# Measuring modules CPX-CMIX

# Key features

**At a glance**

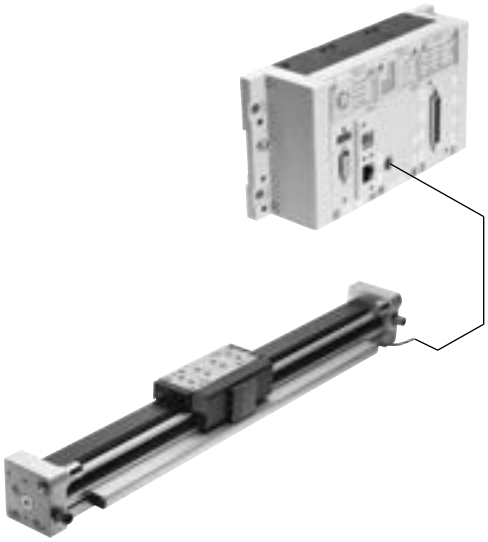
Movement and measurement in one, as an integral component of the valve terminal CPX – the modular peripheral system for decentralised automation tasks.
The modular design means that valves, digital inputs and outputs, positioning modules, end-position controllers and measuring modules, as appropriate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

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 alerts 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 a tried-and-tested system and is quick and easy to commission. | 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 measuring signal of the linear drive DGCI supplies a CAN signal. This signal is read 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**

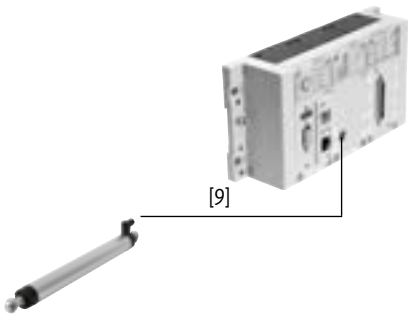
| | | |
|---|---|---|
| Linearity error[1)] | [%] | < ±0.02, min. ±50µm |
| Resolution | [mm] | 0.01 |
| Repetition accuracy[2)] | [mm] | ±0.01/±0.02 |
| Hysteresis | [im] | < 4 |
| Max. temperature coefficient | [ppm/°K] | 15 |
| Smallest measurable speed | [mm/s] | 10 |

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

# Key features

**Drives to use**

Displacement encoder MME



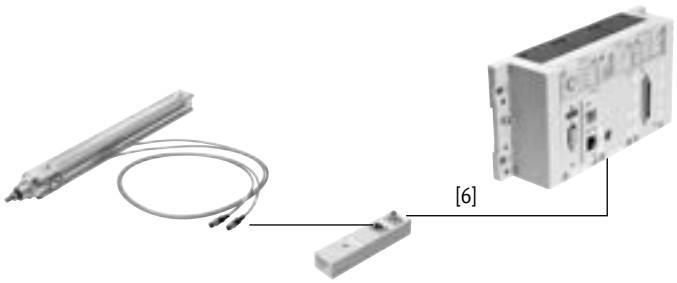

- The measuring signal of the displacement encoder MME supplies a CAN signal. This signal is read directly into the CPX-CMIX module
- The measuring system measures absolute values, in other words the actual position is immediately available for the controller after the system is switched on

| Technical data | | |
|---|---|---|
| Linearity error[1] | [%] | < ±0.01, min. ±40µm |
| Resolution | [mm] | 0.01 |
| Repetition accuracy[2] | [mm] | ±0.01/±0.02 |
| Hysteresis | [im] | < 4 |
| Max. 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

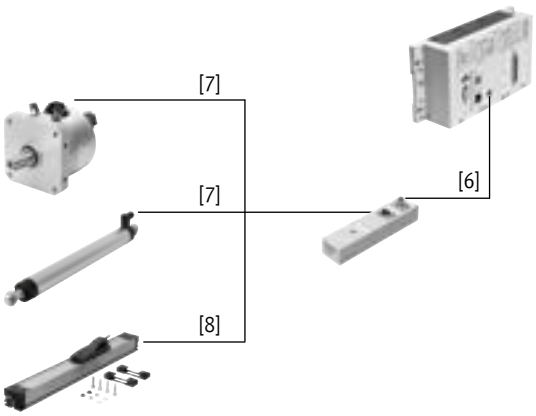



- The measuring signal of the linear drive DNCI is an incremental signal. This signal is converted to a CAN signal in the sensor interface CASM-S-D3-R7. The converted signal is then read into the CPX-CMIX module
- The measuring system does not measure absolute values, so must be homed after it is switched 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 |

# Key features

**Drives to use**
Swivel modules DSMI or potentiometers MLO-POT




- The measuring systems supply an analogue measuring signal. This signal is converted to a CAN signal in the sensor interface CASM-S-D2-R3. The converted signal is then read into the CPX-CMIX module
- 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 and peripherals overview

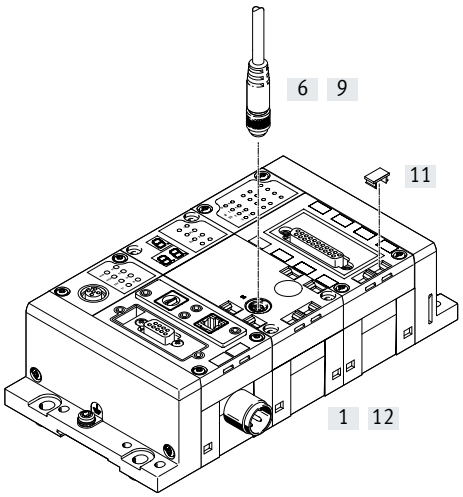
## Type codes

| 001 | Series | |
|---|---|---|
| **CPX-CMIX** | Measuring module for electrical terminal | |

| 002 | Function module | |
|---|---|---|
| **M1** | Measuring unit | |

| 003 | Axes | |
|---|---|---|
| **1** | One | |

## Peripherals overview




**Accessories**

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

# Data sheet

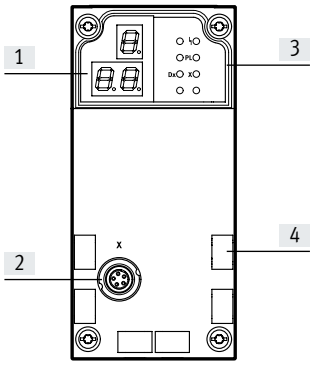
The measuring module CPX-CMIX is intended exclusively for use in valve terminals CPX.

| 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 |
| Short circuit protection | | | Yes |
| Power failure buffering | | [ms] | 10 |
| | | | |
| Number of axis strings | | | 1 |
| Axes per string | | | 1 |
| Length of connecting cable to axis | | [m] | ≤ 30 |
| Max. number 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 indication | | | 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 |

# Data sheet

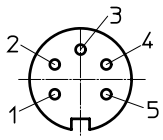
| Operating and environmental conditions | | |
|---|---|---|
| Ambient temperature | [°C] | –5 ... +50 |
| Relative humidity | [%] | 5 ... 95, non-condensing |
| Degree of protection to IEC 60529 | | IP65 |

## Connection and display components




[1] 3-digit display
[2] Control interface
[3] Status LEDs
[4] Inscription labels

**Pin allocation – Control interface**



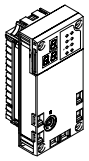
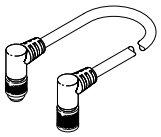
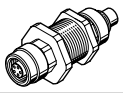
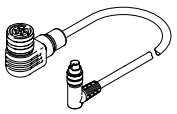
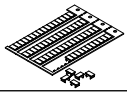

| Pin | Signal | Designation |
|---|---|---|
| 1 | +24 V | Nominal operating voltage |
| 2 | +24 V | Load voltage |
| 3 | 0 V | Ground |
| 4 | CAN_H | CAN high |
| 5 | CAN_L | CAN low |
| Housing | Shielding | Cable shielding |

**Permitted bus nodes/CEC**

| Bus node/CEC | Protocol | Max. number 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 (as function module F23) |
| | | 9 (as functional 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-FB39 | Sercos III | 9 |
| CPX-FB40 | POWERLINK | 9 |
| CPX-FB43 | PROFINET RT, M12 | 9 |
| CPX-M-FB44 | PROFINET RT, RJ45 | 9 |
| CPX-M-FB45 | PROFINET RT, SCRJ | 9 |

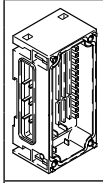
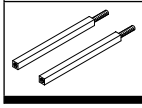
1) As of revision 20 (R20)
2) As of revision 23 (R23)

# 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** |
|  | Connecting component for control cabinet through-feed | | **543252** | **KVI-CP-3-SSD** |
|  | For displacement encoder MME:<br>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 documentation | | | | |
|  | Description of measuring module 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 documentation in paper form is not included in the scope of delivery

# Accessories

| Ordering data | | | | |
|---|---|---|---|---|
| | Brief description | | Part no. | Type |
| Polymer interlinking block as extension block | | | | |
|  | Without power supply | – | **195742** | **CPX-GE-EV** |
| | With additional 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 expansion using an interlinking block | 1 module | **525418** | **CPX-ZA-1-E** |