

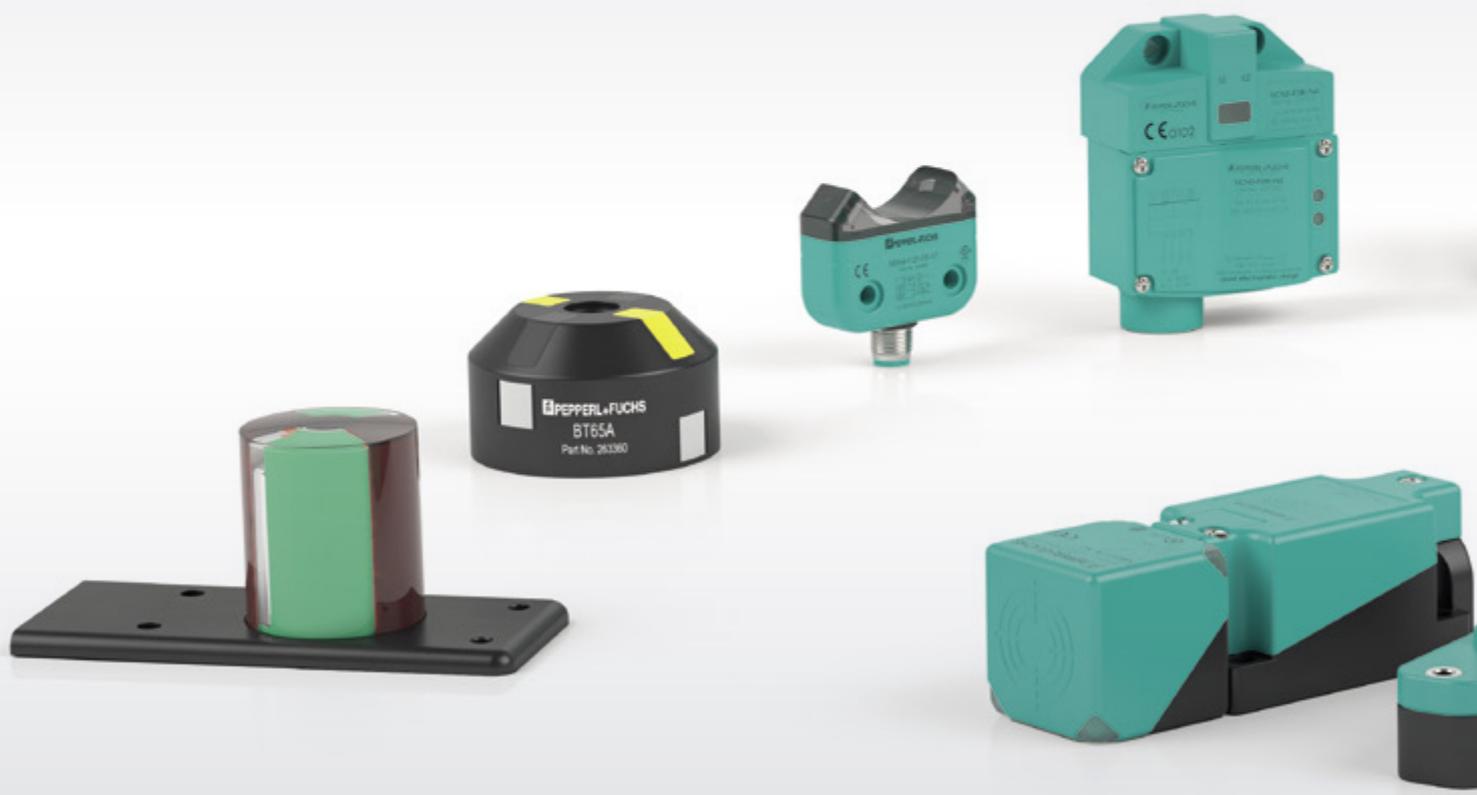


Sensors and Systems for the Process Industry

Industry Brochure

Your automation, our passion.

 **PEPPERL+FUCHS**





Find the Right Sensor in Just a Few Clicks

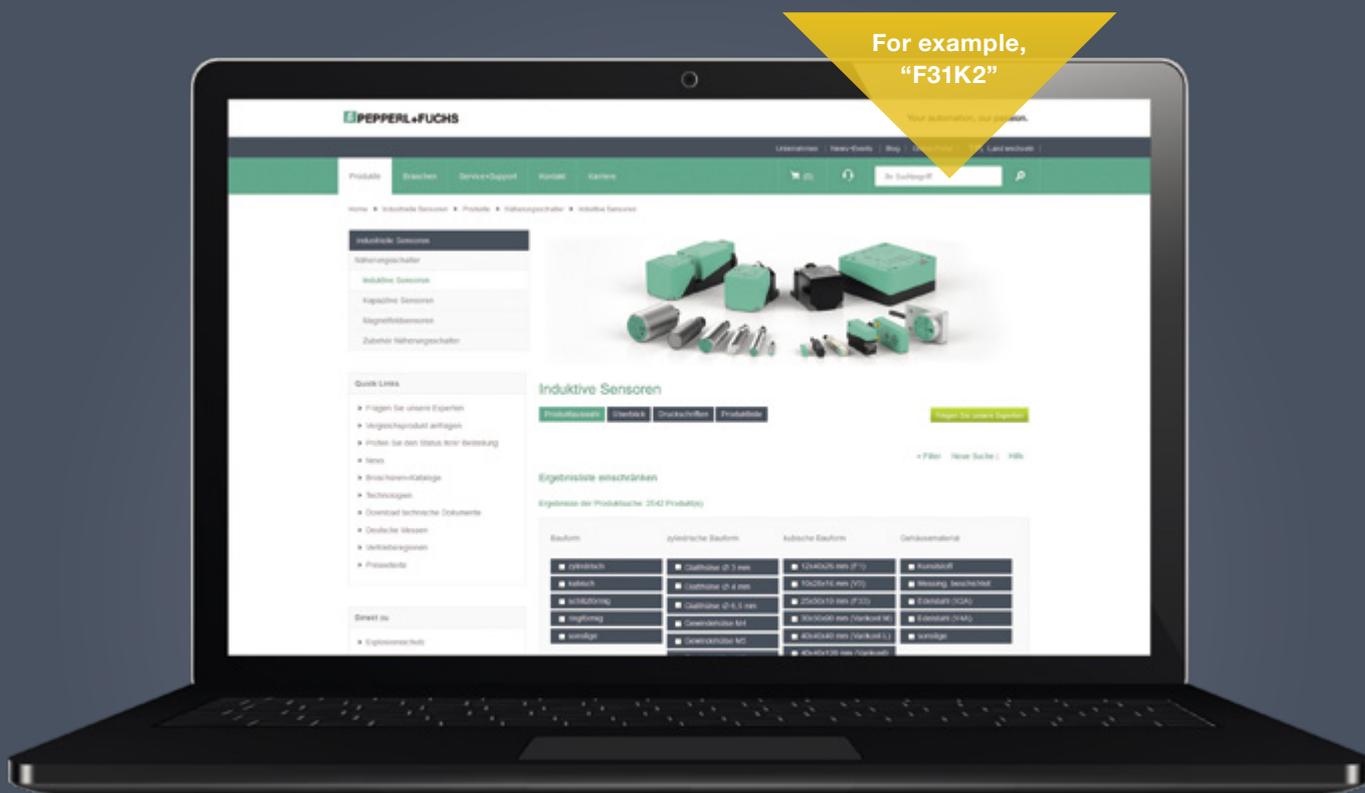
Go online. Specify your requirements. Select your sensor. Find the right solution for your application in just a few clicks. If you have any questions, our experts are available to take your call.

Search on the Pepperl+Fuchs Website

Enter the model number or type description in the search field on the Pepperl+Fuchs website, and go straight to the product selection.

Or browse through our range of product families and groups. You can use product selectors to choose the optimal solution for your application.

For example,
"F31K2"



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Solutions for the Process Industry

Reliable Processes— Wide-Ranging Applications

Reliable processes depend on strict standards. Driven by innovative engineering, Pepperl+Fuchs sets global standards for explosion-protection technologies in oil and gas production, chemical processes, and other industries where flammable gas or dust mixtures can occur. Our comprehensive portfolio offers optimal solutions for the process industry.

More than 60 Years of Experience in the Process Industry

For more than 60 years, the name Pepperl+Fuchs has stood for high-quality products, services, and solutions for process plants in hazardous areas and harsh industrial environments. Decades of experience, application expertise, and constant dialogue with our customers are the basis of a comprehensive portfolio, tailored to this industry's unique requirements.

Flexible Solutions for All Applications

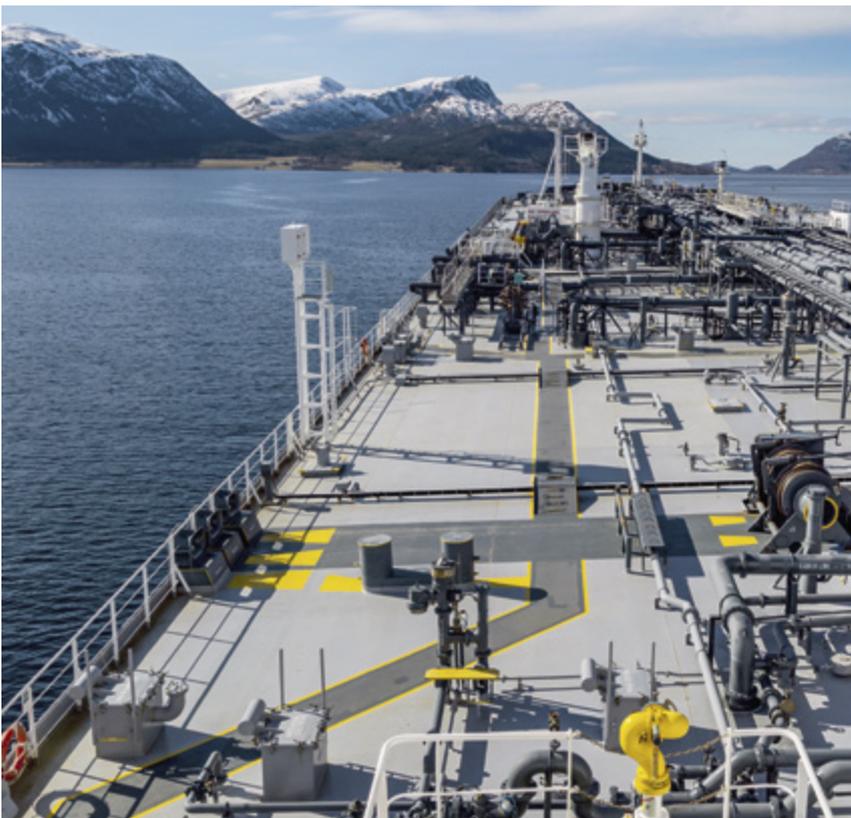
Sensors and systems are indispensable to modern, automated process plants in hazardous areas and beyond. From position feedback on valve actuators to limit detection on positioners, Pepperl+Fuchs' product portfolio offers a wide range of applications for the chemical, pharmaceutical, and oil and gas industries, as well as other industries. Specialized devices have also been developed for the food and beverage, pulp and paper, water treatment, and wastewater industries.

Typical Applications

- Valve position feedback on standard pneumatic and manually operated valves in indoor and outdoor areas
- Valve position feedback on globe valves in applications with strict hygiene requirements
- Monitoring limit values in flow meters and pressure gauges

For more information, visit:
www.pepperl-fuchs.com/bf-markets





Global Industry Standards for Process Applications

Explosion Protection and Intrinsic Safety—Globally.

Selecting the appropriate equipment plays a central role when designing plants in explosion-hazardous areas. Key considerations include device functionality, suitability for the anticipated environmental and operating conditions, and explosion protection requirements. Pepperl+Fuchs' portfolio offers a solution for every requirement.

Labels and Definitions

Areas where potentially explosive atmospheres may occur are classified into Zones. This classification refers to the frequency and duration of the occurrence of such an atmosphere. The following table shows the definition of Zones and Divisions (North America).

Zone		Division			Definition
Gas	Dust	Gas (Class I)	Dust (Class II)	Fibers (Class III)	
0	20	1	1	1	Potentially explosive atmosphere present constantly, for long periods, or frequently
1	21	1	1	1	Potentially explosive atmosphere present occasionally during normal operation
2	22	2	2	2	Potentially explosive atmosphere not present during normal operation, and if present, only rarely and briefly

Principle	International protection type	Zone	Protection type for North America	Division	Products and applications	IEC/EN standard
Preventing the ignition source	Intrinsic safety Ex ia, Ex ib, Ex ic	0, 1, 2 20, 21, 22	Intrinsic safety	1, 2	Inductive, magnetic, and capacitive sensors, inductive dual sensors, AS-Interface	IEC 60079-11 EN 60079-11
	Nonsparking Ex nA	2	Nonincendive	2	Inductive sensors (standard and dual sensors), rotary encoders	IEC 60079-15 EN 60079-15
	Dust ignition protection, Ex ta, Ex tb, Ex tc	20, 21, 22	–	–	Inductive sensors (standard and dual sensors), rotary encoders	IEC 60079-31 EN 60079-31
	Increased safety Ex e	1, 2	–	–	Components and solutions for process automation*	IEC 60079-7 EN 60079-7
Containing the internal explosion	Flameproof enclosure	1, 2	Flameproof	1, 2	Rotary encoders, RFID, components and solutions for process automation*	IEC 60079-1 EN 60079-1

* Current certifications and approvals can be found in the respective product datasheet; other products and information on the components and solutions for process automation are available online at www.pepperl-fuchs.com

ATEX Marking for Products

The ATEX directive covers the device categories (1, 2, or 3) that indicate the security levels, as well as the nature of the hazardous area (G for gas and D for dust). Example:



Very high level of safety, adequate security through two security measures (category 1), gas atmosphere (G)

Equipment Category and Type of Potentially Explosive Atmosphere

Category 1: Very high level of safety, adequate security through two security measures

Category 2: High level of safety, sufficient safety in the event of frequent device faults

Category 3: Normal level of safety, sufficient safety in the event of fault-free operation

G = gas atmosphere

D = dust atmosphere

IEC Marking for Products

The IEC marking includes the type of protection and the equipment protection level (EPL), which indicates the protection level (a, b, or c) for gas or dust atmospheres. Example:



Intrinsic safety

Gas atmosphere (G), very high level of protection (a)

Equipment Protection Level (EPL)

G = gas atmosphere

D = dust atmosphere

M = mining atmosphere

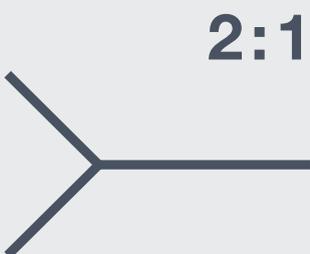
a = very high protection



Safety Integrity Level: Functional Safety for Your Application

The safety integrity level (SIL) is a unit of measurement for quantifying risk reduction. Sensors with a safety function correspond to inductive proximity sensors with a NAMUR interface and a defined failure behavior. In case of component malfunction, the output automatically goes to the safe state. These sensors are certified according to IEC 61508 and permitted for use in areas of functional safety up to SIL 2 or SIL 3. See product documentation for specifications and certifications.

For more information on SIL and to view Pepperl+Fuchs training sessions, visit www.pepperl-fuchs.com/SIL



2:1 Technology

Many applications have two intrinsically safe binary signals per measuring point. With 2:1 technology, Pepperl+Fuchs enables two intrinsically safe signals to be transmitted over one line, which is equivalent to a savings of 50 % on cabling costs in hazardous areas. The wiring is installed using conventional technology, and is evaluated with a single switch amplifier.

For more information, see page 43 of this brochure.

Valve Position Feedback Advanced Technology for Position Detection on Valves

Pepperl+Fuchs offers a portfolio tailored to valve position feedback. Regardless of the location and valve type, products are available for indoor, outdoor, and extreme applications. Well-established engineering expertise and decades of experience in explosion protection ensure absolutely reliable solutions.

Position Feedback Sensors from Pepperl+Fuchs

Dual sensors are used to monitor valves. They combine two overlapping inductive sensor elements that detect the position of the actuator and thus the position of the valve (open/closed).

This approach reduces installation and maintenance costs. Durable, noncontact, and wear-free detection makes it ideal for harsh conditions.



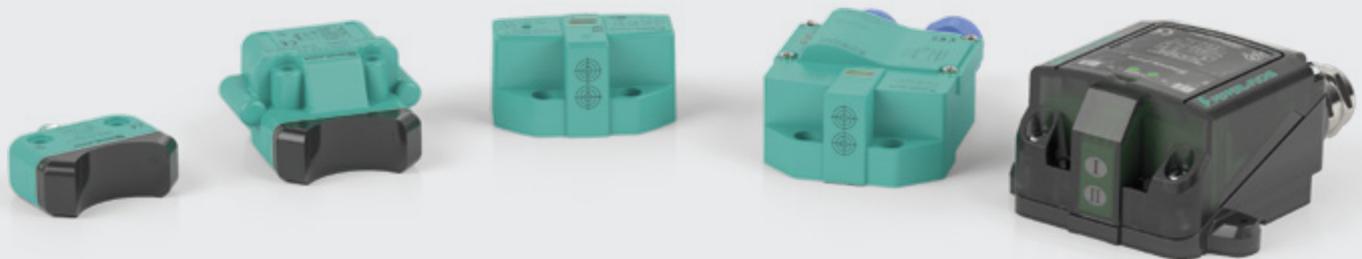
For more information, visit:
www.pepperl-fuchs.com/bf-valve



Dual-Sensor Overview

Easy and Reliable Operation

Pepperl+Fuchs offers a wide range of sensors that were specially developed for the demands of the process industry. Open solutions for valve position feedback are a highlight of this portfolio: from standard to extreme applications, these sensors are easy to operate and ensure maximum reliability.



Open Solutions for Valve Position Feedback

Dual sensors are typically used on standard pneumatic valves. Mounted directly on a valve actuator, they transmit the valve position to a control panel, ensuring absolutely reliable processes.

The Right Solution for Any Application

Our portfolio consists of three series that can be used with one or two targets, depending on the size of the actuator. This makes it easy to find the optimal solution for any application.

The **F25/F25K series** is available with cable, plug, or plug-in terminal connections and combines two sensing elements in one compact housing. It is perfect for smaller, basic applications, such as hand valves in indoor areas.

The **F31/F31K series** is used in applications on standard valve actuators in indoor and outdoor applications. It is easy to install, and a hazardous-location model is also available.

The **F31K2 series** is designed for outdoor use. It offers flexibility, durability, and outstanding performance—for even the most extreme conditions.

Highlights

- Simple mounting on standard valve actuators, no additional mounting components needed
- Open solution with widely visible integrated valve-position indicator
- Flexible, modular housing design
- High reliability due to noncontact, inductive valve-position detection
- Optimized for outdoor use with high UV, temperature, and saltwater resistance

	F25 and F25K series	F31 and F31K series	F31K2 series
Highlight	<ul style="list-style-type: none"> ■ Compact, with cable, plug, or plug-in terminal connections 	<ul style="list-style-type: none"> ■ Suitable for all standard rotary actuators ■ Solenoid valve output 	<ul style="list-style-type: none"> ■ Extremely robust outdoor solution ■ Solenoid valve output
Application	<ul style="list-style-type: none"> ■ Manual valves ■ Small actuators ■ Box installation ■ Ex i-certified Zone 0/20 	<ul style="list-style-type: none"> ■ Indoor and outdoor areas ■ Small and medium-sized drives ■ Ex i-certified Zone 0/20 	<ul style="list-style-type: none"> ■ Optimized for outdoor areas ■ Ex n/t-certified Zone 2/22 ■ Ex i-certified Zone 0/20
Housing material	Glass-reinforced plastic	Glass-reinforced plastic	Glass-reinforced plastic or translucent plastic, aluminum
Temperature range	High: up to +100 °C Low: to -25 °C	High: up to +100 °C Low: to -25 °C	High: up to +100 °C Low: to -40 °C
IP degree of protection	IP67	IP67	IP66, IP67, IP69K
Certifications	<ul style="list-style-type: none"> ■ NAMUR (Ex i) 	<ul style="list-style-type: none"> ■ NAMUR (Ex i) ■ SIL 2 	<ul style="list-style-type: none"> ■ NAMUR (Ex i), SIL 2 ■ 2-wire, DC (Ex nA, Ex tc), small residual current ■ 3-wire, DC (Ex nA, Ex tc)

Sensor Target Overview

Simplified Field Diagnostics

Sensor solutions for valve position feedback are only possible with a suitable target. From compact designs to the rugged puck and high-visibility indicator solution, Pepperl+Fuchs sensor targets are available in different sizes and designs, and are optimized for the complete range of modern actuators.

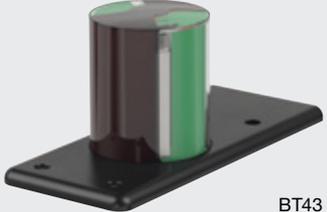
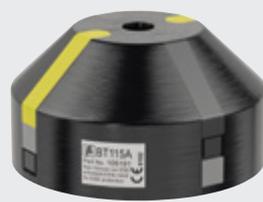


Status Monitoring from a Distance

To detect the open/closed position of valves, every sensor needs a sensor target that acts as the activating element. The unique concept of inductive dual sensors developed by Pepperl+Fuchs provides matching sensor targets for the complete size range of modern actuators. This also includes rugged puck and high-visibility indicator solutions, which consist of two components: the two-colored indicator for wide visibility, and the puck as a target for the sensor.

Highlights

- Consistent target concept for all dual sensors, available as a puck or puck and high-visibility indicator solution
- High visibility with reflective signal colors
- 90° incremental or infinite target adjustability
- Wear-free, noncontact concept
- Standardized mounting in accordance with VDE 3845 (30 x 80 mm and 30 x 130 mm)
- Shaft diameter up to 60 mm (BT65A) or up to 90 mm (BT115A)

Sensor	Target	Puck and High-Visibility Indicator
 <p>F25/F25K</p>	 <p>BT32</p>	 <p>BT43</p>
 <p>F31/F31K</p>	 <p>BT65A</p>  <p>BT115A</p>	 <p>BT65-F31</p>
 <p>F31K2</p>	 <p>BT65A</p>  <p>BT115A</p>	 <p>BT65-F31K2</p>

Select the appropriate actuator for your sensor solution as a standard or puck and high-visibility indicator solution.

Dual-Sensor Portfolio

Compact Solution for Manual Valves and Medium-Sized Actuators



F25 Series

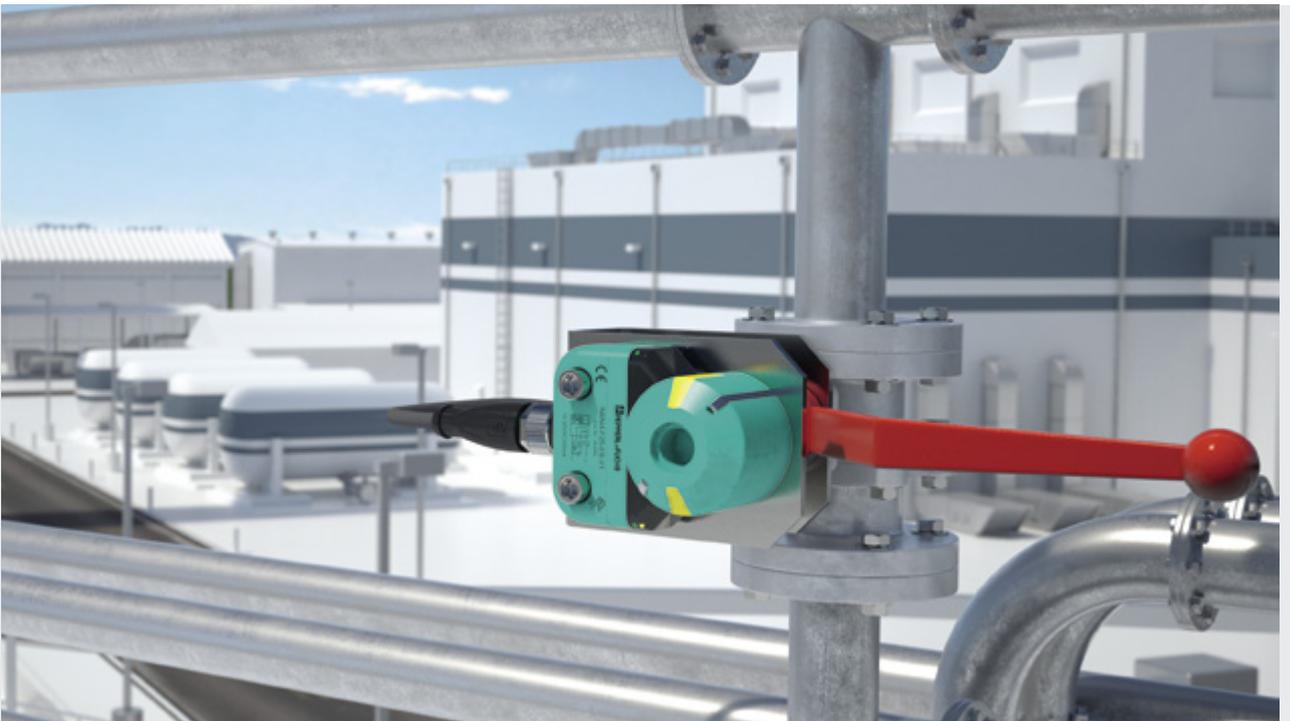
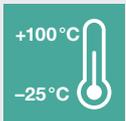
With its compact design, the F25 series is ideal for manual valves and small to medium-sized actuators. Clearly visible LEDs indicate switch status and supply voltage.

The new puck and high-visibility indicator solution maximizes user-friendliness. Signal colors simplify field diagnostics by making it easy to read the valve position from a distance.

This wear-free system can be seamlessly integrated into existing control systems, with no need for expensive retrofitting. A special height-adjustable mounting kit with shaft extension makes it easy to mount onto valves (with ISO flange in accordance with ISO 5211-DIN 3337).

Highlights

- Maximum flexibility due to compact design
- High-visibility indication of valve position
- Two-wire inductive sensor technology with minimal power consumption enables seamless integration into existing control systems
- Fewer parts required to mount the sensor compared with enclosed solutions
- Height-adjustable mounting kit with shaft extension for simple mounting onto valves (with ISO flange in accordance with ISO 5211-DIN 3337)





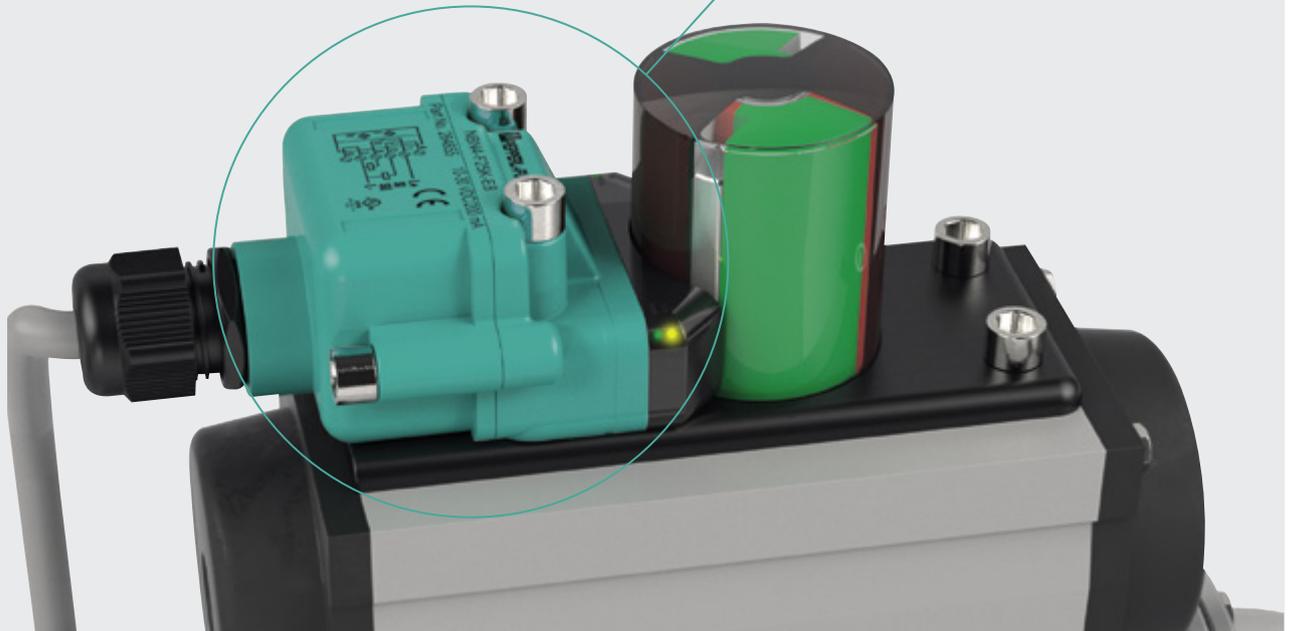
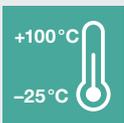
F25K Series

As a supplement to the F25 series, the F25K dual sensor also offers maximum flexibility and ease of use.

This series has a terminal compartment and plug-in terminals. Open cable ends can be connected directly via the terminal compartment. The puck and high-visibility indicator concept also provides better visibility and protection from dirt and damage.

Highlights

- In addition to the advantages of the F25 series, the F25K provides a terminal compartment with plug-in terminals for easy wiring of open cable ends.



Dual-Sensor Portfolio

Position Feedback on Valve Actuators in Indoor and Outdoor Applications

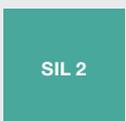


F31 Series

The compact F31 series is optimized for direct mounting onto valve actuators. Mounting is simple and adjustment-free, with no additional components required. Models are available with cable connection, plug and socket, and valve outlets. Different-sized actuators can be used to match the required shaft diameter and height. With the option of mounting on the standard dimensions of 80 x 30 mm or 130 x 30 mm, the system is flexible and easy to install.

Highlights

- Compact housing for direct mounting onto valve actuators
- Easy installation: adjustment-free with no additional components required
- Highly visible LEDs for switch status, supply voltage, and valve position indication
- NAMUR sensors with SIL 2 approval and Ex approvals for Zone 0/20 available worldwide



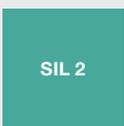


F31K Series

The F31K series has also been specially designed for direct mounting onto valve actuators. A large terminal compartment allows for a simple mounting and valve connection. The valve is activated directly via the sensor connection. This helps reduce installation and cabling costs.

Highlights

- Compact sensing face ensures no pinch point hazard between sensor and puck
- Spacing for standardized mounting
- Options include cable connection, plug and socket, and terminal compartment
- Clear LED indication of switch status, supply voltage, and solenoid activation
- NAMUR sensors with SIL 2 approval and Ex approvals for Zone 0/20 available worldwide



Dual-Sensor Portfolio

Premium Solution for Harsh Environments



F31K2 Series

F31K2 dual sensors are designed for outdoor use with no compromises. The open solution with its highly visible integrated valve position indicator and translucent housing allows status monitoring from a distance. The modular housing design enables easy operation, installation, and diagnosis. The sensor's unique double-housing design provides double the mechanical protection and a high IP rating. And the housing materials ensure high resistance to UV, temperature, and corrosion. NAMUR Ex i (Zone 0/20) and Ex nA (Zone 2/22) versions are available.

Highlights

- Open solution with highly visible integrated valve position indicator and translucent housing
- Modular housing design
- Optimized for outdoor use with high resistance to UV, temperature, and corrosion
- Compatible with DC input types of all modern DCS and PLC systems
- 2-wire DC electronics with low residual current (inductive volt-free contact) and Ex nA approval for Zone 2/22
- NAMUR electronics, with Ex i approval for gas/dust Zone 0/20 and SIL 2 approval according to IEC/EN 61508

IP68
IP69K

Extreme sensor protection for the F31K2 series: V4A (SUS 316) stainless-steel protective cover

Ex

Zone
0/20

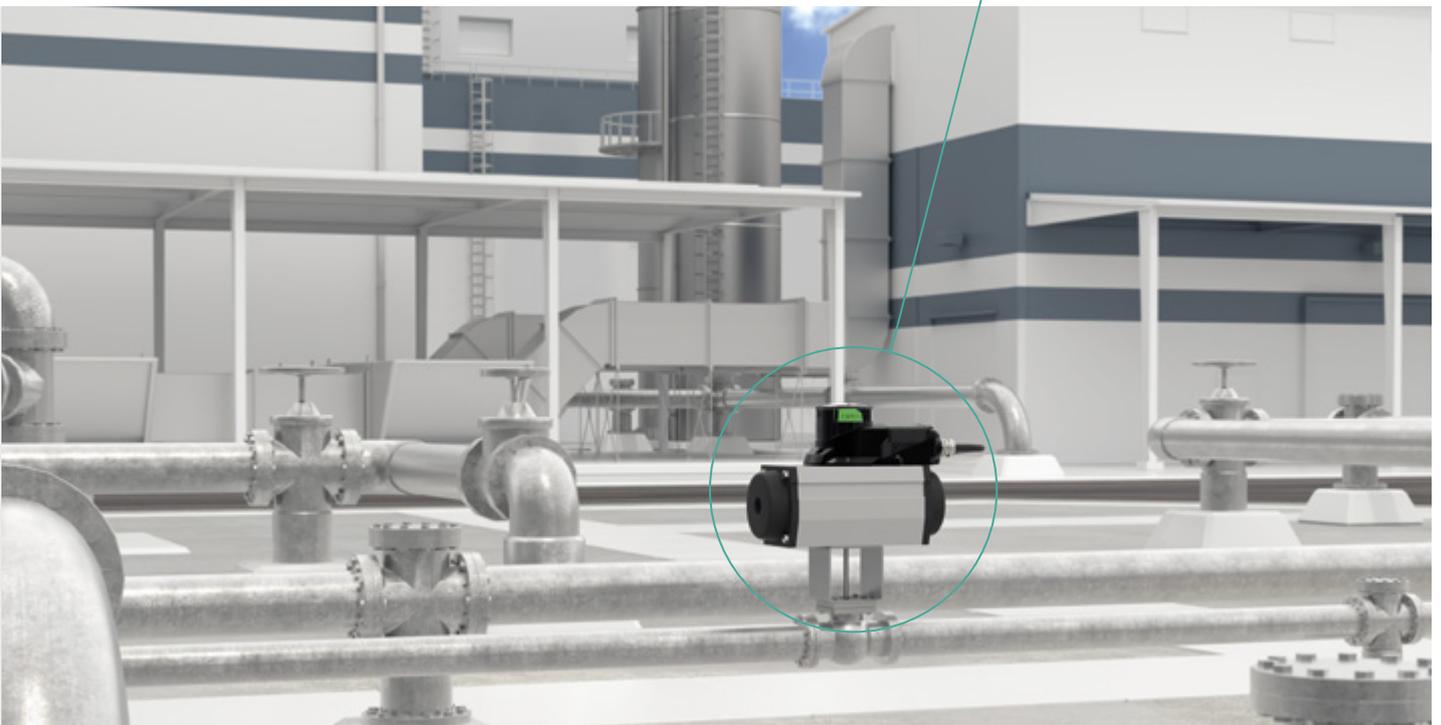
Zone
2/22

SIL 2



Equipped for Hazardous Areas

The F31K2 series also includes versions with ATEX and IECEx approval for use in different explosive gas and dust areas. The NAMUR versions can also be used for functional safety areas up to SIL 2.



Analog Position Feedback

Precise Angle Detection on Valve Actuators



PMI Inductive Positioning System—F130 Series

The PMI-F130 series is a noncontact angle measurement system. It converts a measurement angle of 0° to 360° into an analog signal between 4 mA and 20 mA. The PMI-F130 is suitable for direct mounting on almost all standard pneumatic valves. In addition to analog angle position feedback, the sensor also provides two programmable switch windows for end-position monitoring. A preconfigured model (PMI90-F130-I2E2) is available for use as a position feedback sensor. All settings, such as rotation direction, the swivel angle, and the switch window position and width, can be adjusted as needed.

Highlights

- Noncontact angle measurement system with a measuring range of 0° to 360°
- Preconfigured swivel angle of 0° to 90° corresponding to 4 mA to 20 mA
- Signal overflow for valve wear monitoring
- Two independent, preconfigured switch windows of $\pm 6^\circ$ for end-position monitoring



Analog Position Feedback

Reliable Positioning on Globe Valves



PMI Inductive Positioning System—F90 Series

PMI-F90 series noncontact inductive position sensors are easy to install on pneumatically operated diaphragm valves or linear control valves. These sensors provide a continuous analog output and are the ideal solution for exact valve-position detection. Simple steel targets or even machine parts serve as actuators, making this series a particularly flexible and cost-effective solution.

The F90 series allows range measurements from 40 mm to 120 mm and is also available in ATEX versions for safe use in Zone 2/22 hazardous areas. In addition, the IO-Link models allow custom parameterization.

Highlights

- New applications made possible by IO-Link
- Wide range of application possibilities using simple steel actuators as accessories or customer-specific targets
- High resolution and precise positioning
- Selection of adjustable output signals: 4 mA to 20 mA or 0 VDC to 10 VDC
- Suitable for outdoor use (IP67, temperature range: -25 °C to +85 °C)



For more information, visit:
www.pepperl-fuchs.com/bf-pmi



Optimizing Processes with Data from Field Devices

Cyclic process data from field devices forms the basis of process control. Intelligent field devices also provide a wealth of valuable acyclic status information. SmartBridge® technology from Pepperl+Fuchs provides a new way to access this data and gain valuable insight into the condition of machines and plants.



To learn more about SmartBridge, visit:
www.pepperl-fuchs.com/smartbridge

Components for Linear Valves

A Range of Solutions for Linear Valves



Sensors for Diaphragm Valves

Hygienic linear valves are commonly used in pharmaceutical, biotechnological, and food and beverage applications. Standard cylindrical or rectangular sensors are often built into the control head of the valve. Depending on the mechanical design of the control head, custom solutions are also possible—with AS-Interface communication, for instance.

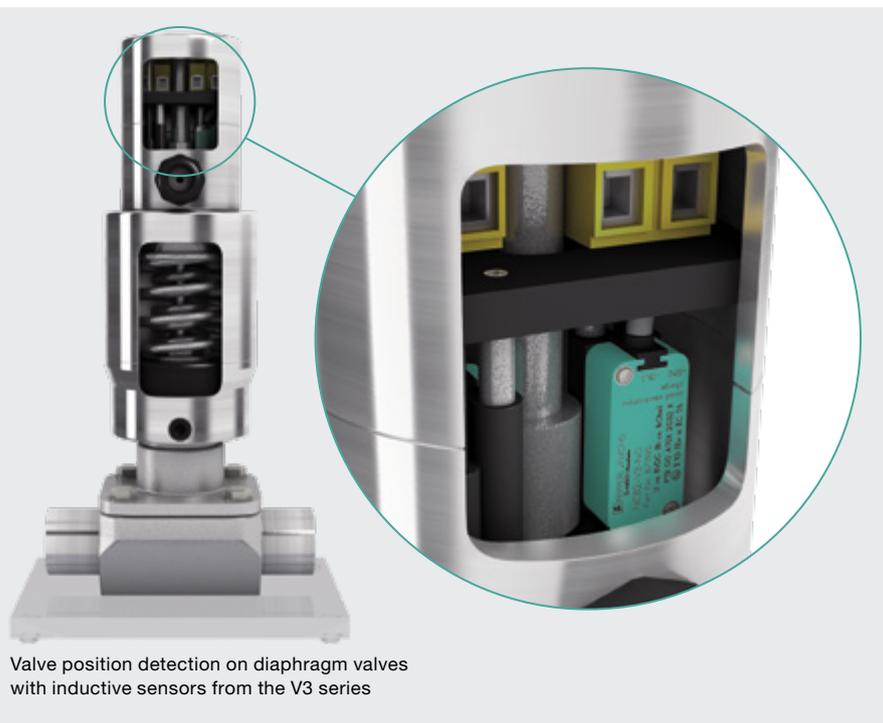
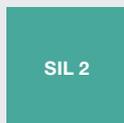
Sensors for Knife Gate Valves

Knife gate valves are used to control thick liquids and solids. These valves are ideal for use in the pulp and paper industry, as well as in water and wastewater applications. In general, cylindrical inductive sensors are used to detect the valve position.

Pepperl+Fuchs offers a variety of compact sensor solutions that can be easily integrated into diaphragm and knife gate valves. There are also sensor options available for hazardous areas and safety applications up to SIL 2.

Highlights

- Extensive portfolio of inductive sensors in a variety of housing styles for optimal integration into diaphragm and knife gate valves
- Versions with intrinsic safety (Ex ia) and Ex versions (Ex nA, Ex tc, Ex ic) for Zones 0, 1, 2, 20, 21, and 22 are available
- Shutoff valves are also available for use in areas with functional safety up to SIL 2



Valve position detection on diaphragm valves with inductive sensors from the V3 series



Cylindrical sensors detect the valve position on knife gate valves

Components for Linear Valves

A Comprehensive Solution for Valve Control

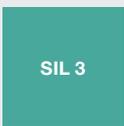


Control Valves

Beyond the standard portfolio, Pepperl+Fuchs offers special comprehensive solutions for valve control. Drawing on our application expertise, we developed an intelligent and reliable solution for the chemical and petrochemical industry in cooperation with valve manufacturers: a system that detects the four individual positions of a control valve. Two or four cylindrical inductive sensors are used, as well as cable protection from Pepperl+Fuchs consisting of a sensor adapter, flexible conduit, and the connection to the terminal box. This module can be adapted to standard valve types and enables reliable valve control—even in hazardous areas.

Highlights

- Tailor-made comprehensive solution for valve control
- Robust stainless-steel construction, ideal for demanding environments
- Extended temperature range from -40°C to $+100^{\circ}\text{C}$ (versions ranging down to -50°C available)
- Suitable for use in hazardous areas: Ex ia/Ex ib/Ex ic IEC 60079-11 and Ex nA for Zone 2/22
- SIL 3 when combined with the KFD2-SH switch amplifier



Switch Box Solutions

Custom Configurations to Solve Any Application



Customer-Specific Switch Boxes

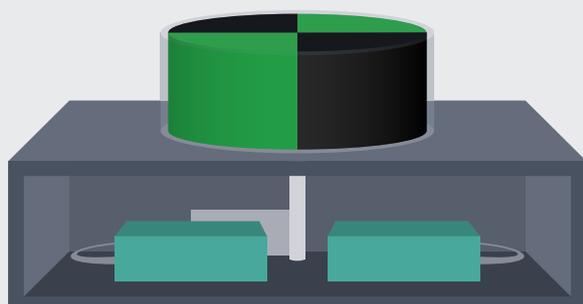
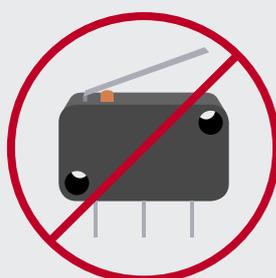
Pepperl+Fuchs offers a comprehensive portfolio of sensors that are suitable for installation in customer-supplied enclosures. The sensors are actuated by targets mounted to a rotating stem that is mechanically coupled to the pneumatic actuator. Leading actuator manufacturers offer standard boxes equipped with Pepperl+Fuchs sensors. The sensor portfolio ranges from products with intrinsic safety (Ex i) to nonincendive versions (Ex nA, Ex tc) that are easily incorporated into the enclosure. The pneumatic actuator coupled to the switch box enables a target to activate the noncontact sensor.

Highlights

- Box supports individual connection options
- System is integrated into a tamper-proof and contamination-proof enclosure
- Mounting via preadjusted sensors
- Standard NAMUR version with SIL 2 approval
- Special NAMUR versions are available with SIL 3 approval

SIL 2

SIL 3

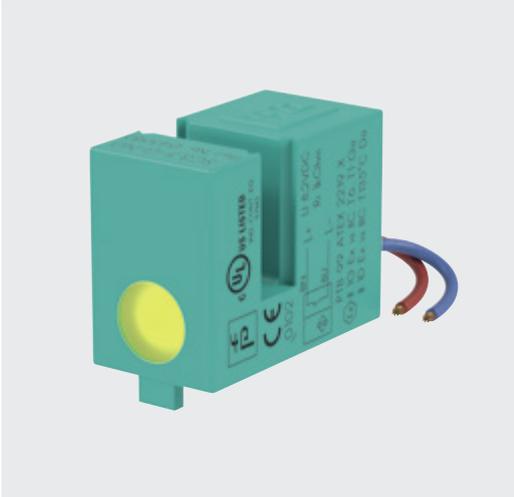


Inductive V3 Sensor for Increased Functional Safety

Mechanical switches and reed contacts are still used in the process industry, particularly in Ex d housings. Although they can be easily connected to a PLC or DCS system, they lose their functional safety when water or condensation is present. To prevent this, Pepperl+Fuchs has developed an inductive 2-wire DC sensor that can be operated on virtually any DCS or PLC control panel due to its extremely low residual current of <math><0.2\text{ mA}</math>. This makes the sensor a reliable alternative for mechanical switches or magnetic reed contacts.

Solutions for Manual Rotary Valves

Precise Position Detection for Universal Use



Inductive Sensors for Position Indication

Valve position indicators allow you to accurately pinpoint the location of open or closed rotary valves. These devices provide reliable valve position information through integrated sensors, as well as a sophisticated meter that automatically counts the valve stem rotations.

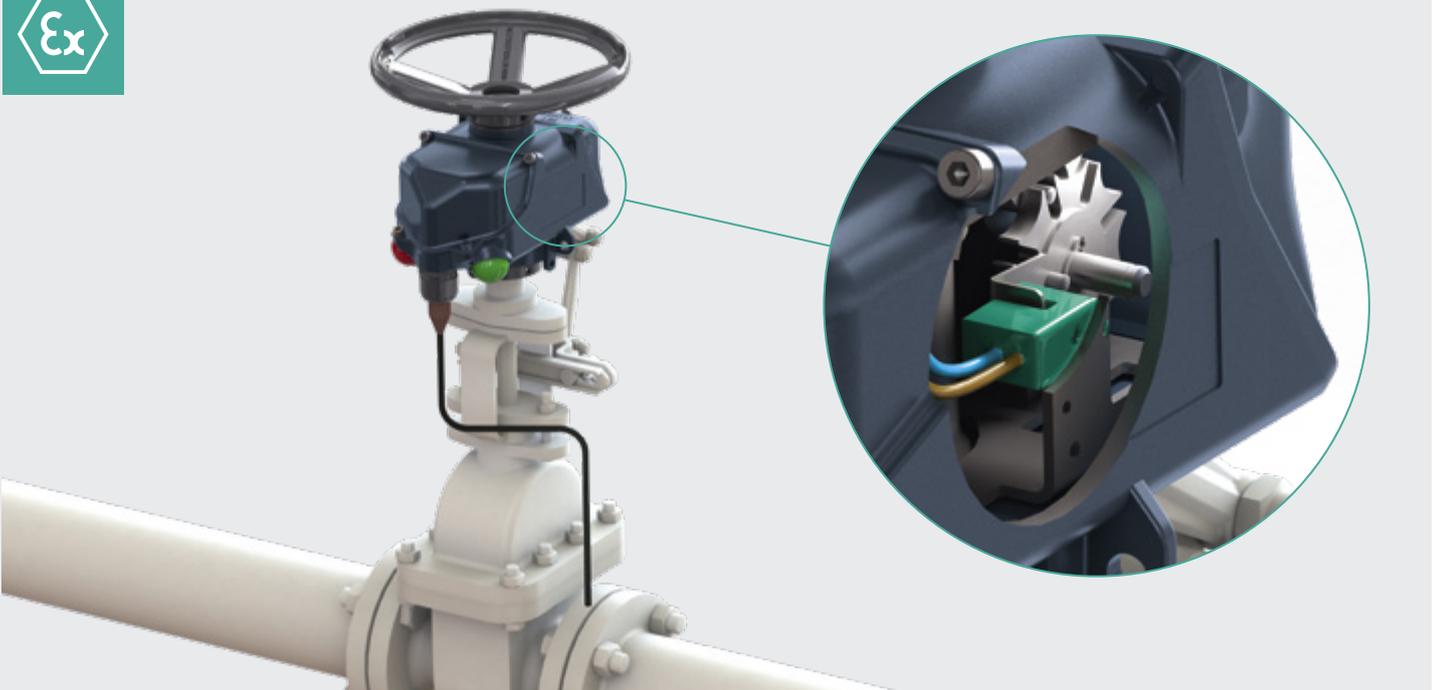
Inductive cylindrical or slot sensors from Pepperl+Fuchs are used in these devices. The broad portfolio includes hazardous-location versions and offers maximum flexibility for this solution.

Highlights

- Extensive portfolio of inductive sensors for position detection
- Intrinsic-safety and nonincendive versions (Ex i and Ex nA) available
- Reliable operation due to precise adjustment and a simple reset of the open/closed positions
- Durable housing design with coated aluminum or AISI 316
- Simple installation and universal application using a mounting kit for any valve type



For more information, visit:
www.pepperl-fuchs.com/bf-vpi



Sensors and Systems

Sensor Technology for Process Applications

As a leading developer of explosion-protection technology, Pepperl+Fuchs draws on decades of experience and in-depth application expertise. This is reflected in our wide range of components for explosion-hazardous industrial areas. In addition to NAMUR sensors paired with intrinsic-safety interface modules, special inductive sensors, rotary encoders, identification solutions, and mobile devices are available for use in Zones 0, 1, and 2, and Zones 20, 21, and 22.



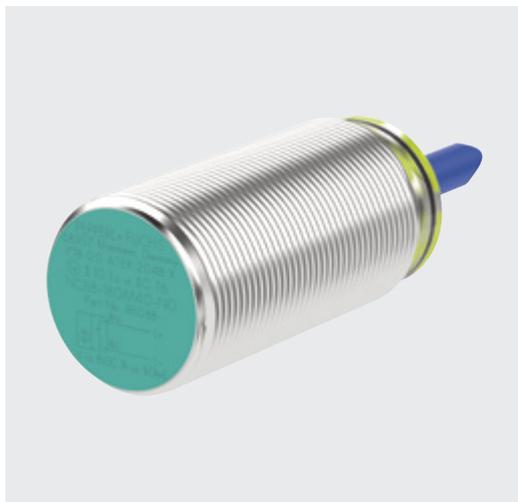
For more information, visit:
www.pepperl-fuchs.com





Proximity Sensors

A Wide Range of Proximity Sensors Directly from the Inventor



Advanced Sensor Technology

As the inventor of the proximity sensor, Pepperl+Fuchs has continually developed and perfected this noncontact, wear-free technology. With the most experience on the market and a complete portfolio of inductive, capacitive, and magnetic sensors, we can always offer the best sensor solution for factory automation and process applications.

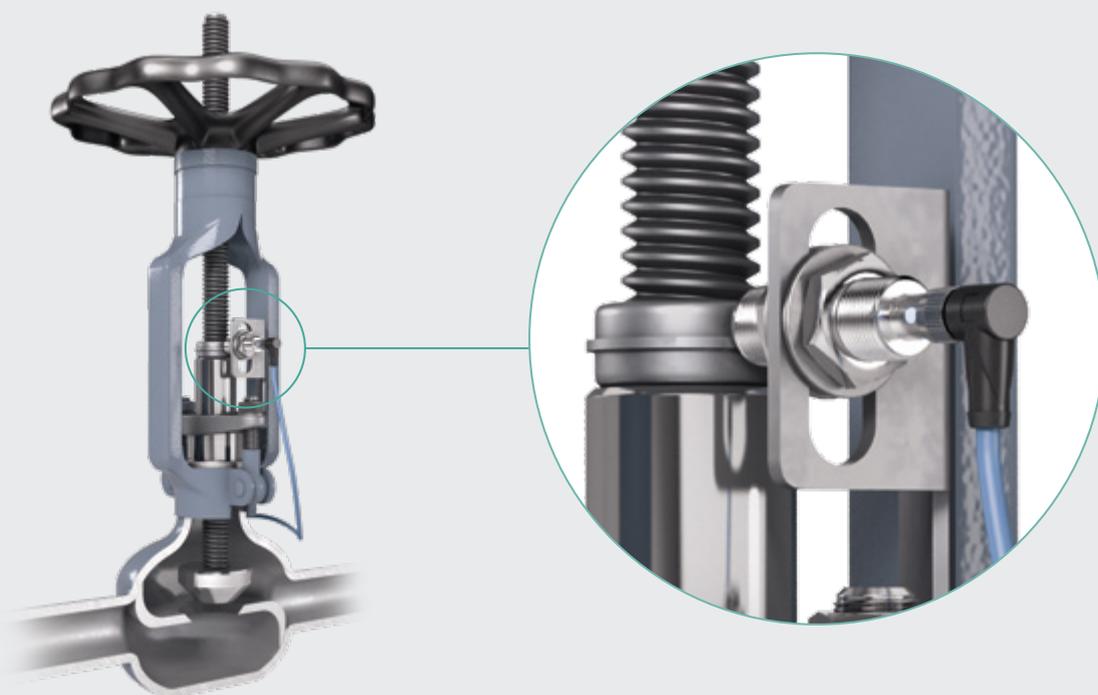
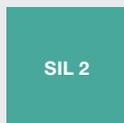
Sensors for Measurement Devices

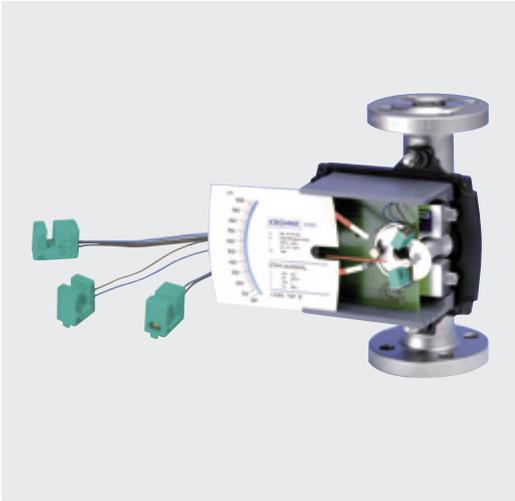
Pepperl+Fuchs offers a range of sensors with high IP ratings, extended temperature ranges, and high-pressure resistance for use in hazardous areas. Applications include valve position detection and the monitoring of limit values.

Inductive, capacitive, and magnetic sensors are available in a wide range of detection ranges, dimensions, and rugged housing materials to meet various application needs. These sensor solutions include intrinsically safe and nonincendive products.

Highlights

- Cylindrical sensors with diameters from 4.5 mm to 30 mm
- Slot sensors with a slot width of 2 mm to 30 mm
- Rectangular sensors with a detection range of 1.5 mm to 50 mm





Slot and Ring Sensors

Inductive sensors are available for applications in control and measuring instruments such as flow meters and pressure gauges for hazardous areas. In conjunction with fail-safe switching amplifiers, intrinsically safe (Ex i) and SIL 3–certified models are also available.

These include slot and ring sensors. The latter are designed to detect the flow of materials through the ring. Inductive slot sensors are used to detect a target between the slot walls of the sensor and are ideal for pointer monitoring in flow meters.

Slot Sensor Highlights

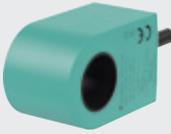
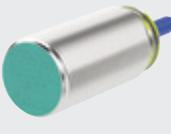
- Compact dimensions for a wide range of applications
- Meets the functional safety criteria (SIL 2/SIL 3) based on IEC 61508
- LED for visual verification of functionality

Ring Sensor Highlights

- 10 mm and 15 mm diameters for rotameter applications
- Reliable NAMUR electronics
- Bistable versions can be operated with standard NAMUR amplifiers and do not require a separate control unit



For more information, visit:
www.pepperl-fuchs.com/bf-proximity

Sensor options	Slot sensors	Ring sensors	Cylindrical sensors	Cube-style sensors	Dual sensors
					
Technology	Inductive	Inductive	Inductive Capacitive Magnetic field	Inductive Capacitive Magnetic field	Inductive
Approvals and certifications	Ex i Zones 0, 1, and 20 Ex-n/t SIL 2, SIL 3	Ex i Zone 1	Ex i Zones 0, 1, and 20 Ex-n/t SIL 2, SIL 3 3G–3D	Ex i Zones 0, 1, and 20 SIL 2 3G–3D	Ex i Zones 0, 1, and 20 SIL 2
Temperature ranges	High: up to +100 °C Low: to –50 °C	High: up to +70 °C Low: to –25 °C	High: up to +150 °C Low: to –50 °C	High: up to +250 °C Low: to –40 °C	High: up to +100 °C Low: to –40 °C
High pressure (1,000 bar)			■		
Degree of protection	Up to IP67	Up to IP67	Up to IP69K	Up to IP69K	Up to IP69K

Rotary Encoders

Always Reliable: Durable Rotary Encoders for Hazardous Areas



A Reliable Solution for Every Hazardous Application

Specially developed for hazardous areas, these rotary encoders offer powerful features and are certified for worldwide use in the most challenging environments. Certificates such as IECEx, Ex NEPSI, and KOSHA round out the available approvals. Hazardous-area rotary encoders have particularly durable housing designs and bearing structures in order to withstand strong shaft loads. Models with seawater-proof housing and an extended temperature range of -40°C to $+70^{\circ}\text{C}$ are ideal for harsh offshore use.

Highlights

- Use in hazardous, potentially explosive atmospheres with gas or dust
- Wide range of models for easy adaptation to any application
- Large range of applications due to models with extended temperature range of -40°C to $+70^{\circ}\text{C}$
- Rugged designs for long life and reduced maintenance



Zone 1



RV184 Series

- Safe for use in a hazardous, potentially explosive atmosphere of gases (Zone 1)
- Robust housing design for increased service life and reduced maintenance
- NAMUR interface according to DIN EN 60947-5-6

Zone 1/21



***78E Series**

- Removable connector cover: flexible mounting and wiring on site
- Simple maintenance: separation of the cable and rotary encoder means that there is no need to replace the entire device
- ATEX, IECEx, and Ex NEPSI certification for worldwide use in Zone 1/21

Zone 2/22



R*158X Series

- Compact housing design for confined spaces
- High signal accuracy with up to 5,000 pulses
- Can be used for longer cable lengths via RS-422 electrical interface with 10 to 30 V supply voltage

Zone 1/21



RVI70E Series

- Certified for worldwide use
- Robust bearing design and seawater-resistant housing for long service life
- Large range of applications due to extended temperature range of -40°C to $+70^{\circ}\text{C}$ and high rotational speeds

Zone 2/22

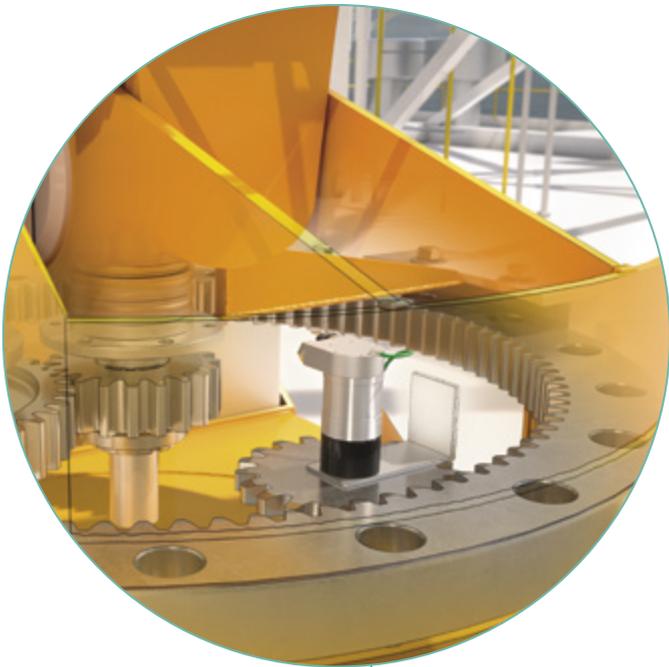


PV*58X, PS*58X Series

- Simplified system installation and reduced maintenance via removable bus cover
- High total resolution of up to 30 bits
- Flexible mounting with a wide range of application and mounting options

Positioning in Extreme Conditions

The variety of applications in hazardous areas is almost unlimited. Rotary encoders provide reliable positioning at various points on drilling units and pipe handlers on oil platforms.



For more information, visit:
www.pepperl-fuchs.com/bf-encoders



Identification Solutions

Secure and Transparent Processes with RFID



RFID Read/Write Heads and Tags

Pepperl+Fuchs offers hazardous location-certified read/write heads in Ex d housings and RFID tags for wide-ranging applications in the process industry: from documenting maintenance and managing process chemicals to tracing entire production processes. The standard portfolio offers high-performing RFID components in a variety of housing designs for optimal integration. For example, RFID can help safely transport fluids from storage tanks to process reactors. The tag is attached to the hose and the reader to the coupling. A hose connection with the wrong fluid for the current process is safely identified, and the valve remains closed.

Highlights

- Wide variety of cube-style and cylindrical housing designs for optimal integration
- Comprehensive portfolio of RFID tags for all frequency ranges (LF, HF, UHF)
- Small tags suitable for very high or low temperatures, excessive wear and tear, and mounting in or on metal



For more information, visit:
www.pepperl-fuchs.com/bf-rfid



Automated identification of hose connections using an RFID read head and tag.

Mobile Solutions

Secure Communication in Hazardous Areas



Mobile Solutions in Harsh Environments

In addition to identification solutions from Pepperl+Fuchs, the ecom product range offers advanced mobile solutions for harsh industrial environments. Powerful devices such as mobile phones, tablets, and smartphones for global use are available, with approvals for ATEX Zone 1/Division 1 and mining. As a worldwide innovation leader in mobile devices for use in explosion-hazardous areas, ecom creates new ways to increase efficiency and productivity with its products. Innovative complete solutions that include headsets, measurement devices, and scanners complement Pepperl+Fuchs' portfolio.

Highlights

- Complete portfolio of solutions for mobile use in harsh industrial environments
- Mobile computing—live and safe data management with compatible tablets, peripherals, and accessories
- Communication devices with explosion protection—mobile phones, radios, and headsets
- Global approvals for ATEX Zone 1/Division 1 etc.



For more information, visit:
www.pepperl-fuchs.com/bf-ecom



Connectivity

Intelligent Connection Technology for Increased Efficiency

Intelligent and reliable connectivity ensures smooth and efficient processes. Pepperl+Fuchs offers tailor-made solutions for the process industry that ensure reliable connections between components. The portfolio includes a range of connectors, cables, AS-Interface solutions, and interface modules.





Connectivity Solutions

Robust and Powerful Connections



Connectivity Solutions—Standardized and Perfected

High-performance sensors need high-performance connections. For this reason, Pepperl+Fuchs' portfolio offers a complete, integrated solution of compatible sensors and connectivity.

Blue NAMUR-compliant cables are available specifically for process applications. They are suitable for intrinsically safe circuits in accordance with DIN EN 60079-14:2014. These include sensor-actuator splitters that merge two signals into one slot, robust outdoor valve connectors, and field connectors for flexible on-site adjustments.

Highlights

- Sensor technology and connection technology from a single source
- Global availability of standard lengths for fast delivery (48 hours)
- Support every step of the way, from application consulting to dedicated technical support
- Experienced application development for individual solutions and special requirements
- UL-approved for market access in Canada and the USA

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



Cable Protection System

Protection from the Elements



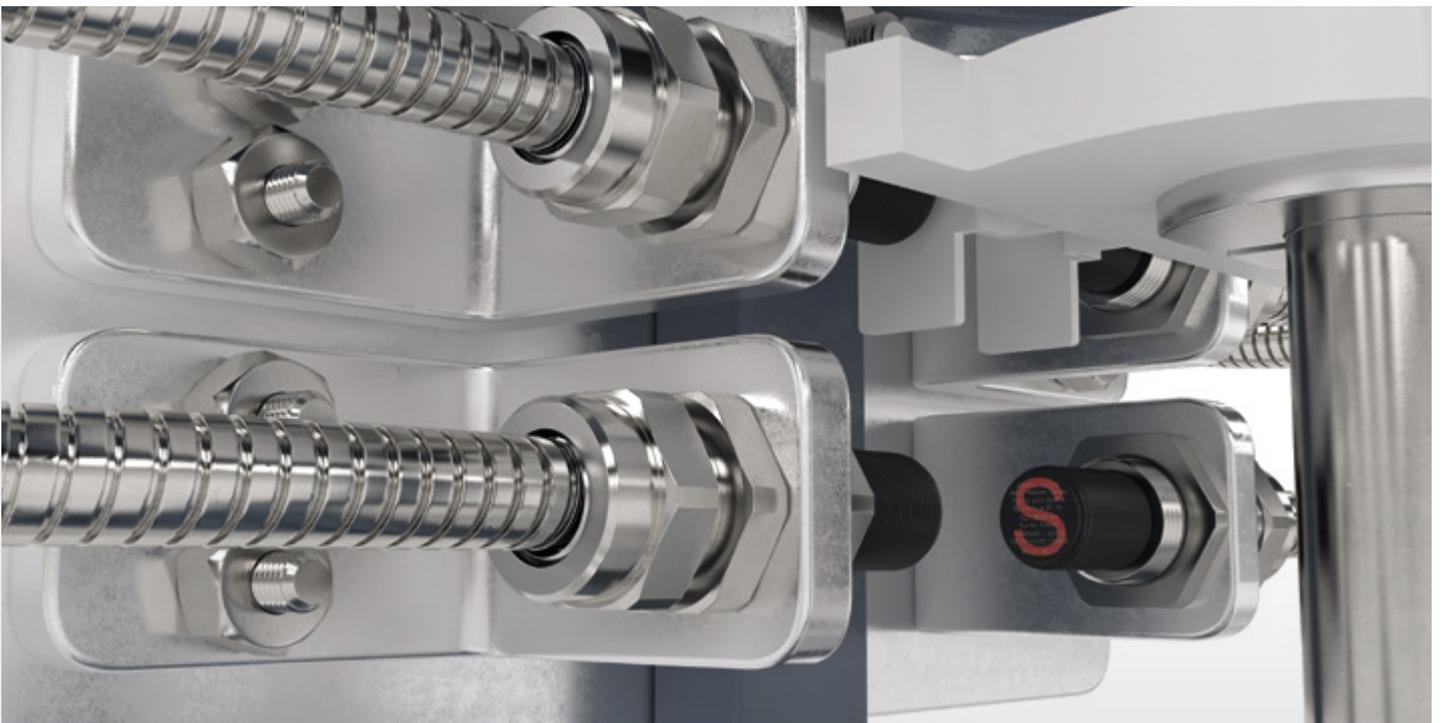
Cable Protection System for Cylindrical Sensors

Cylindrical sensors and their wiring require protection throughout the process industry. Pepperl+Fuchs offers sensor adapters, cable conduits, and cable glands in standard sizes to protect sensors and cables in adverse conditions. Depending on the application, you can choose between a flexible metal conduit or a flexible coated conduit.

The cable protection concept keeps sensor cables safe from mechanical and chemical influence. Cable glands with integrated sealing keep moisture out of enclosures and away from electronics.

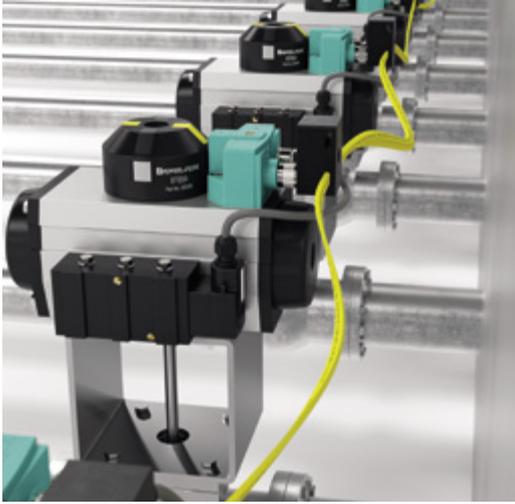
Highlights

- Optimally matched product range for all standard cylindrical sensor types
- Complete solution from a single source: sensors and terminal box available for cable protection
- Robust solution with the highest-quality materials to protect against mechanical and chemical influence
- IP67 sealing to protect the terminal box
- Suitable for environments with temperature extremes and applications with moving parts



AS-Interface

Intelligent, Cost-Effective Wiring



AS-Interface—Open I/O Connectivity Solution

AS-Interface is a flexible, reliable, and easy-to-install interface solution for connecting digital, analog, and safe signals on only two wires. It allows up to 1,000 I/O points to transfer data to higher-level fieldbus systems. AS-Interface is ideal for collecting data from distributed sensors, controlling valves, detecting valve position, and supporting components with IP68/69K ratings.

Ultra-compact G10 modules—also available as safety modules—are the perfect solution for space-limited applications. Switch-cabinet modules such as the ultra-slim KE5 are also available. For efficient plant expansion, Pepperl+Fuchs offers complete solutions that consist of AS-Interface components and the matching sensor and connection technology.

Highlights

- Cost-effective connection of all I/O signals
- Easy integration into large fieldbus networks with simple piercing connection technology
- Supports the transmitting of power and data on one cable
- Integration of safety components up to SIL 3/PL e without network modification
- Established manufacturer-independent system for investment security



For more information, visit:
www.pepperl-fuchs.com/bf-asi



Interface for Discrete Signals

Simple Integration of Control Technology via Digital Communication



FieldConnex® Multi-Input/Output Fieldbus Junction Box

The FieldConnex® multi-input/output (MIO) allows digital signals of various functions to be connected through a single address to a fieldbus. The device collects the status of up to twelve discrete input signals from NAMUR sensors and connects on/off valves, pulse or frequency transmitters, and vibrating forks to every kind of control system. The MIO is certified for operation in Zone 1 and is available both for DIN rail mounting as well as with enclosure solutions.

The MIO also has built-in breakaway and run-time monitoring for valves, sending an alarm when limits are exceeded. Alternatively, the MIO allows overflow and empty-level monitoring for containers and pipes via vibration limit switches. Diagnostic functions provide users with targeted and predictive maintenance, which allows maintenance intervals to be extended. The result is less unplanned downtime and increased plant efficiency.

Highlights

- Connection of all discrete I/O signals in process automation
- Low installation costs
- Control system integration via FDT/DTM
- Monitors sensor status and installation
- Breakaway and run-time monitoring for valves with alarm function
- Removable terminals
- Housing solutions with many options in aluminum, GRP, and stainless steel

For more information, visit:
www.pepperl-fuchs.com/bf-fieldconnex



Multi-Input/Output for DIN Rail Mounting
Removable screw or spring terminals can be selected.



Multi-Input/Output in Enclosure Solutions
GRP and stainless steel enclosures compatible with FieldConnex® installation components. Delivered prewired, certified, and ready for connection.

Isolated Barriers

Intrinsic-Safety Interface Modules— Easy Integration



Isolated Barriers for DIN Rail Mounting

Safe processes, safe personnel, and easy-to-implement protection designed by the intrinsic-safety experts—this is what the K-System stands for. For mixed applications in hazardous and nonhazardous areas, isolated barriers can be combined with signal conditioners.

The K-System ensures reliable and economical transmission of signals between field devices and the control system. It includes isolated barriers for the hazardous area and signal conditioners for the safe area, and is suitable for mixed applications. K-System modules are mounted on the Power Rail®, a 35 mm DIN rail with integrated power and collective error messages. Power feed modules supply all modules mounted on the DIN rail.

Functional safety up to SIL 3 can be achieved by the use of SN and S1N sensors in conjunction with SH series switch amplifiers from Pepperl+Fuchs.



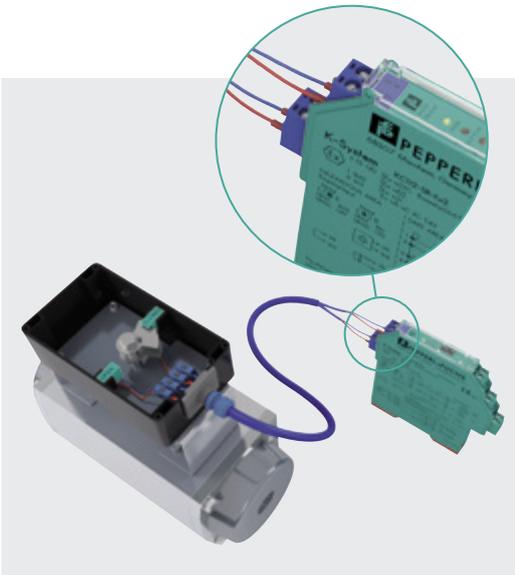
Highlights

- Power Rail for simplified wiring, collective error messages, and flexible installation and expansion
- Modular housing with removable screw terminals
- Simple maintenance with integrated diagnostics and quick module exchange during operation
- Horizontal and vertical mounting with no reduction in operating values
- Standard monitoring of lead breakage and short circuits
- Devices with SIL 2 and SIL 3 classification available

Remote I/O Systems

Remote I/O systems are the right choice for detecting input and output signals in close proximity to field devices. Since the system is installed close to the field device and only one fieldbus cable is needed to connect the remote I/O system to the control system, wiring is reduced considerably. The LB remote I/O system is certified for use in Zone 2, Class I, Div. 2, and nonhazardous areas.



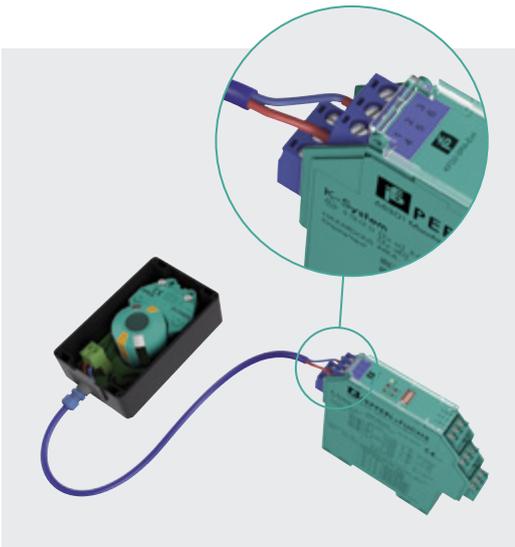


Digital Input Modules

There are many applications for modules with inputs for binary sensors. For example:

- Pressure gauges
- Magnetic immersion probes for level measurement
- Flow measurement via monostable ring sensors
- Position feedback for valves, especially in connection with Pepperl+Fuchs' F25, F31, and F31K series

With standard wiring, both control circuits can be combined with 2-channel switch amplifiers in a small 12.5 mm housing.



K-System with 2:1 Technology—up to 50 % Savings in Wiring Costs

Many applications have two intrinsically safe binary signals at one measuring point. With Pepperl+Fuchs' 2:1 technology, two intrinsically safe signals can be transmitted over one line, saving you 50 % of the wiring costs in the hazardous area. This unique system is ideal for applications where two signals are transferred for each node.

Up to 50 % lower wiring costs.



Safety Applications

For safety applications with a high level of risk for personnel and equipment, SH series safety switch amplifiers are used in combination with safety SN sensors from Pepperl+Fuchs. SN sensors with safety functions are available for a temperature range of -50°C to $+100^{\circ}\text{C}$.

For more information, visit:
www.pepperl-fuchs.com/bf-k-system



Your automation, our passion.

Explosion Protection

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

Industrial Sensors

- Proximity Sensors
- Photoelectric Sensors
- Industrial Vision
- Ultrasonic Sensors
- Rotary Encoders
- Positioning Systems
- Inclination and Acceleration Sensors
- Fieldbus Modules
- AS-Interface
- Identification Systems
- Displays and Signal Processing
- Connectivity