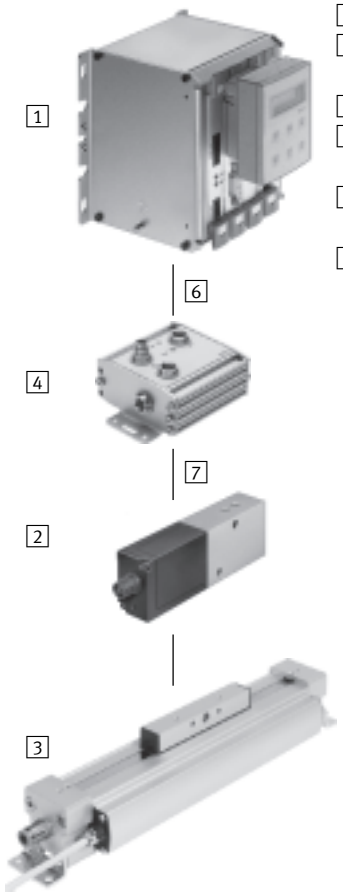
System components for measuring cylinders with measuring module CPX-CMIX							
	Linear drive		Standard cylinder	Swivel module	Displacement encoder		→ Page/ Internet
	DDLI/DGCI	DGPI	DNCI, DDPC	DSMI	MLO-LWG/-TLF	MME-MTS	
Measuring module CPX-CMIX-M1-1	■	■	■	■	■	■	cmix
Sensor interface CASM-S-D2-R3	–	–	–	■	■	–	casm
Sensor interface CASM-S-D3-R7	–	–	■	–	–	–	casm
Connecting cable KVI-CP-3-...	(■)[1]	(■)[1]	■	■	■	(■)	kvi
Connecting cable NEBC-P1W4-...	–	–	–	■	■ / –	–	nebc
Connecting cable NEBC-A1W3-...	–	–	–	–	– / ■	–	nebc
Connecting cable NEBP-M16W6-...	–	■	–	–	–	■	nebp

1) As an extension

Cylinders with displacement encoder

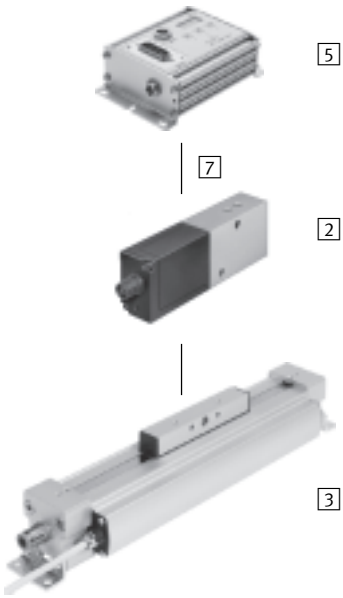
Overview

Individual components for positioning with axis controller SPC200
➔ Internet: spc200



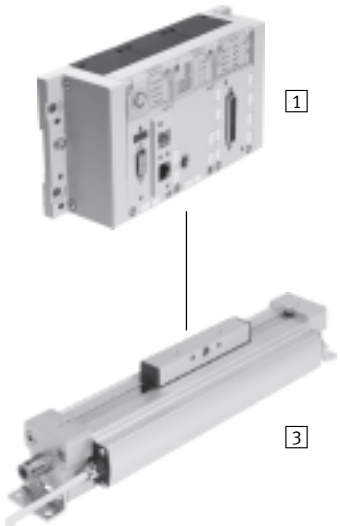
1 Axis controller SPC200
2 Proportional directional control valve MPYE
3 Linear drive DDLI
4 Axis interface SPC-AIF-MTS-2
6 Connecting cable KSPC-AIF-...
7 Connecting cable KMPYE-AIF-...

with end-position controller SPC11
➔ Internet: spc11



2 Proportional directional control valve MPYE
3 Linear drive DDLI
5 End-position controller SPC11-MTS-AIF-2
7 Connecting cable KMPYE-AIF-...

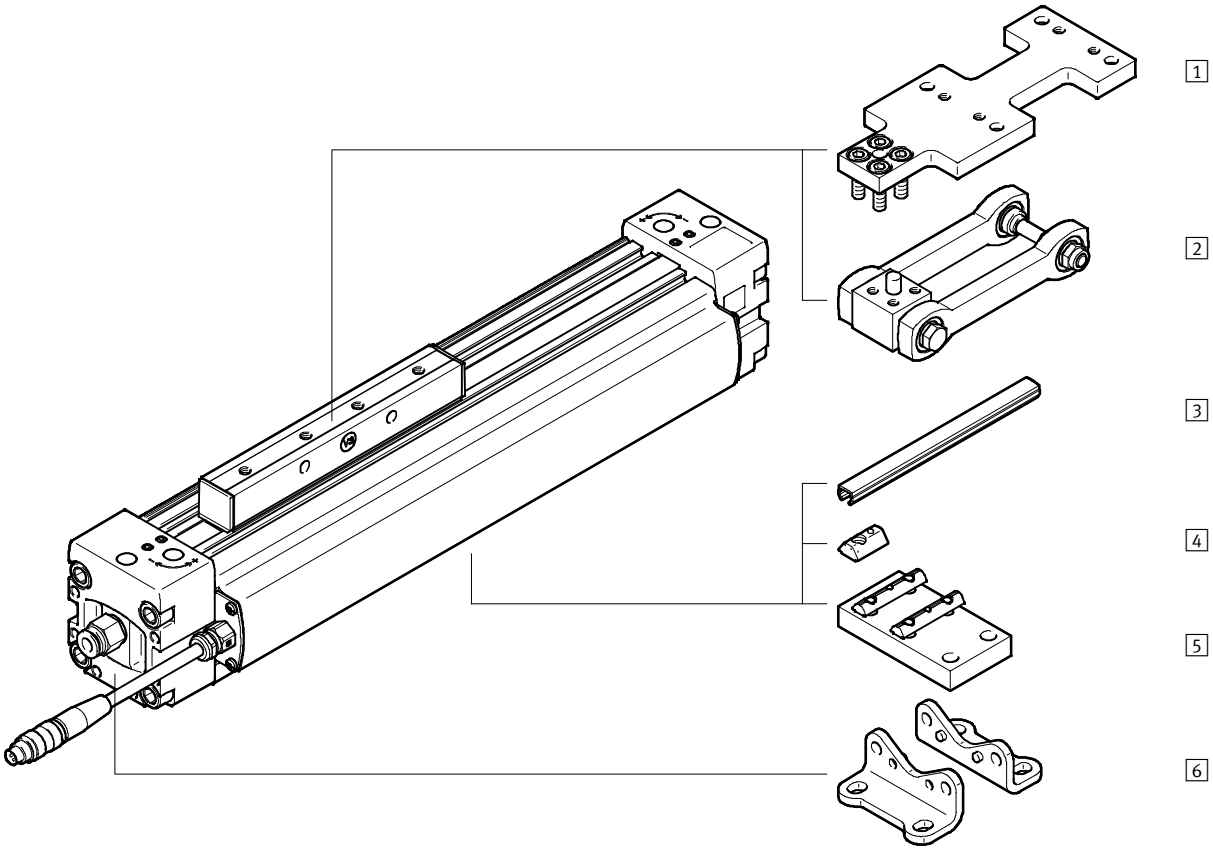
Individual components for use as a measuring cylinder with measuring module CPX-CMIX
➔ Internet: cmix



1 Measuring module CPX-CMIX
3 Linear drive DDLI

Linear drives DDLI, with integrated displacement encoder

Peripherals overview



Accessories			
	Type	Brief description	➔ Page/Internet
1	Adapter plate AP	Has the same interface as the moment compensator FKP with the linear drive DGP	21
2	Moment compensator T	For compensating misalignments when using external guides	21
3	Slot cover NS, NC	For protecting against the ingress of dirt	23
4	Slot nut NM	For mounting attachments	23
5	Central support Employee	For mounting the axis, particularly with long strokes	20
6	Foot mounting MF	For mounting the axis	20

Note

Allocation table of drives and associated proportional directional control valves ➔ 23

Linear drives DDLI, with integrated displacement encoder

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Type codes

Type	
DDLI	Linear drive

Piston ∅ [mm]

Stroke [mm]

Cushioning	
P	Elastic cushioning rings/ plates at both ends

Lubrication	
–	Standard
H1	Approved for use in the food industry

Foot mounting	
–	None
MF	With foot mounting

Central support	
–	None
...MA	With central support

Cover	
–	None
NS	For sensor slot

Cover	
–	None
NC	For mounting slot

Slot nut	
–	None
...NM	For mounting slot

Moment compensator	
–	None
T	With moment compensator

Adapter plate	
–	None
AP	With adapter plate

Operating instructions	
–	With operating instructions
DN	Without operating instructions

New

Linear drives DDLI, with integrated displacement encoder

Technical data

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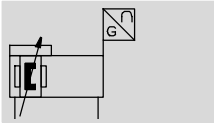
Function



www.festo.com

Diameter
25 ... 40 mm

Stroke length
100 ... 2,000 mm

General technical data				
Piston ∅		25	32	40
Design		Rodless linear drive with slide and displacement encoder		
Mode of operation		Double-acting		
Moment compensator principle		Slotted cylinder, mechanically coupled		
Mounting position		Any		
Type of mounting		Central support		
		Foot mounting		
		Direct mounting		
Cushioning		Elastic cushioning rings/plates at both ends		
Position sensing		Via integrated displacement encoder		
Measuring principle (displacement encoder)		Digital, magnetostrictive, contactless and absolute measurement		
Pneumatic connection[1]		G⅛		G¼
Stroke[2]	[mm]	100; 160; 225; 300; 360; 450; 500; 600; 750; 850; 1,000; 1,250; 1,500; 1,750; 2,000		
Max. speed	[m/s]	3		

1) The tubing outside diameters apply to pre-assembled push-in fittings ➔ 15
2) Note stroke reduction in combination with CPX-CMAX, SPC200

Operating and environmental conditions		
Operating pressure	[bar]	2 ... 8
Operating pressure[1]	[bar]	4 ... 8
Operating medium[2]		Compressed air to ISO 8573-1:2010 [6:4:4]
Note on operating/pilot medium		Lubricated operation not possible Pressure dew point 10°C below ambient temperature/temperature of medium
Ambient temperature	[°C]	–10 ... +60
Vibration resistance to DIN/IEC 68 Part 2-6		At 10 ... 60 Hz: 0.15 mm
		At 60 ... 150 Hz: 2G
Continuous shock resistance to DIN/IEC 68, Part 2-27		Half sine 15 g, 11 ms
CE marking (see declaration of conformity)[3]		To EU EMC Directive
Certification		C-Tick
Corrosion resistance class CRC[4]		1

1) Only applies to applications with end-position controller CPX-CMPX, SPC11 and axis controller CPX-CMAX, SPC200
2) The proportional directional control valve VPWP, MPYE requires these characteristic values
3) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com ➔ Support ➔ User documentation.
If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.
4) Corrosion resistance class 1 according to Festo standard 940 070
Components subject to low corrosion stress. Transport and storage protection. Parts that do not have primary decorative surface requirements, e.g. in internal areas that are not visible or behind covers.

Linear drives DDLI, with integrated displacement encoder

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Technical data

Forces [N] and impact energy [Nm]			
Piston ∅	25	32	40
Theoretical force at 6 bar	295	483	754
Impact energy at the end positions	0.05	0.12	0.25

Positioning characteristics with axis controller CPX-CMAX, SPC200				
Piston ∅		25	32	40
Mounting position		Any		
Resolution	[mm]	0.01		
Repetition accuracy		→ 15		
Minimum load, horizontal[1]	[kg]	2	3	5
Maximum load, horizontal[1]	[kg]	30	50	75
Minimum load, vertical[1]	[kg]	2	3	5
Maximum load, vertical[1]	[kg]	10	15	25
Minimum travel speed	[m/s]	0.05		
Maximum travel speed	[m/s]	3		
Typical positioning time, long stroke[2]	[s]	0.65/1.00	0.65/1.05	0.70/1.05
Typical positioning time, short stroke[3]	[s]	0.38/0.60	0.38/0.60	0.38/0.60
Minimum positioning stroke[4]	[%]	≤ 3		
Stroke reduction[5]	[mm]	25	25	35
Recommended proportional directional control valve				
For CPX-CMAX		→ 23		
For SPC200		→ 24		

1) Load = payload + load of all moving parts on the drive
2) At 6 bar, horizontal mounting position, DDLI-XX-1000, 800 mm travel at min./max. load
3) At 6 bar, horizontal mounting position, DDLI-XX-1000, 100 mm 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 ∅		25	32	40
Mounting position		Any		
Maximum controllable force[1]	[N]	266	435	679
Typical friction forces[2]	[N]	20	30	40
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 differential pressure 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 for the force F at the workpiece:
$F = F_{setpoint} \pm F_{friction\ forces} \pm$ repetition accuracy of pressure control

Linear drives DDLI, with integrated displacement encoder

Technical data

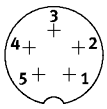
Positioning characteristics with Soft Stop end-position controller CPX-CMPX, SPC11				
Piston ∅		25	32	40
Mounting position		Any		
Repetition accuracy[1]	[mm]	±2		
Minimum load, horizontal[2]	[kg]	2	3	5
Maximum load, horizontal[2]	[kg]	30	50	75
Minimum load, vertical[2]	[kg]	2	3	5
Maximum load, vertical[2]	[kg]	10	15	25
Travel time		➔ SoftStop sizing software: ➔ www.festo.com		
Recommended proportional directional control valve				
For CPX-CMPX		➔ 23		
For SPC11		➔ 24		

1) One intermediate position. The accuracy in the end positions depends solely on the design of the end stops
2) Load = payload + load of all moving parts on the drive

Electrical data – displacement encoder		
Output signal		Digital
Linearity error[1]	[%]	< ±0.02, min. ±50 µm
Maximum travel speed	[m/s]	3
Protection class		IP67
CE marking (see declaration of conformity)		To EU EMC Directive[2]
Power supply	[V DC]	24 (±25%)
Current consumption	[mA]	Typically 100
Maximum temperature coefficient	[ppm/°K]	15
Electrical connection		Cable with 5-pin plug, round design, M9
Cable length	[m]	1.5
Cable quality		Suitable for use with energy chains

1) Always refers to max. stroke.
2) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com ➔ Support ➔ User documentation.
If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

Pin allocation of plug



Pin	Function
1	24 V
2	n.c.
3	0 V

Pin	Function
4	CAN_H
5	CAN_L
–	Screening

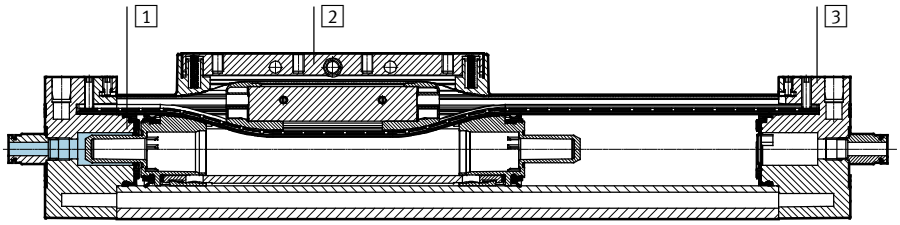
Linear drives DDLI, with integrated displacement encoder

Technical data

Weight [g]			
Piston ∅	25	32	40
Basic weight with 0 mm stroke	1,103	1,716	2,580
Additional weight per 10 mm stroke	34	43	58
Moving mass	130	227	350

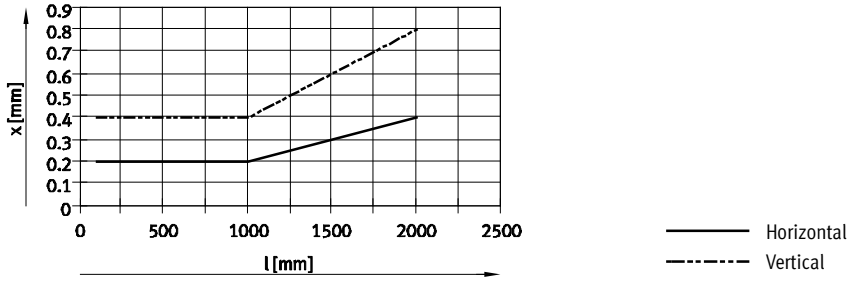
Materials

Sectional view



Linear drives		
1	Cylinder profile, housing	Anodised aluminum
2	Slide	Anodised aluminum
3	End cap	Painted aluminum
–	Seals	NBR, TPE-U(PU)
–	Cable	PUR
–	Note on materials	Free of copper and PTFE
		RoHS-compliant

Repetition accuracy x as a function of stroke l



Tubing outside diameters of pre-assembled push-in fittings				
Size	Stroke	∅ in [mm]		
	[mm]	6	8	10
DDLI-25	100 ... 160	■	–	–
	225 ... 2,000	–	■	–
DDLI-32	100	■	–	–
	160 ... 2,000	–	■	–
DDLI-40	100 ... 750	–	■	–
	850 ... 2,000	–	–	■

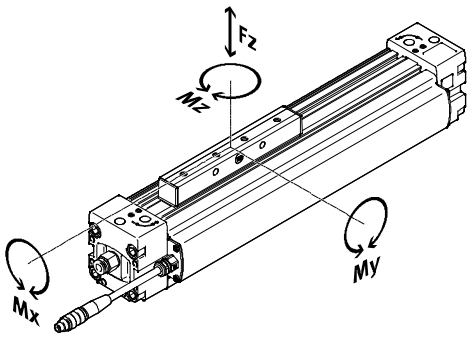
Linear drives DDLI, with integrated displacement encoder

Technical data

FESTO

Characteristic load values

The indicated forces and torques refer to the surface of the slide.
These values must not be exceeded during dynamic operation. Special attention must be paid to the deceleration phase.



If the drive is simultaneously subjected to several of the forces and torques listed below, the following equation must be satisfied in addition to the indicated maximum loads:

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

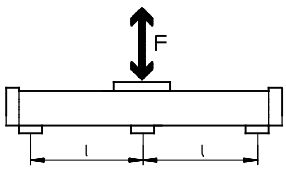
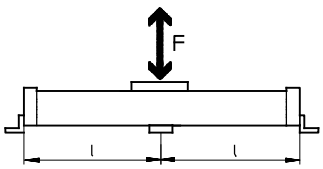
$$\frac{Fz}{Fz_{max.}} \leq 1 \qquad \frac{Mz}{Mz_{max.}} \leq 1$$

Permissible forces and torques

Piston ∅		25	32	40
$Fz_{max.}$	[N]	330	480	800
$Mx_{max.}$	[Nm]	1.2	1.9	3.8
$My_{max.}$	[Nm]	20	40	60
$Mz_{max.}$	[Nm]	3	5	8

Number of central supports MUP as a function of overall length

Excessive distances between the central supports can reduce the positioning accuracy. The following table shows the required minimum number of central supports and foot mountings.

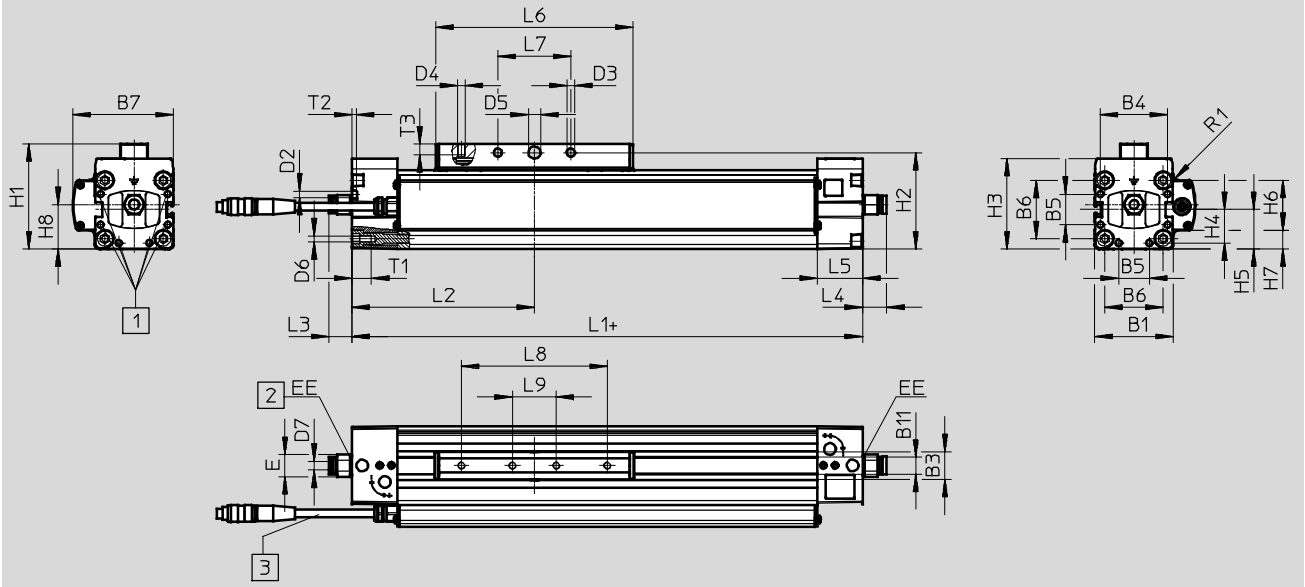
Stroke [mm]	Number of mounting components		
	Order code MA	Order code MF	
	Central support	Foot mounting	+ Central support
			
100 ... 400	2	2	0
401 ... 600	2	2	1
601 ... 1,200	3	2	1
1201 ... 1,400	3	2	2
1401 ... 2,000	4	2	2

Linear drives DDLI, with integrated displacement encoder

Technical data

FESTO

Dimensions Download CAD data ➔ **www.festo.com**



\+ = plus stroke length

[1] Mounting hole for foot mounting

[2] Connecting thread

[3] Cable length 1,500 mm

∅ [mm]	B1 ±0.4	B3 ±0.2	B4	B5	B6	B7 +0.4	B11	D2 ∅	D3 ∅ ±0.2	D4	D5 ∅ H7
25	45	19	39.1	18	32.5	60.2	9.5	3.3	5.2	M5	8
32	54	19	46	21	40	69.1	9.5	4.3	5.2	M5	8
40	64	21	53	28	49	78.4	9.6	4.3	6.5	M6	10

∅ [mm]	D6	EE	H1	H2	H3	H4	H5	H6	H7	H8	R1
25	M4	G1⁄8	63	57	51	19.55	22.5	34.5	5.15	28.7	2.5
32	M5	G1⁄8	72	66	61.8	23	27	34.5	12.65	30.4	3.5
40	M5	G1⁄4	86	78	71.8	26.5	32	34.5	16.25	35.5	5

∅ [mm]	L1	L2	L5	L6	L7 ±0.1	L8 ±0.1	L9 ±0.1	T1	T2	T3
25	200	100	25	109	30	50	–	13	2	7.5
32	250	125	31	135	50	100	30	13.2	3	7.5
40	300	150	31	171	70	130	40	13.2	3	7.5

∅ [mm]	Stroke [mm]	D7	E	L3	L4
25	100 … 160	6	15	15.9	16.4
	225 … 2,000	8	16	21.1	21.6
32	100	6	15	15.9	16.4
	160 … 2,000	8	16	21.1	21.6
40	100 … 750	8	19	16.6	17.2
	850 … 2,000	10	19	23.6	24.3

Linear drives DDLI, with integrated displacement encoder

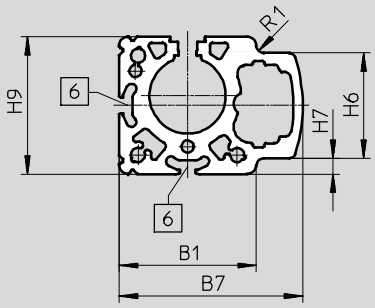
Technical data

FESTO

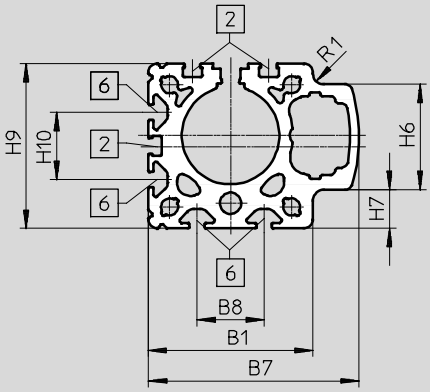
Dimensions Download CAD data ➔ **www.festo.com**

Profile barrel

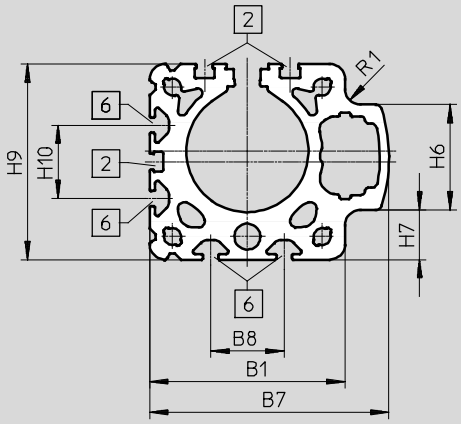
∅ 25



∅ 32



∅ 40



2 Sensor slot
6 Mounting slot for slot nut

∅ [mm]	B1 +0.4	B7 +0.4	B8	H6	H7	H9 +0.4	H10	R1
25	45	60.2	–	34.5	5.15	45	–	2.5
32	54	69.1	22	34.5	12.65	54	22	3.5
40	64	78.4	24	34.5	16.25	64	24	5

Linear drives DDLI, with integrated displacement encoder

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Ordering data – Modular products

Ordering table

		25	32	40	Condi-tions	Code		Enter code
M	Module No.	**1315779**	**1344778**	**1463452**				
	Function	Linear drive with integrated displacement encoder				**DDLI**		DDLI
	Piston ∅ [mm]	25	32	40		**-...**		
	Stroke [mm]	100; 160; 225; 300; 360; 450; 500; 600; 750; 850; 1,000; 1,250; 1,500; 1,750; 2,000				**-...**		
	Cushioning	Elastic cushioning rings/plates at both ends				**-P**		-P
O	Lubrication	Standard						
		Approved for use in the food industry				**-H1**		
	Foot mounting	None						
		1 set				**-MF**		
	Profile mounting	None						
		1 ... 10				**...MA**		
	Sensor slot cover	None						
		–	1 set (for the entire drive length and all slots)			**NS**		
	Mounting slot cover	None						
		1 set (for the entire drive length and all slots)				**NC**		
	Slot nut for mounting slot	None						
		1 ... 50			1	**...NM**		
	Moment compensator	None						
		Moment compensator coupling				**T**		
	Adapter plate	None						
		FKP interface			2	**AP**		
	Operating instructions	With operating instructions						
		Without operating instructions				**DN**		

1 **NM** For size 25: Entry "1NM" = delivery quantity 4 pieces

2 **AP** Only with moment compensator T

Transfer order code

	DDLI	–		–		–	P	–		–									

Linear drives DDLI, with integrated displacement encoder

Accessories

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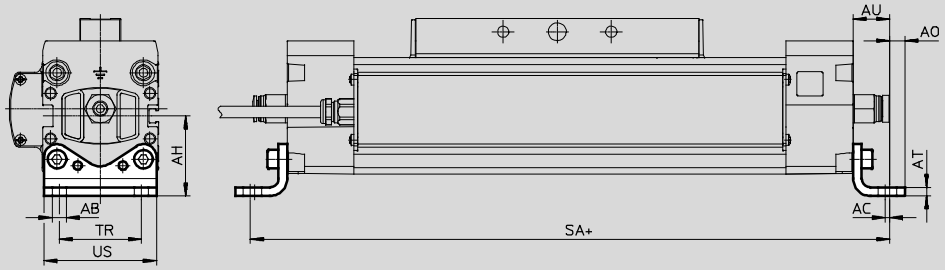
Foot mounting HP
(Order code: MF)

Material:
Galvanised steel

Free of copper and PTFE

Note

Central supports MUP are additionally required for strokes above 400 mm ➔ 15



\+ = plus stroke length

Dimensions and ordering data

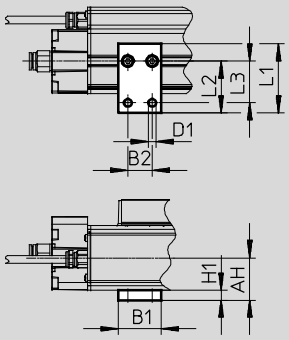
For ∅ [mm]	AB ∅	AC	AH	AO	AT	AU	SA	TR	US	Weight [g]	Part No.	Type
25	5.5	2	29.5	6	3	13	226	32.5	44	61	**150731**	**HP-25**
32	6.6	2	37	7	4	17	284	38	52	117	**150732**	**HP-32**
40	6.6	2	46	8.5	5	17.5	335	45	62	188	**150733**	**HP-40**

Central support MUP
(Order code: MA)

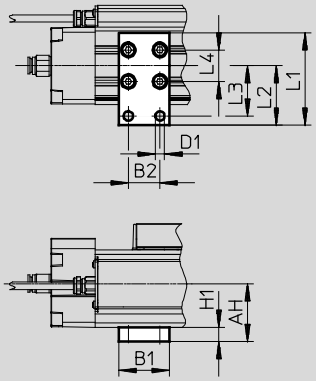
Material:
Anodised aluminum

Free of copper and PTFE

MUP-18/25-P



MUP-32/40



Dimensions and ordering data

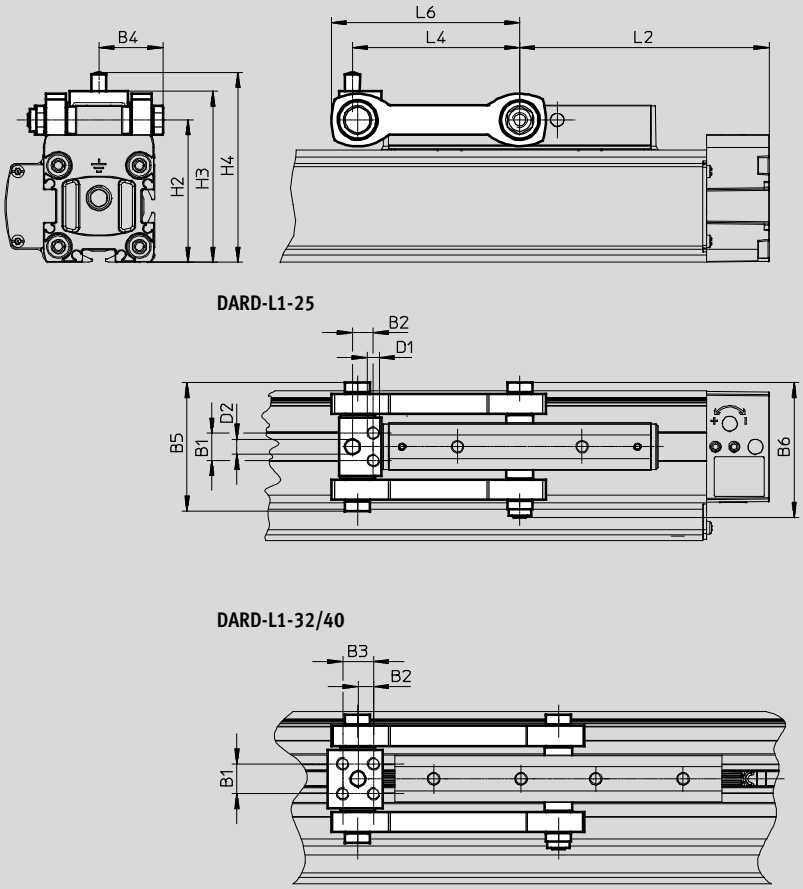
For ∅ [mm]	AH	B1	B2	D1 ∅	H1	L1	L2	L3	L4	Weight [g]	Part No.	Type
25	29.5	30	17	5.5	7	48	36	29	–	32	**1711704**	**MUP-18/25-P**
32	37	35	22	6.6	10	64.5	41.5	35	22	89	**150737**	**MUP-32**
40	46	35	22	6.6	14	75	47	40	24	130	**150738**	**MUP-40**

Linear drives DDLI, with integrated displacement encoder

Accessories

Moment compensator DARD
(Order code: T)

Material:
Galvanised steel



Dimensions and ordering data

For ∅ [mm]	Max. offset between linear drive and external guide[1] [mm]	Max. permissible load in direction of force [N]	Ambient temperature [°C]	Weight [g]
25	±2.5	800	–10 … +60	240
32	±2.5	1,300	–10 … +60	275
40	±2.5	2,000	–10 … +60	580

For ∅ [mm]	B1	B2	B3	B4 ±2.5	B5	B6	D1 ∅	D2 ∅	H2
25	11	8.4	–	25.7	51.4	54	M5x17	6	57
32	12	6.2	12.4	25.7	51.4	54	M5x13	6	66
40	18	11	18	36	72	75.3	M6x16	6	78

For ∅ [mm]	H3 ±2.5	H4 ±2.5	L2	L4	L6 max.	Part No.	Type
25	71.5	79	100	67.1	75.5	**2349275**	**DARD-L1-25-M**
32	80.5	88	125	80.3	91	**2349276**	**DARD-L1-32-M**
40	94.5	104.5	150	104	117	**2349277**	**DARD-L1-40-M**

1) Laterally and vertically.

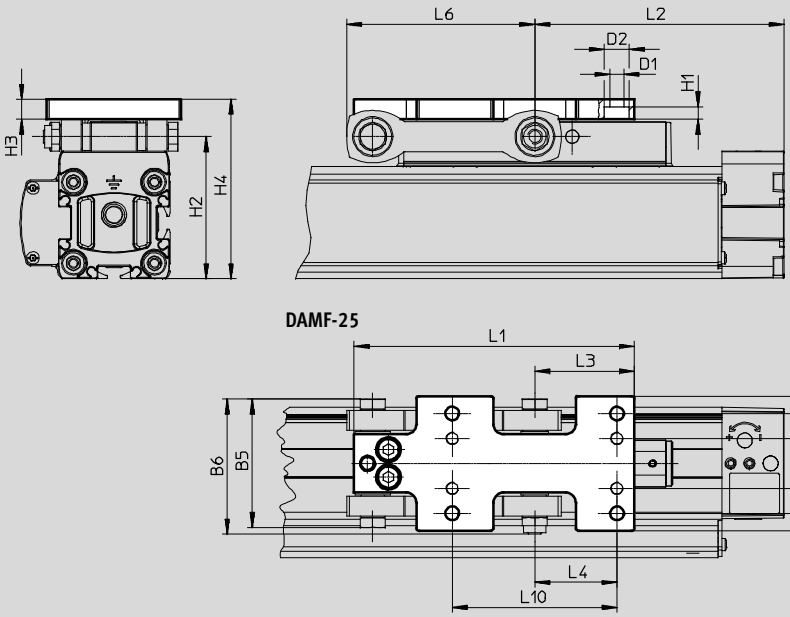
Linear drives DDLI, with integrated displacement encoder

Accessories

Adapter plate DAMF
(Order code: AP)

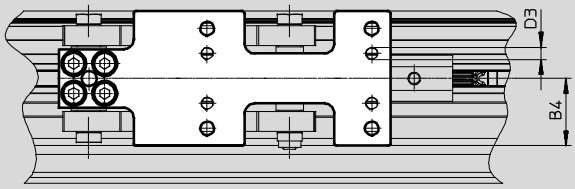
Material:
Galvanised steel

The adapter plate DAMF has the same interface as the moment compensator FKP with linear drive DGP.



DAMF-25

DAMF-32/40



Dimensions and ordering data

For ∅ [mm]	B1	B2	B3	B4 ±2.5	B5	B6	D1 ∅	D2 ∅	D3	H1	H2	H3
25	20	40	54	27	51.4	54	5.5	10	M5	5	57	8
32	20	40	54	27	51.4	54	5.5	10	M5	5	66	8
40	24	44	58	29	72	75.3	6.6	11	M6	6	78	10

For ∅ [mm]	H4 ±2.5	L1	L2	L3	L4	L6 max.	L10	Weight	Part No.	Type
25	75	112.4	100	40	33	75.5	66	265	**2349282**	**DAMF-25-FKP**
32	84	133	125	40.5	33	91	66	308	**2349283**	**DAMF-32-FKP**
40	99	162	150	45	38	117	76	593	**2349284**	**DAMF-40-FKP**

Linear drives DDLI, with integrated displacement encoder

Accessories

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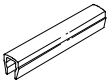
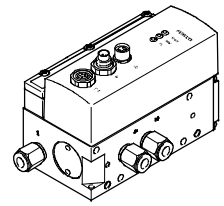
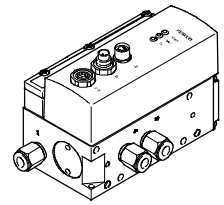
Ordering data						
	For ∅	Comment	Order code	Part No.	Type	PU[1]
Slot nut ABAN, NST					Technical data ➔ Internet: hmbn	
	25	For mounting slot	NM	**8003032**	**ABAN-1M4-5**	4
	32, 40			**150914**	**NST-5-M5**	1
Slot cover ABP					Technical data ➔ Internet: abp	
	25	For mounting slot	NC	**563360**	**ABP-5-S1**	2
	32, 40	Every 0.5 m		**151681**	**ABP-5**	
	32, 40	for sensor slot Every 0.5 m	NS	**563360**	**ABP-5-S1**	2

1) Packaging unit

Ordering data – Proportional directional control valves				
	For ∅	Stroke	Proportional directional control valve Technical data ➔ Internet: vpwp	
	[mm]	[mm]	Part no.	Type
	for applications with axis controller CPX-CMAX			
	25	100 ... 160	**550170**	**VPWP-4-L-5-Q6-10-E-...**
		225 ... 600	**550170**	**VPWP-4-L-5-Q8-10-E-...**
		750 ... 2 000	**550171**	**VPWP-6-L-5-Q8-10-E-...**
	32	100	**550170**	**VPWP-4-L-5-Q6-10-E-...**
		160 ... 360	**550170**	**VPWP-4-L-5-Q8-10-E-...**
		450 ... 2,000	**550171**	**VPWP-6-L-5-Q8-10-E-...**
	40	100 ... 300	**550170**	**VPWP-4-L-5-Q8-10-E-...**
		360 ... 750	**550171**	**VPWP-6-L-5-Q8-10-E-...**
		850 ... 2,000	**550172**	**VPWP-8-L-5-Q10-10-E-...**

Ordering data – Proportional directional control valve				
	For ∅	Stroke	Proportional directional control valve Technical data ➔ Internet: vpwp	
	[mm]	[mm]	Part no.	Type
	for applications with Soft Stop end-position controller CPX-CMPX, horizontal			
	25	100 ... 160	**550170**	**VPWP-4-L-5-Q6-10-E-...**
		225 ... 300	**550170**	**VPWP-4-L-5-Q8-10-E-...**
		360 ... 2,000	**550171**	**VPWP-6-L-5-Q8-10-E-...**
	32	100	**550170**	**VPWP-4-L-5-Q6-10-E-...**
		160 ... 1,000	**550171**	**VPWP-6-L-5-Q8-10-E-...**
		1250 ... 2,000	**550172**	**VPWP-8-L-5-Q-10-E-...** [1]
	40	100 ... 500	**550171**	**VPWP-6-L-5-Q8-10-E-...**
		600 ... 750	**550172**	**VPWP-8-L-5-Q-10-E-...** [1]
		850 ... 2,000	**550172**	**VPWP-8-L-5-Q10-10-E-...**

1) Push-in fittings for a tubing O.D. of 8 mm must be used for these stroke ranges.

Linear drives DDLI, with integrated displacement encoder

Accessories

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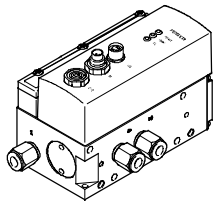
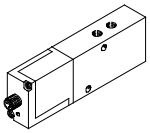
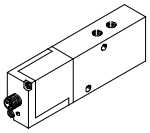
Ordering data – Proportional directional control valve				
	For ∅	Stroke	Proportional directional control valve Technical data ➔ Internet: vpwp	
	[mm]	[mm]	Part no.	Type
	for applications with Soft Stop end-position controller CPX-CMPX, vertical			
	25	100 … 160	**550170**	**VPWP-4-L-5-Q6-10-E-…**
		225 … 750	**550170**	**VPWP-4-L-5-Q8-10-E-…**
		850 … 2,000	**550171**	**VPWP-6-L-5-Q8-10-E-…**
	32	100	**550170**	**VPWP-4-L-5-Q6-10-E-…**
		160 … 300	**550170**	**VPWP-4-L-5-Q8-10-E-…**
		360 … 1,750	**550171**	**VPWP-6-L-5-Q8-10-E-…**
		2,000	**550172**	**VPWP-8-L-5-Q-10-E-…** [1]
	40	100 … 225	**550170**	**VPWP-4-L-5-Q8-10-E-…**
		300 … 750	**550171**	**VPWP-6-L-5-Q8-10-E-…**
		850 … 1,000	**550171**	**VPWP-6-L-5-Q-10-E-…** [2]
		1250 … 2,000	**550172**	**VPWP-8-L-5-Q10-10-E-…**

1) Push-in fittings for a tubing O.D. of 8 mm must be used for this stroke range.
2) Push-in fittings for a tubing O.D. of 10 mm must be used for these stroke ranges.

Ordering data – Proportional directional control valve				
	For ∅	Stroke	Proportional directional control valve Technical data ➔ Internet: mpye	
	[mm]	[mm]	Part no.	Type
	for applications with axis controller SPC200			
	25	100 … 160	**154200**	**MPYE-5-M5-010-B**
		225 … 750	**151692**	**MPYE-5-⅛-LF-010-B**
		850 … 2,000	**151693**	**MPYE-5-⅛-HF-010-B**
	32	100	**154200**	**MPYE-5-M5-010-B**
		160 … 360	**151692**	**MPYE-5-⅛-LF-010-B**
		450 … 2,000	**151693**	**MPYE-5-⅛-HF-010-B**
	40	100 … 300	**151692**	**MPYE-5-⅛-LF-010-B**
		360 … 750	**151693**	**MPYE-5-⅛-HF-010-B**
		850 … 2,000	**151694**	**MPYE-5-¼-010-B**

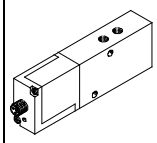
Ordering data – Proportional directional control valve				
	For ∅	Stroke	Proportional directional control valve Technical data ➔ Internet: mpye	
	[mm]	[mm]	Part no.	Type
	for applications with Soft Stop end-position controller SPC11-MTS-AIF-2, horizontal			
	25	100 … 160	**151692**	**MPYE-5-⅛-LF-010-B**
		225 … 300	**151692**	**MPYE-5-⅛-LF-010-B**
		360 … 2,000	**151693**	**MPYE-5-⅛-HF-010-B**
	32	100	**151692**	**MPYE-5-⅛-LF-010-B**
		160 … 1,000	**151693**	**MPYE-5-⅛-HF-010-B**
		1250 … 2,000	**151694**	**MPYE-5-¼-010-B**
	40	100 … 500	**151693**	**MPYE-5-⅛-HF-010-B**
		600 … 750	**151694**	**MPYE-5-¼-010-B**
		850 … 2,000	**151694**	**MPYE-5-¼-010-B**

Linear drives DDLI, with integrated displacement encoder

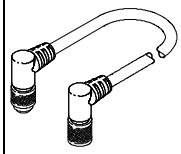
Accessories

FESTO

Ordering data – Proportional directional control valve

	For ∅ [mm]	Stroke [mm]	Proportional directional control valve Technical data ➔ Internet: mpye Part no.	Type
	for applications with Soft Stop end-position controller SPC11-MTS-AIF-2, vertical			
	25	100 … 160	**151692**	**MPYE-5-⅛-LF-010-B**
		225 … 750	**151692**	**MPYE-5-⅛-LF-010-B**
		850 … 2,000	**151693**	**MPYE-5-⅛-HF-010-B**
	32	100	**151692**	**MPYE-5-⅛-LF-010-B**
		160 … 300	**151692**	**MPYE-5-⅛-LF-010-B**
		360 … 1,750	**151693**	**MPYE-5-⅛-HF-010-B**
		2,000	**151694**	**MPYE-5-¼-010-B**
	40	100 … 225	**151692**	**MPYE-5-⅛-LF-010-B**
		300 … 750	**151693**	**MPYE-5-⅛-HF-010-B**
		850 … 1,000	**151693**	**MPYE-5-⅛-HF-010-B**
		1250 … 2,000	**151694**	**MPYE-5-¼-010-B**

Ordering data – Connecting cables

	Brief description	Cable length [m]	Part no.	Type
Connection between axis controller CPX-CMAX/end-position controller CPX-CMPX and proportional directional control valve VPWP				
	Angled plug and angled socket	0.25	**540327**	**KVI-CP-3-WS-WD-0,25**
		0.5	**540328**	**KVI-CP-3-WS-WD-0,5**
		2	**540329**	**KVI-CP-3-WS-WD-2**
		5	**540330**	**KVI-CP-3-WS-WD-5**
		8	**540331**	**KVI-CP-3-WS-WD-8**
	Straight plug and straight socket	2	**540332**	**KVI-CP-3-GS-GD-2**
		5	**540333**	**KVI-CP-3-GS-GD-5**
		8	**540334**	**KVI-CP-3-GS-GD-8**