

Safety above All.

Globally certified protection for people, plants, and the environment.

Product Overview
Interface Technology
from Pepperl+Fuchs



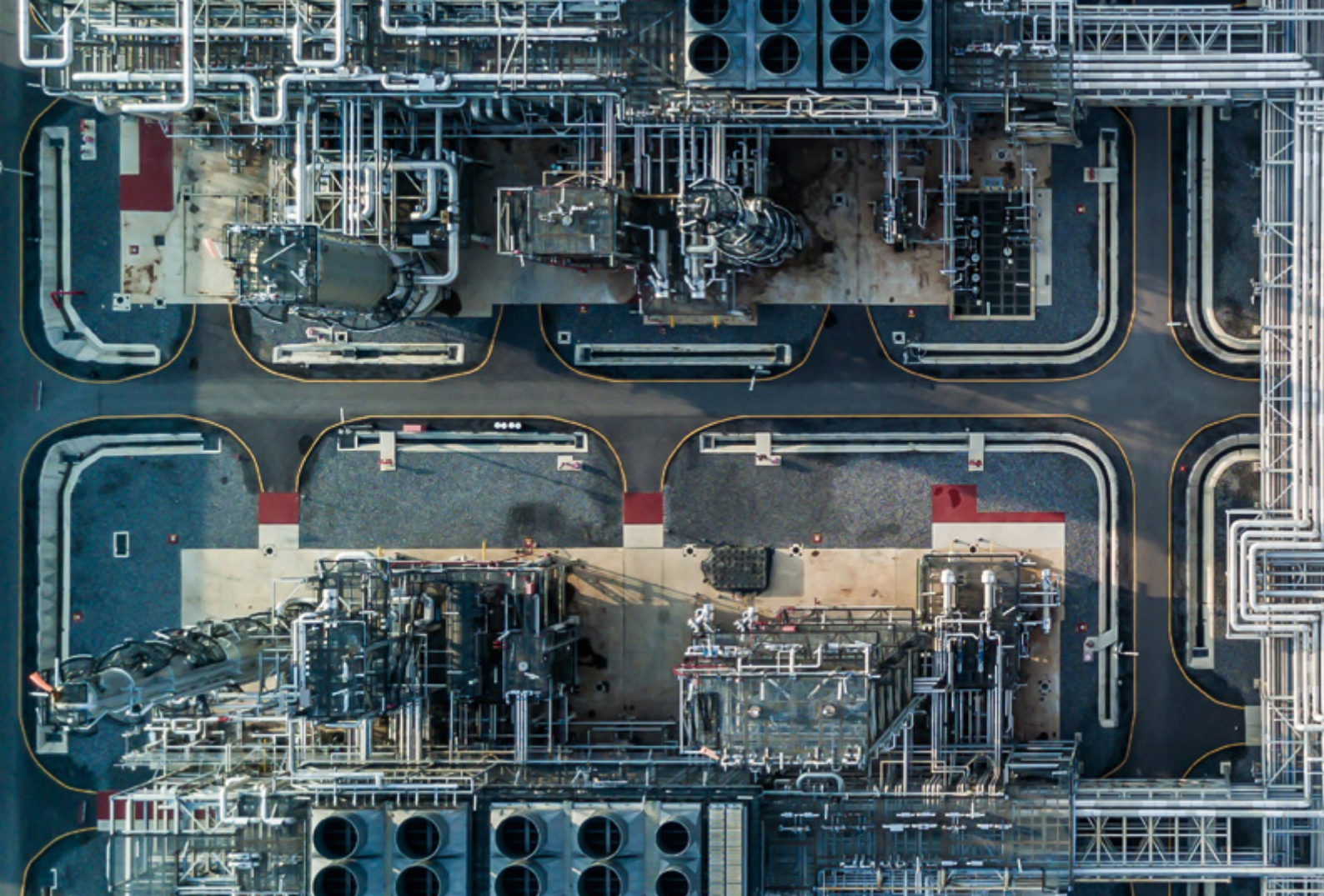
Your automation, our passion.

 **PEPPERL+FUCHS**



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Leading Interface Technology from Pepperl+Fuchs

Secure Signal Transmission, Optimal Processes

“Safety first!” As the pioneer and leading global provider of electrical explosion protection, safety is our top priority. We protect and connect the global process industry with our products and solutions across all types of hazardous area protection and for a wide range of applications.

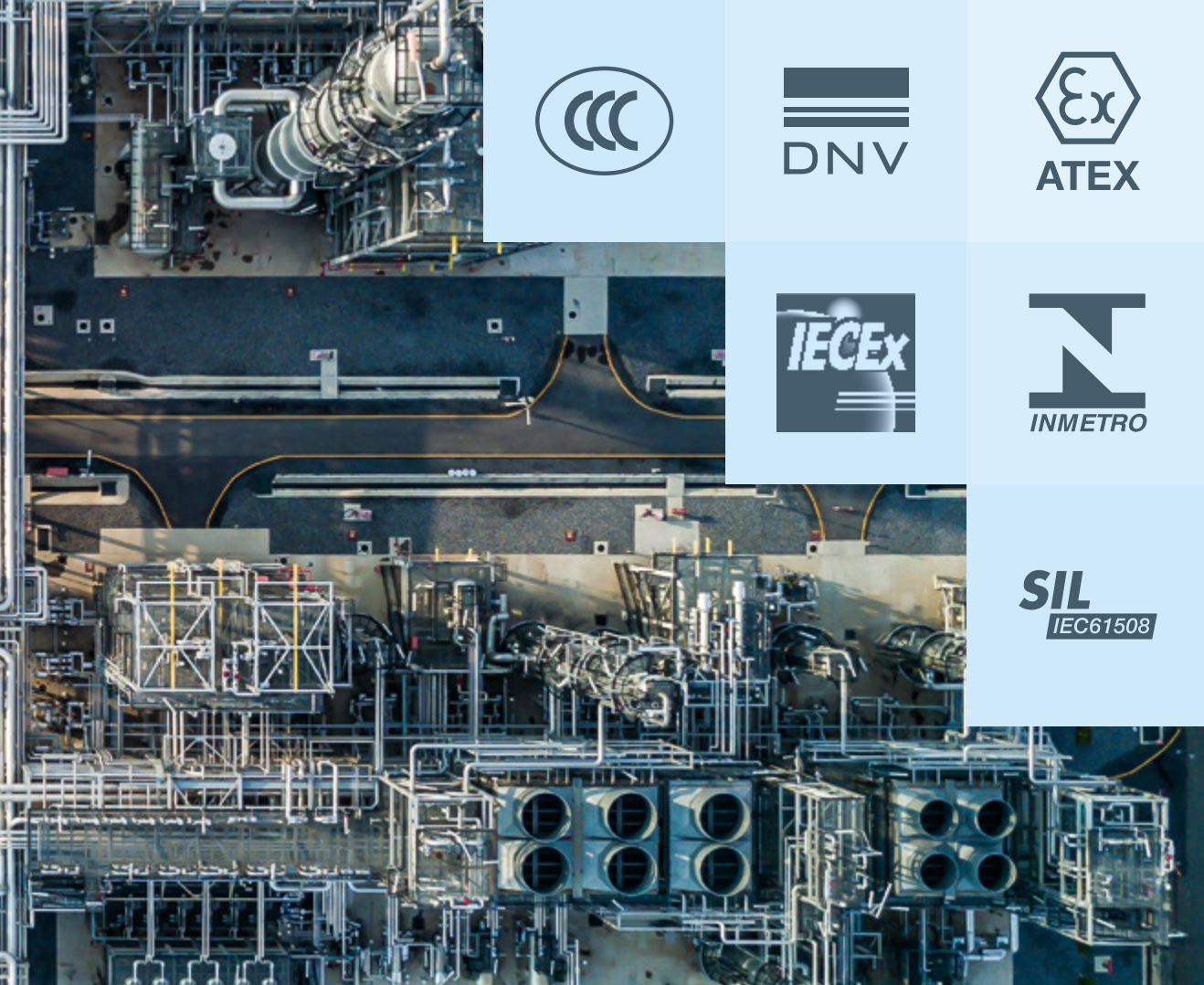
Large Portfolio for Maximum Flexibility

Interface technology from Pepperl+Fuchs combines maximum process reliability with an enormous variety of applications. The extensive portfolio offers the right solution for virtually any process industry requirement. It is perfectly tailored to applications in hazardous and non-hazardous areas—a highly flexible solution for a wide range of requirements.

- Extensive product range
- Solutions for every requirement
- International approvals

Explosion Protection with Barriers for Intrinsic Safety

Intrinsic safety provides the highest level of protection for the hazardous areas in your plant. Signals can be connected up to Zone 0/Div. 1 in order to limit the energy to the field, thereby ensuring no explosion is possible. Intrinsic safety barriers from Pepperl+Fuchs can be installed globally in all major hazardous areas.



Worldwide Certifications Expertise

Pepperl+Fuchs provides support wherever it is needed—with products that are globally certified and suitable for your working environment. From initial application analysis to project implementation through one of six Solution Engineering Centers we have across four continents, the only path to success is through strong partnerships with clear communication and good collaboration.

Safety Integrity Level (SIL)

The safety integrity level is a unit of measure for quantifying risk reduction. It is used to assess devices and systems in terms of the reliability of their safety functions. The SIL rating is based on international standard IEC/EN 61508.

Reliable Processes—Signal after Signal

One highlight is our extensive range of modules and systems. No matter the application, we have the right solution as well as millions of installed devices from North sea platforms to clean room applications in the pharmaceutical industry.



Water and Wastewater

Pepperl+Fuchs has the capabilities to deliver both large and small application solutions for water treatment, wastewater treatment, pump station controls, SCADA, remote networking, and simulator technology.

Pharmaceuticals

The pharmaceutical industry relies on Pepperl+Fuchs to provide safety and availability for their plants. Our products are proven in use throughout the world in a wide range of applications including batch control automation and asset management systems.



Hydrogen

Hydrogen is considered a key technology of the future. Pepperl+Fuchs supports manufacturers along the entire value chain with innovative products and global support.



Chemical

Pepperl+Fuchs equipment is used in all major chemical companies around the world where hazardous or flammable materials are handled. Our products are globally proven in a wide range of applications including emergency shutdown, fire and gas, automation, and asset management systems.



Oil and Gas

For decades, the fossil fuels industry—with emphasis on oil and gas production—has relied on Pepperl+Fuchs to provide safety and availability for their operations. Our equipment is in use across platforms, pipelines, and refineries.

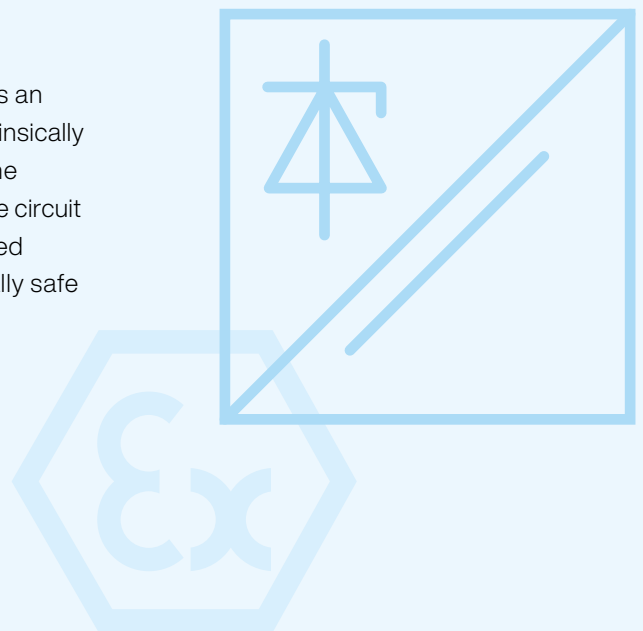


System Overview

The task of interface technology is to ensure safe signal transmission between the control level and field devices. It includes products for explosion and surge protection, galvanic isolation between the field and the control system, as well as additional digital communication based on the HART protocol.

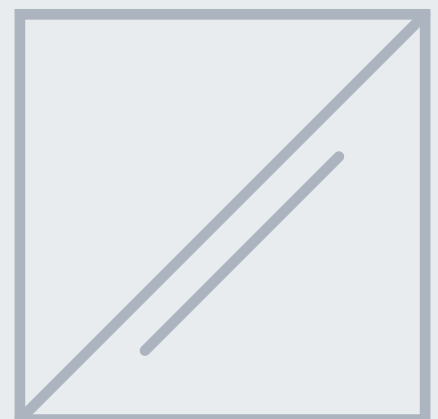
Isolated Barriers

The isolated barrier is used in intrinsically safe applications. It ensures an intrinsically safe circuit in which the field device is integrated. A non-intrinsically safe circuit on the control side is electrically isolated from it. Due to the current and voltage limitation, the energy supplied to the intrinsically safe circuit is so low that safe operation is possible. With galvanic isolation, the isolated barrier combines the advantages of a signal converter with intrinsically safe protection.



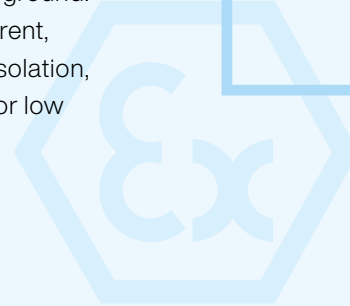
Signal Conditioners

A signal conditioner performs a series of functions on a signal to make it suitable for further processing. Signal isolation and conversion perfectly describe the main function of signal conditioners. Galvanic isolation interrupts the galvanic path between the input and output signals to prevent the transmission of unwanted signals from the input to the output. Galvanic isolation can also filter out unwanted noise or electrostatic interference caused by ground loops, which can severely damage sensitive equipment. The signal conversion includes the supply, amplification, linearization, and scaling of the sensor signal into a standardized 4 ... 20 mA signal. By using standard signals, all applications can be processed in standardized multichannel analog input cards of the control system.



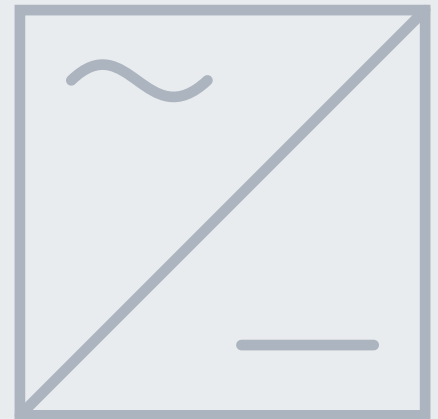
Zener Barriers

Zener Barriers are currently the most economical solution for safety applications in hazardous areas. The Zener barrier only provides intrinsically safe protection of the field-side area and consists of just a few components such as a resistor, Zener diode, and a fuse; a power supply is not required. Intrinsically safe circuits with Zener barriers without galvanic isolation must be grounded via a copper conductor. Compliance with these requirements prevents the occurrence of a dangerous potential with respect to the ground. Zener barriers do not convert the signal, they only transmit voltage, current, and power to and from the field devices. Due to the lack of galvanic isolation, Zener barriers are very accurate in transmission and are often used for low voltage measuring signals in weighing applications.



Power Supplies

Industrial power supplies convert the AC mains voltage into protected 24 V DC. They combine optimum interference immunity and high efficiency with proven durability and reliability. This significantly increases system availability and minimizes downtimes. An uninterrupted power supply can be realized with redundant power supply configurations.



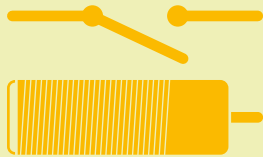
Surge Protection

Overvoltages are caused by lightning strikes, switching operations, and coupling due to poor wiring. The consequences are damage and malfunctions of devices as well as associated disruptions to process sequences and a reduction in system availability. Interface modules with surge protection discharge possible overvoltages and currents via the grounding. Surge protection is necessary for measurement and control signals in the control room and in the field as well as to protect semiconductor components from failure due to voltage dips or frequent overvoltage loads.



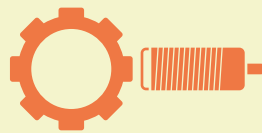
Function Overview

Switch Amplifiers



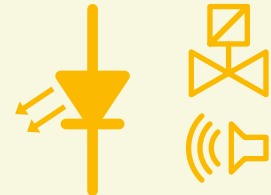
Switch amplifiers process digital input signals, amplify them, and initiate switching outputs via relays or transistors. Applications include limit value monitoring, final position feedback, and position detection of moving parts such as valves. Switch amplifiers also enable 1:1 pulse transmission to the output.

Frequency Converters



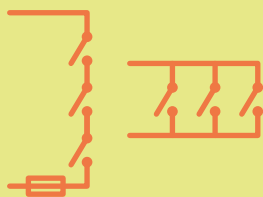
Frequency converters convert digital input signals into analog current or voltage signals and evaluate pulse sequences. These devices are used for rotation speed, standstill, and slip monitoring as well as volume measurement with oval wheel meters.

Solenoid Drivers



Solenoid drivers transmit digital output signals from the control unit to the valve. In contrast to relay modules, they also provide voltage and current. They control valves, regulate open/close functions, and can control visual or acoustic indicators.

Relay Modules



Relay modules transmit digital output signals from the control system to the field device via a relay. The voltage is applied externally. Applications include signal horns, warning lights, applications with active cooling, galvanic isolation of controls during system modernizations, emergency shutdown valves, and motor controls.

Transmitter Power Supplies



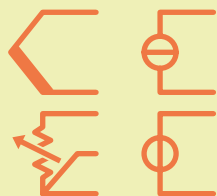
Transmitter power supplies transmit analog input signals from transmitters to the controller and supply voltage via the same line. SMART transmitter power supplies modulate a digital data signal to the 4 ... 20 mA signal. Typical areas of application are the measurement of pressure, temperature, or fill level.

Repeaters



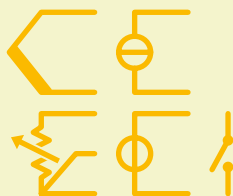
Repeaters amplify and restore analog input signals without changing them. Their main area of application is galvanic isolation with explosion protection.

Signal Converters



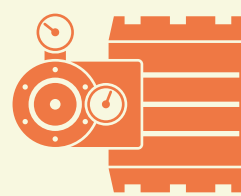
Measuring signal converters transmit analog input signals to the controller and convert them into standard signals. They amplify and linearize the sensor signal. Applications include the use of field devices on control systems, especially for small PLCs that cannot process all sensor signals.

Trip Amplifiers



Trip amplifiers monitor analog and digital input signals for exceeding or falling below set limit values. Their switching output activates emergency shutdowns or alarms.

Current Drivers



Current drivers transmit analog output signals from the control side to the field side, typically a 4 ... 20 mA signal. They control positioners, I/P converters, or field displays, for example.

Accessories



For assembling and operation, many accessories are available for isolated barriers and signal conditioners.

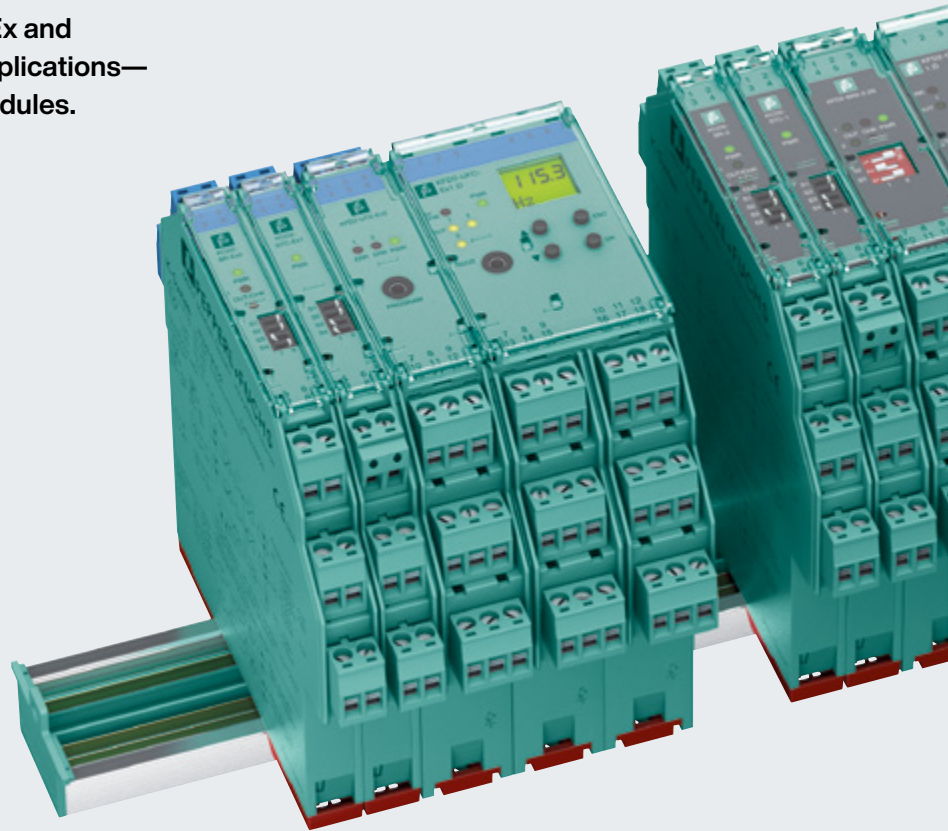
More information:

pepperl-fuchs.com/pf-interface-technology



Isolated Barriers and Signal Conditioners— Flexible Solutions for all Applications

The K-System offers an extensive range of Ex and non-Ex interface modules for signals and applications—from simple isolators to highly functional modules.

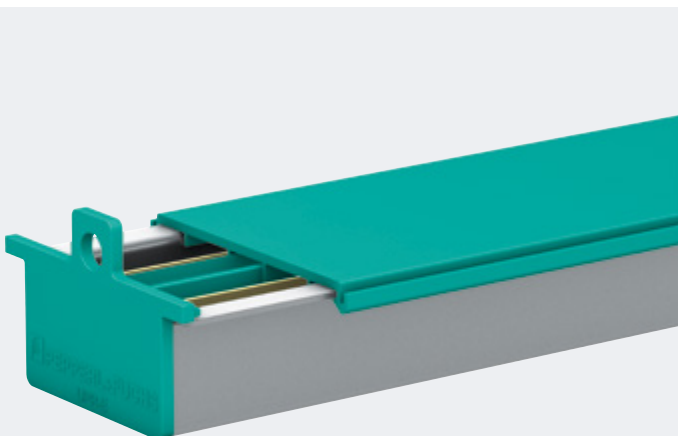


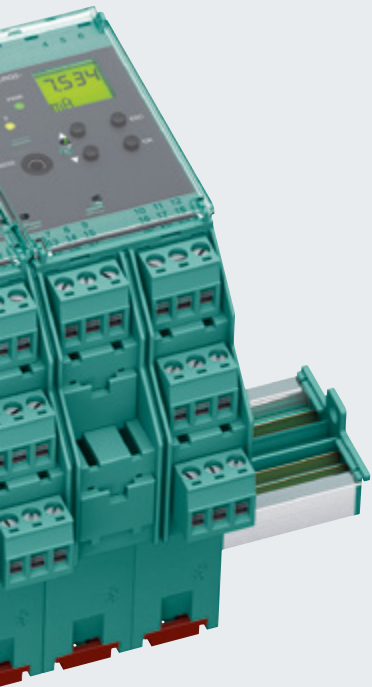
With 200 isolated barriers and 150 signal conditioners, the K-System represents the largest product portfolio of its kind for a wide range of requirements in the process industry. The system is designed for mixed multifunctional applications of Ex and non-Ex modules.

Power Rail

The K-System comprises interface modules, power rail, power supply, and accessories for commissioning and installation. Installation and supply are ensured by the power rail, which consists of gold-plated conductors mounted in a 35 mm DIN rail insert.

With the use of the K-System power feed module, 24 V DC from a standard power supply can be applied onto the conductors of the power rail. This allows power to be applied to each mounted module without having to wire them individually. The power rail also transmits the error signals from detected faults and provides relay contact output to connect to the control system.





K-System Features

- DIN rail mounting
- Extensive product portfolio for all signals
- Isolated barriers and signal conditioners in the same system
- Reduced wiring effort and simple expansion via universal power rail
- Easy maintenance due to removable terminals with test sockets



HART Interface Solutions

HART Interface Solutions from Pepperl+Fuchs consist of two HART Multiplexer systems for multiple signal loops and a HART loop converter for single loop applications. The Multiplexer is used to connect HART field devices to asset management systems such as the AMS Device Manager from Emerson Process Management. This allows the HART Multiplexer to act like a gateway device, routing communications between the maintenance workstation PC and the HART field devices.

Superior Process Reliability

Thermal Power Plant (1)

Thermal power plants employ sophisticated systems to maintain safety and efficiency in the operation of feed water pumps. Isolator modules such as the frequency converters of the K-System offer intrinsically safe solutions for such hazardous environments, such as monitoring the direction of rotation and speed of pumps. The galvanic isolation provided by the modules improves the safety of all processes by separating the control and field sides in non-hazardous areas. These isolator modules from the K-System enable precise control and monitoring, ensuring an uninterrupted supply of feed water and optimum plant performance.

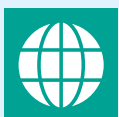
Life Science (3)

In the life sciences, monitoring the temperature in containers with process media is very important in order to prevent unwanted chemical reactions or decomposition. This is particularly important in potentially explosive atmospheres, which are common in the industry. Typical processes include continuous temperature monitoring to ensure that the upper limit values are not exceeded. Isolator modules such as intrinsically safe temperature converters from the K-System provide two configurable limit outputs for the control system, ensuring safety in hazardous environments. These isolator modules are also suitable for applications in non-hazardous areas.

Pharmaceuticals (2)

In the pharmaceutical industry, controlling valves in large plants involves managing the mass flow of active pharmaceutical ingredients (API) in hazardous areas. Ensuring safe signal transmission in large plants is critical. Different supply modes are suitable for numerous valve types. The use of intrinsic safety barriers of the K-System ensures control of all valves. These modules support bus-powered and loop-powered supplies and offer a high operating range with outputs up to 45 mA, with longer cable runs and faster operation of booster solenoids. Safety measures include SIL 3 ESD systems and DCS systems that incorporate line fault transparency (LFT) to determine SIL levels for DO cards/channels in safety-related applications.

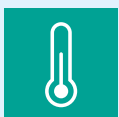
Crossover Features of the K-System



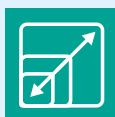
Worldwide certifications



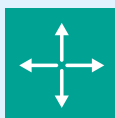
SIL 3 for all signal types



Operating temperature:
-40 °C ... +70 °C
(-40 °F ... +158 °F)



Space-saving design
due to small footprint:
6 mm per channel



Horizontal and vertical
mounting without reducing
the operating values



Dedicated local support in
over 80 offices globally



For more information, visit
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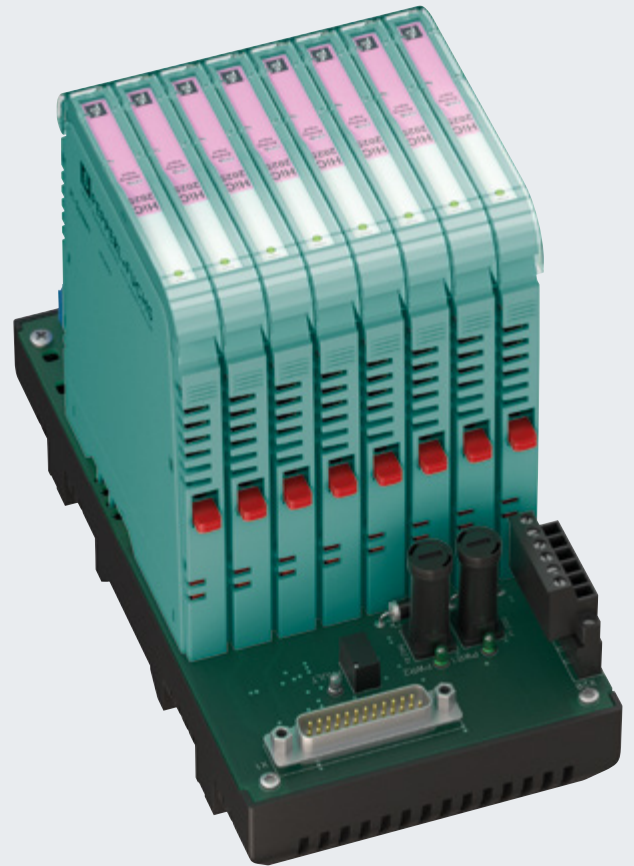


3



Isolated Barriers—Reducing Wiring to a Minimum

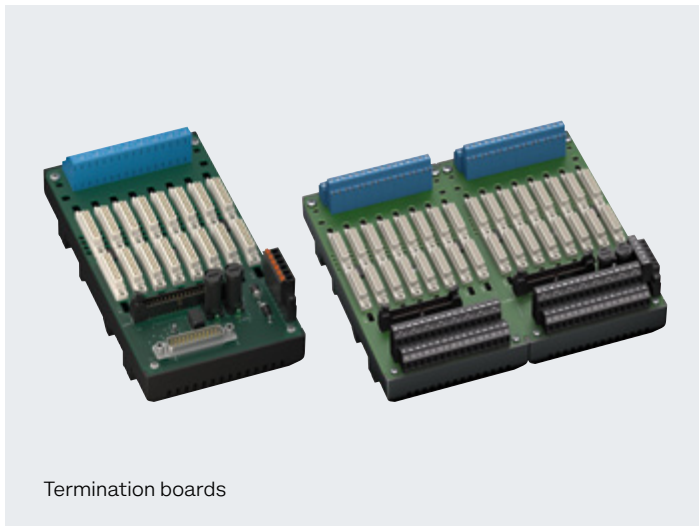
The H-System is especially suitable for medium to large systems in which signals are transmitted between the explosion-hazardous field area and the control system. The system consists of isolated barriers for signals from or to hazardous areas with galvanic isolation, which are mounted on a termination board.



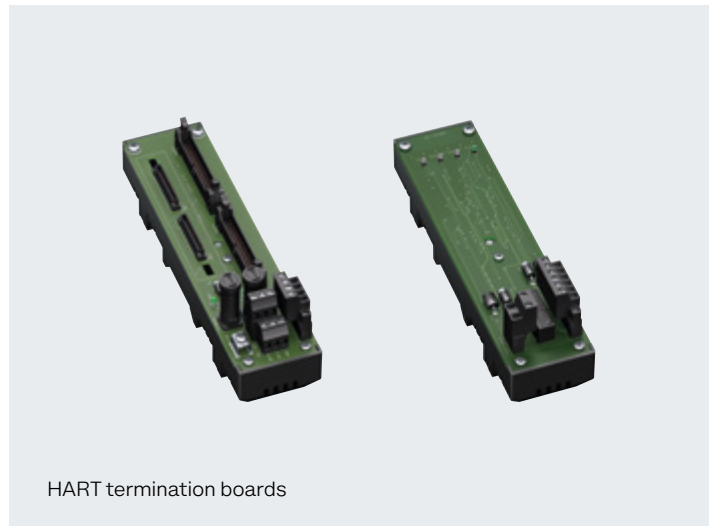
H-System interface modules are very easy to use. They are snapped onto pre-wired termination boards—no wires, no tools. The modules can be installed horizontally or vertically, without spacers or power reduction. The module portfolio includes the narrowest modules with the 12-mm-wide HiC versions.

Termination Boards

The termination boards with plug-in isolated barriers of the H-System are mounted on a 35 mm DIN rail in the control cabinet and connected to a controller via system plugs. They are available as a standard version for 8 and 16 modules or as a universal design with terminals for selectable contacting or with sub-D connectors for adaption to control system-specific cables.



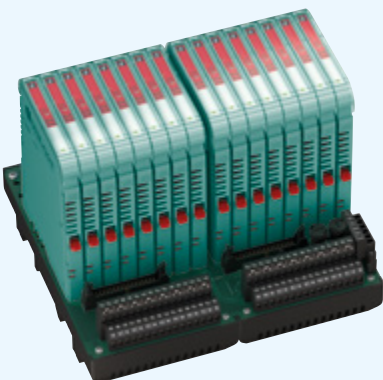
Termination boards



HART termination boards

H-System Features

- Termination board mounting: 8 or 16 modules
- Control system-specific connectors: fast and reliable connection to automation systems
- High availability with redundant powered termination boards
- Tested on original hardware from leading control system manufacturers
- Modules replacement without a hot work permit
- Tool-free mounting and clean installation, no wiring on barrier modules



Universal Barrier

As the only universal barrier, the HiC2441 is able to independently detect I/O requirements and automatically adapt to the currently required signal type (digital input, digital output, analog input, analog output). Configuration changes that used to take days are now completed in a matter of minutes. The space required for replacement components is also drastically reduced with the new universal barrier, as one single module can be kept in stock universally and independently of the signal type. This bypasses the usual limitations imposed by channel dependencies and creates completely new freedom in the design of process and safety I/O systems and control cabinets.

Termination Board Solutions for Connectivity

Hydrogen Pipeline (1)

Hydrogen pipeline positioners with position feedback are essential for controlling actuators that regulate mass flow in hazardous areas. These positioners provide the interface between the pipeline and petrochemical control systems and provide seamless integration. The isolator modules of the H-System enable positioner control and real-time position feedback. These modules ensure universal analog signal transmission while providing transmitter power supply and output driver functions. Control system-specific connectors simplify connection to control systems and offer a robust solution for the safe and efficient operation of hydrogen pipelines.

Petrochemical (3)

In the oil pressure monitoring turbine of a waste incineration plant, H-System transmitter power supplies with SIL 3 and splitter functionality ensure continuous monitoring of the oil pressure to prevent damage to the bearings of the high-speed machines. Positioned in potentially explosive areas due to oil vapors, these modules maintain safety integrity levels at SIL 3. They transmit oil pressure measurements to the control side in non-hazardous areas while providing galvanic isolation. They also enable parallel provision of measured values for both control and ESD systems, allowing for prompt initiation of countermeasures such as standby pump activation, alarms, and generator triggering in the event of oil pressure drops.

Chemical (2)

In the chemical industry, emergency shutdowns of the material supply involve the interruption of the process medium flow during hazardous events, whereby SIL 3 safety integrity levels of the signal circuit(s) must be ensured. The modules of the H-System feature HART-transparent, intrinsically safe output drivers, which allow proof testing of the field devices in hazardous areas, and when operated in binary mode, can be controlled via the HART protocol for partial stroke testing. They guarantee complete opening (normal state) and closure of the pipeline for emergencies and partial valve closure for testing, without plant availability compromise. Control system-specific connectors on the termination boards enable simple integration into the control systems of chemical plants, ensuring easy connection to the interface level and efficient management of emergency shutdowns.

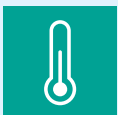
Crossover Features of the H-System



Worldwide certifications



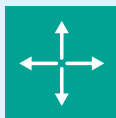
Up to SIL 2 (SC 3)
for all signal types



Operating temperature:
-20 °C ... +70 °C
(-4 °F ... +158 °F)



Space-saving design:
12 mm per module



Horizontal and vertical
mounting without reducing
the operating values



Dedicated local support in
over 80 offices globally



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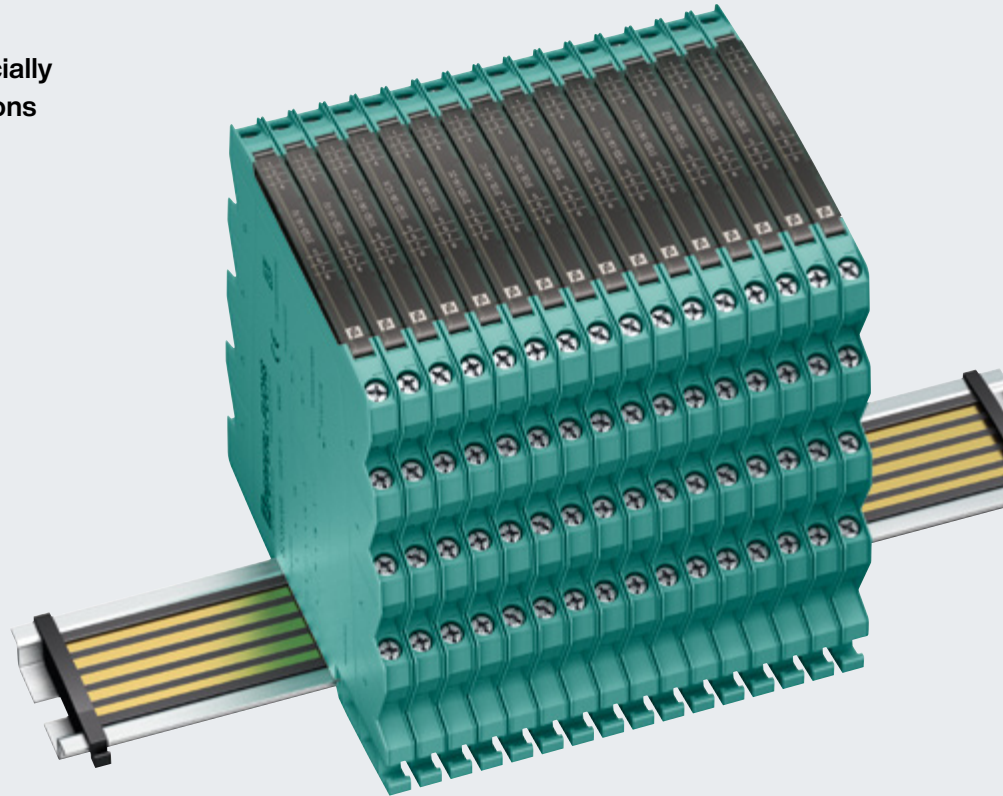


3



Signal Conditioners—Extra Slim, Powerful, and Safe Separation

SC-System signal conditioners are specially designed for general-purpose applications and ensure absolute reliable process communication.



The SC-System stands out with its high-quality isolation, extended temperature range, and extremely compact design, making retrofitting and replacement very easy. Powerful modules for all analog and digital measurement signals are available—from isolating amplifiers and highly functional temperature converters to switch amplifiers. The corresponding accessories make it quick and easy to mount, configure, and supply power to the signal conditioners.

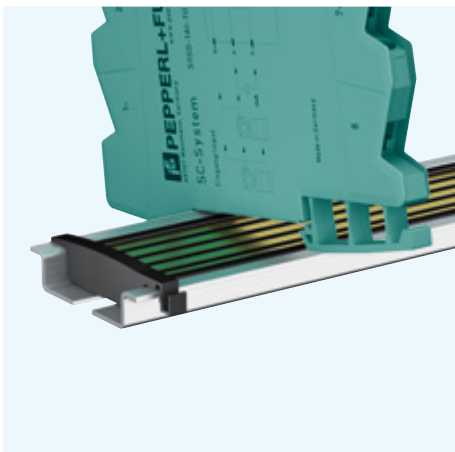
Slim Design, Yet Powerful

The Power Bus is an insert for DIN mounting rails that provides conductors for supplying interface modules via power feed modules. As an alternative to supply via terminals, this ensures a central power supply even for larger applications, which saves on individual wiring. The Power Bus reduces the wiring costs and enables uncomplicated system expansion by simply snapping on new isolator modules as required.



SC System Features

- Quick and easy mounting: DIN mounting rail or Power Bus
- Reduced footprint due to slim 6 mm devices
- Convenient diagnostic functions: fast error analysis and troubleshooting
- Power supply via Power Bus or terminals
- Universal in- and output options selectable by DIP switches



Flexible Mounting and High Availability

Due to the compact design of the SC-System modules, they also fit between narrow cable ducts and are therefore ideal for retrofitting systems. Tool-free installation by simply snapping the modules onto DIN mounting rails is possible horizontally and vertically without reducing the operating values. The system components are designed for high loads—this increases their service life and saves costs, even if the modules are generally used at less extreme temperatures.

Compact Design, High Density, and Maximum Protection

Utility Management (1)

SC-System switch amplifiers in building technology enable galvanic isolation between the evaluation unit and the field side in non-hazardous areas. They transmit consumption data for electricity, water, gas, and heat. These switch amplifiers perform typical tasks such as the transmission of digital signals to evaluation units and the provision of an S0 interface, which is common in building automation and enables the efficient acquisition of measured values from pulse-generating meters.

Food and Beverage (2)

Isolator modules such as the trip amplifiers of the SC-System series with one-shot function enable precise process control. They have galvanic isolation for safety and regulate the filling process by controlling the inflow opening post-impulse and automatically stopping it after a preset duration. This ensures accurate dosing while complying with safety standards. These trip amplifiers efficiently perform tasks such as controlling the inflow, increasing productivity, and maintaining product quality in beverage bottling operations.

Test Benches (3)

The millivolt converters of the SC-System are integrated into test benches for precise millivolt signal measurements. They ensure galvanic isolation between the control and field sides within the non-hazardous area, safeguarding against potential hazards. These converters ensure undistorted provision of the measured values to evaluation units and therefore enable accurate analysis. They can transmit measuring voltages, especially in the millivolt range, in order to reliably transmit critical data for various measuring and control processes.

Crossover Features of the SC-System



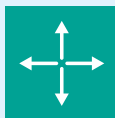
Worldwide certifications



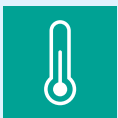
Minimal space requirements: 6 mm width and 97 mm height



Maximum protection of people and equipment: galvanic isolation with 300 V operating-/3 kV test voltage



Horizontal and vertical mounting without reducing the operating values



Operating temperature: -40 °C ... +70 °C (-40 °F ... +158 °F)

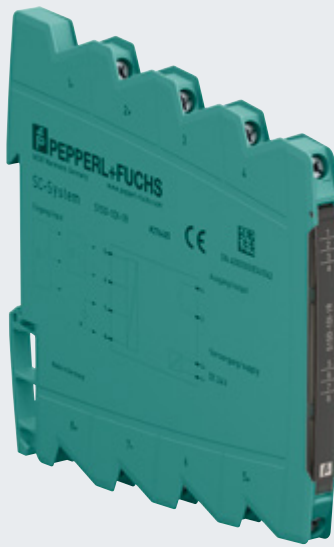


Dedicated local support in over 80 offices globally

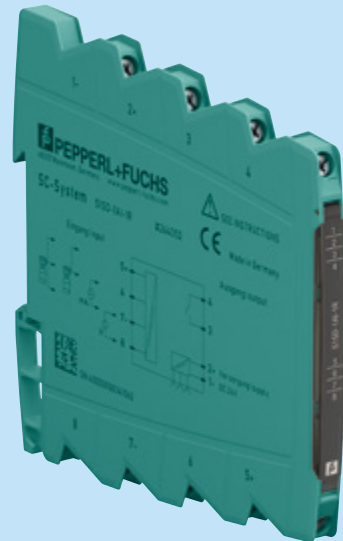


For more information, visit pepperl-fuchs.com/pf-sc-system

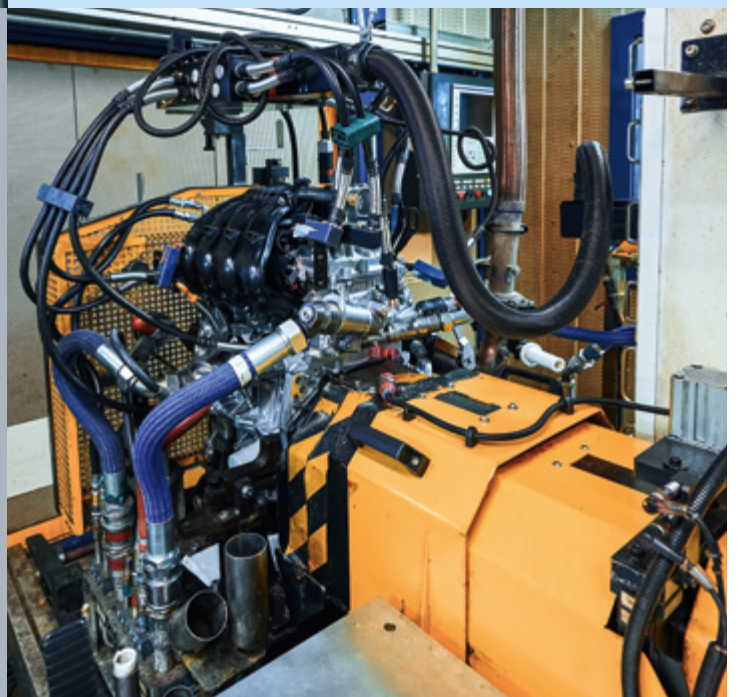
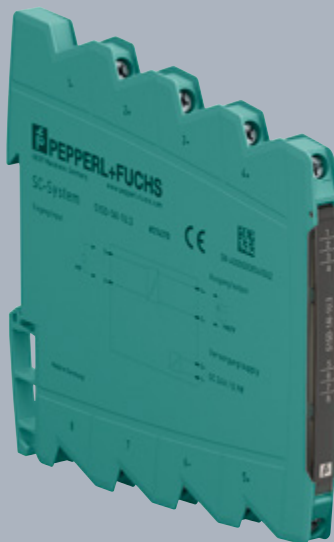
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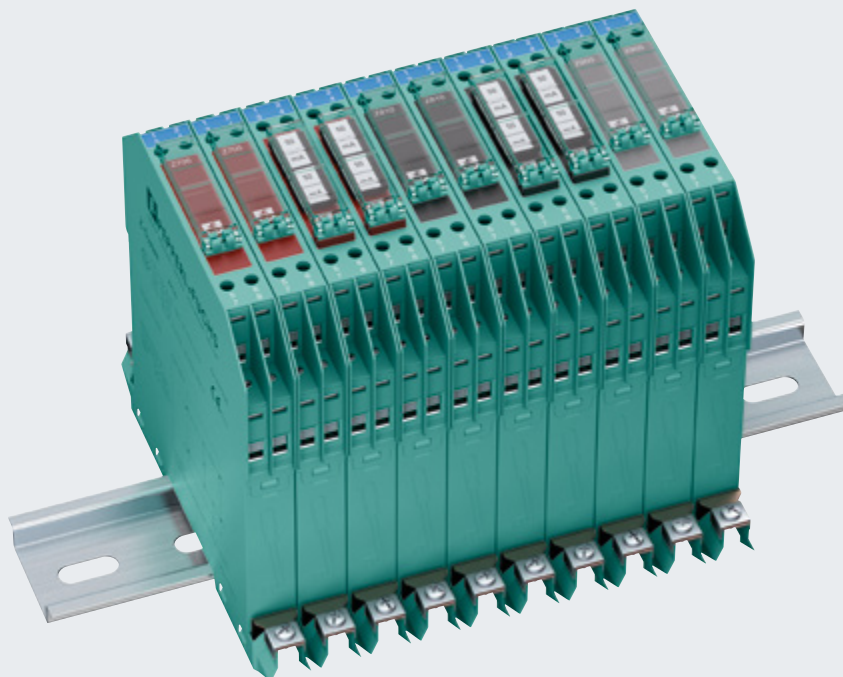


3



Safeguarding Sensitive Equipment from Overvoltage

Zener barriers provide cost-saving Ex protection for various applications in process automation systems. The amount of energy transferred to the hazardous location is limited to a safe level incapable of igniting the explosive atmosphere.



Cost-Effective Explosion Protection with Simple Installation

Zener barriers limit the energy transferred into the intrinsically safe circuit to a safe level incapable of igniting the explosive atmosphere. The Zener barriers of the Z-System from Pepperl+Fuchs are mounted directly on a 35 mm DIN mounting rail. The required grounding can be carried out directly on the DIN rail.

- Fast mounting on the DIN rail
- Grounding connected directly to the DIN rail
- Disconnecting the field circuit by pulling the fuse

Zener barriers of the Z-System are available with a packing density of up to 2 channels at a width of 12.5 mm. Variants with back-up fuses that can be replaced in the field protect the barriers against destruction in the event of overvoltage or possible faults during the commissioning of your system.

Zener Barrier System Features

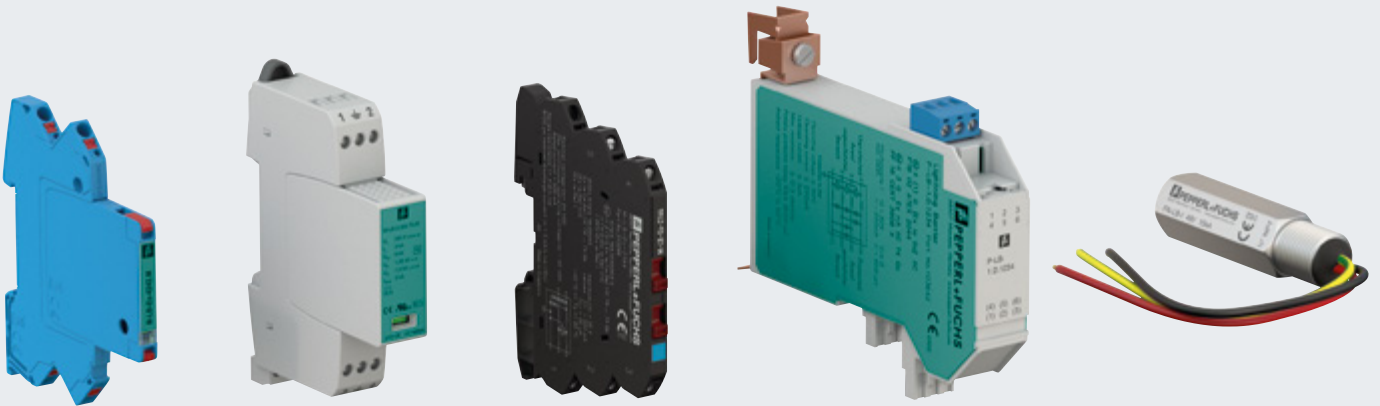
- Compact design: Space-saving for quick and easy installation on the DIN rail
- Full range: AC and DC applications for 1-, 2-, 3-channels (75 modules)
- Compatible with various sensors and transmitters
- Worldwide certifications

For more information, visit
pepperl-fuchs.com/pf-zener-barriers



Power Surge—the No. 1 Underestimated Cause of Damage

Powerful surge protection for plants, people, processes, and the environment.



Pluggable, Safe, and Reliable

In process engineering plants such as refineries with exposed building parts or extensive water management systems, surge events can cause devastating damage. In addition to these dangerous risks for people and the environment, overvoltages are still one of the most frequent causes of damage in electrical plant engineering. They primarily occur due to lightning strikes or switching operations, but also due to the following causes:

- Electrostatic discharge
- Friction or sparks from brushed electric motors
- Fluctuations in the power supply
- Ground faults/short circuits
- Tripping fuses
- Parallel installation of energy and information technology control systems

Surge Protector System Features

- AC voltage high power protection
- Signal line protection in compact design
- For intrinsically safe signals
- DIN rail and field transmitter mounting
- Loop disconnects
- Worldwide certifications
- Functional safety up to SIL 3

For more information, visit
pepperl-fuchs.com/pf-surge





SEC Houston

Solution Engineering Centers (SECs)

Custom-Designed Certified Solutions

Turning Products into Solutions

Each process plant comes with its own challenges and requirements. Efficiency, reliability, and availability of the plant call for a process control system that not only offers insight into the operation of the process, but also provides a well-founded basis for informed decision-making.

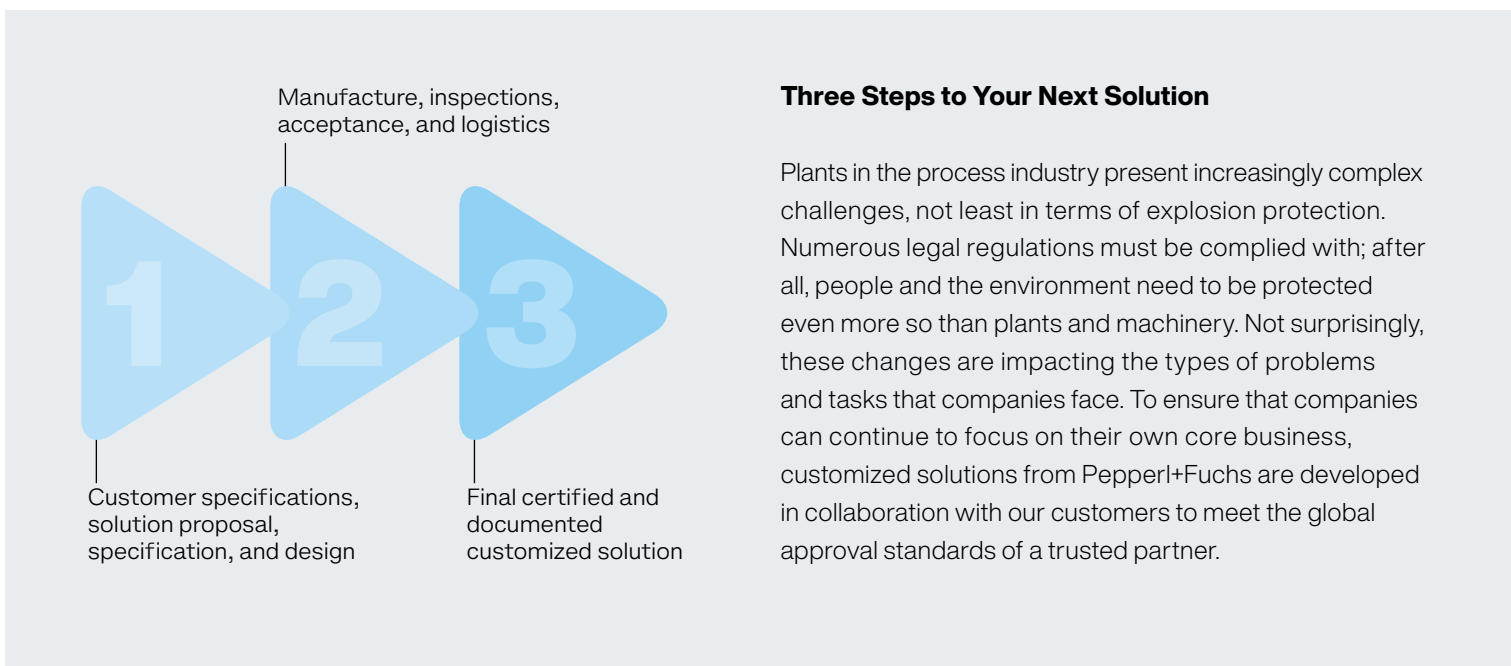
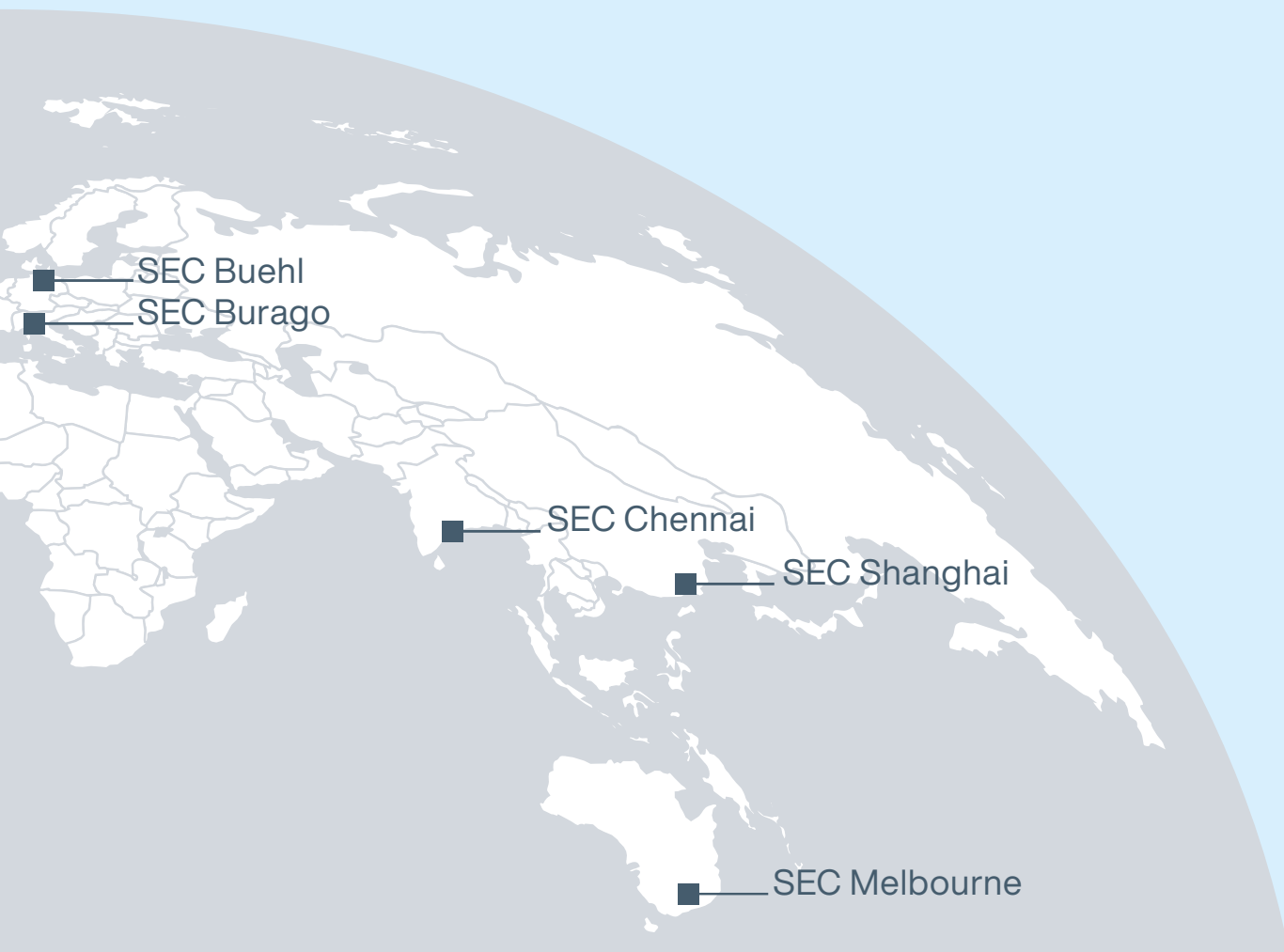
The remote I/O solutions from Pepperl+Fuchs provide the hardware basis for seamless communication between different technology generations. They represent an innovative solution designed for easy integration. The Pepperl+Fuchs Solution Engineering Centers (SECs) are there to assist plant operators and provide them with custom-designed solutions tailored to individual specifications. This not only guarantees firsthand knowledge and experience, but also greatly reduces on-site efforts for engineering, installation, and configuration. Besides remote I/O Pepperl+Fuchs also offers solutions with Ex e (increased safety), or Ex d (flameproof) type of protection and purge purge and pressurization systems.

Global Teams with Local Experience

Pepperl+Fuchs has several Solution Engineering Centers worldwide. They are familiar with local requirements and know the specific needs of the worldwide process industry. Using their services means tapping into deep insider knowledge and outsourcing responsibilities. As a result, the customer gets far more than just components to upgrade plants and bridge technology generations. They obtain a certified turnkey solution that is guaranteed to seamlessly integrate into the existing PCS to gain more control and enhanced system transparency.

For more information, visit
pepperl-fuchs.com/pf-solutions





Your automation, our passion.

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