

Decentralised remote I/O system CPX-AP-I

FESTO



Connectivity in real time

Highlights

- Ultra-light and compact
- IO-Link master and IO-Link device tool
- Short bus cycle times up to 250 μ s
- 2 kByte I/O process data
- Parallel data processing of real-time and non-real-time data
- Theoretically up to 500 modules in line, star and tree topology
- Cable lengths up to 50 m between modules
- Best price/performance ratio with a combination of valve terminals and decentralised IO

The new I/O system in IP65/IP67 enables powerful I/O modules and existing valve terminal interfaces to be integrated in the most important host systems. Based on the innovative AP system communication from Festo, CPX-AP-I ensures continuous communication from the workpiece to the cloud – tailored to your needs!

Technological excellence

A bus cycle time of up to 250 μ s and a net data rate of 200 Mbaud make CPX-AP-I real-time capable and enable up to 2 kByte I/O process data. This is ideal for fast and synchronous processes. The extremely flexible system is easily scalable with cable lengths up to 50 m. Load and logic voltage supply are galvanically isolated.

Welcome to the world of AP

CPX-AP-I lets you connect up to 500 modules and valve terminals to standard bus systems. Even existing valve terminals can be easily integrated. Connection to the IoT gateway, easy integration and parameterisation of IO-Link devices, a web server, and an extensive range of functions with the software Festo Automation Suite make your system fit for seamless connectivity!

Everything is interlinked: from pneumatics to electrics, from the workpiece to the cloud

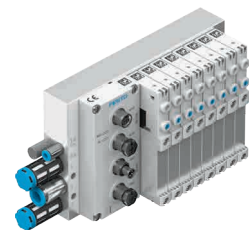
So many advantages for you!

- Communication and voltage supply via two separate connecting cables. This enables, for example, the creation of voltage zones
- Can be flexibly integrated in applications of any size
- Sturdy, compact and ultra-light for assembly machines with limited installation space, handling and tool change systems, or mobile applications where low weight and small installation space are called for
- Compatible with all commercially available host systems
- Up to 50 m cable length possible between the modules
- IO-Link master and IO-Link device tool already integrated
- Connection of the field level to the IIoT via CPX-IoT
- Real-time capability and extremely short bus cycles up to 250 µs for rapid production processes
- Latency times within the system network per station in the ns range

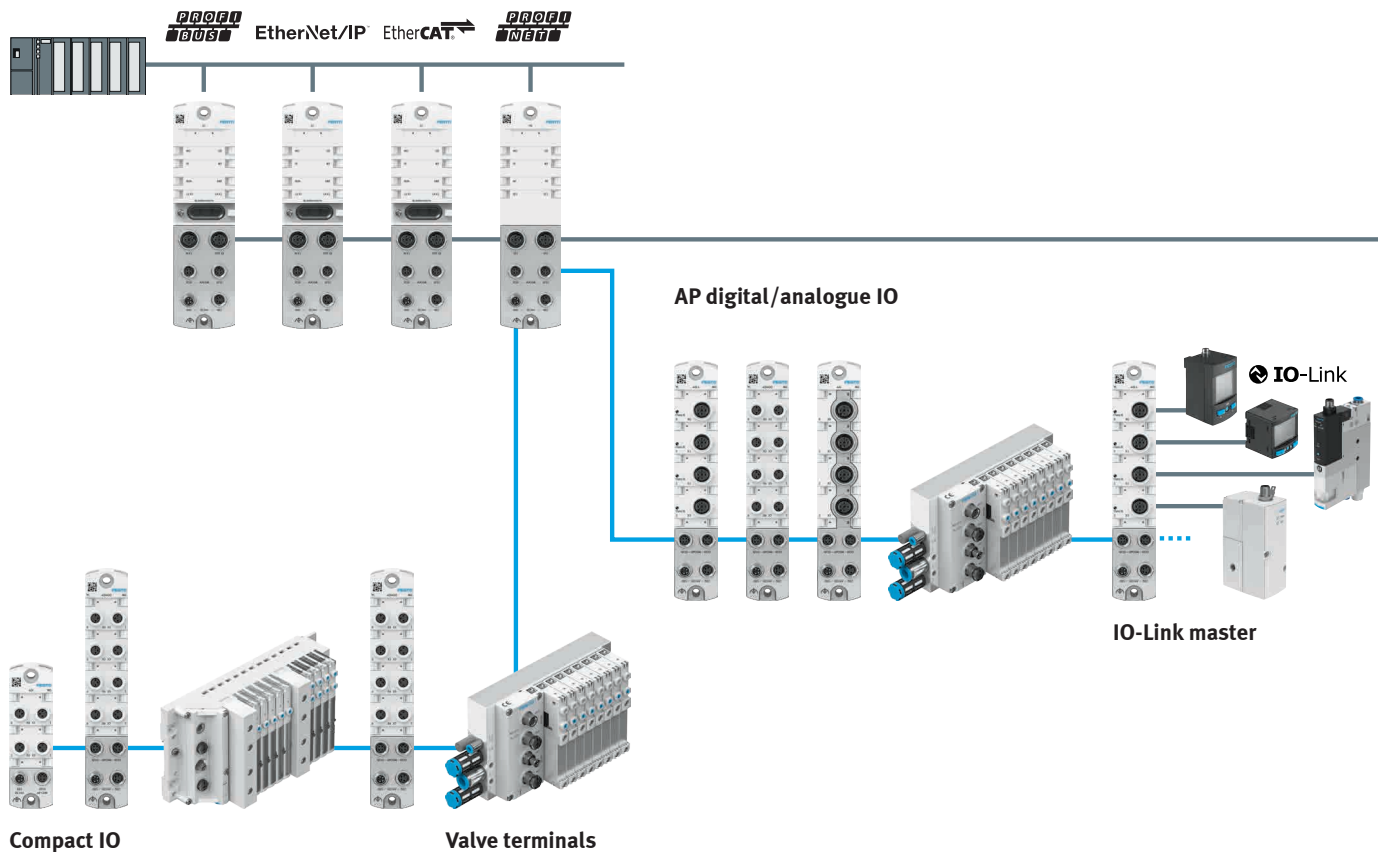
Retrofit for existing valve terminals

The new AP system communication will integrate future valve terminals from Festo seamlessly into your application. Existing valve terminal series such as VTUG or MPA-L can also be easily integrated via the AP interface of the CPX-AP-I. With the added new functions, they can then also be used as switching cycle counters or for load voltage monitoring, for instance. In addition, they can be connected to the cloud. This enables the use of intelligent tools such as dashboards for preventive maintenance and

condition monitoring. Another plus point: valve terminals with IO-Link interface, e.g. VTOC, VTUB, CPV, can be connected via IO-Link.



The valve terminal VTUG from Festo can be easily integrated with an electrical AP interface.



AP system communication

Configurable I/O modules help ensure that each application is optimised individually with the CPX-AP-I. Cross-communication between modules opens up completely new opportunities for fast applications and decisions. When you integrate the platform in the commissioning software Festo Automation Suite, engineering, condition monitoring and diagnostics will also be easier for you.

Continuous communication with all standard host environments is possible at any time, even without engineering tools from Festo! And IO-Link technology can be used without any problem as IO-Link stations can be easily integrated into the system via the IO-Link master and IO-Link device tool. Additionally, CPX-AP-I is optimised for current and future industrial Ethernet protocols such as TSN.



Engineering, condition monitoring and enhanced diagnostics – all in one with the Festo Automation Suite.

Ready for digitalisation in the age of Industry 4.0



Festo Dashboards

- Predictive maintenance
- Condition monitoring

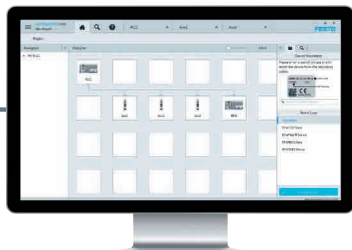
When connected to the IoT gateway from Festo, CPX-AP-I communicates via standard cloud protocols such as OPC UA, MQTT and AMQP. This extends the diagnostic options and thus improves maintenance, reduces downtimes and increases overall equipment effectiveness (OEE), optionally via dashboards too. The great thing about it: the system's real-time capability is not affected by handling big data. Smart predictive

maintenance features are already available, e.g. switching cycle counter, cable quality monitoring, cable length indication as well as load voltage monitoring. The diagnostics portfolio, too, is enhanced for maximum effectiveness with features such as actuator travel time monitoring, additional commissioning aids as well as advanced connectivity functionalities.

TCP/IP



IoT gateway



Festo Automation Suite

- Smart engineering
- Enhanced diagnostics

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Technical data

CPX-AP-I	
Net data rate	200 Mbaud
Process data	2 kByte input/output
Network stations	Up to 500, from market launch: 80
Connecting cables	Prefabricated, standard CAT6e, 4-pin, D-coded M8 connector for communication and power Cable length up to 50 m, from market launch up to 15 m
Topology	Daisy chain as line, star, tree; from market launch: line
Power supply	24 V DC 2 x 4 A, separated load/logic supply Additional supply possible at any time
Diagnostics	Short-circuit/overload, voltage monitoring, logic/load, module status monitoring, monitoring the system communication, load voltage monitoring, IO-Link events
IP protection	IP65/IP67

Type	Dimensions	Weight
Bus interface	165 x 30 x 28 mm	Approx. 180 g
Digital I/O module	165 x 30 x 28 mm	Approx. 160 g
Analogue I/O module	165 x 30 x 28 mm	Approx. 180 g

Conclusion: a typical application configured for moving system components is made lighter by around 1 kg, while reducing space requirements by 80 cm².

Bus modules



CPX-AP-I-PN-M12

- Web server
- IRT also clock synchronous
- System redundancy NAP S2



CPX-AP-I-PB-M12



CPX-AP-I-EP-M12

- Web server
- QuickConnect
- Modbus®/TCP



CPX-AP-I-EC-M12

- EtherCAT Profile: CoE, EoE, FoE
- Fast Hot Connect, Distributed Clocks

I/O modules

CPX-AP-I-8DI	CPX-AP-I-4DI4DO	CPX-AP-I-4DI	CPX-AP-I-4IOL	CPX-AP-I-4AI-U-I-RTD	VAEM-AP	VMPAL-AP
8-way digital input modules	Digital input/output modules	4-way digital compact module	4-way IO-Link master	4-way analogue input module	Pneumatic interface VTUG	Pneumatic interface MPA-L
<ul style="list-style-type: none"> • M12 and M8 connection technology • Parameterisation of input bounce time 	<ul style="list-style-type: none"> • Galvanically isolated outputs • 0.5 A rated current per output • M8 and M12 connection technology 	<ul style="list-style-type: none"> • M8 connection technology • Most compact and light weight IO on the market 	<ul style="list-style-type: none"> • 4-way IO-Link master Class B • IO-Link device tool • 2 A rated current per output (4 A rated total current) 	<ul style="list-style-type: none"> • Measuring range/type: 0/4..20 mA, 0..10 V, 1..5 V, +/- 5 V, +/- 10V, PT100/Ni100, 500 Ohm • 16-bit analogue value • 1 ms cycle time • Basic error ≤0,15% at 25 °C • Linear scaling 	<ul style="list-style-type: none"> • Low-cost interface • Load voltage monitoring • Fail state parameterisation 	<ul style="list-style-type: none"> • Lean interface • Load voltage monitoring • Fail state parameterisation