Measuring modules CPX-CMIX

FESTO

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Key features

At a glance

Movement and measurement in one, 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, end-position controllers and measuring modules, as appropriate to the application, can be combined in almost any way on the CPX terminal.

Advantages:
- Pneumatics and electrics – movement and measurement on one platform
- Innovative measurement 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

| Retracting/advancing and measuring in one work step	Time and space-saving	Process reliability	Reduced system costs
Fully digital data acquisition and transmission means pneumatic cylinders can now be used as sensors. With very high repetition accuracy and incorporating both analogue and digital measuring sensors.	Electrical peripherals enable the highly efficient measuring module to be seamlessly and compactly integrated into existing control environments. The new component is tailored to the proven CPX system and can be commissioned quickly and easily.	All process steps are measured and documented, which significantly improves quality. The adjustable contact force (via pressure regulator) also increases the precision of the "displacement sensor".	As with all modules in the electrical terminal CPX, easy functional integration in fieldbus/Ethernet networks is a matter of course.

Drives to use

Linear drives DGCI
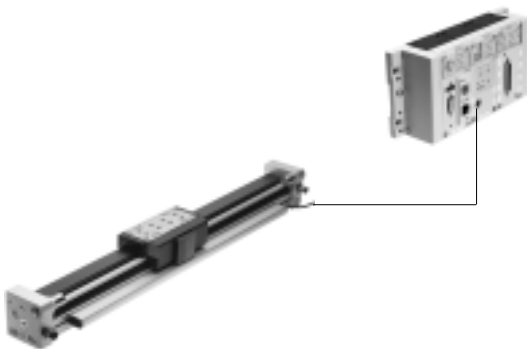
- The measurement signal of the linear drive DGCI supplies a CAN signal, which is read in directly into the CPX-CMIX module
- The measuring system measures absolute values, in other words the actual position is immediately available for the controller after the system is switched on

Technical data

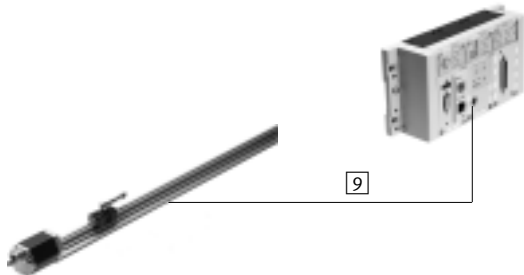| Linearity error[1]	[%]	< ±0.02, min. ±50 µm
Resolution	[mm]	0.01
Repetition accuracy[2]	[mm]	±0.01/±0.02
Hysteresis	[µm]	< 4
Maximum temperature coefficient	[ppm/°K]	15
Smallest measurable speed	[mm/s]	10

1)   Always refers to max. stroke.
2)   Stroke ≤ 1000 mm/stroke > 1000 mm

Drives to use

Displacement encode MME

- The measurement signal of the displacement decoder MME supplies a CAN signal, which is read in directly into the CPX-CMIX module
- The measuring system measures absolute values, in other words the actual position is immediately available for the controller after the system is switched on
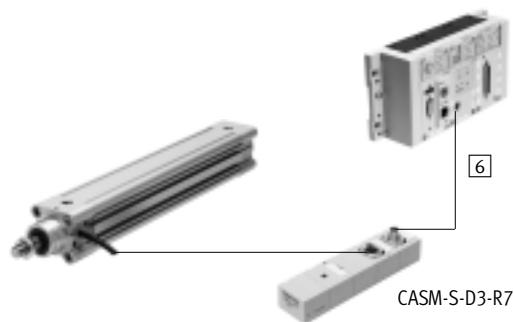
Technical data		
Linearity error[1]	[%]	< ±0.01, min. ±40µm
Resolution	[mm]	0.01
Repetition accuracy[2]	[mm]	±0.01/±0.02
Hysteresis	[µm]	< 4
Maximum temperature coefficient	[ppm/°K]	15
Smallest measurable speed	[mm/s]	10

1) Always refers to max. stroke.
2) Stroke ≤ 1000 mm/stroke > 1000 mm

Linear drives DNCI

CASM-S-D3-R7

- The measuring signal of the linear drive DNCI is an incremental signal, which is converted to a CAN signal in the sensor interface CASM-S-D3-R7. The converted signal is then read into the CPX-CMIX
- The measuring system does not measure absolute values, so must be homed after it is switched on. The actual position is available for the controller once this has been done

Technical data		
Linearity error		
Strokes up to 500 mm	[mm]	< ±0.08
Strokes up to 1000 mm	[mm]	< ±0.09
Strokes over 1000 mm	[mm]	< ±0.11
Resolution	[mm]	0.01
Repetition accuracy	[mm]	< ±0.02
Hysteresis	[mm]	< 0.03
Smallest measurable speed	[mm/s]	10

Swivel modules DSMI, standard cylinders DNCM or potentiometers MLO-POT
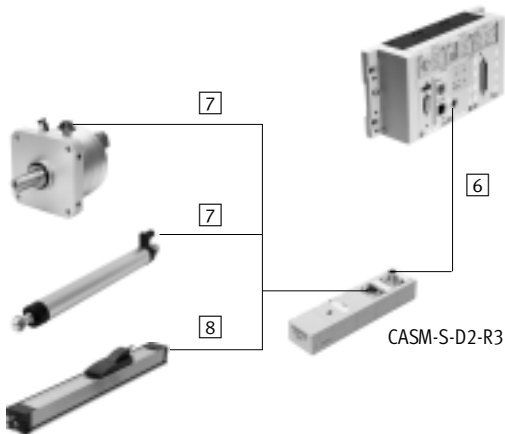
CASM-S-D2-R3

- The measuring systems supply an analogue measuring signal, which is converted to a CAN signal in the sensor interface CASM-S-D2-R3. The converted signal is then read into the CPX-CMIX
- Potentiometers measure absolute values, in other words the actual position is immediately available for the controller after the potentiometer is switched on

Other potentiometers can be used, in which case the following must be noted:
- The connection resistance of the potentiometer must be 3 ... 20 kΩ
- Poorer potentiometer values for linearity and temperature coefficient will decrease the accuracy of the measured value
- A special cable must be used for connection to the sensor interface

Technical data

Measuring length	[mm]	100	150	225	300	360	450	500
Linearity error								
MLO-POT	[%]	±0.1	±0.08	±0.07	±0.06	±0.05	±0.05	±0.05
DSMI[1]	[%]	< ±0.25						
Resolution								
MLO-POT	[mm]	±0.01	±0.01	±0.01	±0.01	±0.01	±0.01	±0.01
DSMI	[°]	< ±0.1						
Repetition accuracy								
MLO-POT	[mm]	±0.01	±0.01	±0.01	±0.01	±0.02	±0.02	±0.02
DSMI	[°]	< ±0.1						
Smallest measurable speed	[mm/s]	3	5	7	9	11	14	15
Temperature coefficient	[ppm/°K]	5						

Measuring length	[mm]	600	750	1000	1250	1500	1750	2000
Linearity error								
MLO-POT	[%]	±0.05	±0.04	±0.04	±0.03	±0.03	±0.03	±0.02
DSMI[1]	[%]	< ±0.25						
Resolution								
MLO-POT	[mm]	±0.01	±0.02	±0.02	±0.02	±0.03	±0.03	±0.03
DSMI	[°]	< ±0.1						
Repetition accuracy								
MLO-POT	[mm]	±0.02	±0.03	±0.03	±0.04	±0.05	±0.06	±0.07
DSMI	[°]	< ±0.1						
Smallest measurable speed	[mm/s]	18	23	31	38	46	53	61
Temperature coefficient	[ppm/°K]	5						

1) Refers to max. swivel angle

Type codes

	CPX	–	CMIX	–	M1	–	1

Valve terminal	
CPX	Terminal

Type	
CMIX	Measuring module

Function module	
M1	Measuring unit

Axes	
1	One axis

Peripherals overview
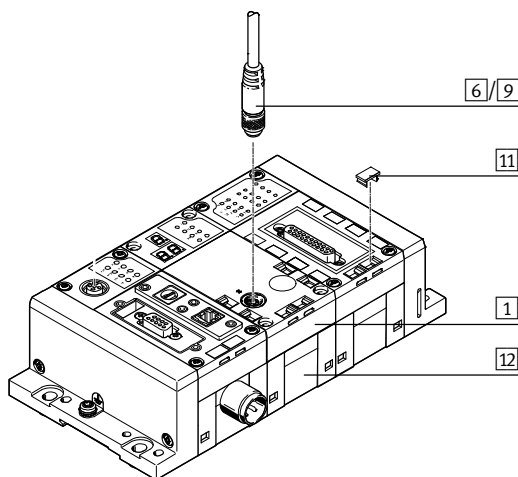
Accessories			
	Type	**Description**	**➔ Page/Internet**
1	Measuring module CPX-CMIX	Integrated in the CPX terminal. Screws for mounting on the plastic interlinking block are included in the scope of delivery	6
6	Connecting cable KVI-CP-3	For connecting the measuring module CPX-CMIX and sensor interface CASM	8
11	Inscription label IBS	For labelling the modules	8
12	Interlinking block CPX-GE	Connects the individual modules. Two versions are available: plastic or metal interlinking block	9
–	Screws CPX-M-M3	For mounting on the metal interlinking block	8
7	Connecting cable NEBC-P1W4-…	For connecting the sensor interface CASM and swivel module DSMI or potentiometer LWG	nebc
8	Connecting cable NEBC-A1W3-…	For connecting the sensor interface CASM and potentiometer TLF	nebc
9	Connecting cable NEBP-M16W6-…	For connecting measuring module CPX-CMIX and displacement encoder MME	8

Measuring modules CPX-CMIX

Technical data

The measuring module CPX-CMIX is
intended exclusively for use in valve
terminals CPX.

General technical data			
Operating voltage			
Operating voltage range		[V DC]	18 … 30
Nominal operating voltage		[V DC]	24
Current consumption at nominal operating voltage		[mA]	80
Protection against short circuit			Yes
Power failure bridging		[ms]	10
No. of axis strings			1
Axes per string			1
Length of connecting cable to axis		[m]	≤ 30
Max. no. of modules			9
Display			7-segment display
Assigned addresses	Outputs	[bit]	6x8
	Inputs	[bit]	6x8
Diagnostics			Channel and module-oriented
			Via local 7-segment display
			Undervoltage of modules
			Undervoltage of measuring system
Status display			Power Load
			Error
Control interface			
Data			CAN bus with Festo protocol
			Digital
Electrical connection			5-pin
			M9
			Socket
Materials: Housing			Reinforced PA
Note on materials			RoHS-compliant
Product weight		[g]	140
Dimensions	Length	[mm]	107
	Width	[mm]	50
	Height	[mm]	55

➜ Internet: www.festo.com/catalogue/...   Subject to change – 2017/10

Operating and environmental conditions
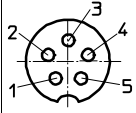
Ambient temperature	[°C]	−5 … +50
Relative air humidity	[%]	5 … 95, non-condensing
Protection class to IEC 60529		IP65

Connection and display components
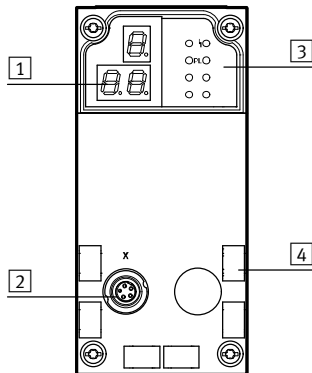
1	3-digit display
2	Control interface
3	Status LEDs
4	Inscription labels

Pin allocation – Control interface

Pin	Signal	Designation
1	+24 V	Nominal operating voltage
2	+24 V	Load voltage
3	0 V	Ground
4	CAN_H	CAN high
5	CAN_L	CAN low
Housing	Screened	Cable screening

Permitted bus nodes/CEC

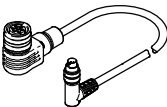| Bus node/CEC	Protocol	Max. no. of CMIX modules
CPX-CEC…	–	9
CPX-FB6	INTERBUS	2
CPX-FB11	DeviceNet[1]	9
CPX-FB13	PROFIBUS[2]	9
CPX-FB14	CANopen	5
CPX-M-FB21	INTERBUS	2
CPX-FB23-24	CC-Link	5 (function module F23)
		9 (function module F24)
CPX-FB33	PROFINET RT, M12	9
CPX-M-FB34	PROFINET RT, RJ45	9
CPX-M-FB35	PROFINET RT, SCRJ	9
CPX-FB36	EtherNet/IP	9
CPX-FB37	EtherCAT	9
CPX-FB38	EtherCAT	9
CPX-FB39	Sercos III	9
CPX-FB40	POWERLINK	9
CPX-M-FB41	PROFINET RT	9

1) With Revision 20 (R20)
2) With Revision 23 (R23)
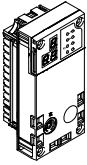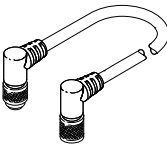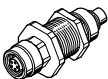
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Accessories

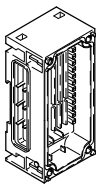**Ordering data**

	Brief description		Part No.	Type
Measuring module				
	Order code in the CPX configurator: T23		567417	**CPX-CMIX-M1-1**
Connecting cables				
	Connecting cable with angled plug and angled socket	0.25 m	540327	**KVI-CP-3-WS-WD-0,25**
		0.5 m	540328	**KVI-CP-3-WS-WD-0,5**
		2 m	540329	**KVI-CP-3-WS-WD-2**
		5 m	540330	**KVI-CP-3-WS-WD-5**
		8 m	540331	**KVI-CP-3-WS-WD-8**
	Connecting cable with straight plug and straight socket	2 m	540332	**KVI-CP-3-GS-GD-2**
		5 m	540333	**KVI-CP-3-GS-GD-5**
		8 m	540334	**KVI-CP-3-GS-GD-8**
	Connector for control cabinet through-feed		543252	**KVI-CP-3-SSD**
	For displacement encoder MME Connection between displacement encoder MME and measuring module CPX-CMIX	2 m	575898	**NEBP-M16W6-K-2-M9W5**
Screws				
	For mounting on the metal interlinking block		550219	**CPX-M-M3X22-4X**
Inscription labels				
	Inscription labels 6x10, in frames	64 pieces	18576	**IBS-6X10**
User manual				
	Measuring module description CPX-CMIX[1]	German	567053	**P.BE-CPX-CMIX-DE**
		English	567054	**P.BE-CPX-CMIX-EN**
		Spanish	567055	**P.BE-CPX-CMIX-ES**
		French	567056	**P.BE-CPX-CMIX-FR**
		Italian	567057	**P.BE-CPX-CMIX-IT**

1) User manual in paper form is not included in the scope of delivery.

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Ordering data				
	Brief description		Part No.	Type
Interlinking block, plastic, as expansion block				
	Without power supply	–	**195742**	**CPX-GE-EV**
	With additional power supply for outputs	M18 – 4-pin	**195744**	**CPX-GE-EV-Z**
		7/8" – 5-pin	**541248**	**CPX-GE-EV-Z-7/8-5POL**
		7/8" – 4-pin	**541250**	**CPX-GE-EV-Z-7/8-4POL**
	With additional power supply for valves	M18 – 4-pin	**533577**	**CPX-GE-EV-V**
		7/8" – 4-pin	**541252**	**CPX-GE-EV-V-7/8-4POL**
Tie rods				
	For extension using an interlinking block	1-fold	**525418**	**CPX-ZA-1-E**