

**THE GATEWAY BETWEEN
TWO TECHNOLOGICAL WORLDS**

REMOTE I/O SYSTEMS

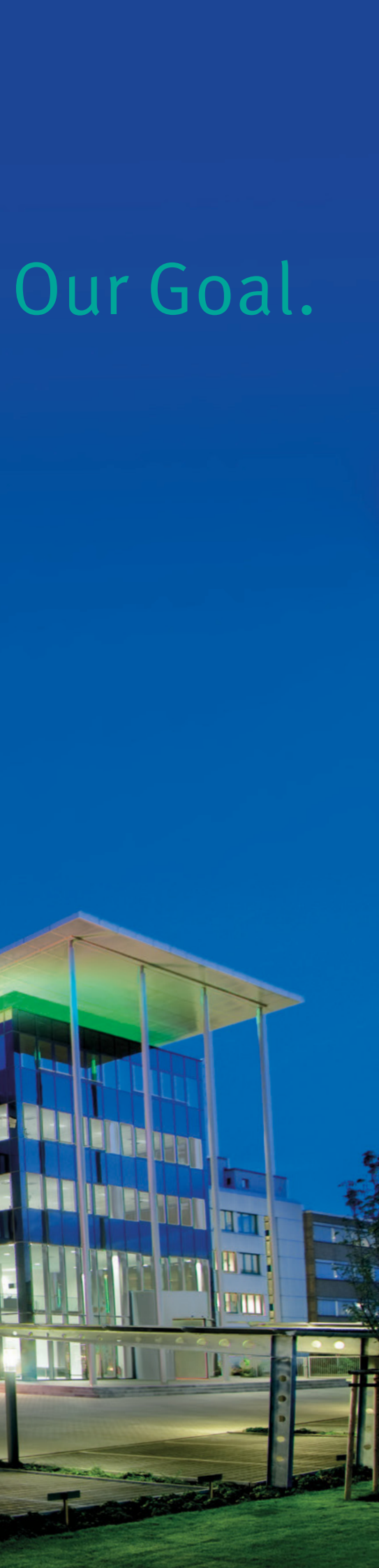
Automation Is Our World. A Perfect Application Solution Is

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





Our Goal.

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Remote I/O. The Gateway between

Whether in the context of plant engineering, expansions, or modernization: Remote I/O systems from Pepperl+Fuchs bring together the strengths of conventional field technology with state-of-the-art bus technology in a highly efficient way. Doing so delivers a whole host of benefits: low wiring costs, reduced investment costs, and a high level of transparency for process equipment that is competitive in every way.

Tradition and Progress Perfectly Matched

Remote I/O technology has been successfully used in process automation for many years – it provides the perfect combination of the benefits offered by traditional technology with those of the most advanced. This solution offers significant benefits for plant operators. When modernizing plants, the existing conventional field technology can be retained in its entirety, and connected with the bus technology in the new control system via the Remote I/O system. By taking this approach, investment costs can be significantly reduced.

Optimized Workflows. Utilized Potential.

Using a HART connection, Remote I/O opens up new diagnostic possibilities – a highly cost-effective way to increase transparency and process reliability, while maintaining efficiency with the option of decentralized installation. Wiring complexity and the associated costs can be significantly reduced – monitoring tasks, configuration, and parameterization are all carried out remotely. What's more, 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.



n Two Technological Worlds

Compact System. Flexible Planning.

The Remote I/O systems from Pepperl+Fuchs have an equally huge impact when it comes to saving space. Ultraslim Remote I/O modules with energy-saving power management systems and low power dissipation enable maximum packing density to be achieved, delivering maximum efficiency in the tightest of spaces. Remote I/O is the most compact system in process automation for Zone 2 that permits the operation of intrinsically safe and nonintrinsically safe modules on a backplane.

Represented Worldwide. In All Sectors.

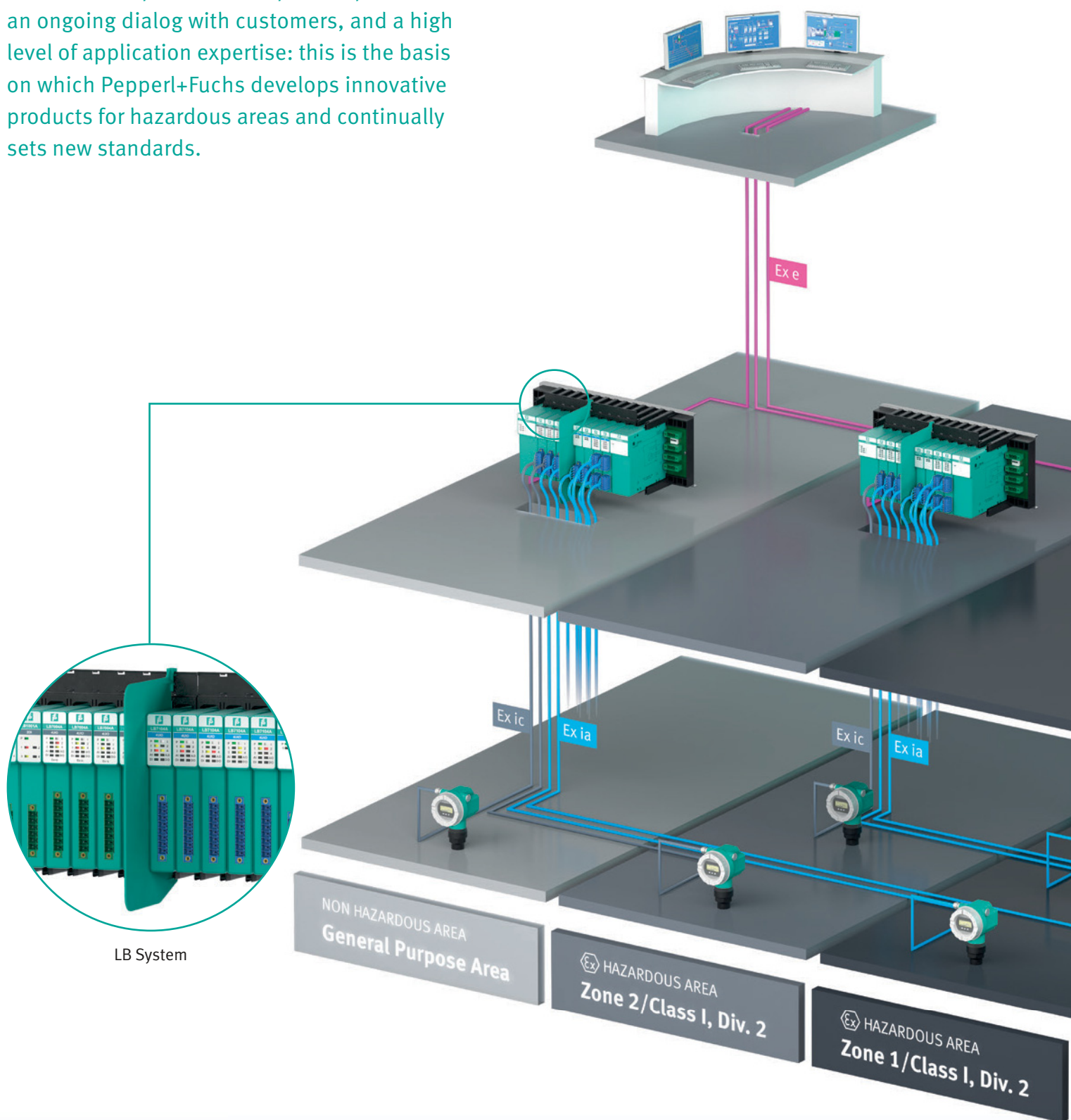
Remote I/O systems from Pepperl+Fuchs are used across various sectors in the modern process industry, in particular in the petrochemical and chemical industry, in refineries, and in the oil and gas industry. Remote I/O is an excellent solution wherever space for process equipment is limited, as is the case on oil rigs, oil production ships, or tankers.

Typical Applications Include:

- Digital input for NAMUR proximity switches
- Frequency and counter input with direction of rotation detection
- Digital output for switching contacts, solenoid valves, acoustic alarms
- Relay output for switching solenoid valves
- Analog input for measuring pressures, temperatures, levels
- Analog output for driving I/P converters
- Analog output for driving proportional valves
- Temperature converter for resistance thermometers and thermocouples such as Pt100

Solutions for All Hazardous Areas

Decades of experience in explosion protection, an ongoing dialog with customers, and a high level of application expertise: this is the basis on which Pepperl+Fuchs develops innovative products for hazardous areas and continually sets new standards.



Reliable Explosion Protection. Uncompromisingly Safe.

The name Pepperl+Fuchs has stood for the highest level of expertise in explosion protection for over 60 years. The high-quality products and solutions we offer protect customer processes with absolute reliability. What's more, this protection is provided without any compromise in quality, safety, and reliability. Behind it all is the desire to constantly set new standards for technology in the field of explosion protection.

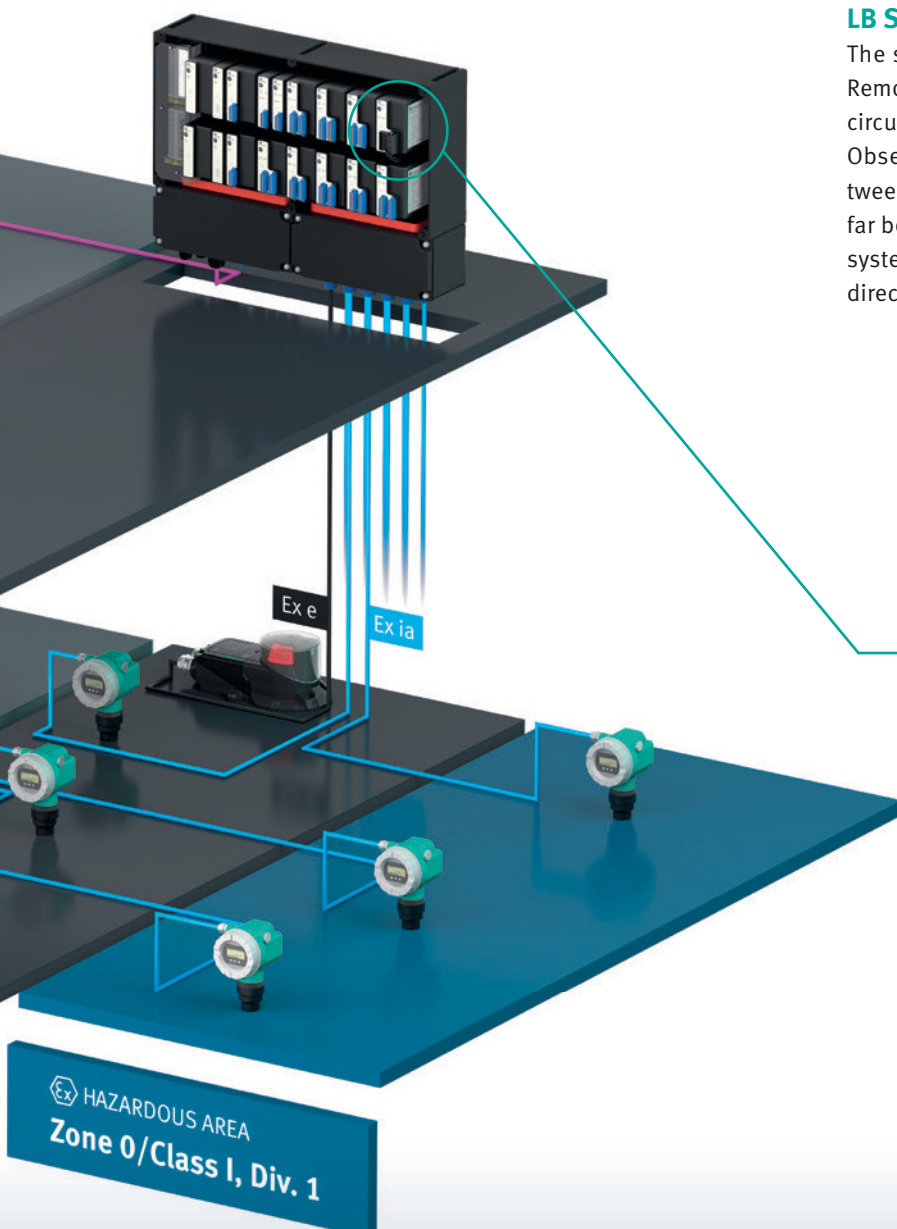
Explosion Protection Systems Can Be Flexibly Combined on One Backplane.

FB System

In the case of Remote I/O, this expertise can be seen in our patented flame proof design that allows the modules to be exchanged under live operating conditions in Zone 1 and the combination of Ex i and Ex e modules with the FB system. An innovative front connector system for Ex e modules complete with cover saves space and costs since marshalling terminals are no longer required. The modules can be easily replaced without exposing the wiring.

LB System

The system for Zone 2 offers impressive benefits for users: Remote I/O uses intrinsically safe and nonintrinsically safe circuits, as well as different kinds of explosion protection. Observing the required clearance that must be maintained between the modules takes up valuable space that could be put to far better use. For this reason, Pepperl+Fuchs has developed a system with LB, which allows different current circuits to operate directly next to each other.



FB System

LB System: the Most Compact Pro

A Remote I/O system that provides more power and requires less space. That was the goal. The innovative solution is the most compact system in process automation; one that provides maximum power.



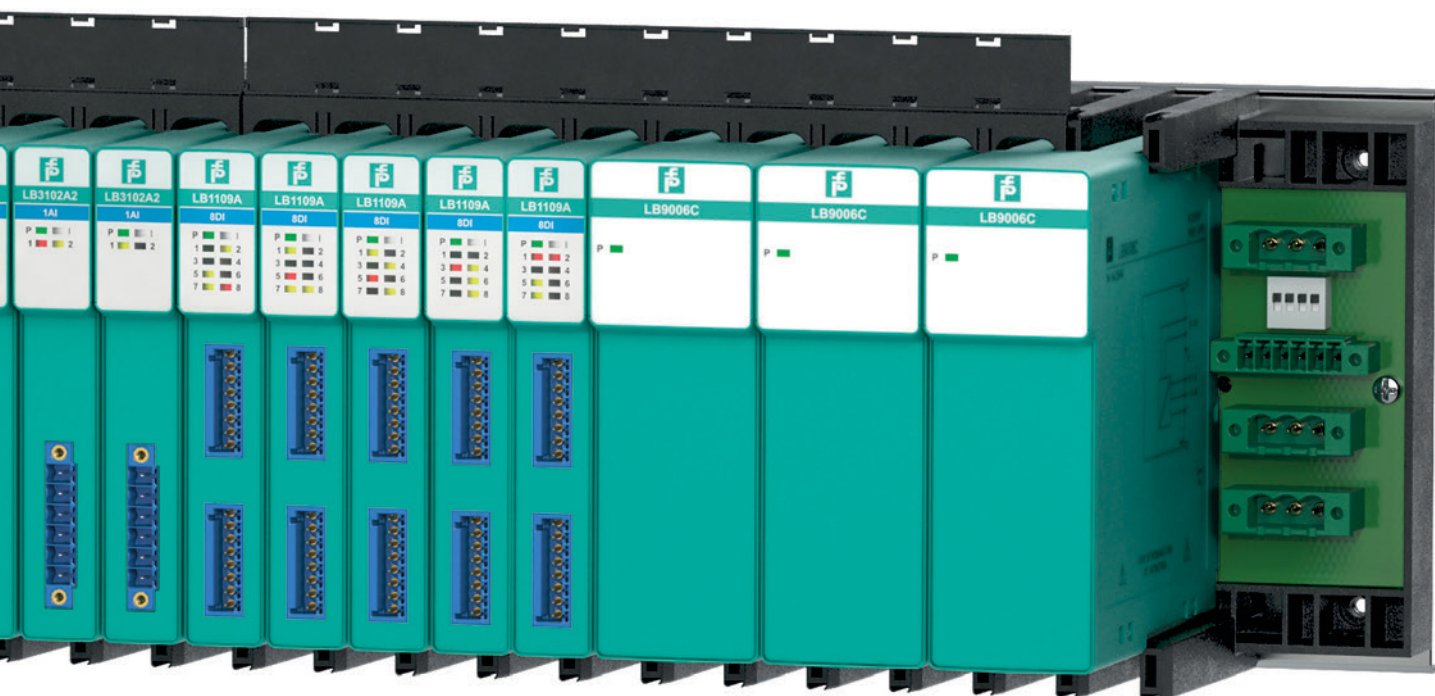
LB Remote I/O System for Zone 2/Div. 2

Maximum performance in the smallest space: the LB remote I/O system from Pepperl+Fuchs. High-performance modules in the XS design are simply plugged into a backplane. The energy saving power management system and low power dissipation allow maximum packing density. With the capacity to use several channels per node, the LB system is the most compact system on the process automation market.

Remarkably Simple: the Partition Principle

The innovative partition enables intrinsically safe and nonintrinsically safe modules to be located directly next to one another. Simply plugged into the backplane, the partition ensures the required clearance of 50 millimeters. The partition is simply inserted between two modules so that no slot is lost.

Process Automation System



Specifications

- I/O modules for non-explosive and intrinsic safety field connections
- LB modules can be inserted into any slot, enabling a mixture of I/O modules
- Modules can be replaced during ongoing operation (“hot swap”)
- Combination of single-channel, high-availability modules with multichannel modules to achieve maximum packing density
- Configuration during ongoing operation with no bus loss
- Bus and power supply can be redundant
- Maximum of 80 analog and 184 digital inputs and outputs
- Inputs and outputs approved for Zone 2, Zone 22, Class I, Div. 2

FB System. Robust. Efficient. Relia

Technology that is the perfect match for harsh ambient conditions. An efficient design that makes optimum use of the space available – FB remote I/O systems from Pepperl+Fuchs are ideal for demanding applications in hazardous areas.

FB Remote I/O System for Zone 1

Robust, durable technology: the FB remote I/O system from Pepperl+Fuchs. Highly efficient and reliable, Ex e and Ex i signals can be effortlessly combined. The modules are simply plugged into integrated backplanes of the housing. The corrosion-resistant housings are offered in robust plastic or stainless steel. The product is the perfect match for the harsh ambient conditions that prevail on onshore and offshore plants. The system is based on the same engineering principle as the LB remote I/O system, delivering major benefits for plant operators: as the functionality of both systems appears identical at control level, less training is required for personnel.

Specifications

- I/O modules for Ex i and Ex e field connections
- FB modules can be inserted into any slot, enabling a mixture of I/O modules
- Modules can be replaced during ongoing operation (“hot swap”) for maintenance without the need to obtain a hot work permit
- Combination of single-channel, high-availability modules with multichannel modules (maximum packing density)
- Configuration during ongoing operation with no bus loss
- Redundancy can be integrated on base backplane
- Extension backplane identical to base backplane
- Flanged housing part (simplified cable entry and screen rails)
- Maximum of 80 analog and 196 digital inputs and outputs
- Inputs and outputs approved for Zone 1, Zone 21



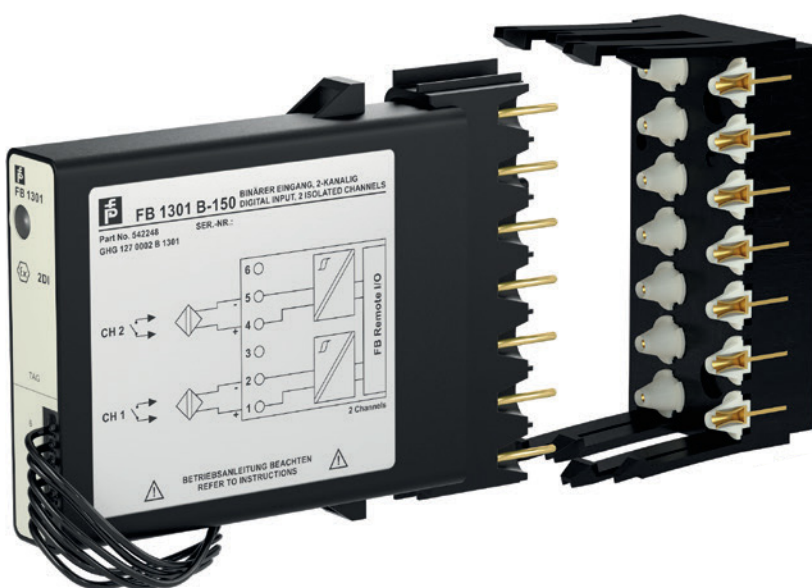
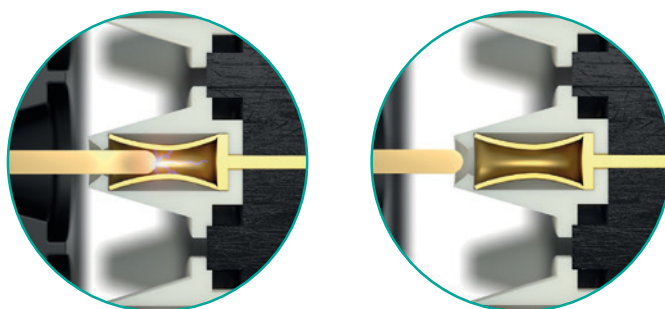
ble.



Functional Principle

Easy to Mount with the Two-step Disconnect Process

Single and multichannel Ex i and Ex e modules can be quickly and easily equipped using the insertion and two-step disconnect process. Here, an innovative disconnection in two steps ensures that the energy of the break spark is slowly released through the flameproof plug connection. First, the electrical circuit is disconnected. The metal pins of the module remain inside the flame protected area until the module is removed from the backplane. At this time, possible sparks inside the flameproof connection are extinguished and the module can be replaced during operation (hot swap).



and Accessories for the FB System

Reliable over Large Distances: the Fiber Optic Coupler

The PROFIBUS fiber-optic coupler for Zone 1 converts PROFIBUS signals into fiber-optic signals and vice versa. Performing these conversions makes it possible to reliably bridge large distances between the control room and the Remote I/O stations, even at high transfer rates. The fiber-optic coupler automatically adapts to the PROFIBUS transfer rate, detects line faults, and can carry out a redundancy switchover.

- Full galvanic isolation between field and control room
- Very high level of immunity
- Supports star, ring, or line topology
- Automatic redundancy switchover



Increased Voltage for Hazardous Areas: Multifunction Terminals

With multifunction terminals from Pepperl+Fuchs, significantly more energy can be used in the hazardous area than is possible with intrinsically safe circuits. Removing a module eliminates the potential for a spark to ignite in the flameproof area of the terminal. Maintenance can therefore be carried out on the current circuit without a hot work permit, making it easy to use and saving time and maintenance expenditures.

- Different modules available: diode, relay, resistor module, etc.
- Replacement during ongoing operation in Zone 1, Zone 21
- Maintenance without hot work permit
- Relay switch for power circuits
- Connection in increased safety (Ex e)





Transparency from the DCS to the

Remote I/O systems by Pepperl+Fuchs offer a variety of bus standards and can be easily integrated in the DCS. Additionally, the HART connection offers more than just extensive options for controlling HART-compatible field devices remotely. Added diagnostic information and better analysis options are also available, to provide increased transparency and process reliability.

Full Integration into the Process Control System

Process control systems are central components that determine the productivity and flexibility of process systems, and form an interface for connecting to the Remote I/O system. The modules from Pepperl+Fuchs support several bus standards, making it quick and easy to integrate the technology into all current control systems.

- PROFIBUS
- MODBUS RTU
- Foundation Fieldbus
- Ethernet with MODBUS TCP

The modules can communicate with the master process control system, a PLC, or the SCADA system via these bus technologies.

Maximum Convenience: FDT/DTM

The system is fully integrated into the process control system environment with maximum convenience using FDT/DTM technology. There is also the option to use DTMs at a separate workstation – separated from the process control system. Since the FB and the LB system are identical in terms of technology and use the same software, operating and maintaining the systems is really simple and convenient.



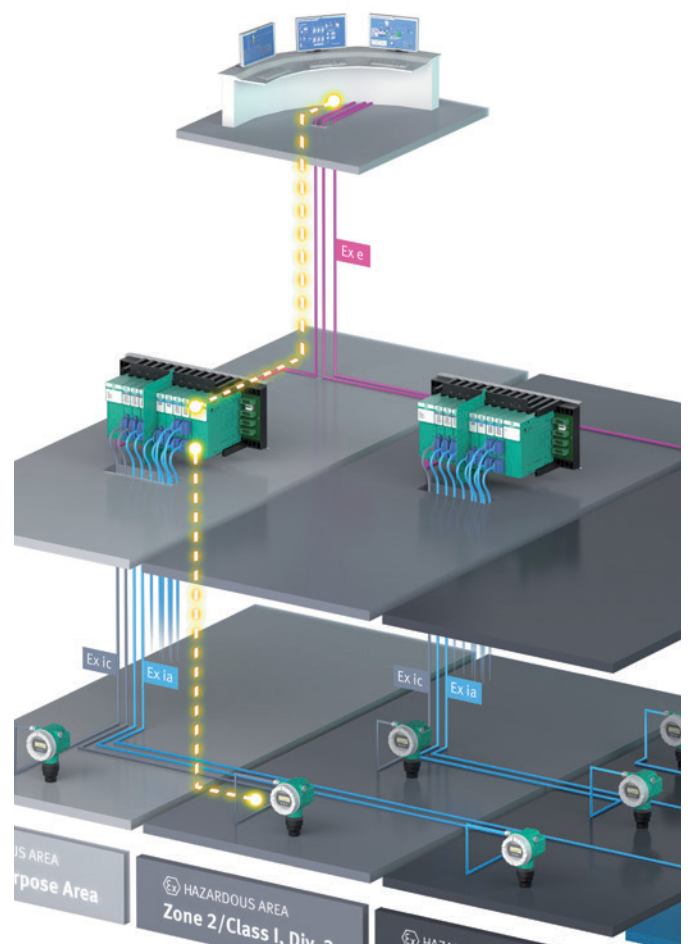
Field

HART Connection for Diagnostic Functions

HART has proven its reliability for decades, and it is still used frequently in the process industry today. In particular in combination with Remote I/O technology, the following are especially clear:

- Parametrization and configuration of field devices from control system
- Query of status information from the control system
- Stranded HART variables are made available
- Connection of the HART-enabled field devices to the Asset Management System

The transparency of the process increases the availability and plant safety significantly. Unplanned shutdowns and failures can be avoided by preventive maintenance.



The Remote I/O system forwards HART signals from the field device to the DCS or the Asset Management System.

Remote I/O Solutions. Tailored fo

Individual applications in hazardous areas require tailored solutions that offer reliable protection and that possess all the necessary certification. To achieve this, thorough consultation with a project engineer – in addition to high-quality components - is just as important as a high level of expert knowledge. The application-specific configured Remote I/O field units from Pepperl+Fuchs offer all of this from a single source.

The Best Possible Consulting: Application Expertise

To perfectly tailor your Remote I/O solution to its applications, one thing is particularly important: getting the right advice. The starting point is often just a specification with requirements and framework conditions. However, the experienced application experts at Pepperl+Fuchs know your industry and your applications. Based on the information you provide, they define the requirements and develop an individual Remote I/O solution that is tailored to your applications.

Perfect Result: Individually Tailored

Which devices are connected to the process control system via Remote I/O? Which accessories, which Remote I/O components are required to do this? Our specialists can provide the right answers to all of these questions. And the results speak for themselves: Remote I/O technology that optimally supports your applications and is fully certified.



FB remote I/O station in stainless steel housing



LB remote I/O station in stainless steel housing

r Every Application.



Application, Customer Inquiry, and Specification

Right from the initial consultation, the customer is assisted in designing the tailored Remote I/O system. If an application-specific system containing the appropriate modules is selected, each of the requirements and external factors, such as environmental conditions or statutory provisions, are checked in detail, and various approaches are put forward. This precise specification guarantees the most efficient solution for the customer.



Documentation

The customer-specific solution is certified by Pepperl+Fuchs Engineering. The certification forms part of the system documentation and can easily be transferred directly to the plant documentation system.



Production, Assembly, and Acceptance

As part of the acceptance procedure for the completed Remote I/O solution, the actual operation of the system can be simulated by Pepperl+Fuchs together with the customer using the test specifications. This ensures that the solution fulfills the specified function in the plant. An assembled system ready for connection is delivered to the site and can be commissioned quickly.

Staying in Touch. The World Over.

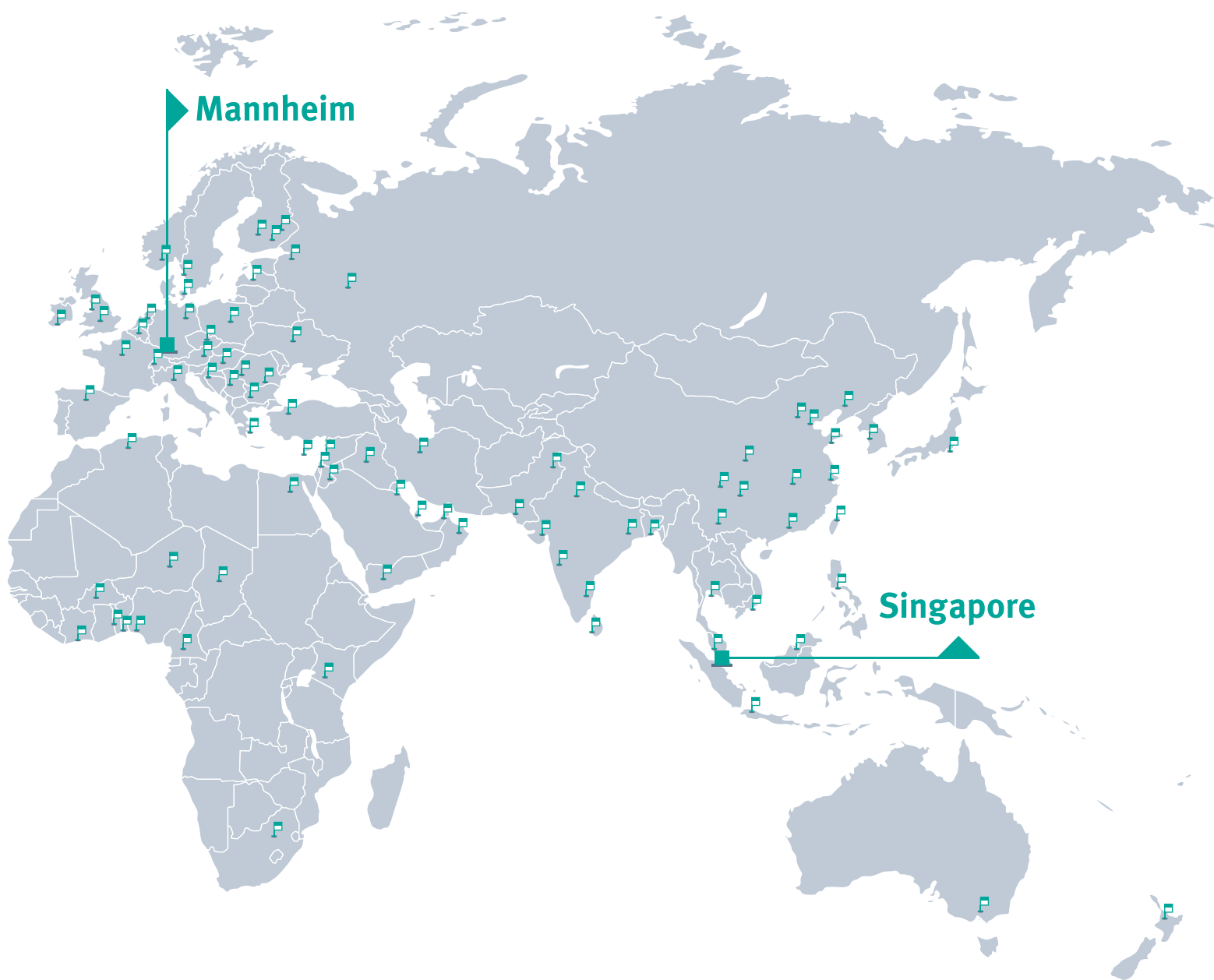
Good customer relationships need care and attention. They are an indication of genuine interest, trust, and a cooperative spirit: the foundation of Pepperl+Fuchs' strengths. No matter where you might be, we are always nearby. And we speak your language – in more than 140 countries the world over.



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



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