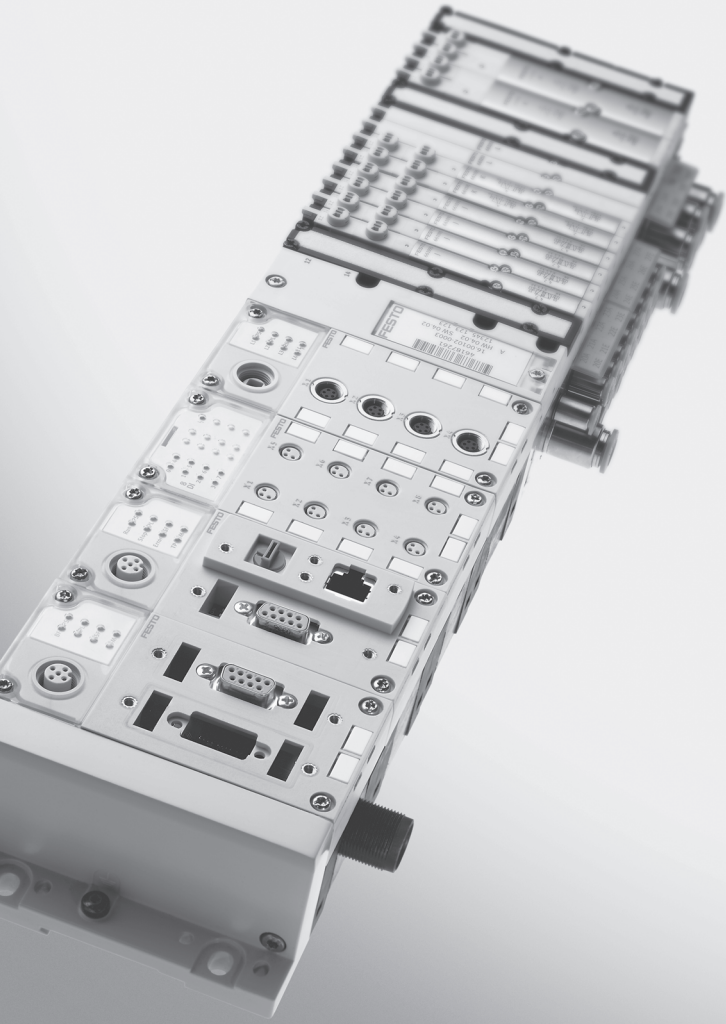
CPX terminal

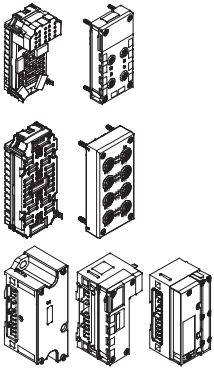


FESTO

Manual
Electronics

Digital CPX
I/O modules and
Connection blocks
Types:
- CPX-...DE...
- CPX-...DA
- CPX-8DE-8DA
- CPX-M-...
- CPX-L-...
- CPX-AB-...

CPX pneumatic
interfaces
Types:
- VMPA...-FB-EPL-...
- VMPAL...-EPL-...
- VABA-S6-1-X...
- CPX-GP-03-...
- CPX-GP-CPA-...



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Order no. 526 440

Internet: http://www.festo.com
E-Mail: service_international@festo.com

Contents

Intended use

The digital CPX I/O modules, CPX connection blocks and CPX pneumatic interfaces described in this manual have been designed exclusively for use in conjunction with CPX terminals from Festo. The modules and pneumatic interfaces are only to be used as follows:

– As specified in industrial applications.

– In an original condition, without any modifications by the user.
  Only the conversions or modifications described in the documentation supplied with the product are permitted.

– In perfect technical condition.

If conventional accessory components such as sensors and actuators are connected, the specified limits for pressures, temperatures, electrical data, torques etc. should be observed.
Please observe the standards specified in the relevant chapters and comply with technical regulations, as well as with national and local regulations.

Warning
- Only use PELV **circuits** as per IEC/DIN EN 60204-1 for the electric power supply (protective extra-low voltage, PELV).
  Also observe the general requirements for PELV circuits in accordance with IEC/DIN EN 60204-1.
- Only use **power sources** that guarantee reliable electrical isolation of the operating voltage as per IEC/DIN EN 60204-1.

Protection against electric shock (protection against direct and indirect contact) is guaranteed in accordance with IEC/DIN EN 60204-1 by using PELV circuits (electrical equipment of machines, general requirements).

Areas of application and approval by authorities

The products fulfil the requirements of EU directives and bear the CE mark.

Standards and test values, which the products must comply with and fulfil, can be found in the section “Technical appendix”. The product-relevant EU directive can be found in the declaration of conformance.

Certificates and declarations of conformance for these products can be found at www.festo.com.

Target group

This manual is intended exclusively for technicians trained in control and automation technology, who have experience in installing, commissioning, programming and diagnosing programmable logic controllers (PLC) and fieldbus systems.

Service

Please consult your local Festo Service agent if you have any technical problems.

Important user instructions

Danger categories

This description contains instructions on the possible dangers which can occur if the product is not used correctly. These instructions are marked (Warning, Caution, etc), printed on a shaded background and marked additionally with a pictogram. A distinction is made between the following danger warnings:

Warning
... means that failure to observe this instruction may result in serious personal injury or damage to property.

Caution
... means that failure to observe this instruction may result in personal injury or damage to property.

Note
... means that failure to observe this instruction may result in damage to property.

The following pictogram marks passages in the text which describe activities with electrostatically sensitive devices:

Electrostatic sensitive devices: inappropriate handling can result in damage to components.

Identification of specific information

The following pictograms designate texts that contain special information.

Pictograms

Information:
Recommendations, tips and references to other sources of information.

Accessories:
Information about necessary or useful accessories for the Festo product.

Environment:
Information about the environmentally-friendly use of Festo products.

Text designations

- Bullet points indicate activities that may be carried out in any order.

1. Numerals denote activities which must be carried out in the numerical order specified.

– Hyphens indicate general lists.

Notes on the use of this manual

This manual contains general basic information about the method of operation, fitting and installation of digital CPX I/O modules, CPX connection blocks and CPX pneumatic interfaces.

Information about MPA pneumatic and electronic modules can be found in a separate description of type P.BE-MPA-ELEKTRONIK-...

General basic information about the method of operation, fitting, installation and commissioning of CPX terminals can be found in the CPX system description.

Special information about commissioning, parameterising and diagnosing a CPX terminal with the bus node you are using can be found in the appropriate manual for the bus node.

Information about further CPX modules can be found in the manual for the respective module.

An overview of the structure of the CPX terminal user documentation is contained in the CPX system description.

Conventions

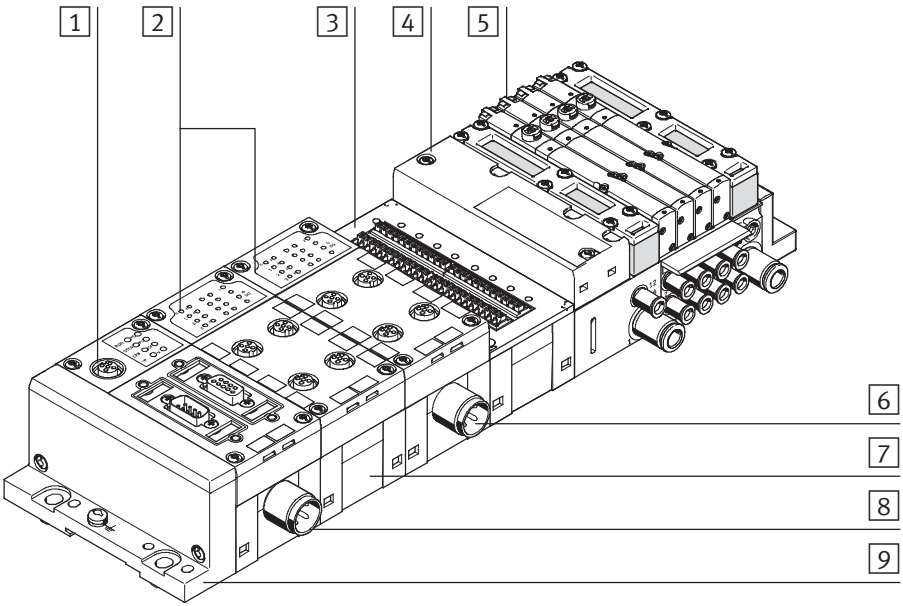
The special parameters of the modules are described in the individual chapters. These appear in English on the handheld type CPX-MMI-1.

[.....] The data and parameters which appear in English on the handheld are shown in square brackets in this manual, e.g.:

Input debounce time [Debounce time].

Structure of a CPX terminal

CPX terminals consist of electric function modules, individual modules and components. The diagram below shows an example.



1 Bus node
(see separate description)

2 CPX I/O modules
(see chapter 1 - 4)

3 CPX-L I/O module
(see chapter 2 and 4)

4 Pneumatic interface
(see chapter 5)

5 MPA pneumatics
(see separate descriptions)

6 Interlinking block with additional power supply (see CPX system description)

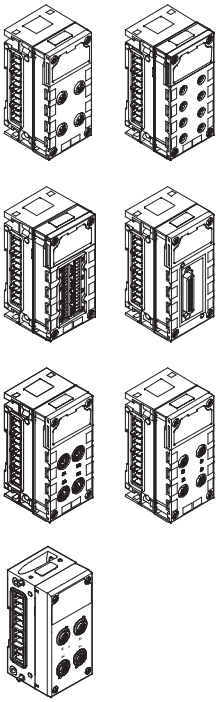
7 Interlinking block without supply

8 Interlinking block with system supply for

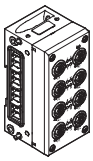
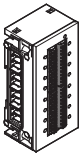
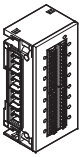
9 End plate

Fig. 0/1: Example, CPX terminal with MPA pneumatics

CPX I/O modules and connection blocks

I/O modules	Type designation	Description	Connection blocks and interlinking modules
	– CPX-4DE – CPX-8DE – CPX-16DE	Input modules with 4, 8 or 16 inputs, PNP	The I/O modules each consist of the electronic module as well as a connection block and an interlinking block (see Fig. 1/1) Connection blocks: – CPX-AB-4-M12x2-5POL – CPX-AB-4-M12x2-5POL-R – CPX-AB-8-M8-3POL – CPX-AB-8-M8-4POL – CPX-AB-8-KL-4POL – CPX-AB-1-SUB-BU-25POL – CPX-AB-4-HARX2-4POL – CPX-AB-4-M12-8POL – CPX-M-4-M12x2-5POL (Note the possible combinations in section 1.2.2). Interlinking modules: – CPX-GE-EV – CPX-GE-EV-...
	– CPX-8DE-D	Input module with 8 inputs and channel diagnosis, PNP	
	– CPX-8NDE	Input module with 8 inputs, negative logic, NPN	
	– CPX-4DA	Output module with 4 outputs, PNP	
	– CPX-8DA	Output module with 8 outputs, PNP	
	– CPX-8DA-H	High-current output module with 8 outputs, PNP	
	– CPX-8DE-8DA	Multi I/O module (input/output module) with 8 inputs and 8 outputs, PNP	

Tab. 0/1: Overview of I/O modules – part 1

I/O modules	Type designation	Description	Connection blocks and interlinking modules
	– CPX-M-16DE-D	Input module with 16 inputs and channel diagnosis, PNP	The I/O modules each consist of the electronic module as well as a connection block and an interlinking module. Connection block: – CPX-M-8-M12x2-5POL Interlinking modules: – CPX-GE-EV – CPX-GE-EV-...
	CPX-L-16DE-16-KL-3POL	Input module with 16 inputs	CPX-L modules are integrated in the interlinking block and are equipped with 48 push-in terminals.
	CPX-L-8DE-8DA-16-KL-3POL	Multi I/O module (input/output module) with 8 inputs and 8 outputs, PNP	

Tab. 0/2: Overview of I/O modules – part 2

CPX pneumatic interfaces

An overview of CPX pneumatic interfaces can be found in Tab. 5/1.

MPA pneumatic modules

Information about MPA pneumatic and electronic modules can be found in the description of type P.BE-MPA-ELEKTRONIK-...

Diagnosis via the fieldbus or a network

Depending on the parameterisation, CPX I/O modules and CPX pneumatic interfaces register specific faults via the fieldbus or your network.

These can be evaluated via the:

- Status bits (system status)
- I/O diagnostic interface (system diagnosis)
- Module diagnosis
- Error numbers

Further information on diagnosis can be found in the CPX system description or in the description for the bus node.

The following product-specific terms and abbreviations are used in this manual:

Term/abbreviation	Meaning
Bus node	Provides the connection to specific fieldbuses/networks. Transmits control signals to the connected modules and monitors their ability to function.
Connection block	Replaceable upper part of module housing with connections
CPX modules	Collective term for the various modules which can be integrated in a CPX terminal.
DIL switch	Dual-in-line switches consist of several logic elements with which settings can be made.
I	Digital input
I/O diagnostic interface	The I/O diagnostic interface is a bus-independent diagnostic interface at I/O level, permitting access to internal data of the CPX terminal.
I/O modules	Collective term for the CPX modules which provide digital inputs and outputs (CPX input modules and CPX output modules).
I/Os	Digital inputs and outputs
Input module	CPX input module
Interlinking block	Lower part of the housing of a CPX module for linking the module electrically with the CPX terminal. There are different variants with and without power supplies, as well as those made of plastic and metal.
O	Digital output
Output module	CPX output module
Pneumatic interface	The pneumatic interface is the interface between the modular electrical peripherals and the pneumatics.
PLC/IPC	Programmable logic controller/industrial PC
Status bits	Internal inputs that supply coded common diagnostic messages.

Tab. 0/3: Product-specific abbreviations

Overview and connection blocks for CPX I/O modules

Chapter 1

Type CPX-AB-4-M12x2-5POL
CPX-AB-4-M12x2-5POL-R

CPX-M-4-M12x2-5POL

CPX-AB-8-M8-3POL
CPX-AB-8-M8-4POL
CPX-AB-8-KL-4POL
CPX-AB-1-SUB-BU-25POL
CPX-AB-4-HARX2-4POL
CPX-AB-4-M12-8POL

CPX-M-8-M12x2-5POL

Contents

1.1 Components of an I/O module

Note
Chapter 1 and the following contents **do not apply to CPX-L modules**. CPX-L I/O modules do not have any exchangeable connection blocks and cannot be dismantled.

1 Connection block with specific connection technology

2 Electronics module

3 Interlinking block

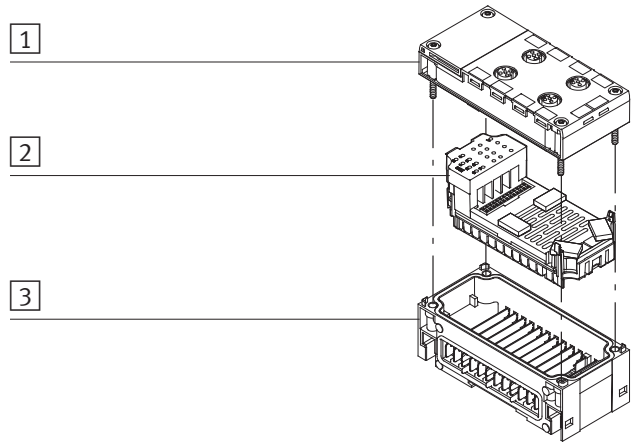


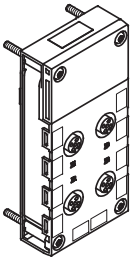
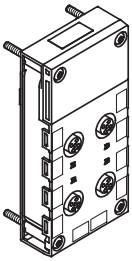
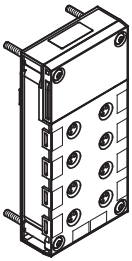
Fig. 1/1: Components of an I/O module (representation)

All I/O modules consist of three parts:

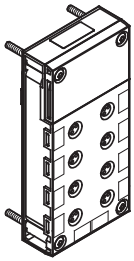
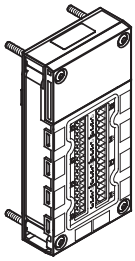
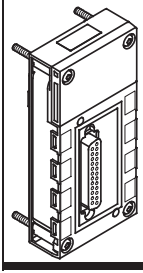
- The connection block provides the electrical connections in the form of different sockets or terminal strips.
- The electronics module contains the printed circuit board with the electronics and the LED display of the I/O module. The electronics module is fitted into the connection block and is connected to this and to the interlinking block by means of electric plug connectors.
- The interlinking block as the lower part of the housing provides the mechanical and electrical link between the module and the valve terminal.

1.2 Connection technology

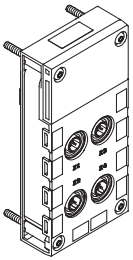
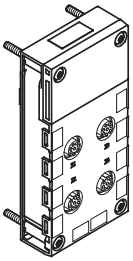
Individual connection requirements can be fulfilled with different connection blocks. These connection blocks provide the required sockets or terminal strips for connecting the sensors and actuators, irrespective of the I/O module used.

Connection block	Type	Description
	CPX-AB-4-M12x2-5POL	4 M12 sockets, 5-pin – Protection class IP65/IP67 – One functional earth connection per socket – Screening possibility via screening plate (see Accessories, Appendix B.3)
	CPX-AB-4-M12x2-5POL-R	4 M12 sockets with metal thread, 5-pin – Protection class IP65/IP67 – One functional earth connection per socket – Screening possibility via metal thread – Enables M12 connectors and SPEEDCON plug connectors to be used.
	CPX-AB-8-M8-3POL	8 M8 sockets, 3-pin – Protection class IP65/IP67

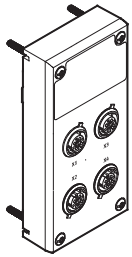
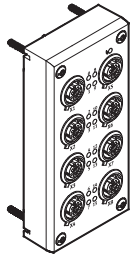
Tab. 1/1: Connection technology – part 1

Connection block	Type	Description
	CPX-AB-8-M8-4POL	8 M8 sockets, 4-pin – Protection class IP65/IP67
	CPX-AB-8-KL-4POL	2 terminal strips, 16-pin (4 x 4-pin) – Protection class IP20 Protection class IP65/IP67 with cover AK-8KL and screw connector set VG-K-M9 – All cores can be laid individually in spring-clip terminals – Connections are arranged in groups of 4, one functional-earth connection per group
	CPX-AB-1-SUB-BU-25POL	1 SUB-D socket, 25-pin – Protection class IP20 – With plug type SD-SUB-D-ST25: IP 65/IP67 (see Accessories, Appendix B.3)

Tab. 1/2: Connection technology – part 2

Connection block	Type	Description
	CPX-AB-4-HARX2-4POL	4 HARAX connections, 4-pin – Protection class IP65/IP67 with the plugs intended for this purpose (see Accessories, Appendix B.3) – Connection with insulation displacement technology
	CPX-AB-4-M12-8POL	4 M12 sockets, 8-pin – Protection class IP65/IP67 – Intended for connecting cylinder-valve combination type DNCV – Connections are arranged in groups, one functional-earth connection per group – Screening possibility via screening plate (see Accessories, Appendix B.3)

Tab. 1/3: Connection technology – part 3

Connection block, Metal design	Type	Description
	CPX-M-4-M12x2-5POL	4 M12 sockets with metal thread, 5-pin – Protection class IP65/IP67 – One functional earth connection per socket – Screening possibility via metal thread – Enables M12 connectors and SPEEDCON plug connectors to be used.
	CPX-M-8-M12x2-5POL	8 M12 sockets with metal thread, 5-pin – Protection class IP65/IP67 – One functional earth connection per socket – Screening possibility via metal thread – Enables M12 connectors and SPEEDCON plug connectors to be used.

Tab. 1/4: Connection technology – part 4: Connection blocks in metal design

1.2.1 Display and connecting elements

On most input and output modules the LEDs and the module identification are visible through the transparent cover of the connection block (see Fig. 1/2). The input module type CPX-M-16DE-D is an exception (see Fig. 1/3).

1 Name plate

2 Module identification (here “8DI” for an input module type CPX-8DE)

3 LEDs:
Inputs (green),
Outputs (yellow),
Faults (red)

4 Electrical connections (example)

5 Inscription fields for addresses

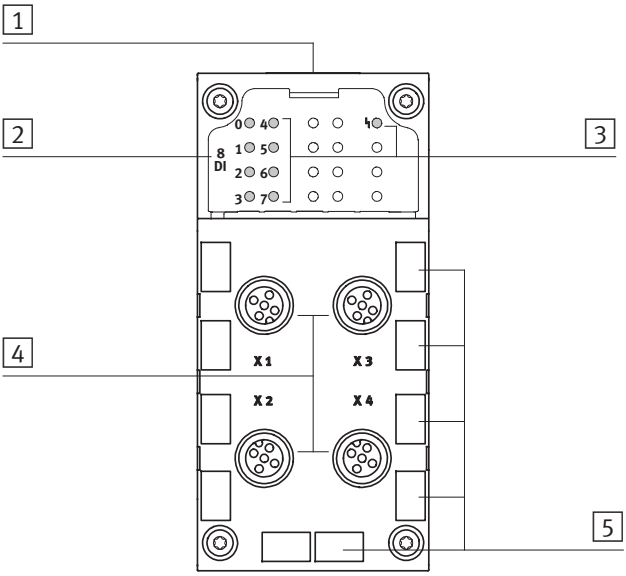


Fig. 1/2: Display and connecting elements on modules with transparent cover

Use identity labels type IBS 6x10 for marking the addresses.

1 Name plate

2 Electrical connections (example)

3 LEDs:
Inputs (green),
Outputs (yellow),
Faults (red)

4 Holes for fastening identity labels

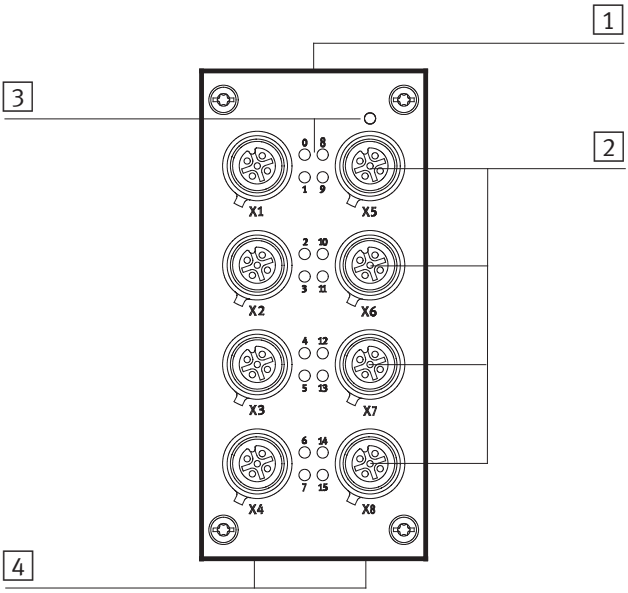


Fig. 1/3: Display and connecting elements on metal designs (here CPX-M-8-M12x2-5POL)

Use screws type CPX-M-M2,5X6-12X for fastening the identity labels.

1.2.2 Combinations of I/O modules and connection blocks

The following tables show the permitted combinations of I/O modules with plastic and metal connection blocks:

Connection block **Type**	**Digital input modules** **CPX-4DE** (4 inputs)	 **CPX-8DE** **CPX-8DE-D** **CPX-8NDE** (8 inputs)	 **CPX-16DE** (16 inputs)
CPX-AB-4-M12x2-5POL (4 M12 sockets, 5-pin)	•	•	–
CPX-AB-4-M12x2-5POL-R (4 M12 sockets with metal thread, 5-pin)	•	•	–
CPX-AB-8-M8-3POL (8 M8 sockets, 3-pin)	•	•	–
CPX-AB-8-M8-4POL (8 M8 sockets, 4-pin)	–	–	•
CPX-AB-8-KL-4POL (2 terminal strips, 16-pin)	•	•	•
CPX-AB-1-SUB-BU-25POL (1 SUB-D socket, 25-pin)	•	•	•
CPX-AB-4-HARX2-4POL (4 M12 sockets with insulation displacement technology, 4-pin)	•	•	–
CPX-AB-4-M12-8POL (4 M12 sockets, 8-pin)	–	–	–
• Can be combined – Cannot be combined			

Tab. 1/5: Permitted combinations of digital input modules with plastic connection blocks

Connection block **Type**	**Digital output modules and multi I/O module**			
	CPX-4DA (4 outputs)	**CPX-8DA** (8 outputs)	**CPX-8DA-H** (8 high current outputs)	**CPX-8DE/8DA** (8 inputs and outputs)
CPX-AB-4-M12x2-5POL (4 M12 sockets, 5-pin)	•	•	–	–
CPX-AB-4-M12x2-5POL-R (4 M12 sockets with metal thread, 5-pin)	•	•	•	–
CPX-AB-8-M8-3POL (8 M8 sockets, 3-pin)	•	•	–	–
CPX-AB-8-M8-4POL (8 M8 sockets, 4-pin)	•	•	•	–
CPX-AB-8-KL-4POL (2 terminal strips, 16-pin)	•	•	•	•
CPX-AB-1-SUB-BU-25POL (1 SUB-D socket, 25-pin)	•	•	•	•
CPX-AB-4-HARX2-4POL (4 M12 sockets with insulation displacement technology, 4-pin)	•	•	–	–
CPX-AB-4-M12-8POL (4 M12 sockets, 8-pin)	–	–	–	•
• Can be combined – Cannot be combined				

Tab. 1/6: Permitted combinations of digital output modules and the multi I/O module with plastic connection blocks

Connection block, Metal design	**Digital input modules**			
Type	**CPX-4DE** (4 inputs)	**CPX-8DE** **CPX-8DE-D** **CPX-8NDE** (8 inputs)	**CPX-16DE** (16 inputs)	**CPX-16DE-D** (16 inputs)
CPX-M-4-M12x2-5POL (4 M12 sockets with metal thread, 5-pin)	•	•	–	–
CPX-M-8-M12x2-5POL (8 M12 sockets with metal thread, 5-pin)	–	–	–	•
• Can be combined – Cannot be combined				

Tab. 1/7: Permitted combinations of digital input modules with metal connection blocks

Connection block, Metal design	**Digital output modules and multi I/O module**			
Type	**CPX-4DA** (4 outputs)	**CPX-8DA** (8 outputs)	**CPX-8DA-H** (8 high current outputs)	**CPX-8DE/8DA** (8 inputs and outputs)
CPX-M-4-M12x2-5POL (4 M12 sockets with metal thread, 5-pin)	•	•	•	–
CPX-M-8-M12x2-5POL (8 M12 sockets with metal thread, 5-pin)	–	–	–	–
• Can be combined – Cannot be combined				

Tab. 1/8: Permitted combinations of digital output modules and the multi I/O module with connection blocks in a metal design

1.2.3 Connecting the cables and plugs to the connection blocks

Sensors and actuators must only be connected to the CPX I/O modules at the connection blocks. In this way, e.g. when an electronic module is replaced, the plugs and cables remain fitted in the connection block.

Warning
Uncontrolled movements of the connected actuators and uncontrolled movements of loose tubing can cause injury to human beings or damage to property.

Before carrying out installation and maintenance work, switch off the following:

– Compressed air supply

– The operating and load voltage supplies.

The protection class of the I/O modules depends on the connection block used as well as on the plugs and protective caps used. Instructions can be found on the following pages and in the Appendix A.1.

Use plugs and cables from the Festo range for connecting sensors and actuators (see Appendix B.3).

Connection blocks CPX-AB-4-M12x2-5POL (-R)
CPX-M-4-M12x2-5POL,
CPX-M-8-M12x2-5POL

Note
In order that completely fitted modules with connection block CPX-AB-4-M12x2-5POL (-R) or CPX-M-...-M12x2-5POL comply with protection class IP 65/IP67:

- Use plugs and cables from the Festo range for connecting the sensors and actuators (see Appendix B.3).
- Tighten the union nuts of the plugs by hand.
- Seal unused sockets with protective caps type ISK-M12 (see Appendix B.3: Accessories).

The connection blocks with metal thread (type CPX-AB-4-M12x2-5POL**-R** and CPX-M-...-M12x2-5POL) enable fast locking systems to be used, e.g. SPEEDCON from Phoenix Contact.

- When using fast locking systems follow the manufacturer's instructions in order to comply with protection class IP65/IP67.

Screening

– On plugs without metal housing:

  - Connect the cable screening to pin 5 (functional earth FE).

– On plugs with metal housing:

  - Use the connection block with metal thread (type CPX-AB-4-M12x2-5POL**-R** and CPX-M-...-M12x2-5POL). The metal thread of this connection block is connected internally with pin 5 (functional earth FE).

    or

  - Connect the cable screening via the plug housing and the screening plate to FE.

Screening plate type CPX-AB-S-4-12

Connection blocks CPX-AB-4-M12x2-5POL (without metal thread) and CPX-AB-4-M12-8POL can be combined with a screening plate. Depending on what you have ordered, this may already be fitted on the connection block.

Instructions on subsequent fitting of the screening plate can be found in section 1.3.2.

Electromagnetic compatibility can be improved with screening plates, e.g. in environments heavily subjected to interference or for analogue signals. For this purpose the screening plates must be earthed at the flat contact intended for this purpose as per DIN 46 244 B2,8-1 (2.8 x 1 mm).

- Connect the earth cable of the screening plate with low impedance to the functional earth connection (FE) as per Fig. 1/4.
  Screening plates lying next to each other are connected together by spring clips and must not be connected individually to FE.

If the intended plugs are used (see Accessories, Appendix B.3), the plug housing will be connected to the functional earth via the spring contacts on the screening plate.

- Before fitting the plugs screw the spring contacts as far as possible onto the thread of the plug.

1 Plug

2 Spring contact

3 Screening plate

4 Functional earth connection (FE) with blade connector as per DIN 46 245 B2,8-1

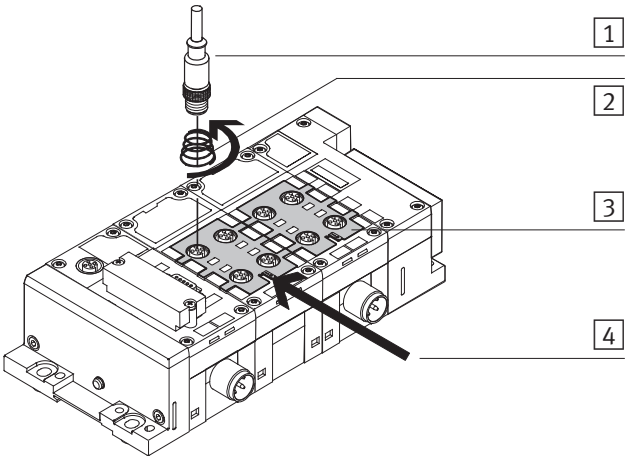


Fig. 1/4: Connecting the screening plates

Note

To comply with protection class IP65/IP67:

- Do not use the spring contacts if you have sealed unused sockets with protective caps.

Connection blocks CPX-AB-8-M8-3POL and -4POL

Note
In order that the completely fitted modules with connection block CPX-AB-8-M8-3POL and -4POL comply with protection class IP65/IP67:

- Use plugs and cables from the Festo range for connecting the sensors and actuators (see Appendix B.3).
- Tighten the union nuts of the plugs by hand.
- Seal unused sockets with protective caps type ISK-M8 (Accessories).

Connection block CPX-AB-8-KL-4POL

The completely fitted connection block CPX-AB-8-KL-4POL complies with protection class IP20.

Specifications of the cable terminals:

– Conductor cross section: 0.08 ... 1.5 mm^2

– Max. current: see chapter A.1

– Insulation removed: 5 ... 6 mm

Permitted copper conductors:

– Single wire, multi-wire, fine wire, also with tin-plated individual cores

– Fine wire compressed

– Fine wire with core end sleeves (sealed against gas, crimped on) *)

– Fine wire with pin cable socket (sealed against gas, crimped on *)

*) If necessary, use next smaller conductor cross section

1 Screwdriver, blade 2.5 x 0.4 mm

2 Unlocking opening (inside)

3 Cable

4 Terminal opening for inserting the conductors (outside)

5 Terminal strips

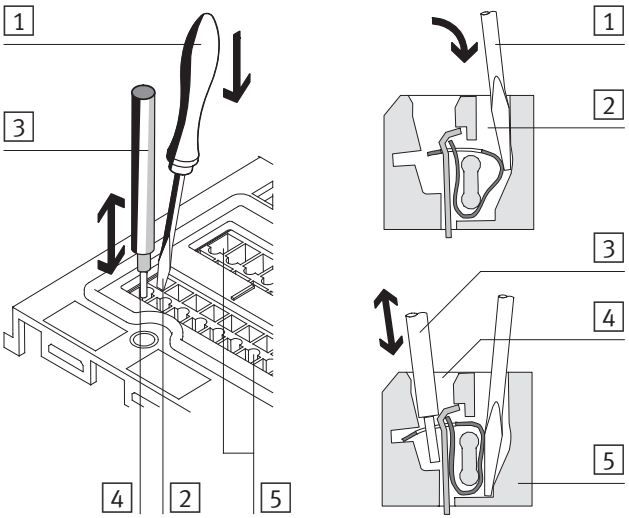


Fig. 1/5: Connecting the terminal strips

Fitting and removing the cables:

Note

- To ensure reliable contact, only connect one conductor per terminal.
- Only insert cables into the terminal opening. The terminal will be damaged if a screwdriver is inserted into the opening.

When connecting and disconnecting the cables:

1. Press the screwdriver with a light rotary movement towards the centre of the unlocking opening (see Fig. 1/5). The terminal will then be unlocked.
2. When the terminal is unlocked you can insert or pull out the ends of the cable through the opening.
3. Remove the screwdriver from the unlocking opening. The cable will then be securely locked.

You will then comply with protection class IP65/IP67

In order that connection block CPX-AB-8-KL-4POL complies with protection class IP65/IP67, use cover type AK-8KL and the screw connector set type VG-K-M9 from Festo. Note the relevant fitting instructions.

1 Cover AK-8KL

2 Screw connector set VG-K-M9

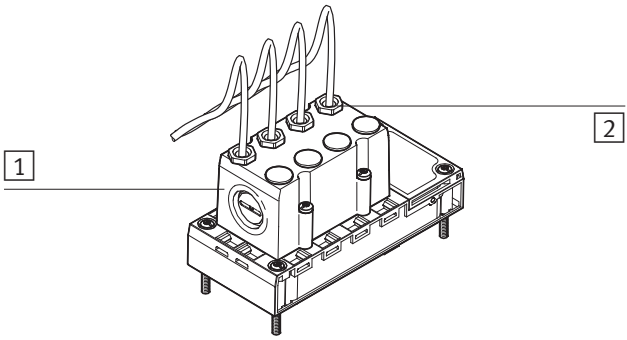


Fig. 1/6: Cover and screw connector set for connection block CPX-AB-8-KL-4POL (for complying with protection class IP65/67)

Connection block CPX-AB-1-SUB-BU-25POL

The completely fitted connection block CPX-AB-1-SUB-BU-25POL complies with protection class IP20.

In order that connection block CPX-AB-1-SUB-BU-25POL complies with protection class IP65/IP67, use plug type SD-SUB-D-ST25 from Festo.
When fitting the plug onto the connection block, observe the maximum tightening torque of 0.5 Nm.

Connection block CPX-AB-4-HARX2-4POL

Note
In order that the completely fitted modules with connection block CPX-AB-4-HARX2-4POL comply with protection class IP65/IP67:

- Use plugs (type SEA-GS-HAR-4POL) from the Festo range (consisting of union nut, strain relief and splicing ring) for connecting sensors and actuators.
- Tighten the union nuts of the plugs by hand.
- Seal the unused connecting sockets with protective caps from Harting (see Accessories, Appendix B.3).

Specifications of the cables for the connection block CPX-AB-4-HARX2-4POL:

–	Conductor cross section:	0.25 ... 0.5 mm^2
–	Strand cross-section:	up to 0.1 mm
–	Insulation material:	PVC/PUR/PE
–	Insulation thickness:	max. 1.6 mm
–	Core diameter:	1.2 mm ... 1.6 mm
–	Cable outer diameter:	4.0 ... 5.1 mm

Assembly

1 Cut the cable to length and remove the coating. Push the union nut and the seal insert onto the end of the cable.

2 Insert the ends of the core into the appropriate slots of the splicing ring.

3 Place the seal and the splicing ring together and cut off the projecting core ends flush with the splicing ring.

4 Insert the pre-fitted splicing seal element into the contact support in the connection block. Screw in the union nut as far as possible.

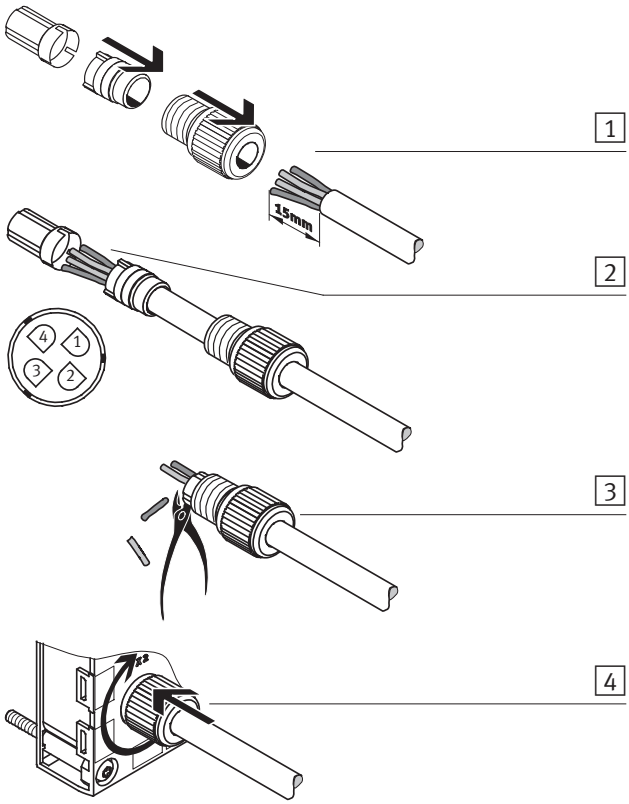


Fig. 1/7: Connecting the cables to connection block CPX-AB

Dismantling

- Loosen the screw connector and remove the cores by pulling them out of the contacts.

The cores can be connected up to 10 times if the contact ends are cut away each time (if the same core diameter is used). Cut off the used cable ends and repeat steps 2 to 4.

Connection block CPX-AB-4-M12-8POL

Note
In order that the completely fitted modules with connection block CPX-AB-4-M12-8POL comply with protection class IP65/IP67:

- Use cable type KM12-8GD8GS-2-PU from Festo for connecting the cylinder-valve combination type DNCV or other sensors and actuators (see Appendix B.3)
- Tighten the union nuts of the plugs by hand.
- Seal unused sockets with protective caps type ISK-M12 (Accessories).

Screening plate type CPX-AB-S-4-12

Connection block CPX-AB-4-M12-8POL can be combined with a screening plate. This can be ordered separately as an accessory.

Instructions on subsequent fitting of the screening plate can be found in section 1.3.2.
Instructions on using the screening plates can be found with connection block CPX-AB-4-M12x2-5POL.

1.3 Assembly

Warning
Uncontrolled movements of the connected actuators and uncontrolled movements of loose tubing can cause injury to human beings or damage to property.

Before carrying out installation and maintenance work, switch off the following:

– Compressed air supply
– The operating and load voltage supplies.

Caution
Inappropriate handling can result in damage to the modules.

- Do not touch any components.
- Observe the handling specifications for electrostatic sensitive devices.
- Discharge yourself before installing or removing sub-assemblies to protect the sub-assemblies from static discharges.

Before the CPX terminal can be expanded or converted, it must first be unscrewed and dismantled. Instructions on this can be found in the CPX system manual.

The CPX terminal does not need to be dismantled when connection blocks or electronic modules are fitted or removed. This also applies to the plugs and cables on the connection block.

1.3.1 Fitting the connection blocks

Note
Handle all modules and components of the CPX terminal with great care. Pay particular attention to the following:

- Screws must be fitted exactly (otherwise threads will be damaged).
  Screws should only be secured by hand. Screws must be fitted so that the self-cutting threads can be used for plastic interlinking blocks.
- The specified torques must be observed.
- Threaded connections must be mounted free of offset and mechanical tension.
- Check the seals for damage (IP65/IP67).
- Connecting surfaces must be clean (to ensure sealing effect, avoid leakage and contact faults).

The screw connection between the connection block and the interlinking block is designed to withstand at least 10 fitting/removal cycles under observance of the instructions for plastic interlinking blocks.

Also observe the mounting instructions in the package insert supplied with modules and components subsequently ordered.

CPX terminals are supplied from the factory completely fitted. It may be necessary to fit or remove the connection blocks for the following reasons:

– replacing the connections,

– to simplify fitting the sensor plugs or cables.

It may be necessary to fit or remove the electronic modules for the following reasons:

– for changing the function of the I/O module (e.g. CPX-8DE instead of CPX-4DE),

– for replacing defective electronic modules.

Dismantling

Dismantle the connection block as follows (see Fig. 1/8):

1. Loosen the 4 screws in the relevant connection block with a Torx screwdriver size T10.
2. Pull the connection block carefully and without tilting away from the electrical plug connection of the electronic module.

Only in cases where the electronic module is to be removed:

- Pull the electronic module carefully and without tilting away from the contact rails of the interlinking block.

1 Connection block
2 Screws
3 Electrical plug connector
4 Electronics module
5 Contact rails
6 Interlinking block

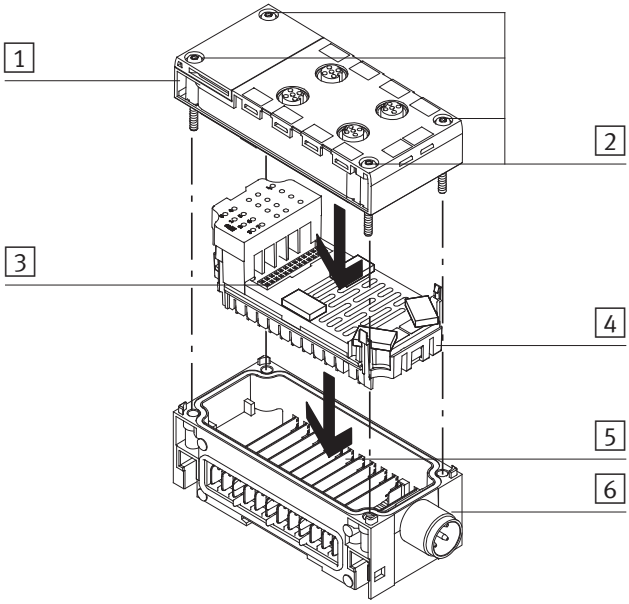


Fig. 1/8: Fitting/removing the I/O module (representation), not applicable for CPX-L modules

Fitting

Fit the modules as follows (see Fig. 1/8):

→

Note
- Please observe the instructions on combining I/O modules and connection blocks in section 1.2.2.
- Please observe the instructions on combining and arranging modules on the CPX terminal in the CPX system manual.

→

Note
If there is a combination of connection blocks and interlinking blocks with metal on plastic or plastic on metal, always use the appropriate screws for the **interlinking block** (see Appendix B.3: Accessories):
– for plastic interlinking blocks: thread-cutting screws
– for metal interlinking blocks: screws with metric thread

Only in cases where the electronic module has been removed:

- Place the electronic module in interlinking block. Make sure that the grooves with the contact terminals on the bottom of the electronic module lie above the contact rails. Then push the electronic module carefully and without tilting as far as possible into the interlinking block.

Fitting the connection blocks:

1. Only CPX-M-8-M12x2-5POL:
   Observe the following asymmetrically arranged features for the correct alignment of the components:
   - the centre electrical plug connector and
   - the fibre-optic indicator for the error LED
2. Align the connection block over the interlinking block with the electronic module. Make sure that the plug connectors of the connection block are aligned exactly with the connectors of the electronic module. Then push the connection block carefully and without tilting onto the interlinking block.
3. Only tighten the screws by hand. Set the screws so that the self-cutting threads can be used.
   Tighten the screws with a Torx screwdriver (size T10) with a torque of 0.9 ... 1.1 Nm.

Note
CPX-L modules do not have any exchangeable connection blocks. They cannot be dismantled.

1.3.2 Fitting the screening plates

A screening plate type CPX-AB-S-4-12 can be fitted on connection blocks CPX-AB-4-M12x5-5POL and CPX-AB-4-M12-8POL. The connection block must be removed before fitting or dismantling.

Fitting

Fit the screening plate as follows (see Fig. 1/9):

1. Dismantle the connection block (see section 1.3.1).
2. Snap the spring clips of the screening plate from above into the appropriate recesses on the dismantled connection block.
3. Fit the connection block.

Instructions on earthing the screening plate can be found in section 1.2.3.

Dismantling

The screening plate must be removed in reverse sequence to the fitting procedure.

1 Spring contact

2 Screening plate

3 Spring clip

4 Connection block type CPX-AB-4-M12x2-5POL or CPX-AB-4-M12-8POL

5 CPX terminal

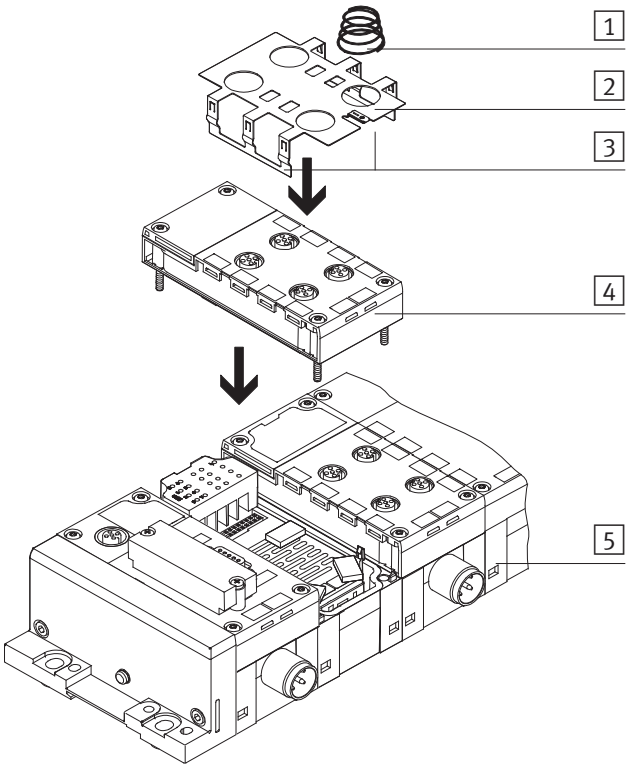


Fig. 1/9: Fitting screening plate type CPX-AB-S-4-12

Digital CPX input modules

Chapter 2

Type CPX-4DE
CPX-8DE
CPX-8DE-D
CPX-8NDE
CPX-16DE

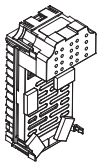
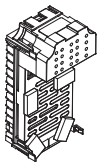
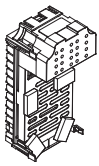
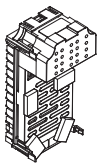
CPX-M-16DE-D

CPX-L-16DE-16-KL-3POL

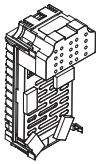
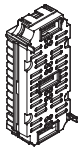
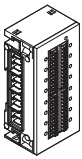
Contents

2.1 Function of the input modules

Input modules provide digital inputs in the valve terminal for connecting sensors and for enabling e.g. cylinder positions to be scanned. A distinction is made between the following types:

Type		Description
	CPX-4DE	Provides 4 digital inputs (as per IEC 61131-2 type 2, 24 V, positive logic – PNP).
	CPX-8DE	Provides 8 digital inputs (as per IEC 61131-2 type 2, 24 V, positive logic – PNP).
	CPX-8DE-D	Provides 8 digital inputs **with channel diagnosis** (as per IEC 61131-2 type 2, 24 V, positive logic – PNP).
	CPX-8NDE	Provides 8 digital inputs (as per IEC 61131-2 type 2, 24 V, negative logic – NPN).

Tab. 2/1: Overview of input modules (part 1)

Type		Description
	CPX-16DE	Provides 16 digital inputs (as per IEC 61131-2 type 2, 24 V, positive logic – PNP).
	CPX-M-16DE-D	Provides 16 digital inputs **with channel diagnosis** (as per IEC 61131-2 type 2, 24 V, positive logic – PNP).
	CPX-L-16DE-16-KL-3POL	Provides 16 digital inputs (as per IEC 61131-2 type 1, 24 V, positive logic – PNP). CPX-L modules do not have any exchangeable connection blocks.

Tab. 2/2: Overview of input modules (part 2)

2.2 Assembly

See section 1.3.

2.3 Installation

Warning
Uncontrolled movements of the connected actuators and uncontrolled movements of loose tubing can cause injury to human beings or damage to property.

Before carrying out installation and maintenance work, switch off the following:

– Compressed air supply
– The operating and load voltage supplies.

In the following sections you will find the pin assignments of the input modules for the different connection blocks.

Instructions on connecting the cables and plugs to the connection blocks can be found in section 1.2.3.

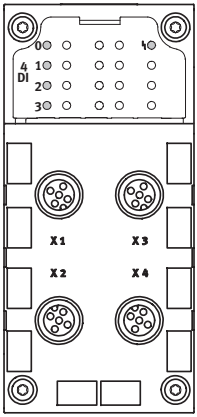
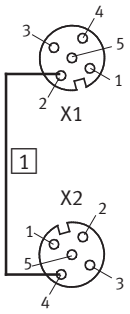
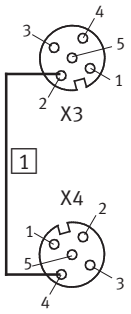
Power supply

The 24 V supply for the electronics and the inputs of the input modules is provided via the operating voltage supply for the electronics/sensors ($V_{EL/SEN}$).

2.3.1 Input module CPX-4DE

Pin assignment CPX-4DE with connection block
CPX-AB-4-M12x2-5POL (-R), CPX-M-4-M12x2-5POL

I-module type CPX-4DE with connection block
CPX-AB-4-M12x2-5POL (-R), CPX-M-4-M12x2-5POL

Connection block	Pin assignment X1, X2	LED	Pin assignment X3, X4	LED
	 Socket X1: 1: 24 V_{SEN} 2: Ix+1 3: 0 V_{SEN} 4: Ix 5: FE[1)] Socket X2: 1: 24 V_{SEN} 2: n.c. 3: 0 V_{SEN} 4: Ix+1 5: FE[1)]	1 0 1	 Socket X3 1: 24 V_{SEN} 2: Ix+3 3: 0 V_{SEN} 4: Ix+2 5: FE[1)] Socket X4: 1: 24 V_{SEN} 2: n.c. 3: 0 V_{SEN} 4: Ix+3 5: FE[1)]	3 2 3

Example of representation with CPX-AB-4-M12x2-5POL

Ix = Input x
FE = Functional earth
n.c. = Not connected
[1] Connected internally
1) In CPX-AB-4-M12x2-5POL-**R** and CPX-M-4-M12x2-5POL the metal thread is connected to FE

Tab. 2/3: Pin assignment of I-module type CPX-4DE with connection block CPX-AB-4-M12x2-5POL (-R), CPX-M-4-M12x2-5POL

Recommendation for the 4-input module:
Use the Festo DUO cable in order to connect two sensors to sockets X1 and X3 with one plug at low cost.

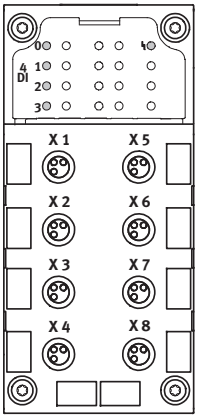
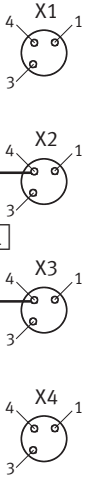
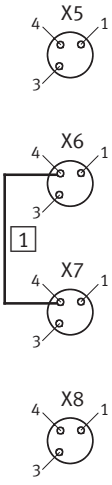
CPX-AB-4-M12x2-5POL-**R**, CPX-M-4-M12x2-5POL

The metal thread of these connection blocks is connected internally with pin 5 (functional earth FE).

Pin assignment CPX-4DE with connection block CPX-AB-8-M8-3POL

Note
Sockets X1 to X8 on the connection block are marked accordingly. The numbering of the sockets does not correspond to the input addresses.

I-module type CPX-4DE with connection block CPX-AB-8-M8-3POL

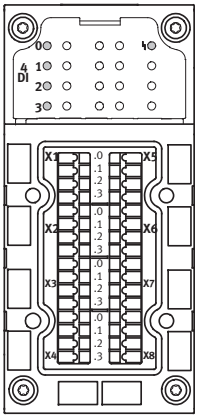
Connection block	Pin assignment X1 to X4	LED	Pin assignment X5 to X8	LED
		0 1 1		2 3 3
	Ix = Input x FE = Functional earth n.c. = Not connected [1] Connected internally			

Tab. 2/4: Pin assignment of I-module type CPX-4DE with connection block CPX-AB-8-M8-3POL

Pin assignment CPX-4DE with connection block CPX-AB-8-KL-4POL

Note
Pins X1 to X8 on the connection block are marked accordingly. The numbering of the pins does not correspond to the input addresses.

I-module type CPX-4DE with connection block CPX-AB-8-KL-4POL

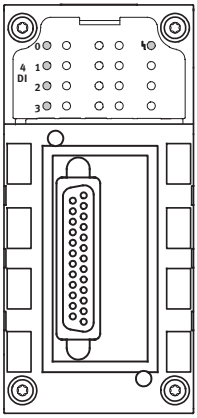
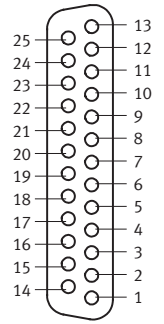
Connection block	Pin assignment X1 to X4	LED	Pin assignment X5 to X8	LED
	X1.0: 24 V_{SEN} X1.1: 0 V_{SEN} X1.2: Ix X1.3: FE	0	X5.0: 24 V_{SEN} X5.1: 0 V_{SEN} X5.2: Ix+2 X5.3: FE	2
	X2.0: 24 V_{SEN} X2.1: 0 V_{SEN} X2.2: Ix+1 X2.3: FE	1	X6.0: 24 V_{SEN} X6.1: 0 V_{SEN} X6.2: Ix+3 X6.3: FE	3
	X3.0: 24 V_{SEN} X3.1: 0 V_{SEN} X3.2: Ix+1 X3.3: FE	1	X7.0: 24 V_{SEN} X7.1: 0 V_{SEN} X7.2: Ix+3 X7.3: FE	3
	X4.0: 24 V_{SEN} X4.1: 0 V_{SEN} X4.2: n.c. X4.3: FE		X8.0: 24 V_{SEN} X8.1: 0 V_{SEN} X8.2: n.c. X8.3: FE	

Ix = Input x
FE = Functional earth
n.c. = Not connected
[1] Connected internally

Tab. 2/5: Pin assignment of I-module type CPX-4DE with connection block CPX-AB-8-KL-4POL

Pin assignment of CPX-4DE with connection block CPX-AB-1-SUB-BU-25POL

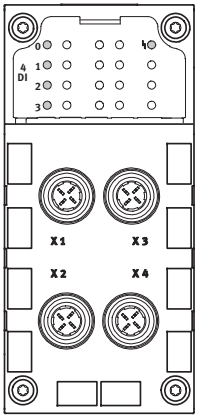
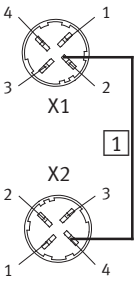
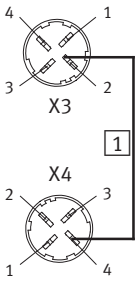
I-module type CPX-4DE with connection block CPX-AB-1-SUB-BU-25POL

Connection block	Pin assignment		LED	Pin assignment	LED
		1: Ix 2: Ix+1 3: Ix+1 4: n.c. 5: 24 V_{SEN} 6: 0 V_{SEN} 7: 24 V_{SEN} 8: 0 V_{SEN} 9: 24 V_{SEN} 10: 24 V_{SEN} 11: 0 V_{SEN} 12: 0 V_{SEN} 13: FE	0 1 1	14: Ix+2 15: Ix+3 16: Ix+3 17: n.c. 18: 24 V_{SEN} 19: 24 V_{SEN} 20: 24 V_{SEN} 21: 24 V_{SEN} 22: 0 V_{SEN} 23: 0 V_{SEN} 24: 0 V_{SEN} 25: FE Housing: FE	2 3 3
	Ix = Input x FE = Functional earth n.c. = Not connected				

Tab. 2/6: Pin assignment of I-module type CPX-4DE with connection block CPX-AB-1-SUB-BU-25POL

Pin assignment CPX-4DE with connection block CPX-AB-4-HARX2-4POL

I-module type CPX-4DE with connection block CPX-AB-4-HARX2-4POL

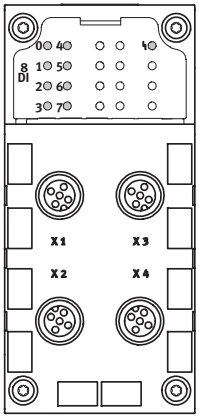
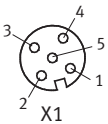
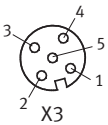
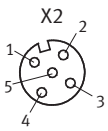
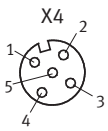
Connection block	Pin assignment X1, X2	LED	Pin assignment X3, X4	LED
	 Socket X1: 1: 24 V_{SEN} 2: Ix+1 3: 0 V_{SEN} 4: Ix Socket X2: 1: 24 V_{SEN} 2: n.c. 3: 0 V_{SEN} 4: Ix+1	1 0 1	 Socket X3 1: 24 V_{SEN} 2: Ix+3 3: 0 V_{SEN} 4: Ix+2 Socket X4: 1: 24 V_{SEN} 2: n.c. 3: 0 V_{SEN} 4: Ix+3	3 2 3
Ix = Input x FE = Functional earth n.c. = Not connected [1] Connected internally				

Tab. 2/7: Pin assignment of I-module type CPX-4DE with connection block CPX-AB-4-HARX2-4POL

2.3.2 Input module CPX-8DE

Pin assignment CPX-8DE with connection block
CPX-AB-4-M12x2-5POL (-R), CPX-M-4-M12x2-5POL

I-module type CPX-8DE with connection block
CPX-AB-4-M12x2-5POL (-R), CPX-M-4-M12x2-5POL

Connection block	Pin assignment X1, X2	LED	Pin assignment X3, X4	LED
	 Socket X1: 1: 24 V_{SEN} 2: Ix+1 3: 0 V_{SEN} 4: Ix 5: FE[1)]	1 0	 Socket X3 1: 24 V_{SEN} 2: Ix+5 3: 0 V_{SEN} 4: Ix+4 5: FE[1)]	5 4
	 Socket X2: 1: 24 V_{SEN} 2: Ix+3 3: 0 V_{SEN} 4: Ix+2 5: FE[1)]	3 2	 Socket X4: 1: 24 V_{SEN} 2: Ix+7 3: 0 V_{SEN} 4: Ix+6 5: FE[1)]	7 6
Example of representation with CPX-AB-4-M12x2-5POL	Ix = Input x FE = Functional earth 1) In CPX-AB-4-M12x2-5POL-**R** and CPX-M-4-M12x2-5POL the metal thread is connected to FE			

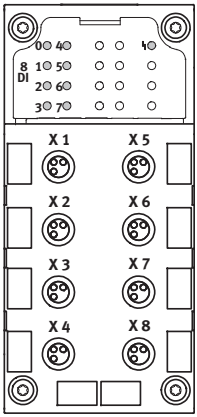
Tab. 2/8: Pin assignment of I-module type CPX-8DE with connection block CPX-AB-4-M12x2-5POL (-R), CPX-M-4-M12x2-5POL

Recommendation for the 8-input module:
Use the Festo DUO cable in order to connect two sensors with one plug at low cost.

CPX-AB-4-M12x2-5POL-**R**, CPX-M-4-M12x2-5POL — The metal thread of these connection blocks is connected internally with pin 5 (functional earth FE).

Pin assignment CPX-8DE with connection block CPX-AB-8-M8-3POL

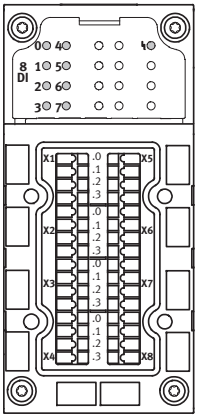
I-module type CPX-8DE with connection block CPX-AB-8-M8-3POL

Connection block	Pin assignment X1 to X4	LED	Pin assignment X5 to X8	LED
	 Socket X1: 1: 24 V_{SEN} 3: 0 V_{SEN} 4: Ix	0	 Socket X5: 1: 24 V_{SEN} 3: 0 V_{SEN} 4: Ix+4	4
	 Socket X2: 1: 24 V_{SEN} 3: 0 V_{SEN} 4: Ix+1	1	 Socket X6: 1: 24 V_{SEN} 3: 0 V_{SEN} 4: Ix+5	5
	 Socket X3: 1: 24 V_{SEN} 3: 0 V_{SEN} 4: Ix+2	2	 Socket X7: 1: 24 V_{SEN} 3: 0 V_{SEN} 4: Ix+6	6
	 Socket X4: 1: 24 V_{SEN} 3: 0 V_{SEN} 4: Ix+3	3	 Socket X8: 1: 24 V_{SEN} 3: 0 V_{SEN} 4: Ix+7	7
	Ix = Input x FE = Functional earth			

Tab. 2/9: Pin assignment of I-module type CPX-8DE with connection block CPX-AB-8-M8-3POL

Pin assignment CPX-8DE with connection block CPX-AB-8-KL-4POL

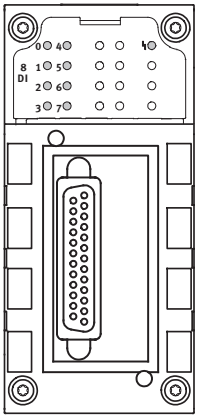
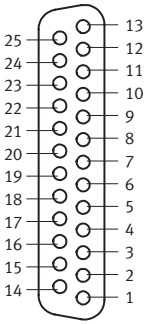
I-module type CPX-8DE with connection block CPX-AB-8-KL-4POL

Connection block	Pin assignment X1 to X4	LED	Pin assignment X5 to X8	LED
	X1.0: 24 V_{SEN} X1.1: 0 V_{SEN} X1.2: Ix X1.3: FE	0	X5.0: 24 V_{SEN} X5.1: 0 V_{SEN} X5.2: Ix+4 X5.3: FE	4
	X2.0: 24 V_{SEN} X2.1: 0 V_{SEN} X2.2: Ix+1 X2.3: FE	1	X6.0: 24 V_{SEN} X6.1: 0 V_{SEN} X6.2: Ix+5 X6.3: FE	5
	X3.0: 24 V_{SEN} X3.1: 0 V_{SEN} X3.2: Ix+2 X3.3: FE	2	X7.0: 24 V_{SEN} X7.1: 0 V_{SEN} X7.2: Ix+6 X7.3: FE	6
	X4.0: 24 V_{SEN} X4.1: 0 V_{SEN} X4.2: Ix+3 X4.3: FE	3	X8.0: 24 V_{SEN} X8.1: 0 V_{SEN} X8.2: Ix+7 X8.3: FE	7
	Ix = Input x FE = Functional earth			

Tab. 2/10: Pin assignment of I-module type CPX-8DE with connection block CPX-AB-8-KL-4POL

Pin assignment of CPX-8DE with connection block CPX-AB-1-SUB-BU-25POL

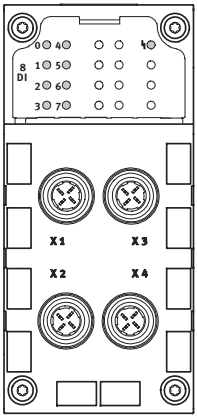
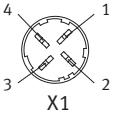
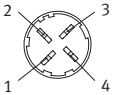
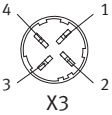
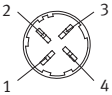
I-module type CPX-8DE with connection block CPX-AB-1-SUB-BU-25POL

Connection block	Pin assignment		LED	Pin assignment	LED
		1: Ix 2: Ix+1 3: Ix+2 4: Ix+3 5: 24 V_{SEN} 6: 0 V_{SEN} 7: 24 V_{SEN} 8: 0 V_{SEN} 9: 24 V_{SEN} 10: 24 V_{SEN} 11: 0 V_{SEN} 12: 0 V_{SEN} 13: FE	0 1 2 3	14: Ix+4 15: Ix+5 16: Ix+6 17: Ix+7 18: 24 V_{SEN} 19: 24 V_{SEN} 20: 24 V_{SEN} 21: 24 V_{SEN} 22: 0 V_{SEN} 23: 0 V_{SEN} 24: 0 V_{SEN} 25: FE Housing: FE	4 5 6 7
	Ix = Input x FE = Functional earth				

Tab. 2/11: Pin assignment of I-module type CPX-8DE with connection block CPX-AB-1-SUB-BU-25POL

Pin assignment CPX-8DE with connection block CPX-AB-4-HARX2-4POL

I-module type CPX-8DE with connection block CPX-AB-2-HARX2-4POL

Connection block	Pin assignment X1, X2	LED	Pin assignment X3, X4	LED
	 Socket X1: 1: 24 V_{SEN} 2: Ix+1 3: 0 V_{SEN} 4: Ix X2  Socket X2: 1: 24 V_{SEN} 2: Ix+3 3: 0 V_{SEN} 4: Ix+2	1 0 3 2	 Socket X3 1: 24 V_{SEN} 2: Ix+5 3: 0 V_{SEN} 4: Ix+4 X4  Socket X4: 1: 24 V_{SEN} 2: Ix+7 3: 0 V_{SEN} 4: Ix+6	5 4 7 6
	Ix = Input x FE = Functional earth			

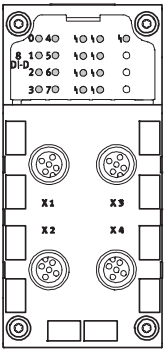
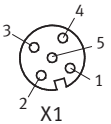
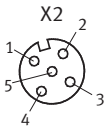
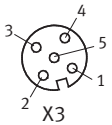
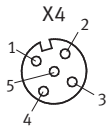
Tab. 2/12: Pin assignment of I-module type CPX-8DE with connection block CPX-AB-4-HARX2-4POL

2.3.3 Input module CPX-8DE-D with channel diagnosis

Pin assignment CPX-8DE-D with connection block CPX-AB-4-M12x2-5POL (-R), CPX-M-4-M12x2-5POL

On these connection blocks only the sensor supplies for inputs Ix, Ix+2, Ix+4 and Ix+6 are available. These supplies are used **in pairs** by the inputs Ix/Ix+1, Ix+2/Ix+3, Ix+4/Ix+5 and Ix+6/Ix+7. The diagnostic messages are therefore only for the inputs Ix, Ix+2, Ix+4 and Ix+6. The inputs Ix+1, Ix+3, Ix+5 and Ix+7 do not generate a diagnostic message.

I-module type CPX-8DE-D with connection block CPX-AB-4-M12x2-5POL (-R), CPX-M-4-M12x2-5POL

Connection block	Pin assignment X1, X2	LED	Pin assignment X3, X4	LED
	 Socket X1: 1: 24 V_{SENx} 2: Ix+1 3: 0 V_{SENx} 4: Ix 5: FE[1)]  Socket X2: 1: 24 V_{SENx+2} 2: Ix+3 3: 0 V_{SENx+2} 4: Ix+2 5: FE[1)]	1 0 3 2	 Socket X3 1: 24 V_{SENx+4} 2: Ix+5 3: 0 V_{SENx+4} 4: Ix+4 5: FE[1)]  Socket X4: 1: 24 V_{SENx+6} 2: Ix+7 3: 0 V_{SENx+6} 4: Ix+6 5: FE[1)]	5 4 7 6
Example of representation with CPX-AB-4-M12x2-5POL	Ix = Input x FE = Functional earth 1) In CPX-AB-4-M12x2-5POL-**R** and CPX-M-4-M12x2-5POL the metal thread is connected to FE			

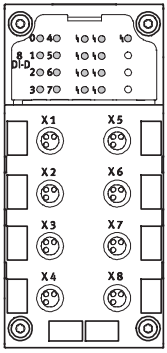
Tab. 2/13: Pin assignment CPX-8DE-D with connection block CPX-AB-4-M12x2-5POL (-R), CPX-M-4-M12x2-5POL

Recommendation for the 8-input module:
Use the Festo DUO cable in order to connect two sensors with one plug at low cost.

CPX-AB-4-M12x2-5POL**-R** The metal thread of these connection blocks is connected internally with pin 5 (functional earth FE).

Pin assignment CPX-8DE-D with connection block CPX-AB-8-M8-3POL

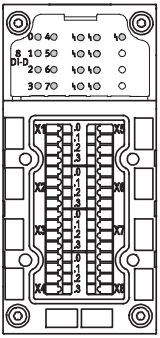
I-module type CPX-8DE-D with connection block CPX-AB-8-M8-3POL

Connection block	Pin assignment X1 to X4	LED	Pin assignment X5 to X8	LED
	 Socket X1: 1: 24 V_{SENx} 3: 0 V_{SENx} 4: Ix	0	 Socket X5: 1: 24 V_{SENx+4} 3: 0 V_{SENx+4} 4: Ix+4	4
	 Socket X2: 1: 24 V_{SENx+2} 3: 0 V_{SENx+2} 4: Ix+1	1	 Socket X6: 1: 24 V_{SENx+5} 3: 0 V_{SENx+5} 4: Ix+5	5
	 Socket X3: 1: 24 V_{SENx+2} 3: 0 V_{SENx+2} 4: Ix+2	2	 Socket X7: 1: 24 V_{SENx+6} 3: 0 V_{SENx+6} 4: Ix+6	6
	 Socket X4: 1: 24 V_{SENx+3} 3: 0 V_{SENx+3} 4: Ix+3	3	 Socket X8: 1: 24 V_{SENx+7} 3: 0 V_{SENx+7} 4: Ix+7	7
	Ix = Input x FE = Functional earth			

Tab. 2/14: Pin assignment of I-module type CPX-8DE-D with connection block CPX-AB-8-M8-3POL

Pin assignment CPX-8DE-D with connection block CPX-AB-8-KL-4POL

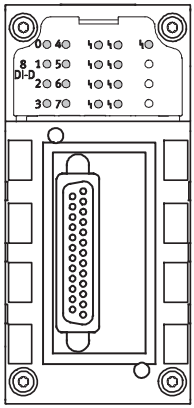
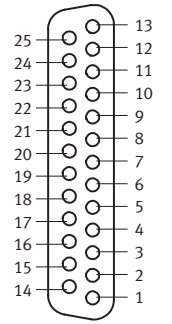
I-module type CPX-8DE-D with connection block CPX-AB-8-KL-4POL

Connection block	Pin assignment X1 to X4	LED	Pin assignment X5 to X8	LED
	X1 .0 X1.0: 24 V_{SENx} .1 X1.1: 0 V_{SENx} .2 X1.2: Ix .3 X1.3: FE X2 .0 X2.0: 24 V_{SENx+2} .1 X2.1: 0 V_{SENx+2} .2 X2.2: Ix+1 .3 X2.3: FE X3 .0 X3.0: 24 V_{SENx+2} .1 X3.1: 0 V_{SENx+2} .2 X3.2: Ix+2 .3 X3.3: FE X4 .0 X4.0: 24 V_{SENx+3} .1 X4.1: 0 V_{SENx+3} .2 X4.2: Ix+3 .3 X4.3: FE	0 1 2 3	.0 X5.0: 24 V_{SENx+4} .1 X5.1: 0 V_{SENx+4} .2 X5.2: Ix+4 .3 X5.3: FE X5 X6 .0 X6.0: 24 V_{SENx+5} .1 X6.1: 0 V_{SENx+5} .2 X6.2: Ix+5 .3 X6.3: FE X7 .0 X7.0: 24 V_{SENx+6} .1 X7.1: 0 V_{SENx+6} .2 X7.2: Ix+6 .3 X7.3: FE X8 .0 X8.0: 24 V_{SENx+7} .1 X8.1: 0 V_{SENx+7} .2 X8.2: Ix+7 .3 X8.3: FE	4 5 6 7
	Ix = Input x FE = Functional earth			

Tab. 2/15: Pin assignment of I-module type CPX-8DE-D with connection block CPX-AB-8-KL-4POL

Pin assignment of CPX-8DE-D with connection block CPX-AB-1-SUB-BU-25POL

I-module type CPX-8DE-D with connection block CPX-AB-1-SUB-BU-25POL

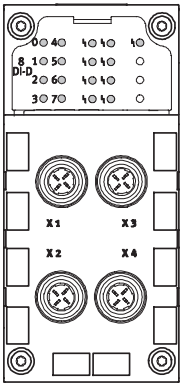
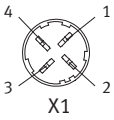
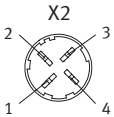
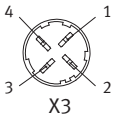
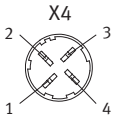
Connection block	Pin assignment		LED	Pin assignment	LED
		1: Ix 2: Ix+1 3: Ix+2 4: Ix+3 5: 24 V_{SENx+1} 6: 0 V_{SENx+1} 7: 24 V_{SENx+3} 8: 0 V_{SENx+3} 9: 24 V_{SENx} 10: 24 V_{SENx+2} 11: 0 V_{SENx} 12: 0 V_{SENx+2} 13: FE	0 1 2 3	14: Ix+4 15: Ix+5 16: Ix+6 17: Ix+7 18: 24 V_{SENx+4} 19: 24 V_{SENx+5} 20: 24 V_{SENx+6} 21: 24 V_{SENx+7} 22: 0 $V_{SENx+4...x+7}$ 23: 0 $V_{SENx+4...x+7}$ 24: 0 $V_{SENx+4...x+7}$ 25: FE Housing: FE	4 5 6 7
	Ix = Input x FE = Functional earth				

Tab. 2/16: Pin assignment of I-module type CPX-8DE-D with connection block CPX-AB-1-SUB-BU-25POL

Pin assignment CPX-8DE-D with connection block CPX-AB-4-HARX2-4POL

On this connection block only the sensor supplies for inputs Ix, Ix+2, Ix+4 and Ix+6 are available. These supplies are used **in pairs** by the inputs Ix/Ix+1, Ix+2/Ix+3, Ix+4/Ix+5 and Ix+6/Ix+7. The diagnostic messages are therefore only for the inputs Ix, Ix+2, Ix+4 and Ix+6. The inputs Ix+1, Ix+3, Ix+5 and Ix+7 do not generate a diagnostic message.

I-module type CPX-8DE-D with connection block CPX-AB-2-HARX2-4POL

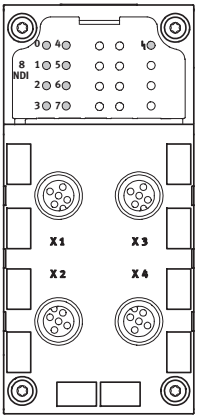
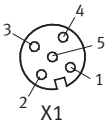
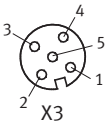
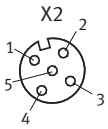
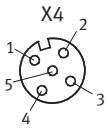
Connection block	Pin assignment X1, X2	LED	Pin assignment X3, X4	LED
	 Socket X1: 1: 24 V_{SENx} 2: Ix+1 3: 0 V_{SENx} 4: Ix  Socket X2: 1: 24 V_{SENx+2} 2: Ix+3 3: 0 V_{SENx+2} 4: Ix+2	1 0 3 2	 Socket X3 1: 24 V_{SENx+4} 2: Ix+5 3: 0 V_{SENx+4} 4: Ix+4  Socket X4: 1: 24 V_{SENx+6} 2: Ix+7 3: 0 V_{SENx+6} 4: Ix+6	5 4 7 6
	Ix = Input x FE = Functional earth			

Tab. 2/17: Pin assignment of I-module type CPX-8DE-D with connection block CPX-AB-4-HARX2-4POL

2.3.4 Input module CPX-8NDE

Pin assignment of CPX-8NDE with connection block CPX-AB-4-M12x2-5POL (-R), CPX-M-4-M12x2-5POL

I-module type CPX-8NDE with connection block CPX-AB-4-M12x2-5POL (-R), CPX-M-4-M12x2-5POL

Connection block	Pin assignment X1, X2	LED	Pin assignment X3, X4	LED
	 Socket X1: 1: 24 V_{SEN} 2: Ix+1 3: 0 V_{SEN} 4: Ix 5: FE[1)]	1 0	 Socket X3 1: 24 V_{SEN} 2: Ix+5 3: 0 V_{SEN} 4: Ix+4 5: FE[1)]	5 4
	 Socket X2: 1: 24 V_{SEN} 2: Ix+3 3: 0 V_{SEN} 4: Ix+2 5: FE[1)]	3 2	 Socket X4: 1: 24 V_{SEN} 2: Ix+7 3: 0 V_{SEN} 4: Ix+6 5: FE[1)]	7 6
Example of representation with CPX-AB-4-M12x2-5POL	Ix = Input x FE = Functional earth 1) In CPX-AB-4-M12x2-5POL-**R** and CPX-M-4-M12x2-5POL the metal thread is connected to FE			

Tab. 2/18: Pin assignment of I-module type CPX-8NDE with connection block CPX-AB-4-M12x2-5POL (-R), CPX-M-4-M12x2-5POL

■ ■ ■

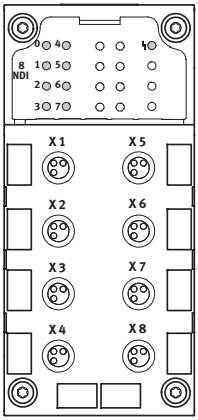
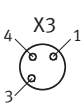
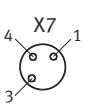
Recommendation for the 8-input module:
Use the Festo DUO cable in order to connect two sensors with one plug at low cost.

CPX-AB-4-M12x2-5POL-**R**, CPX-M-4-M12x2-5POL

The metal thread of these connection blocks is connected internally with pin 5 (functional earth FE).

Pin assignment CPX-8NDE with connection block CPX-AB-8-M8-3POL

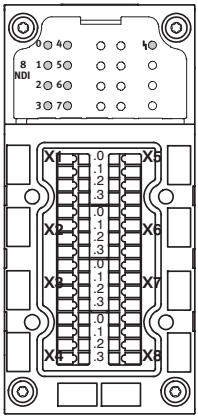
I-module type CPX-8NDE with connection block CPX-AB-8-M8-3POL

Connection block	Pin assignment X1 to X4	LED	Pin assignment X5 to X8	LED
	 Socket X1: 1: 24 V_{SEN} 3: 0 V_{SEN} 4: Ix	0	 Socket X5: 1: 24 V_{SEN} 3: 0 V_{SEN} 4: Ix+4	4
	 Socket X2: 1: 24 V_{SEN} 3: 0 V_{SEN} 4: Ix+1	1	 Socket X6: 1: 24 V_{SEN} 3: 0 V_{SEN} 4: Ix+5	5
	 Socket X3: 1: 24 V_{SEN} 3: 0 V_{SEN} 4: Ix+2	2	 Socket X7: 1: 24 V_{SEN} 3: 0 V_{SEN} 4: Ix+6	6
	 Socket X4: 1: 24 V_{SEN} 3: 0 V_{SEN} 4: Ix+3	3	 Socket X8: 1: 24 V_{SEN} 3: 0 V_{SEN} 4: Ix+7	7
	Ix = Input x FE = Functional earth			

Tab. 2/19: Pin assignment of I-module type CPX-8NDE with connection block CPX-AB-8-M8-3POL

Pin assignment of CPX-8NDE with connection block CPX-AB-8-KL-4POL

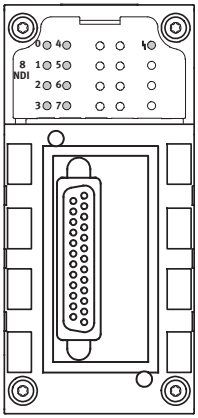
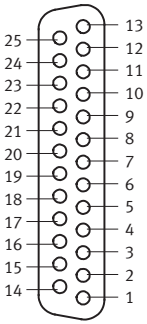
I-module type CPX-8NDE with connection block CPX-AB-8-KL-4POL

Connection block	Pin assignment X1 to X4	LED	Pin assignment X5 to X8	LED
	X1.0: 24 V_{SEN} X1.1: 0 V_{SEN} X1.2: Ix X1.3: FE	0	X5.0: 24 V_{SEN} X5.1: 0 V_{SEN} X5.2: Ix+4 X5.3: FE	4
	X2.0: 24 V_{SEN} X2.1: 0 V_{SEN} X2.2: Ix+1 X2.3: FE	1	X6.0: 24 V_{SEN} X6.1: 0 V_{SEN} X6.2: Ix+5 X6.3: FE	5
	X3.0: 24 V_{SEN} X3.1: 0 V_{SEN} X3.2: Ix+2 X3.3: FE	2	X7.0: 24 V_{SEN} X7.1: 0 V_{SEN} X7.2: Ix+6 X7.3: FE	6
	X4.0: 24 V_{SEN} X4.1: 0 V_{SEN} X4.2: Ix+3 X4.3: FE	3	X8.0: 24 V_{SEN} X8.1: 0 V_{SEN} X8.2: Ix+7 X8.3: FE	7
	Ix = Input x FE = Functional earth			

Tab. 2/20: Pin assignment of I-module type CPX-8NDE with connection block CPX-AB-8-KL-4POL

Pin assignment of CPX-8NDE with connection block CPX-AB-1-SUB-BU-25POL

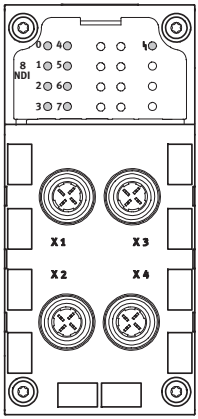
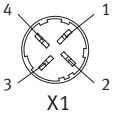
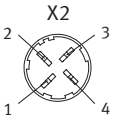
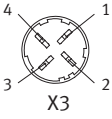
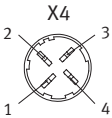
I-module type CPX-8NDE with connection block CPX-AB-1-SUB-BU-25POL

Connection block	Pin assignment		LED	Pin assignment	LED
		1: Ix 2: Ix+1 3: Ix+2 4: Ix+3 5: 24 V_{SEN} 6: 0 V_{SEN} 7: 24 V_{SEN} 8: 0 V_{SEN} 9: 24 V_{SEN} 10: 24 V_{SEN} 11: 0 V_{SEN} 12: 0 V_{SEN} 13: FE	0 1 2 3	14: Ix+4 15: Ix+5 16: Ix+6 17: Ix+7 18: 24 V_{SEN} 19: 24 V_{SEN} 20: 24 V_{SEN} 21: 24 V_{SEN} 22: 0 V_{SEN} 23: 0 V_{SEN} 24: 0 V_{SEN} 25: FE Housing: FE	4 5 6 7
	Ix = Input x FE = Functional earth				

Tab. 2/21: Pin assignment of I-module type CPX-8NDE with connection block CPX-AB-1-SUB-BU-25POL

Pin assignment of CPX-8NDE with connection block CPX-AB-4-HARX2-4POL

I-module type CPX-8NDE with connection block CPX-AB-2-HARX2-4POL

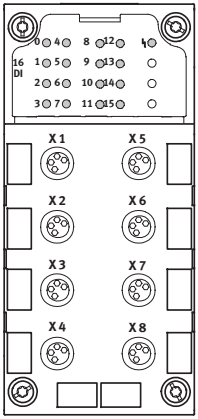
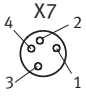
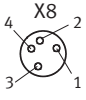
Connection block	Pin assignment X1, X2	LED	Pin assignment X3, X4	LED
	 Socket X1: 1: 24 V_{SEN} 2: Ix+1 3: 0 V_{SEN} 4: Ix  Socket X2: 1: 24 V_{SEN} 2: Ix+3 3: 0 V_{SEN} 4: Ix+2	1 0 3 2	 Socket X3 1: 24 V_{SEN} 2: Ix+5 3: 0 V_{SEN} 4: Ix+4  Socket X4: 1: 24 V_{SEN} 2: Ix+7 3: 0 V_{SEN} 4: Ix+6	5 4 7 6
	Ix = Input x FE = Functional earth			

Tab. 2/22: Pin assignment of I-module type CPX-8NDE with connection block CPX-AB-4-HARX2-4POL

2.3.5 Input module CPX-16DE

Pin assignment of CPX-16DE with connection block CPX-AB-8-M8-4POL

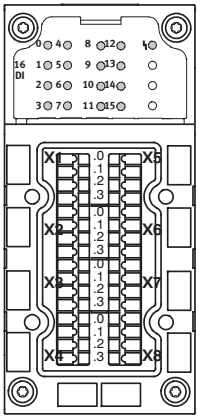
I-module type CPX-16DE with connection block CPX-AB-8-M8-4POL

Connection block	Pin assignment X1 to X4	LED	Pin assignment X5 to X8	LED
	 Socket X1: 1: 24 V_{SEN} 2: Ix+1 3: 0 V_{SEN} 4: Ix	 1 0	 Socket X5: 1: 24 V_{SEN} 2: Ix+9 3: 0 V_{SEN} 4: Ix+8	 9 8
	 Socket X2: 1: 24 V_{SEN} 2: Ix+3 3: 0 V_{SEN} 4: Ix+2	 3 2	 Socket X6: 1: 24 V_{SEN} 2: Ix+11 3: 0 V_{SEN} 4: Ix+10	 11 10
	 Socket X3: 1: 24 V_{SEN} 2: Ix+5 3: 0 V_{SEN} 4: Ix+4	 5 4	 Socket X7: 1: 24 V_{SEN} 2: Ix+13 3: 0 V_{SEN} 4: Ix+12	 13 12
	 Socket X4: 1: 24 V_{SEN} 2: Ix+7 3: 0 V_{SEN} 4: Ix+6	 7 6	 Socket X8: 1: 24 V_{SEN} 2: Ix+15 3: 0 V_{SEN} 4: Ix+14	 15 14
	Ix = Input x			

Tab. 2/23: Pin assignment of O-module type CPX-16DE with connection block CPX-AB-8-M8-4POL

Pin assignment of CPX-16DE with connection block CPX-AB-8-KL-4POL

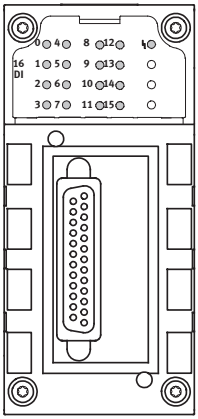
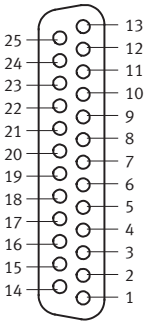
I-module type CPX-16DE with connection block CPX-AB-8-KL-4POL

Connection block	Pin assignment X1 to X4	LED	Pin assignment X5 to X8	LED
	X1.0: Ix+8	8	X5.0: Ix+12	12
	X1.1: 24 V_{SEN}		X5.1: 0 V_{SEN}	
	X1.2: Ix	0	X5.2: Ix+4	4
	X1.3: FE		X5.3: FE	
	X2.0: Ix+9	9	X6.0: Ix+13	13
	X2.1: 24 V_{SEN}		X6.1: 0 V_{SEN}	
	X2.2: Ix+1	1	X6.2: Ix+5	5
	X2.3: FE		X6.3: FE	
	X3.0: Ix+10	10	X7.0: Ix+14	14
	X3.1: 24 V_{SEN}		X7.1: 0 V_{SEN}	
	X3.2: Ix+2	2	X7.2: Ix+6	6
	X3.3: FE		X7.3: FE	
	X4.0: Ix+11	11	X8.0: Ix+15	15
	X4.1: 24 V_{SEN}		X8.1: 0 V_{SEN}	
	X4.2: Ix+3	3	X8.2: Ix+7	7
	X4.3: FE		X8.3: FE	
	Ix = Input x FE = Functional earth			

Tab. 2/24: Pin assignment of I-module type CPX-16DE with connection block CPX-AB-8-KL-4POL

Pin assignment of CPX-16DE with connection block CPX-AB-1-SUB-BU-25POL

I-module type CPX-16DE with connection block CPX-AB-1-SUB-BU-25POL

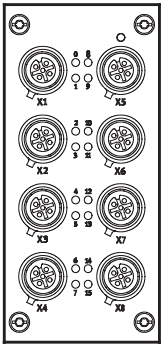
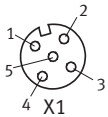
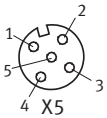
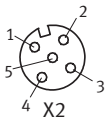
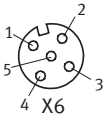
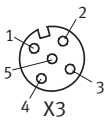
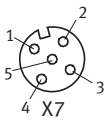
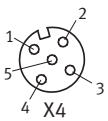
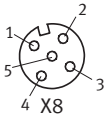
Connection block	Pin assignment		LED	Pin assignment	LED
		1: Ix 2: Ix+1 3: Ix+2 4: Ix+3 5: Ix+9 6: 24 V_{SEN} 7: Ix+11 8: 24 V_{SEN} 9: Ix+8 10: Ix+10 11: 24 V_{SEN} 12: 24 V_{SEN} 13: FE	0 1 2 3 9 11 8 10	14: Ix+4 15: Ix+5 16: Ix+6 17: Ix+7 18: Ix+12 19: Ix+13 20: Ix+14 21: Ix+15 22: 0 V_{SEN} 23: 0 V_{SEN} 24: 0 V_{SEN} 25: FE Housing: FE	4 5 6 7 12 13 14 15
	Ix = Input x FE = Functional earth				

Tab. 2/25: Pin assignment of I-module type CPX-16DE with connection block CPX-AB-1-SUB-BU-25POL

2.3.6 Input module CPX-M-16DE-D with channel diagnosis

Pin assignment of CPX-M-16DE-D with connection block CPX-M-8-M12x2-5POL

I-module type CPX-M-16DE-D with connection block CPX-AB-8-M12x2-5POL

Connection block	Pin assignment X1, X2, X3, X4	LED	Pin assignment X5, X6, X7, X8	LED
	 Socket X1: 1: 24 V_{SENx} 2: Ix+1 3: 0 V_{SENx} 4: Ix 5: FE[1)]	1 0	 Socket X5: 1: 24 V_{SENx+8} 2: Ix+9 3: 0 V_{SENx+8} 4: Ix+8 5: FE[1)]	9 8
	 Socket X2: 1: 24 V_{SENx+2} 2: Ix+3 3: 0 V_{SENx+2} 4: Ix+2 5: FE[1)]	3 2	 Socket X6: 1: 24 $V_{SENx+10}$ 2: Ix+11 3: 0 $V_{SENx+10}$ 4: Ix+10 5: FE[1)]	11 10
	 Socket X3: 1: 24 V_{SENx+4} 2: Ix+5 3: 0 V_{SENx+4} 4: Ix+4 5: FE[1)]	5 4	 Socket X7 1: 24 $V_{SENx+12}$ 2: Ix+13 3: 0 $V_{SENx+12}$ 4: Ix+12 5: FE[1)]	13 12
	 Socket X4: 1: 24 V_{SENx+6} 2: Ix+7 3: 0 V_{SENx+6} 4: Ix+6 5: FE[1)]	7 6	 Socket X8: 1: 24 $V_{SENx+14}$ 2: Ix+15 3: 0 $V_{SENx+14}$ 4: Ix+14 5: FE[1)]	15 14
	Ix = Input x FE = Functional earth [1)] In CPX-M-8-M12x2-5POL the metal thread is connected to FE			

Tab. 2/26: Pin assignment of I-module type CPX-16DE-D with connection block CPX-M-8-M12x2-5POL

With this connection block the sensor supplies are available **in pairs** for the inputs Ix/Ix+1, Ix+2/Ix+3, ... The diagnostic messages are displayed **channel-by-channel** for the inputs Ix, Ix+1, Ix+2, ...

Recommendation for the 16-input module:
Use the Festo DUO cable in order to connect two sensors with one plug at low cost.

CPX-M-8-M12x2-5POL

The metal thread of this connection block is connected internally with pin 5 (functional earth FE).

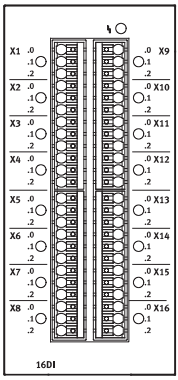
2.3.7 Input module CPX-**L**-16DE-16-KL-3POL

CPX-L modules do not have any exchangeable connection blocks.

Note
When using 2-wire sensors the residual current at “log. 0” must be smaller than the standard value as per IEC61131-2 type 1. At $V_{Ix,\ Ix+1,...}$ < 5 V: $I_{residual}$ < 500 µA.

Pin assignment CPX-L-16DE-...

I-module type CPX-L-16DE-16-KL-3POL

Connection block	Pin assignment X1 to X8	Pin assignment X9 to X16
	X1.0: 24 V_{SEN} X1.1: Ix X1.2: 0 V_{SEN} X2.0: 24 V_{SEN} X2.1: Ix+1 X2.2: 0 V_{SEN} X3.0: 24 V_{SEN} X3.1: Ix+2 X3.2: 0 V_{SEN} X4.0: 24 V_{SEN} X4.1: Ix+3 X4.2: 0 V_{SEN} X5.0: 24 V_{SEN} X5.1: Ix+4 X5.2: 0 V_{SEN} X6.0: 24 V_{SEN} X6.1: Ix+5 X6.2: 0 V_{SEN} X7.0: 24 V_{SEN} X7.1: Ix+6 X7.2: 0 V_{SEN} X8.0: 24 V_{SEN} X8.1: Ix+7 X8.2: 0 V_{SEN}	X9.0: 24 V_{SEN} X9.1: Ix+8 X9.2: 0 V_{SEN} X10.0: 24 V_{SEN} X10.1: Ix+9 X10.2: 0 V_{SEN} X11.0: 24 V_{SEN} X11.1: Ix+10 X11.2: 0 V_{SEN} X12.0: 24 V_{SEN} X12.1: Ix+11 X12.2: 0 V_{SEN} X13.0: 24 V_{SEN} X13.1: Ix+12 X13.2: 0 V_{SEN} X14.0: 24 V_{SEN} X14.1: Ix+13 X14.2: 0 V_{SEN} X15.0: 24 V_{SEN} X15.1: Ix+14 X15.2: 0 V_{SEN} X16.0: 24 V_{SEN} X16.1: Ix+15 X16.2: 0 V_{SEN}
	Ix = Input x	

Tab. 2/27: Pin assignment of I-module type CPX-L-16DE-...

2.4 Instructions on commissioning

The behaviour of I/O modules can be parameterised. The table below gives an overview of the parameters.

The Appendix of the CPX system manual contains further information on parameterisation. There you will find:

– Time diagrams on the course of the input debounce time and the signal extension time

– Details on Forcing and on Fail safe and Idle mode.

2.4.1 Parameters of the input modules

Module parameters: Monitoring the CPX module		
Function no.	4828 + m * 64 + 0 m = module number (0 ... 47)	
Description	Monitoring of the possible faults can be activated or deactivated (suppressed) for each module independently. Active monitoring causes the following. The fault is: – Sent to the CPX bus node – Displayed by the module common error LED.	
Bit 0	Monitoring Description Short circuit/overload in sensor supply (SCS)	[Monitor] [Monitor SCS]
Values	1 = active (presetting) 0 = inactive	[Active] [Inactive]
Note	Monitoring can also be set for the complete CPX terminal (see “System parameter monitoring”).	

Tab. 2/28: Monitoring the CPX module

Module parameters: Behaviour after short circuit/overload		
Function no.	4828 + m * 64 + 1 m = module number (0 ... 47)	
Description	Determines after a short circuit in the sensor supply whether the power is to remain switched off or whether it is to be switched on again automatically.	
Bit 0	Behaviour after short circuit/overload Description Short circuit/overload in sensor supply (SCS)	[Behaviour after] [Behaviour after SCS]
Values	0 = V_{SEN} remains switched off 1 = V_{SEN} switch on again (presetting)	[Leave switched off] [Resume]
Note	With the setting "$V_{SEN/OUT}$ remains switched off," Power Off/On is necessary to restore the power. Check which setting is necessary for reliable operation of your system. This parameter also applies to the entire module for modules CPX-8DE-D and CPX-M-16DE-D. Detailed description under Diagnosis, Tab. 2/34.	

Tab. 2/29: Behaviour after short circuit/overload

Module parameters: Input debounce time		
Function no.	4828 + m * 64 + 1 m = module number (0 ... 47)	
Description	Determines when a change of edge of the sensor signal on this module is to be accepted as a logical input signal.	
Bit	Bit 4, 5	
Values Bit 5 4 0 0 0 1 1 0 1 1	Input debounce time Description 0.1 ms 3 ms (presetting) 10 ms 20 ms	[Debounce time]
Note	Input debounce times are specified in order to eliminate interfering changes of signal edge during switching procedures (bouncing of the input signal). This setting applies to all inputs of the module. Further information on this parameter can be found in the CPX system manual.	

Tab. 2/30: Input debounce time

Module parameters: Signal extension time		
Function no.	4828 + m * 64 + 1 m = module number (0 ... 47)	
Description	Determines the signal extension time for the relevant I-module. Signal states accepted as logical input signals usually remain valid at least until the specified signal extension time (minimum signal duration) has expired. Changes of edge within the extension time are ignored.	
Bit	Bit 6, 7	
Values Bit 7 6 0 0 0 1 1 0 1 1	Signal extension time Description 0.5 ms 15 ms (presetting) 50 ms 100 ms	[Signal extension]
Note	There is a danger that short signals are not “recognised” due to long cycle times of the higher-order controller. In order for such signals to also be taken into consideration in the control sequence, a signal extension time can be specified (see CPX system manual). The signal extension time can be activated channel-by-channel (see channel-specific module parameters).	

Tab. 2/31: Signal extension time

Module parameters: Signal extension channel x		
Function no.	4828 + m * 64 + 6 m = module number (0 ... 47) 4828 + m * 64 + 7 (additionally for CPX-16DE, channel 8 ... 15)	
Description	Determines whether the signal extension for the relevant I-channel is to be enabled or blocked.	
Bit	Bit 0 ... 7 (channel 0 ... 7) Bit 0 ... 7 (channel 8 ... 15) (for CPX-16DE channel 8 ... 15 with function no. 4828 + m * 64 + 7)	
Values	Signal extension input channel ... 0 = blocked (presetting) 1 = enabled	[Signal extension Inp Ch ...] [Disabled] [Enabled]
Note	The signal extension time can be specified separately for each module (see function no. 4828 + m * 64 +1, bit 6, 7).	

Tab. 2/32: Signal extension channel x (channel-specific)

Module parameters: Force channel x	
Function no.	Access to these module parameters is enabled via protocol-specific functions (see the manual for the bus node).
Description	Force mode of inputs channel x: blocked (presetting) Force state Force state of inputs channel x: Set signal Reset signal (presetting)
Note	The Force function enables the manipulation of signal states detached from actual operating states (also refer to the CPX system manual).

Tab. 2/33: Force channel x (channel-specific)

2.5 Diagnosis

Specific faults of the input modules are registered or suppressed depending on the module parameterisation.

The faults are indicated locally via the Error LED and, if necessary, they can be evaluated with the handheld (MMI).

The faults are sent to the bus node (depending on module parameterisation), where they can be evaluated according to the fieldbus protocol used.

2.5.1 Error messages of the input modules

An input module can register the following standard faults:

Error number	Description	Error handling
2	**Fault short circuit/overload** Short circuit/overload in sensor supply ($V_{EL/SEN}$).	1. Eliminate short circuit/overload or check connected sensors 2. Depending on parameterisation "Behaviour after short circuit/overload in sensor supply (SCS)" (see Tab. 2/29): • Setting "V_{SEN} switch on again": Power supply for sensors will be switched on again **automatically** when the short circuit is eliminated. • Setting "V_{SEN} remains switched off": – Power Off/On necessary or – modify parameter "Short circuit/ overload in sensor supply (SCS)" to "V_{SEN} switch on again".

Tab. 2/34: Error messages of the input modules

Note
When using the input modules please note that the sensor supplies are switched off differently in the event of a short circuit depending on the module and connection block used. Tab. 2/35 provides an overview of this.

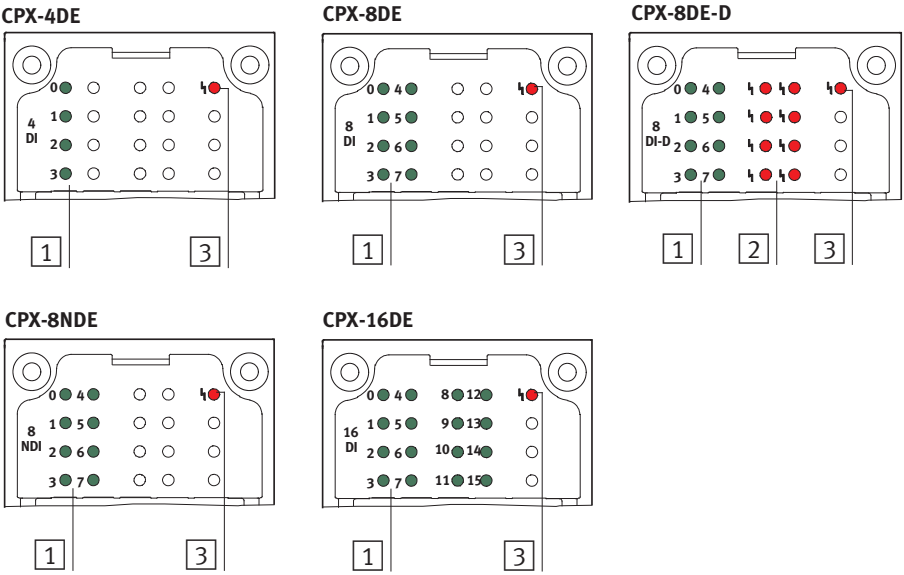
Providing it is not programmed otherwise, the sensor supply voltage will be switched on again **automatically** when the short circuit is eliminated.

CPX-4DE **CPX-8DE** **CPX-8NDE** **CPX-16DE** **CPX-L-16DE**	**CPX-8DE-D** (except with the connection blocks designated in the next column)	**CPX-8DE-D** with connection blocks: – AB-4-M12x2-5POL(-R) – AB-4-HARX2-4POL – CPX-M-4-M12x2-5POL	**CPX-M-16DE-D**
The diagnostic messages are displayed **together** for all inputs.	The diagnostic messages are displayed **channel-by-channel** for each input. For exceptions refer to the next column!	The diagnostic messages are **only** displayed for inputs Ix, Ix+2, Ix+4 and Ix+6. Inputs Ix+1, Ix+3, Ix+5 and Ix+7 do not generate **any** diagnostic messages.	The diagnostic messages are displayed **channel-by-channel** for each input.
If there is a short circuit, all sensor supplies will be switched off **together**.	If there is a short circuit, the sensor supplies will be switched off **channel-by-channel**.	The sensor supplies are grouped together in pairs on these connection blocks. If there is a short circuit, the sensor supplies will be switched off **in pairs**: Ix and Ix+1, Ix+2 and Ix+3, Ix+4 and Ix+5, ...	

Tab. 2/35: Different behaviour of the input modules in the event of a short circuit

2.5.2 LED display

Various LEDs are situated under the transparent cover of the device for diagnosing the input modules.



1 Status LEDs (green): for assignment to the inputs see the pin assignment of the module

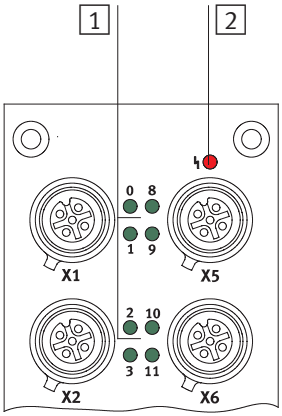
2 Channel-related error LEDs (red)

3 Error LED (red)

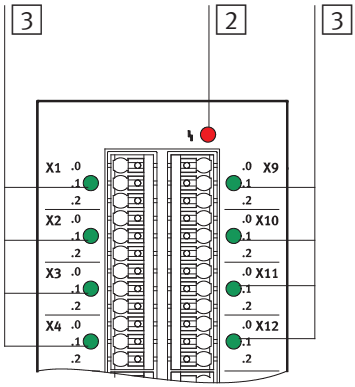
4 Shared LEDs for status of the input (green) or channel-related error (red)

Fig. 2/1: LED display of the input modules (part 1)

The LEDs are located directly next to the ports for channel-oriented diagnostics of the CPX metal and CPX-L input modules.



CPX-M-16DE-D



CPX-L-16DE-16-KL-3POL

1 Shared LEDs for status of the input (green) or channel-related error (red)

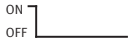
2 Error LED (red): Module fault

3 Status LEDs (green) for the inputs

Fig. 2/2: LED display of the input modules (part 2, CPX metal and CPX-L)

Status LEDs

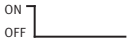
There is a green status LED for each input. This LED indicates the status of the signal at the relevant input. This means:

Status LED (green)	Procedure	Status
 LED illuminates		logical 1 (signal present)
LED is off		logical 0 (signal not present)

Tab. 2/36: Status LED of the input modules

Error LED

The red error LED indicates a module fault due to short circuit or overload of the sensor supply depending on parameterisation.

Error LED (red)	Procedure	Status	Error number	Error handling
 LED is off		Trouble-free operation.	0	None
 LED illuminates		**Fault short circuit/overload** Short circuit/overload in sensor supply ($V_{EL/SEN}$).	2	See section 2.5.1, Tab. 2/34

Tab. 2/37: Error LED of the input modules

Channel-related error LEDs (only CPX-8DE-D and CPX-M-16DE-D)

Module CPX-8DE-D has a separate red error LED for each input; module CPX-M-16DE-D has a combined green/red LED for status and error display. The error LEDs of the inputs indicate a fault at the input caused by short circuit or overload irrespective of parameterisation.

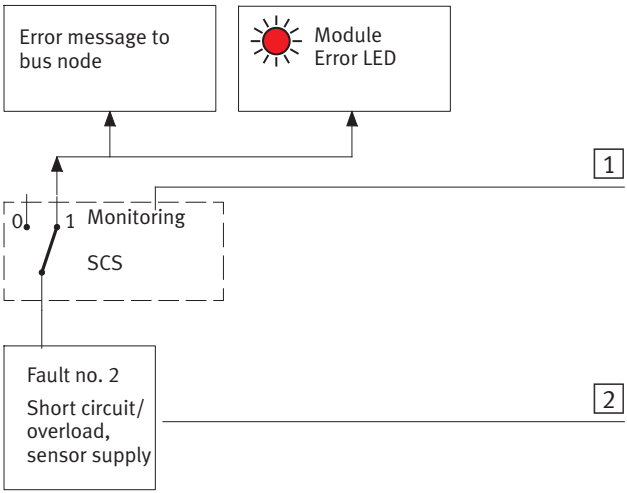
Channel-related error LED (red)	**Procedure**	**Status**	**Error number**	**Error handling**
○ LED is off	ON / OFF	Input without short circuit/overload, trouble-free operation.	0	None
☀ LED illuminates	ON / OFF	**Fault short circuit/overload** Short circuit/overload in sensor supply 24 $V_{SENx...}$	2	See section 2.5.1, Tab. 2/34

Tab. 2/38: Channel-related error LEDs for input module CPX-8DE-D and CPX-M-16DE-D

Note
Please note that the diagnostic messages and the disconnection of sensor supplies in input modules CPX-8DE-D and CPX-M-16DE-D depends on the connection block used. A detailed description can be found in Tab. 2/35.

2.5.3 Error handling and parameterisation

The following diagram shows the error handling procedure in the input modules. Further registering and display of the faults can be suppressed as desired with the appropriate module parameter (represented in the diagram as a switch). A description of the parameter can be found in section 2.4.



1 Module parameters
(switch position represented = default setting)

2 Module-specific faults

Fig. 2/3: Principle of error handling and parameterisation in the input modules

Digital CPX output modules

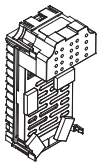
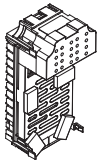
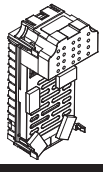
Chapter 3

Type CPX-4DA
CPX-8DA
CPX-8DA-H

Contents

3.1 Function of the output modules

Output modules provide digital outputs for connecting electric actuators and other current-consuming devices (valves, contactors, displays) in the valve terminal. At present the following type is available:

Type		Description
	CPX-4DA	Provides 4 digital outputs (based on IEC 61131-2 type 2, 24 V, positive logic – PNP).
	CPX-8DA	Provides 8 digital outputs (as per IEC 61131-2 type 2, 24 V, positive logic – PNP).
	CPX-8DA-H	Provides 8 digital high-current outputs (based on IEC 61131-2 type 2, 24 V, positive logic – PNP).

Tab. 3/1: Overview of output modules

3.2 Assembly

See section 1.3.

3.3 Installation

Warning
Uncontrolled movements of the connected actuators and uncontrolled movements of loose tubing can cause injury to human beings or damage to property.

Before carrying out installation and maintenance work, switch off the following:

– Compressed air supply
– The operating and load voltage supplies.

In the following sections you will find the pin assignments of the output modules for the different connection blocks.

Instructions on connecting the cables and plugs to the connection blocks can be found in section 1.2.3.

Power supply

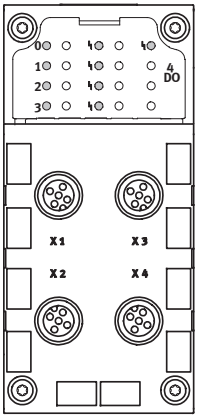
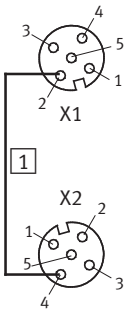
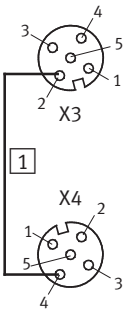
The 24 V supply for the electronics of the output modules is provided via the operating voltage supply for the electronics/ sensors ($V_{EL/SEN}$).

The 24 V supply for the outputs is provided via the load voltage outputs of the CPX terminal (V_{OUT}).

3.3.1 Output module CPX-4DA

Pin assignment CPX-4DA with connection blocks
CPX-AB-4-M12x2-5POL (-R), CPX-M-4-M12x2-5POL

O-module type CPX-4DAE with connection blocks CPX-AB-4-M12x2-5POL (-R), CPX-M-4-M12x2-5POL

Connection block	Pin assignment X1, X2	LED	Pin assignment X3, X4	LED
	 Socket X1: 1: n.c. 2: Ox+1 3: 0 V_{OUT} 4: Ox 5: FE[1)] 1 Socket X2: 1: n.c. 2: n.c. 3: 0 V_{OUT} 4: Ox+1 5: FE[1)]	1 0 1	 Socket X3 1: n.c. 2: Ox+3 3: 0 V_{OUT} 4: Ox+2 5: FE[1)] 1 Socket X4: 1: n.c. 2: n.c. 3: 0 V_{OUT} 4: Ox+3 5: FE[1)]	3 2 3
Example of representation with CPX-AB-4-M12x2-5POL	Ox = Output x FE = Functional earth n.c. = Not connected 1 Connected internally 1) In CPX-AB-4-M12x2-5POL-**R** and CPX-M-4-M12x2-5POL the metal thread is connected to FE			

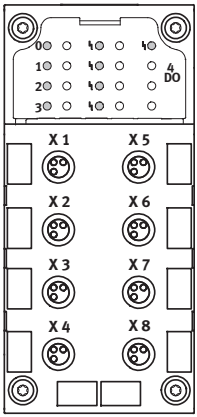
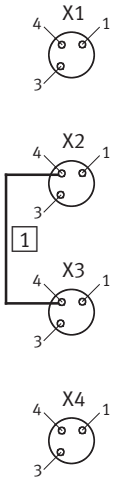
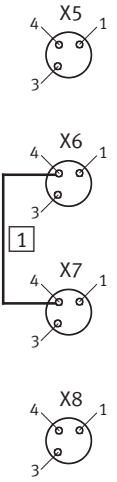
Tab. 3/2: Pin assignment of O-module type CPX-4DA with connection blocks CPX-AB-4-M12x2-5POL (-R), CPX-M-4-M12x2-5POL

CPX-AB-4-M12x2-5POL-**R**, CPX-M-4-M12x2-5POL	The metal thread of these connection blocks is connected internally with pin 5 (functional earth FE).

Pin assignment CPX-4DA with connection block CPX-AB-8-M8-3POL

Note
Sockets X1 to X8 on the connection block are marked accordingly. The numbering of the sockets does not correspond to the output addresses.

O-module type CPX-4DA with connection block CPX-AB-8-M8-3POL

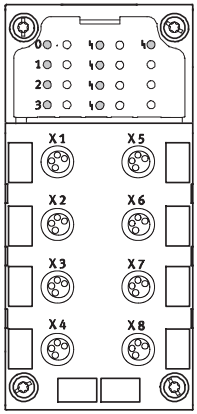
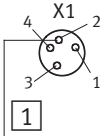
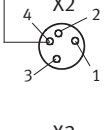
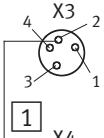
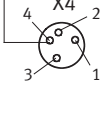
Connection block	Pin assignment X1 to X4	LED	Pin assignment X5 to X8	LED
	 Socket X1: 1: n.c. 3: 0 V_{OUT} 4: Ox Socket X2: 1: n.c. 3: 0 V_{OUT} 4: Ox+1 Socket X3: 1: n.c. 3: 0 V_{OUT} 4: Ox+1 Socket X4: 1: n.c. 3: 0 V_{OUT} 4: n.c.	0 1 1	 Socket X5: 1: n.c. 3: 0 V_{OUT} 4: Ox+2 Socket X6: 1: n.c. 3: 0 V_{OUT} 4: Ox+3 Socket X7: 1: n.c. 3: 0 V_{OUT} 4: Ox+3 Socket X8: 1: n.c. 3: 0 V_{OUT} 4: n.c.	2 3 3
	Ox = Output x FE = Functional earth n.c. = Not connected [1] Connected internally			

Tab. 3/3: Pin assignment of O-module type CPX-4DA with connection block CPX-AB-8-M8-3POL

Pin assignment CPX-4DA with connection block CPX-AB-8-M8-4POL

Note
Sockets X1 to X8 on the connection block are marked accordingly. The numbering of the sockets does not correspond to the output addresses.

O-module type CPX-4DA with connection block CPX-AB-8-M8-4POL

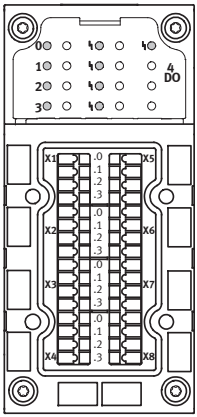
Connection block	Pin assignment X1 to X4	LED	Pin assignment X5 to X8	LED
	 Socket X1: 1: 0 V_{OUT} 2: Ox+1 3: 0 V_{OUT} 4: Ox [1]  Socket X2: 1: 0 V_{OUT} 2: n.c. 3: 0 V_{OUT} 4: Ox+1  Socket X3: 1: 0 V_{OUT} 2: Ox+3 3: 0 V_{OUT} 4: Ox+2 [1]  Socket X4: 1: 0 V_{OUT} 2: n.c. 3: 0 V_{OUT} 4: Ox+3	1 0 1 3 2 3	 Socket X5: 1: 0 V_{OUT} 2: n.c. 3: 0 V_{OUT} 4: n.c.  Socket X6: 1: 0 V_{OUT} 2: n.c. 3: 0 V_{OUT} 4: n.c.  Socket X7: 1: 0 V_{OUT} 2: n.c. 3: 0 V_{OUT} 4: n.c.  Socket X8: 1: 0 V_{OUT} 2: n.c. 3: 0 V_{OUT} 4: n.c.	
	Ox = Output x FE = Functional earth n.c. = Not connected [1] Connected internally			

Tab. 3/4: Pin assignment of O-module type CPX-4DA with connection block CPX-AB-8-M8-4POL

Pin assignment CPX-4DA with connection block CPX-AB-8-KL-4POL

Note
Pins X1 to X8 on the connection block are marked accordingly. The numbering of the pins does not correspond to the output addresses.

O-module type CPX-4DA with connection block CPX-AB-8-KL-4POL

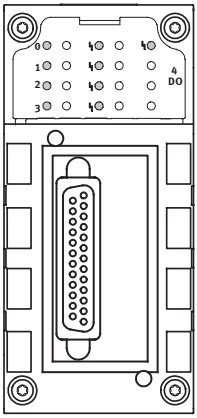
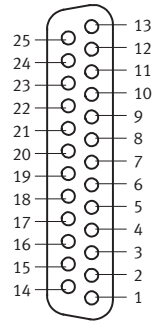
Connection block	Pin assignment X1 to X4	LED	Pin assignment X5 to X8	LED
	X1.0: n.c. X1.1: 0 V_{OUT} X1.2: Ox X1.3: FE X2.0: n.c. X2.1: 0 V_{OUT} X2.2: Ox+1 X2.3: FE X3.0: n.c. X3.1: 0 V_{OUT} X3.2: Ox+1 X3.3: FE X4.0: n.c. X4.1: 0 V_{OUT} X4.2: n.c. X4.3: FE	0 1 1 	X5.0: n.c. X5.1: 0 V_{OUT} X5.2: Ox+2 X5.3: FE X6.0: n.c. X6.1: 0 V_{OUT} X6.2: Ox+3 X6.3: FE X7.0: n.c. X7.1: 0 V_{OUT} X7.2: Ox+3 X7.3: FE X8.0: n.c. X8.1: 0 V_{OUT} X8.2: n.c. X8.3: FE	2 3 3

Ox = Output x
FE = Functional earth
n.c. = Not connected
[1] Connected internally

Tab. 3/5: Pin assignment of O-module type CPX-4DA with connection block CPX-AB-8-KL-4POL

Pin assignment of CPX-4DA with connection block CPX-AB-1-SUB-BU-25POL

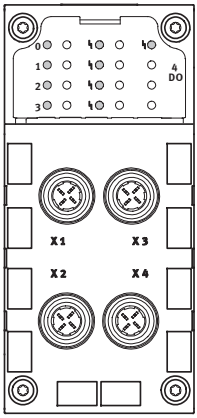
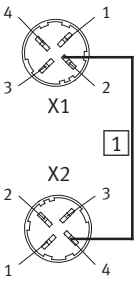
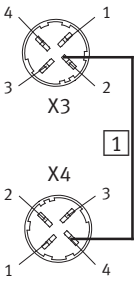
O-module type CPX-4DA with connection block CPX-AB-1-SUB-BU-25POL

Connection block	Pin assignment		LED	Pin assignment	LED
		1: Ox 2: Ox+1 3: Ox+1 4: n.c. 5: n.c. 6: 0 V_{OUT} 7: n.c. 8: 0 V_{OUT} 9: n.c. 10: n.c. 11: 0 V_{OUT} 12: 0 V_{OUT} 13: FE	0 1 1	14: Ox+2 15: Ox+3 16: Ox+3 17: n.c. 18: n.c. 19: n.c. 20: n.c. 21: n.c. 22: 0 V_{OUT} 23: 0 V_{OUT} 24: 0 V_{OUT} 25: FE Housing: FE	2 3 3
	Ox = Output x FE = Functional earth 0 V = 0 V load n.c. = Not connected				

Tab. 3/6: Pin assignment of O-module type CPX-4DA with connection block CPX-AB-1-SUB-BU-25POL

Pin assignment CPX-4DA with connection block CPX-AB-4-HARX2-4POL

O-module type CPX-4DA with connection block CPX-AB-4-HARX2-4POL

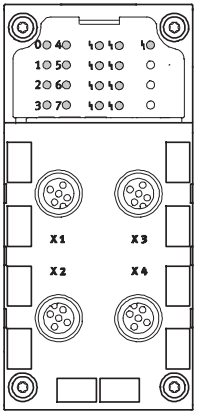
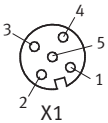
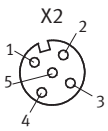
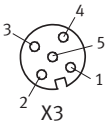
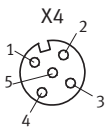
Connection block	Pin assignment X1, X2	LED	Pin assignment X3, X4	LED
	 Socket X1: 1: n.c. 2: Ox+1 3: 0 V_{OUT} 4: Ox 1 Socket X2: 1: n.c. 2: n.c. 3: 0 V_{OUT} 4: Ox+1	1 0 1	 Socket X3 1: n.c. 2: Ox+3 3: 0 V_{OUT} 4: Ox+2 1 Socket X4: 1: n.c. 2: n.c. 3: 0 V_{OUT} 4: Ox+3	3 2 3
	Ox = Output x FE = Functional earth n.c. = Not connected 1 Connected internally			

Tab. 3/7: Pin assignment of O-module type CPX-4DA with connection block CPX-AB-4-HARX2-4POL

3.3.2 Output module CPX-8DA

Pin assignment CPX-8DA with connection blocks
CPX-AB-4-M12x2-5POL (-R), CPX-M-4-M12x2-5POL

O-module type CPX-8DA with connection blocks CPX-AB-4-M12x2-5POL (-R), CPX-M-4-M12x2-5POL

Connection block	Pin assignment X1, X2	LED	Pin assignment X3, X4	LED
	 Socket X1: 1: n.c. 2: Ox+1 3: 0 V_{OUT} 4: Ox 5: FE[1)]  Socket X2: 1: n.c. 2: Ox+3 3: 0 V_{OUT} 4: Ox+2 5: FE[1)]	 1 0 3 2	 Socket X3 1: n.c. 2: Ox+5 3: 0 V_{OUT} 4: Ox+4 5: FE[1)]  Socket X4: 1: n.c. 2: Ox+7 3: 0 V_{OUT} 4: Ox+6 5: FE[1)]	 5 4 7 6
Example of representation with CPX-AB-4-M12x2-5POL	Ox = Output x FE = Functional earth n.c. = Not connected 1) In CPX-AB-4-M12x2-5POL-R and CPX-M-4-M12x2-5POL the metal thread is connected to FE			

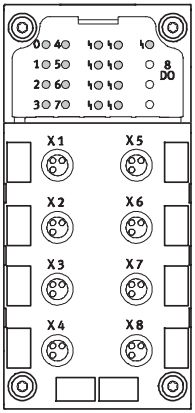
Tab. 3/8: Pin assignment of O-module type CPX-8DA with connection block CPX-AB-4-M12x2-5POL (-R), CPX-M-4-M12x2-5POL

CPX-AB-4-M12x2-5POL-**R**, CPX-M-4-M12x2-5POL — The metal thread of these connection blocks is connected internally with pin 5 (functional earth FE).

Pin assignment CPX-8DA with connection block CPX-AB-8-M8-3POL

Note
Sockets X1 to X8 on the connection block are marked accordingly. The numbering of the sockets does not correspond to the output addresses.

O-module type CPX-8DA with connection block CPX-AB-8-M8-3POL

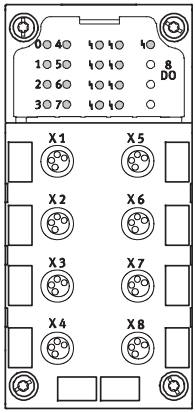
Connection block	Pin assignment X1 to X4	LED	Pin assignment X5 to X8	LED
	 Socket X1: 1: n.c. 3: 0 V_{OUT} 4: Ox	0	 Socket X5: 1: n.c. 3: 0 V_{OUT} 4: Ox+4	4
	 Socket X2: 1: n.c. 3: 0 V_{OUT} 4: Ox+1	1	 Socket X6: 1: n.c. 3: 0 V_{OUT} 4: Ox+5	5
	 Socket X3: 1: n.c. 3: 0 V_{OUT} 4: Ox+2	2	 Socket X7: 1: n.c. 3: 0 V_{OUT} 4: Ox+6	6
	 Socket X4: 1: n.c. 3: 0 V_{OUT} 4: Ox+3	3	 Socket X8: 1: n.c. 3: 0 V_{OUT} 4: Ox+7	7
	Ox = Output x FE = Functional earth n.c. = Not connected			

Tab. 3/9: Pin assignment of O-module type CPX-8DA with connection block CPX-AB-8-M8-3POL

Pin assignment CPX-8DA with connection block CPX-AB-8-M8-4POL

Note
Sockets X1 to X8 on the connection block are marked accordingly. The numbering of the sockets does not correspond to the output addresses.

O-module type CPX-8DA with connection block CPX-AB-8-M8-4POL

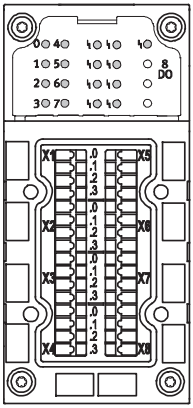
Connection block	Pin assignment X1 to X4	LED	Pin assignment X5 to X8	LED
	 Socket X1: 1: 0 V_{OUT} 2: Ox+1 3: 0 V_{OUT} 4: Ox	1 0	 Socket X5: 1: 0 V_{OUT} 2: n.c. 3: 0 V_{OUT} 4: n.c.	
	 Socket X2: 1: 0 V_{OUT} 2: Ox+3 3: 0 V_{OUT} 4: Ox+2	3 2	 Socket X6: 1: 0 V_{OUT} 2: n.c. 3: 0 V_{OUT} 4: n.c.	
	 Socket X3: 1: 0 V_{OUT} 2: Ox+5 3: 0 V_{OUT} 4: Ox+4	5 4	 Socket X7: 1: 0 V_{OUT} 2: n.c. 3: 0 V_{OUT} 4: n.c.	
	 Socket X4: 1: 0 V_{OUT} 2: Ox+7 3: 0 V_{OUT} 4: Ox+6	7 6	 Socket X8: 1: 0 V_{OUT} 2: n.c. 3: 0 V_{OUT} 4: n.c.	
	Ox = Output x FE = Functional earth n.c. = Not connected			

Tab. 3/10: Pin assignment of O-module type CPX-8DA with connection block CPX-AB-8-M8-4POL

Pin assignment CPX-8DA with connection block CPX-AB-8-KL-4POL

Note
Pins X1 to X8 on the connection block are marked accordingly. The numbering of the pins does not correspond to the output addresses.

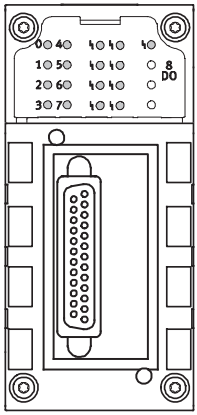
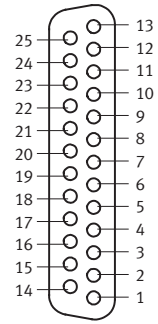
O-module type CPX-8DA with connection block CPX-AB-8-KL-4POL

Connection block	Pin assignment X1 to X4	LED	Pin assignment X5 to X8	LED
	X1.0: n.c. X1.1: 0 V_{OUT} X1.2: Ox X1.3: FE	0	X5.0: n.c. X5.1: 0 V_{OUT} X5.2: Ox+4 X5.3: FE	4
	X2.0: n.c. X2.1: 0 V_{OUT} X2.2: Ox+1 X2.3: FE	1	X6.0: n.c. X6.1: 0 V_{OUT} X6.2: Ox+5 X6.3: FE	5
	X3.0: n.c. X3.1: 0 V_{OUT} X3.2: Ox+2 X3.3: FE	2	X7.0: n.c. X7.1: 0 V_{OUT} X7.2: Ox+6 X7.3: FE	6
	X4.0: n.c. X4.1: 0 V_{OUT} X4.2: Ox+3 X4.3: FE	3	X8.0: n.c. X8.1: 0 V_{OUT} X8.2: Ox+7 X8.3: FE	7
	Ox = Output x FE = Functional earth n.c. = Not connected			

Tab. 3/11: Pin assignment of O-module type CPX-8DA with connection block CPX-AB-8-KL-4POL

Pin assignment CPX-8DA with connection block CPX-AB-1-SUB-BU-25POL

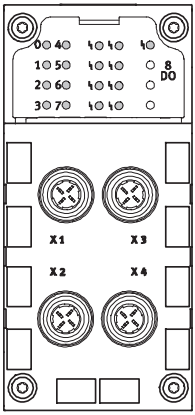
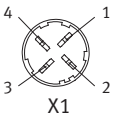
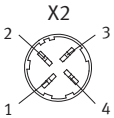
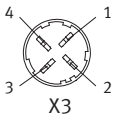
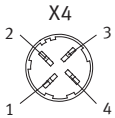
O-module type CPX-8DA with connection block CPX-AB-1-SUB-BU-25POL

Connection block	Pin assignment		LED	Pin assignment	LED
		1: Ox 2: Ox+1 3: Ox+2 4: Ox+3 5: n.c. 6: 0 V_{OUT} 7: n.c. 8: 0 V_{OUT} 9: n.c. 10: n.c. 11: 0 V_{OUT} 12: 0 V_{OUT} 13: FE	0 1 2 3	14: Ox+4 15: Ox+5 16: Ox+6 17: Ox+7 18: n.c. 19: n.c. 20: n.c. 21: n.c. 22: 0 V_{OUT} 23: 0 V_{OUT} 24: 0 V_{OUT} 25: FE Housing: FE	4 5 6 7
	Ox = Output x FE = Functional earth 0 V = 0 V load n.c. = Not connected				

Tab. 3/12: Pin assignment of O-module type CPX-8DA with connection block CPX-AB-1-SUB-BU-25POL

Pin assignment CPX-8DA with connection block CPX-AB-4-HARX2-4POL

O-module type CPX-8DA with connection block CPX-AB-4-HARX2-4POL

Connection block	Pin assignment X1, X2	LED	Pin assignment X3, X4	LED
	 Socket X1: 1: n.c. 2: Ox+1 3: 0 V_{OUT} 4: Ox  Socket X2: 1: n.c. 2: Ox+3 3: 0 V_{OUT} 4: Ox+2	1 0 3 2	 Socket X3 1: n.c. 2: Ox+5 3: 0 V_{OUT} 4: Ox+4  Socket X4: 1: n.c. 2: Ox+7 3: 0 V_{OUT} 4: Ox+6	5 4 7 6
	Ox = Output x FE = Functional earth n.c. = Not connected			

Tab. 3/13: Pin assignment of O-module type CPX-8DA with connection block CPX-AB-4-HARX2-4POL

3.3.3 High-current output module CPX-8DA-H

The high-current output module CPX-8DA-H provides digital outputs in the valve terminal for connecting current-consuming devices with high current consumption (e. g. hydraulic valves).

Note
Observe the maximum permitted connection values in the section “Technical specifications” and the temperature dependency of the maximum load current with the aid of Fig. A/1, in order to avoid overheating and, as a consequence, damage to the connections and to the electronic module.

Pay attention to the following when planning:

- Maximum current consumption of 2.1 A per output/channel or per output socket when the plug/cable is assigned twice and a maximum current consumption of 8.4 A for the complete module.
- Note the instructions/footnotes for the relevant connection block.
- Note the instructions on contact loading for the relevant connection block.
- Use electric conductors with suitable diameter.
- Avoid long distances between the load and the high-current output.

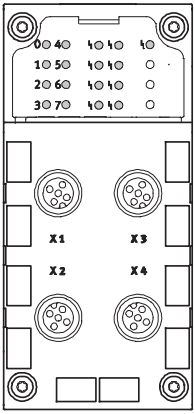
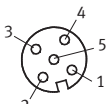
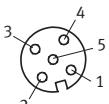
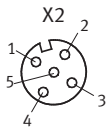
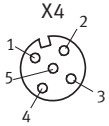
Protection against short circuit

In addition to (reversible) electronic short circuit protection, the output module also possesses an (irreversible) fuse (fusible cutout) in case the electronic short circuit protection device fails.

Note
After the fusible cutout has functioned, the high-current output module must be replaced.

Pin assignment CPX-8DA-H with connection blocks CPX-AB-4-M12x2-5POL-R, CPX-M-4-M12x2-5POL

O-module type CPX-8DA-H with connection block CPX-AB-4-M12x2-5POL-R, CPX-M-4-M12x2-5POL

Connection block	Pin assignment X1, X2	LED	Pin assignment X3, X4	LED
 Example of representation with CPX-AB-4-M12x2-5POL-R	 Socket X1: 1: n.c. 2: Ox+1 3: 0 V_{OUT} 1) 4: Ox 5: FE 2)	1 0	 Socket X3 1: n.c. 2: Ox+5 3: 0 V_{OUT} 1) 4: Ox+4 5: FE 2)	5 4
	 Socket X2: 1: n.c. 2: Ox+3 3: 0 V_{OUT} 1) 4: Ox+2 5: FE 2)	3 2	 Socket X4: 1: n.c. 2: Ox+7 3: 0 V_{OUT} 1) 4: Ox+6 5: FE 2)	7 6
	Ox = Output x FE = Functional earth n.c. = Not connected 1) There is only one shared 0 V_{OUT} connection per plug-in connector; at no time may it be placed under load by more than one of the two outputs per plug-in connector. 2) The metal thread is connected internally with functional earth FE.			

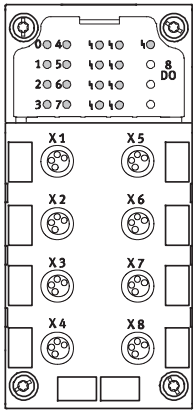
Tab. 3/14: Pin assignment of O-module type CPX-8DA-H with connection block CPX-AB-4-M12x2-5POL-R, CPX-M-4-M12x2-5POL

Note
Only one of the two outputs per plug-in connector may be placed under load, as otherwise the contact loading (see chapter A.1 and A.2) of the 0 V_{OUT} connection could be exceeded if a short-circuit/overload occurs.

Pin assignment CPX-8DA-H with connection block CPX-AB-8-M8-4POL

Note
Sockets X1 to X8 on the connection block are marked accordingly. The numbering of the sockets does not correspond to the output addresses.

O-module type CPX-8DA-H with connection block CPX-AB-8-M8-4POL

Connection block	Pin assignment X1 to X4	LED	Pin assignment X5 to X8	LED
	 Socket X1: 1: 0 V_{OUT} 1) 2: Ox+1 3: 0 V_{OUT} 1) 4: Ox	1 0	 Socket X5: 1: 0 V_{OUT} 1) 2: n.c. 3: 0 V_{OUT} 1) 4: n.c.	
	 Socket X2: 1: 0 V_{OUT} 1) 2: Ox+3 3: 0 V_{OUT} 1) 4: Ox+2	3 2	 Socket X6: 1: 0 V_{OUT} 1) 2: n.c. 3: 0 V_{OUT} 1) 4: n.c.	
	 Socket X3: 1: 0 V_{OUT} 1) 2: Ox+5 3: 0 V_{OUT} 1) 4: Ox+4	5 4	 Socket X7: 1: 0 V_{OUT} 1) 2: n.c. 3: 0 V_{OUT} 1) 4: n.c.	
	 Socket X4: 1: 0 V_{OUT} 1) 2: Ox+7 3: 0 V_{OUT} 1) 4: Ox+6	7 6	 Socket X8: 1: 0 V_{OUT} 1) 2: n.c. 3: 0 V_{OUT} 1) 4: n.c.	

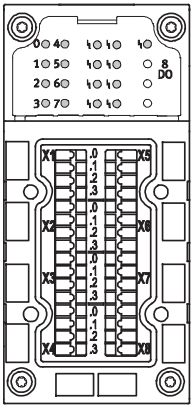
Ox = Output x
FE = Functional earth
n.c. = Not connected
1) The relevant 0 V_{OUT} connection must be used for each channel (contact loading see chapter A.1 and A.2)

Tab. 3/15: Pin assignment of O-module type CPX-8DA-H with connection block CPX-AB-8-M8-4POL

Pin assignment CPX-8DA-H with connection block CPX-AB-8-KL-4POL

Note
Pins X1 to X8 on the connection block are marked accordingly. The numbering of the pins does not correspond to the output addresses.

O-module type CPX-8DA-H with connection block CPX-AB-8-KL-4POL

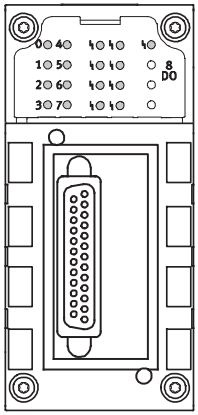
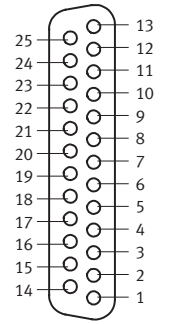
Connection block	Pin assignment X1 to X4	LED	Pin assignment X5 to X8	LED
	X1 .0 X1.0: n.c. .1 X1.1: 0 V_{OUT} 1) .2 X1.2: Ox .3 X1.3: FE	0	X5 .0 X5.0: n.c. .1 X5.1: 0 V_{OUT} 1) .2 X5.2: Ox+4 .3 X5.3: FE	4
	X2 .0 X2.0: n.c. .1 X2.1: 0 V_{OUT} 1) .2 X2.2: Ox+1 .3 X2.3: FE	1	X6 .0 X6.0: n.c. .1 X6.1: 0 V_{OUT} 1) .2 X6.2: Ox+5 .3 X6.3: FE	5
	X3 .0 X3.0: n.c. .1 X3.1: 0 V_{OUT} 1) .2 X3.2: Ox+2 .3 X3.3: FE	2	X7 .0 X7.0: n.c. .1 X7.1: 0 V_{OUT} 1) .2 X7.2: Ox+6 .3 X7.3: FE	6
	X4 .0 X4.0: n.c. .1 X4.1: 0 V_{OUT} 1) .2 X4.2: Ox+3 .3 X4.3: FE	3	X8 .0 X8.0: n.c. .1 X8.1: 0 V_{OUT} 1) .2 X8.2: Ox+7 .3 X8.3: FE	7

Ox = Output x
FE = Functional earth
n.c. = Not connected
1) The relevant 0 V_{OUT} connection must be used for each channel (contact loading see chapter A.1 and A.2)

Tab. 3/16: Pin assignment of O-module type CPX-8DA-H with connection block CPX-AB-8-KL-4POL

Pin assignment CPX-8DA-H with connection block CPX-AB-1-SUB-BU-25POL

O-module type CPX-8DA-H with connection block CPX-AB-1-SUB-BU-25POL

Connection block	Pin assignment		LED	Pin assignment	LED
		1: Ox 2: Ox+1 3: Ox+2 4: Ox+3 5: n.c. 6: 0 V_{OUT} 1) 7: n.c. 8: 0 V_{OUT} 1) 9: n.c. 10: n.c. 11: 0 V_{OUT} 1) 12: 0 V_{OUT} 1) 13: FE	0 1 2 3	14: Ox+4 15: Ox+5 16: Ox+6 17: Ox+7 18: n.c. 19: n.c. 20: n.c. 21: n.c. 22: 0 V_{OUT} 2) 23: 0 V_{OUT} 2) 24: 0 V_{OUT} 2) 25: FE Housing: FE	4 5 6 7
	Ox = Output x FE = Functional earth 0 V = 0 V load n.c. = Not connected 1) A separate 0 V_{OUT} connection must be used for each channel (contact loading see chapter A.6) 2) A total of 4 outputs can be connected to pins 22 ... 24. These are connected with each other internally. (contact loading see chapter A.1 and A.2)				

Tab. 3/17: Pin assignment of O-module type CPX-8DA-H with connection block CPX-AB-1-SUB-BU-25POL

3.4 Instructions on commissioning

The behaviour of I/O modules can be parameterised.
The table below gives an overview of the parameters.

Further information about parameterisation can be found in the CPX system manual and in the manual for the bus node.

3.4.1 Parameters of the output modules

Module parameters: Monitoring the CPX module		
Function no.	4828 + m * 64 + 0 m = module number (0 ... 47)	
Description	Monitoring of possible faults can be activated or deactivated (suppressed) for each module independently. Active monitoring causes the following. The fault is: – Sent to the CPX bus node – Displayed by the module common error LED.	
Bit 1 2	Monitoring Description Short circuit/overload at the outputs (SCO) Undervoltage at outputs (V_{OUT})	[Monitor] [Monitor SCO] [Monitor Vout]
Values	1 = active (presetting) 0 = inactive	[Active] [Inactive]
Note	Monitoring can also be set for the complete CPX terminal (see “System parameter monitoring”).	

Tab. 3/18: Monitoring the CPX module

Module parameters: Behaviour after short circuit/overload		
Function no.	4828 + m * 64 + 1 m = module number (0 ... 47)	
Description	Determines in the event of a short circuit of the outputs whether the power is to remain switched off or whether it is to be switched on again automatically.	
Bit 1	Behaviour after short circuit/overload Description Short circuit/overload at the outputs (SCO)	[Behaviour after] [Behaviour after SCO]
Values	0 = V_{OUT} remains switched off (presetting) 1 = V_{OUT} switch on again	[Leave switched off] [Resume]
Note	With the setting "V_{OUT} remains switched off", the relevant output must be set/reset before the power can be restored. Check which setting is necessary for reliable operation of your system. Detailed description under Diagnosis, Tab. 3/23.	

Tab. 3/19: Behaviour after short circuit/overload

Module parameter: Fail safe channel x	
Function no.	Access to these module parameters is enabled via protocol-specific functions (see the manual for the bus node).
Description	Fault mode channel x: Hold last state Fault state (presetting) Fault state channel x: Set output Reset output (presetting)
Note	With the aid of so-called Fail Safe parameterisation, you can specify which signal status the outputs are to assume in the event of fieldbus communication errors (also see CPX system manual).

Tab. 3/20: Fail Safe channel x (channel-specific)

Module parameters: Idle mode channel x	
Function no.	Access to these module parameters is enabled via protocol-specific functions (see the manual for the bus node).
Description	Only relevant for certain fieldbus protocols. Idle mode channel x: Hold last state Idle state (presetting) Idle state channel x: Set output Reset output (presetting)
Note	With the aid of so-called Idle Mode parameterisation, you can specify which signal status the outputs are to assume when switching is made to the Idle state (also see CPX system manual). This parameter is not available with all fieldbus protocols.

Tab. 3/21: Idle mode channel x (channel-specific)

Module parameters: Force channel x	
Function no.	Access to these module parameters is enabled via protocol-specific functions (see the manual for the bus node).
Description	Force mode of outputs channel x: Blocked (presetting) Force state Force state of outputs channel x: Set signal Reset signal (presetting)
Note	The Force function enables the manipulation of signal states detached from actual operating states (also refer to the CPX system manual).

Tab. 3/22: Force channel x (channel-specific)

3.5 Diagnosis

Specific faults of the output modules are registered or suppressed depending on module parameterisation.

The faults are indicated locally via the Error LED and, if necessary, they can be evaluated with the handheld (MMI).

The faults are sent to the bus node (depending on module parameterisation), where they can be evaluated according to the fieldbus protocol used.

3.5.1 Error messages of the output modules

An output module can register the following standard faults:

Error number	Description	Error handling
2	**Fault short circuit/overload** Short circuit/overload at output. The reaction depends on the parameterisation "Behaviour after short circuit/overload at outputs (SCO)": – Setting "V_{OUT} remains switched off" (default): The output is switched off	1. Check actuators, eliminate short circuit/ overload (number of faulty channel: see LED display or module diagnostic data). 2. Depending on the parameterisation "Behaviour after short circuit/overload at outputs (SCO)": • Set output to 0, then set to 1 again or modify parameter "Behaviour after short circuit/overload at outputs (SCO)" to "V_{OUT} switch on again".
	only CPX-8DA: – Setting "V_{OUT} switch on again": The output current is limited to approx. 250 mA.	• If the output current is lower than 400 mA: The voltage will be switched on again **automatically** when the short circuit is eliminated. • If the output current is greater than 400 mA: Set output to 0, then set to 1 again.
	only CPX-8DA-H: – Setting "V_{OUT} switch on again"	• If the output current is lower than 2.1 mA: The voltage will be switched on again **automatically** when the short circuit is eliminated. • If the output current is greater than 2.5 A, the output begins to pulse. The frequency and duration of the pulse depend on temperature and overloading/current value (see "Technical specifications", chapter A.4)
5	**Fault in load voltage for outputs** Load voltage for outputs (V_{OUT}) missing or too low. [1)]	• Check the load voltage
[1)] Tolerance range of the load voltage supply V_{OUT} see "Technical specifications" in the appendix.		

Tab. 3/23: Error messages of the output modules

3.5.2 LED display

Various LEDs are situated under the transparent cover of the module for diagnosing the output modules.

1 Status LEDs (yellow): for allocation to outputs see the pin assignment of the module

2 Channel-related error LEDs (red)

3 Error LED (red) (Module error)

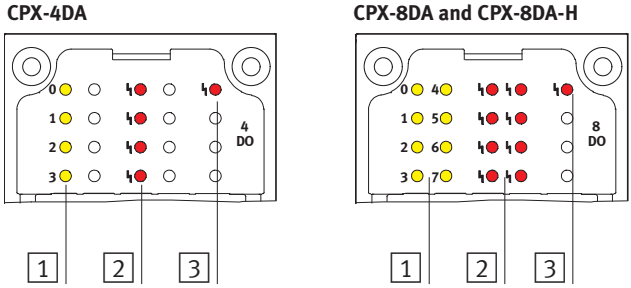


Fig. 3/1: LED display of the output modules (diagram on right shows CPX-8DA)

Status LEDs

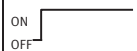
There is a yellow status LED for each output. This LED indicates the status of the signal at the relevant output. This means:

Status LED (yellow)	Procedure	Status
LED illuminates	ON / OFF	logical 1 (output supplies a 1-signal)
LED is off	ON / OFF	logical 0 (output supplies a 0-signal)

Tab. 3/24: Status LEDs of output modules

Channel-related error LEDs

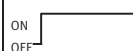
There is a red error LED for each output. This indicates a fault at the output due to short circuit or overload irrespective of the parameterisation.

Channel-related error LED (red)	Procedure	Status	Error number	Error handling
○ LED is off		Output without short circuit/ overload, trouble-free operation.	0	None
LED illuminates		**Fault short circuit/overload** Short circuit/overload at output.	2	See section 3.5.1, Tab. 3/23.

Tab. 3/25: Channel-related error LEDs of output modules

Error LED

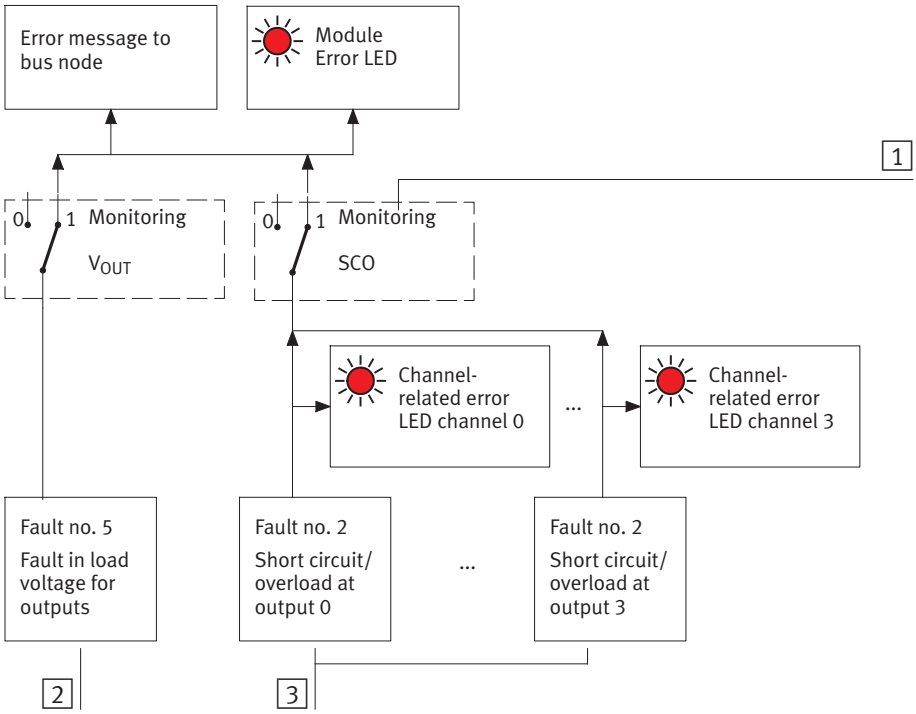
The red error LED indicates the following faults depending on parameterisation:

Error LED (red)	Procedure	Status	Error number	Error handling
○ LED is off		No module error has occurred.	0	None
LED illuminates		**Fault short circuit/overload** Short circuit/overload at output.	2	See section 3.5.1, Tab. 3/23.
		Fault in load voltage for outputs Load voltage for outputs (V_{OUT}) missing or too low.	5	

Tab. 3/26: Error LED of output modules

3.5.3 Error handling and parameterisation

The following diagram shows the error handling procedure in the output modules. Further registering and display of the faults can be suppressed as desired with the appropriate module parameters (represented in the diagram as switches). The parameters are described in section 3.4.



1 Module parameters (switch position represented = default setting)

2 Module-specific faults

3 Channel-specific faults

Fig. 3/2: Principle of error handling and parameterisation in the output modules

Digital CPX multi I/O modules

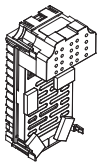
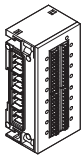
Chapter 4

Type CPX-8DE-8DA
CPX-L-8DE-8DA-16-KL-3POL

Contents

4.1 Function of multi I/O modules

Multi I/O modules provide digital inputs in the valve terminal for connecting sensors as well as digital outputs for connecting electric actuators and other current-consuming devices (valves, contactors, displays). At present the following type is available:

Type		Description
	CPX-8DE-8DA	Provides 8 digital inputs and 8 digital outputs (each as per IEC 61131-2 type 2, 24 V, positive logic – PNP).
	CPX-L-8DE-8DA-16-KL-3POL	Provides 8 digital inputs (as per IEC 61131-2 type 1, 24 V, positive logic – PNP) as well as 8 digital outputs (as per IEC 61131-2 , 24 V, positive logic – PNP). CPX-L modules do not have any exchangeable connection blocks.

Tab. 4/1: Overview of multi I/O modules

4.2 Assembly

See section 1.3.

4.3 Installation

Warning
Uncontrolled movements of the connected actuators and uncontrolled movements of loose tubing can cause injury to human beings or damage to property.

Before carrying out installation and maintenance work, switch off the following:

– Compressed air supply
– The operating and load voltage supplies.

In the following sections you will find the pin assignments of the multi I/O modules for the different connection blocks.

Instructions on connecting the cables and plugs to the connection blocks can be found in section 1.2.3.

Power supply

The 24 V supply for the electronics and the inputs of the Multi I/O modules is provided via the operating voltage supply for the electronics/sensors ($V_{EL/SEN}$).
The 24 V supply for the outputs is provided via the load voltage outputs of the CPX terminal (V_{OUT}).

Note
The CPX-L-8DE-8DA module internally connects the contact rails 0 $V_{EL/SEN}$ and 0 V_{OUT} of the CPX terminal.

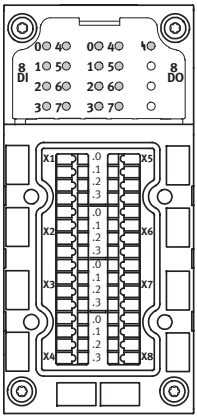
This means that the operating voltage supply for the electronics/sensors ($V_{EL/SEN}$) and the load voltage supply for the outputs (V_{OUT}) are no longer electrically isolated in the CPX terminal.

Basic information on the power supply arrangement of the CPX terminal can be found in the CPX system manual.

4.3.1 Multi I/O module CPX-8DE-8DA

Pin assignment CPX-8DE-8DA with connection block CPX-AB-8-KL-4POL

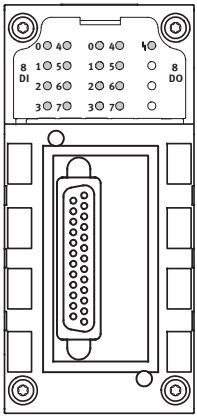
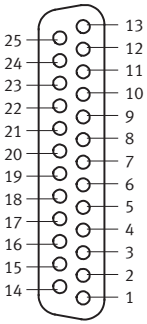
Multi I/O module type CPX-8DE-8DA with connection block CPX-AB-8-KL-4POL

Connection block	Pin assignment X1 to X4	LED	Pin assignment X5 to X8	LED
	X1.0: 24 V_{SEN} X1.1: 0 V_{SEN} X1.2: Ix X1.3: FE	 0 (E) 	X5.0: Ox+4 X5.1: 0 V_{OUT} X5.2: Ox X5.3: FE	4 (A) 0 (A)
	X2.0: Ix+4 X2.1: Ix+5 X2.2: Ix+1 X2.3: FE	4 (E) 5 (E) 1 (E) 	X6.0: Ox+5 X6.1: 0 V_{OUT} X6.2: Ox+1 X6.3: FE	5 (A) 1 (A)
	X3.0: 24 V_{SEN} X3.1: 0 V_{SEN} X3.2: Ix+2 X3.3: FE	 2 (E) 	X7.0: Ox+6 X7.1: 0 V_{OUT} X7.2: Ox+2 X7.3: FE	6 (A) 2 (A)
	X4.0: Ix+6 X4.1: Ix+7 X4.2: Ix+3 X4.3: FE	6 (E) 7 (E) 3 (E) 	X8.0: Ox+7 X8.1: 0 V_{OUT} X8.2: Ox+3 X8.3: FE	7 (A) 3 (A)
	Ix = Input x Ox = Output x FE = Functional earth			

Tab. 4/2: Pin assignment of multi I/O module type CPX-8DE-8DA with connection block CPX-AB-8-KL-4POL

Pin assignment of CPX-8DE-8DA with connection block CPX-AB-1-SUB-BU-25POL

Multi I/O module type CPX-8DE-8DA with connection block CPX-AB-1-SUB-BU-25POL

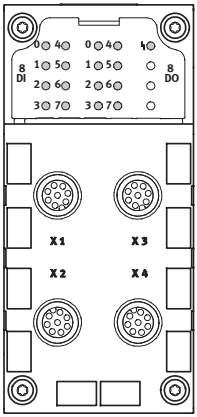
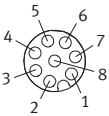
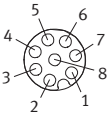
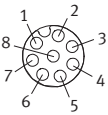
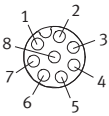
Connection block	Pin assignment		LED	Pin assignment	LED
		1: Ix 2: Ix+1 3: Ix+2 4: Ix+3 5: Ix+4 6: Ix+5 7: Ix+6 8: Ix+7 9: 24 V_{SEN} 10: 24 V_{SEN} 11: 0 V_{SEN} 12: 0 V_{SEN} 13: FE	0 (E) 1 (E) 2 (E) 3 (E) 4 (E) 5 (E) 6 (E) 7 (E)	14: Ox 15: Ox+1 16: Ox+2 17: Ox+3 18: Ox+4 19: Ox+5 20: Ox+6 21: Ox+7 22: 0 V_{OUT} 23: 0 V_{OUT} 24: 0 V_{OUT} 25: FE Housing: FE	0 (A) 1 (A) 2 (A) 3 (A) 4 (A) 5 (A) 6 (A) 7 (A)
	Ix = Input x Ox = Output x FE = Functional earth				

Tab. 4/3: Pin assignment of multi I/O module type CPX-8DE-8DA with connection block CPX-AB-1-SUB-BU-25POL

Pin assignment CPX-8DE-8DA with connection block CPX-AB-4-M12-8POL

Note
In the multi I/O module CPX-8DE-8DA with connection block CPX-AB-4-M12-8POL the inputs Ix+4 and Ix+6 are available on sockets X1 and X3 resp. X2 and X4 (connected internally).

Multi I/O module type CPX-8DE-8DA with connection block CPX-AB-4-M12-8POL

Connection block	Pin assignment X1, X2		LED	Pin assignment X3, X4		LED
	 X1	Socket X1: 1: 24 V_{SEN} 2: Ix 3: Ix+1 4: 0 V_{SEN} 5: Ox 6: Ox+1 7: Ix+4 8: 0 V_{OUT}	 0 (E) 1 (E) 0 (A) 1 (A) 4 (E)	 X3	Socket X3: 1: 24 V_{SEN} 2: Ix+4 3: Ix+5 4: 0 V_{SEN} 5: Ox+4 6: Ox+5 7: n.c. 8: 0 V_{OUT}	 4 (E) 5 (E) 4 (A) 5 (A)
	X2 	Socket X2: 1: 24 V_{SEN} 2: Ix+2 3: Ix+3 4: 0 V_{SEN} 5: Ox+2 6: Ox+3 7: Ix+6 8: 0 V_{OUT}	 2 (E) 3 (E) 2 (A) 3 (A) 6 (E)	X4 	Socket X4: 1: 24 V_{SEN} 2: Ix+6 3: Ix+7 4: 0 V_{SEN} 5: Ox+6 6: Ox+7 7: n.c. 8: 0 V_{OUT}	 6 (E) 7 (E) 6 (A) 7 (A)
	Ix = Input x Ox = Output x n.c. = Not connected					

Tab. 4/4: Pin assignment of multi I/O module type CPX-8DE-8DA with connection block CPX-AB-4-M12x2-5POL

Sockets X1 to X4 are designed for connecting cylinder-valve combinations type DNCV with connecting cable type KM12-8GD8GS-2-PU.

Note

Inputs Ix+4 and Ix+6 are provided both at pin 7 of sockets X1 and X2 as well as at pin 2 of sockets X3 and X4.

The cylinder-valve combination type DNCV **with** diagnostic module **and** activated diagnostic output supplies an inverted diagnostic signal (1-signal = no fault) at pin 7.

Therefore, when cylinder-valve combinations type DNCV **with** diagnostic module **and** activated diagnostic output are connected to sockets X1 and X2, pin 2 at sockets X3 and X4 cannot be used.

4.3.2 Multi I/O module CPX-**L**-8DE-8DA-...

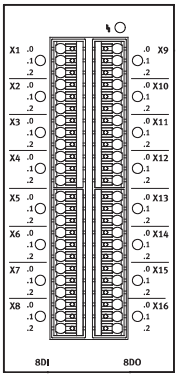
CPX-L modules do not have any exchangeable connection blocks.

Note
When using 2-wire sensors the residual current at “log. 0” must be smaller than the standard value as per IEC61131-2 type 1. $V_{Ix,\ Ix+1,...} < 5$ V: $I_{residual} < 500$ µA.

- Observe the instructions for power supply in section 4.3.

Pin assignment CPX-L-8DE-8DA-...

I-module type CPX-L-8DE-8DA-16-KL-3POL

Connection block	Pin assignment X1 to X8	Pin assignment X9 to X16
	X1.0: 24 V_{SEN} X1.1: Ix X1.2: 0 V_{SEN} X2.0: 24 V_{SEN} X2.1: Ix+1 X2.2: 0 V_{SEN} X3.0: 24 V_{SEN} X3.1: Ix+2 X3.2: 0 V_{SEN} X4.0: 24 V_{SEN} X4.1: Ix+3 X4.2: 0 V_{SEN} X5.0: 24 V_{SEN} X5.1: Ix+4 X5.2: 0 V_{SEN} X6.0: 24 V_{SEN} X6.1: Ix+5 X6.2: 0 V_{SEN} X7.0: 24 V_{SEN} X7.1: Ix+6 X7.2: 0 V_{SEN} X8.0: 24 V_{SEN} X8.1: Ix+7 X8.2: 0 V_{SEN}	X9.0: 24 V_{SEN} X9.1: Ox X9.2: 0 V_{OUT} X10.0: 24 V_{SEN} X10.1: Ox+1 X10.2: 0 V_{OUT} X11.0: 24 V_{SEN} X11.1: Ox+2 X11.2: 0 V_{OUT} X12.0: 24 V_{SEN} X12.1: Ox+3 X12.2: 0 V_{OUT} X13.0: 24 V_{SEN} X13.1: Ox+4 X13.2: 0 V_{OUT} X14.0: 24 V_{SEN} X14.1: Ox+5 X14.2: 0 V_{OUT} X15.0: 24 V_{SEN} X15.1: Ox+6 X15.2: 0 V_{OUT} X16.0: 24 V_{SEN} X16.1: Ox+7 X16.2: 0 V_{OUT}
	Ix = Input x	Ox = Output x, 24 V_{SEN} is not required for the outputs

Tab. 4/5: Pin assignment of I-module type CPX-L-8DE-8DA-...

4.4 Instructions on commissioning

The behaviour of I/O modules can be parameterised. The table below gives an overview of the parameters.

Further information about parameterisation can be found in the CPX system manual or in the manual for the bus node.

4.4.1 Parameters of the multi I/O modules type CPX-8DE-8DA

Module parameters: Monitoring the CPX module		
Function no.	4828 + m * 64 + 0 m = module number (0 ... 47)	
Description	Monitoring of possible faults can be activated or deactivated (suppressed) for each module independently. Active monitoring causes the following. The fault is: – Sent to the CPX bus node – Displayed by the module common error LED.	
	Monitoring Bit Description 0 Short circuit/overload in sensor supply (SCS) 1 Short circuit/overload at the outputs (SCO) 2 Undervoltage at outputs (V_{OUT})	[Monitor] [Monitor SCS] [Monitor SCO] [Monitor Vout]
Values	1 = active (presetting) 0 = inactive	[Active] [Inactive]
Note	Monitoring can also be set for the complete CPX terminal (see “System parameter monitoring”).	

Tab. 4/6: Monitoring the CPX module

Module parameters: Behaviour after short circuit/overload		
Function no.	4828 + m * 64 + 1 m = module number (0 ... 47)	
Description	Determines after a short circuit in the sensor supply or the outputs whether the power is to remain switched off or whether it is to be switched on again automatically.	
	Behaviour after short circuit/overload Bit Description 0 Short circuit/overload in sensor supply (SCS) 1 Short circuit/overload at the outputs (SCO)	[Behaviour after] [Behaviour after SCS] [Behaviour after SCO]
Values	0 = V_{SEN}/V_{OUT} remains switched off 1 = V_{SEN}/V_{OUT} switch on again Presetting: Bit 0: V_{SEN}/V_{OUT} switch on again; Bit 1: V_{SEN}/V_{OUT} remains switched off	[Leave switched off] [Resume]
Note	With the setting "$V_{SEN/OUT}$ remains switched off", Power On/Off or Set/Reset is required to restore power. Check which setting is necessary for reliable operation of your system. Detailed description under Diagnosis, Tab. 4/15.	

Tab. 4/7: Behaviour after short circuit/overload

Module parameters: Input debounce time		
Function no.	4828 + m * 64 + 1 m = module number (0 ... 47)	
Description	Determines when a change of edge of the sensor signal on this module is to be accepted as a logical input signal.	
Bit	Bit 4, 5	
Values Bit 5 4 0 0 0 1 1 0 1 1	Input debounce time Description 0.1 ms 3 ms (presetting) 10 ms 20 ms	[Debounce time]
Note	Input debounce times are specified in order to eliminate interfering changes of signal edge during switching procedures (bouncing of the input signal). This setting applies to all inputs of the module. Further information on this parameter can be found in the CPX system manual.	

Tab. 4/8: Input debounce time

Module parameters: Signal extension time		
Function no.	4828 + m * 64 + 1 m = module number (0 ... 47)	
Description	Determines the signal extension time for the relevant I-module. Signal states accepted as logical input signals usually remain valid at least until the specified signal extension time (minimum signal duration) has expired. Changes of edge within the extension time are ignored.	
Bit	Bit 6, 7	
Values Bit 7 6 0 0 0 1 1 0 1 1	Signal extension time Description 0.5 ms 15 ms (presetting) 50 ms 100 ms	[Signal extension]
Note	There is a danger that short signals are not “recognised” due to long cycle times of the higher-order controller. In order for such signals to also be taken into consideration in the control sequence, a signal extension time can be specified (see CPX system manual). The signal extension time can be activated channel-by-channel (see channel-specific module parameters).	

Tab. 4/9: Signal extension time

Module parameters: Signal extension channel x		
Function no.	4828 + m * 64 + 6 m = module number (0 ... 47)	
Description	Determines whether the signal extension for the relevant I-channel is to be enabled or blocked.	
Bit	Bit 0 ... 7 (channel 0 ... 7)	
Values	Signal extension input channel ... 0 = blocked (presetting) 1 = enabled	[Signal extension Inp Ch ...] [Disabled] [Enabled]
Note	The signal extension time can be specified separately for each module (see function no. 4828 + n; n = m * 64 + 1).	

Tab. 4/10: Signal extension channel x (channel-specific)

Module parameter: Fail safe channel x	
Function no.	Access to these module parameters is enabled via protocol-specific functions (see the manual for the bus node).
Description	Fault mode channel x: Hold last state Fault state (presetting) Fault state channel x: Set output Reset output (presetting)
Note	With the aid of so-called Fail Safe parameterisation, you can specify which signal status the outputs are to assume in the event of fieldbus communication errors (also see CPX system manual).

Tab. 4/11: Fail Safe channel x (channel-specific)

Module parameters: Idle mode channel x	
Function no.	Access to these module parameters is enabled via protocol-specific functions (see the manual for the bus node).
Description	Only relevant for certain fieldbus protocols. Idle mode channel x: Hold last state Idle state (presetting) Idle state channel x: Set output Reset output (presetting)
Note	With the aid of so-called Idle Mode parameterisation, you can specify which signal status the outputs are to assume when switching is made to the Idle state (also see CPX system manual). This parameter is not available with all fieldbus protocols.

Tab. 4/12: Idle mode channel x (channel-specific)

Module parameters: Force channel x	
Function no.	Access to these module parameters is enabled via protocol-specific functions (see the manual for the bus node).
Description	Force mode of inputs channel x: Blocked (presetting) Force state Force state of inputs channel x: Set signal Reset signal (presetting) Force mode of outputs channel x: Blocked (presetting) Force state Force state of outputs channel x: Set signal Reset signal (presetting)
Note	The Force function enables the manipulation of signal states detached from actual operating states (also refer to the CPX system manual).

Tab. 4/13: Force channel x (channel-specific)

4.5 Diagnosis

Specific faults of the multi I/O modules are registered or suppressed depending on module parameterisation.

The faults are indicated locally via the Error LED and, if necessary, they can be evaluated with the handheld (MMI).

The faults are sent to the bus node (depending on module parameterisation), where they can be evaluated according to the fieldbus protocol used.

4.5.1 Error messages of the multi I/O modules

A multi I/O module can register the following standard faults:

Error number	Description	Error handling
2	**Fault short circuit/overload** – Short circuit/overload in sensor supply ($V_{EL/SEN}$). or (see continuation)	1. Eliminate short circuit/overload or check connected sensors 2. Depending on the parameterisation "Behaviour after short circuit/overload in sensor supply (SCS)": • Setting "V_{SEN} switch on again": Power supply for sensors will be switched on again **automatically** when the short circuit is eliminated. • Setting "V_{SEN} remains switched off": – Power Off/On necessary or – modify parameter "Behaviour after short circuit/overload at sensor supply (SCS)" to "V_{SEN} switch on again".

Tab. 4/14: Error messages of the multi I/O modules – part 1

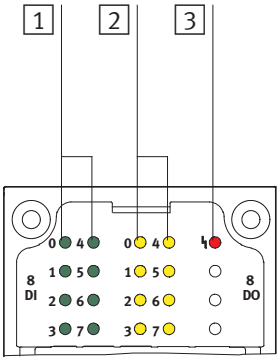
Error number	Description	Error handling
2 (continuation)	**Fault short circuit/overload** Short circuit/overload at output. The reaction depends on the parameterisation “Behaviour after short circuit/overload at outputs (SCO)”: – Setting “V_{OUT} remains switched off” (default): The output is switched off – Setting “V_{OUT} switch on again”: The output current is limited to approx. 250 mA.	1. Check actuators, eliminate short circuit/ overload (number of faulty channel: see module diagnostic data). 2. Depending on the parameterisation “Behaviour after short circuit/overload at outputs (SCO)”: • Set output to 0, then set to 1 again or modify parameter “Behaviour after short circuit/overload at outputs (SCO)” to “V_{OUT} switch on again”. • If the output current is lower than 400 mA: The voltage will be switched on again **automatically** when the short circuit is eliminated. If the output current is greater than 400 mA: Set output to 0, then set to 1 again.
5	**Fault in load voltage for outputs** Load voltage for outputs (V_{OUT}) missing or too low. [1]	• Check the load voltage
[1] Tolerance range of the load voltage supply V_{OUT} see “Technical specifications” in the appendix.		

Tab. 4/15: Error messages of the multi I/O modules – part 2

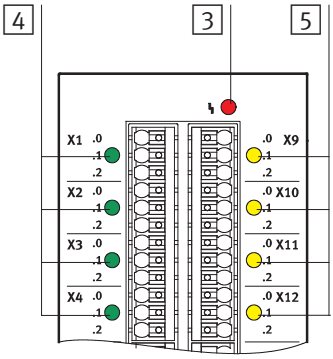
Note
Please note when using the multi I/O modules:
– If there is a short circuit, all sensor supplies will be switched off **together**.
– Providing it is not programmed otherwise, the sensor supply voltage will be switched on again **automatically** when the short circuit is eliminated.

4.5.2 LED display

Various LEDs for diagnosing the multi I/O modules are situated under the transparent cover of the module. The LEDs are located directly next to the ports for channel-oriented diagnostics of the CPX-L multi I/O modules.



CPX-8DE-8DA



CPX-L-8DE-8DA-16-KL-...

1 Status LEDs (green): for assignment to the inputs see the pin assignment of the module

2 Status LEDs (yellow): for allocation to outputs see the pin assignment of the module

3 Error LED (red): Module fault

4 Status LEDs (green) for the inputs

5 Status LEDs (yellow) for the outputs

Fig. 4/1: LED display of the multi I/O modules

Status LEDs (green)

There is a green status LED for each input. This LED indicates the status of the signal at the relevant input. This means:

Status LED (green)	Procedure	Status
 LED illuminates		logical 1 (signal present)
 LED is off		logical 0 (signal not present)

Tab. 4/16: Status LEDs for the inputs of the multi I/O modules

Status LEDs (yellow)

There is a yellow status LED for each output. This LED indicates the status of the signal at the relevant output. This means:

Status LED (yellow)	Procedure	Status
 LED illuminates		logical 1 (output supplies a 1-signal)
 LED is off		logical 0 (output supplies a 0-signal)

Tab. 4/17: Status LEDs for the outputs of the multi I/O modules

Error LED

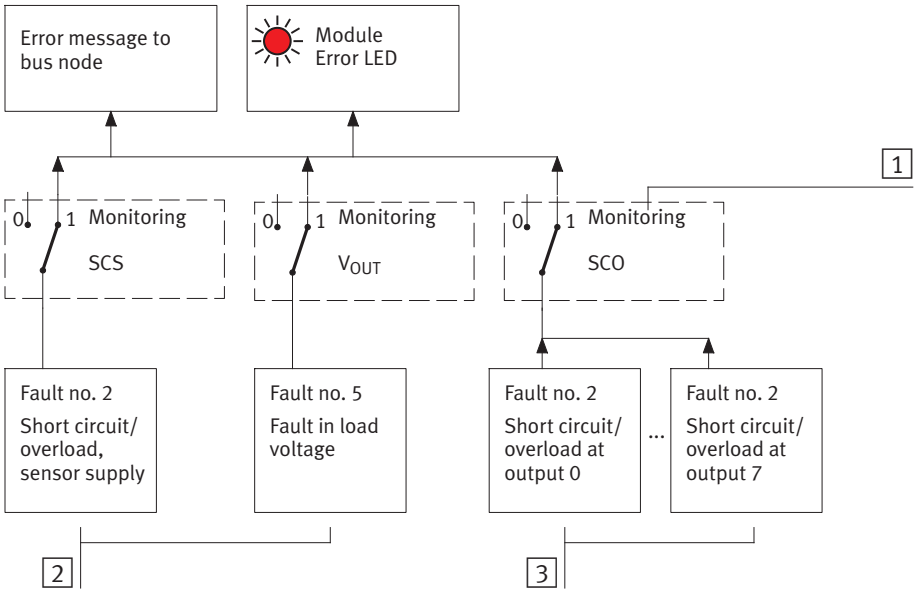
The red error LED indicates the module fault “Short circuit/ overload in sensor supply” and faults which refer to individual outputs, e.g. due to short circuit or overload.

Error LED (red)	Procedure	Status	Error number	Error handling
○ LED is off		Trouble-free operation.	0	None
 LED illuminates		**Fault short circuit/overload** – Short circuit/overload in sensor supply ($V_{EL/SEN}$) or – Short circuit/overload at at least one output	2	See section 4.5.1, Tab. 4/14 and Tab. 4/15.
		Fault in load voltage for outputs Load voltage for outputs (V_{OUT}) missing or too low.	5	

Tab. 4/18: Error LED of multi I/O modules

4.5.3 Error handling and parameterisation

The following diagram shows the error handling procedure in the multi I/O modules. Further registering and display of the faults can be suppressed as desired with the appropriate module parameters (represented in the diagram as switches). The parameters are described in section 4.4.



1 Module parameters (switch position represented = default setting)

2 Module-specific faults

3 Channel-specific faults

Fig. 4/2: Principle of error handling and parameterisation in the multi I/O modules

CPX pneumatic interfaces

Chapter 5

Type VMPA-FB-EPL-...
VMPAF-FB-EPL-PS
VMPAL-EPL-CPX

VABA-S6-1-X1
VABA-S6-1-X2

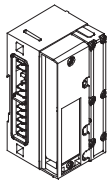
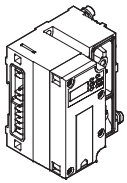
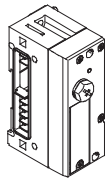
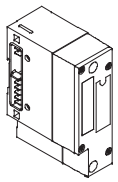
CPX-GP-03-4.0

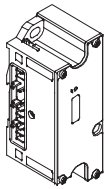
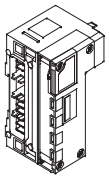
CPX-GP-CPA-10
CPX-GP-CPA-14

Contents

5.1 Function of the CPX pneumatic interfaces

The CPX pneumatic interfaces in a CPX valve terminal provide the connection to the pneumatic modules.
The pneumatic modules enable pneumatic actuators to be controlled by means of the valves fitted.

Pneumatic interfaces	Type designation	Description	Connection to Pneumatics
	– VMPA-FB-EPL-... – VMPA-FB-EPLM-...	CPX pneumatic interface to MPA CPX pneumatic interface to MPA (CPX metal)	Pneumatic interface for connecting the modular electrical peripherals of type 50 (CPX) to valve terminals type 32/33 (MPA-S, MPA-F)
	– VMPAF-FB-EPL-PS	CPX pneumatic interface to MPA with integrated pressure sensor	Pneumatic interface with integrated pressure sensor for connecting the modular electrical peripherals (type 50) CPX to valve terminals type 33 (MPA-F)
	– VMPAL-EPL-CPX	CPX pneumatic interface to MPA-L	Pneumatic interface for connecting the modular electrical peripherals of type 50 (CPX) to valve terminals type MPA-L
	– VABA-S6-1-X1 – VABA-S6-1-X2	CPX pneumatic interface for VTSA pneumatics (ISO, type 44) ...-X2: Metal design	Pneumatic interface for connecting the modular electrical peripherals of type 50 (CPX) to VTSA/ISO valves (type 44)

Pneumatic interfaces	Type designation	Description	Connection to Pneumatics
	– CPX-GP-03-4.0	CPX pneumatic interface to Midi/Maxi	Pneumatic interface for connecting the modular electrical periphery type 50 (CPX) to valve terminals type 03 (Midi/Maxi).
	– CPX-GP-CPA-10 – CPX-GP-CPA-14	CPX pneumatic interface to CPA10 CPX pneumatic interface to CPA14	Pneumatic interface for connecting the modular electrical periphery type 50 (CPX) to valve terminals type 12 (CPA).

Tab. 5/1: Overview of pneumatic interfaces

MPA-S, MPA-F pneumatics

From a technical point of view, the individual MPA-S and MPA-F pneumatic modules each represent an electric module with e.g. 8 digital outputs for controlling the valves fitted (see manual P.BE-MPA-ELEKTRONIK-...).

→

Note
The pneumatic interface VMPA...-FB-EPL-... for MPA pneumatics provides the mechanical and electrical connection to the MPA pneumatic modules.
With regards to the CPX terminal it does not count as an electric module.

MPA-L, VTSA, Midi/Maxi or CPA pneumatics

With regards to the CPX terminal the pneumatic interfaces for MPA-L, VTSA, Midi/Maxi or CPA pneumatics represent an electrical module with a variable number of digital outputs for triggering the built-in valves.

5.1.1 Display and connecting elements

MPA pneumatic interface

The pneumatic interface for MPA-S and MPA-F pneumatics (type 32/33) possesses the following display and connecting elements:

1 Connecting plug to the MPA pneumatic modules

2 Inscription panel

3 Connecting plug to the CPX interlinking blocks

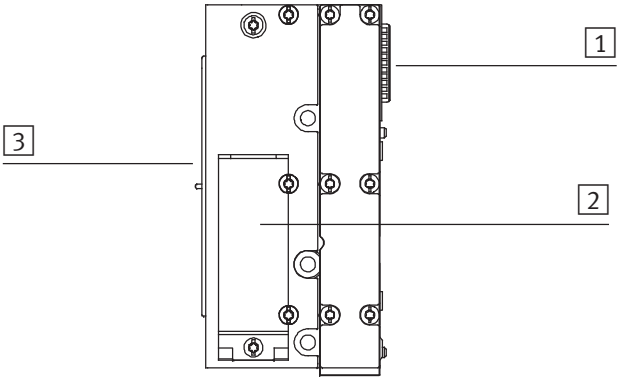


Fig. 5/1: Display and connecting elements of the pneumatic interface for MPA-S and MPA-F pneumatics (type VMPA...-FB-EPL-...)

MPA-L pneumatic interface

See the pneumatics manual for MPA-L (P.BE-MPAL-...).

MPA pneumatic interface with pressure sensor

The pneumatic interface for MPA-F pneumatics (type 33) with integrated pressure sensor possesses the following display and connecting elements:

1 Pneumatic interface

2 Red LED: Pressure fallen below

3 Display

4 Green LED: Pressure conformed to

5 Red LED: Pressure exceeded

6 Red LED: Common error display

7 Yellow LED “bar”: Value in display shown in bar

8 Yellow LED “psi”: Value in display shown in psi

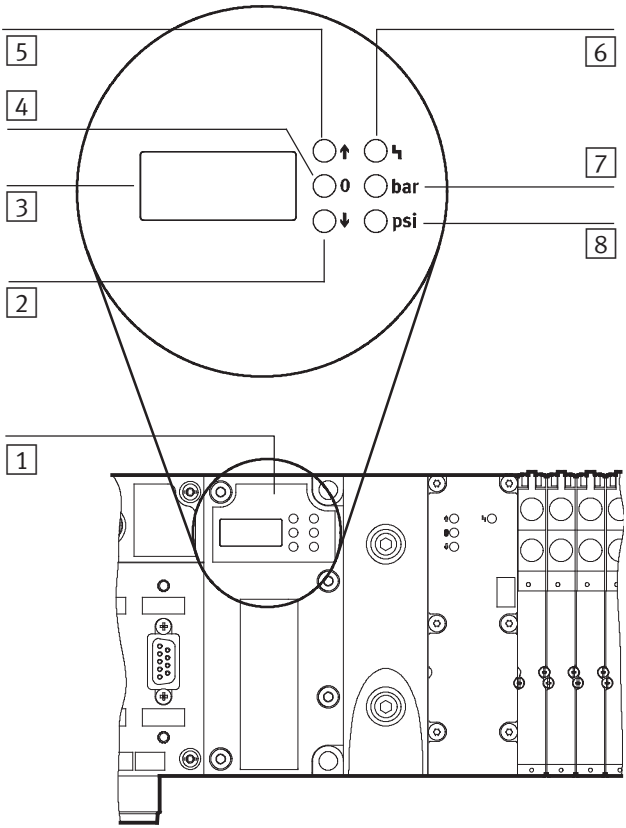


Fig. 5/2: Display and connecting elements of the MPA-F pneumatic interface with pressure sensor (type VMPAF-FB-EPL...-PS)

VTSA pneumatics (ISO)

The pneumatic interface for VTSA pneumatics (ISO, type 44) possesses the following display and connecting elements:

1 Connecting plug to the VTSA pneumatic modules

2 Error LED (red)

3 Inscription panel

4 DIL switch under a transparent cover

5 Connecting plug to the CPX interlinking blocks

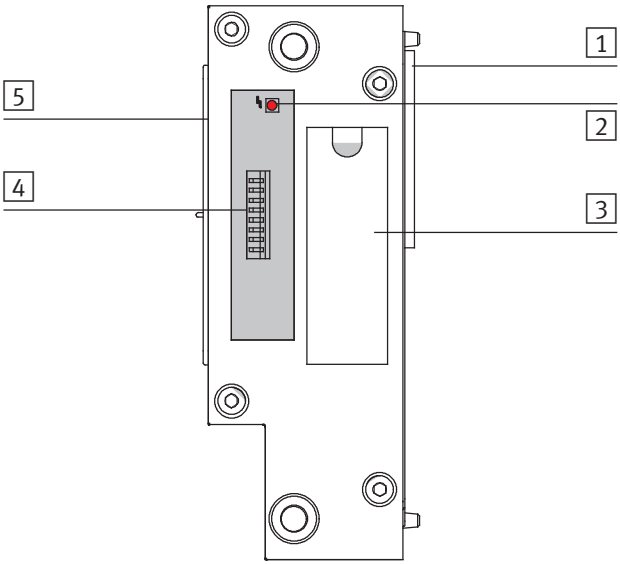


Fig. 5/3: Display and connecting elements of the pneumatic interface for ISO pneumatics

Midi/Maxi or CPA pneumatics

The pneumatic interfaces for Midi/Maxi or CPA pneumatics possess the following display and connecting elements:

1. Pneumatic interface for Midi/Maxi pneumatics (type 03)
2. Pneumatic interface for CPA pneumatics (type 12 – here size 10)
3. Connecting plug for the valves
4. Fault LED (red)
5. DIL switch under a transparent cover
6. Inscription fields
7. Connecting plug to the CPX interlinking blocks

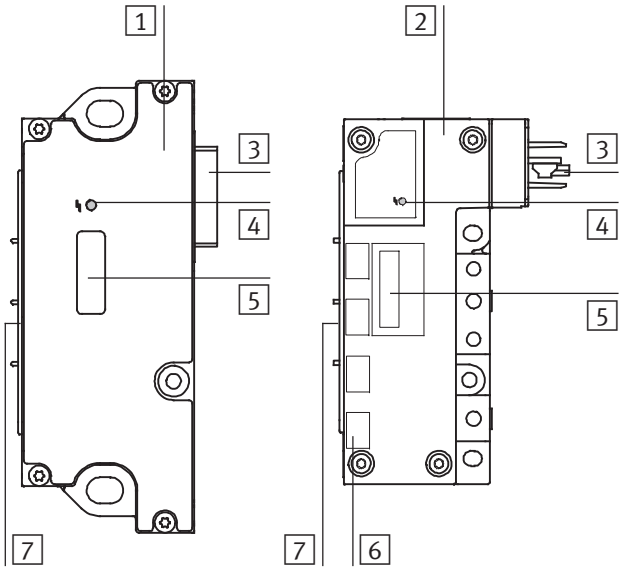


Fig. 5/4: Display and connecting elements of the pneumatic interface for Midi/Maxi or CPA pneumatics

Use identification labels type IBS 6x10 for marking the pneumatic interface for CPA pneumatics.

5.2 Assembly

Warning
Uncontrolled movements of the connected actuators and uncontrolled movements of loose tubing can cause injury to human beings or damage to property.

Before carrying out installation and maintenance work, switch off the following:

– Compressed air supply
– The operating and load voltage supplies.

Expanding or converting the CPX terminal:
Depending on the version of the CPX terminal, pneumatic interfaces are either screwed in place or secured with tie rods. Further information can be found under the “Assembly” chapter in the **CPX system manual**.
For information regarding assembly of the pneumatic modules please refer to the appropriate **pneumatics manual**.

For Midi/Maxi, CPA or ISO pneumatic interfaces:
The setting of the DIL switches for configuring the pneumatics (valves used) can be set on the CPX terminal without the need to dismantle the terminal.

5.3 Settings for configuring the pneumatics

Midi/Maxi, CPA or VTSA pneumatics

Settings for configuring the pneumatics are only necessary with the pneumatic interfaces for Midi/Maxi, CPA and VTSA pneumatics (ISO).

No settings are required for MPA pneumatics.

Caution
After conversion or extension of the Midi/Maxi, CPA or VTSA pneumatics, the number of output addresses occupied by the pneumatics must be set on a DIL switch on the pneumatic interface.

CPX terminals can be fitted with various valves and electric modules in accordance with the customer's wishes.

The size of the valve address range on Midi/Max, CPA or VTSA pneumatics is not modified when the valves are extended or converted, providing sufficient address space has already been reserved for the extension. The valve address range must be set with a DIL switch. The DIL switch is situated under the transparent cover on the pneumatic interface.

Warning
Uncontrolled movements of the connected actuators and uncontrolled movements of loose tubing can cause injury to human beings or damage to property.

Before carrying out installation and maintenance work, switch off the following:

– Compressed air supply
– The operating and load voltage supplies.

Caution
Inappropriate handling can result in damage to the modules.

- Do not touch any components.
- Observe the handling specifications for electrostatic sensitive devices.
- Discharge yourself before installing or removing sub-assemblies to protect the sub-assemblies from static discharges.

Note
Handle all modules and components of the CPX terminal with great care. Pay particular attention to the following:

- Screws must be fitted exactly (otherwise threads will be damaged).
  Screws should only be secured by hand. Screws must be fitted so that the self-cutting threads can be used.
- The specified torques must be observed.
- Threaded connections must be mounted free of offset and mechanical tension.
- Check the seals for damage (IP65).
- Connecting surfaces must be clean (to ensure sealing effect, avoid leakage and contact faults).

The screw connection between the cover and the lower part of the CPA pneumatic interface is designed for at least 10 fitting/removal cycles.

Removing the cover

1. Loosen the screws in the cover with a TORX screwdriver size T10.
2. Lift the cover up carefully.

3. Set the DIL switch elements in accordance with the following table. Use a suitable tool, e.g. a small screwdriver, for setting the DIL switches.

1 Printed circuit board

2 Error LED

3 DIL switches for configuring the pneumatics

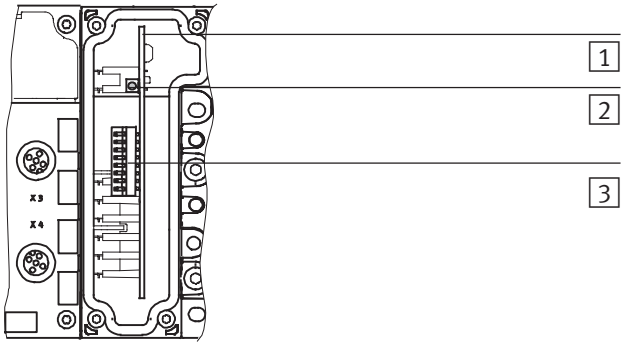


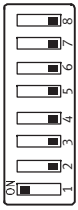
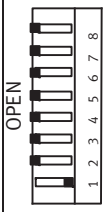
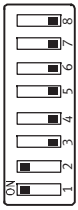
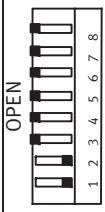
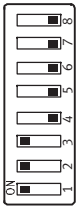
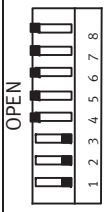
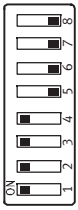
Fig. 5/5: DIL switches on the pneumatic interface (here for CPA pneumatics)

The DIL switch contains 8 switch elements. These switch elements are numbered from 1...8. The positions OPEN (CPA, VTSA/ISO) or ON (Midi/Maxi) are marked.

Rules for setting

- If the number of valve solenoid coils fitted is less than the number of output addresses set with the DIL switch, the superfluous addresses will be reserved for later extensions (if the maximum number of valves is fitted, output addresses will then remain unused).
- Modifications to the configuration will not become effective until the operating voltage is switched on again.
- 8 further output addresses per switch element will be assigned for valves in the address range.
- The setting of the highest-value DIL switch in the ON (closed) position is decisive for the assigned address range.

Setting the DIL switch

DIL switch setting				Assigned addresses
Midi/maxi	**CPA**	**VTSA/ISO**	**Switch**	
			8: Reserved 7: Reserved 6: Reserved 5: Reserved 4: OFF/OPEN 3: OFF/OPEN 2: OFF/OPEN 1: ON/CLOSED	8 outputs for valves
			8: Reserved 7: Reserved 6: Reserved 5: Reserved 4: OFF/OPEN 3: OFF/OPEN 2: ON/CLOSED 1: Any	16 outputs for valves
			8: Reserved 7: Reserved 6: Reserved 5: Reserved 4: OFF/OPEN 3: ON/CLOSED 2: Any 1: Any	24 outputs for valves (factory setting for CPA [1]) – With CPA: only 22 can be used [2]
	Setting not permitted		8: Reserved 7: Reserved 6: Reserved 5: Reserved 4: ON/CLOSED 3: Any 2: Any 1: Any	32 outputs for valves (factory setting for Midi/Maxi and VTSA/ISO[1]) – With Midi/Maxi: only 26 can be used [2]

[1] Depending on the equipment fitted on the CPX and the bus node, see following note
[2] Additionally occupied output addresses remain unused

Tab. 5/2: DIL switch setting

Note
In the case of fieldbus protocols with which, due to the limiting of the address range, the setting “32 outputs” (VTSA/ISO or Midi/Maxi) or “24 outputs” (CPA) together with the CPX equipment fittings would lead to an error, the DIL switches have been set at the factory according to the actual number of valve solenoid coils.

Note
DIL switch settings which are not represented are not permitted!

Fitting the cover

1. Check the seal and the surface opposite it for damage or dirt. If necessary, the seal must be replaced (only with type CPX-GP-03-4.0) or the surfaces must be cleaned.

2. Place the cover carefully into position so that the seal is not damaged.
   With type CPX-GP-CPA-...: Only tighten the screws by hand. Place the screws so that the self-cutting threads can be used.

3. Tighten the screws in diagonally opposite sequence with a TORX screwdriver size T10. Observe the tightening torques listed in the table below:

Pneumatic interface	Tightening torque
Midi/Maxi (type CPX-GP-03-4.0)	1.0 ... 1.3 Nm
VTSA (type VABA-S6-1-X1/-X2)	1.2 ... 1.8 Nm
CPA (type CPX-GP-CPA-...)	0.9 ... 1.1 Nm

Tab. 5/3: Tightening torques for the pneumatic interfaces (cover)

5.4 Installation

Instructions on installing the pneumatic components can be found in the relevant pneumatics manual.
Instructions on installing the electric components can be found in the CPX system manual.
Instructions on addressing the valve solenoid coils as well as further instructions on installing the electric components can be found in the relevant bus node manual.

Power supply

The 24 V supply for the valves is provided via the load voltage for the valves of the CPX terminal (V_{VAL}).

The power supply for the electronics of the pneumatic interfaces is provided via the operating voltage supply for the electronics/sensors ($V_{EL/SEN}$).

Address assignment within the pneumatic modules

Instructions on assigning the addresses to the individual valve solenoid coils with Midi/Maxi or CPA pneumatics can be found in the appropriate pneumatics manual.

Instructions on assigning the addresses to the individual valve solenoid coils with MPA pneumatic modules can be found in the manual P.BE-MPA-ELEKTRONIK-...

Protection class

When completely fitted, the pneumatic interfaces with the valve terminal pneumatics comply with protection class IP65 (see Appendix A.6).

5.5 Instructions on commissioning, parameterisation

Midi/Maxi, CPA or VTSA pneumatics

The behaviour of the pneumatic interface for Midi/Maxi, CPA or VTSA pneumatics can be parameterised. The table below provides an overview of the parameters for these pneumatic interfaces.

Parameterisation of the MPA pneumatics is effected via the individual MPA pneumatic modules (module-orientated, see manual P.BE-MPA-ELEKTRONIK-...).

Further information about parameterisation can be found in the CPX system manual P.BE-CPX-SYS-... and in the manual for the bus node or control block.

Note

Only activate wire-fracture monitoring for outputs which also have a valve solenoid coil.

If wire-fracture monitoring is activated for an output which does not have a valve solenoid coil, the CPX terminal will register the fault “Wire fracture” when it is switched on, due to the valve solenoid coil being incorrectly registered as defective.

Parameters of the MPA pneumatic interface with integrated pressure sensor type VMPAF-FB-EPL-PS

Parameterisation of the MPA pneumatic interface with integrated pressure sensor corresponds to parameterisation of the MPA pressure sensor plate VPMA-FB-PS-...
Further information can be found in the MPA electronics manual P.BE-MPA-ELEKTRONIK-...

Parameters of pneumatic interfaces type CPX-GP-03-4.0, CPX-GP-CPA-... and VABA-S6-1-X...

Module parameters: Monitoring the CPX module		
Function no.	4828 + m * 64 + 0 m = module number (0 ... 47)	
Description	Monitoring of possible faults can be activated or deactivated (suppressed) for each module independently. Active monitoring causes the following. The fault is: – Sent to the CPX bus node – Displayed by the module common error LED.	
	Monitoring Bit Description 2 Undervoltage of valves (V_{VAL}) 3 Short circuit at the valve (SCV)	[Monitor] [Monitor Vval] [Monitor SCV]
Values	1 = active 0 = inactive Presetting: Bit 2: active; bit 3: inactive	[Active] [Inactive]
Note	Monitoring can also be set for the complete CPX terminal (see CPX system manual).	
[...] = display in the Handheld		

Tab. 5/4: Monitoring the CPX module

Module parameters: **Monitoring wire fracture channel x (only CPA and VTSA pneumatics)**		
Function no. - channel 0 ... 7: - channel 8 ... 15: - channel 16 ... 23: - channel 24 ... 31:	 4828 + m * 64 + 6 4828 + m * 64 + 7 4828 + m * 64 + 8 4828 + m * 64 + 9	 m = module number (0 ... 47)
Description	Determines whether Monitoring Wire Fracture for the relevant channel is active or inactive (CPA: Channel 0 ... 21, VTSA/ISO: Channel 0 ... 31).	
	Monitoring wire fracture output channel ... 0 = inactive (presetting) 1 = active	[Monitor open circuit Out Ch ...] [Inactive] [Active]
Note	With Monitoring Wire Fracture, a missing valve or a wire fracture (connection fault between the pneumatic interface and the valve coil) is recognised.	
[...] = display in the Handheld		

Tab. 5/5: Monitoring wire fracture channel x (channel-specific)

Module parameter: Fail safe channel x		
Function no.	Access to these module parameters is enabled via protocol-specific functions (see the manual for the bus node).	
Description	Fault mode channel x: Fault state channel x:	Hold last state Fault state (presetting) Set output Reset output (presetting)
Note	With the aid of so-called Fail Safe parameterisation, you can specify which signal status the outputs are to assume in the event of fieldbus communication errors (also see CPX system manual).	

Tab. 5/6: Fail Safe channel x (channel-specific)

Module parameters: Idle mode channel x	
Function no.	Access to these module parameters is enabled via protocol-specific functions (see the manual for the bus node).
Description	Only relevant for certain fieldbus protocols. Idle mode channel x: Hold last state Idle state (presetting) Idle state channel x: Set output Reset output (presetting)
Note	With the aid of so-called Idle Mode parameterisation, you can specify which signal status the outputs are to assume when switching is made to the Idle state (also see CPX system manual). This parameter is not available with all fieldbus protocols.

Tab. 5/7: Idle mode channel x (channel-specific)

Module parameters: Force channel x	
Function no.	Access to these module parameters is enabled via protocol-specific functions (see the manual for the bus node).
Description	Force mode of outputs channel x: Blocked (presetting) Force state Force state of outputs channel x: Set signal Reset signal (presetting)
Note	The Force function enables the manipulation of signal states detached from actual operating states (also refer to the CPX system manual).

Tab. 5/8: Force channel x (channel-specific)

5.6 Diagnosis

Midi/Maxi, CPA or VTSA pneumatics

Specific faults of the pneumatic interfaces are registered or suppressed depending on module parameterisation.

The faults are indicated locally via the Error LED and, if necessary, they can be evaluated with the handheld (MMI).

The faults are sent to the bus node (depending on module parameterisation), where they can be evaluated according to the fieldbus protocol used.

Diagnosis of the MPA pneumatics is effected via the individual MPA pneumatic modules (module-orientated, see manual P.BE-MPA-ELEKTRONIK-...).

5.6.1 Fault messages of the pneumatic interfaces

Midi/Maxi, CPA or VTSA pneumatics

A pneumatic interface can register the following standard faults:

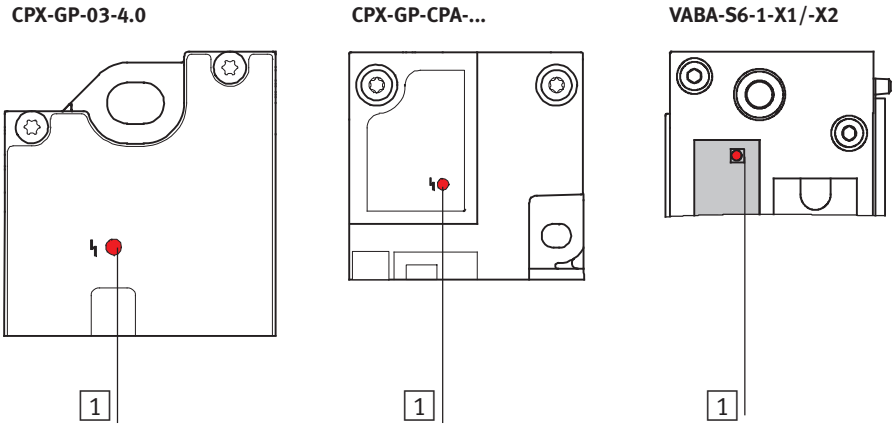
Error number	Description	Error handling
5	**Fault in load voltage for valves** Load voltage for the valves (V_{VAL}) missing or too low. [1]	• Check the load voltage
11	**Fault short circuit at valve** [2] Short circuit/overload at valve.	• Check that the valves are fitted correctly and check the electrical connections, • if necessary, replace the valve
13	**Fault wire fracture** [2] Monitoring the residual current of the valve solenoid coils (open load, only active with 0-signal). Only relevant for CPA or VTSA pneumatics.	• Check that the valves are fitted correctly and check the electrical connections, • if necessary, replace the valve • Correct any faulty parameterisation (e.g. with reserved valve locations/ blanking plates, see section 5.3)

[1] Tolerance range of the load voltage supply V_{VAL} see “Technical specifications” in the appendix
[2] Number of the faulty channel: see module diagnostic data.

Tab. 5/9: Fault messages of the pneumatic interface for Midi/Maxi, CPA or VTSA pneumatics

5.6.2 LED display

Midi/Maxi, CPA or VTSA pneumatics	There is an LED under the transparent cover for diagnosing these pneumatic interfaces.



1 Error LED (red)

Fig. 5/6: LED display of the pneumatic interfaces

Error LED

Midi/Maxi, CPA or VTSA pneumatics

The red error LED of these pneumatic interfaces indicates the faults of the pneumatic interface depending on parameterisation.

Error LED (red)	Procedure	Status	Error number	Error handling
○ LED is off	ON / OFF	Trouble-free operation.	–	None
☀ LED illuminates	ON / OFF	**Fault in load voltage for valves** Load voltage for the valves (V_{VAL}) missing or too low.	5	See section 5.6.1, Tab. 5/9.
		Fault short circuit at valve Short circuit/overload at valve.	11	
		Wire fracture fault Monitoring the residual current of the valve solenoid coils (open load, only active with 0-signal). Only relevant for CPA or VTSA pneumatics.	13	

Tab. 5/10: Error LED for pneumatic interfaces Midi/Maxi, CPA or VTSA pneumatics

The fault indicated by the red error LED is transmitted by the pneumatic interface to the fieldbus node (unless parameterised otherwise).

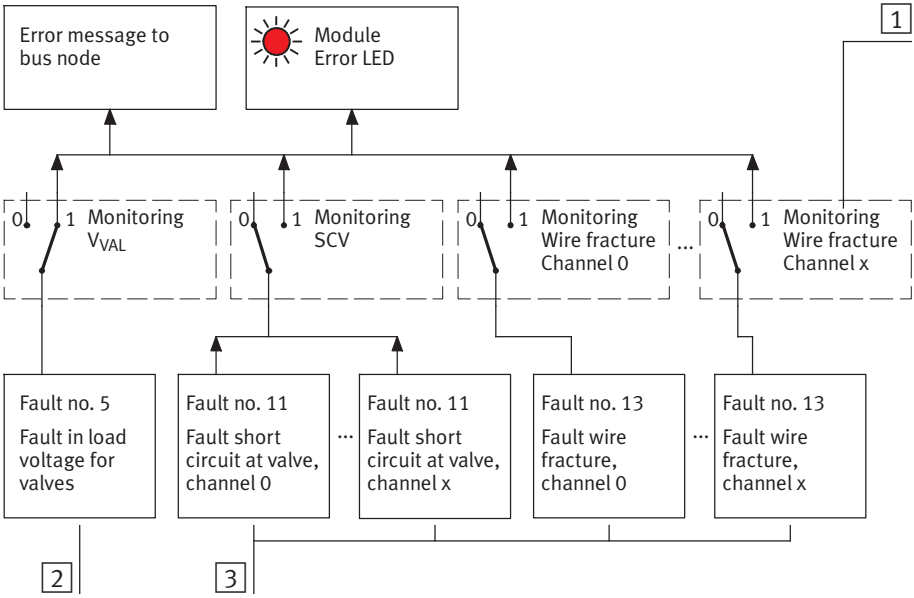
Status LEDs of the valve solenoid coils

The yellow status LEDs on the valve solenoid coils indicate the status of the relevant output (see appropriate pneumatics manual).

5.6.3 Error handling and parameterisation

Midi/Maxi, CPA or VTSA pneumatics

The following diagram shows the error handling procedure in the pneumatic interface for Midi/Maxi, CPA or VTSA pneumatics. Further registering and display of the faults can be suppressed as desired with the appropriate module parameters (represented in the diagram as switches). The parameters are described in section 5.5.



1 Module parameters (switch position represented = default setting)

2 Module-specific faults

3 Channel-specific faults (fault no. 13 only with CPA or VTSA pneumatics)

Fig. 5/7: Principle of error handling and parameterisation in the pneumatic interfaces for Midi/Maxi, CPA or VTSA pneumatics

Technical appendix

Appendix A

Contents

A.1 Technical specifications of the CPX connection blocks

Technical data	CPX-AB-...				
	...4-M12x2-5POL	...4-M12x2-5POL-R	...8-M8-3POL	...8-M8-4POL	...8-KL-4POL
General technical data	See CPX System Description				
Protection class as per EN 60 529	IP65/IP67, completely fitted, plug connector inserted or provided with protective cap				IP20 (with AK-8KL and VG-K-M9: IP65/ IP67)
Ports – Version	4 M12 sockets, 5-pin	4 M12 sockets, 5-pin	8 M8 sockets, 3-pin	8 M8 sockets, 4-pin	2 terminal strips (spring clip terminals), 16-pin (4x4-pin) for cable cross section 0.08 ... 1.5 mm^2 (for conductor specification see section 1.2.3)
– Contact loading	3 A	4 A	3 A	4 A	4 A

Technical data	CPX-AB-...		
	...1-SUB-BU-25POL	...4-HARX2-4POL	...4-M12-8POL
General technical data	See CPX System Description		
Protection class as per EN 60 529	IP20 (with plug SD-SUB-D-ST25: IP65/IP67)	IP65/IP67, completely fitted, plug connector inserted or provided with protective cap	
Ports – Version	1 sub-D socket, 25-pin	4 HARAX sockets, 4-pin, connection with insulation displacement technology, for cable cross section 0.5 ... 1.0 mm^2 (for conductor specification see section 1.2.3)	4 M12 sockets, 8-pin, for connection ZVK
– Contact loading	4 A	3 A	3 A

A.2 Technical specifications of the CPX metal connection blocks

Technical data	CPX-M-...	
	...4-M12x2-5POL	...8-M12x2-5POL
General technical data	See CPX System Description	
Protection class as per EN 60 529	IP65/IP67, completely fitted, plug connector inserted or provided with protective cap	
Ports – Version – Contact loading	4 M12 sockets, 5-pin 4 A	8 M12 sockets, 5-pin 4 A

A.3 Technical specifications of the CPX input modules

Technical data	CPX-4DE	CPX-8DE	CPX-8DE-D	CPX-8NDE
General technical data	See CPX System Description			
Protection class to EN 60 529	See technical specifications for the connection block fitted			
Operating voltage supply for electronics/sensors ($V_{EL/SEN}$) – Nominal voltage – Intrinsic current consumption at 24 V (internal electronics)	DC 24 V ± 25 % Typ. 15 mA			
Digital inputs as per IEC 61131-2 type 2, 24 V	4 inputs	8 inputs		8 inputs n-switching
– Version	0 ... 30 V DC, positive logic (PNP)			Negative logic (NPN)
– Logic level: log. 0 / log. 1	≤ 5 V / ≥ 11 V			≥ 11 V/≤ 5 V
– Response delay at 24 V – Current consumption at 24 V (input current) – Sensor supply: Voltage drop to $V_{EL/SEN}$ (reduction of sensor supply voltage) – Reverse polarity protection 24 V_{SEN} against 0 V_{SEN}	Can be parameterised, typ. 3 ms With “log. 1”: typ. + 9.3 mA (CPX-8NDE: typ. - 9.3 mA) Max. 0.7 V Yes			
– Short circuit protection in sensor supply	Electronic for the complete module (CPX-8DE-D: per channel)			
– Response threshold – Characteristic	0.7 A ... 2.4 A slow-blowing		1.0 A ... 2.5 A slow-blowing	0.7 A ... 1.9 A slow-blowing
Galvanic isolation	None			
Potential difference between 0 V sensor supply connections and 0 V supply for electronics/sensors ($V_{EL/SEN}$)	Not permitted			24 V conn.: not permitted
Module code [type code] (CPX-specific) Module identification (Handheld)	1 4DI	2 8DI	7 8DI-D	14 8NDI

Technical data	**CPX-16DE**	**CPX-M-16DE-D**	**CPX-L-16DE-...**
General technical data	See CPX System Description		
Protection class to EN 60 529	See technical specifications for the connection block fitted		
Operating voltage supply for electronics/sensors ($V_{EL/SEN}$) – Nominal voltage – Intrinsic current consumption at 24 V (internal electronics)	DC 24 V ± 25 % Typ. 15 mA	DC 24 V ± 25 % Typ. 35 mA	DC 24 V ± 25 % Typ. 15 mA
Digital inputs as per IEC 61131-2 type 2, 24 V	16 inputs		
– Version	0 ... 30 V DC positive logic (PNP)		
– Logic level: log. 0 / log. 1	≤ 5 V / ≥ 11 V		≤ 5 V / ≥ 15 V
– Response delay at 24 V	Can be parameterised, typ. 3 ms		
– Current consumption at 24 V (input current)	Typ. + 9.3 mA with “log. 1”		Typ. 5.2 mA with “log. 1”
– Sensor supply: Voltage drop to $V_{EL/SEN}$ (reduction of sensor supply voltage)	Max. 1.0 V		Max. 1.0 V
– Reverse polarity protection 24 V_{SEN} against 0 V_{SEN} – Short circuit protection in sensor supply	Yes Electronic (for the complete module)	Yes Electronic (per channel pair)	Yes Electronic (for the complete module)
– Response threshold – Characteristic	1.8 A ... 6.5 A Slow-blowing	1.0 A ... 2.5 A Slow-blowing	1.8 A ... 6.5 A Slow-blowing
– Discrete fusing of the inputs	None	Cutout fuse (3 A, slow-blowing)	None
Galvanic isolation	None		
Potential difference between sensor supply connections and $V_{EL/SEN}$	0 V-connections: not permitted		
Module code/Submodule code [type code] (CPX-specific) Module identification (Handheld)	11 16DI	16 M-16DI-D	20/2 L-16DI

A.4 Technical specifications of the CPX output modules

Technical data	CPX-4DA	CPX-8DA	CPX-8DA-H
General technical data	See CPX System Description		
Protection class to EN 60 529	See technical specifications for the connection block fitted		
Operating voltage supply for electronics/sensors ($V_{EL/SEN}$) – Nominal voltage – Intrinsic current consumption at 24 V (internal electronics, all outputs 0-signal)	DC 24 V ± 25 % Typ. 16 mA		
Load voltage supply for outputs (V_{OUT}) – Nominal voltage – Intrinsic current consumption at 24 V (internal electronics) – Diagnostic message undervoltage V_{OUT} (monitoring V_{OUT}, load voltage outside function range)	DC 24 V ± 25 % Typ. 20 mA ≤ 17 ... 14 V	DC 24 V ± 25 % Typ. 34 mA ≤ 17 ... 14 V	
Digital outputs	4 outputs based on IEC 61131-2 type 2, 24 V	8 outputs as per IEC 61131-2, 24 V	8 outputs based on IEC 61131-2 type 2, 24 V
– Rated load voltage – Version – Reverse polarity protection	V_{OUT} Positive logic (PNP) Yes		
Max. output current – per channel – per output socket when plug/cable is assigned twice – per module	Max. 1.0 A (24 W bulb load) 2.0 A 4.0 A	Max. 0.5 A (12 W bulb load) 1.0 A 4.0 A	Max. 2.1 A (50 W bulb load) **not permitted** 8.4 A

Technical data	CPX-4DA	CPX-8DA	CPX-8DA-H
– Short circuit protection	Yes (electronic), response threshold › 1 A	Yes (electronic), response threshold › 0.5 A	Yes (electronic), response threshold see Fig. A/1
– Discrete fusing of the outputs	None	None	Cutout fuse (4 A, slow-blowing)
– Voltage drop at output	≤ 1 V		≤ 1 V
– Output delay with ohmic load – signal change “0” to “1” – signal change “1” to “0”	 ‹ 200 µs ‹ 200 µs		 ‹ 200 µs ‹ 200 µs
– Parallel switching of outputs for increased performance	Yes, max. 4 outputs of the same module:		Not permitted
	O0 ... O3	O0...O3 / O4...O7	
– Protection against reverse voltage – Limiting the inductive switch-off voltage of connected coils/solenoid valves	Max. V_{OUT} Typ. -16 V		
Galvanic isolation – between the channels – between the operating voltage supply for the electronics/sensors ($V_{EL/SEN}$) and the load voltage for the outputs (V_{OUT})	None Yes, with power supply via interlinking block type: – CPX-GE-EV-**Z** (M18) – CPX-GE-EV-**S**-7/8-**5POL** – CPX-GE-EV-**Z**-7/8-**5POL** – CPX-M-GE-EV-**S**-7/8-**5POL** – CPX-M-GE-EV-**Z**-7/8-**5POL** – CPX-GE-EV-**Z**-7/8-4POL		
Isolation	Tested with 500 V DC		
Module code [type code] (CPX-specific) Module identification (Handheld)	3 4DO	6 8DO	17 8DO-H

1 Load current I at outlet O0, if O1 = O2 = O3 = O4 = O5 = O6 = O7 = 0 A

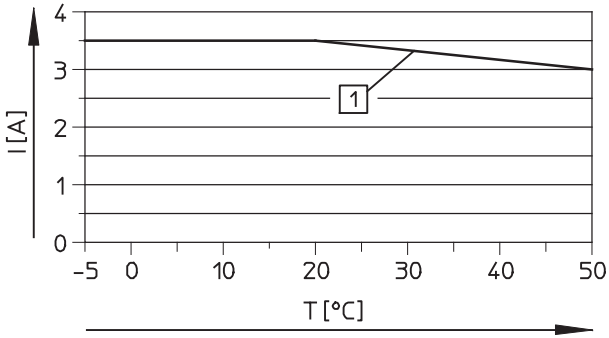


Fig. A/1: Short circuit protection with high-current output module CPX-8DA-H: Maximum load current I per channel depending on operating temperature T

A.5 Technical specifications of the CPX multi I/O modules

Technical data	CPX-8DE-8DA	CPX-L-8DE-8DA-...
General technical data	See CPX System Description	
Protection class to EN 60 529	See technical specifications for the connection block fitted	
Operating voltage supply for electronics/sensors ($V_{EL/SEN}$) – Nominal voltage – Intrinsic current consumption at 24 V (internal electronics, all outputs 0-signal)	 DC 24 V ± 25 % Typ. 22 mA	 DC 24 V ± 25 % Typ. 15 mA
Load voltage supply for outputs (V_{OUT}) – Nominal voltage – Intrinsic current consumption at 24 V (internal electronics) – Diagnostic message undervoltage V_{OUT} (monitoring V_{OUT}, load voltage outside function range)	 DC 24 V ± 25 % Typ. 34 mA ≤ 17 ... 14 V	 DC 24 V ± 25 % Typ. 62 mA ≤ 17,5 ... 12.5 V
Digital inputs – Version – Logic level: log. 0 / log. 1 – Response delay at 24 V – Current consumption at 24 V (input current) – Sensor supply: Voltage drop to $V_{EL/SEN}$ (reduction of sensor supply voltage) – Reverse polarity protection 24 V_{OUT} against 0 V_{SEN} – Short circuit protection in sensor supply (for the complete module) – Response threshold – Characteristic	8 inputs as per IEC 61131-2 type 2, 24 V 0 ... 30 V DC, positive logic (PNP) ≤ 5 V / ≥ 11 V Can be parameterised, typ. 3 ms With “log. 1”: typ. + 9.3 mA Max. 0.7 V Yes Electronic 0.7 A ... 2.4 A Slow-blowing	8 inputs as per IEC 61131-2 type 1, 24 V 0 ... 30 V DC, positive logic (PNP) ≤ 5 V / ≥ 15 V Can be parameterised, typ. 3 ms With “log. 1”: typ. + 5.2 mA Max. 1.0 V Yes Electronic 1.8 A ... 6.5 A Slow-blowing
Electrical isolation of inputs	None	None

Technical data	**CPX-8DE-8DA**	**CPX-L-8DE-8DA-...**
Potential difference between 0 V sensor supply connections and 0 V supply for electronics/sensors ($V_{EL/SEN}$)	Not permitted	Not permitted

Digital outputs
 	
– Rated load voltage
– Version
– Reverse polarity protection
– Output current per channel
– Short circuit protection
 	
– Voltage drop at output
– Output delay with ohmic load
  – signal change “0” to “1”
  – signal change “1” to “0”
– Parallel switching of outputs for increased performance
 	
– Protection against reverse voltage
– Limiting the inductive switch-off voltage of connected coils/solenoid valves
	8 outputs as per IEC 61131-2, 24 V
	V_{OUT}
	Positive logic (PNP)
	Yes
	Max. 0.5 A (12 W lamp load)
	Yes (electronic), response threshold › 0.5 A
	≤ 1 V
	
	‹ 200 µs
	‹ 200 µs
	Yes, max. 4 outputs (O0 ... O3 or O4 ... O7) from the same module
	Max. V_{OUT}
	Typ. -16 V
		8 outputs as per IEC 61131-2, 24 V
		V_{OUT}
		Positive logic (PNP)
		Yes
		Max. 0.25 A (6 W lamp load)
		Yes (electronic), response threshold › 0.25 A
		≤ 1 V
		
		‹ 200 µs
		‹ 200 µs
		Yes, max. 4 outputs (O0 ... O3 or O4 ... O7) from the same module
		Max. V_{OUT}
		Typ. -18 V

Electrical isolation of the outputs – between the channels – between the operating voltage supply for the electronics/sensors ($V_{EL/SEN}$) and the load voltage for the outputs (V_{OUT})	None Yes, with power supply via interlinking block type: – CPX-GE-EV-**Z** (M18) – CPX-GE-EV-**S**-7/8-**5POL** – CPX-GE-EV-**Z**-7/8-**5POL** – CPX-M-GE-EV-**S**-7/8-**5POL** – CPX-M-GE-EV-**Z**-7/8-**5POL** – CPX-GE-EV-**Z**-7/8-4POL	None None: The CPX-L multi I/O module internally connects the contact rails 0 $V_{EL/SEN}$ and 0 V_{OUT} of the CPX terminal. This means that the operating voltage supply for the electronics/sensors ($V_{EL/SEN}$) and the load voltage supply for the outputs (V_{OUT}) are no longer electrically isolated (see section 4.3).
Isolation	Tested with 500 V DC	–
Module code/Submodule code [type code] (CPX-specific) Module identification (Handheld)	4 8DI/8DO	22/2 L-8DI8DO

A.6 Technical specifications of the pneumatic interfaces

Technical data	VABA-S6-1-X1/-X2 for VTSA pneumatics (ISO)
General technical specifications of the CPX terminal	See CPX System Description
Protection class as per EN 60 529	IP65, in fitted state
Operating voltage supply for electronics/sensors ($V_{EL/SEN}$) – Nominal voltage – Intrinsic current consumption at 24 V (internal electronics)	 DC 24 V ± 25 % Typ. 15 mA
Load voltage supply for valves (V_{VAL}) – Nominal voltage – Intrinsic current consumption at 24 V (internal electronics, without valves) – Diagnostic message undervoltage V_{VAL} (monitoring V_{VAL}, load voltage outside function range)	 DC 24 V ± 10 % Typ. 30 mA ≤ 21.6 ... 21.5 V
Digital outputs (valve solenoid coils) – Rated load voltage – Intended for connecting to pneumatics – Short circuit protection at valve output – Monitoring wire fracture (open load)	Max. 32 outputs V_{VAL} VTSA (ISO, type 44) Yes (electronic), Response threshold › 1.0 A Capable of parameterisation
Isolation	Tested with 500 V DC
Galvanic isolation – between the channels (valve solenoid coils) – between the operating voltage supply for the electronics/sensors ($V_{EL/SEN}$) and the load voltage for the valves (V_{VAL})	 None With power supply via interlinking block type: – CPX-GE-EV-S: None – CPX-GE-EV-S-7/8-**5**POL: Yes – CPX-GE-EV-V...: Yes
Module code [type code] (CPX-specific) Module identification (Handheld)	69 ISO Plug-In or type 44 (depending on the version of the Handheld)

Technical data	**CPX-GP-03-4.0**	**CPX-GP-CPA-...**
General technical specifications of the CPX terminal	See CPX System Description	
Protection class as per EN 60 529	IP65, in fitted state	
Operating voltage supply for electronics/sensors ($V_{EL/SEN}$) – Nominal voltage – Intrinsic current consumption at 24 V (internal electronics)	 DC 24 V ± 25 % Typ. 15 mA	
Load voltage supply for valves (V_{VAL}) – Nominal voltage – Intrinsic current consumption at 24 V (internal electronics, without valves) – Diagnostic message undervoltage V_{VAL} (monitoring V_{VAL}, load voltage outside function range)	 DC 24 V ± 10 % Typ. 30 mA ≤ 21.6 ... 21.5 V	 DC 24 V +10 %/-15% Typ. 30 mA ≤ 19.8 ... 19.6 V
Digital outputs (valve solenoid coils) – Rated load voltage – Intended for connecting to pneumatics – Short circuit protection at valve output – Monitoring wire fracture (open load)	Max. 26 outputs V_{VAL} Midi/Maxi (type 03) Yes (electronic), response threshold › 1.0 A No	Max. 22 outputs V_{VAL} CPA (type 12) Yes (electronic), response threshold › 1.0 A Capable of parameterisation
Isolation	Tested with 500 V DC	
Galvanic isolation – between the channels (valve solenoid coils) – between the operating voltage supply for the electronics/sensors ($V_{EL/SEN}$) and the load voltage for the valves (V_{VAL})	None With power supply via interlinking block type: – CPX-GE-EV-S: None – CPX-GE-EV-S-7/8-**5**POL: Yes – CPX-GE-EV-V...: Yes	
Module code [type code] (CPX-specific) Module identification (Handheld)	67 TYPE3	66 CPA10/14

Internal structure and circuitry examples

Appendix B

Contents

B.1 Internal structure of the CPX I/O modules

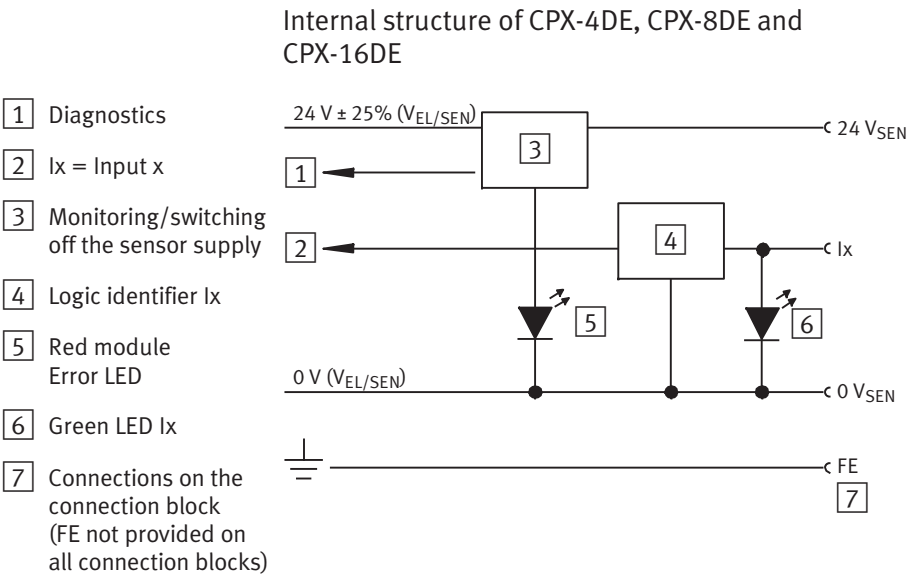
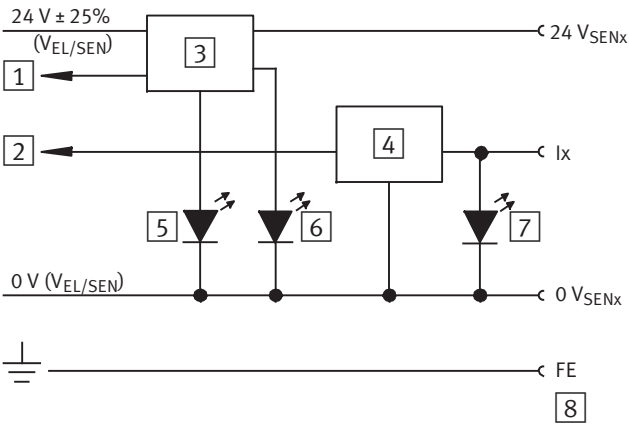


Fig. B/1: Internal structure of CPX-4DE, CPX-8DE and CPX-16DE

Internal structure of CPX-8DE-D, CPX-M-16DE-D



1 Diagnostics

2 Ix = Input x

3 Monitoring/switching off the sensor supply

4 Logic identifier Ix

5 Red module Error LED

6 Red channel error LED

7 Green LED Ix

8 Connections on the connection block (FE not provided on all connection blocks)

Fig. B/2: Internal structure of CPX-8DE-D, CPX-M-16DE-D

On input module CPX-M-16DE-D, the LEDs 6 and 7 are positioned so that a common optical waveguide can be used in connection block CPX-M-8-M12x2-5POL.

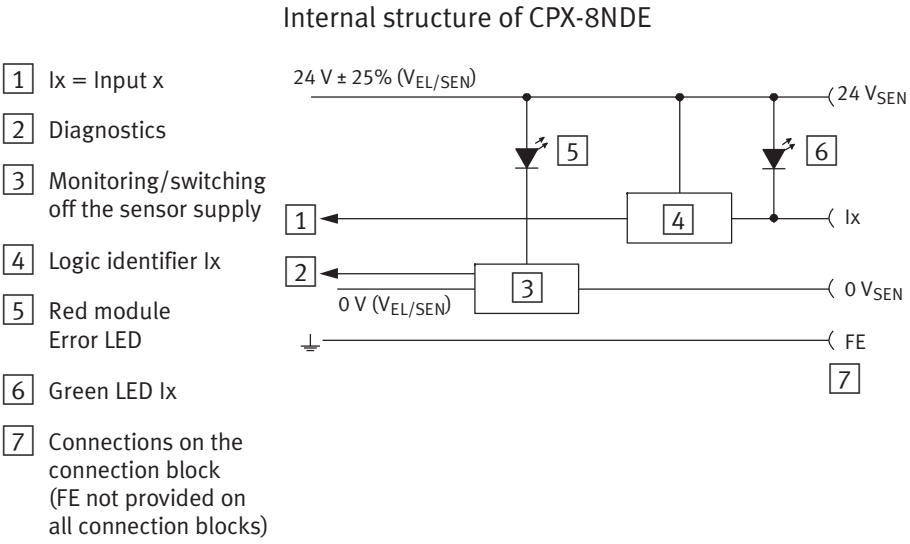
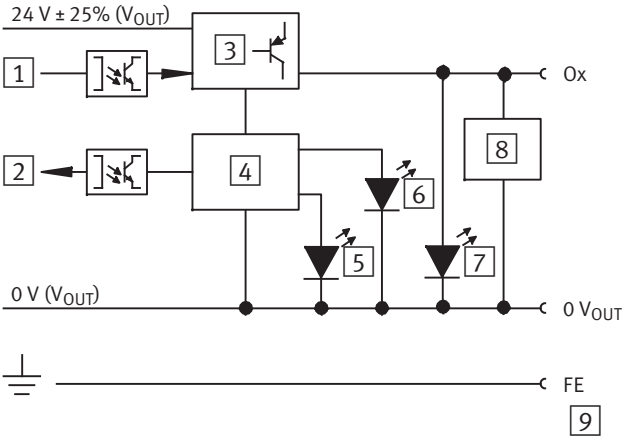


Fig. B/3: Internal structure of CPX-8NDE

Internal structure of CPX-4DA, CPX-8DA and CPX-8DA-H



1 Ox = Output x

2 Diagnostics
- Output status
- Overload
- Undervoltage

3 Output driver

4 Monitoring

5 Red module Error LED

6 Red channel Error LED Ox

7 Yellow LED Ox

8 Limiting inductive voltage peaks

9 Connections on the connection block (FE not provided on all connection blocks)

Fig. B/4: Internal structure of CPX-4DA, CPX-8DA and CPX-8DA-H

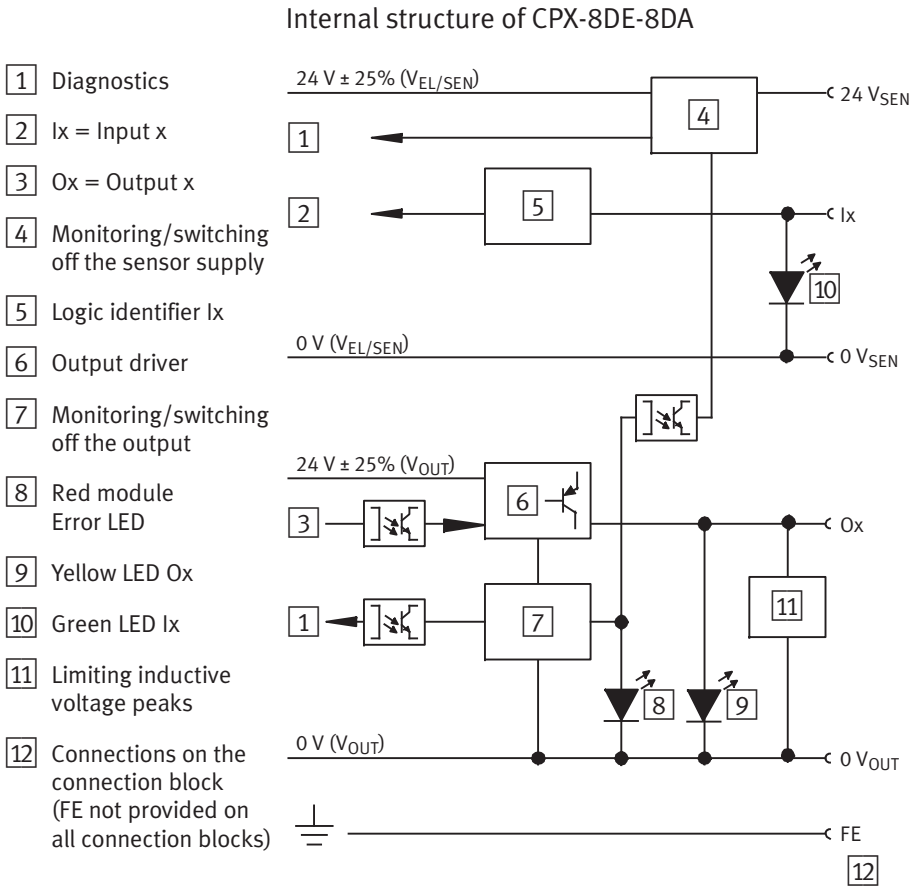


Fig. B/5: Internal structure of CPX-8DE-8DA

B.2 Circuitry examples for CPX inputs and outputs

B.2.1 Circuitry examples for PNP inputs

1 Three-wire sensor (positive logic)

2 Two-wire sensor (positive logic)

3 Contact

Ix = Input x

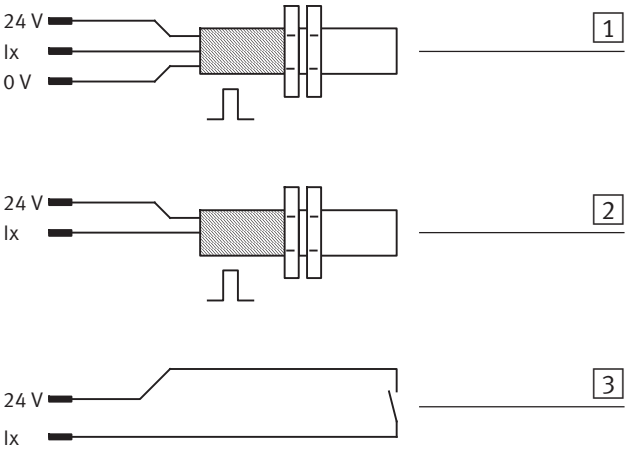


Fig. B/6: Circuitry examples for PNP inputs

B.2.2 Circuitry examples for PNP outputs

1 Example 1: Lamp

2 Example 2: Relay

Ox = Output x

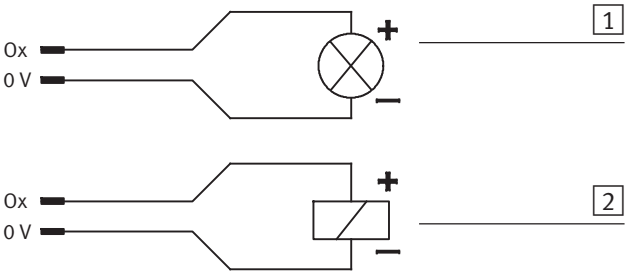


Fig. B/7: Circuitry examples for PNP outputs

B.2.3 Circuitry examples for NPN inputs

1 Three-wire sensor (negative logic)

2 Two-wire sensor (negative logic)

3 Contact

Ix = Input x

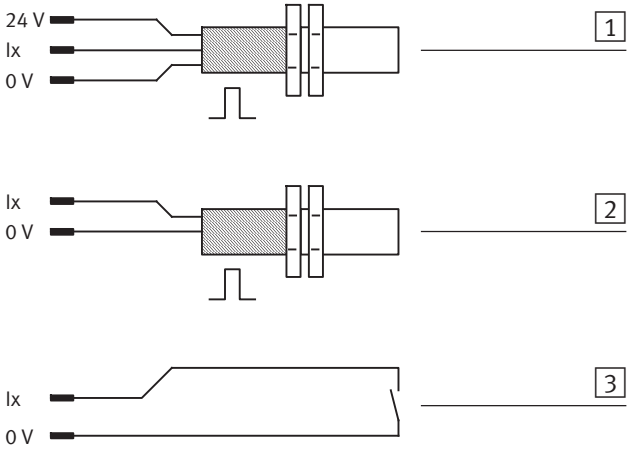
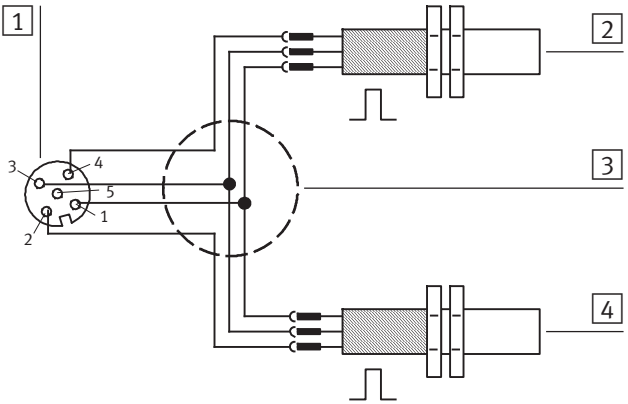


Fig. B/8: Circuitry examples for NPN inputs

B.2.4 Circuitry example with DUO cable

Connection only possible with connection block CPX-AB-4-M12x2-5POL (-R), CPX-M-4-M12x2-5POL or CPX-M-8-M12x2-5POL.



1 CPX-4DE:
Sockets X1, X3
CPX-8DE (-D):
Sockets X1 ... X4
CPX-M-16DE-D:
Sockets X1 ... X8

Pin allocation
1: 24 V
2: Ix+1
3: 0 V
4: Ix
5: FE

2 Sensor 1 (Ix)

3 2-way distributor
(T-piece, e.g. Festo
Duo cable;
only 4-pin)

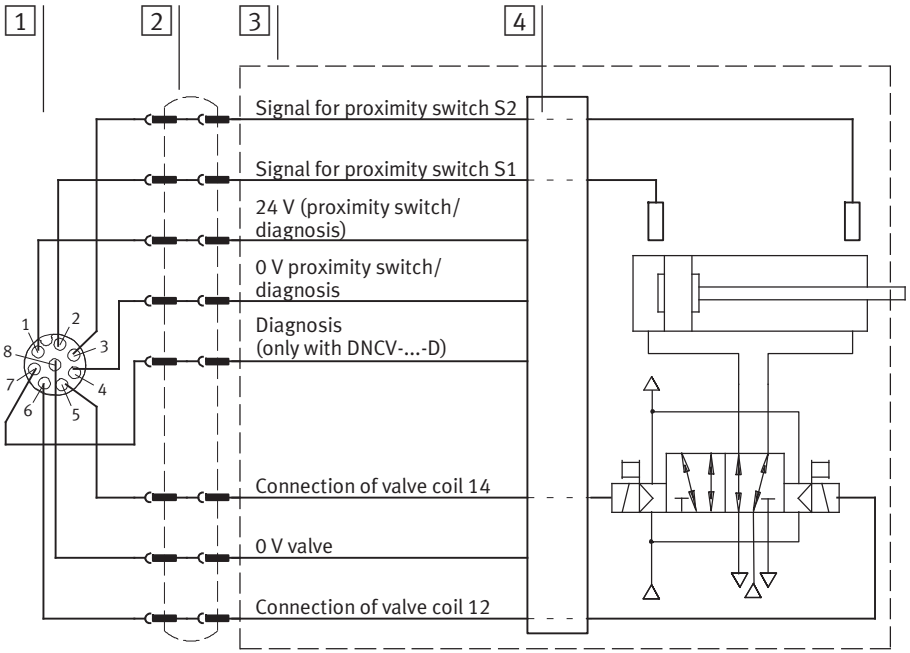
4 Sensor 2 (Ix+1)

Ix = Input x
(x = 0, 2, 4, 6)

Fig. B/9: Circuitry examples for DUO cable with connection block CPX-AB-4-M12x2-5POL (-R), CPX-M-4-M12x2-5POL or CPX-M-8-M12x2-5POL

B.2.5 Circuitry example with DNCV

Connection with connection block CPX-AB-4-M12-8POL.



1 CPX-8DE-8DA:
Sockets X1 ... X4

Pin allocation (example X1):
1: 24 V_{SEN}
2: Ix
3: Ix+1
4: 0 V_{SEN}
5: Ox
6: Ox+1
7: Ix+4 *)
8: 0 V_{OUT}

2 Connecting cable type KM12-8GD8GS-2-PU, Cable screening connected to functional earth via plug housing

3 Cylinder-valve combination type DNCV-...
Example type DNCV-...-5/2J-D

4 Electronics (e.g. protection against short circuit or incorrect polarity, voltage monitoring, holding current reduction, diagnosis, ...)

Ix = Input x
Ox = Output x
*) not assigned with sockets X3 and X4

Fig. B/10: Circuitry examples for DNCV with connection block CPX-AB-4-M12-8POL

B.3 Accessories (CPX terminal)

→ www.festo.com/catalogue

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Appendix C

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