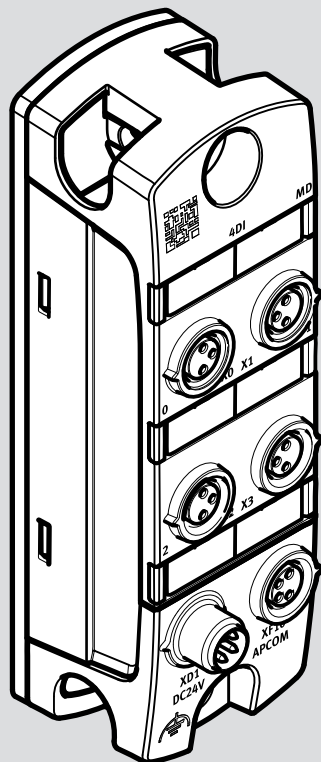


CPX-AP-I-4DI-M8-3P

Digital input module

FESTO

Operating instruction



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2025-05c
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Original instructions

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1 About this document

1.1 Applicable documents



All available documents for the product → www.festo.com/sp.

Document	Contents
Operating instructions remote I/O system CPX-AP-I	Instruction manual and important information on the assembly, electrical installation and maintenance tasks and also description of the remote I/O system CPX-AP-I

Tab. 1: Applicable documents

1.2 Product version

This document refers to the following product versions:

Product	Version
CPX-AP-I-4DI-M8-3P	Digital input module CPX-AP-I-4DI-M8-3P revision 1 or later

Tab. 2: Product version

The product version can be determined from the product labelling.



There may be an updated version of this document for this or later product versions → www.festo.com/sp.

1.3 Product labelling

The product labelling is located on the sides of the module. The Data Matrix code is on the connection side. Scanning the printed Data Matrix Code with an appropriate device opens the Festo Internet page with documents appropriate for the product. Alternatively, the Product Key (11-digit alphanumeric code on the product labelling) can be entered in the search field → www.festo.com/sp.

1.4 Specified standards

Version	
IEC 60204-1:2016-10	EN 60204-1:2018-09
IEC 61131-2:2017-08	EN 60529:1991-10

Tab. 3: Standards specified in the document

2 Safety

2.1 Safety instructions

- Only use the product if it is in perfect technical condition.
- Observe the identifications on the product.
- Store the product in a cool, dry environment protected from UV and corrosion. Keep storage times short.
- If there is a connection to other circuits at one of the connections for inputs or outputs, the circuits must also comply with SELV/PELV.
- Before working on the product, switch off the power supply and secure it against being switched on again.

2.2 Intended use

The product described in this document is intended only for use in a remote I/O system CPX-AP.

Use the product only as follows:

- Use only in an industrial environment. Outside of industrial environments, e.g. in commercial and mixed-residential areas, actions to suppress interference may have to be taken.
- Use only in combination with modules and components that are approved for the applicable product variant → www.festo.com/catalogue.

2.3 Training of qualified personnel

Work on the product may only be carried out by qualified personnel who can evaluate the work and detect dangers. The qualified personnel have skills and experience in dealing with electrical (open-loop) control technology.

2.4 UL certification

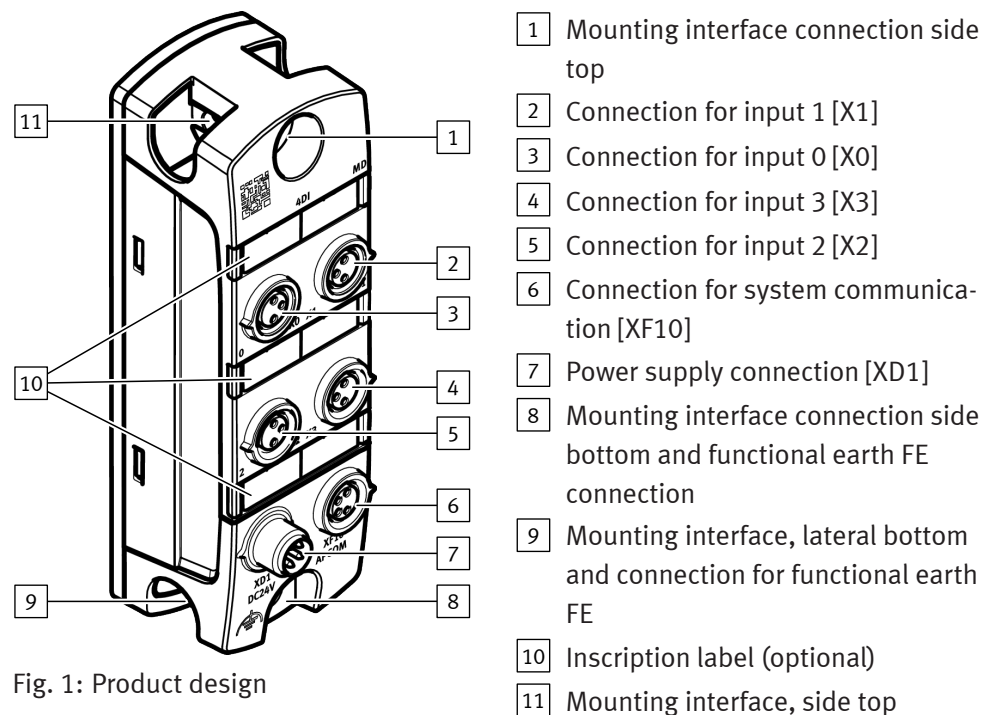
The information in the operating instructions for the remote I/O system CPX-AP-I in combination with the UL inspection mark on the product is also applicable to ensure compliance with the certification conditions of Underwriters Laboratories Inc. (UL) for USA and Canada → 1.1 Applicable documents.

3 Additional information

- Contact the regional Festo contact if you have technical problems
→ www.festo.com.
- Accessories → www.festo.com/catalogue.

4 Product overview

4.1 Product design



4.2 LED indicators

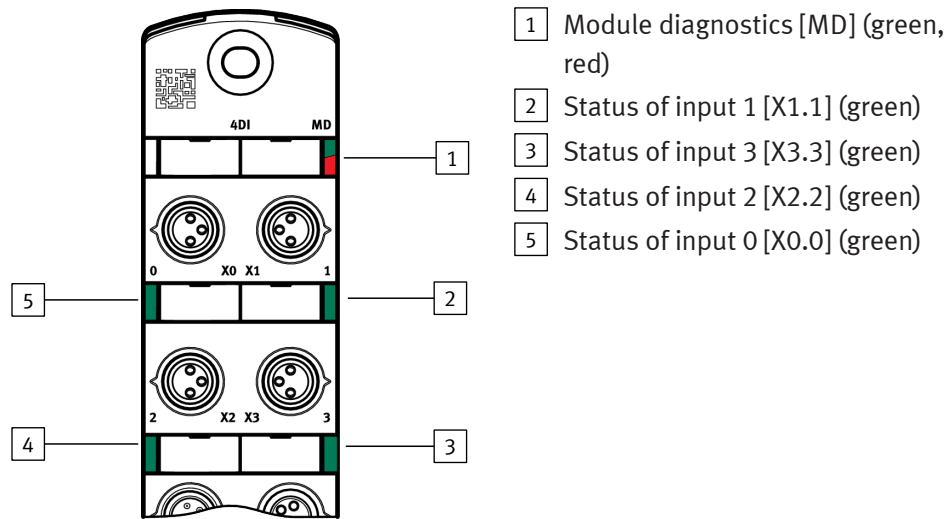


Fig. 2: LED indicators

4.3 Connecting elements

Power supply connection [XD1]			
M8 plug, 4-pin, A-coded		Signal	
	1	+24 V DC logic supply PS	
	2	0 V DC load supply PL	
	3	0 V DC logic supply PS	
	4	+24 V DC load supply PL	

Tab. 4: Power supply connection



For information on power supply, see operating instructions for remote I/O system CPX-AP-I ➔ 1.1 Applicable documents.

Connection for system communication [XF10]			
Socket M8, 4-pin, D-coded		Signal	
	1	TX-	Transmitted data -
	2	RX+	Received data +
	3	TX+	Transmitted data +
	4	RX-	Received data -

Tab. 5: Connection for system communication

Connection for inputs [X0] ... [X3]		
M8 socket, 3-pin, A-coded		Signal
	1	+24 V DC sensor supply
	3	0 V DC sensor supply
	4	Input 0 ... 3

Tab. 6: Connection for inputs



If there is a connection to other circuits at one of the connections for inputs or outputs, the circuits must also comply with SELV/PELV.

5 Function

The module provides digital inputs for the connection of sensors in a remote I/O system CPX-AP, thereby enabling the recording and further processing of digital input signals. The module supplies the sensors with a voltage of 24 V DC and return a logic 0 or 1 to the inputs.

The module response can be parameterised.

Status and error messages are indicated by LED displays on the module and reported to the interface by the system communication.

The sensor supply has an electronic fuse for protection against short circuit or overload. If this electronic fuse is triggered, the sensor supply of the module is switched off and the error is shown by an LED indicator on the module. After the short circuit or the overload has been cleared, the sensor supply is switched on again automatically. The electronic fuse of the module is a slow-blow type. Sensors with a higher short-term current requirement can therefore also be connected.

6 Mounting

- Carry out assembly in accordance with the operating instruction for remote I/O system CPX-AP-I ➔ 1.1 Applicable documents.

7 Installation

- Install in accordance with the operating instructions for remote I/O system CPX-AP-A" ➔ 1.1 Applicable documents.

7.1 Connecting cables

⚠ WARNING

Risk of injury due to electric shock.

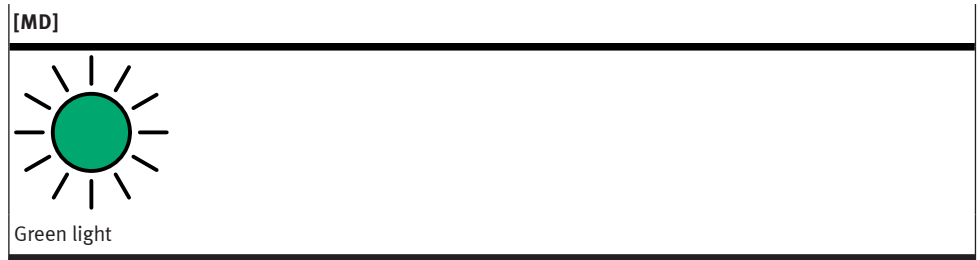
- For the electric power supply, use SELV or PELV circuits that guarantee a reliable electric disconnection from the mains network.
- Observe IEC 60204-1/EN 60204-1.

1. Switch off the power supply.
2. Use a suitable torque screwdriver with socket to tighten union nuts.
 - For example, use PHOENIX CONTACT SAC BIT M8-D10 with a tightening torque of 0.4 Nm ± 15% for M8. Different from the information for connecting cables.
 - For example, use PHOENIX CONTACT SAC BIT M12-D15 with a tightening torque of 0.6 Nm ± 10% for M12. Different from the information for connecting cables.
3. Seal unused connections with cover caps.

8 Commissioning

- Commissioning of the remote I/O system CPX-AP-I in accordance with the remote I/O system CPX-AP-I operating instructions ➔ 1.1 Applicable documents.

Response of the display components of the module after error-free commissioning



Tab. 7: Response of the LED displays of the module after error-free commissioning

9 Parameterisation

Various parameters are available for reading out information about the modules in a remote I/O system CPX-AP-A and for configuring the modules for the application.

Standard parameters

ID	Parameters	Number of instances ¹⁾	Data type	Access ²⁾	Array size
246	Fieldbus serial number	1	UINT32	ro	–
791	Product key	1	CHAR	ro	12
960	Firmware version	1	CHAR	ro	30
20000	Module code	1	UINT32	ro	–
20085	Measured value of temperature AP-ASIC	1	INT16	ro	–
20087	Current measured value of logic supply (PS)	1	UINT16	ro	–
20088	Current measured value of load supply (PL)	1	UINT16	ro	–
20093	Hardware version	1	UINT8	ro	–
20118	Application-specific identification	1	CHAR	rw	32
11295004	I&M 2 Date of installation	1	CHAR	rw	17

1) Counting starting at 0.

2) ro = read only; rw = read write

Tab. 8: Standard parameters

Channel parameter inputs

ID	Parameters	Number of instances ¹⁾	Data type	Access ²⁾	Array size
20014	Input debounce time – 0: 0.1ms – 1: 3ms – 2: 10ms – 3: 20ms	1	ENUM_ID	rw	–








1) Counting starting at 0.

2) ro = read only; rw = read write



Tab. 9: Channel parameter inputs

10 Diagnostics

10.1 LED displays

Module diagnostics [MD]		
LED	Meaning	Remedy
 Off	Logic supply PS not available.	Check connection of logic supply PS.
 Green light	Module diagnostics not active	–
 Flashing green 0.5 Hz	Module diagnostics active "Information" degree of severity e.g. switching off load supply PL	–
 Flashing red 0.5 Hz	Module diagnostics active "Warning" degree of severity e.g. parameterisation error	Take appropriate remedial action, e.g. check parameterisation.
 Red light	Module diagnostics active "Error" degree of severity e.g. undervoltage in load supply PL	Take appropriate remedial action, e.g. check load supply PL.
 Fast flashing red 2 Hz	Module ramp-up not yet completed. System communication not yet initial- ised.	–
 Fast flashing green 2 Hz	Module identification (service function)	–

Tab. 10: Module diagnostics LED [MD]

Status of input		
LED	Meaning	Remedy
 Green light	Input active (logic 1) Logic 1 at input	–
 Off	Input inactive (logic 0) Logic 0 at input	–

Tab. 11: LED status of input

10.2 Diagnostic messages

For all diagnostics messages of the remote I/O system and for information on grouping and displaying the diagnostic messages see the operating instructions for remote I/O system ➔ 1.1 Applicable documents.

The table below contains the diagnostic messages of the module.

ID hex (dec)	Message	Description	Remedy	Diagnostics status
01 01 010B 16843019	Short circuit/overload in sensor supply	A short-circuit/overload of the sensor supply was detected	<ul style="list-style-type: none"> – Check sensor for correct function, in particular for current consumption. – Check sensor wiring. 	Error
02 01 0016 33619990	Undervoltage in logic supply (PS) 24 V DC	Undervoltage of the logic supply (PS) 24 V DC was detected.	<ul style="list-style-type: none"> – Check the power supply (logic) 	Error
02 01 0017 33619991	Overvoltage in logic supply (PS) 24 V DC	Overvoltage of the logic supply (PS) 24 V DC was detected.	<ul style="list-style-type: none"> – Check the power supply (logic) 	Error
08 01 0124 134283556	Communication to AP master interrupted	The communication to the AP Master is interrupted.	<ul style="list-style-type: none"> – Restart AP Master. – Check communication AP connecting cable. 	Error
08 01 0130 134283568	Output process data watchdog of the AP module expired	Output process data watchdog of the AP module expired	<ul style="list-style-type: none"> – Restart AP system. – Check cable. 	Error
08 01 01A2 134283682	System state emergency operation mode	System initialisation (module detection) has failed. The system is in maintenance mode. I/O function is not available.	<ul style="list-style-type: none"> – Restart system – Update firmware to the latest version – Contact Festo Service 	Error

Tab. 12: Diagnostic messages

11 Technical data

General technical data	
General technical data for remote I/O system CPX-AP	Instruction manual for remote I/O system CPX-AP-I ➔ 1.1 Applicable documents
Dimensions [mm] (length × width × height)	102.5 × 30.0 × 35.0
Product weight [g]	81
Ambient temperature [°C]	–20 ... +60
Storage temperature [°C]	–40 ... +70
Max. storage time [years]	2
Humidity (non-condensing) [%]	5 ... 95
Assigned address space [Byte] (inputs/outputs)	1/–
Module code (hex/dec)	0x2006/8198d
Module identification	CPX-AP-I-4DI-M8-3P
Degree of protection in accordance with EN 60529	IP65/IP67, if all cables are connected and connections that are not required are closed with cover caps.
Protection against electric shock (protection against direct and indirect contact)	by the use of SELV/PELV circuits (safe extra-low voltage/protected extra-low voltage)
Electromagnetic compatibility	See declaration of conformity ➔ www.festo.com/sp
Mounting position	Any

Tab. 13: General technical data

Digital inputs		
No. of inputs		4
Type in accordance with IEC 61131-2		3 (24 V DC)
Cable length	[m]	Max.30
Design	[V]	0 ... 30, positive logic (PNP)
Logic level (logic 0/1)	[V]	$\leq 5 / \geq 11$
Input debounce time		Parameterisable
Electrical isolation between the channels		No
Electrical isolation between inputs and PS		No
Sensor supply		
Sensor power supply SEN	[V DC]	24 \pm 25 % If there is a connection to other circuits at one of the connections for the inputs, the circuits must also comply with SELV/PELV.
Voltage drop at short-circuit protection (reduction SEN)	[V]	≤ 1
Reverse polarity protection 24 V SEN against 0 V SEN		Yes
Potential difference between 0 V SEN external and 0 V SEN internal		Not permissible
Sensor power supply short circuit protection		
Short-circuit protection		Electronic
Trigger level	[A]	> 0.8
Characteristic		Slow-blow
Response after end of overload		Automatic recovery

Tab. 14: Digital inputs

11.1 Technical data, electrical

Power supply		
Logic supply PS		
Logic supply PS	[V DC]	24 \pm 25 %
Intrinsic current consumption at nominal operating voltage 24 V from PS	[mA]	Typically 32
Undervoltage detection in logic supply PS		
Trigger level	[V]	17.2
Hysteresis	[V]	0.3
Overvoltage detection in logic supply PS		
Trigger level	[V]	> 30

Tab. 15: Power supply

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