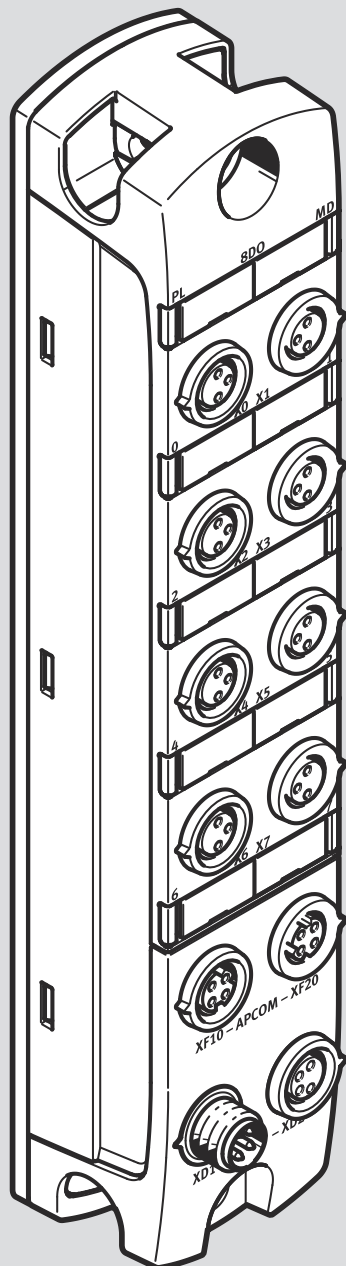


CPX-AP-I-8DO-M8-3P

Digital output module

FESTO

Operating instruction



8234663

8234663
2025-05b
[8234665]

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
Remote I/O System CPX-AP-I operating instructions	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-8DO-M8-3P	Revision 1 and above

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 and the Data Matrix Code are printed on the housings of the modules. Scanning the 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 Design

4.1.1 Product design

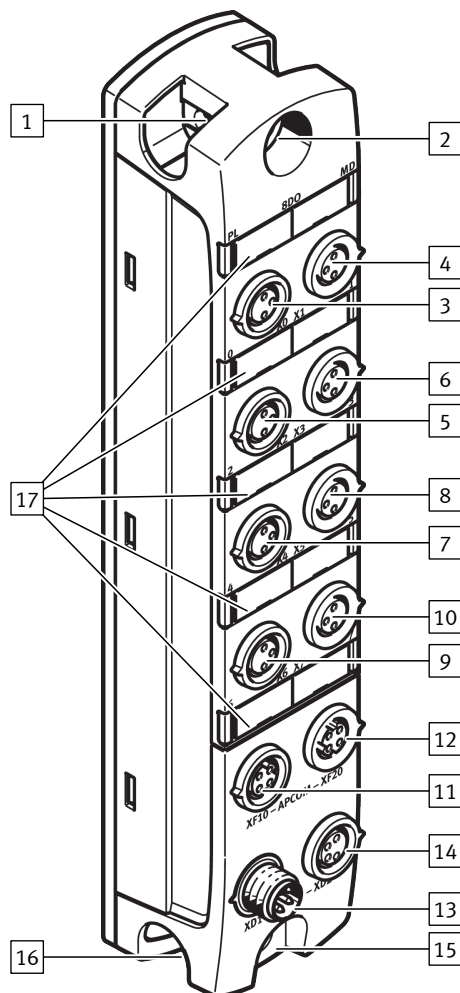


Fig. 1: Product design

- | | |
|---|---|
| <p>[1] Mounting side top</p> <p>[2] Mounting front top</p> <p>[3] Connection [X0]: output 0</p> <p>[4] Connection [X1]: output 1</p> <p>[5] Connection [X2]: output 2</p> <p>[6] Connection [X3]: output 3</p> <p>[7] Connection [X4]: output 4</p> <p>[8] Connection [X5]: output 5</p> <p>[9] Connection [X6]: output 6</p> <p>[10] Connection [X7]: output 7</p> <p>[11] Connection [XF10]: system communication</p> | <p>[12] Connection [XF20]: system communication forwarding</p> <p>[13] Connection [XD1]: power supply</p> <p>[14] Connection [XD2]: forwarding supply</p> <p>[15] Front bottom mounting with functional earth connection</p> <p>[16] Side bottom mounting with functional earth connection</p> <p>[17] Inscription label (optional)</p> |
|---|---|

4.1.2 LED indicators

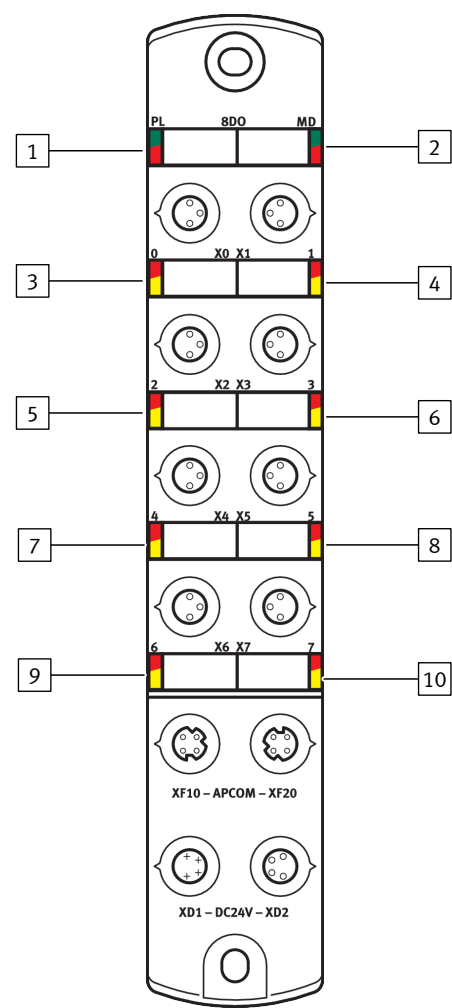


Fig. 2: LED indicators

- 1

LED [PL]: load supply
- 2

LED [MD]: module diagnostics
- 3

LED [X0.0]: output 0 status
- 4

LED [X1.1]: output 1 status
- 5

LED [X2.2]: output 2 status

6

LED [X3.3]: output 3 status

7

LED [X4.4]: output 4 status

8

LED [X5.5]: output 5 status

9

LED [X6.6]: output 6 status

10

LED [X7.7]: output 7 status

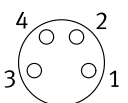
4.1.3 Connecting elements

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

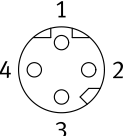
Tab. 4: Power supply connection



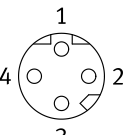
For information on power supply, see operating instructions for remote I/O system CPX-AP-I ➔ 1.1 Applicable documents.

Connection for voltage forwarding [XD2]		
M8 socket, 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

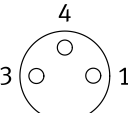
Tab. 5: Connection for voltage forwarding

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. 6: Connection for system communication

Connection for system communication forwarding [XF20]			
Socket M8, 4-pin, D-coded	Signal		
	1	RX–	Received data –
	2	TX+	Transmitted data +
	3	RX+	Received data +
	4	TX–	Transmitted data –

Tab. 7: Connection for system communication forwarding

Connection for outputs [X0] ... [X7]		
M8 socket, 3-pin, A-coded	Signal	
	1	n.c.
	3	0 V DC outputs
	4	Output 0 ... 7

Tab. 8: Connection for outputs



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.

4.2 Function

The module supplies eight digital outputs in a remote I/O system CPX-AP. The module response can be parameterised ➔ 8 Parameterisation. Status and error messages are indicated by LED displays on the module and reported to the interface by the system communication.

4.2.1 Digital outputs

The digital outputs are used to control electrical actuators. Valves, contactors or display components, for example, can therefore be actuated with a voltage of 24 V DC.

The power is supplied to the outputs by the load supply PL and is electronically protected against short circuit or overload separately for each output. If this fuse is tripped, the power supply of the output is switched off and the error is shown by an LED on the module. After the short circuit or the overload has been cleared,

the power supply is not switched on again until after the output is reset. The electronic fuse of the module is a slow-blow type. Electrical consumers with a temporarily higher current requirement can therefore also be connected.

5 Mounting

- Carry out assembly in accordance with the "Remote I/O system CPX-AP-I operating instructions" → 1.1 Applicable documents.

6 Installation

- Carry out installation in accordance with the "Remote I/O system CPX-AP-A operating Instructions" → 1.1 Applicable documents.

6.1 Connecting cables

⚠ WARNING

Risk of injury due to electric shock.

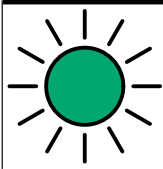
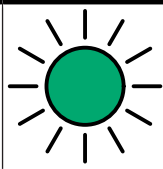
- For the electric power supply, use SELV or PELV circuits that guarantee a reliable electric disconnection from the mains network.
- Observe IEC 60204-1/EN 60204-1.

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.

7 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

[MD]	[PL]
 Green light	 Green light

Tab. 9: Response of the LED displays of the module after error-free commissioning

8 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.

Fieldbus startup parameters

ID	Parameters	Number of instances ¹⁾	Data type	Access ²⁾	Array size
20022	Configuration for load supply (PL) voltage monitoring – 0: load voltage monitoring inactive – 1: load voltage monitoring active, with suppression of diagnostics at switch-off (factory setting) – 2: load voltage monitoring active	1	ENUM_ID	rw	–
20052	Response in error status (communication malfunction) – 0: reset outputs (factory setting) – 1: maintain status	1	ENUM_ID	rw	–

1) Counting starting at 0.

2) ro = read only; rw = read write

Tab. 10: Fieldbus startup parameters

AP parameter

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 [°C]	1	INT16	ro	–
20087	Current measured value of logic supply PS [mV]	1	UINT16	ro	–
20088	Current measured value of load supply PL [mV]	1	UINT16	ro	–
20093	Hardware version	1	UINT8	ro	–

1) Counting starting at 0.

2) ro = read only; rw = read write

Tab. 11: AP parameter

9 Diagnostics

9.1 LED indicator

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 initialised.	–
 Fast flashing green 2 Hz	Module identification (service function)	–

Tab. 12: Module diagnostics LED [MD]

Load supply [PL]		
LED	Meaning	Remedy
 Green light	Load supply PL available.	–
 Flashing green 0.5 Hz	Load supply PL not available.	Check load supply PL.
 Flashing red 0.5 Hz	Load supply PL outside the tolerance range.	Check load supply PL.

Tab. 13: Load supply LED [PL]

Status of output		
LED	Meaning	Remedy
 Yellow light	Output active (logic 1) Output sends logic 1	–
 Off	Output inactive (logic 0) Output sends logic 0	–

Tab. 14: LED status of output

Diagnostics of output		
LED	Meaning	Remedy
 Red light	Short circuit/overload at output	Check the connected actuators, eliminate short circuit/overload. To acknowledge the error after correcting the malfunction, reset the output.
 Off	No channel error at output	–

Tab. 15: LED diagnostics of output

9.2 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.

ID hex (dec)	Message	Description	Remedy	Diagnostics status
01 01 010C (16843020)	Short-circuit/overload output signal	Connected digital output load is too high for the channel.	– Check connected load for correct function, in particular for current consumption. – Check wiring. – The output must be reset after the malfunction has been cleared.	Error
02 01 0016 (33619990)	Undervoltage in logic supply (PS) 24 V DC	Undervoltage of the logic supply (PS) 24 V DC was detected.	– 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.	– Check the power supply (logic)	Error
02 01 0105 (33620229)	Undervoltage in load supply (PL) 24 V DC	Undervoltage in the load supply (PL) 24 V DC was detected.	– Check power supply (load) – Check for short circuit	Error
02 01 0106 (33620230)	Shutdown of load supply (PL) 24 V DC	A shutdown of the load voltage supply PL was detected. The cause can be a deliberate shutdown by emergency stop.	– Check whether emergency stop was activated – Check the load voltage supply	Information
02 01 013F (33620287)	Overvoltage in load supply (PL) 24 V DC	Overvoltage in load supply (PL) 24 V DC	– Check power supply	Error
08 01 0124 (134283556)	Communication to AP master interrupted	The communication to the AP Master is interrupted.	– Restart AP Master. – Check communication AP connecting cable.	Error

ID hex (dec)	Message	Description	Remedy	Diagnostics status
08 01 0130 (134283568)	Output process data watchdog of the AP module expired	Output process data watchdog of the AP module expired	– 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.	– Restart system – Update firmware to the latest version – Contact Festo Service	Error

Tab. 16: Diagnostic messages

10 Technical data

10.1 Technical data, general

General technical data	
Certificates, declaration of conformity	➔ www.festo.com/sp
Dimensions [mm] (length × width × height)	170 × 30 × 35
Product weight [g]	127
Ambient temperature [°C]	–20 ... +60
Storage temperature [°C]	–40 ... +70
Max. storage time [years]	2
Humidity (non-condensing) [%]	5 ... 95
Assigned address space (inputs/outputs) [Byte]	–/1
Module code (hex/dec)	0x2139/8505d
Module identification	CPX-AP-I-8DO-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.
Electromagnetic compatibility	See declaration of conformity ➔ www.festo.com/sp
Mounting position	Any

Tab. 17: General technical data

10.2 Technical data, electrical

Power supply		
Logic supply PS		
Logic supply PS	[V DC]	24 ± 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
Load supply PL		
Load supply PL	[V DC]	24 ± 25 % If there is a connection to other circuits at one of the connections for the outputs, the circuits must also comply with SELV/PELV..
Intrinsic current consumption at nominal operating voltage 24 V from PL	[mA]	Typically 10
Undervoltage detection in load supply PL		
Trigger level	[V]	17.5
Hysteresis	[V]	0.3
Overvoltage detection in load supply PL		
Trigger level	[V]	> 30
Cut-off voltage for load supply PL		
Trigger level	[V]	5.7
Hysteresis	[V]	0.3
Capacitive load at load supply PL		
24 V PL to 0 V PL	[nF]	Typically 45
24 V PL to FE	[nF]	Typically 35
0 V PL to FE	[nF]	Typically 20

Tab. 18: Power supply

Digital outputs		
Number of outputs		8
Type in accordance with IEC 61131-2		0.5 (24 V DC)
Max. cable length	[m]	30
Design		Positive logic (PNP)
Reverse polarity protection		Yes
Max. output current per channel	[A]	0.5
Max. lamp load per channel	[W]	12
Voltage drop via output	[V DC]	≤ 1
Parallel connection of outputs		Yes
Reverse voltage resistance		Max. PL
Limitation of inductive switch-off voltage	[V]	Typically –16
Electrical isolation		
Between PS and PL		Yes
Between the channels		No
Output short-circuit protection		
Short-circuit protection		Electronic
Trigger level	[A]	> 0.5
Characteristic		Slow-blow
Response after end of overload		No automatic recovery
Output delay with resistive load		
Signal change from 0 to 1	[μs]	< 200
Signal change from 1 to 0	[μs]	< 200

Tab. 19: Digital outputs

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