All set for automation with IO-Link®

Simply smart

◆ IO-Link

FESTO

Point-to-point!

Highlights

- Safe installation
- User-friendly data handling
- Easy to replace devices
- Quick restart
- Large product range thanks to data storage for IO-Link and Festo automation
- Find description files quickly and easily with the IODD finder

Standardised IO-Link technology (IEC 61131-9) makes communication with sensors and actuators simple and economical. The result of an evolutionary development, this low-cost connection technology with three or five conductors is used for point-to-point connection without complex wiring and with minimal material requirements.

Parameterisation made easy

Software-supported parameterisation of intelligent sensors and actuators via the IO-Link master makes it extremely easy to set and reassign parameters. All description files are stored in the central IODD finder database. The automatic parameter assignment server function (data storage) following device replacement is an especially convenient feature.

Less downtime, increased productivity

The comprehensive exchange of diagnostic and operational data between device and master systems speeds up troubleshooting and forms the basis for condition monitoring systems.

Safe investment thanks to standardisation

An international, open and fieldbus-independent IO-Link standard supports existing and future connection concepts.

Easier to install

Uncomplicated wiring of the sensor-actuator combinations with standardised, unscreened cables reduces material costs, simplifies logistics and saves time.

Easier communication

More flexible communication thanks to standardisation, from the control level to the field level, and compatible with Industry 4.0 host environments.

IO-Link – the intelligent "last step" in automation

What does IO-Link do?

IO-Link is not a new bus system, but a new kind of interface which expands fieldbus and Industrial Ethernet systems. IO-Link allows you not only to transmit process data, but also to download parameter data from the control system to the sensor or actuator, and to send diagnostic data in the other direction to the control system.

Whereas integrating a fieldbus interface all the way down to the lowest field level used to be very costly, digital or analogue values can now be transmitted with only a simple 3- or 5-wire cable – with no special features in terms of screening, twisting, impedance or terminating resistance.

The gateway between the fieldbus and one or more IO-Link slaves is normally provided by a fieldbus device with multiple IO-Link master channels. In smaller machines or systems, which may not require a fieldbus because of their size, the PLC acts as the IO-Link master.

A mass of expertise

Festo is a member of all the globally relevant fieldbus/Ethernet organisations as well as AS-Interface and IO-Link. We have been developing fieldbus-capable electronic components for more than 25 years, and we are a global market leader in intelligent pneumatics and in technical basic and further training.

What are the key features of IO-Link?

- Serial, bidirectional communication interface for sensors and actuators
- Simplified commissioning of a wide range of devices based on standardised profiles
- Point-to-point connection at field level with master-device communication

- Can be used either for simple sensors or for very complex sensor-actuator combinations
- One standard connection for measuring or switching sensors as well as for field devices with a mix of signals and data
- Compatible with standard cables and connectors

- Parameter assignment server function (data storage) for the fast and easy replacement of sensors and actuators. If an IO-Link device fails, the old settings are automatically transferred to the replacement device by the IO-Link master
- Device description file IODD for easy parameterisation on the PC with a graphical user interface: https://ioddfinder. io-link.com

IO-Link benefits with Festo

Professional and consistent decentralisation: the compact controller CECC with four IO-Link master ports doesn't just reduce the cost of installing and networking intelligent sensors and valve terminals. It also provides valuable diagnostic options. The automation system CPX-E with 4-way IOL master in IP20 is a new addition.

Economical and efficient installation

Low-cost standard cables and IO-Link for valve terminals instead of multi-pin plugs allow simple, decentralised diagnostic messages and offer distinct technical advantages, such as more flexible installation, improved energy chain feed-through, and optimum adaptation to humid or particularly harsh ambient conditions.

Secure processes and data transmission

Proportional pressure regulators VPPM or vacuum generators OVEM connected to the IO-Link master do not need a screened analogue cable, making the signal level less prone to interference. Parameterisation and data storage take place in the IO-Link master (parameter assignment server function), so that devices can be restarted after replacement.

Easy integration of complex sensors

The uniform interface in IO-Link replaces individual sensor connections, e.g. with a mix of analogue and digital signals. That means that even position transmitters SDAT and parameterisable pressure and flow sensors can be integrated and installed at low cost.

Secure: valve terminals with type B ports

Valve terminals from Festo have a galvanically isolated power supply to the electronics and valves. They communicate using the IO-Link V1.0 and V1.1 protocol with a baud rate according to COM3. And as type B port devices, they ensure that valves can be shut down securely after emergency off.
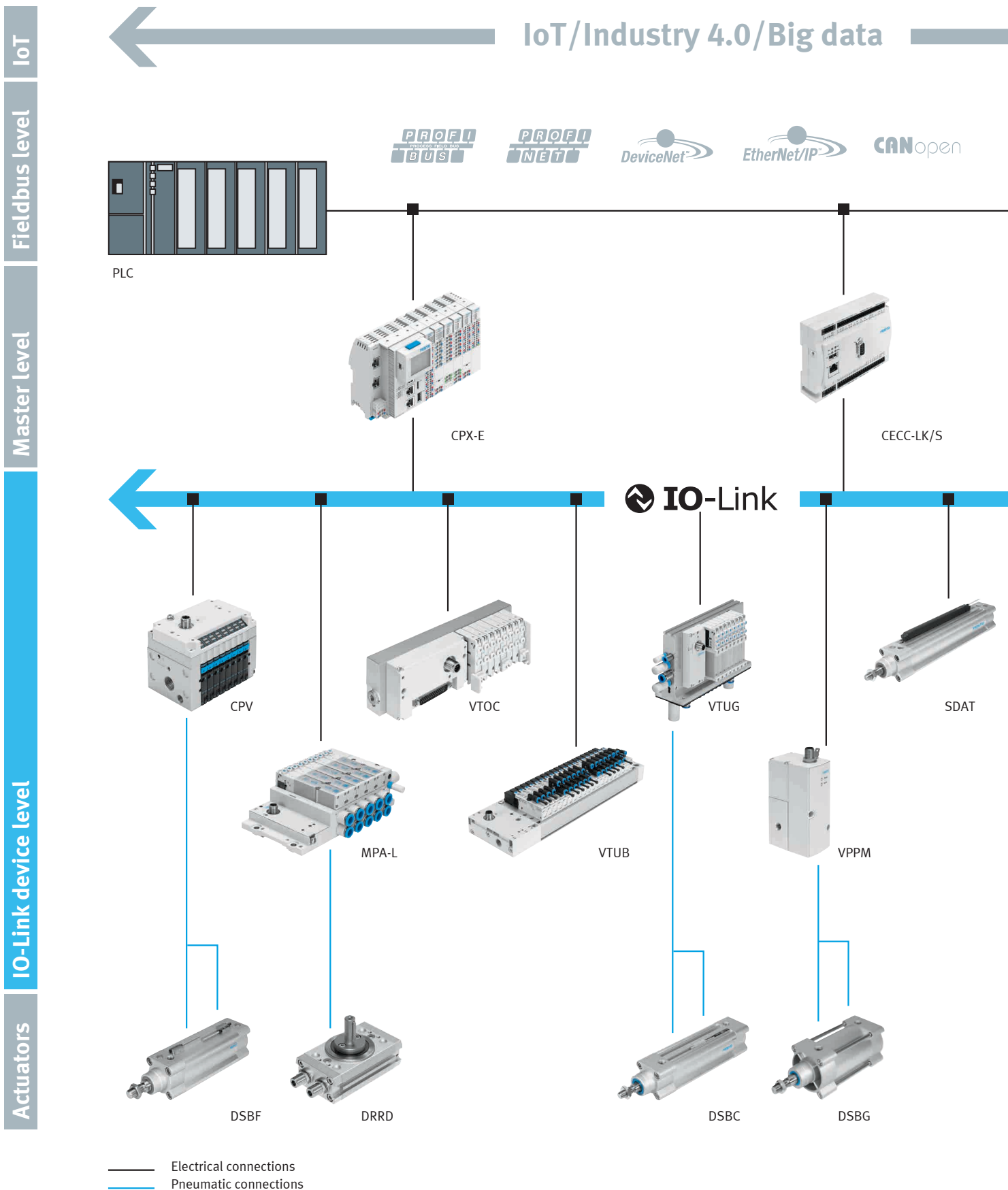
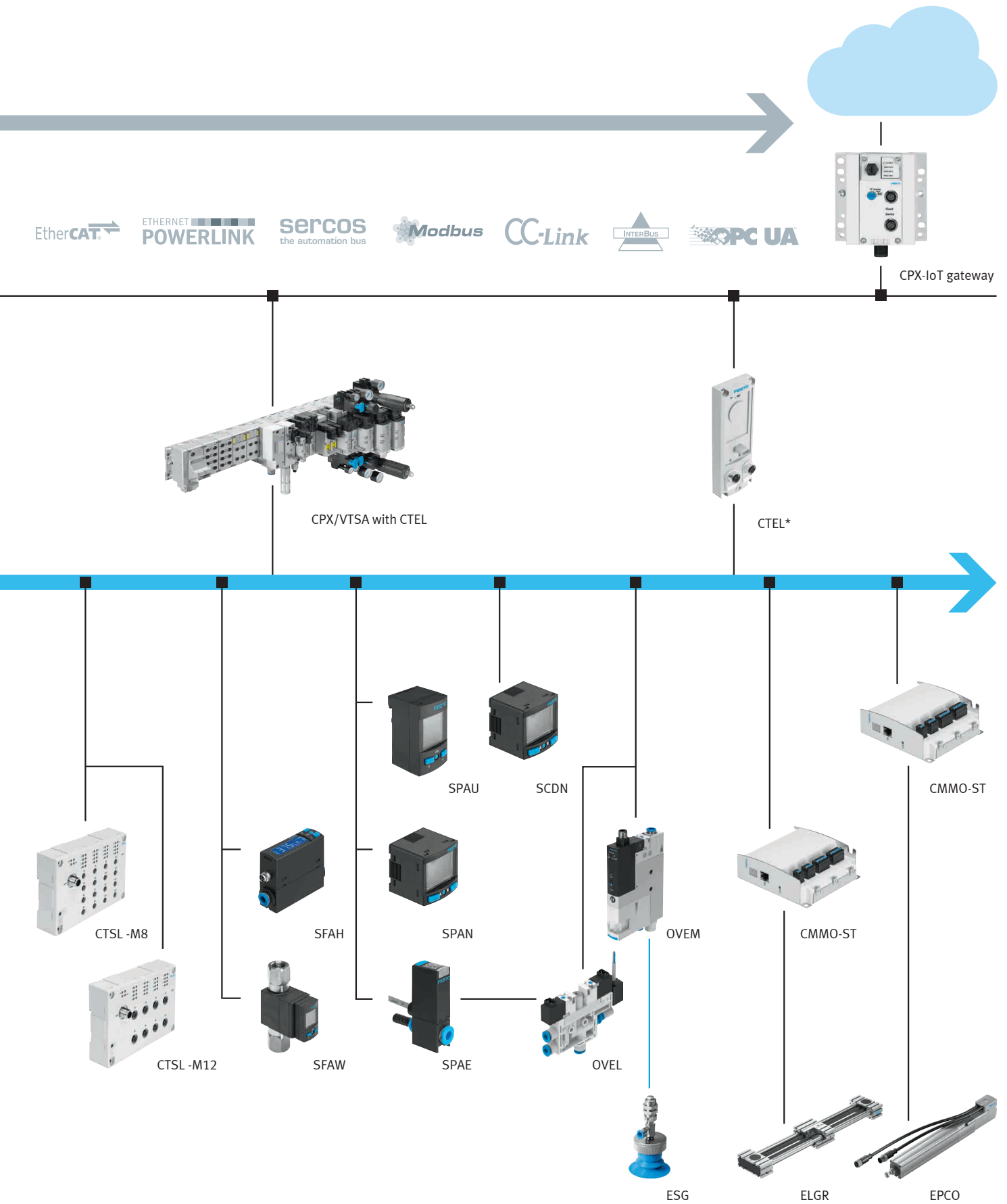Other IO-Link devices from Festo have a type A port and protocol V1.1.

The benefits of Industry 4.0 and IO-Link

All fieldbus/Ethernet, AS-Interface and IO-Link products are suitable for use as "contributors" in terms of Industry 4.0. IO-Link offers a clear and machine-readable data structure. Festo offers you a comprehensive IO-Link portfolio for integrated solutions from the mechanical system to the cloud.

Installation, parameterisation and diagnostics in peak form

IoT

IoT/Industry 4.0/Big data

Fieldbus level

PROFI BUS PROCESS FIELD BUS PROFI NET DeviceNet EtherNet/IP CANopen

PLC

Master level

CPX-E

CECC-LK/S

IO-Link

IO-Link device level

CPV

VTOC

VTUG

SDAT

MPA-L

VTUB

VPPM

Actuators

DSBF

DRRD

DSBC

DSBG

— Electrical connections
— Pneumatic connections

EtherCAT | ETHERNET POWERLINK | sercos the automation bus | Modbus | CC-Link | INTERBUS | OPC UA

CPX-IoT gateway

CPX/VTSA with CTEL

CTEL*

SPAU

SCDN

CMMO-ST

CTSL -M8

SFAH

SPAN

OVEM

CMMO-ST

CTSL -M12

SFAW

SPAE

OVEL

ESG

ELGR

EPCO

* Installation system CTEL, bus node CTEU, adapter CAPC for 2 Festo I-Port/IO-Link devices

IO-Link and products from Festo

Compact controller CECC as master (port type B, V1.1)

- CECC-LK with four IO-Link master ports and CECC-S with one IO-Link master port
- For activating electric and pneumatic actuators for small tasks
- Stand-alone or in mechatronic solutions via CODESYS V3.5 provided by Festo, with OPC UA for Industry 4.0

Features
- Innovative: IO-Link master
- Hybrid: direct activation and connection of electric and pneumatic actuators via CANopen
- Can be integrated into higher-level systems via Modbus/TCP
- Compact and with more functions
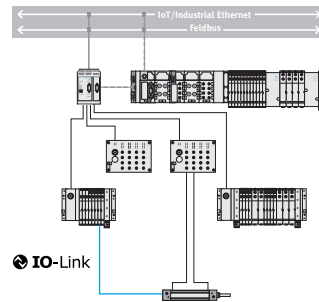
Compact controller CECC as device (port type A, V1.0)

- CECC-LK and CECC-S can also be operated as IO-Link devices on any IO-Link master module
- For activating electric and pneumatic actuators for small tasks
- Stand-alone or in mechatronic solutions via CODESYS V3.5 provided by Festo, with OPC UA for Industry 4.0

Features
- Hybrid: direct activation and connection of electric and pneumatic actuators via CANopen
- Can be integrated into higher-level systems via Modbus/TCP
- Compact and with more functions

Terminal CPX (port type B, V1.0)

Allows one or more master interfaces for IO-Link devices to be integrated when used as remote I/O or in conjunction with valve terminals.

Currently available for:
PROFINET
SERCOS III
EtherNet/IP
CoDeSys controller
CPX-CEC-V3-5(≥SP7)

Features
- On-site installation
- Control platform to IP65
- Integrated in a valve terminal MPA or VTSA
- Comprehensive function integration
- Simple control of pneumatic or electric actuators
- Plus: individual IO-Link third-party devices can be connected in the near/direct vicinity of the valve terminal
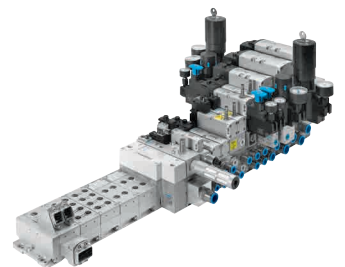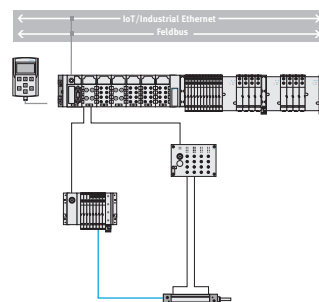
CPX-E modular remote I/O and control system

Powerful and extremely compact system for factory automation focusing on the function of motion control (CODESYS V3). Profinet, EtherNet/IP, EtherCAT or OPC UA for Industry 4.0 are available for integration in existing host environments, plus a 4-way IO-Link master module for system expansion.

Features
- High performance (Dual Core 766 MHz, 512 MB RAM)
- Integrated bus master interfaces:
  – EtherCAT master
- Integrated bus slave interfaces:
  – PROFINET device
  – EtherNet/IP slave (from the end of 2018)
- Bus modules:
  – PROFIBUS
  – PROFINET
- EtherCAT
- EtherNet/IP (with Modbus/TCP)
- USB interface
- SD card interface
- Optional display
- Modern programming system CODESYS V3 to IEC 61131-3 ›SP10
- Integration of motion functions (SoftMotion)
- UL/CSA, C-Tick, IEC Ex certifications

Valve terminal MPA-L (port type B, V1.1)

Expandable in individual steps.

Features
- Light, cost effective and corrosion-resistant thanks to sub-base with polymer technology
- Wide range of electrical connection options from multi-pin plug up to fieldbus thanks to Festo I-Port (IO-Link) and CPX
- Low-cost and tamper-proof fixed restrictor with vertical pressure shut-off plate to replace valves during operation, and pressure regulator
- Three combinable valve sizes for flow rates of up to 850 l/min, optionally in polymer or metal design
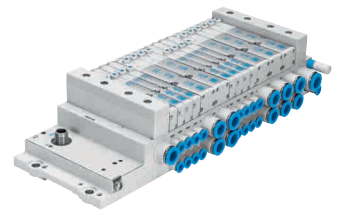
Valve terminal VTUG (port type B, V1.1)

Compact with high flow rate: VTUG with plug-in.

Features
- A wealth of electrical connection options from multi-pin plug up to fieldbus thanks to Festo I-Port (IO-Link)
- Manifold rails for direct integration and optimised installation in control cabinets
- Electrically and pneumatically actuated valves for vacuum applications even in an ATEX environment
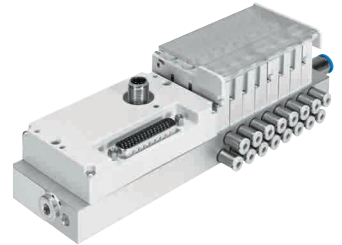- Three valve sizes for flow rates of 220 up to 1300 l/min
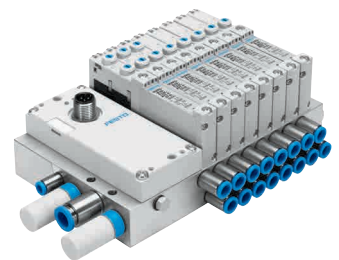
Valve terminal VTOC (port type B, V1.0)

Pilot/miniature valve terminal

Features
- Wide range of electrical connection options thanks to Festo I-Port (IO-Link)
- Interlock option for more safety

Valve terminal CPV (port type B, V1.0)

Maximum power density, light and compact.

Features
- Electrically actuated valves for vacuum applications even in an ATEX environment
- ATEX certification as per EU ATEX directive
- Manifold rails for direct integration and optimised installation in control cabinets
- Three valve sizes for flow rates of 400 up to 1600 l/min

Input module CTSL (port type A, V1.0)

16 inputs on 8xM12 or 16xM8.

Features
- Display of the input statuses for each input signal via an assigned LED
- Operating voltage supply 24 V DC for all connected sensors
- M12: DUO plug connector with double allocation
- Labelling options on all sides with large, hinged inscription label
- Earthing plate and H-rail mounting already integrated

Proportional pressure regulator VPPM (port type A, V1.1)

First proportional valve with
IO-Link connection technology.

Features
- Short cycle times thanks to
  point-to-point connection
- Choice of 3 regulator settings
- Easy connection to the system
- Adjustable pressure ranges

Applications
- Pressure regulation
- Checking
- Metering
- Pressing
- Press fitting

Main industry segments
- Special purpose machines,
  food and beverage, printing
  and paper, automotive,
  electronics and assembly

Position transmitter SDAT (port type A, V1.1)

Piston position detection with
high repetition accuracy, whether
for monitoring screwing-in
processes, riveting, ultrasonic
welding, pressing or adhesive
bonding, or for object detection.

Features
- Analogue feedback signal
  for piston position
- Optimised for T-slots
- Insertable from above
- Sensing ranges from 50 to
  160 mm
- SDAT-MHS and SMAT-8M:
  transmitter solutions for
  large and small drives

- High repetition accuracy
- Programmable IO-Link/
  switching output
- Five sensing ranges to match
  the most important standard
  strokes
- Sensor function and mechanical
  mounting suitable for all Festo
  drives

Signal converters SCDN

The signal converter detects
analogue current or voltage
signals from sensors (transmitters).
Connection to the higher-level
system is provided by IO-Link.
Process values can be read out
and parameters changed and
transmitted to additional devices.

Features
- Transmitter signal range
  scalable (e.g.: 1 ... 5 V)
- Measured value indicator can
  be individually configured
- Min./max. monitoring
- PNP/NPN, switchable
- Eco mode
- Tamper protection with
  security code

- Filter can be adjusted to
  smooth the signals
- Quick and easy setting of the
  switching points via teach-in

Pressure transmitters SPAE and pressure sensors SPAU and SPAN (port type A, V1.1)

Features

**SPAE:** very small pressure sensor with indicator for core pneumatic applications
- Ideal for vacuum applications with pick & place in assembly and testing

SPAU: universal pressure sensor and transmitter for all non-corrosive gases
- Uniquely flexible connection concept
- Quick and easy mounting and commissioning
- Visual pressure status indication: blue for pressure OK, red for pressure not OK

SPAN: compact 30x30 mm pressure sensor with wide range of variants in pressure range up to 16 bar
- Electrical compatibility with all controllers
- Tamper protection
- Attractive price and great performance

SPAN

SPAU

SPAE
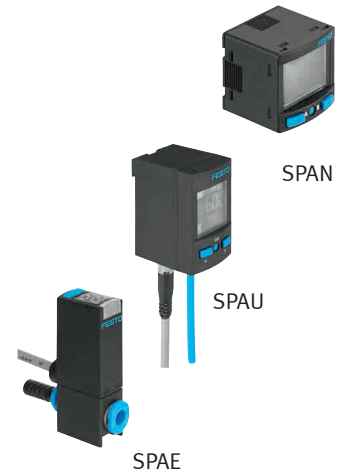
Flow sensor SFAW and SFAH (port type A, V1.1)

Features
- For liquid media
- Clip connection for quick replacement
- For measuring flow rate, volume and temperature, e.g. when monitoring a cooling circuit

- Rotatable sensor display which can be aligned after installation for optimum viewing
- Sensor can be rotated around its longitudinal axis when installed
- Display switches between red and blue for visual feedback on system status
- Sensor SFAH for air and non-corrosive gases

SFAH

SFAW
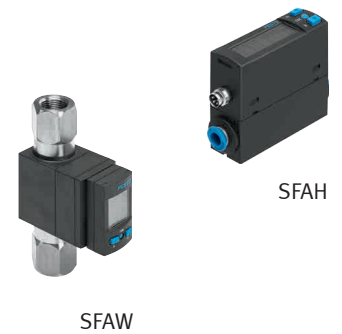
## Motor controller CMMO-ST (port type A, V1.1)

Closed-loop servo controller as a position controller for stepper motors on IO-Link.

Features
- Optimised Motion Series: the entire system, consisting of actuator, permanently integrated stepper motor with servo functionality, servo controller and cabling, can be ordered with one order code and is easy to configure via web server

Perfect for use with:
- Electric cylinder EPCO
- Electric axis ELGR
- Rotary drive
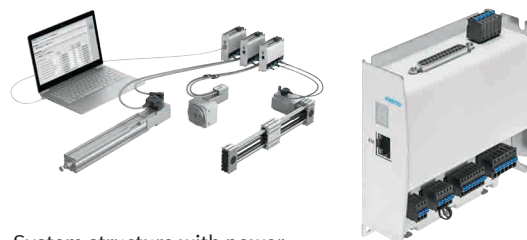
System structure with power supply unit, motion controller CECC and laptop for simple parameterisation via web server

Vacuum generator OVEM and OVEL (port type A, V1.1)

The modular vacuum generator series OVEM offers a wide range of individually selectable functions, so that a solution for a huge variety of applications can be found.
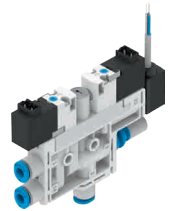
Features

- Digital setpoint/actual value transfer, convenient parameterisation and accurate diagnostic feedback.
- Device exchange with automatic re-parameterisation.
- Ejector pulse: quick, precise and reliable, separately controllable.

- OVEM monitors the set evacuation and ejection time for each cycle. With automatic and timely error reporting. Additionally: LCD display

OVEM

OVEL

Connecting cable NEBU-... compatible with IO-Link

Special catalogue "Electrical Connection Technology" available. Individual advice possible with "cable folder".

Features

- M8/M12 and other connecting cables available in standard lengths as stock items
- Modular cable system with individually configurable connecting cables M8/M12 – precisely tailored to your application and your requirements
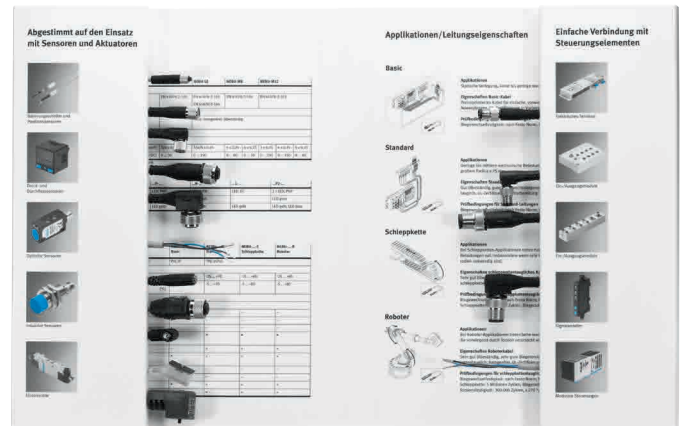
IO-Link – created for greater productivity

Diagnostics:

Festo IO-Link masters have a comprehensive range of diagnostic options – seen here using the CPX interface as an example (I-Port interface for IO-Link). The "IOL_Call" module also allows seamless integration into a Siemens diagnostic environment.

CPX web server cpx-io-link / 192.168.30.1 Home Device info Diagnosis PROFINET / I&M Ethernet **Device information** **Slot 0 - FB34-RIO** PROFINET IO 2x PP RJ45 MC: 216/0 Revision: 98 Serial number: 0005006A **Slot 1 - M-16DI-D** Input module MC: 16/0 Revision: 8 Serial number: A3482835 Inputs: 16x 1 Bit **Slot 2 - CTEL-2-LK** I-Port LK Master MC: 194/1 Revision: 1 Serial number: 00000001 Inputs: 24x 8 Bit Outputs: 24x 8 Bit IOL-D 1: 014Dh Festo AG & Co. KG 000410h CPV10-GE-PT-8 IOL-D 2:	Web server in PROFINET fieldbus node

CPX web server cpx-io-link / 192.168.30.1 Home Device info Diagnosis PROFINET / I&M Ethernet **CPX Terminal** Number of modules: 4 Number of input bytes: 34 Number of output bytes: 24	Festo Maintenance Tool FMT, error message from an IO-Link third-party device

Your goal is to increase productivity. Automation with innovative IO-Link products from Festo takes you directly to your goal. Judge for yourself:

Security

- IO-Link provides a secure connection for analogue, binary and serial communication devices.

Efficiency

IO-Link is a uniform, standardised and therefore efficient technology for installation and wiring.

Simplicity

IO-Link devices are quick and easy to parameterise – and can be put back into operation immediately after replacement without the need for engineering software tools.

Competency

Festo offers a comprehensive range of products for IO-Link from a single source: several masters, pressure and flow sensors, displacement encoders/ position transmitters, five valve terminal series, proportional pressure regulators, vacuum generators, stepper motor controllers and the connecting cables. In addition, Festo has a wealth of application knowledge in factory and process automation, as well as basic and further training for industrial users – right up to Industry 4.0.
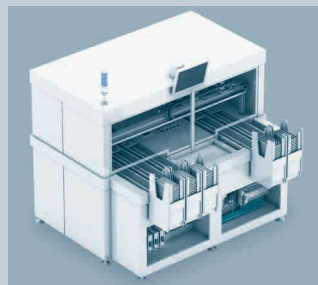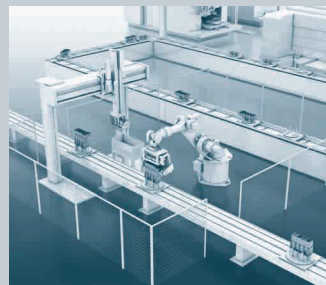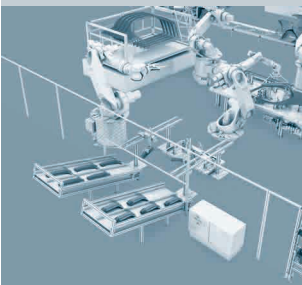
Typical IO-Link applications for complex sensor technology and terminals: in the body shop and in automotive assembly, for personal protection with safety fences, in heavy machinery construction and for machine tools, at manual workstations, assembly cells, input/output stations etc.

Take your future into your own hands:
with IO-Link and electric automation from Festo