Decentralised remote I/O system CPX-AP-I

Connectivity in real time

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 15 μs 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!

Highlights
- Ultra-light and compact
- IO-Link master and IO-Link device tool
- Short bus cycle times up to 250 μs
- 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 stations
- Best price/performance ratio with a combination of valve terminals and decentralised IO
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 15 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.

Ready for digitalisation in the age of Industry 4.0

When connected to the IoT gateway from Festo, CPX-AP-I communicates via standard cloud protocols such as OPC UA 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.

IoT gateway

TCP/IP

Festo Automation Suite
- Smart engineering
- Enhanced diagnostics

Festo Dashboards
- Predictive maintenance
- Condition monitoring
Decentralised remote I/O system CPX-AP-I

Technical data

<table>
<thead>
<tr>
<th>CPX-AP-I</th>
<th>Type</th>
<th>Dimensions</th>
<th>Weight</th>
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</thead>
<tbody>
<tr>
<td>Net data rate</td>
<td>Bus interface</td>
<td>165 x 30 x 28 mm</td>
<td>Approx. 180 g</td>
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<tr>
<td>Process data</td>
<td>Digital I/O module</td>
<td>165 x 30 x 28 mm</td>
<td>Approx. 160 g</td>
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<tr>
<td>Network stations</td>
<td>Analogue I/O module</td>
<td>165 x 30 x 28 mm</td>
<td>Approx. 180 g</td>
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<tr>
<td>Connecting cables</td>
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<tr>
<td></td>
<td>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</td>
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<tr>
<td>Topology</td>
<td>Daisy chain as line, star, tree; from market launch: line</td>
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<tr>
<td>Power supply</td>
<td>24 V DC 2 x 4 A, separated load/logic supply Additional supply possible at any time</td>
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<tr>
<td>Diagnostics</td>
<td>Short-circuit/overload, voltage monitoring, logic/load, module status monitoring, monitoring the system communication, load voltage monitoring, IO-Link results</td>
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<tr>
<td>IP protection</td>
<td>IP65/IP67</td>
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Bus modules

- CPX-AP-I-PN-M12
  - Web server
  - IRT also clock synchronous
  - System redundancy NAP S2
- CPX-AP-I-PB-M12
  - Web server
  - QuickConnect
  - Modbus®/TCP
- CPX-AP-I-EC-M12
  - EtherCAT Profile: AoE, EoE, FoE
  - Fast Hot Connect, Distributed Clocks

I/O modules

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<tbody>
<tr>
<td>8-way digital input modules</td>
<td>Digital input/output modules</td>
<td>4-way digital compact module</td>
<td>4-way IO-Link master</td>
<td>4-way analogue input module</td>
<td>Pneumatic interface VTUG</td>
<td>Pneumatic interface MPA-L</td>
</tr>
<tr>
<td>- M12 and M8 connection technology</td>
<td>- Galvanically isolated outputs 0.5 A rated current per output</td>
<td>- M8 connection technology</td>
<td>- 4-way IO-Link master Class B</td>
<td>- M12 connection technology</td>
<td>- Low-cost interface</td>
<td>- Lean interface</td>
</tr>
<tr>
<td>- Parameterisation of input bounce time</td>
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<td>- IO-Link device tool</td>
<td>- Measuring range/type: 0/4...20 mA, 0..10 V, 1..5 V +/- 5 V, +/- 10V, PT100/Ni100, 500 Ohm</td>
<td>- Provides switching cycle counters</td>
<td>- Provides switching cycle counters</td>
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Conclusion: a typical application configured for moving system components is made lighter by around 1 kg, while reducing space requirements by 80 cm².