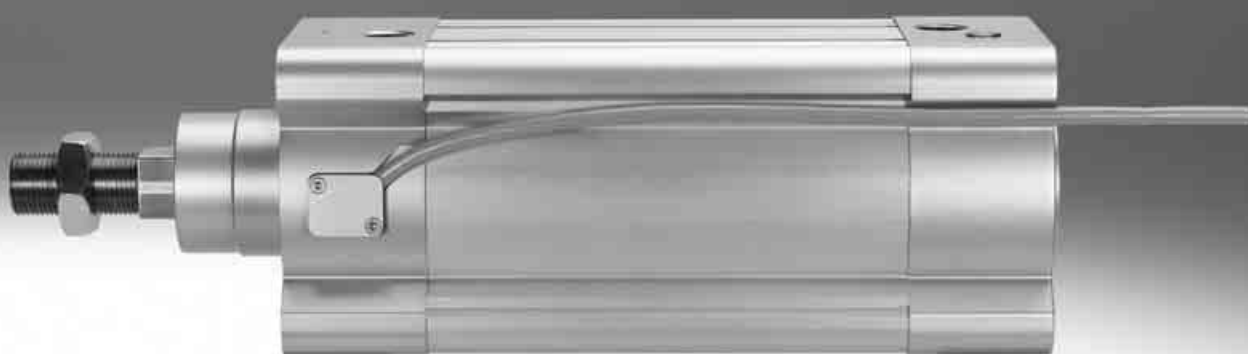



## Standard cylinders DDPC, integrated displacement encoder

**FESTO**



# Cylinders with displacement encoder

Product range overview

Function	Type	Brief description
Drives	<b>Rodless</b>	
	DDLI	 <ul style="list-style-type: none"> <li>• Without guide</li> <li>• With contactless displacement encoder</li> <li>• Based on linear drive DGC-K</li> <li>• Supply ports on end face</li> <li>• System product for handling and assembly technology</li> </ul>
	DGCI	 <ul style="list-style-type: none"> <li>• With guide</li> <li>• With contactless displacement encoder</li> <li>• Based on linear drive DGC</li> <li>• Supply ports optionally on end face or front</li> <li>• System product for handling and assembly technology</li> </ul>
	DGPI/DGPIL	 <p><b>Do not use for new designs!</b></p> <ul style="list-style-type: none"> <li>• With or without guide</li> <li>• With contactless displacement encoder, integrated</li> <li>• Wide range of options for mounting on drives</li> <li>• System product for handling and assembly technology</li> </ul>
	DGP/DGPL	 <p><b>Do not use for new designs!</b></p> <ul style="list-style-type: none"> <li>• With or without guide</li> <li>• With potentiometer or contactless displacement encoder, attached</li> <li>• With clamping unit</li> <li>• Wide range of options for mounting on drives</li> </ul>
	<b>With piston rod</b>	
	DNCI	 <ul style="list-style-type: none"> <li>• With contactless displacement encoder</li> <li>• Various piston rod variants</li> <li>• Standards-based cylinder to ISO 15552</li> </ul> <p>ISO DIN VDMA</p>
	DDPC	 <ul style="list-style-type: none"> <li>• With contactless displacement encoder</li> <li>• Various piston rod variants</li> <li>• Standards-based cylinder to ISO 15552</li> </ul> <p>ISO DIN VDMA</p>
	DNC/DSBC	 <ul style="list-style-type: none"> <li>• With attached potentiometer MLO-LWG</li> <li>• Various piston rod variants</li> <li>• Standards-based cylinder to ISO 15552</li> </ul> <p>ISO DIN VDMA</p>
Swivel module	<b>Swivel module</b>	
	DSMI	 <ul style="list-style-type: none"> <li>• Based on swivel module DSM</li> <li>• Integrated rotary encoder</li> <li>• Compact design</li> <li>• Wide range of mounting options</li> </ul>

# Cylinders with displacement encoder

Product range overview

**FESTO**

Piston Ø	Stroke/swivel angle [mm/°]	Suitable				
		For positioning with		For end-position controller		For use as a measuring cylinder
		CPX-CMAX	SPC200	CPX-CMPX	SPC11	
Rodless						
25, 32	100; 160; 225; 300; 360; 450; 500; 600; 750; 850; 1,000; 1,250; 1,500; 1,750; 2,000	■	■	■	■	■
18, 25, 32, 40, 63	100; 160; 225; 300; 360; 450; 500; 600; 750; 850; 1,000; 1,250; 1,500; 1,750; 2,000	■	■	■	■	■
25, 32, 40, 50, 63	225; 300; 360; 450; 500; 600; 750; 1,000; 1,250; 1,500; 1,750; 2,000	■	■	■	■	■
25, 32, 40, 50, 63	225; 300; 360; 450; 500; 600; 750; 1,000; 1,250; 1,500; 1,750; 2,000	–	■	–	■	■
With piston rod						
32, 40, 50, 63	10 ... 2,000	–	–	–	–	■
	100 ... 750	■	■	■	■	–
80, 100	10 ... 2,000	–	–	–	–	■
	100 ... 750	■	■	■	■	–
32, 40, 50, 63, 80	100, 150, 225, 300, 360, 450, 600, 750	■	■	■	■	■
Swivel module						
25, 40, 63	270	■	■	■	■	■

# Cylinders with displacement encoder

Key features

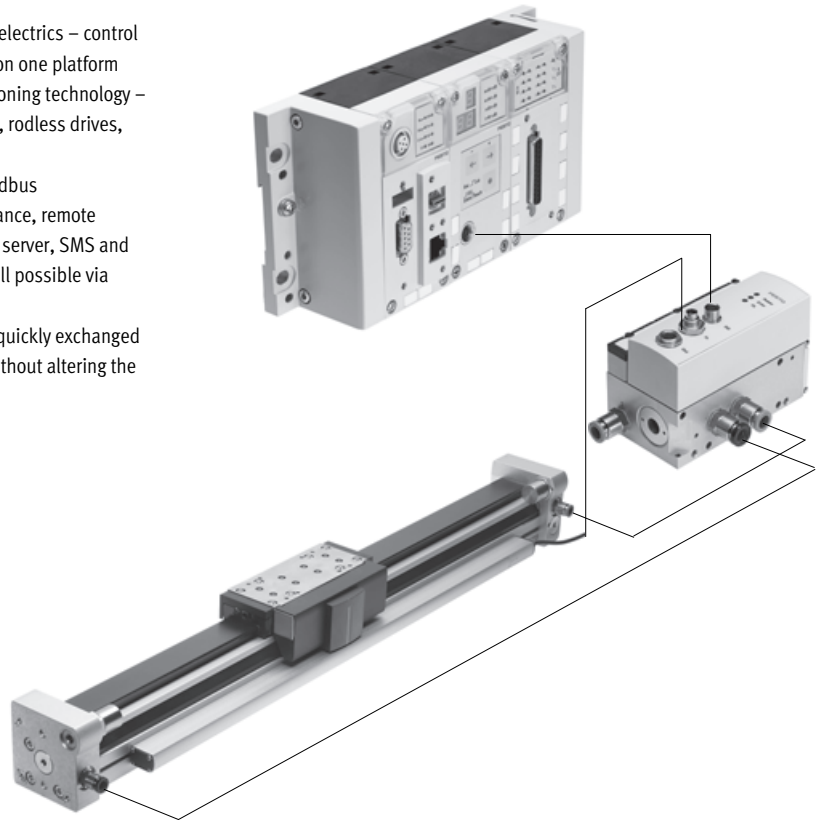
FESTO

## 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 alert 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 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 in the axis controller CPX-CMAX.

All stations are recognised as the auto-identification function identifies each station 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.

## Technical data → Internet: cpx-cmax

### 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

Key features

**FESTO**

## End-position controller 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.

Technical data → Internet: [cpx-cmpx](#)

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 for the machine

## Proportional directional control valve 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, 1,400 and 2,000 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.

Technical data → Internet: [vpwp](#)

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



Fully digital data acquisition and transmission means 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.

Technical data → Internet: [cpx-cmix](#)

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

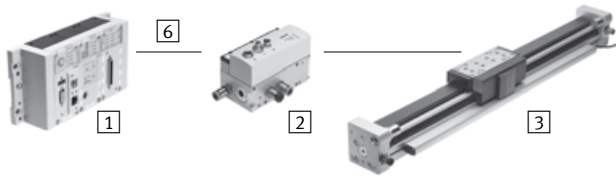
# Cylinders with displacement encoder

Drive options

**FESTO**

## System with linear drive DDLI, DGCI

Technical data → Internet: dgci



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

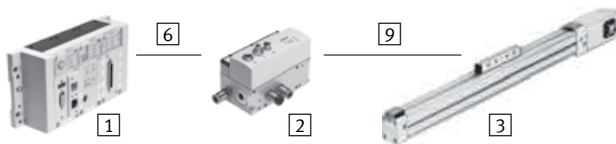
- Pneumatic rodless linear drive with displacement encoder and recirculating ball bearing guide
- Displacement encoder with absolute and contactless measuring
- Identical design to pneumatic linear drive DGC
- Diameter:
  - DGCI: 18 ... 63 mm
  - DDLI: 25, 32 mm
- Stroke: 100 ... 2,000 mm in fixed lengths
- Range of applications: Soft Stop and pneumatic positioning
- Loads from 1 ... 180 kg
- No sensor interface required

Advantages:

- Complete drive unit, precision guide
- Excellent running characteristics
- For fast and accurate positioning down to  $\pm 0.2$  mm (only with axis controller CPX-CMAX)

## System with linear drive DGPI, DGPIIL 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, DGPIIL with displacement encoder
- 6 Connecting cable KVI-CP-3-...
- 9 NEBP-M16W6-K-2-M9W5

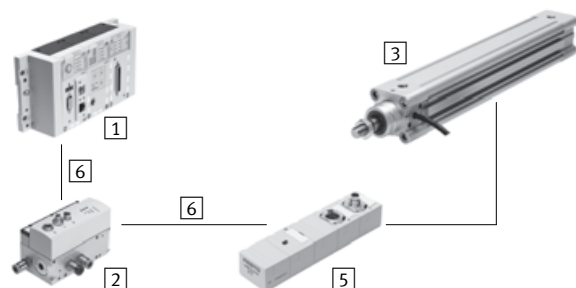
- Pneumatic rodless linear drive with displacement encoder, with or without recirculating ball bearing guide
- Displacement encoder with absolute and contactless measuring
- Diameter: 25 ... 63 mm
- Stroke: 225 ... 2,000 mm in fixed lengths
- Range of applications: Soft Stop and pneumatic positioning
- 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  $\pm 0.2$  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 the 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 down to  $\pm 0.5$  mm (only with axis controller CPX-CMAX)

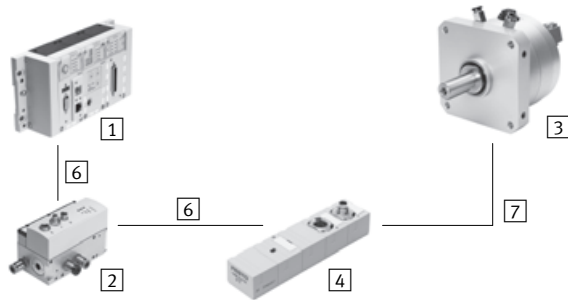
# Cylinders with displacement encoder

Drive options

**FESTO**

## 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

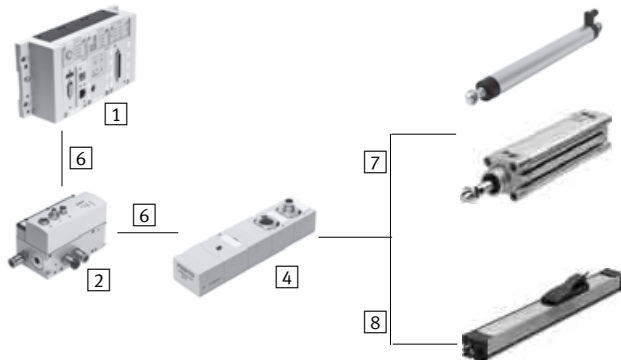
- Swivel module DSMI with integrated displacement encoder
- Identical design to pneumatic swivel module DSM
- Absolute displacement encoder on basis of potentiometer
- Swivel range from 0 ... 270°
- Size: 25, 40, 63
- Max. torque: 5 ... 40 Nm
- Range of applications: Soft Stop and pneumatic positioning
- Mass moments of inertia from 15 ... 6,000 kgcm<sup>2</sup> and the 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 ... 2,000 mm
- Pre-assembled cables guarantee faultless and fast connection with the sensor interface CASM
- Range of applications: Soft Stop and pneumatic positioning with cylinder Ø 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 environmental conditions
- Variety of drives: CPX-CMPX and CPX-CMAX also support cylinders with external displacement encoder

# Cylinders with displacement encoder

Drive options

**FESTO**

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
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-...	–	■	–	–	–	■	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
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-...	–	■	–	–	–	■	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-...	(■) <sup>1)</sup>	(■) <sup>1)</sup>	■	■	■	(■)	kvi
Connecting cable NEBC-P1W4-...	–	–	–	■	■ / –	–	nebc
Connecting cable NEBC-A1W3-...	–	–	–	–	– / ■	–	nebc
Connecting cable NEBP-M16W6-...	–	■	–	–	–	■	nebp

1) As extension



# Cylinders with displacement encoder

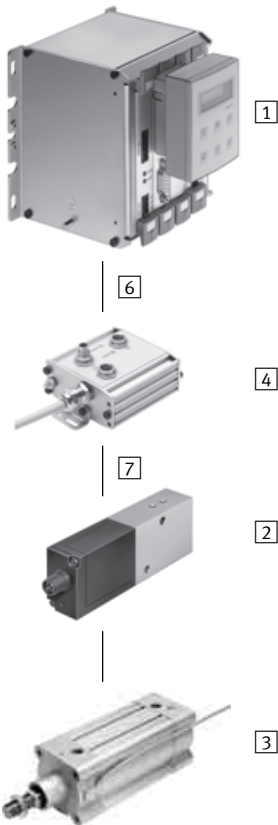
Overview

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## Individual components for positioning

With axis controller SPC200

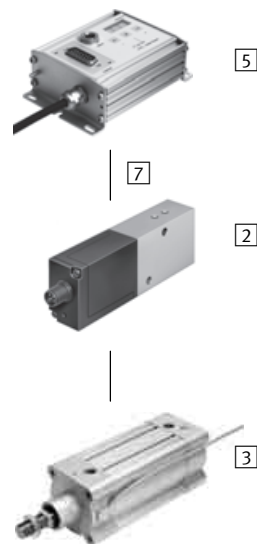
→ Internet: spc200



- 1 Axis controller SPC200
- 2 Proportional directional control valve MPYE
- 3 Standard cylinder DNCI, DDPC
- 4 Axis interface SPC-AIF-INC
- 6 Connecting cable KSPC-AIF-...
- 7 Connecting cable KMPYE-AIF-...

## With end-position controller SPC11

→ Internet: spc11

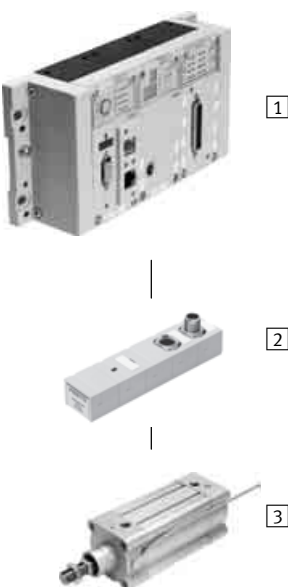


- 2 Proportional directional control valve MPYE
- 3 Standard cylinder DNCI, DDPC
- 5 End-position controller SPC11-INC
- 7 Connecting cable KMPYE-AIF-...

## Individual components for use as a measuring cylinder

With measuring module CPX-CMIX

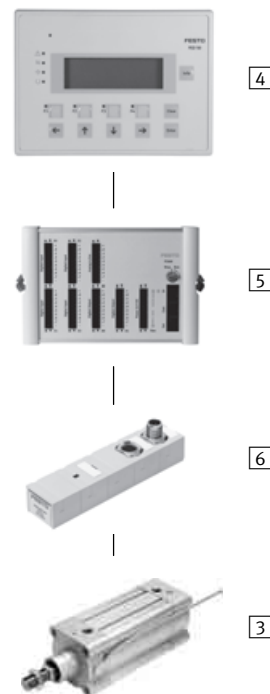
→ Internet: cmix



- 1 Measuring module CPX-CMIX
- 2 Sensor interface CASM-S-D3-R7
- 3 Standard cylinder DNCI, DDPC

## With measured-value transducer DADE

→ Internet: dade

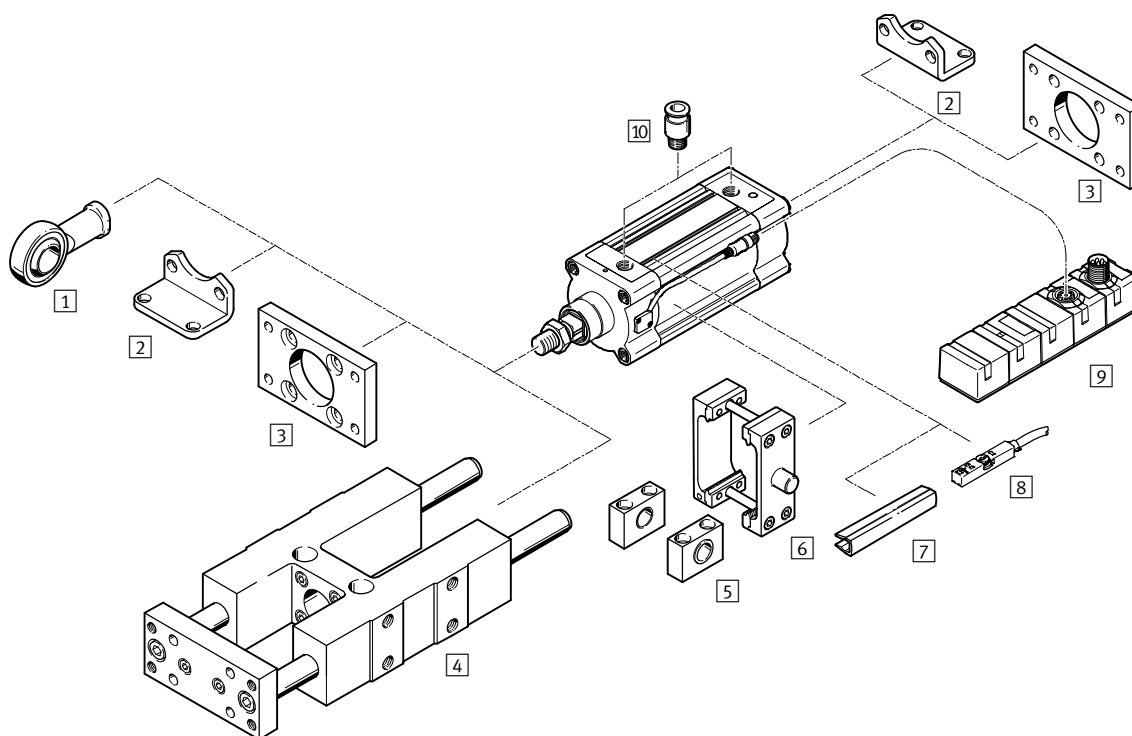


- 3 Standard cylinder DNCI, DDPC
- 4 Operator unit FED
- 5 PLC controller FEC
- 6 Measured-value transducer DADE

## Standard cylinders DDPC, integrated displacement encoder

Peripherals overview

**FESTO**



### Note

If the drive DDPC is used without an end-position controller CPX-CMPX, SPC11 or axis controller CPX-CMAX, SPC200, e.g. as a measuring cylinder, then the standard accessories for the drive DNC can be used.

## Standard cylinders DDPC, integrated displacement encoder

Peripherals overview

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Accessories		
Type	Brief description	→ Page/Internet
1 Rod eye SGS	With spherical bearing	22
2 Foot mounting HNC	For mounting the drive on the bearing and end cap	22
3 Flange mounting FNC	For mounting the drive on the bearing and end cap	22
4 Guide unit <sup>1)</sup> FENG-KF	For protecting against rotation at high torque loads	20
5 Trunnion support LNZG	For securing the trunnion mounting kit DAMT	24
6 Trunnion mounting kit DAMT	For swivelling movements of the drive	23
7 Slot cover ABP-5-S	For protecting against the ingress of dirt	24
8 Proximity sensor SME/SMT-8	For additional sensing of the piston position, can be ordered optionally, only in combination with the order code A in the modular products section for the drive	sm
9 Sensor interface CASM	Used to connect pneumatic drives with analogue/incremental displacement encoder to a position controller CPX-CMAX or CPX-CMPX	casm
10 Push-in fitting QS	For connecting compressed air tubing with standard O.D.	24

1) Guide unit FENG-KF must be attached to the piston rod in a way that eliminates backlash

### Note

Allocation table of drives and associated proportional directional control valves → 25

## Standard cylinders DDP, integrated displacement encoder

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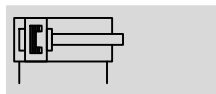
Type codes

		DDPC	-	Q	-		-		-		-		-		-	P		-	A	-	
<b>Type</b>																					
DDPC	Standard cylinder																				
<b>Protection against rotation</b>																					
Q	With protection against rotation																				
<b>Piston Ø [mm]</b>																					
<b>Stroke [mm]</b>																					
<b>Guide unit</b>																					
-	None																				
D	Attached																				
<b>Clamping unit</b>																					
-	None																				
C	Attached																				
<b>Piston rod type</b>																					
-	At one end																				
T	Through piston rod																				
<b>Cushioning</b>																					
P	Elastic cushioning rings/pads at both ends																				
<b>Position sensing</b>																					
A	Via proximity sensor																				
<b>Piston rod extension</b>																					
-	None																				
...E	1 ... 500 mm																				

# Standard cylinders DDP, integrated displacement encoder

Technical data

## Function



- N- Diameter  
80 and 100 mm
- T- Stroke length  
10 ... 2,000 mm



General technical data		
Piston Ø	80	100
Based on standard	ISO 15552	
Design	Piston	
	Piston rod	
	Profile barrel	
Mode of operation	Double-acting	
Guide <sup>1)</sup>	Guide rod with yoke, with ball bearing guide	
Protection against rotation	Square piston rod	
Mounting position	Any	
Type of mounting	Via accessories	
Cushioning	Elastic cushioning rings/pads at both ends	
Position sensing	Integrated displacement encoder	
	Via proximity sensor <sup>2)</sup>	
Measuring principle (displacement encoder)	Encoder, non-contacting and relative measurement	
Pneumatic connection	G <sup>3</sup> / <sub>8</sub>	G <sup>1</sup> / <sub>2</sub>
Stroke		
DDPC-... <sup>3)</sup>	[mm]	10 ... 2,000
DDPC-...-D	[mm]	100 ... 500
Extended piston rod	[mm]	1 ... 500

1) Guide unit FENG-KF can be ordered via the modular product system (feature D) 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 without restriction as a positioning drive in the range from 100 ... 750 mm.

Note stroke reduction in combination with CPX-CMAX, SPC200

Operating and environmental conditions		
Operating pressure	[bar]	4 ... 12
Operating pressure <sup>1)</sup>	[bar]	4 ... 8
Operating medium <sup>2)</sup>	Compressed air to ISO 8573-1:2010 [6:4:4]	
Note on operating/pilot medium	Operation with lubricated medium not possible	
	Pressure dew point 10 °C below ambient/medium temperature	
Ambient temperature <sup>3)</sup>	[°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 mark (see declaration of conformity) <sup>4)</sup>	To EU EMC Directive	
Corrosion resistance class CRC <sup>5)</sup>	1	

1) Only applies to applications with end-position controller CPX-CMPX, SPC11 and axis controller CPX-CMAX, SPC200

2) Characteristic values contingent on the proportional directional control valve VPWP, MPYE

3) Note operating range of proximity sensors

4) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: [www.festo.com](http://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.

5) 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 primarily decorative surface requirements, e.g. in internal areas that are not visible or behind covers.

# Standard cylinders DDP, integrated displacement encoder

Technical data

**FESTO**

Forces [N] and impact energy [Nm]		
Piston Ø	80	100
Theoretical force at 6 bar, advancing	3,016	4,712
Theoretical force at 6 bar, retracting	2,721	4,418
Impact energy at the end positions	1.8	2.5

Permissible impact velocity:

$$v_{perm.} \leq \sqrt{\frac{2 \times E_{perm.}}{m_{dead} + m_{load}}}$$

$v_{perm.}$  Permissible impact velocity  
 $E_{perm.}$  Max. impact energy  
 $m_{dead}$  Moving load (drive)  
 $m_{load}$  Moving effective load

## Note

These specifications represent the maximum values that can be achieved. Note the maximum permissible impact energy.

Maximum permissible load:

$$m_{load} \leq \frac{2 \times E_{perm.}}{v^2} - m_{dead}$$

Positioning characteristics with axis controller CPX-CMAX, SPC200		
Piston Ø	80	100
Stroke	[mm]	100 ... 750
Mounting position		Any
Resolution	[mm]	0.01
Repetition accuracy	[mm]	≤ ±0.5
Min. load, horizontal	[kg]	20
Max. load, horizontal	[kg]	300
Min. load, vertical <sup>1)</sup>	[kg]	20
Max. load, vertical <sup>1)</sup>	[kg]	100
Min. travel speed	[m/s]	0.05
Max. travel speed	[m/s]	1
Typical positioning time, long stroke <sup>2)</sup>	[s]	0.88/1.02
Typical positioning time, short stroke <sup>3)</sup>	[s]	0.77/0.95
Min. positioning stroke <sup>4)</sup>	[mm]	≤ 3
Stroke reduction <sup>5)</sup>	[mm]	15
Recommended proportional directional control valve		
For CPX-CMAX	➔ 25	
For SPC200	➔ 26	

- 1) Only in combination with external guide
- 2) At 6 bar, horizontal mounting position, DDP-XX-500, 400 mm positioning travel at min./max. load
- 3) At 6 bar, horizontal mounting position, DDP-XX-500, 200 mm positioning travel at min./max. load
- 4) Refers to the cylinder stroke, but not more than 10 mm
- 5) The stroke reduction must be maintained on each side of the drive, the max. positionable stroke is therefore: stroke – 2x stroke reduction

Force control characteristics with axis controller CPX-CMAX		
Piston Ø	80	100
Stroke	[mm]	100 ... 750
Mounting position		Any
Max. controllable force <sup>1)</sup>	[N]	2,710/2,440
Typical friction forces <sup>2)</sup>	[N]	140
Repetition accuracy pressure regulation <sup>3)4)</sup>	[%]	< ±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 is controlled and refers to the maximum controllable force (the internal differential pressure corresponds to the prescribed force setpoint value)
- 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:  
 $F = F_{setpoint} \pm \text{Friction forces} \pm \text{internal repetition accuracy}$

# Standard cylinders DDPC, integrated displacement encoder

Technical data

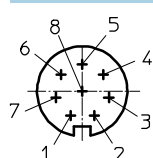
Positioning characteristics with Soft Stop end-position controller CPX-CMPX, SPC11			
Piston Ø		80	100
Stroke	[mm]	100 ... 750	
Mounting position		Any	
Repetition accuracy	[mm]	±2	
Min. load, horizontal	[kg]	20	32
Max. load, horizontal	[kg]	300	450
Min. load, vertical <sup>1)</sup>	[kg]	20	32
Max. load, vertical <sup>1)</sup>	[kg]	100	150
Travel time	[s]	➔ Soft Stop sizing software: ➔ <a href="http://www.festo.com">www.festo.com</a>	
Recommended proportional directional control valve			
For CPX-CMPX		➔ 25	
For SPC11		➔ 26	

1) Only in combination with external guide

Electrical data – Displacement encoder		
Output signal		Analogue
Independent linearity		
Strokes up to 500 mm	[mm]	< ±0.08
Strokes up to 1,000 mm	[mm]	< ±0.09
Strokes above 1,000 mm	[mm]	< ±0.11
Max. travel speed	[m/s]	1.5
Protection class		IP65
CE marking (see declaration of conformity)		In accordance with EU EMC Directive <sup>1)</sup>
Max. permitted magnetic disruption field <sup>2)</sup>	[kA/m]	10
Electrical connection		Cable with 8-pin plug, round type M12
Cable length	[m]	1.5

- 1) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: [www.festo.com](http://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.
- 2) At 100 mm interval

## Pin assignment 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	Screened
8	n.c.	–

## Standard cylinders DDP, integrated displacement encoder

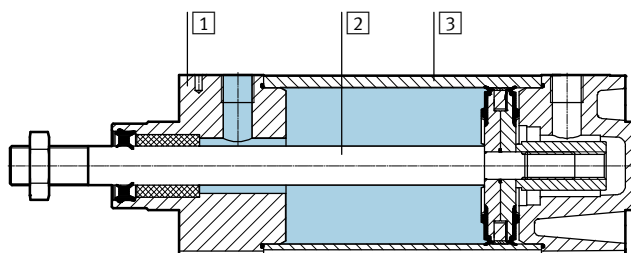
**FESTO**

Technical data

Weight [g]		
Piston Ø	80	100
DDPC-...		
Basic weight with 0 mm stroke	3,053	4,330
Additional weight per 10 mm stroke	87	95
Moving load with 0 mm stroke	804	994
Additional weight per 10 mm stroke	31	31
DDPC-...-T – Through piston rod		
Basic weight with 0 mm stroke	3,537	5,019
Additional weight per 10 mm stroke	127	134
Moving load with 0 mm stroke	1,247	1,467
Additional weight per 10 mm stroke	70	70
DDPC-...-...E – Additional weight with piston rod extension		
Additional weight per 10 mm extension	31	31
DDPC-...-C – Additional weight with clamping unit		
Additional weight	2,046	2,829
DDPC-...-D – Additional weight with guide unit		
Basic weight with 0 mm stroke	10,430	12,990
Additional weight per 10 mm stroke	80	80

### Materials

Sectional view



Standard cylinder		
1	End cap	Wrought aluminium alloy
2	Piston rod	High-alloy steel
3	Cylinder barrel	Wrought aluminium alloy
–	Seals	Nitrile rubber, polyurethane
Note on materials		Free of copper and PTFE
		RoHS-compliant



# Standard cylinders DDPC, integrated displacement encoder

Technical data

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## Torques and lateral forces

Max. torque for protection against rotation

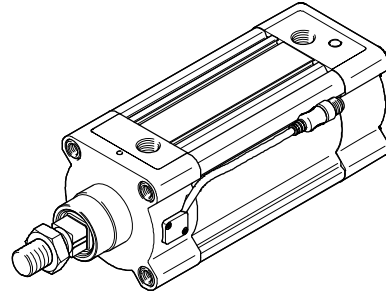
Dynamic  $\leq 3 \text{ Nm}$

Static  $\leq 5 \text{ Nm}$

An external guide unit FENG-KF is recommended with higher torque loads. The guide unit is supplied attached.

The permissible static and dynamic characteristic load values with and without attached guide

→ Internet: feng



## Mounting conditions

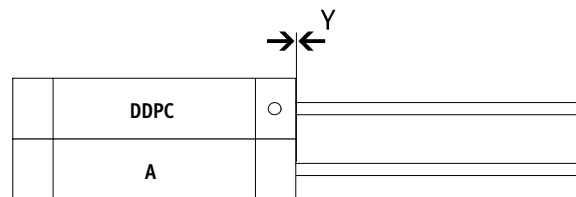
When mounting a drive A with magnet (for position sensing) next to a standard cylinder DDPC, the following conditions must be observed:

X Minimum distance between the drives

Y Offset between the drives on the bearing cap

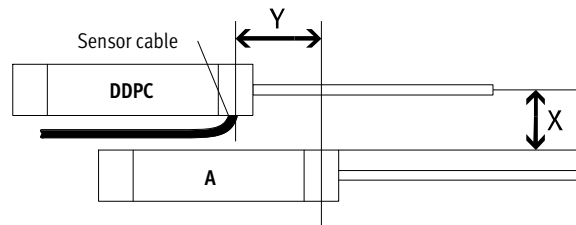
### Parallel assembly

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



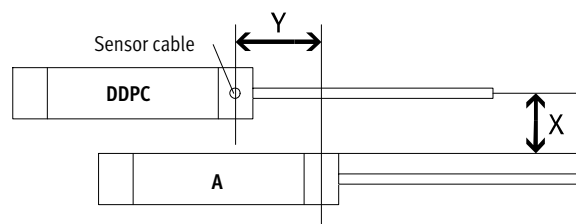
### Offset assembly, cable outlet between the drives

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



### Offset assembly, cable outlet upwards or downwards

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



# Standard cylinders DDPG, integrated displacement encoder

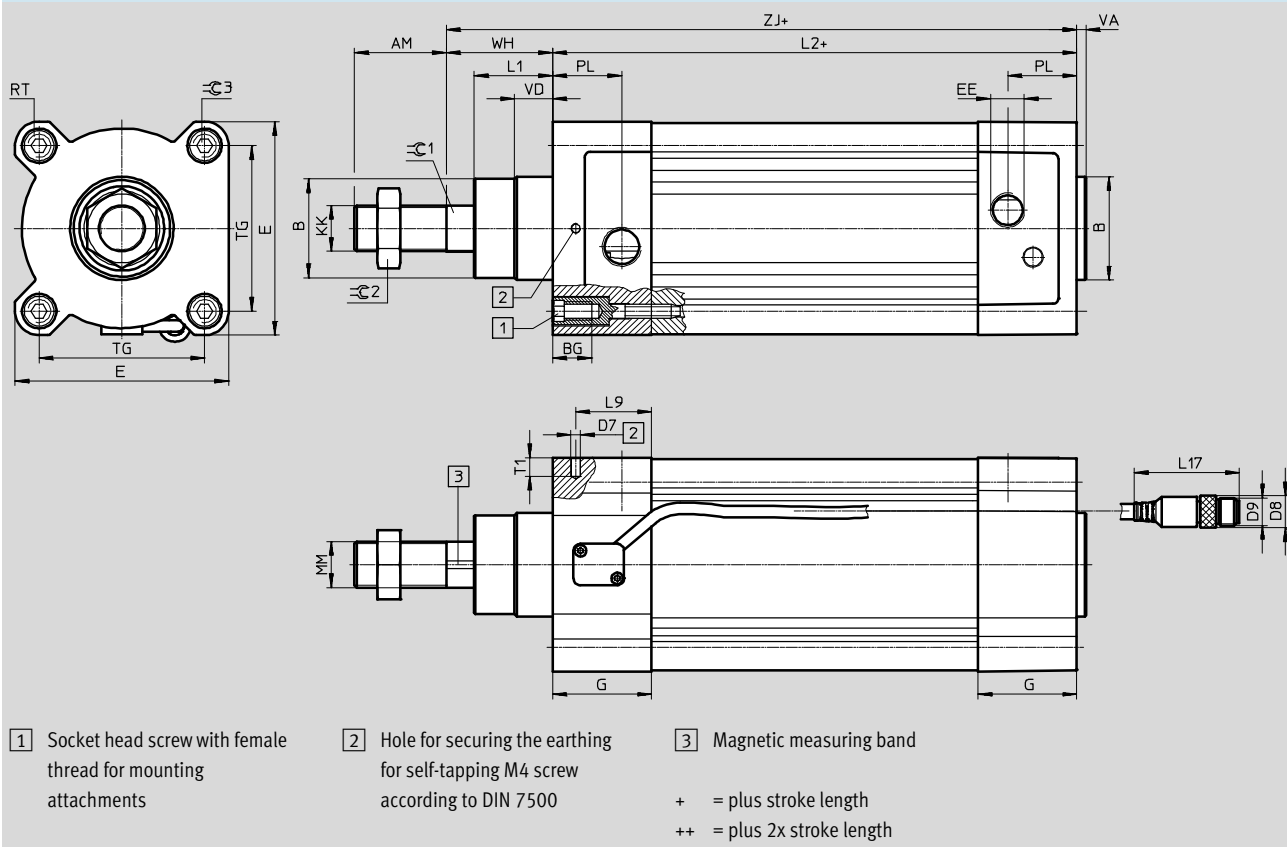
**FESTO**

Technical data

## Dimensions

Download CAD Data → [www.festo.com/us/cad](http://www.festo.com/us/cad)

DDPG...



Ø	AM	B	BG	D7	D8	D9	E	EE	G
[mm]		Ø d11		Ø	Ø				
80	40	45	17	3.7	14	M12	93	G $\frac{3}{8}$	43
100	40	55	17	3.7	14	M12	110	G $\frac{1}{2}$	48

Ø	KK	L1	L2	L9	L17	MM	PL	RT	T1
[mm]						Ø			
80	M20x1.5	34.2	128	20	45.7	20	30	M10	8
100	M20x1.5	38	138	21.5	45.7	20	31.5	M10	8

Ø	TG	VA	VD	WH	ZJ	⌀ 1	⌀ 2	⌀ 3
[mm]								
80	72	4	16.7	46	174	22	30	6
100	89	4	20.5	51	189	22	30	6

# Standard cylinders DDPC, integrated displacement encoder

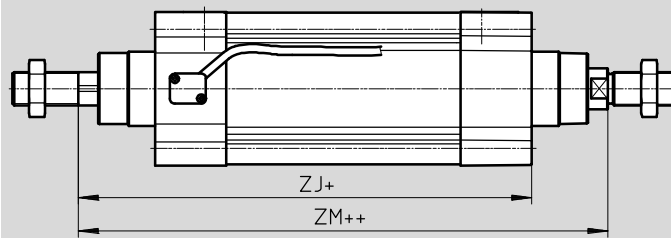
Technical data

**FESTO**

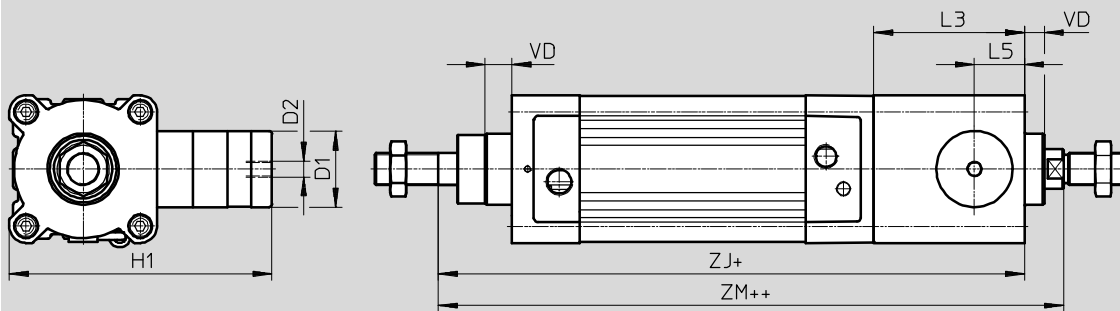
## Dimensions

Download CAD Data → [www.festo.com/us/cad](http://www.festo.com/us/cad)

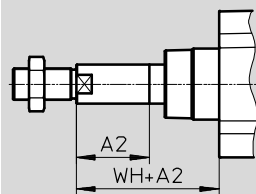
### DDPC-...-T – Through piston rod



### DDPC-...-CT – Through piston rod with clamping unit



### DDPC-...-E – Extended piston rod



Ø	A2	D1	D2	H1	L3	L5
[mm]	max.	Ø				
80	500	48	G1/8	165.5	95	31.5
100	500	48	G1/8	174	98	31

Ø	VD	WH	ZJ		ZM	
[mm]			DDPC-...-T	DDPC-...-CT	DDPC-...-T	DDPC-...-CT
80	16.7	46	174	269	222	317
100	20.5	51	189	287	240	338

# Standard cylinders DDPG, integrated displacement encoder

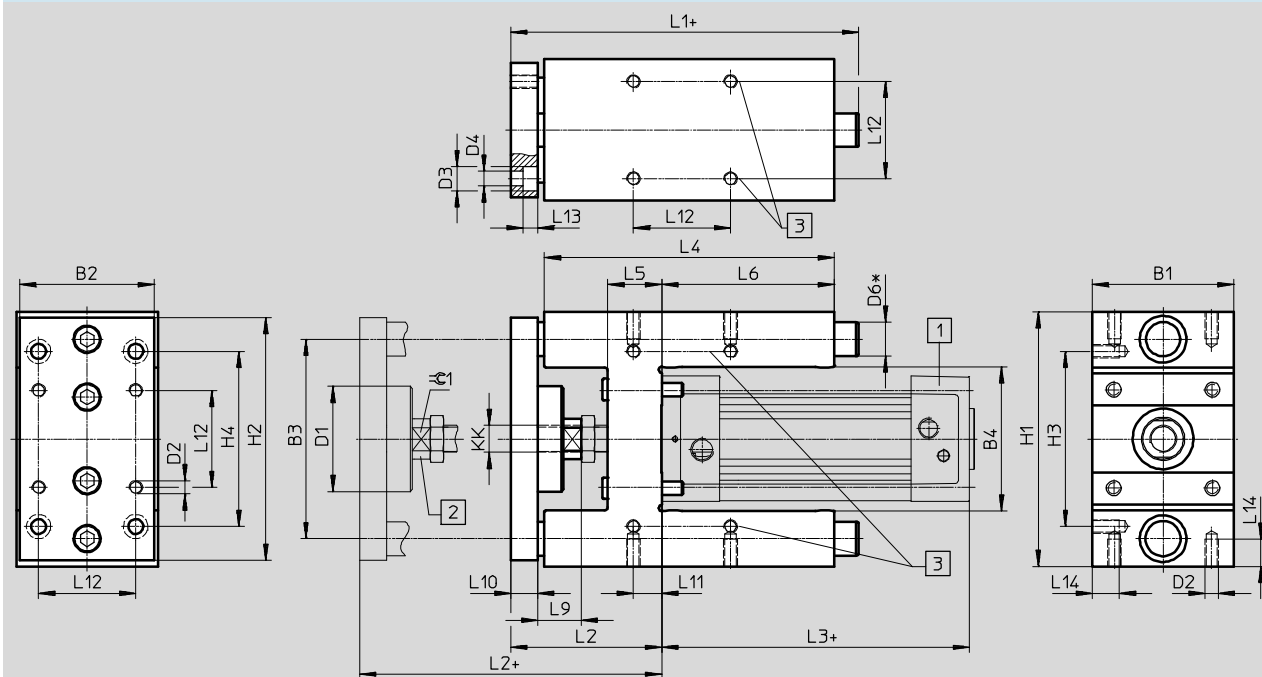
Technical data

**FESTO**

## Dimensions

Download CAD Data → [www.festo.com/us/cad](http://www.festo.com/us/cad)

DDPG-...-D



- 1 Standard cylinder DDPG  
2 Compensating coupling

- 3 Users can drill additional mounting holes as required

+ = plus stroke length

Ø	B1	B2	B3	B4	D1	D2	D3	D4	D6
[mm]	-0.3		±0.2	±0.6	Ø		Ø	Ø	Ø
80	105	100	148	106	78	M10	18	11	25
100	130	120	172	131	78	M10	18	11	25

Ø	H1	H2	H3	H4	KK	L1	L2	L3	L4
[mm]	-0.5		±0.2	±0.2			+10		
80	189	180	130	130	M20x1.5	258	111	194	215
100	213	200	150	150	M20x1.5	263	116	138	220

Ø	L5	L6	L9	L10	L11	L12	L13	L14	⌀ 1
[mm]						±0.2			
80	40	128	32	20	21	72	11	20	27
100	40	128	32	20	24.5	89	11	20	27

# Standard cylinders DDP, integrated displacement encoder

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Ordering data – Modular products

Ordering table					
Piston Ø	80	100	Condition s	Code	Enter code
<b>M</b> Module No.	<b>1677705</b>	<b>1691433</b>			
Function	Standard cylinder with integrated displacement encoder			<b>DDPC</b>	DDPC
Protection against rotation	With protection against rotation			<b>-Q</b>	-Q
Piston Ø [mm]	80	100		-...	
Stroke [mm]	10 ... 2,000		<b>1</b>	-...	
<b>O</b> Guide unit	None				
	Attached			<b>-D</b>	
Clamping unit	None				
	Attached		<b>2</b>	<b>-C</b>	
Piston rod type	At one end				
	Through piston rod			<b>T</b>	
<b>M</b> Cushioning	Elastic cushioning rings/pads at both ends			<b>-P</b>	-P
Position sensing	Via proximity sensor			<b>A</b>	A
<b>O</b> Piston rod extension	None				
	[mm] 1 ... 500			<b>-...E</b>	

**1** -... Can only be used without restriction as a positioning drive in the range from 100 ... 750 mm

**2** **C** Only available with T

Transfer order code

DDPC

-

Q

-

-

-

-

-

P

-

A

-

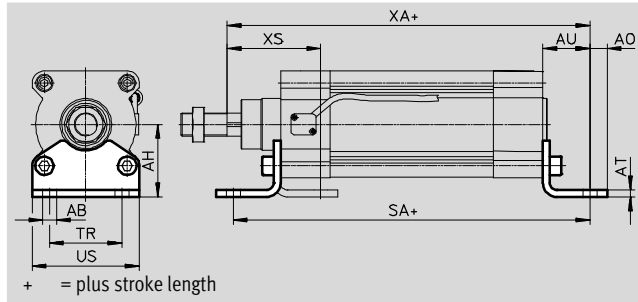
# Standard cylinders DDPC, integrated displacement encoder

FESTO

Accessories

## Foot mounting HNC

Materials:  
Galvanised steel  
Free of copper and PTFE



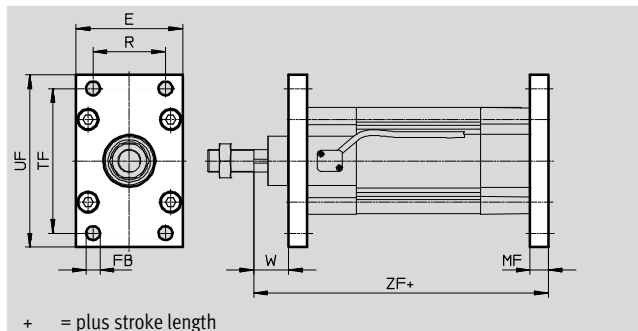
Dimensions and ordering data							
For Ø	AB Ø	AH	AO	AT	AU	SA	
[mm]						DDPC-...	DDPC-...-C
80	12	63	15	6	41	276	371
100	14.5	71	17.5	6	41	220	318

For Ø	TR	US	XA		XS	CRC <sup>1)</sup>	Weight	Part No.	Type
[mm]			DDPC-...	DDPC-...-C			[g]		
80	63	93	281	376	81	2	829	<b>174373</b>	<b>HNC-80</b>
100	75	110	230	328	86	2	1,009	<b>174374</b>	<b>HNC-100</b>

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

## Flange mounting FNC

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



Dimensions and ordering data										
For Ø	E	FB Ø H13	MF	R	TF	UF	W	ZF		CRC <sup>1)</sup>
[mm]								DDPC-...	DDPC-...-C	
80	93	12	16	63	126	150	30	256	351	1
100	110	14	16	75	150	175	35	205	303	1

1) 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 primarily decorative surface requirements, e.g. in internal areas that are not visible or behind covers.

# Standard cylinders DDPC, integrated displacement encoder

FESTO

Accessories

## Rod eye SGS

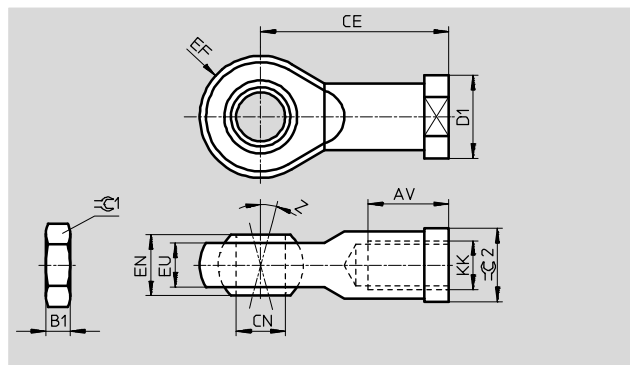
Scope of delivery:

1 rod eye, 1 hex nut to DIN 439

Materials:

Galvanised steel

RoHS-compliant



Dimensions and ordering data														Weight	Part No.	Type
For Ø	AV	B1	CE	CN Ø	D1 Ø	EF ±0.5	EN	EU	Z [°]	≈C1	≈C2	CRC <sup>1)</sup>		[g]		
[mm]				H7												
M20x1.5	33 -2	10	77	20	34	25	25	18	15	30	30	2		464	9264	SGS-M20x1,5

1) Corrosion resistance class 2 according to Festo standard 940 070

Components subject to moderate corrosion stress. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

## Trunnion mounting kit DAMT

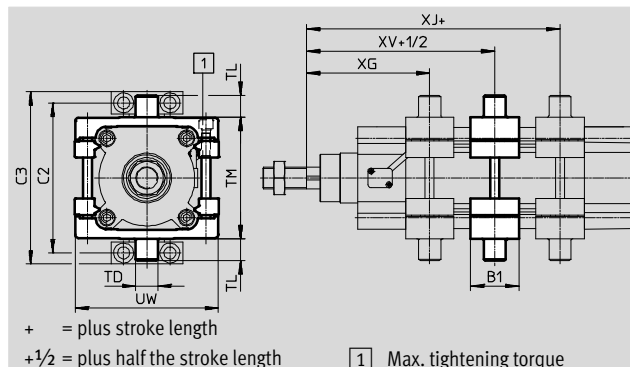
The mounting kit can be attached at any position along the profile barrel of the cylinder.

Materials:

Galvanised steel

Free of copper and PTFE

RoHS-compliant



+ = plus stroke length

+1/2 = plus half the stroke length

1 Max. tightening torque

Dimensions and ordering data									
For Ø	B1	C2	C3	TD Ø	TL	TM	UW	XG	
[mm]				e9				DDPC-...	DDPC-...-C
80	44	136	156	20	20	110	130	111	206
100	48	164	189	25	25	132	145	123	221

For Ø	XJ		XV		Max. tightening torque	CRC <sup>1)</sup>	Weight	Part No.	Type
[mm]	DDPC-...	DDPC-...-C	DDPC-...	DDPC-...-C	[Nm]		[g]		
80	175	270	143	238	28+2	1	1,494	163529	DAMT-V1-80-A
100	117	215	120	218	28+2	1	2,095	163530	DAMT-V1-100-A

1) 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 primarily decorative surface requirements, e.g. in internal areas that are not visible or behind covers.

# Standard cylinders DDPC, integrated displacement encoder

FESTO

Accessories

## Trunnion support LNZN

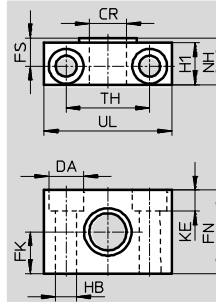
Materials:

Trunnion support: Anodised aluminium

Plain bearing: Plastic

Free of copper and PTFE

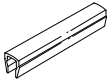
RoHS-compliant



Dimensions and ordering data															
For Ø	CR	DA	FK	FN	FS	H1	HB	KE	NH	TH	UL	CRC <sup>1)</sup>	Weight	Part No.	Type
	Ø	Ø	Ø				Ø								
[mm]	D11	H13	±0.1				H13			±0.2			[g]		
80	20	18	20	40	13	20	11	11	23	42	65	2	178	32961	LNZG-63/80
100	25	20	25	50	16	24.5	14	13	28.5	50	75	2	306	32962	LNZG-100/125

1) Corrosion resistance class 2 according to Festo standard 940 070

Components subject to moderate corrosion stress. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

Ordering data					
	For Ø	Comment	Part No.	Type	PU <sup>1)</sup>
Slot cover				Technical data → Internet: abp	
	80, 100	Every 0.5 m	<b>151680</b>	<b>ABP-5-S</b>	2

1) Packaging unit

## Note

Recommended proximity sensor

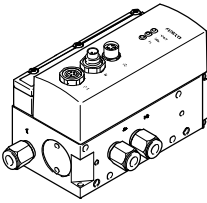
→ Internet: dsbc



# Standard cylinders DDPC, integrated displacement encoder

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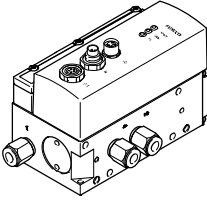
Accessories

Ordering data – Proportional directional control valves and push-in fittings							
	For Ø	Stroke	Proportional directional control valve		Push-in fitting for DDPC		
	[mm]	[mm]	Technical data → Internet: vpwp		Technical data → Internet: quick star		PU <sup>1)</sup>
			Part No.	Type	Part No.	Type	
	For applications with axis controller CPX-CMAX						
	80	100 ... 200	550171	VPWP-6-L-5-Q8-10-E-...	186100	QS-G <sup>3</sup> / <sub>8</sub> -8	10
		201 ... 450	550172	VPWP-8-L-5-Q10-10-E-...	186102	QS-G <sup>3</sup> / <sub>8</sub> -10	
		451 ... 750	1552544	VPWP-10-L-5-Q-10-E-G-EX1	186103	QS-G <sup>3</sup> / <sub>8</sub> -12	
	100	100 ... 120	550171	VPWP-6-L-5-Q8-10-E-...	186104	QS-G <sup>1</sup> / <sub>2</sub> -12 <sup>2)</sup>	1
		121 ... 330	550172	VPWP-8-L-5-Q10-10-E-...	186104	QS-G <sup>1</sup> / <sub>2</sub> -12 <sup>3)</sup>	
		331 ... 750	1552544	VPWP-10-L-5-Q-10-E-G-EX1	186104	QS-G <sup>1</sup> / <sub>2</sub> -12	

1) Packaging unit

2) With additional reduction from Ø 12 to Ø 8, with push-in connector QS-12H-8 (part number 130624)

3) With additional reduction from Ø 12 to Ø 10, with push-in connector QS-12H-10 (part number 153044)

Ordering data – Proportional directional control valves and push-in fittings							
	For Ø	Stroke	Proportional directional control valve		Push-in fitting for DDPC		
	[mm]	[mm]	Technical data → Internet: vpwp		Technical data → Internet: quick star		PU <sup>1)</sup>
			Part No.	Type	Part No.	Type	
	For applications with Soft Stop end-position controller CPX-CMPX						
	80	100 ... 125	550170	VPWP-4-L-5-Q8-10-E-...	186100	QS-G <sup>3</sup> / <sub>8</sub> -8	10
		126 ... 160	550171	VPWP-6-L-5-Q8-10-E-...	186100	QS-G <sup>3</sup> / <sub>8</sub> -8	
		161 ... 400	550172	VPWP-8-L-5-Q10-10-E-...	186102	QS-G <sup>3</sup> / <sub>8</sub> -10	
		401 ... 750	1552544	VPWP-10-L-5-Q-10-E-G-EX1	186103	QS-G <sup>3</sup> / <sub>8</sub> -12	
	100	100 ... 150	550171	VPWP-6-L-5-Q8-10-E-...	186104	QS-G <sup>1</sup> / <sub>2</sub> -12 <sup>2)</sup>	1
		151 ... 350	550172	VPWP-8-L-5-Q10-10-E-...	186104	QS-G <sup>1</sup> / <sub>2</sub> -12 <sup>3)</sup>	
		351 ... 750	1552544	VPWP-10-L-5-Q-10-E-G-EX1	186104	QS-G <sup>1</sup> / <sub>2</sub> -12	

1) Packaging unit

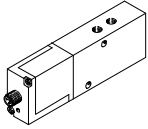
2) With additional reduction from Ø 12 to Ø 8, with push-in connector QS-12H-8 (part number 130624)

3) With additional reduction from Ø 12 to Ø 10, with push-in connector QS-12H-10 (part number 153044)

# Standard cylinders DDPC, integrated displacement encoder

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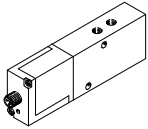
Accessories

Ordering data – Proportional directional control valves and push-in fittings							
	For Ø	Stroke	Proportional directional control valve		Push-in fitting for DDPC		
	[mm]	[mm]	Technical data → Internet: mpye		Technical data → Internet: quick star		
			Part No.	Type	Part No.	Type	PU <sup>1)</sup>
	For applications with axis controller SPC200						
	80	100 ... 200	151693	MPYE-5-1/8-HF-010-B	186100	QS-G <sup>3</sup> / <sub>8</sub> -8	10
		201 ... 450	151694	MPYE-5-1/4-010-B	186102	QS-G <sup>3</sup> / <sub>8</sub> -10	
		451 ... 750	151695	MPYE-5-3/8-010-B	186103	QS-G <sup>3</sup> / <sub>8</sub> -12	
	100	100 ... 120	151693	MPYE-5-1/8-HF-010-B	186104	QS-G <sup>1</sup> / <sub>2</sub> -12 <sup>2)</sup>	1
		121 ... 330	151694	MPYE-5-1/4-010-B	186104	QS-G <sup>1</sup> / <sub>2</sub> -12 <sup>3)</sup>	
		331 ... 750	151695	MPYE-5-3/8-010-B	186104	QS-G <sup>1</sup> / <sub>2</sub> -12	

1) Packaging unit

2) With additional reduction from Ø 12 to Ø 8, with push-in connector QS-12H-8 (part number 130624)

3) With additional reduction from Ø 12 to Ø 10, with push-in connector QS-12H-10 (part number 153044)

Ordering data – Proportional directional control valves and push-in fittings							
	For Ø	Stroke	Proportional directional control valve		Push-in fitting for DDPC		
	[mm]	[mm]	Technical data → Internet: mpye		Technical data → Internet: quick star		
			Part No.	Type	Part No.	Type	PU <sup>1)</sup>
	For applications with Soft Stop end-position controller SPC11						
	80	100 ... 125	151692	MPYE-5-1/8-LF-010-B	186100	QS-G <sup>3</sup> / <sub>8</sub> -8	10
		126 ... 160	151693	MPYE-5-1/8-HF-010-B	186100	QS-G <sup>3</sup> / <sub>8</sub> -8	
		161 ... 400	151694	MPYE-5-1/4-010-B	186102	QS-G <sup>3</sup> / <sub>8</sub> -10	
		401 ... 750	151695	MPYE-5-3/8-010-B	186103	QS-G <sup>3</sup> / <sub>8</sub> -12	
	100	100 ... 150	151693	MPYE-5-1/8-HF-010-B	186104	QS-G <sup>1</sup> / <sub>2</sub> -12 <sup>2)</sup>	1
		151 ... 350	151694	MPYE-5-1/4-010-B	186104	QS-G <sup>1</sup> / <sub>2</sub> -12 <sup>3)</sup>	
		351 ... 750	151695	MPYE-5-3/8-010-B	186104	QS-G <sup>1</sup> / <sub>2</sub> -12	

1) Packaging unit

2) With additional reduction from Ø 12 to Ø 8, with push-in connector QS-12H-8 (part number 130624)

3) With additional reduction from Ø 12 to Ø 10, with push-in connector QS-12H-10 (part number 153044)

## Product Range and Company Overview

### A Complete Suite and Company Overview

Our experienced engineers provide complete support at every stage of your development process, including: conceptualization, analysis, engineering, design, assembly, documentation, validation, and production.



**Custom Automation Components**  
Complete custom engineered solutions



**Custom Control Cabinets**  
Comprehensive engineering support and on-site services



**Complete Systems**  
Shipment, stocking and storage services

### The Broadest Range of Automation Components

With a comprehensive line of more than 30,000 automation components, Festo is capable of solving the most complex automation requirements.



**Electromechanical**  
Electromechanical actuators, motors, controllers & drivers



**Pneumatics**  
Pneumatic linear and rotary actuators, valves, and air supply



**PLCs and I/O Devices**  
PLC's, operator interfaces, sensors and I/O devices

### Supporting Advanced Automation... As No One Else Can!

Festo is a leading global manufacturer of pneumatic and electromechanical systems, components and controls for industrial automation, with more than 16,000 employees in 60 national headquarters serving more than 180 countries. For more than 80 years, Festo has continuously elevated the state of manufacturing with innovations and optimized motion control solutions that deliver higher performing, more profitable automated manufacturing and processing equipment. Our dedication to the advancement of automation extends beyond technology to the education and development of current and future automation and robotics designers with simulation tools, teaching programs, and on-site services.

### Quality Assurance, ISO 9001 and ISO 14001 Certifications

Festo Corporation is committed to supply all Festo products and services that will meet or exceed our customers' requirements in product quality, delivery, customer service and satisfaction.

To meet this commitment, we strive to ensure a consistent, integrated, and systematic approach to management that will meet or exceed the requirements of the ISO 9001 standard for Quality Management and the ISO 14001 standard for Environmental Management.

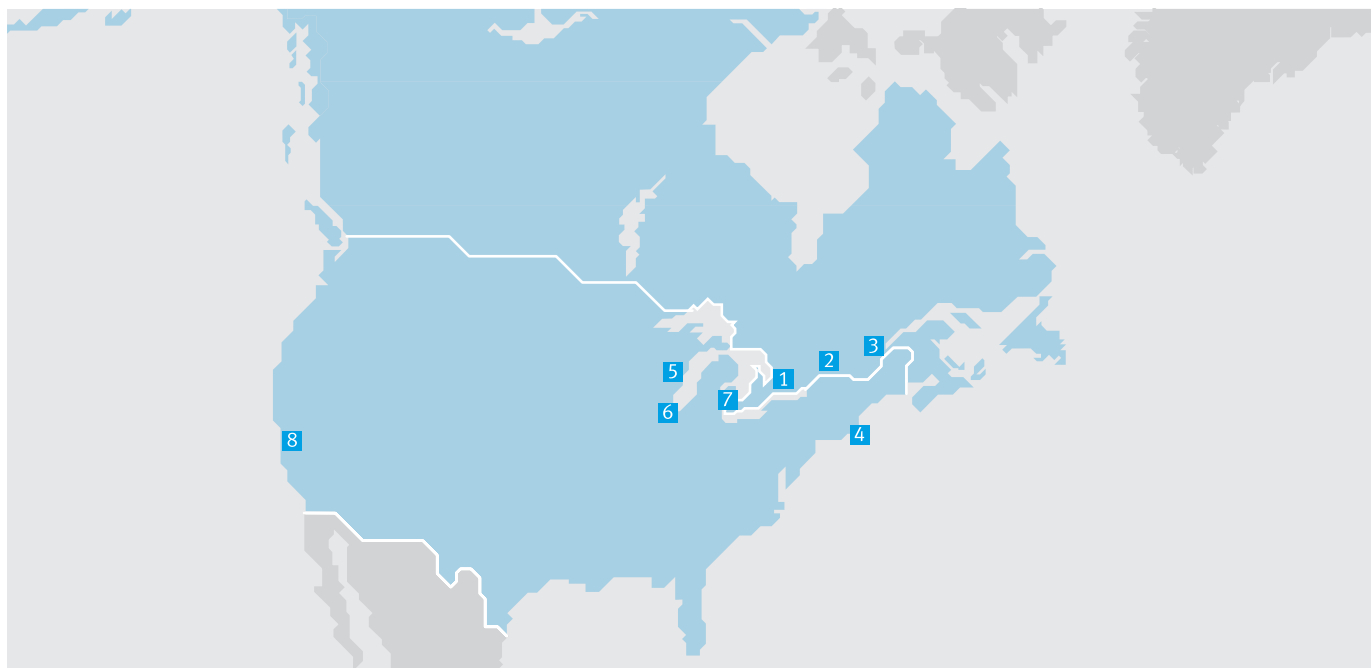


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