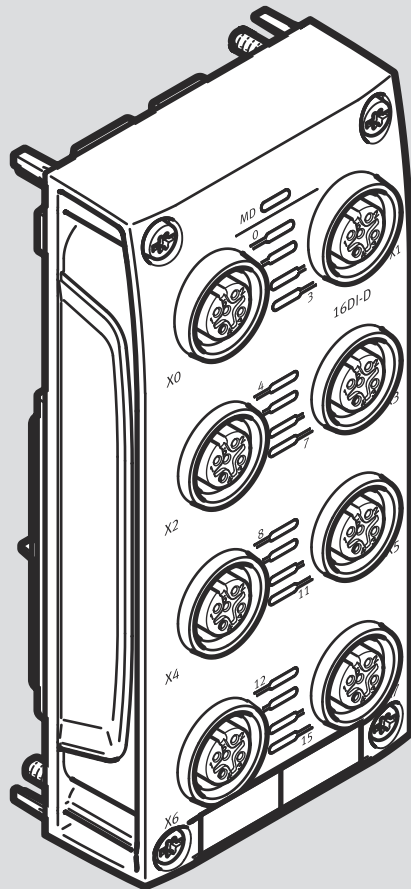


CPX-AP-A-16DI-D-M12-5P

Digital input module

FESTO

Operating instruction



8235660

8235660
2025-05b
[8235662]

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

Tab. 1: Applicable documents

1.2 Product version

This document refers to the following product versions:

Product	Version
CPX-AP-A-16DI-D-M12	From revision 1

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	IEC 61131-2:2017-08
IEC 60364-4-41:2005-12	–

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.
- Before working on the product, switch off the power supply and secure it against being switched on again.

2.2 Intended use

The digital input module is intended for use in a remote I/O system CPX-AP-A. Use the product as follows:

- Use only in an industrial environment. Outside industrial environments, e.g. in commercial and residential/mixed-use areas, it may be necessary to take measures to suppress radio interference.
- 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.

3 Additional information

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

4 Product overview

4.1 Product design

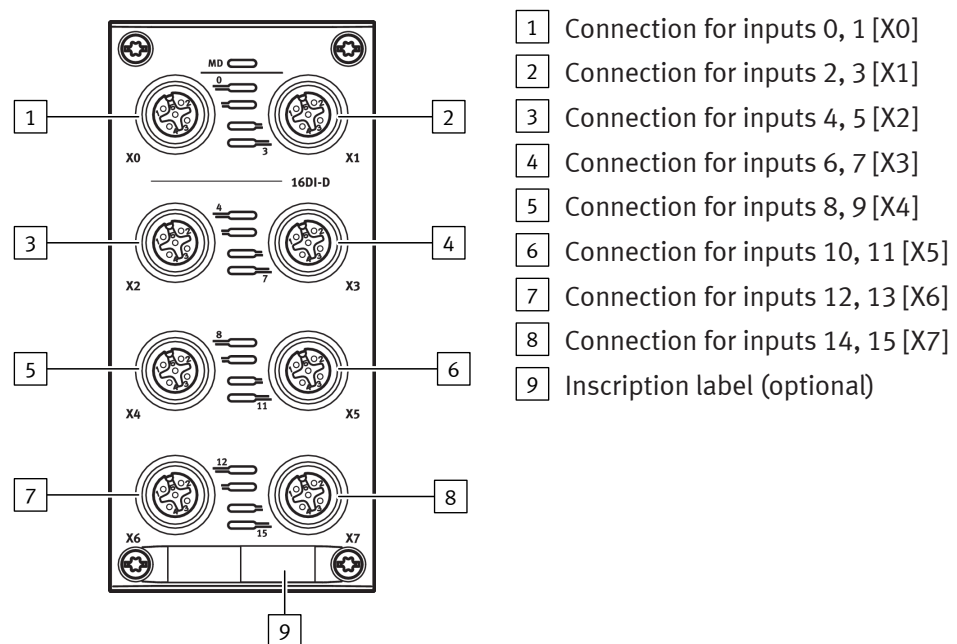


Fig. 1: Product design

4.2 LED indicators

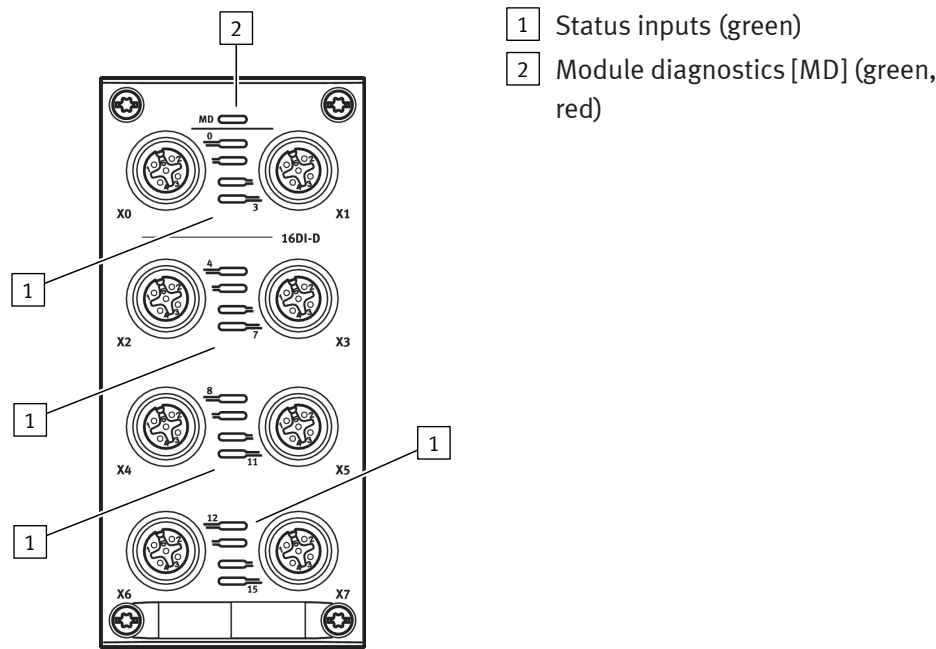


Fig. 2: LED indicators

4.3 Connecting elements

Connection for inputs [X0] ... [X7]		
M12 socket, 5-pin, A-coded		Signal
	1	24 V DC sensor supply
	2	Input: 1, 3, 5, 7, 9, 11, 13, 15
	3	0 V DC sensor supply
	4	Input: 0, 2, 4, 6, 8, 10, 12, 14
	5	Functional earth FE

Tab. 4: 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.

Digital and analogue signal lines	
Max. cable length	30 m

Tab. 5: Requirements for the connecting cable

5 Function

Function description

The module provides 16 digital inputs.
The module response can be parameterised.
Status and error messages are indicated by LED displays on the module and reported to the bus interface via system communication.

5.1 Digital inputs

The digital inputs are used to connect sensors, thereby enabling the recording and further processing of digital input signals. The sensors are supplied with a voltage of 24 V DC via the module and return a logic 0 or logic 1 to the inputs.

The sensor supply has an electronic fuse for protection against short circuit or overload. If this electronic fuse is tripped, the sensor supply for every M12 plug connector is switched off, the error is displayed via an LED display on the module and reported via the system communication. 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.

5.2 Channel diagnostics

The channel diagnostics give an overview of any pending diagnostic messages for the channels of the selected module.

6 Mounting

- Carry out assembly in accordance with the "Operating Instructions remote I/O system CPX-AP-A" → 1.1 Applicable documents.

7 Installation

- Carry out installation in accordance with the "Operating Instructions 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 $0.4 \text{ Nm} \pm 15\%$ for M8. Different from the information for connecting cables.
 - For example, use PHOENIX CONTACT SAC BIT M12-D15 with a tightening torque of $0.6 \text{ Nm} \pm 10\%$ for M12. Different from the information for connecting cables.
3. Close the unused connections with cover caps.

8 Commissioning

- Carry out commissioning in accordance with the "Instruction manual remote I/O system CPX-AP-A" → 1.1 Applicable documents.

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



Tab. 6: Response of the LED displays of the module after error-free commissioning

9 Parameterisation

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. 7: 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. 8: 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	–
 Flashing red 0.5 Hz	Module diagnostics active "Warning" degree of severity e.g. parameterisation error	– Carry out appropriate remedial measures, e.g. check parameterisation.
 Red light	Module diagnostics active "Error" degree of severity e.g. undervoltage in logic supply PS	– Carry out appropriate remedial measures, e.g. check logic supply PS.
 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. 9: Module diagnostics LED [MD]

Status of input		
LED	Meaning	Remedy
 Off	Input inactive (logic 0) Logic 0 at input	–
 Green light	Input active (logic 1) Logic 1 at input	–
 Red light	Short circuit overload sensor supply	–

Tab. 10: LED status of input

10.2 Diagnostic messages

ID hex (dec)	Message	Description	Remedy	Diagnostic status
01 01 010B (16843019)	Short circuit/overload in sensor supply	A short-circuit/overload of the sensor supply was detected	– 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.	– 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
08 01 0124 (134283556)	Communication to AP master interrupted	The communication to the AP Master is aborted.	– 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	– 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. 11: Diagnostic messages

11 Technical data

11.1 Technical data, general

General technical data	
Certificates, declaration of conformity	➔ www.festo.com/sp
Mounting position	Any
Dimensions [mm] (width × length × height)	50.1 × 107.3 × 57.5 (including interlinking module)
Product weight [g]	96
Ambient temperature [°C]	–20 ... +50
Storage temperature [°C]	–20 ... +70
Humidity (non-condensing) [%]	5 ... 95
Assigned address space (inputs) [Byte]	2
Module code (hex/dec)	0x3001/12289d
Module identification	CPX-AP-A-16DI-D-M12-5P
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

Tab. 12: General technical data

11.2 Technical data, electrical

Power supply		
Logic supply PS	[V DC]	24 ± 25 %
Intrinsic current consumption at nominal operating voltage 24 V from PS	[mA]	Typically 40
Diagnostics message, under-voltage in logic supply PS	[V DC]	< 18

Tab. 13: Power supply

Digital inputs		
No. of inputs		16
Type in accordance with IEC 61131-2		3 (24 V DC)
Max. cable length	[m]	30
Design	[V DC]	0 ... 30, positive logic (PNP)
Logic level (logic 0/1)	[V DC]	≤ 5/ ≥ 11
Input debounce time		Parameterisable
Electrical isolation between the channels		No
Electrical isolation between inputs and PS		No
Sensor supply		
Sensor internal power supply U_{Sen}	[V DC]	24 ± 25 %
Max. current per channel	[A]	0.5
Max. aggregate current of inputs per module	[A]	1.8
Voltage drop at short-circuit protection (reduction U_{Sen})	[V DC]	≤ 1
Reverse polarity protection U_{Sen} against 0 V		Yes
Potential difference between 0 V external sensor power supply and 0 V internal sensor power supply		Not permissible
Sensor power supply short circuit protection		
Short-circuit protection		Electronic
Trigger level	[A]	> 0.5
Characteristic		Slow-blow
Response after end of overload		Automatic recovery

Tab. 14: Digital inputs

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