



**COMPONENTS AND SOLUTIONS**

**PRODUCT OVERVIEW  
FOR PROCESS AUTOMATION**







# Automation Is Our World. A Perfect Application Solution Is

A willingness to take entrepreneurial risks, a pioneering spirit, and a firm belief in their own inventive powers – these were the assets that Walter Pepperl and Ludwig Fuchs started out with when they opened their Mannheim radio repair shop in 1945. Their invention of the proximity switch a few years later proved their strength. It was also the starting point in a successful history defined by close customer relationships as well as innovative automation technologies and procedures.

Then as now, our focus is directed squarely on the individual requirements of each customer. Whether as a pioneer in electrical explosion protection, or as a leading innovator of highly efficient sensors, close communication with our customers is what allowed us to become the leader in automation technology. Our main objective is combining state-of-the-art technologies and comprehensive services to optimize our customers' processes and applications.

For more information, please visit our website: [www.pepperl-fuchs.com](http://www.pepperl-fuchs.com)





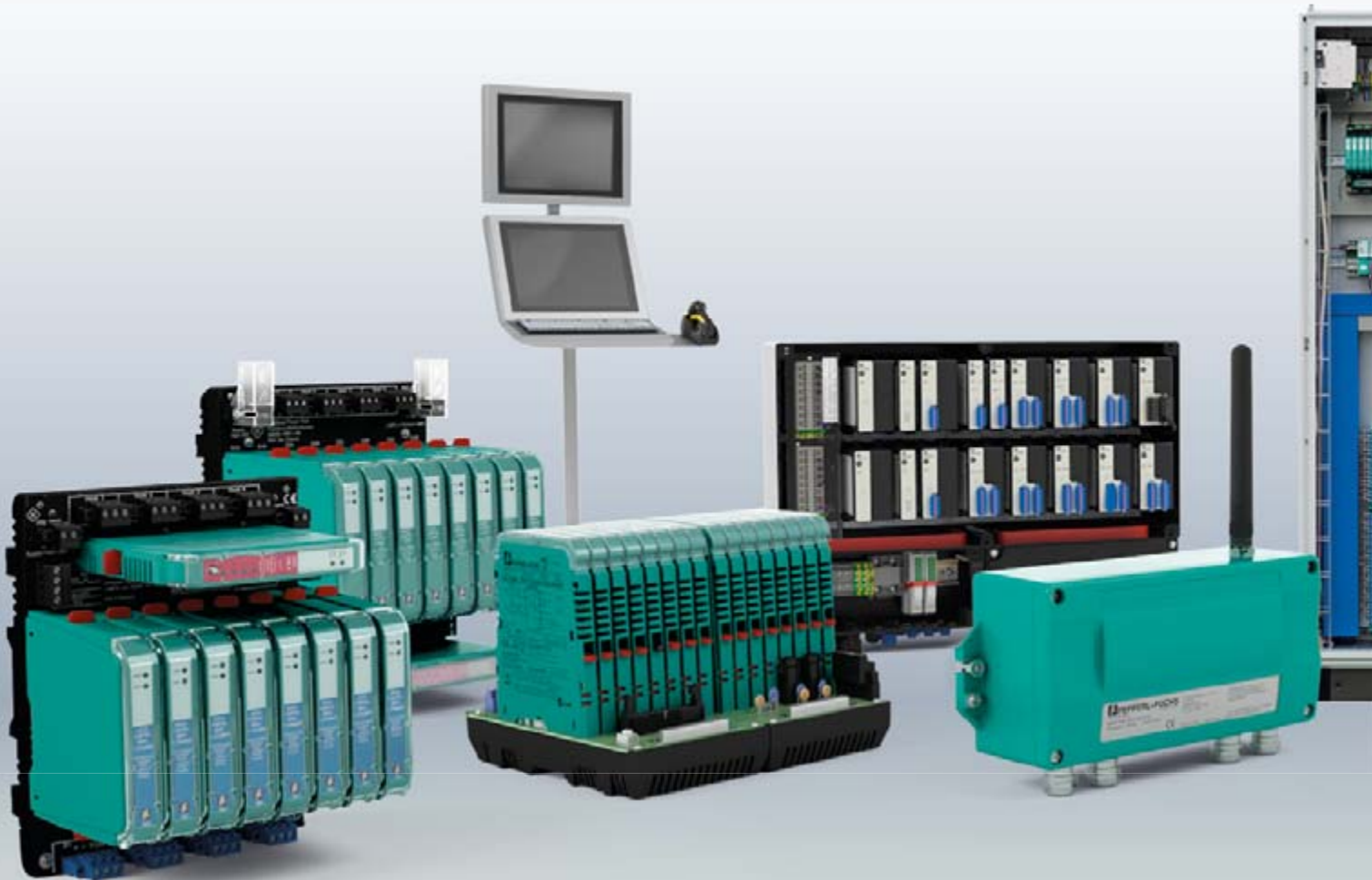
# Our Goal.

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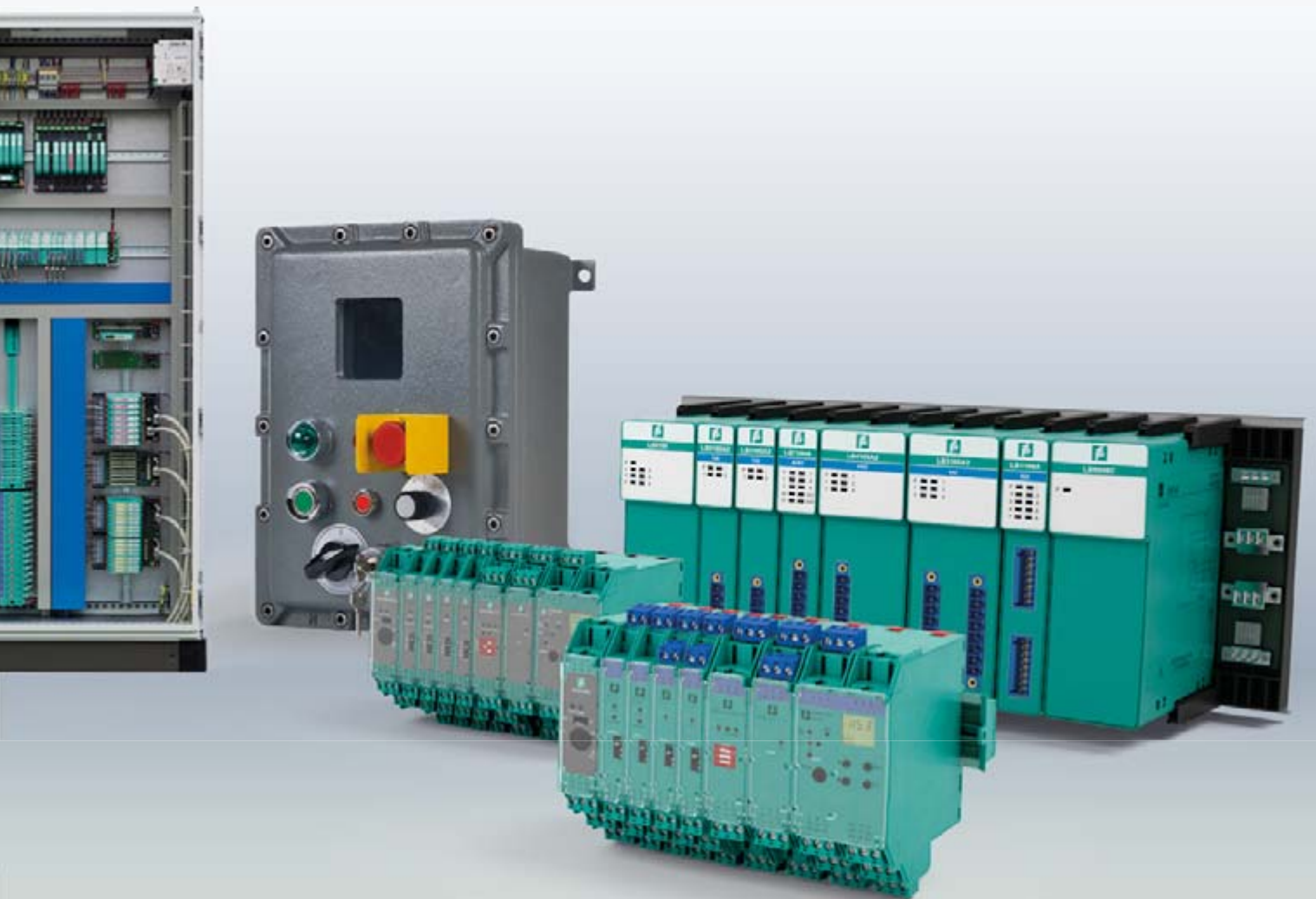
# Solutions by Pepperl+Fuchs: Turning Your Ideas Into Successes



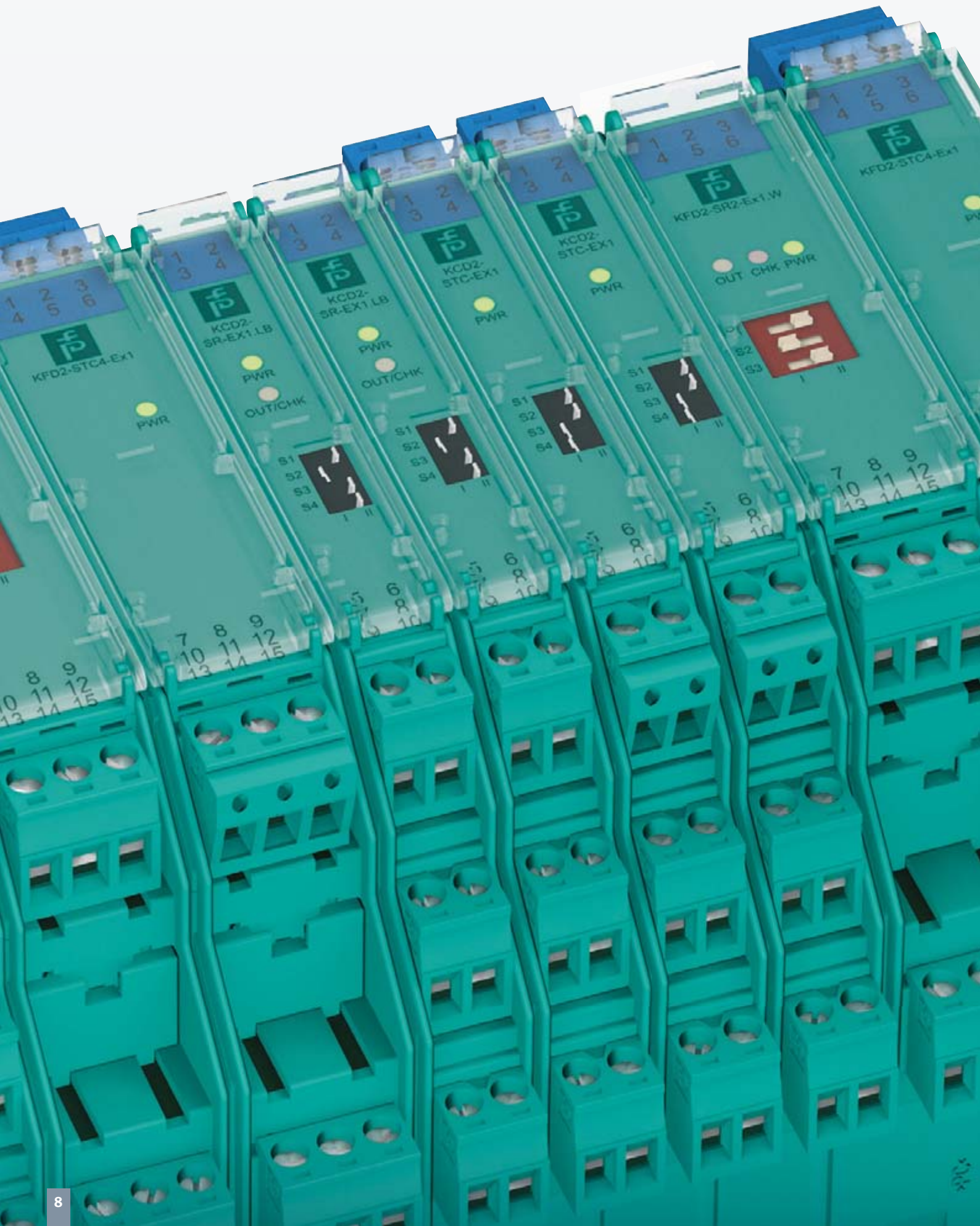
For more than 60 years, the name Pepperl+Fuchs has been synonymous with high-quality products, services, and solutions for processing systems in hazardous areas and harsh industrial environments. Experience spanning decades, a high level of application expertise, and continuous dialogue with our customers form the basis of a comprehensive portfolio for every requirement.

As a reliable partner, we understand our customers' individual processes and procedures and know their industries and requirements down to the last detail. We provide creative ideas and fresh impetus, preparing you for future tasks in ever more competitive markets. We oversee each project with a great deal of care and commitment, from the initial consultation to the commissioning stage and downstream support.

We make no compromises when it comes to quality, safety, and reliability. Only by applying the highest standards can we ensure that we are able to provide your processes with reliable protection. By applying this philosophy and by providing top-quality engineering, we set global benchmarks for technologies in the area of explosion protection. And we do so time and time again.











*Point to Point: Interface Technology*

# Reliable Processes – Signal after Signal

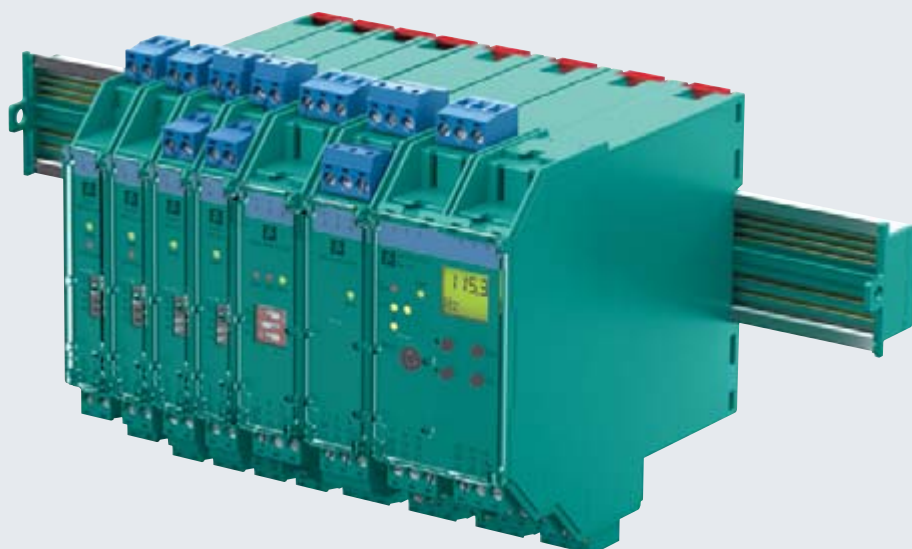
Safety, transparency, flexibility – the trusted technology of point-to-point wiring is a tried-and-tested, globally established procedure. The clear assignment of each signal to a terminal means the technology is easy to manage using simple resources. Since its inception, the classic interface technology from Pepperl+Fuchs has been an integral part of the process industry. From the Euro Cards of the 1970s to innovations such as prewired solutions, a large number of state-of-the-art modules and systems for hazardous and for safe areas are available to provide optimum support for all our customers' applications.

The wide variety of intrinsically safe isolated barriers within this range of products is one of the highlights. Over 200 different types of devices make up the largest portfolio of its kind on the market, providing a completely reliable solution for the safe transmission of signals in hazardous areas for every requirement.

A large selection of signal conditioners protect system operators from interference in the signal transmission from the field device to the process control system. A portfolio comprising more than 100 modules ensures optimum signal quality and an unrivaled level of process reliability.

# Safety First with Intrinsically Safe

K-System Mounted on Power Rail



Highly Functional Devices



Safety for the process, safety for the plant operators, and an easy-to-implement protection method: the K-System provides a comprehensive portfolio with reliable modules, designed by the experts in intrinsic safety. For mixed applications with hazardous and nonhazardous areas, signal conditioners and isolated barriers can be combined.

## Typical Applications

Providing isolated barriers for hazardous areas and signal conditioners for safe areas, the K-System offers solutions even for mixed applications.

- Oil and gas industries
- Petrochemical industry

## Key Benefits

- Power Rail for drastically reduced wiring, collective error messaging for flexible installation and expansion
- Simple maintenance with integrated diagnostics and quick change of modules during ongoing operation
- Simple configuration using DIP switches or software
- Many modules available with international approvals as well as SIL2 and SIL3 ratings for easy and reliable planning and documentation
- Horizontal and vertical mounting with no reduction in operating values
- Line fault detection for field circuits



# Isolated Barriers

20 mm Modules



Small 12.5 mm Modules



## Technical Features

- Various functionalities: from simple switch amplifiers to high-performance modules for temperature, frequency, and strain gauge bridges
- Compact, one-channel 12.5 mm wide modules providing single-loop integrity
- Maximum channel density in the 20 mm housings
- Only 5 mm per channel
- HART signal transparency

More information can be found in the Pepperl+Fuchs “Reliable Signals. Interface Technology Product Overview” brochure and online at [www.pepperl-fuchs.com/k-system](http://www.pepperl-fuchs.com/k-system)

# Efficiency with Intrinsically Safe Te

Mounted H-System



Termination Board



The termination boards are at the core of the intrinsically safe isolated barriers of the H-System. The internal wiring together with the control system-specific connectors and cables keep planning and wiring to a minimum. This simplifies mounting and significantly accelerates the commissioning process. All termination boards are tested with the original hardware of the respective control system manufacturer. The corresponding test reports are available.

## Typical Applications

The H-System is used for connecting the control systems of major control system manufacturers to field devices.

- Refineries
- Oil platforms
- Petrochemical industry

## Key Benefits

- Considerably reduced expenditure for wiring, mounting, commissioning, and documentation
- Simple mounting of modules without tools
- Line fault detection for field circuits
- Many modules with international approvals as well as SIL2 and SIL3 ratings for simple and reliable planning and documentation



# Termination Boards

## Transmitter Power Supply



## Technical Features

- Various functionalities: from simple switch amplifiers to high-performance modules for temperature, frequency, and strain gauge bridges
- Mounting of modules on coded slots of the termination board
- Mounting of termination boards on 35 mm DIN mounting rail in the control cabinet
- Control system-specific preassembled cables and termination boards
- HIC module with 12.5 mm housing width for single-loop integrity
- Maximum channel density in the 18 mm housings of the HID modules
- Only 4.5 mm per channel
- HART signal transparency

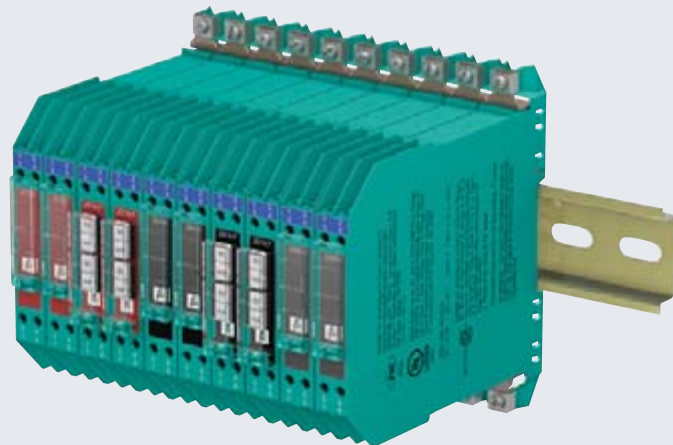
## HIGHLIGHTS

- Single system for horizontal and vertical mounting across the entire temperature range with no reduction in operating values
- Tests of termination boards with original controllers from leading control system manufacturers with corresponding test reports
- Control system-specific connectors guarantee a quick and reliable connection of the signals to the automation systems
- Module change during ongoing operation

More information can be found at [www.pepperl-fuchs.com/h-system](http://www.pepperl-fuchs.com/h-system)

# Simple Protection with Zener Barr

Mounted Zener Barriers



Single Zener Barrier



Zener barriers and surge protection barriers provide reliable protection and ensure a high level of plant availability: Zener diode barriers have long been a cost-effective and popular solution for providing intrinsic safety protection for circuits by limiting energy transferred to a hazardous location to safe levels. Surge protection barriers divert harmful voltage transients and surge currents to ground. They protect all measurement and control instruments inside a control room, in the field, or even inside a hazardous area.

### Typical Z-System Applications

Zener barriers prevent the transmission of excessively high energy levels from the safe area to the hazardous area.

- Oil and gas industries
- Petrochemical industry
- Mixed applications with hazardous and nonhazardous areas

### Technical Features of the Z-System

- Limitation of energy supplied in intrinsically safe circuits
- High packing density with up to three channels
- More than 75 variants for AC and DC as well as one-, two-, and three-channel modules



# Surge Protection Barriers and Surge Arrestors

**Field Mount Module**



**DIN Rail-Mounted Surge Protector**



## HIGHLIGHTS

- Reliable surge protection, e.g. from lightning strikes or switching processes
- Cost-effective solutions with many variants
- Increased availability

## Typical Surge Protection Applications

Surge protection barriers ground dangerous current and voltages and protect electronic measurement and control devices.

- Prevention of the risk of subsequent coupling caused by poor wiring

## Types of Surge Protection Barriers

- K-System: snap-on surge protection for K-System modules
- Field Device: screw mounting for field devices with metal housing with degree of protection IP20; simple mounting in hazardous areas in a free cable gland of the field device
- AC power: plug-in surge protection for 115/230 V mains power supplies
- DIN Rail: universal module for DIN mounting rail

More information can be found at [www.pepperl-fuchs.com/z-system](http://www.pepperl-fuchs.com/z-system) and [www.pepperl-fuchs.com/k-system](http://www.pepperl-fuchs.com/k-system)

# K-System Signal Conditioners – Co

Mounting on Power Rail



Switch Amplifier



Through galvanic isolation, signal conditioners protect measurement and control circuits against false signals and dangerous surges. The conversion, standardization, and splitting of measurement and control signals are among the core functions of these modules. K-System signal conditioners can be used flexibly with signals from hazardous and nonhazardous areas. Equipped with all system features of the K-System isolated barriers, such as power supply and collective error messages via power rail, they offer a versatile solution for a wide range of applications.

## Typical Applications

- Water and sewage industry: level, flow, and temperature measurement; worm conveyor and screen control
- Food industry: temperature measurement, level measurement, pressure monitoring
- Wind turbines: frequency measurement, rotation speed monitoring, temperature
- Hydropower plants: frequency and level measurement

## Modules for Digital and Analog Field Signals

### Digital Signals

- Switch amplifier for position feedback from the field
- Frequency connector for standstill and rotation speed monitoring
- Level measurement/overflow protection
- Relay modules

### Analog Signals

- Measuring transmitter for the conversion of analog measured values to standard signals, e.g. for precise temperature measurement
- Transmitter power supplies with splitting function to provide measured values for other systems

# Convenient and Versatile

Transmitter Power Supply



Frequency Converter



## Technical Features

- Effective protection against measurement and control errors caused by false signals, and surge protection using high-quality galvanic isolation
- Signal conversion and splitting
- Analog outputs for adapting to sources and sinks
- Comprehensive portfolio for all signal types, including high-functioning modules
- Application range:  $-25^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$

## HIGHLIGHTS

- Power rail with power supply and collective error messages
- Universal power supply
- Designed for functionality, versatility, and convenience
- Well suited for applications with Ex and non-Ex-signals

More information can be found in the Pepperl+Fuchs “Isolation. Conversion. Protection. Signal Conditioners” brochure and online at [www.pepperl-fuchs.com/signalconditioner-k-system](http://www.pepperl-fuchs.com/signalconditioner-k-system)



# SC-System Signal Conditioners –

Mounting on DIN Rail



Transmitter Power Supply



Galvanic isolation, combined with practical features for applications in nonhazardous areas and the most compact of forms, is what makes SC-System signal conditioners stand out from the rest. They offer the exact functionality required in applications where hazardous areas are not a factor. Most importantly, they reliably protect signals, which can be endangered by factors such as equalizing currents in ground loops.

## Typical Applications

- Water and sewage industry: level, flow, and temperature measurement
- Food industry: temperature measurement, level measurement, pressure monitoring
- Steel, cement: temperature and level measurement, measurement of shunt signals
- Hydropower plants: level measurement

## Modules for Analog Signals

- Transmitter power supply, also available in SMART and splitter versions
- Isolated amplifier for standard and +/- signals
- Passive isolator
- Temperature converter

# Compact and Efficient

**Isolating Amplifier for Standard Signals**



**Temperature Converter**



## Technical Features

- Effective protection against measurement and control errors caused by false signals, and surge protection using high-quality galvanic isolation
- Signal conversion and splitting
- Analog output as a current source
- Modules for typical signal types in nonhazardous applications
- Application range:  $-25^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$

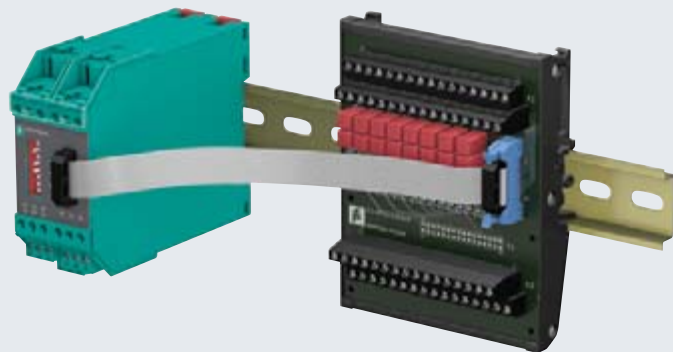
## HIGHLIGHTS

- Compact design with a width of just 6 mm
- Power supply with 24 VDC
- DIN rail mounting
- Well suited for application with Non-Ex signals

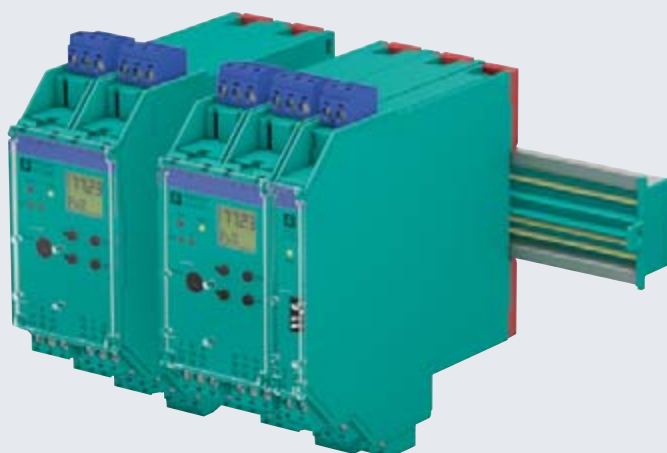
More information can be found in the Pepperl+Fuchs “Reliability in Its Most Efficient Form. The SC-System.” brochure and online at [www.pepperl-fuchs.com/signalconditioner-sc-system](http://www.pepperl-fuchs.com/signalconditioner-sc-system)

# HART Communication: Fast. Simple.

HART Multiplexer K-System



HART Loop Converter



The HART digital standard has been firmly established in the process industry for decades. More than 30 million HART-compatible field devices are in use worldwide. HART interface solutions from Pepperl+Fuchs include two HART multiplexer systems and a single-channel HART loop converter.

## Typical Applications

HART enables additional functions to be incorporated in available topologies, allowing information such as the error diagnostics and other measurement parameters to be accessed.

- Retrofitting of existing plants
- Reconfiguration of field devices in batch processes
- Activation and feedback of emergency valves
- Reading of status information from faulty field devices

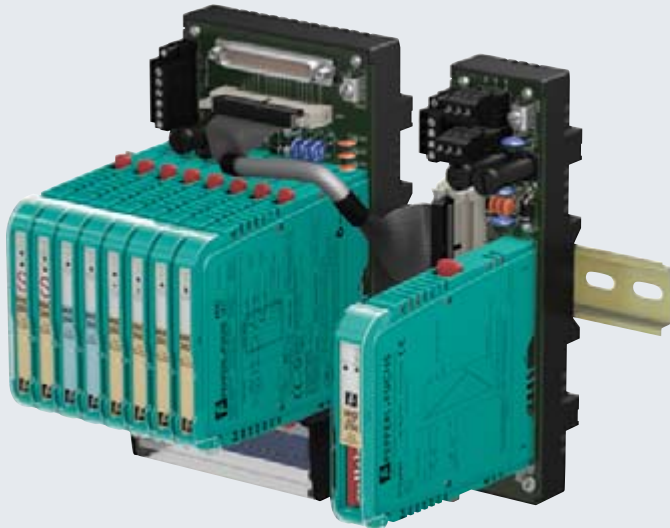
## Key Benefits

- Access to additional information such as configuration and diagnostics data and measurement parameters
- High operability due to early error messages
- Affordable solution for upgrading



# le. Secure.

## HART Multiplexer H-System



	K-System	H-System
HART multiplexer master	■	■
HART multiplexer slave	■	
Termination Boards	■	■
HLC	■	

### HART Multiplexer

A multiplexer works similarly to a gateway that extracts the digital HART signal without disturbing or compromising the communication between the field devices and the DCS or PLC. It provides an ideal solution for existing control system installations that do not support HART-capable I/O.

- K-System HART multiplexer supports up to 256 field devices
- H-System multiplexer termination board supports up to 32 field devices

### HART Loop Converter

The K-System HART loop converter is a single-channel isolated barrier for intrinsically safe applications.

- Implementation of HART variables into analog signals
- Transmitter power supply and HART monitoring in a single device
- Use of up to four measurements as HART variables and integration into conventional control systems

More information can be found in the Pepperl+Fuchs “HART Interface Solutions” brochure and online at [www.pepperl-fuchs.com/hart-interface](http://www.pepperl-fuchs.com/hart-interface)







*Wireless*HART

# Minimum Expenditure for HART-Based Systems

*Wireless*HART brings wireless communication to the field with all the benefits of HART technology. Particularly for plants extending over a large geographical area or with difficult-to-access measurement points, this technology offers minimum expenditure and maximum convenience. The mesh network uses wireless adapters both as routers and repeaters and is independent of a central gateway. This enables the development of very extensive network structures in which any transmission failures can be compensated for automatically. This is a valuable plus point for the availability of the process plant.

*Wireless*HART technology from Pepperl+Fuchs is a cost-effective solution with perfectly coordinated components that significantly simplify every process step. From planning using 3D simulation software and the intelligent gateway to the conversion of measurement values – and with an impressive price/performance ratio.



# The Simple Wireless Network

Gateway



Adapter



Ready for operation, fault-free, and safe – *WirelessHART* offers a level of simplicity and convenience almost unrivaled by other technologies during installation, maintenance, servicing, and ongoing operation. It is resistant to environmental influences and provides reliable information in all ambient conditions. It offers a cost-effective alternative to time-consuming cable installations and extensive plants.

## Typical Applications

*WirelessHART* is the perfect choice to install new measurements or upgrade existing field devices to measure temperature, level, pressure, and more. This enables greater insight into any process for optimization, flexibility in installation, and improves asset management as it reveals the information needed for preventive maintenance.

## Key Benefits

- High-performance DTM for the *WirelessHART* Gateway and Web interface
- Wide range of supportable devices
- Hazardous-rated adapters and gateways
- Quick and easy commissioning
- Simple network diagnostics
- Complete flexibility in the selection of the control system manufacturer

Our gateways have native communications for Modbus TCP, RS485, and Ethernet IP.

## Temperature Converter

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### Technical Features

- WiNC 3D simulation software allows seamless planning of the plant
- *WirelessHART* Gateway with redundant power supply and integrated network manager
- *WirelessHART* Adapter for creating a HART interface and connecting conventional HART devices
- Aluminum adapter for harsh industrial environments
- *WirelessHART* temperature converter for the conversion of measurements into measured values and the transmission of data to the network

More information can be found in the Pepperl+Fuchs “Wireless Sensing with *WirelessHART*” brochure and online at [www.pepperl-fuchs.com/wirelesshart](http://www.pepperl-fuchs.com/wirelesshart)





*Point to Bus: Remote I/O Systems*

# The Gateway between Two Technological Worlds

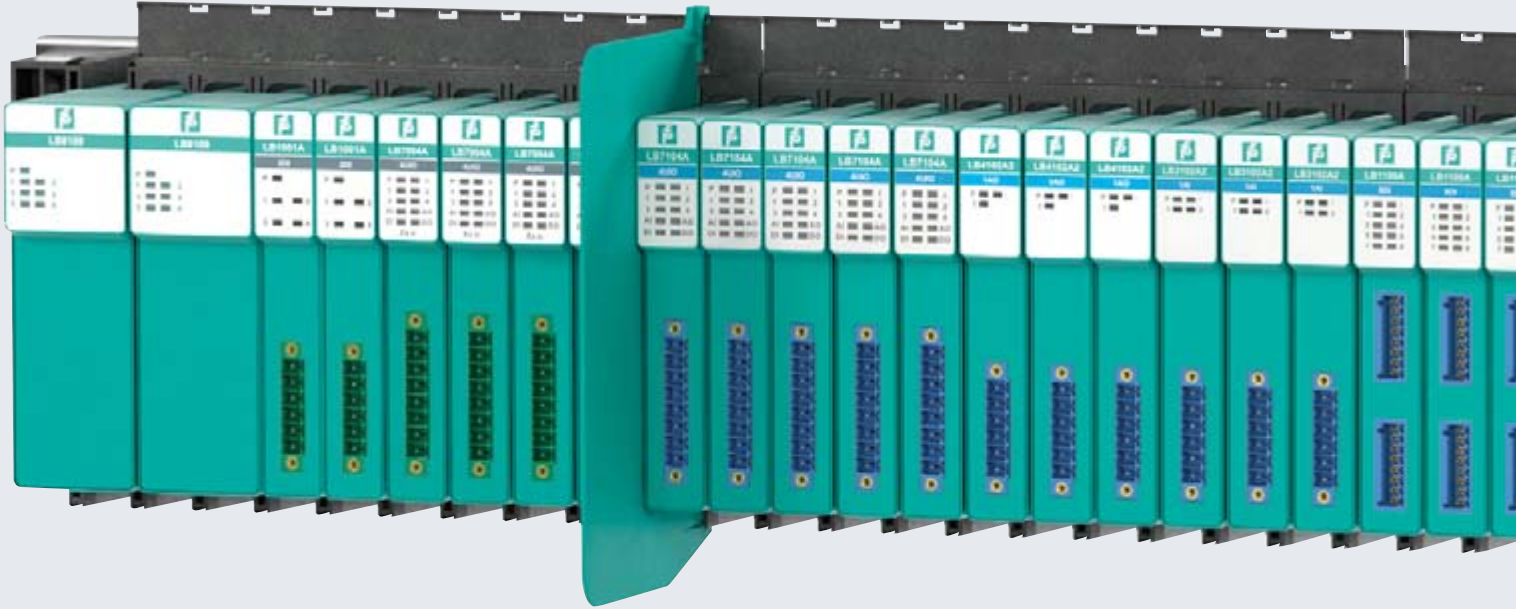
The successful use of Remote I/O demonstrates that the benefits of traditional technology cannot only be combined with advanced technology, but can also offer plant operators a whole host of advantages. The advantage of the clear assignment of a signal to a terminal is maintained, while existing nonsmart instruments can be easily integrated using the existing wiring. Investment costs can be reduced significantly through the modernization or expansion of existing plants. At the same time, wiring is considerably reduced, the need for space decreases, and new diagnostics information via the HART connection makes the process more transparent. This is the ideal and by far the most cost-effective way to modify plants and make them more competitive.

Pepperl+Fuchs identified and developed the potential of Remote I/O technology at an early stage. Our product family today includes sophisticated components with the most compact housing design in process automation for Zone 2 – this is a decisive factor for the user, as he can fully exploit the space that is available. The systems offered by Pepperl+Fuchs have another, very important benefit to offer: keeping the topology of the LB and FB systems the same across the process control level simplifies planning and carrying out maintenance.



# Greater Performance and Reduced

## LB Remote I/O System



Maximum performance for installations in hazardous areas in the smallest spaces – this is the key feature of the system. The capacity for more channels per participant than any other technology makes the LB remote I/O system the most compact and efficient system in process automation. The decentralized installation also contributes to the reduction of wiring and enables monitoring, configuration, and parameterization via a remote controller.

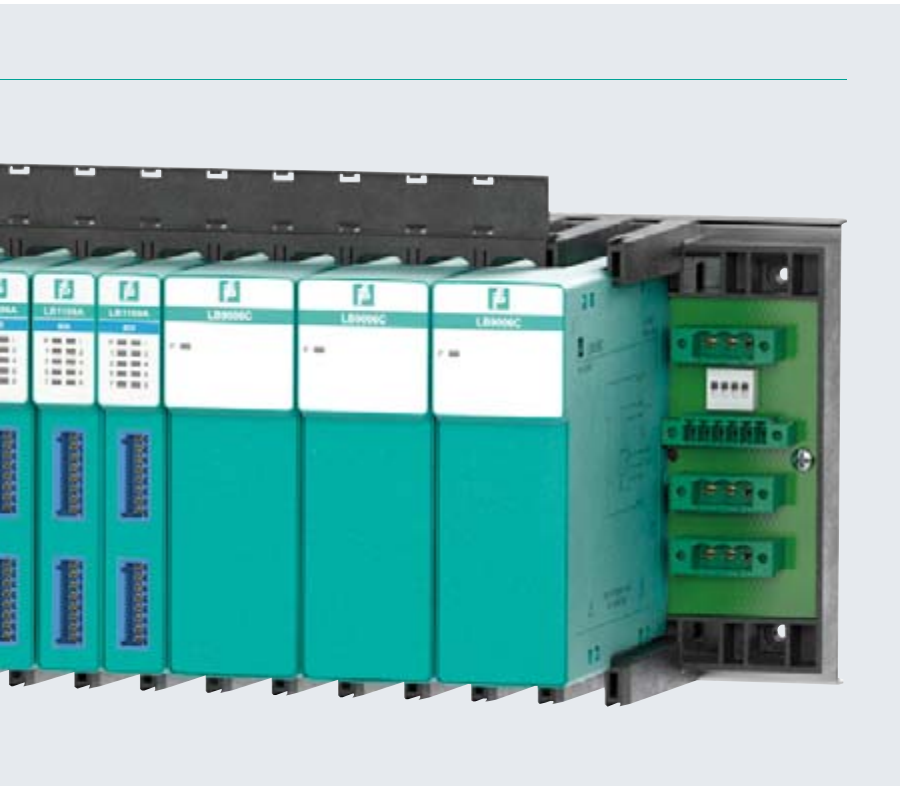
### Typical Applications

In any process automation installation, the LB system is versatile and is perfect for collecting any measurement signal as temperatures, pressures, levels, or any digital inputs for status reports and for controlling any outputs as proportional valves, solenoids, or indicators via a fieldbus. The LB remote I/O system can be installed in Zone 2/Div. 2 environments.

### Key Benefits

- Compatible with the digital communication protocols FOUNDATION fieldbus, PROFIBUS, Modbus, and HART
- Compact system with minimum space requirements
- Maintenance of wiring and field devices at field level
- Maximum packing density
- Combination of Ex i and non-Ex components

# Installation Space



## Technical Features

- Mounting of backplane on standard DIN rail
- Plug-in modules with removable plugs, swappable
- Free combination of I/O modules for non-Ex and Ex i field connections in the same backplane
- Combination of single-channel and multichannel modules for the highest possible packing density
- Redundant gateway and power supply
- Backplane with shutdown groups for safety shutdown

More information can be found in the brochure “The Gateway between Two Technological Worlds. Remote I/O” by Pepperl+Fuchs and in the special Pepperl+Fuchs publication “XL Performance. XS Design. LB1109,” as well as online at [www.pepperl-fuchs.com/rio](http://www.pepperl-fuchs.com/rio)

# Robust Technology for Zone 1 Ins

## FB Remote I/O System



The robust modules of the FB remote I/O system are ideal for harsh industrial environments and for use in Zones 1 and 21. The modules are based on the same engineering as the LB remote I/O system, meaning less work, easier planning, and significantly reduced costs for the plant operator. Depending on the application, the FB system is available in different housing design options.

# tallation



## Typical Applications

The FB system is used for the same applications as the LB system for installations in Zones 1 and 21. Like the LB module, it is versatile and is perfect for collecting any measurement signal as temperatures, pressures, levels, or any digital inputs for status reports and for controlling any outputs as proportional valves, solenoids, or indicators via a fieldbus.

## Key Benefits

- Robust design for harsh environments
- Preservation of field level
- Maximum packing density
- Combination of Ex i and Ex e components

## Technical Features

- Completely certified solution including backplane, housing, and modules, engineered by Pepperl+Fuchs
- Plug-in modules with removable plugs
- Free combination of I/O modules for Ex e and Ex i field connections in the same backplane
- Combination of single-channel and multichannel modules for the highest possible packing density
- Maintenance without hot work permit
- Backplane support power and communication gateway redundancy
- Ex e connections as removal protection (IP30)

More information can be found in the brochure “The Gateway between Two Technological Worlds. Remote I/O” by Pepperl+Fuchs and online at [www.pepperl-fuchs.com/rio](http://www.pepperl-fuchs.com/rio)









*Bus to Bus:  
FieldConnex Fieldbus Technology*

# The Ultimate in Transparency: FieldConnex from Pepperl+Fuchs

Where processes require the highest level of transparency, and maximum availability is crucial for success, there is no alternative to fieldbus technology. FieldConnex products are high-performance components for fieldbus installations and infrastructure. They make the connection level between the process control technology and field device transparent – and therefore manageable. Sophisticated, intelligent diagnostics functions immediately recognize any undesired deviations, while state-of-the-art electronics isolate and prevent errors before they occur. This system makes processes safer, more available, and more efficient than ever before.

Pepperl+Fuchs has also been very active in the area of fieldbus technology from the beginning and has made a key contribution to the development of this technology by linking fieldbus and explosion protection. FieldConnex provides an innovative product portfolio with unique functions, ensuring maximum reliability and availability for all fieldbus infrastructures. The latest development is intelligent fieldbus. This includes diagnostics components with self-monitoring and error detection, which are unique on the market and bring diagnostics and protection to the field for the first time. No other technology offers greater safety or availability.

Innovations such as these provide the entire process industry with new opportunities and potential time and again – and this progress is continuing.

# Continuous Diagnostics to Ensure

High-Density Power Hub



Compact Power Hub



Segment Coupler 3



Achieving 100% availability – this objective is the basis for all technological developments of the FieldConnex fieldbus technology. To provide maximum availability, seamless error monitoring and diagnostics must be ensured. At the core of this technology is FieldConnex Advanced Diagnostics, which provides a high level of transparency and reliability.

## Typical Applications

FieldConnex is certified in accordance with all international standards and is used worldwide wherever flammable materials are processed or potentially explosive atmospheres can arise.

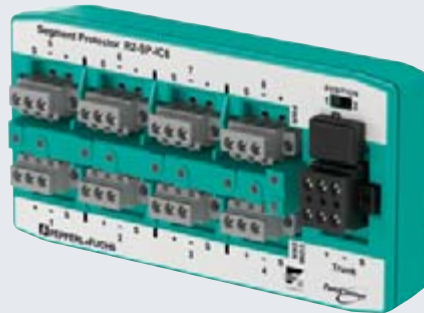
- Oil and gas industry: high availability including all methods of ignition protection relevant for fieldbus and diagnostic-enabled components providing high reliability
- Chemical industry: all FieldConnex components meet strict safety requirements and comply with environmental regulations
- Offshore and marine industry: special certified components for extreme environmental conditions
- Water, wastewater, and desalination: remote monitoring, configuration, and diagnosis of the automation system

# Maximum Availability

FieldBarrier in Aluminum Enclosure



Segment Protector



Temperature Multiplexer



## Key Benefits

- Shortened commissioning and efficient troubleshooting via diagnostic tools
- Maximum safety with no limitation of power
- Widespread plants with long cable runs and many devices
- Investment protection for existing instruments in the case of retrofits

## Technical Features

- Components for the FOUNDATION Fieldbus H1 and PROFIBUS PA bus systems
- FieldBarrier: intrinsically safe connection to the high-power trunk and short-circuit protection
- Segment Protector: connection of field devices, integrated short circuit protection
- Power Hubs: power supply with integrated fieldbus diagnostics
- Advanced Diagnostics: diagnostics module on the Power Hub, also optional integration as FOUNDATION fieldbus H1 nodes and EDDL device description

More information can be found in the Pepperl+Fuchs “FieldConnex for FOUNDATION Fieldbus” and “FieldConnex for PROFIBUS PA” brochures and online at [www.pepperl-fuchs.com/fieldconnex](http://www.pepperl-fuchs.com/fieldconnex)

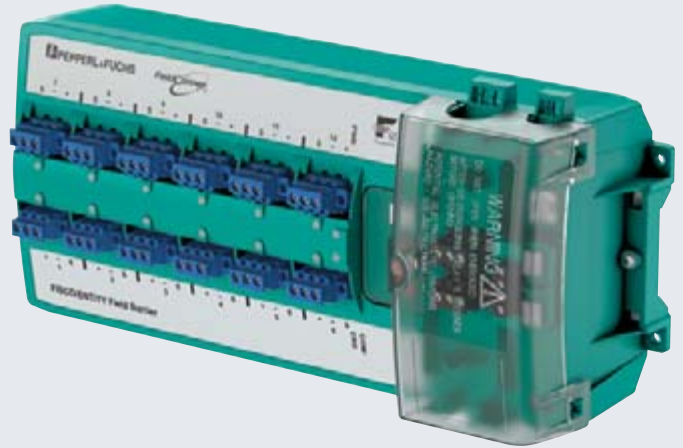


# The First Fieldbus Infrastructure wi

Diagnostic Gateway



12-Channel FieldBarrier



Identifying, preventing, and isolating errors – these functions best characterize the newly developed FieldConnex components equipped with features capable of performing diagnostics. Errors are reported immediately and faults are efficiently and reliably isolated directly in the field. This user-oriented state-of-the-art technology sets a new benchmark for plant safety and availability.

## Diagnostic Gateway

- Reliable monitoring of the control cabinet
- Integrated, easy-to-configure I/O

## FieldBarrier

- Self-monitoring FieldBarrier
- Excellent error identification and isolation well beyond short circuits
- Integrated diagnostics of physical layer at each output
- Extremely compact housing
- Supports up to 31 nodes in Zone 0

## Segment Protector

- Excellent error identification and isolation well beyond short circuits

## Lightning Protection

- Self-monitoring lightning protection
- Message prior to module failure
- Immediate alarm message on-site and in the control room

# th Diagnostic Capability in the Field

Surge Protector Trunk



Surge Protector Spur



Leakage Sensor



## Enclosure Leakage Sensor (ELS)

- Protection against even the smallest amount of penetrating moisture
- Immediate alarm signal to the control room
- Can be used in a junction box, field device, or switch cabinet



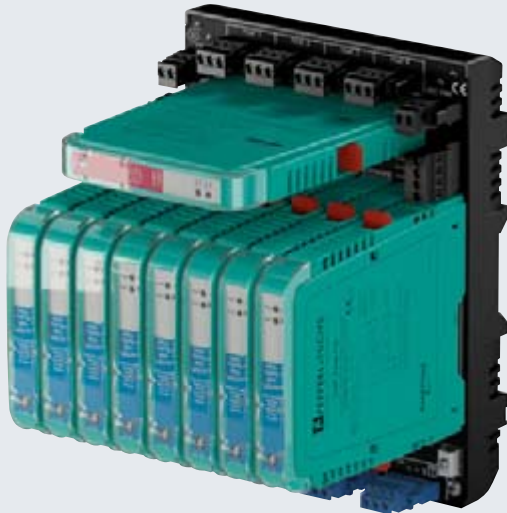
## HIGHLIGHTS

- Maximum protection from the control room to the field device and all the error-prone points in-between.
- Seamless diagnostics and monitoring in the
  - › Field device
  - › Field distributor
  - › Control cabinet
- Convenient, intelligent monitoring without configuration
  - › With the Diagnostic Manager software
  - › Optimal communication quality when the plant starts up
  - › Up-to-date protection after each service on instruments in the field.

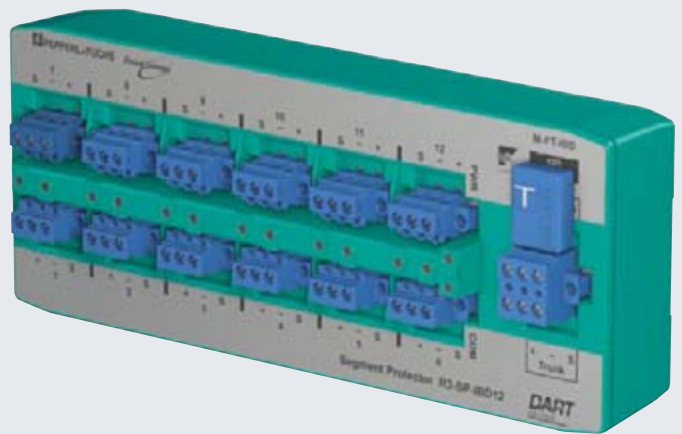
More information can be found in the Pepperl+Fuchs “Intelligent Fieldbus—Keeps Your Process Running” brochure and online at [www.pepperl-fuchs.com/intelligent-fieldbus](http://www.pepperl-fuchs.com/intelligent-fieldbus)

# The Intrinsically Safe High-Power

DART Power Hub



DART Segment Protector



DART technology is an innovation from Pepperl+Fuchs. What makes it unique is its ability to identify sparks as soon as they form and to prevent them from igniting. This makes it possible to ensure maximum safety without implementing power limitation for intrinsically safe applications.

## DART Power Hub

- Intrinsically safe redundant power supplies
- Host interfaces adapted to the process control system
- Optional Diagnostic Module for monitoring the physical layer

## DART Segment Protector

- Integrated short-circuit protection at the spur
- Spur length up to 1,200 m
- Installation in Zone 1
- Connection of up to four Segment Protectors to a cable length of up to 1,000 m

# Trunk

## DART Segment Coupler 3

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### Technical Features

- Freedom in plant design
- Transparent coupling to PROFIBUS DP

More information can be found at [www.dart-fieldbus.com](http://www.dart-fieldbus.com)







*Human-Machine Interface: VisuNet*

# Insightful Solutions

The complexity of modern processes and high-tech machinery require HMI systems and components directly in the process area. Adding to this complexity are processes with hazardous areas. Typically, these HMIs are subject to moisture, extreme temperature shifts, and the use and abuse of daily operations. To ensure process availability, a high level of engineering expertise and experience is required of your HMI supplier.

With VisuNet, Pepperl+Fuchs has developed HMI systems and components that draw on decades of experience and expertise in hazardous locations. This product range satisfies even the most demanding requirements for process visualization and is used worldwide in oil and gas exploration, refineries, life sciences, and chemical production facilities – from a panel PC in a drilling console monitoring the drilling process on a platform, to an operator workstation automating batch processes, or formulation in a pharmaceutical facility. Each and every day, operators around the world rely on the quality and protection provided by our continuous-duty HMI products.

# Rugged HMI for the Oil and Gas In

VisuNet IND



VisuNet XT



Demanding industrial applications such as the extraction of fossil fuels bring visualization systems to the limits of endurance. VisuNet HMI workstations and panel components were developed for such extreme conditions in continuous-duty operations. They are guaranteed to withstand the rugged conditions common to each stage of oil and gas exploration, refining, and transportation.

## Typical Applications

- Petrochemical production
- Blending processes
- Compressor and pumping stations
- Tank and terminal storage
- Tanker filling stations
- Gas plants/fractionation plants
- LNG production

## Key Benefits

- Extremely robust design provides product longevity
- Reliable performance under adverse environmental conditions
- Globally certified for ATEX, IECEx, and NEC
- Field-maintainable HMI units

# dustries

VisuNet EX 1



VisuNet Panel Mount PC Solutions



## Technical Features

- Durable enclosures
- Wide range of operating temperatures
- Sunlight-readable displays



## HIGHLIGHTS VISUNET XT

In fossil fuel exploration, harsh conditions can be extremely problematic for drilling equipment as well as for the control and monitoring of equipment. To increase efficiency, rugged panel PC and software applications have replaced many hydraulic gauges, recorders, and counters used for drilling wells. This requires an HMI solution properly engineered to deliver shear strength and processing speed. Applications for VisuNet XT are:

- Drillers monitors
- Compressor controls
- Mud logging
- Safety systems
- Choke controls

More information can be found in the Pepperl+Fuchs “VisuNet Solutions. Rugged HMI Solutions for the Oil and Gas Industries” brochure and online at [www.pepperl-fuchs.com/hmi](http://www.pepperl-fuchs.com/hmi)



# High-Tech Components for Life Sci

VisuNet GMP



VisuNet EX1



Applications in regulated industries such as the pharmaceutical and food and beverage industries are determined by current international GMP guidelines. The VisuNet portfolio matches GMP requirements both in form and function. Our life science portfolio is designed for cleaning and proper drainage with SS finishes – typical life science HMI requirements.

## Typical Applications

- Batch and dosing control
- Tablet and filling machines in the
  - Pharmaceutical industry
  - Food industry
  - Cosmetics industry
- Production of perfumes and flavorings

## Key Benefits

- Designed in line with common GMP requirements
- Ideal for clean room and hygienic applications
- Focused products that solve the environmental challenges and obstacles presented by taking HMIs into hazardous areas

# ence Applications

## VisuNet Panel Mount Solutions



## VisuNet Edge



### Technical Features

- Sleek, smooth housings
- Resistant to high pressure and temperature
- For heavy wash down, steam jets, and chemical cleaning
- Globally certified units for Zone 1, Zone 2, and Class I, Div. 1/2



### HIGHLIGHTS VISUNET EX 2 GMP

Good Manufacturing Practice (GMP) regulations vary from manufacturer to manufacturer, but each is required to take active quality measures to ensure product safety. Regulatory quality measures range from ingredient handling to SOP cleaning procedures. VisuNet Ex 2 GMP meets these demands in every way. Commonly used in:

- Biopharmaceutical production
- Clean rooms
- MES recipe handling
- Semiconductors
- Flavors and fragrances

More information can be found at [www.pepperl-fuchs.com/hmi](http://www.pepperl-fuchs.com/hmi)



*Purge and Pressurization: Bebcu EPS*

# Engineering in Ex p

Purge and pressurization is the most flexible Ex protection method, because it allows the use of non-Ex electrical equipment in hazardous areas. Standard components are easily installed in an Ex p enclosure. Flammable gas collected inside the enclosure is removed and the accumulation of gases or ignitable dust within the pressurized enclosure is prevented. By establishing and maintaining an overpressure within the housing by air or inert gas, the entering of an explosive atmosphere is prevented.

Pepperl+Fuchs Bebcu EPS systems form a comprehensive portfolio suitable for all requirements and are a safe and economical solution. Many of the units are globally certified, which makes specification, installation, and operation easier. User-friendly interfaces and menu-driven, easy programming guarantee ease of use.

For very specific requirements, the design engineers in our Solution Engineering Center (SEC) in the U.S., Europe, and Asia will design and manufacture a custom, certified enclosure assembled to your specifications – including all the necessary system approvals and certificates.



# Purging Solutions for Every Dema

6000 Series



5500 Series



Fully automatic systems with many functionalities or standard programs for simple implementation – the Bebcu EPS product range offers solutions for every application. Each system has been designed and engineered with a user-friendly programming interface and standard configurations to simplify implementation, and all components and solutions are supplied with certificates and system approvals.

## Typical Applications

- Control cabinets, motors, filling, and weighing
- Camera systems and video alarms
- Gas analyzers
- Hazardous location HMIs

## Key Benefits

- Controls the temperature inside the enclosure
- Prevents moisture and dust accumulation
- Requires little maintenance and provides easy access to equipment
- Customized certified solutions with all the necessary certificates
- Increases the life expectancy of expensive electronics

## Technical Features: 6000 Series

- Fully automatic and field-configurable system
- Reduces classification inside enclosure from Zone 1/Div. 1 to a nonhazardous area
- Automatic Rapid® exchange for temperature control and leak compensation
- Globally certified for ATEX, IECEx, and NFPA 496 standards

## Automatic Purge Systems



### 6000 series

#### Technical Features: 5500 Series

- Small and compact system
- Reduces the classification within the protected enclosure from a Zone 2/Div. 2 to a nonhazardous area
- The unit is field-configurable, making it easy for users to select the program for their application using the menus on the display screen

#### Technical Features: 3000 Series

- Reduces the classification within the protected enclosure from a Zone 2/Div. 2 to a nonhazardous area
- Supports differential pressure switch and alarm outputs
- Various mounting options and component kit
- Simple but very effective, well-proven design

#### Technical Features: Enviro-Line

- Complete solution to pressurization applications in nonhazardous areas that contain dusty, dirty, and corrosive atmospheres

More information can be found in the Pepperl+Fuchs “Purge and Pressurization Systems. The Leaders in Purging Technology” brochure and online at [www.pepperl-fuchs.com/purge](http://www.pepperl-fuchs.com/purge)





*Level Measurement Technology*

# The Highest Level of Precision for All Measurement Tasks

The reliable monitoring of limit levels and highly precise data on levels and consumption are essential for efficient plant management. This monitoring requires solutions that are perfectly tailored to the measurement requirements. Additionally, they must also optimally support the most demanding of customer processes. The large number of measurement tasks, which also require a wide range of products, represent a major challenge here.

The Pepperl+Fuchs product portfolio provides users with almost unlimited options. Whether it is the housing, material, or coating – the measurement technology can be tailored precisely to all specific customer requirements and can be used universally, no matter what the medium and even under the most difficult of measuring conditions.

Technology that can be used at every location worldwide is a matter of efficiency for international companies. The portfolio also meets this requirement: Pepperl+Fuchs measurement technology is equipped with all common process connections and meets all technical requirements defined by national and international standards.



# The Method Is What Matters: Reliable Measurements in Any Me

Vibration Fork LVL-M



Ultrasonic Sensor LUC-M



Guided Microwave Pulscon LTC



Precise, self-monitoring, reliable, and robust – level measurement technology from Pepperl+Fuchs guarantees the greatest possible process reliability for every device. Which solution perfectly meets the individual requirement depends primarily on the right measurement process and the appropriate measuring principle. Pressure, vibration, ultrasonic, float – the range of measuring methods is extensive and the right sensor is also selected based on the consistency of the medium.

## Typical Applications

Whether in the oil and gas industry or for pharmaceuticals, the chemical industry, or water and wastewater – level measurement technology is used everywhere in modern process facilities. Levels are commonly monitored in a number of areas, ranging from bulk goods to pastes and liquids in tanks, filling stations, silos, and transportable containers.

## Limit Value Detection

- Overflow safety device
- Minimum/maximum controls
- Overflow and dry-run protection

## Continual Measurement

- Consumption determination
- Loss control
- Balancing
- Stocking
- Storage capacity

**Vibration Fork Vibracon S LVL-B**



**Pressure Sensor LHC-M**



**Pressure Sensor PPC-M**



## Key Benefits

- Maximum precision
- Self-monitoring sensors
- Sensor technology for all measurement processes and measurement principles
- Reliable measurement results irrespective of medium
- Maximum process reliability

Limit Level Measurement	Continual Measurement
<p><b>Fixed</b></p> <ul style="list-style-type: none"> <li>■ Vibracon S</li> <li>■ Capacitive trip amplifier</li> </ul>	<p><b>Fixed</b></p> <ul style="list-style-type: none"> <li>■ Ultrasonic</li> <li>■ Pulscon</li> </ul>
<p><b>Liquid</b></p> <ul style="list-style-type: none"> <li>■ Vibracon</li> <li>■ Conductive electrodes</li> <li>■ Magnetic immersion probe</li> <li>■ Floating switches</li> </ul>	<p><b>Liquid</b></p> <ul style="list-style-type: none"> <li>■ Ultrasonic</li> <li>■ Pulscon</li> <li>■ Magnetic immersion probe</li> <li>■ Level sensor</li> <li>■ Pressure transmitters</li> </ul>

More information can be found in the Pepperl+Fuchs “Level Measurement Product Overview” brochure and online at [www.pepperl-fuchs.com/level](http://www.pepperl-fuchs.com/level)





*PS3500 Power Supplies*

# Improving Operational Integrity

Digital networks operate in some of the most demanding industrial environments. Process safety valves and control systems are typically dependent upon low-cost, industrial-grade power supplies not designed for 24/7 operation. A single power supply failure has a catastrophic effect at continuous-process facilities that equates to a tremendous amount of lost revenue.

Monitoring power, not unlike a traditional process variable, means transparency and added protection for critical loops. Power redundancy and detailed diagnostics guarantee that system functionality continues even during a supply failure. Reducing the probability of failure and improving safety is a decisive step towards system integrity.

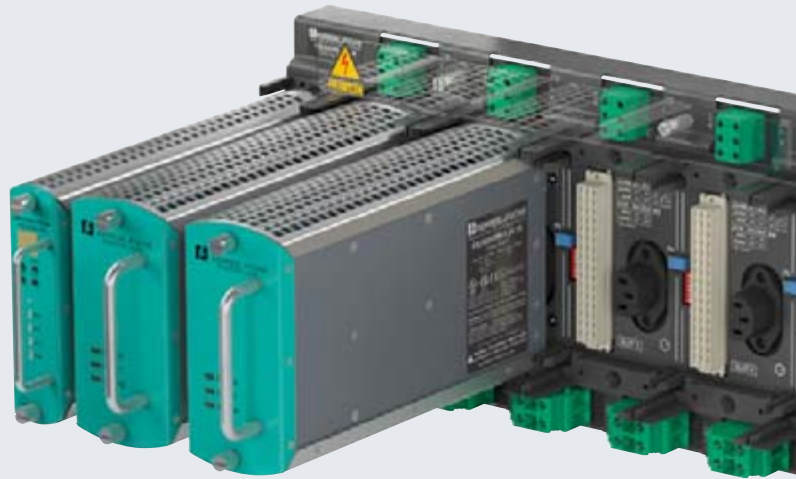


# Designed for 24/7 Operation: Reliable Technology with Integrat

PS3500 Power Supply System – 45A



PS3500 Power Supply System – 90A



Redundancy, diagnostics, high immunity, and industry-leading efficiency for demanding environments – the PS3500 power supplies provide performance at the highest level for all process industries. All modules are configurable and allow full N+1 or N+N redundancy for critical system power requirements.

## PS3500 Diagnostics Module

PS3500 has a new power supply diagnostic module. It plugs directly into the backplane for real-time system diagnostics and features a local display for immediate feedback on primary- and secondary-side operating parameters. The simple-to-understand information will easily integrate into plant asset-management software programs and will complement the existing FieldConnex Diagnostic Module. This mission-critical information will help improve maintenance functions and prevent unplanned shutdowns.

- Monitors operating parameters and sets warning and alarms for negative shifts in input/output voltages, current, and temperature
- Two-way indication – Diagnostic Module LEDs and Asset Management System (DTM, HART, and EDDL)
- The diagnostic module is transparent to the system and the communications are galvanically isolated

## Typical Applications

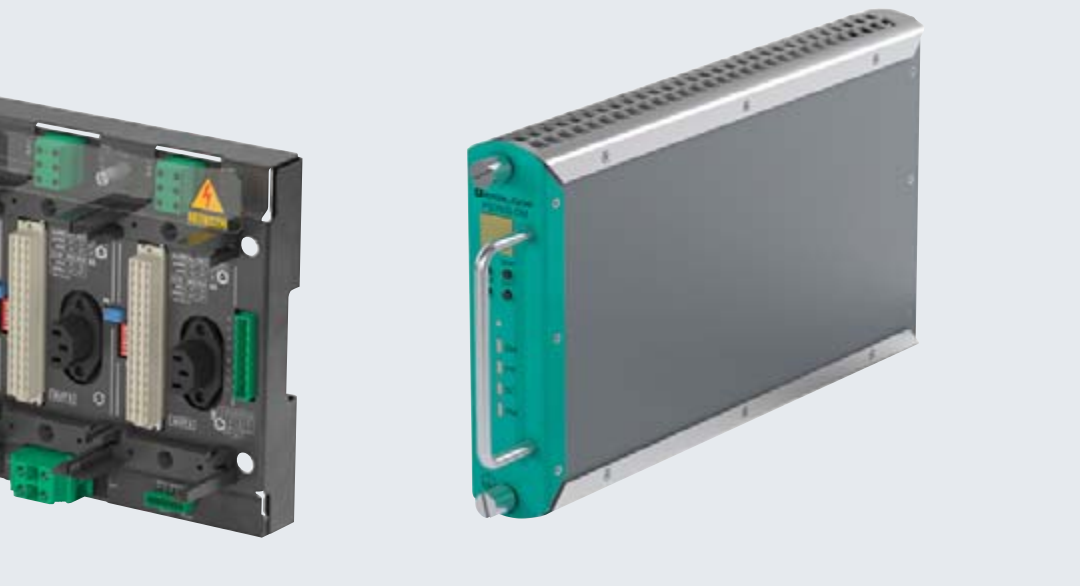
- Redundancy for 24 V power to instrumentation
- Vibration monitoring systems
- Bulk power for control system cabinets

## Typical Applications for N+1 redundancy

- Continuous process facilities – refineries
- Emergency shutdown systems/SIL3
- Offshore platforms
- Fieldbus projects

# ed Diagnostics

PS3500 Diagnostics Module



## Key Benefits

- Improved operational integrity
- Identical monitoring of power as other control variables
- Additional protection in critical loops
- Reduced failure probability

## Technical Features

- Simple hot-swappable removal of a module without causing system shutdown
- Operates at 91% efficiency, allowing higher ambient temperature conditions
- Active load sharing and high system reliability (no internal fans)
- Universal AC or DC input and 22.5 to 30 V DC adjustable output

More information can be found in the Pepperl+Fuchs “Unrelenting Current. Powering Availability with PS3500 Power Supplies” brochure and online at [www.pepperl-fuchs.com/ps3500](http://www.pepperl-fuchs.com/ps3500)





*Explosion Protection Equipment*

# All Angles Covered: A Flexible Portfolio for a Variety of Applications

The variety of applications in hazardous locations is almost unlimited, and even common applications can entail a wide range of requirements depending on the type of protection, the industry, or country-specific guidelines. To meet all these requirements, it is necessary to offer customers a wide range of flexible and adjustable products and systems.

The range of electrical components and systems offered by Pepperl+Fuchs for explosion protection is specially tailored to this range of requirements. All functions required for installation and operation are available, ranging from terminal boxes and local control stations to comprehensive complex control systems. The various product lines are based on high-quality enclosures and components of the increased safety, intrinsic safety, and flameproof types of protection. They are available in a wide range of functions, sizes, and materials. No matter how specific the requirements are, the optimum adjustment to any application can be ensured.



# Remarkably Diverse: Functions for

Terminal Boxes Ex e, Ex ia



Terminal Boxes Ex d IIC



Control Units Ex e



Signaling, monitoring, control, and distribution are the key tasks of the components and systems for explosion protection. Pepperl+Fuchs products allow for quick installation and commissioning and offer the user an unrivaled selection of functionalities and configurations.

## Typical Applications

All products offer a high degree of protection for electrical installation – including in difficult environmental conditions. The products are suitable for installation in:

- Production plants with hazardous areas
- Production areas with high levels of dust generation
- Aggressive environments commonly found in marine and offshore applications
- Areas with strict hygiene guidelines (e.g. pharmaceuticals, food and beverage)

## Key Benefits

The portfolio offers a high level of flexibility that reliably meets every conceivable customer requirement.

- All kinds of cable glands
- Freely selectable number and type of terminals with terminal and junction boxes
- Large selection of control and monitoring functions with free combination of operating elements
- Robust enclosures for all environmental conditions
- High surface quality with resistance to aggressive media
- Large selection of enclosure sizes and variants

# Every Application

Control Units Ex d IIC



Control Stations Ex e



Control Stations Ex d IIB



## Technical Features

- Ex d, Ex e, Ex i, Ex tb certifications
- Various enclosure materials: glass fiber reinforced plastic (GRP), aluminum, stainless steel, and cast iron
- Electropolished, shot-peened, or epoxy-coated surfaces
- Extensive range of installation components and accessories

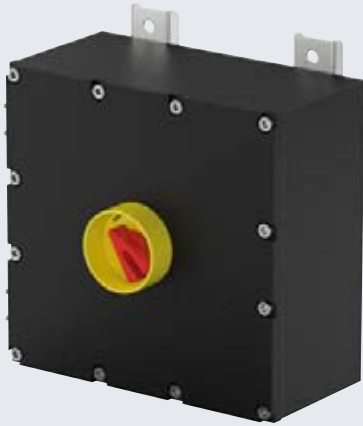
## HIGHLIGHTS

- Unlimited flexibility: control stations and local control units can be equipped with a broad range of control functions and allow installation of more than 50 operating elements in a single enclosure
- The highest degree of protection for all applications: various enclosure variants in different types of protection and materials ensure the right solution for every application

More information can be found in the Pepperl+Fuchs “Explosion Protection Equipment” brochure and online at [www.explosionprotection.com](http://www.explosionprotection.com)

# Maximum Protection in the Harsh

Power Switching Ex d IIB



Motor Starter Ex d IIB



Control Panel Ex d IIB Type EJB



Switching, monitoring, and distribution solutions are important components for controlling processes. An explosion-protected design is often not available, and many times the safe area is too far away from the sensors and actuators. Flameproof systems offer an efficient solution.

## Typical Applications

Flameproof control and distribution systems are used whenever electrical installations and automated production operations need to be safely protected against explosions and environmental influences.

- Control systems on drilling rigs
- Operations with significant dust exposure
- Operations with aggressive and corrosive media
- Oil and gas processing

## Key Benefits

- Protected switching of drives and power circuits in hazardous zones
- Cost savings by means of the use of non-Ex components in hazardous areas
- Increased efficiency due to configurations exactly according to your specifications
- Cost savings thanks to the simple and quick installation of Ex de combination solutions
- Lower maintenance and servicing expenditure due to protection against environmental influences

# est Conditions

Control Panel Ex d IIB Type ASM



Control Panel Ex d IIC Type GUB



Control Panel Ex d/Ex e combined



## Technical Features

- Flameproof enclosures Ex d IIB or IIC
- Customer-specific installation of non-Ex components
- Enclosure materials: aluminum, stainless steel, and cast iron
- Large selection of enclosure sizes and variants
- Large selection of certified operating elements and accessories

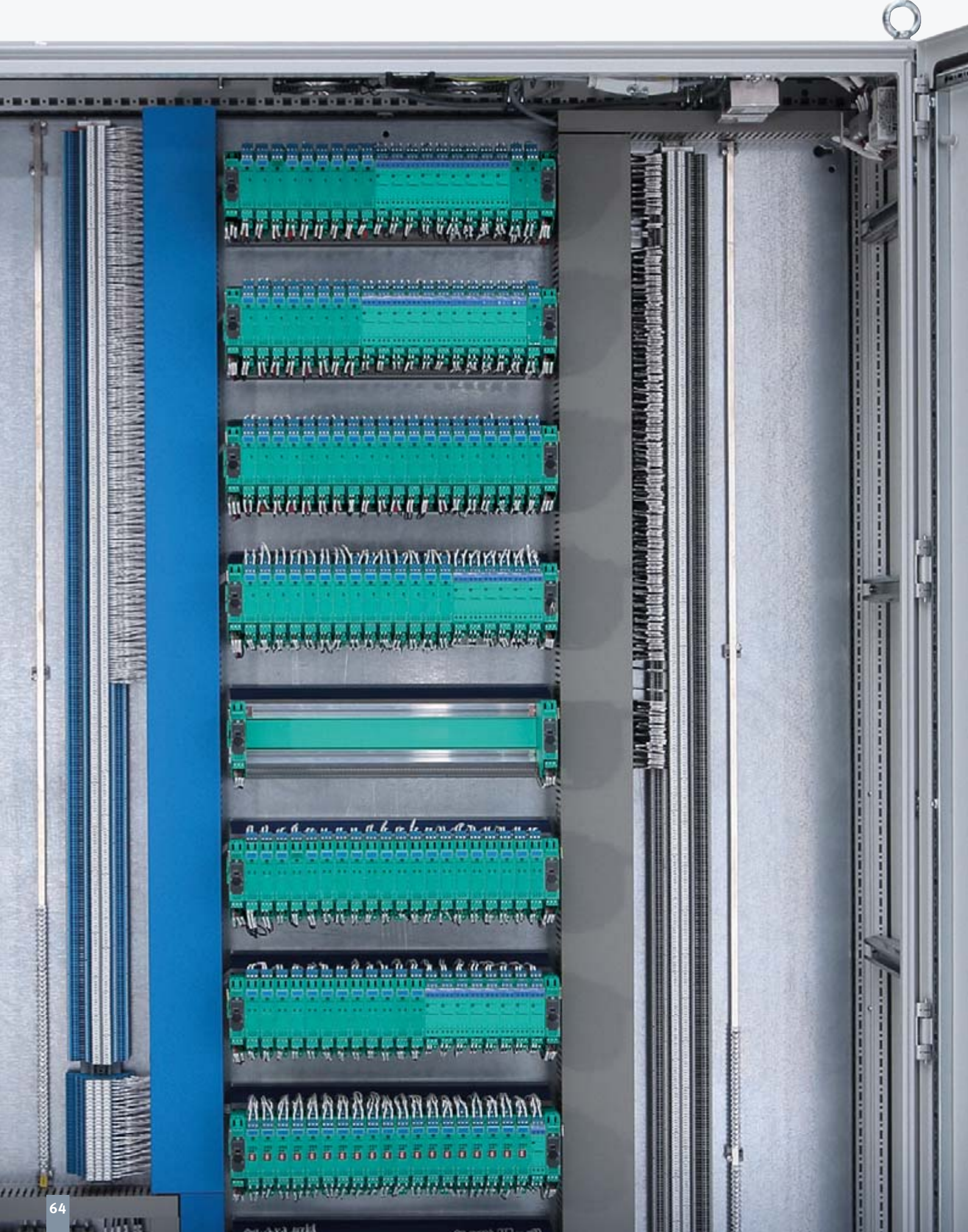
## HIGHLIGHTS

Solutions with combined Ex d/Ex e types of protection: the use of these solutions offers the plant operator significant benefits during installation and operation. The Ex d housing incorporates all the non-Ex components and is delivered as a complete certified solution.

All connection work required during installation and commissioning takes place in the Ex e terminal compartment, along with the operating components. This makes it significantly easier to modify the solutions at a later time.

More information can be found in the Pepperl+Fuchs “Explosion Protection Equipment” brochure and online at [www.explosionprotection.com](http://www.explosionprotection.com)







*Solutions with Process Interfaces*

# Success Is a Question of Getting the Right Advice

The more complex the application, the more important the engineering – this applies in particular to specific requirements and individual applications in hazardous areas. Customized solutions are required here, which despite their high level of individualization offer reliable protection and include all certifications. To ensure that such a solution perfectly meets the requirements of your application, careful consultation with a project engineer – in addition to high-quality components – is just as important as a high level of expert knowledge.

At Pepperl+Fuchs, the foundations for a project's success are laid during the initial consultation. Experienced application experts meticulously develop a solution that exactly meets your requirements. The options are almost unlimited: based on a large selection of enclosure types and sizes, the system is configured exactly in line with your specific task. From conventional interface modules, Remote I/O and FieldConnex to HMI components, all interfaces are installed and all peripherals are integrated by Pepperl+Fuchs – if necessary by combining various types of protection. Your personal advisor provides you with support throughout the entire project and even after its conclusion. For us, your satisfaction is what matters.



# Steps to a Successful Project



The development of your customized solution begins with the selection of your personal contact partner who is familiar with your industry, application, and specific requirements. He or she provides you with support from the outset, during each step of the project process, and is an available resource to provide advice and assistance throughout the entire process.

## Customer Specification

- Local support from system and application specialists
- Evaluation of customer requirements
- Analysis of customer requirements/specifications
- Definition of project objectives and scope of services

## Solution Proposal

- Budget proposal
- Listing of scope of services with description of system components
- Creation of detailed draft solutions
- Project schedule
- Presentation of possible alternative solutions
- Solution specification with the customer and final decision

## Specification and Design

- Definition of project specification
- Performance of detailed engineering: creation of parts lists, production documents, and customer approval drawings
- Project schedule planning taking account of supply-chain procurement times
- Detailed costs calculations
- Customer approval for production



## Manufacture

- Procurement of purchased parts
- Mounting and assembly
- Global production sites with ISO 9000 certification
- Continual quality control

## Inspection, Acceptance, and Logistics

- Internal inspection and functional test of all components
- Test and acceptance by the customer (FAT)
- Appropriate packaging and delivery

## Certification and Documentation

- Complete certification
- Creation of project documentation by engineers
- Where necessary, preparation of all project documents for transfer into the customer's documentation system
- Documentation of all purchased parts
- Creation of test reports and acceptance certificates

More information can be found at [www.pepperl-fuchs.com/solution-engineering](http://www.pepperl-fuchs.com/solution-engineering)



# Optimum Integration for Every Ap

## Fieldbus Junction Boxes



Three FieldConnex FieldBarriers in stainless steel enclosure, ready for commissioning in Zone 1

## Remote I/O Field Units



Remote I/O LB in stainless steel enclosure, ready for commissioning in Zone 2

## Control and Distribution Panels



Control panel with intrinsic safety barriers in flameproof enclosure Ex d IIB for Zone 1

A large selection of field enclosures with different designs and materials means a wide range of options for individual customer solutions. From small boxes with one single component to fully equipped large control cabinets, the optimum solution that saves the most space for every application will be designed.

## Fieldbus Junction Boxes

- Intrinsically safe connection of several field devices to a trunk using FieldConnex FieldBarriers or Segment Protectors
- Multifunction terminal (option) for live disconnect and hot swap of fieldbus components
- Integrated lightning protection module
- Simple connection and marshalling of field devices

## Remote I/O Field Units

- Installation in stainless steel and GRP enclosures
- Reliable protection of all components and accessories against environmental influences
- Suitable for use in areas with stringent hygiene requirements
- Simple installation of the system, which is delivered ready for operation, using freely configurable terminals and cable glands

## Control and Distribution Panels

- Use of any type of installation and automation components in dangerous and harsh ambient conditions using flameproof enclosures and accordingly certified operating elements
- Activation of intrinsically safe sensors and actuators via integrated interface modules
- Monitoring of processes using indicators visible through window
- Ready for connection and completely certified by delivery

# plication

## Industrial Monitors and HMI Solutions



Operator workstation in stainless steel housing for Zone 1/Div. 1

## Purge and Pressurization Systems



Redundant purge system Series 6000 for Zone 1

## Interface Cabinet Solutions



K-System intrinsic safety barriers with accessories in stainless steel enclosure

## Hazardous Location HMIs

- Development, design, manufacturing and testing of complete HMI solutions by specialists in the Solution Engineering Centers (SEC)
- ATEX- and UL 508-certified panel shops for hazardous areas (NNNY and 698A)
- Modular concept with customized components based on standard hardware
- Integration of components from all manufacturers

## Purge Solutions

- Simple, cost-effective protection for the installation of non-explosion-protected electrical apparatus in hazardous areas
- Solutions in accordance with ATEX, IECEx, NEC, and CEC

## Interface Cabinet Solutions

- Planning, installation, and ready-for-connection delivery of interface modules for a wide range of functions in accordance with customer specifications
- Arrangement of all required components, such as fans, power supplies, circuit breakers, and cabinet lighting for an optimum solution
- Integration of components from every manufacturer according to the customer's specifications

More information can be found at [www.pepperl-fuchs.com/solution-engineering](http://www.pepperl-fuchs.com/solution-engineering)

# Staying in Touch. The World Over.

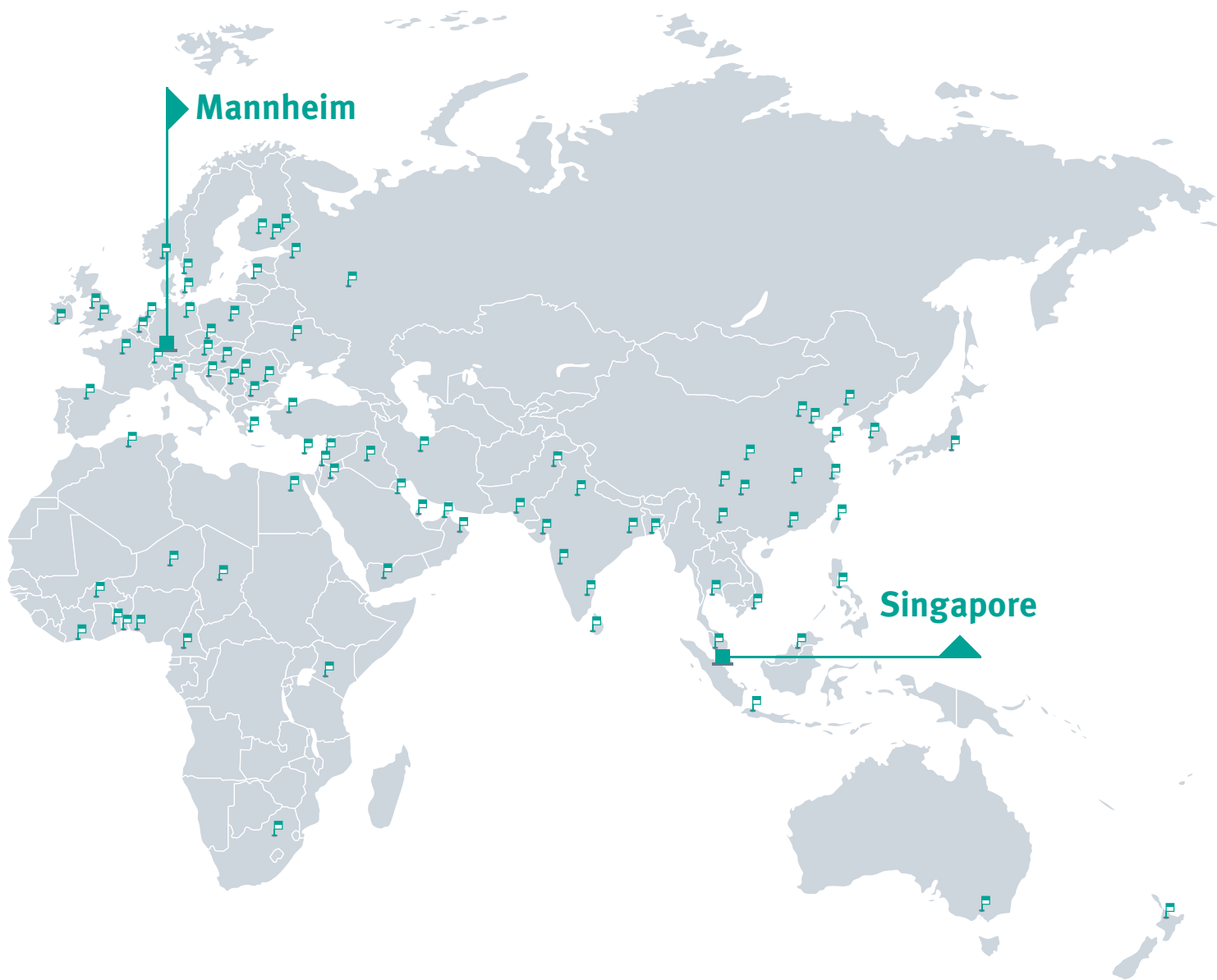
Good customer relationships need care and attention. They are an indication of genuine interest, trust, and a cooperative spirit: the foundation of Pepperl+Fuchs' strengths. No matter where you might be, we are always nearby. And we speak your language – in more than 140 countries the world over.



## At Home on All Continents

Our customers are at the center of all our activities. Our worldwide network ensures that we provide them with the best possible service and support. Our world headquarters in Mannheim services Europe through a network of more than 40 affiliates. Asia is handled by our office in Singapore, with more than 1,000 employees in manufacturing, service, and sales. And our North American headquarters in Twinsburg, Ohio, is responsible for a comprehensive network of offices and sales partners in the USA, Canada, and Mexico.

No matter where in the world you may be, Pepperl+Fuchs is right nearby – and always there for you.





# YOUR APPLICATION. OUR CHALLENGE.

## PROCESS INTERFACES

- Intrinsically safe barriers
- Signal conditioners
- Fieldbus infrastructure
- Remote I/O systems
- HART interface solutions
- Wireless solutions
- Level measurement
- Purge and pressurization systems
- Industrial monitors and HMI solutions
- Explosion protection equipment
- Solutions with process interfaces

## INDUSTRIAL SENSORS

- Proximity sensors
- Photoelectric sensors
- Industrial vision
- Ultrasonic sensors
- Rotary encoders
- Positioning systems
- Inclination and acceleration sensors
- AS-Interface
- Identification systems
- Logic control units

