

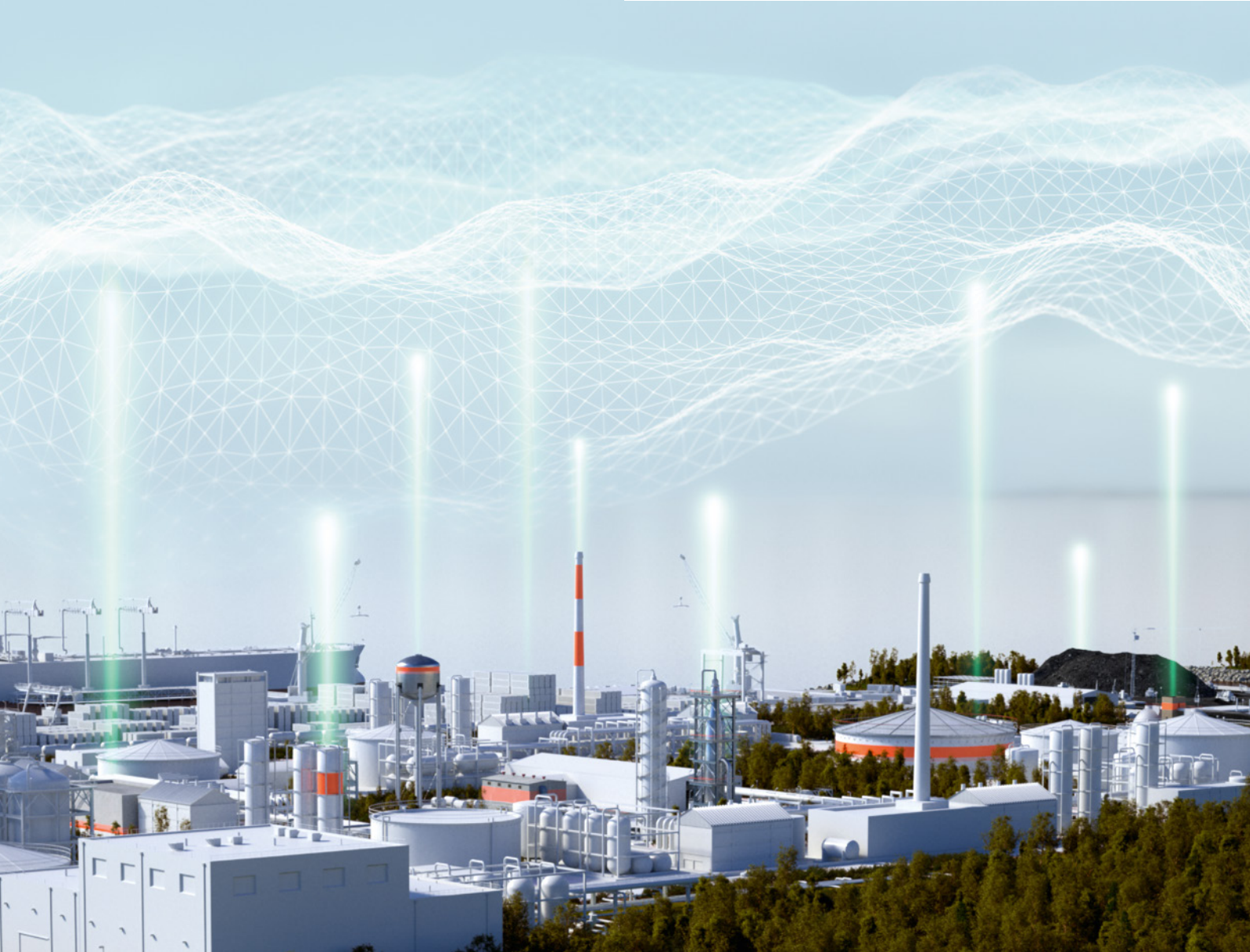
Shaping the Future.



ethernet-apl™
advanced physical layer

The world's first switch that brings Ethernet into the field of process plants.

Ethernet-APL Rail Field Switch—
the Latest FieldConnex® Innovation



Your automation, our passion.

 **PEPPERL+FUCHS**

Ethernet APL: Shaping the Future of Process Industries

Industry 4.0—for ten years now, the future shape of industry has been at the center of developments in the automation industry. In factory automation, Industry 4.0 applications are now part of everyday work—not least due to the use of Ethernet as a communication standard. The technology is now on the verge of becoming a feasible option for the process industry—and with it access to IIoT applications.

Barrier-Free Communication for Industry 4.0 Applications

Industry 4.0 applications and the Industrial Internet of Things (IIoT) require system architectures with continuous, direct communication across all levels of the automation system. Ethernet can quickly transmit large amounts of data in real time, making it the ideal technology for this purpose. However, it has not yet been possible to use Ethernet for process automation instrumentation due to a number of physical hurdles such as cables that are too short, a lack of supply to the connected devices, and, above all, a lack of explosion-protection concepts.



More information
online



More information
in the video

Together Toward a New Standard

To open up Ethernet for use in process automation, the physical layer of the communication system must be standardized—this is the goal of a recently completed development by well-known manufacturers and associations, including Pepperl+Fuchs, which is unique in the process industry to date: the Ethernet Advanced Physical Layer, or Ethernet-APL for short.

The focus of this cooperation is simplicity, as Ethernet is an established part of our everyday lives. It fulfills all the central requirements for process plants such as long cable runs, two-wire cables for communication and power supply, rugged terminals, explosion protection with integrated intrinsic safety, and interoperability. In other words, Ethernet-APL makes it possible to use standard Ethernet technologies in the process

industry while offering the simple, straightforward handling expected by users. For the first time, this enables the use of modern Ethernet technology in hazardous areas up to Zone 0/Class 1, Div. 1—and continuous communication from the field of the process plant to the process control system and to the cloud.

From Hazardous Areas to the Cloud— Barrier-Free and Highly Efficient Communication

- The quickest and most efficient way to continuously communicate large amounts of data from hazardous areas to the cloud—barrier-free
- Increased availability of process plants
- Simple and cost-effective plant modernization
- Flexible applications worldwide

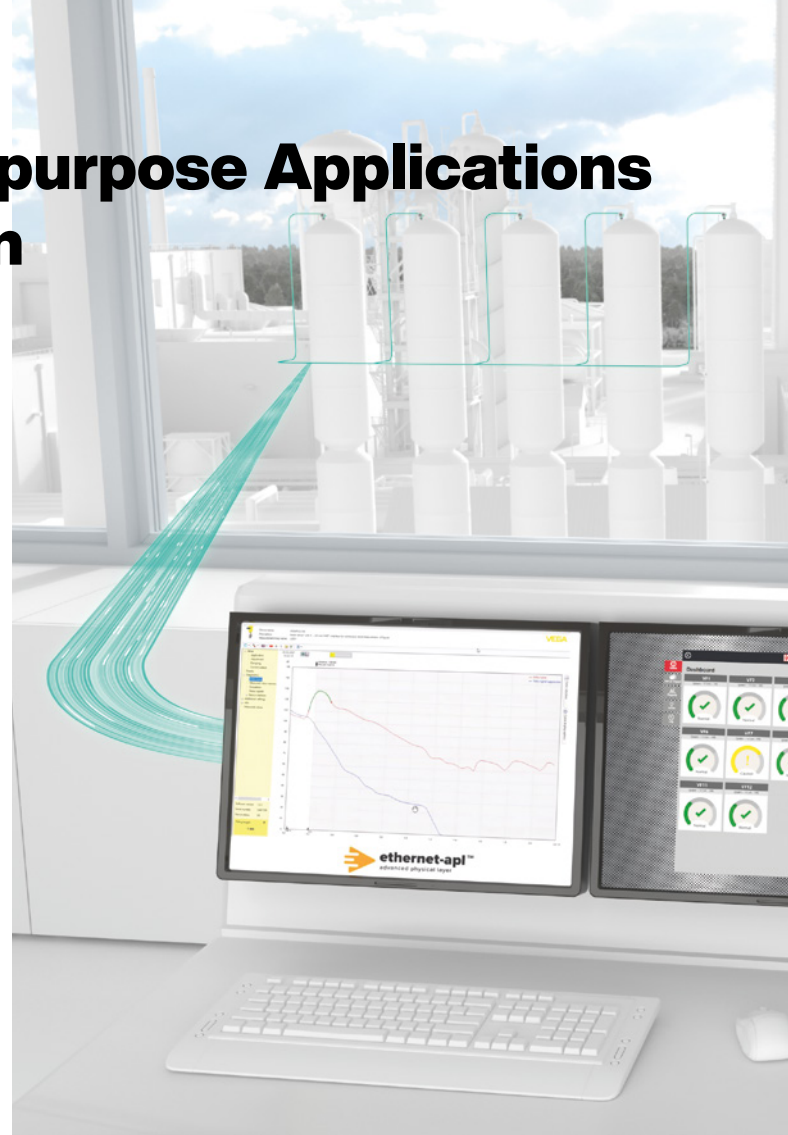
Highlights

- Detection range of up to 1000 m (spur of up to 200 m, trunk of up to 1000 m)
- Supply of up to 50 field devices with up to 60 W
- High-speed communication: 10 Mbit/s, full-duplex
- Download of approx. 100 configuration parameters in just a few seconds per field device
- Intrinsic safety protection is easy to implement



Simple Ethernet—Multipurpose Applications and Efficient Integration

A key benefit of Ethernet-APL is the preservation of existing installations and instrumentation—for the decades-long runtimes of process plants typical in the process industry, this represents enormous savings during migration. With Ethernet-APL, field devices can be connected directly to all common Ethernet-based systems. There is no longer a need for network transitions or interfaces and the complex configuration processes they required.



Reduced Planning and Time

Ethernet APL supports the trunk-and-spur topology established in process automation and specifies standard type A fieldbus cables, allowing plant operators to use their existing cabling. Ethernet-APL works as the physical layer for any industrial Ethernet protocols such as EtherNet/IP, HART IP, OPC UA, and PROFINET. There is no need to plan and implement protocol transitions.

The Ethernet-APL rail field switch supports both field devices with an APL interface and conventional fieldbus devices. It automatically detects if a PROFIBUS PA device is connected instead of an Ethernet field device and translates the data into PROFINET. This enables mixed operation of different technologies on one infrastructure and therefore a step-by-step migration as part of the FieldConnex® APL concept. This allows plant operators to take advantage of Ethernet communication and the wealth of information from field devices and sensors without having to completely convert the plant.

The Ethernet-APL rail field switch from FieldConnex® is the enabler for:

- Joint operation of PROFIBUS PA and PROFINET on one infrastructure
- Easy operation and simplified upgrade processes
- Quick access to complex device data
- Synchronized configuration of field devices for optimized asset management
- Automatic detection of field devices



Unique Insight into Plant Status via Ethernet-APL

Ethernet-APL enables full access to instrumentation in parallel—which can be used completely independently of each other by engineering, asset management, and the control system. This offers high ease of use, as new devices can be automatically assigned in the system by reading out the address and identifier as soon as they have been commissioned.

Users can therefore easily access diagnostic data for the devices and the entire installation. To illustrate this with an example: A service technician can use a mobile end device, such as a smartphone or tablet, to read out the status of the field devices from anywhere to prepare and plan any required interventions in a targeted manner. Automatic neighborhood and topology detection provide additional support when replacing devices. Device configurations are automatically backed up or the configuration is simply transferred to the new device. Furthermore, an infrastructure based on Ethernet-APL offers another advantage: software updates can be managed and installed automatically in the future.

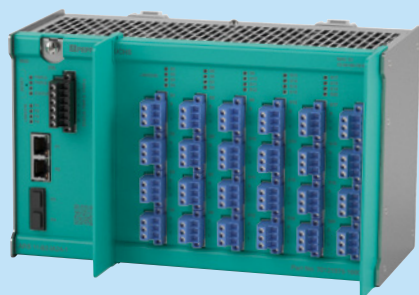
Companies can therefore gain new information and additional insights about the field devices that are relevant to digitalization. The parallel access that Ethernet-APL provides is in line with NAMUR requirements. Within the framework of NAMUR Open Architecture (NOA), NAMUR has specified how users should obtain data from the field.

In addition to the convenience already described and the associated reduced effort, this software-supported device management offers further advantages: The susceptibility to errors during operation is lowered because repetitive, manual activities are significantly reduced. As a result, companies can reduce their maintenance costs while increasing the reliability of devices and plants.

The First Ethernet-APL Field Switch for Process Automation

The digital transformation is reaching the field level in process plants: The Ethernet-APL rail field switch from FieldConnex® is the first switch in process automation to enable direct, quick, barrier-free access to field devices via Ethernet-APL.

Ethernet-APL Rail Switch	Attribute
Type code	ARS11 with proxy, ARS12 without
PROFIBUS PA devices	Automatic detection with built-in proxy
Intrinsic safety	Ex ic IIC and Ex ia IIC on spur port
Number of spur ports	8, 16, 24 can be selected
Connector	Screw or spring terminal can be selected
Installation	Switch cabinet installation in Zone 2/Div. 2
Voltage supply	External, 20 – 60 V DC
Media redundancy	Ring redundancy in the company network
PROFINET redundancy	S2 system redundancy
Network management	Yes, layer 3 with PROFINET



IIoT Applications for the Process Industry

The Ethernet-APL rail field switch has been designed with intrinsic safety explosion protection, Ex ic IIC, which allows Ethernet in hazardous areas of Zone 2 and Division 2. It is mounted on the DIN mounting rail. In addition, the switch is the only product in the world that supports the Manchester Bus-powered Physical Layer (MBP) alongside Ethernet-APL and can therefore be easily added to the existing base of PROFIBUS PA devices.

Highlights



For the first time, Ethernet can be used in hazardous areas



More availability through direct access to all diagnostic data simultaneously



Preservation of existing field devices reduces costs



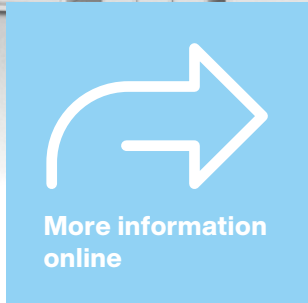
Highly efficient electronics achieve optimal heat management



Integrated intrinsic safety and familiar two-wire cable facilitate easy installation



Concept with two physical layers allows cost-effective plant modernization



More Information. More Availability. More Efficiency.

Always the right choice: The Ethernet-APL rail field switch from FieldConnex® is designed to be a cost-effective solution for any industry, for any process plant, and for any topology.

Investment Protection and Cost-Effectiveness

The Ethernet-APL rail field switch makes it possible to operate existing and new field devices at the same time via a common infrastructure. Old and new technologies are used in parallel, which not only protects the investment in existing equipment technology—individual measuring points can be equipped with new functions or quick communication in a targeted manner, if required.

Integrated Diagnostics for the Installation

The Ethernet-APL rail field switch from FieldConnex® features integrated diagnostics for the physical layer. This allows users to monitor the installation itself at all times and to intervene early in the event of a fault—an important performance feature that ensures smooth operation and prevents unwanted downtime.

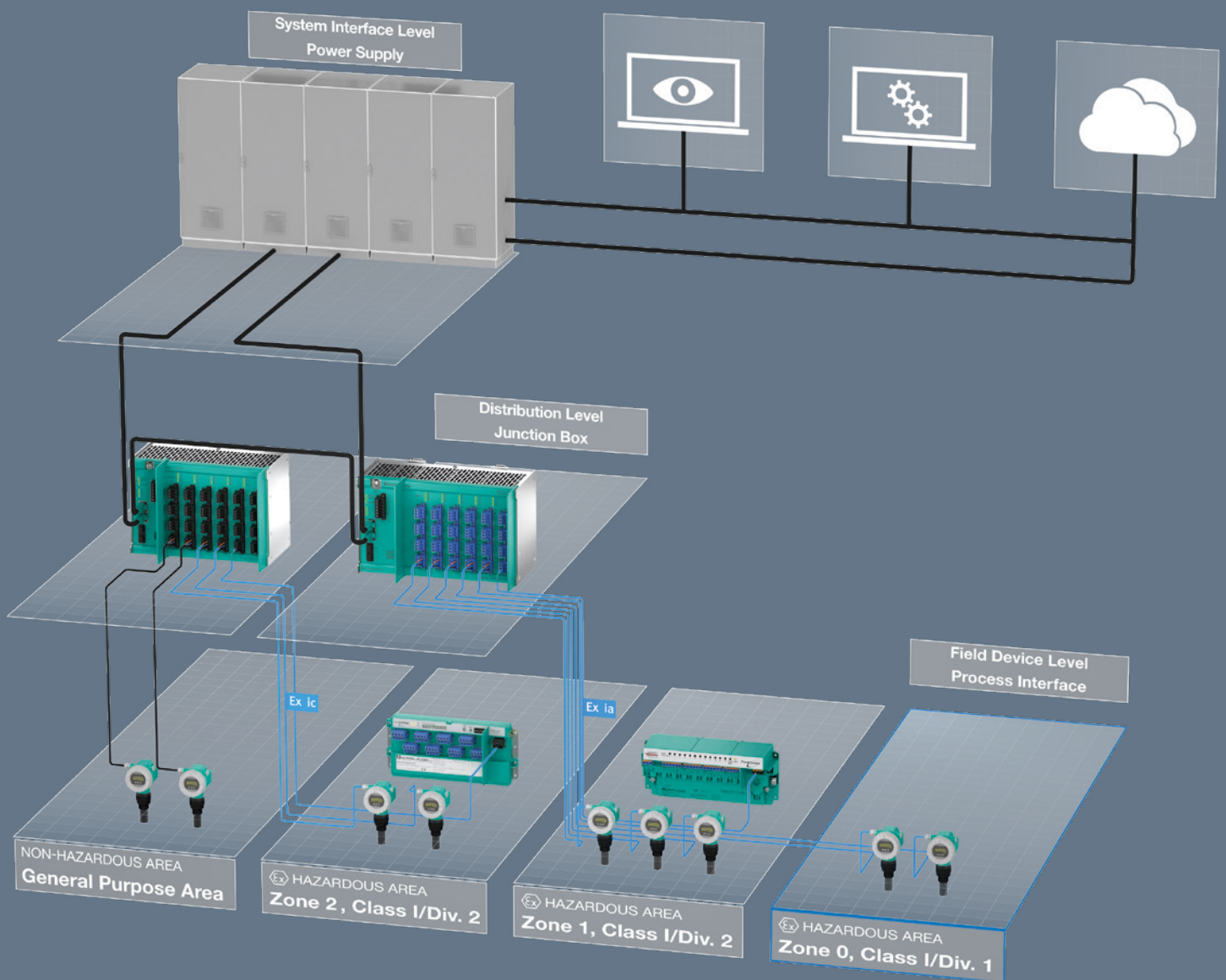
Ethernet-APL rail field switch in a terminal box. Installation in Zone 2/Div. 2.



Ideal for Star Topology

The Ethernet-APL rail field switch from FieldConnex® is designed for star topologies typically used in compact or indoor installations. It has the following features and meets these requirements:

- Cable lengths of up to 200 m to the field device
- Indoor installations such as in the chemical and pharmaceutical industry
- Installation of the switches in switch cabinets or junction boxes
- Ethernet redundancy at the plant level
- Explosion protection for all hazardous areas



More information
online

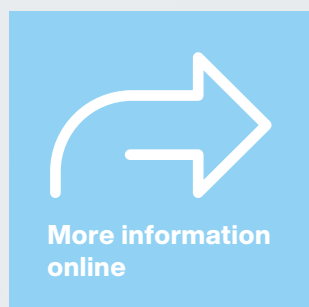
FieldConnex®—Present in All Process Industry Markets

Maximum power, seamless safety, and maximum plant availability: These are the features that have firmly established FieldConnex® as the technology of choice for fieldbus infrastructures in the process industry. With solutions that are tailored to their requirements down to the finest detail—across all industries and geared to the future.

State-of-the-Art Technology

Maximum transparency, maximum availability, and plant safety: These are the main requirements in the process industry. FieldConnex® from Pepperl+Fuchs offers impressive innovative diagnostic functions, which immediately display any errors—the electrical installation/infrastructure for digital communication is seamlessly transparent and at the same time very easy to use.

Another crucial advantage: FieldConnex® ensures quick, seamless integration into the control technology and that the installation is simple to use. It is state-of-the-art technology in every aspect, providing maximum availability and safety for process plants—and continuous innovation.

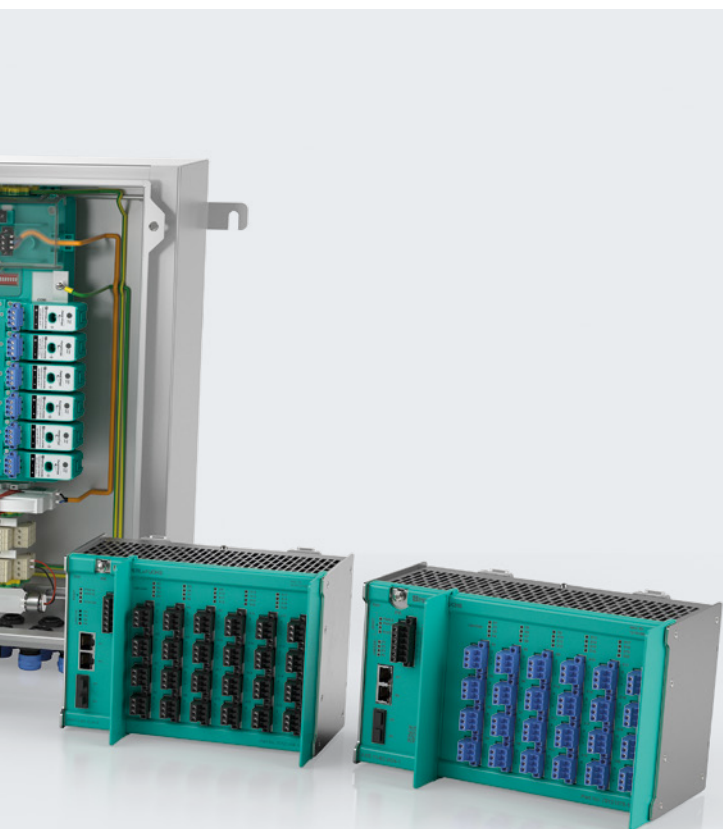


The Path to Digital Communication

FieldConnex® enables users to take the next step toward the future with its latest innovation, the Ethernet-APL rail field switch. In addition to the capabilities for IIoT applications, it features all the typical FieldConnex® characteristics that facilitate simple assembly of fieldbus installations:

- Robustness
- Extended temperature range
- Use in hazardous areas
- Explosion protection with intrinsic safety

The first generation of Ethernet-APL-enabled switches marks the first step of FieldConnex® products toward IIoT and therefore makes an important contribution to digital transformation in the process industry—further innovative components will follow.



Let's Start Together.

Interested?

Please feel free to contact us.

 **PEPPERL+FUCHS**

Your automation, our passion.

Explosion Protection

- Intrinsic Safety Barriers
- Signal Conditioners
- FieldConnex® Fieldbus Infrastructure
- Remote I/O Systems
- Electrical Explosion Protection Equipment
- Purge and Pressurization Systems
- HMI Systems
- Mobile Computing and Communications
- HART Interface Solutions
- Surge Protection
- Wireless Solutions
- Level Measurement

Industrial Sensors

- Proximity Sensors
- Photoelectric Sensors
- Industrial Vision
- Ultrasonic Sensors
- Rotary Encoders
- Positioning Systems
- Inclination and Acceleration Sensors
- Vibration Sensors
- Industrial Ethernet
- AS-Interface
- IO-Link
- Identification Systems
- Displays and Signal Processing
- Connectivity

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