

Industrial Communication

Versatile and Future-Proof System Solutions

Access to data in the Internet of Things is a central component of Industry 4.0. To make the communication of industrial networks more efficient and flexible, Pepperl+Fuchs offers powerful components that reliably transport large quantities of data across all levels. Users benefit from maximum efficiency and increased system transparency.

SmartBridge®

SmartBridge® technology enables convenient access to any IO-Link device. It allows interruption-free access to process data and valuable status information for connected devices. It transfers this data—independent of the machine control—to a smartphone or tablet.

Fieldbus Modules

For connecting sensors and actuators in the field, Pepperl+Fuchs offers innovative Ethernet IO modules. They open up a new dimension of universal connectivity for future-proof automation. Their decentralized control function allows self-sufficient control of applications and efficient, needs-based machine communication via the selective transmission of data. Modules with integrated IO-Link master provide full process transparency, right down to the sensor/actuator level.

AS-Interface

For efficient wiring of machines and plants, Pepperl+Fuchs offers a complete solution based on a variety of AS-Interface components and compatible sensor technology. Wiring via topology-free, two-wire flat cable allows maximum flexibility and easy integration into existing systems. The well-established and manufacturer-independent system provides absolute investment security.

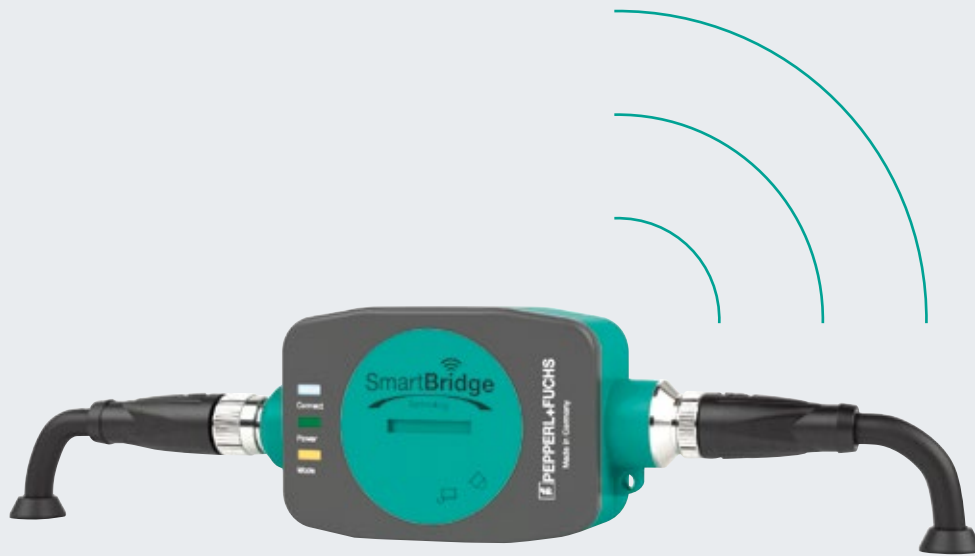


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Easy Access to IO-Link Devices

Condition-based maintenance, process optimization, and service on demand—these have become a reality with SmartBridge® technology. SmartBridge® takes valuable status data from automation components and makes it directly available to higher-level information systems.



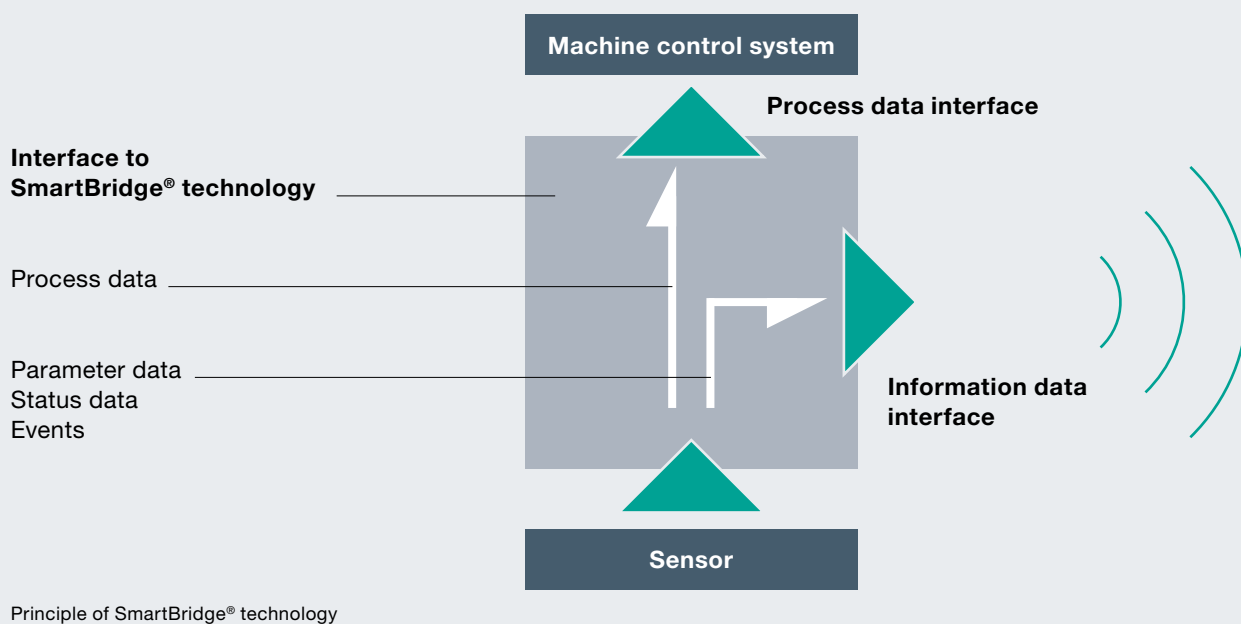
Using Field Devices as a Valuable Source of Data for Process Optimization

Cyclic process data from field devices builds the basis for how machine control systems regulate processes. Simultaneously, intelligent field devices deliver a wealth of valuable, acyclic status information.

SmartBridge® technology captures status information and process data and transmits it wirelessly. This allows information about the operation status of the individual components to be transmitted directly to mobile devices, higher-level information systems, and service systems—bypassing the machine control system.

Typical Applications

- Setup, control, and maintenance of IO-Link devices
- Configuration of IO-Link systems that are integrated into machine modules, such as dosing pumps or robot grippers
- Monitoring statuses of IO-Link devices, such as runtime, switching cycles, or contamination
- Analysis of machine functions and manufacturing processes



Key Benefits

- Simple configuration of IO-Link devices via graphical interface
- Access to cyclic and acyclic status and event data for monitoring IO-Link devices with a mobile device
- SmartBridge® app provides a consistent and easily understandable user interface for IO-Link compatible field devices, regardless of device manufacturer
- Easy integration into existing infrastructures via plug-and-play for data access without interrupting the manufacturing process
- International standards such as Bluetooth and IO-Link for investment security

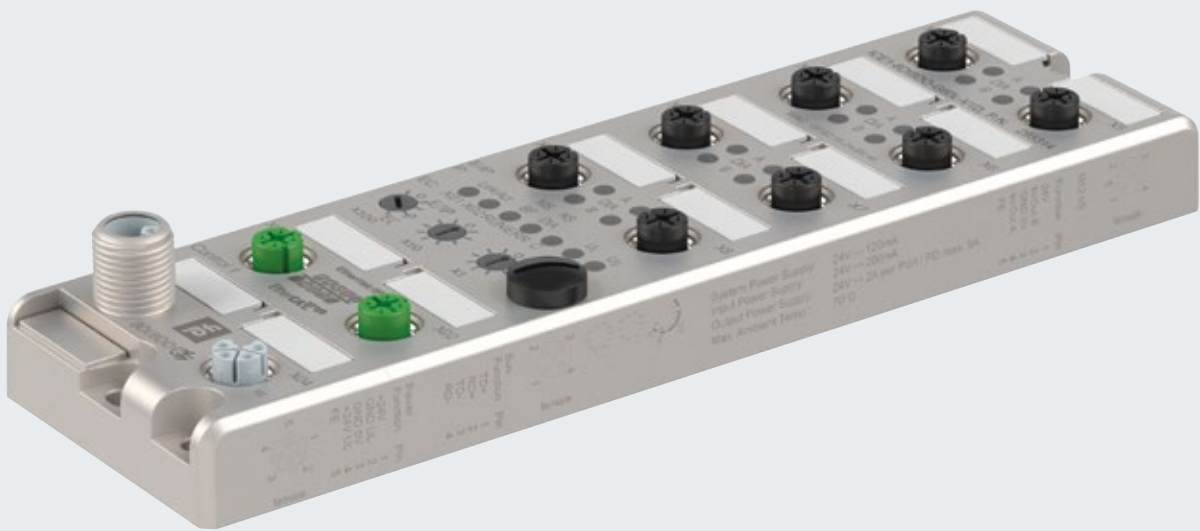
Technical Features

- Built-in SD card slot for data logging
- Intuitive operation via smartphone or tablet with the SmartBridge® app
- Automatic control and display files for all IO-Link devices

Fieldbus Modules

Reliable Communication across All Levels

A rugged module for all standard Ethernet protocols, IO-Link, and integrated, decentralized control and diagnostics function. Fieldbus modules from Pepperl+Fuchs are a perfect fit for the requirements profile of innovative machine and plant builders—and Industry 4.0.



Ethernet IO Module with integrated control function

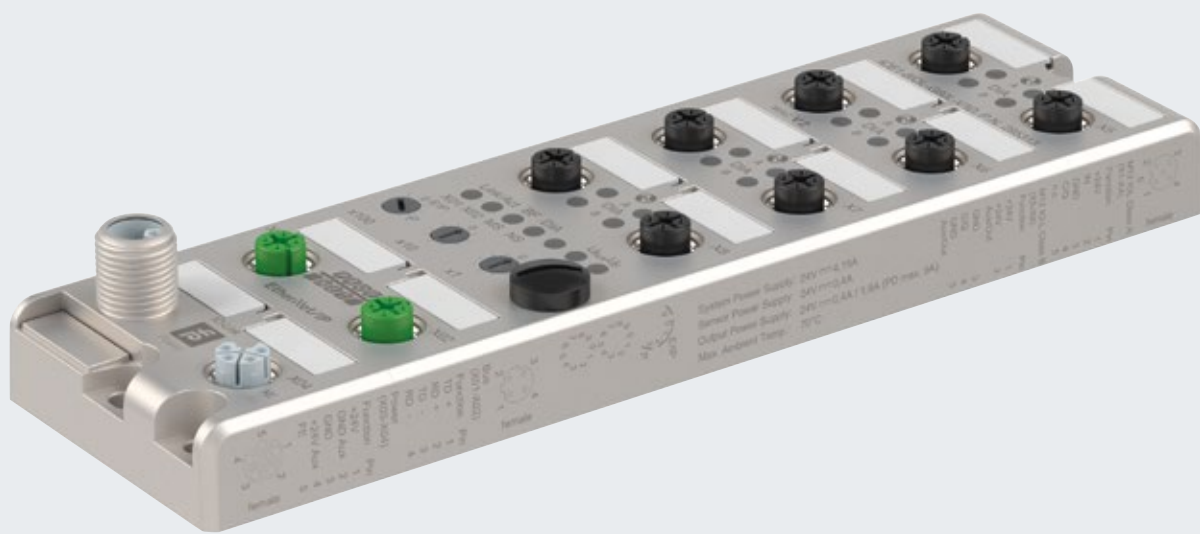
Typical Applications

Fieldbus modules act as interfaces for industrial fieldbus systems. They enable efficient communication between control systems and the field level. Typical applications for these modules include:

- Automotive industry: networking in final assembly
- Production lines: switch control for sorting scrap via decentralized logic
- Packaging machines: monitoring wear for preventive maintenance

Key Benefits

- All standard Ethernet communication protocols are supported in a single module for optimal machine standardization
- Innovative M12 power connector for reduced installation costs thanks to higher current rating of 2x 16 A for sensors and actuators
- Integrated IO-Link master for continuous diagnostics and parameterization from the control system to the sensor level
- Integrated, decentralized control function allows self-sufficient functionality independent of the PLC
- Comprehensive diagnostics available through Web server for more transparency and increased process reliability



Ethernet IO Module with integrated IO-Link master

Technical Features

- Fully encapsulated metal housing with IP67 protection: ideal for mounting directly on the machine with high resistance to shock and mechanical vibration
- Connection of sensors and actuators via 16 digital inputs, 8 digital inputs/outputs, or 8 IO-Link sensors/actuators
- Future-proof with IO-Link Standard V1.1 in accordance with IEC 61131-9
- Rotary switch for setting the communication protocol (PROFINET, EtherNet/IP, EtherCAT) provides easy operation
- Highly visible, channel-accurate status LEDs as well as displays for communication, diagnostics, and power supply for status control

AS-Interface

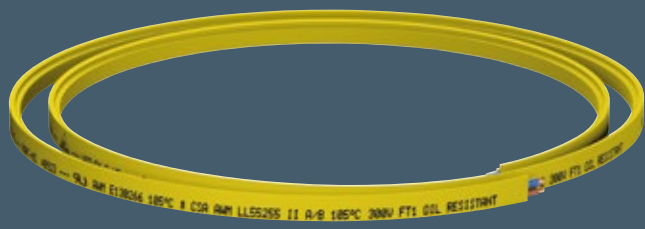
Simple and Efficient System Wiring

Firmly established as a global standard, AS-Interface enables fast and efficient connection of automation components. Its simplified control system, topology-free optimized installation, and improved diagnostics capabilities provide a clear increase in productivity.



AS-Interface Flat Cable

The flat cable for AS-Interface and AUX is ideal for quick and easy wiring. With piercing technology, all components of the automation technology can be connected efficiently.



Key Benefits

- Complete solutions consisting of AS-Interface components and compatible sensors from Pepperl+Fuchs
- Simple mounting and operation: a flat cable for power and data transfer
- Maximum flexibility with topology-free, optimized installation
- Reliable, error-free mounting with piercing technology
- Flexible integration of safety components up to SIL 3/PL e without network changes
- Established, manufacturer-independent system for investment security
- Cost-effective connection to all I/O signals



Typical Applications

- Efficient wiring of complex conveyor systems and integration of sensors and actuators into existing systems
- Consistent wiring of extensive plants in the process industry
- Flexible use of safety components in the automotive industry

Technical Features

- Interoperable system, compatible with nearly all control systems
- Additions are possible anywhere on the flat cable
- Replacement of modules with automatic addressing
- Comprehensive diagnostics
- Transfer of safe and unsafe signals over one line
- Standardized wiring in machine building with integrated safety function
- Cost-effective, compact wiring in the packaging industry

Masters and Gateways

Pepperl+Fuchs offers gateways for all common fieldbus systems: PROFINET, EtherNet/IP, EtherCAT, PROFIBUS, DeviceNet, CC-Link, etc. This allows simple and standardized data transfer to the higher-level control system. In addition, gateways with integrated safety monitors are available for reliable monitoring of both AS-Interface segments.

Power Supplies

Every AS-Interface segment requires a power supply. These include data decoupling for interference-free communication on the AS-Interface secondary circuit. Alternatively, double masters with integrated data decoupling are available that can be operated with a power supply.

AS-Interface Modules

Versatility for Field Applications and Cabinet Installation

Durability and compactness for field applications. Fast wiring and simple diagnostics in the control cabinet. Pepperl+Fuchs offers a variety of specific modules for efficient transfer of digital, analog, and safe signals.



Modules for Field Applications

For field applications, Pepperl+Fuchs offers a variety of perfectly coordinated AS-Interface modules. They offer exactly what is required: compact design, high environmental protection, and quick, easy installation. Their robust design and high degree of protection ensure durability.

Key Benefits of Selected Modules

G10—the Ultra-Compact Module:

- Flexible mounting directly in the cable duct
- Quick installation with a one-piece housing concept and captive central screw
- ECOLAB certified and IP68/69K protection
- Many models available—including a G10 safety module

G11, G12, and G16 Modules—a Range of Housing Designs:

- Sensor connection via M12 or M8 connectors
- Simple mounting in various housing designs
- Tool-free installation (G12)
- Connection of analog devices (G11)



Modules for Cabinet Installation

Switch cabinet modules have different requirements than modules for field applications—features such as space- and time-saving installation and simple diagnostics are crucial. The KE5 module in particular, with a front-panel, push-in connection, perfects switch-cabinet wiring.

Key Benefits of Selected Modules

KE5 Module—Unique Switch Cabinet Wiring:

- Front-panel, push-in connection simplifies installation
- Extremely narrow housing, <19 mm, with 28 terminals and downward cable routing for optimized cabinet space
- Multicolor backlit I/O display and labeled front cover provide unmistakable I/O association
- Channel-specific overload indication

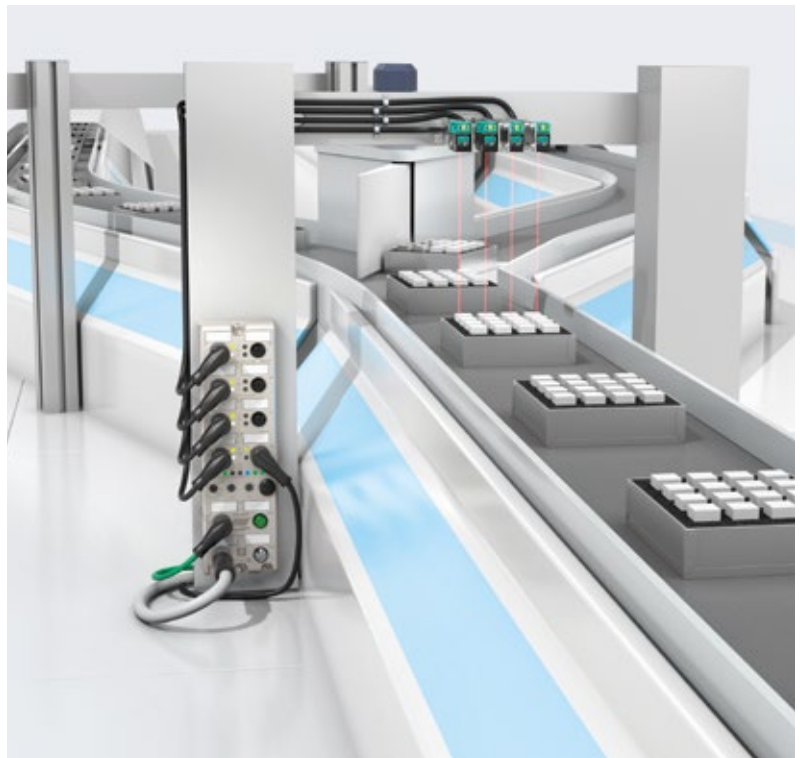
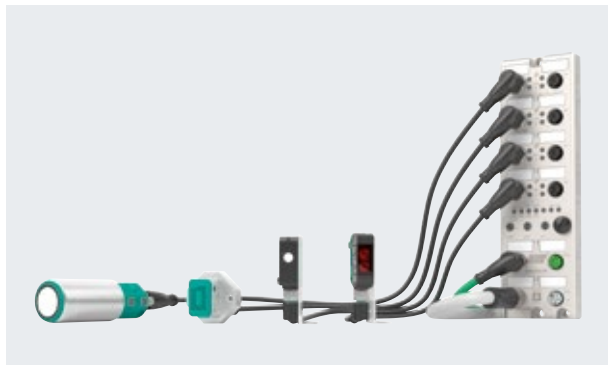
Technical Features

- Dimensions (W x D x H): 19 x 99 x 125 mm
- Total current 6 A without derating
- Up to 2 A output current per channel
- Selectable supply to the sensors: external or from AS-Interface
- Bridged connections for AS-Interface and AUX terminals
- Connection up to 2.5 mm²

Industrial Communication Applications

Ethernet IO Modules for Maximum Transparency across All Levels

One module for all Ethernet-based protocols, comprehensive diagnostics, and IO-Link: Ethernet IO modules from Pepperl+Fuchs are versatile and reliable. They enable efficient communication between the control system and the field level.



Uniform Communication Standard and Maximum Transparency with IO-Link

Used in modern production lines, intelligent Ethernet IO modules from Pepperl+Fuchs enable standardization with multi-protocol communication. An innovative solution that allows all Ethernet-based control systems to be used with a single module.

With an optional integrated eight-way IO-Link master, these modules enable direct connection of up to eight IO-Link devices. This allows parameters to be set, measurement and switching signals to be transferred, and diagnostics to be carried out. The result is more transparency down to the sensor or actuator level and improved process performance.

Prefailure warning, predictive maintenance, simple restart after sensor replacement, and an overview of the entire system are all possible—completely in line with Industry 4.0.

Key Benefits of the Ethernet IO Module with IO-Link Master

- Enables continuous diagnostics and parameterization right down to the sensor/actuator level
- Simplifies device replacement and commissioning: automatic transfer of preconfigured parameters when several sensors are connected
- Supports eight IO-Link channels for sensors (Type A) and actuators (Type B)
- Future-proof with IO-Link standard IEC 61131-9

AS-Interface Module for Decentralized Motor Roller Control

For connecting automation components quickly and efficiently, AS-Interface and the G20 motor roller module are the perfect solution. The G20 module allows decentralized, on-demand control of DC motor rollers and, with an innovative design, enables preassembly of conveyor segments.



Intelligent Conveyor Technology through Decentralized Control

Modern roller conveyor systems consist of segments that can be controlled individually based on the position of the product. The presence of goods is detected by a sensor, and the signal is transferred to the nearest motor roller.

The G20 AS-Interface module is used to control the motor rollers. Up to eight speeds and various acceleration profiles can be configured and adjusted. This allows high-precision start and stop positions that adapt to the products being transported.

The innovative design of the module offers a key advantage: all automation components can be connected directly to the module and preassembled in the factory. Segments can be produced, and the flat cable can be installed on-site.

Key Benefits of the G20 Motor Roller Module

- DC motor roller module version available for controlling speed, direction, and start/stop function on material handling conveyors
- Digital version available for simple ON/OFF solutions for motors or pneumatic actuators
- Simple, tool-free installation: one-piece housing with a flat cable connection and direct connection to the sensor/actuator
- Preassembly and delivery of segments, with AS-Interface flat cable installed on-site

Connectivity

Connection Technology for Automation

High-performance sensors need strong connections to match. Driven by the goal of making your applications as simple, efficient, and reliable as possible, we have developed an integrated product portfolio that provides everything you need for optimal sensor connectivity.

Perfectly Matched Products from a Single Source

As innovators and pioneers in sensing technology, we channeled decades of practical experience into a connectivity portfolio that is perfectly adapted to your automation needs. By providing sensors and their corresponding connection components from a single source, we boost your productivity and increase the performance of machines and plants.

Excellent Quality in Any Environment

Pepperl+Fuchs products are used in a wide range of applications, including those that take place in harsh and hazardous conditions. This is why we set the highest quality standards for our entire product portfolio, including our connectivity products. With zero-defect tolerance, automated functional testing of every item, and state-of-the-art production at our facility in Hungary, we deliver reliable products that will stand the test of time.



For more information, visit
www.pepperl-fuchs.com/fa-connectivity

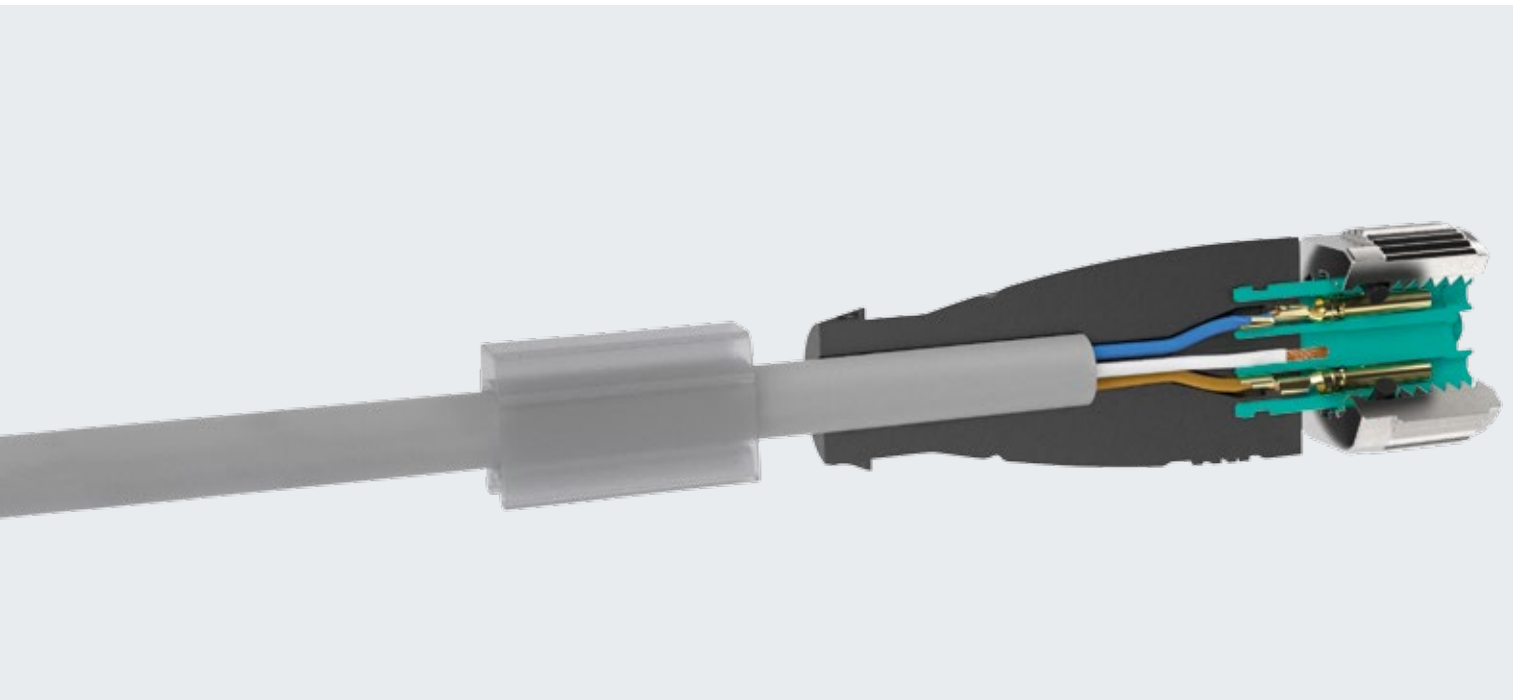




Sensor-Actuator Cables

Standardized and Perfected for Maximum Durability

Built on years of application experience, sensor-actuator cables from Pepperl+Fuchs ensure maximum durability, application reliability, and service life. They are developed based on real-world market needs and carefully designed with every detail in mind.



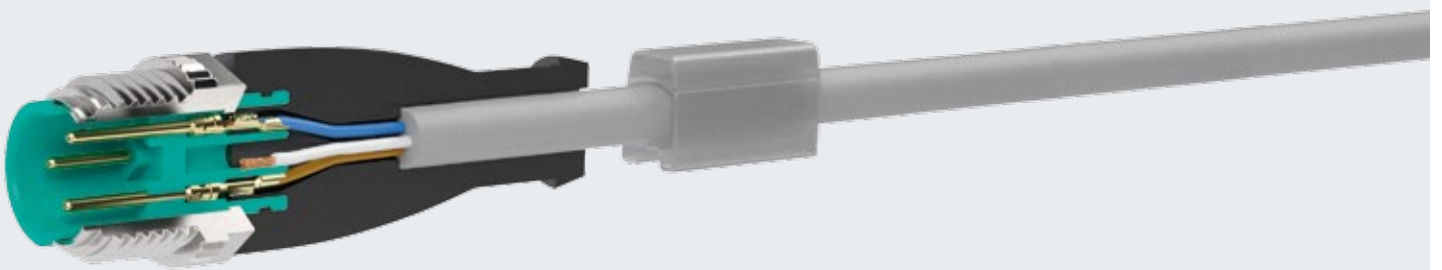
Key Benefits

- Connectors with knurling and hex flat for quick and easy fastening by hand or tool
- FKM captive seal for high-quality connections and maximum chemical resistance
- Integrated fixed stop for torques from 0.4 Nm to 1.0 Nm to protect the O-ring
- Highly durable with optimized vibration protection and gas-tight connections
- Doubled creepage distance and IP68/IP69K protection for harsh industrial applications

Wide Selection of Cable Types

No two applications are exactly alike, and each installation environment has its own unique requirements. Since the features and advantages of the connection technology are crucial in determining the best solution, Pepperl+Fuchs offers the right cable for every situation.

- PVC—solid and economical
- PUR—durable and highly flexible
- PUR-U—highly flexible with UL approval
- PUR-A—resistant to welding sparks for the automotive industry
- PUR-O—for tough outdoor applications
- PUR-R—highly flexible for demanding robotics applications
- STOOW—designed specifically for the American market
- POC—designed specifically for welding areas



Technical Features

Mounting without a Datasheet

- Pinouts are printed on the socket
- Easy-to-see arrow on the grip aligns with the connector key

Quick and Easy Installation

- Quick fastening by hand via knurling or open-end wrench via hex flats
- Protection of O-ring and wide torque ranges with integrated fixed stop
- Easy status diagnostics, even in bright light, with high-contrast LED models

100° Angle for Longer Service Life

- Reduced strain on wires increases service life
- Innovative catch design makes securing protective cable loom quick and easy

High-Performance, Even in Harsh Environments

- Optimized vibration protection with radially mounted latches
- Increased tolerance against contamination from moisture, dirt, and dust with doubled creepage distance

Connectivity Product Portfolio

More Than Just Connectors and Cordsets

In addition to connectors and cables, Pepperl+Fuchs offers a range of components that ensure long-term functional reliability and machine operation. Among these are fully encapsulated Y-splitters that provide the ultimate in flexibility and field-attachable connectors that are a convenient solution for customizing connectivity to your application.



Sensor-Actuator Splitters

Splitters allow you to easily merge two signals into one junction block port. They are also suitable for cost-effective looping of bus signals to minimize wiring.

- Fully encapsulated housing with IP68 protection
- Available with sockets or molded cables
- Variety of cable lengths available

Field Connectors

A wide range of field-attachable connectors suitable for a variety of applications. Ideal for maintenance, easy repair, or plant expansion on-site.

- Plastic and metal versions
- Shielded and unshielded versions
- Different connector sizes, including M8, M12, 7/8", and others, with screw connection or insulation displacement technology
- Allows for cable configuration on-site

Junction Blocks

M8 and M12 multiport sensor connection blocks with master cable or connector for easier installation.

- Fully encapsulated housing with IP68 protection
- 100 % tested for complete reliability
- Integrated LEDs for easier diagnostics
- Wide socket separation (M12) or offset sockets (M8) for easy-fit connection
- Rugged outdoor version also available

Sensor-Actuator Receptacles

Signal routing from the control cabinet directly into the field.

- Sealing in accordance with IP67/68
- Multiple connection types and pin counts
- Available with PG or metric mounting thread
- Cabinet wall mount, front or back



Data Connectors

Fieldbus cables enable you to establish a reliable network between the different components of your automation system.

- PROFIBUS
- PROFINET/Ethernet
- CAN/DeviceNet

Valve Connectors

As a solution provider, Pepperl+Fuchs provides ready-made components with robust designs.

- Fully overmolded housings with IP68 rating
- Overmolded, captive seal
- Various internal circuit types to provide built-in noise suppression
- Models in accordance with DIN industry standards
- Rugged outdoor versions available with stainless-steel screw and silicone seal

Installation Tools for Connectors

Speed and precision are crucial for both installation and maintenance. These installation tools allow our knurled coupling connectors to be attached securely at exactly the right torque.

Industry-Specific Connectivity Solutions

Every industry places individual requirements on connection technology. In addition to universal standard products, Pepperl+Fuchs also offers solutions that are tailored to individual requirements. One example is the Mobile Equipment Connectivity (MEC) series, which includes DEUTSCH connectors and other components that are designed for use on mobile equipment in extreme outdoor conditions.