



PERFECTION BY PRECISION

SENSORS FOR PROCESS EQUIPMENT



The modern automated process plant relies on sensors to accurately monitor the open/closed position of ball and butterfly valves, knife gate valves, diaphragm valves, etc. Inductive sensors are also used for accurate and reliable detection in measurement devices such as manometers and flowmeters. Whether in general-purpose or hazardous locations, Pepperl+Fuchs has products for a wide variety of applications in industries that range from the chemical, pharmaceutical, and oil and gas industries.

Also, Pepperl+Fuchs has developed a broad range of products, especially for the food and beverage, pulp and paper, water treatment and wastewater industries.

Due to our experience and expertise in the field of process equipment you can be assured that we will provide you with a perfect solution for all your sensing needs.

Should you have any questions, please do not hesitate to contact us. Our specialists will be glad to help you.

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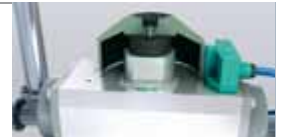
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VALVE POSITION SENSORS – DIRECT MOUNT SENSORS

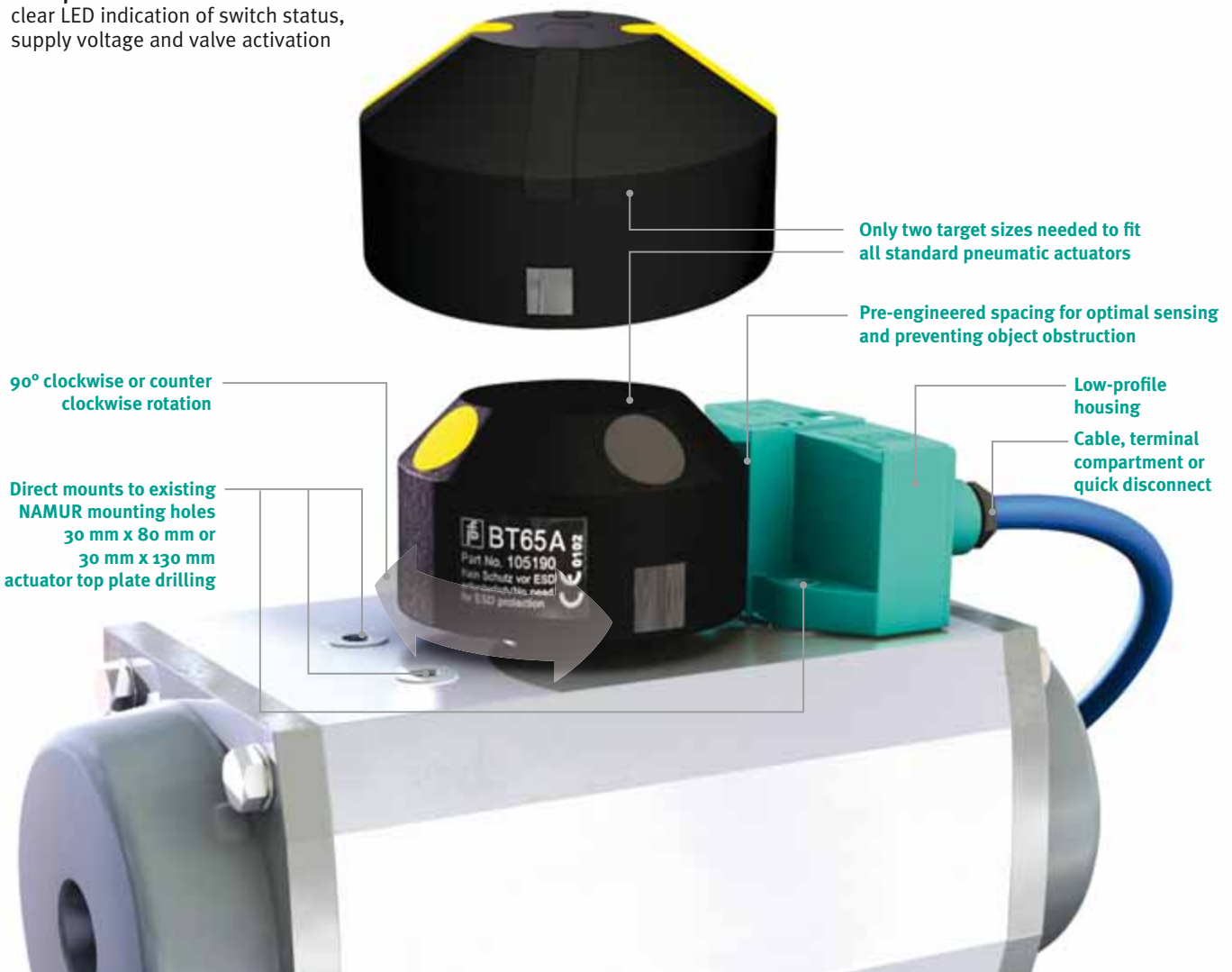
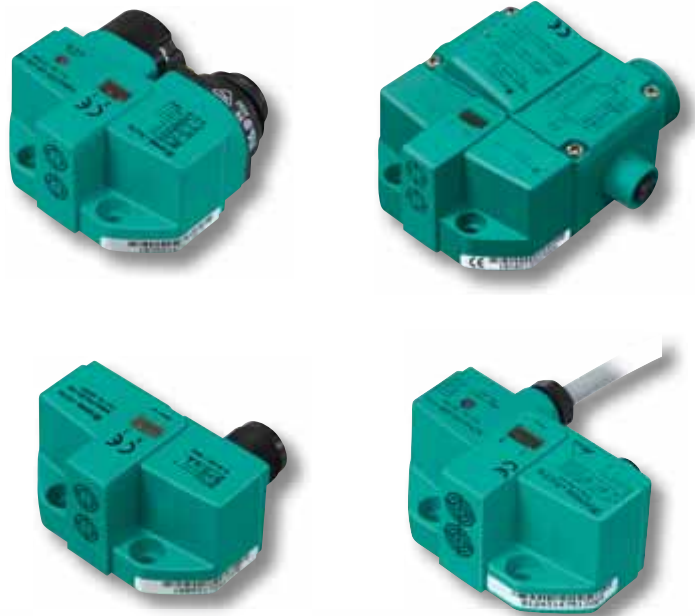
Direct mount valve position sensors minimize space requirements, maintain assured sensing distance, and offer simplicity and sophistication in monitoring and reliability. Designed to meet the requirements of the process valve market, our double sensors mount directly onto the actuator, and targets mount directly to the actuator stem.

SERIES F31/F31K

The F31/F31K series is designed for direct mounting to the actuator in applications where space is limited. Actuator targets are available in two sizes that fit all standard pneumatic actuators.

HIGHLIGHTS:

- **Safe** – no risk for injuries thanks to small detection surfaces
- **Variable** – sensors are compatible with all standard actuators regardless of size or brand
- **Fixed** – round mounting holes in the sensor housing ensure that no adjustment is necessary when installing the sensor
- **Universal** – both clockwise and counterclockwise rotating actuators can be monitored
- **Versatile** – choice between cable connection, quick disconnect and terminal compartment
- **Transparent** – clear LED indication of switch status, supply voltage and valve activation





Cable or quick disconnect

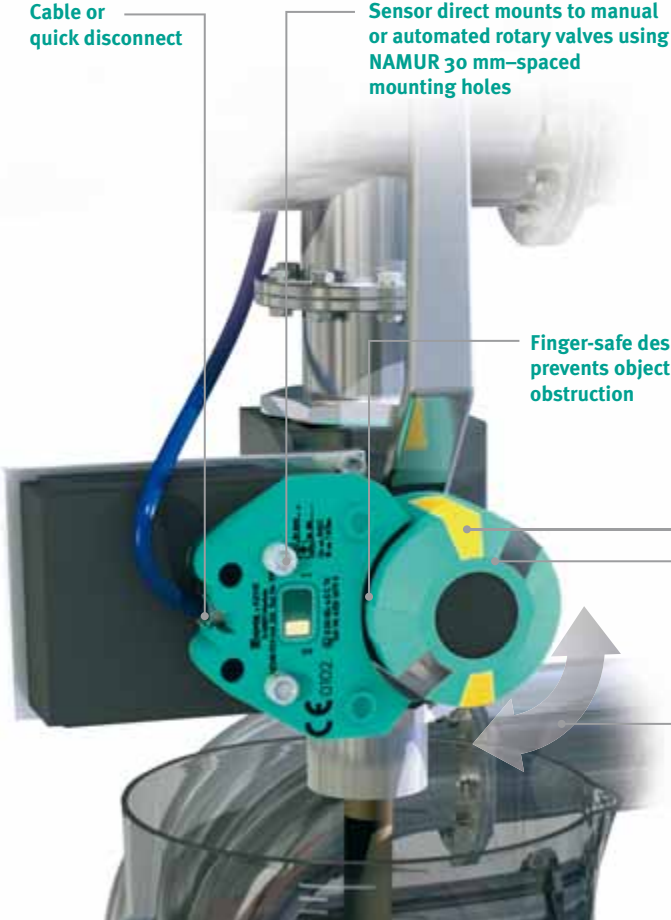
Sensor direct mounts to manual or automated rotary valves using NAMUR 30 mm-spaced mounting holes

Finger-safe design prevents object obstruction

Visual position indicator

Actuator target for position monitoring applications

90° clockwise or counterclockwise rotation



SERIES F25

The F25 sensor series from Pepperl+Fuchs provides an interesting alternative to valve position indicators, especially for hand operated ball valves.

HIGHLIGHTS:

- **Double Sensor** – sensor has 2 active zones
- **Safe** – fingers cannot get caught between actuator and sensor in compliance with the current accident prevention regulations
- **Variable** – mounted directly onto the actuator or valve, or with a bracket
- **Simple** – adjustment-free mounting: maintains accurate sensing distance

Sensor Options	Series F25	Series F31	Series F31K
Highlights	<ul style="list-style-type: none"> ■ Dual sensor ■ Direct mount to all standard pneumatic actuators ■ For use with manual valves 	<ul style="list-style-type: none"> ■ Dual sensor ■ Direct mount to all standard pneumatic actuators 	<ul style="list-style-type: none"> ■ Dual sensor ■ Direct mount to all standard pneumatic actuators
Clockwise or CCW rotation	■	■	■
NAMUR versions	■	■	■
2-wire DC*	■	■	■
3-wire DC*	■	■	■
AC/DC		■	
AS-Interface *		■	■
Solenoid outputs		■	■
Electrical connection option	Cables, quick disconnect	Cables, quick disconnect	Terminal connections

* Sensors also available with Ex-approvals for applications in zone 2/zone 22

DIRECT MOUNT TARGETS

Thanks to the unique concept developed by Pepperl+Fuchs, only two targets are needed for the complete range of modern actuators. One only needs to know if the actuator has a mounting pattern 30 mm x 80 mm or 30 mm x 130 mm. Stem height and diameter are covered automatically.

ACTUATORS FOR SERIES F31/F31K

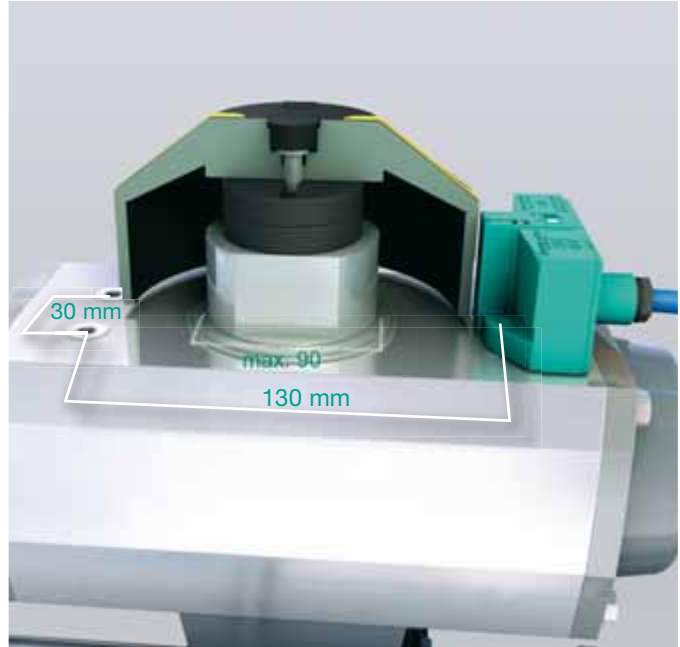
HIGHLIGHTS:

BT65A

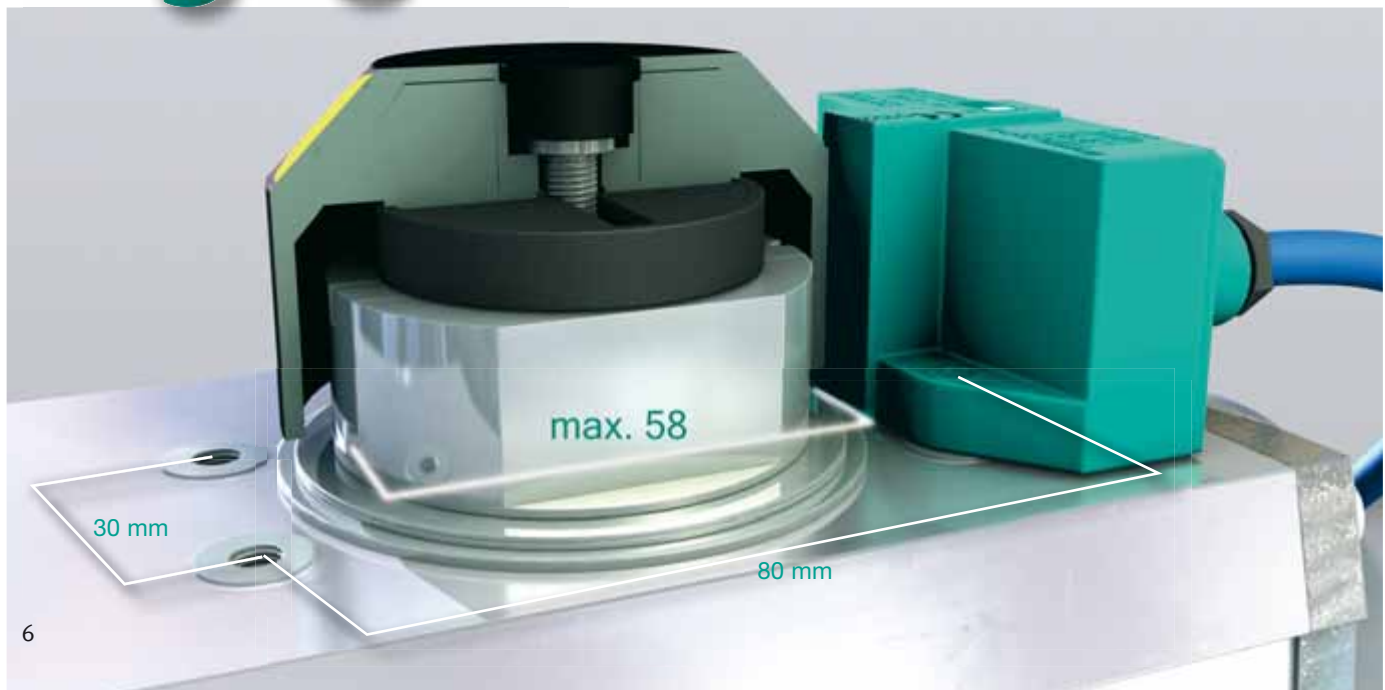
- For standard 30 mm x 80 mm actuator top plate mounting
- For shaft heights of 20 mm and 30 mm (Spacers included in delivery package)
- For shaft diameters up to 58 mm
- For clockwise and counterclockwise rotating drives with 90° and 180° rotational movement
- With four actuating elements (fixed at 90° offset)
- Also available with reversed working direction

BT115A

- For standard 30 mm x 130 mm actuator top plate mounting
- For shaft heights of 30 mm and 50 mm (Spacers included in delivery package)
- For shaft diameters up to 90 mm
- For clockwise and counterclockwise rotating drives with 90° and 180° rotational movement
- With four actuating elements (fixed at 90° offset)
- Also available with reversed working direction



Actuator Target Options	Rotary F25	Rotary F31/F31K
	Non-contact design	Non-contact design
For standard 30 mm x 80 mm actuator top plate mounting	■	■
For standard 30 mm x 130 mm actuator top plate mounting		■
90° rotation CW or CCW	■	■
180° rotation CW or CCW		■
Reversed working direction	■	■
Fully adjustable damping		■
Antistatic (conductive) construction		■



VALVE POSITION SENSORS – BOX SOLUTION

Pepperl+Fuchs has a wide range of sensors applicable for mounting into a customer-supplied enclosure. The sensors are actuated by targets mounted to a rotating stem mechanically coupled to the pneumatic actuator.

CLASSIC BOX SOLUTION

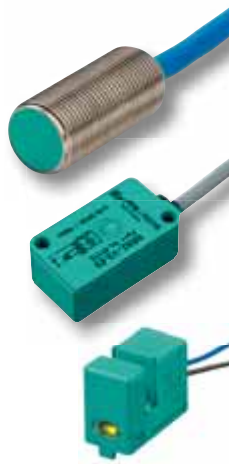
Pepperl+Fuchs has sensors that are easily incorporated into an enclosure. The pneumatic actuator coupled to the switch box enables a target to activate the non-contact sensor. These standard boxes can accommodate different types of sensors:

- Cylindrical sensors with a typical length of 40 mm
- Square-shaped sensors with the standard dimensions of mechanical microswitches
- Slot sensors with a 3.5 mm slot width

Most leading actuator manufacturers offer standard boxes equipped with Pepperl+Fuchs sensors with or without LED.

HIGHLIGHTS:

- **Versatile** – box supports individual connection options
- **Reliable** – system is integrated in a tamper-proof and contamination-proof box
- **Simple** – mounting via preadjusted sensors
- **Standard compliant** – the terminal assignment of process control and instrumentation devices conforms to DIN 45140 Part 1 and the mechanical mounting to VDI/VDE 3845



Sensor Options	Slot	Cylindrical	V3	Circuit Board
NAMUR versions	■	■	■	■
2-wire DC*	■	■	■	■
3-wire DC*	■	■	■	■
2-wire AC/DC		■	■	
SIL3 Functional Safety**	■	■		■
SIL3 Functional Safety** reversed working direction	■	■		
AS-Interface		■		■
LEDs	■	■	■	■

* Sensors also available with Ex-approvals for applications in zone 2/zone 22

** SIL3 only in conjunction with fail safe switch amplifier KFD2-SH-EX1

CIRCUIT BOARD SOLUTION

The board features a terminal compartment for connecting both the sensor and the solenoid. For this purpose, coded, plug-in terminals are provided. LEDs on the dual sensor allow you to monitor the valve position.





VALVE POSITION SENSORS – LINEAR VALVES

Pepperl+Fuchs has sensors for linear valves such as diaphragm valves, knife gate valves, pinch valves, etc.

DIAPHRAGM VALVES

Hygienic linear valves are commonly used in the pharmaceutical industry, as well as in the food and beverage industry. Standard cylindrical or rectangular sensors are often built into the control head of the valve. Depending on the mechanical design of the control head, a custom solution may be considered, with or without bus communication such as AS-Interface.

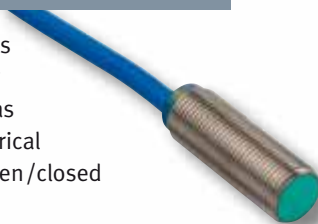


Sensor Options	Cylindrical	V3	Custom-made
NAMUR versions 	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2-wire DC*	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3-wire DC*	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2-wire AC/DC	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
SIL3 Functional Safety**	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
SIL3 Functional Safety** reversed working direction	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
AS-Interface 	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
LEDs	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

* Sensors also available with Ex-approvals for applications in zone 2/zone 22
 ** SIL3 only in conjunction with fail safe switch amplifier KFD2-SH-EX1

KNIFE GATE VALVES

Knife gate valves are used to control viscous fluids and solids. This makes them ideal for the use in pulp and paper industry as well as waste water applications. In general, cylindrical inductive sensors are used to detect the open/closed position of the valve.



VALVE POSITION SENSORS – ANALOG OUTPUT

Through continuous innovation and enhancement of the inductive proximity sensor, Pepperl+Fuchs has created a complete family of position detection and angle measurement sensors.

SERIES F90/F110 – POSITION SENSORS FOR LINEAR TRAVEL APPLICATIONS WITH CONTINUOUS ANALOG OUTPUT

The F90/F110 inductive non-contact proximity sensors are easy to install on pneumatically operated diaphragm valves or linear control valves. F110 series sensors are designed for longer travel distance.

HIGHLIGHTS F90:

- Pepperl+Fuchs supplied target or customized 8 mm steel target
- High resolution and accuracy (< 0.1 mm)
- Choice of adjustable output signals: 4 mA ... 20 mA or 0 V DC ... 10 V DC
- Suitable for outdoor use (IP67, temp range: -25 °C ... +70 °C)



Sensor Options	Linear F90 Series	Linear F110 Series	Rotary F130 Series
Highlights	<ul style="list-style-type: none"> ■ Non-contact design ■ 4 models for stem travel from 48 mm to 120 mm 	<ul style="list-style-type: none"> ■ Non-contact design ■ 5 models for stem travel from 210 mm to 960 mm 	<ul style="list-style-type: none"> ■ For 360° rotation
For direct- or reverse-acting actuators	■	■	■
Analog output 4 mA ... 20 mA or 0 V DC ... 10 V DC	■	■	■
TEACH IN for adjustable output signal and 2 switch set points	■		■
Optional model with three adjustable switch set points	■		■
LED for switch status and power indication	■		■
Power supply 18 V DC ... 30 V DC	■	■	■

SERIES F130 – POSITION SENSOR FOR QUARTER TURN APPLICATIONS WITH CONTINUOUS ANALOG OUTPUT

The F130 is a 360° angle measurement system with a 4 mA ... 20 mA current output as well as two switching points. Zero point, scale and switching points are fully adjustable via TEACH-IN.

HIGHLIGHTS:

- Measuring range adjustable 0° ... 360°
- High resolution and accuracy (< 0.4°)
- Choice of adjustable output signals: 4 mA ... 20 mA or 0 V DC ... 10 V DC
- Suitable for outdoor use (IP67, temp range: -25 °C ... +70 °C)



Pepperl+Fuchs provides reliable and accurate inductive sensors for applications in positioners and measurement devices like flowmeters and manometers for hazardous areas. For critical applications, we have a range of sensors that are SIL3 approved in conjunction with our fail-safe switch amplifier KFD2-SH-EX1.

SLOT SENSORS

The SJ and SC series are used to detect the target presence between the sensor slot walls and are ideal for “vane monitoring” in flow meters.

HIGHLIGHTS:

- **Versatile** – The compact dimensions enable various applications
- **Safe** – Meets functional safety criteria based on IEC61508
- **Easy installation** – The SC series LED enables visual indication to verify functionality



Sensor Options	Slot	Ring
NAMUR versions 	■	■
2-wire DC*	■	
3-wire DC*	■	■
SIL3 Functional Safety**	■	
SIL3 Functional Safety** reversed working direction	■	
Bistable		■
LEDs	■	

* Sensors also available with Ex-approvals for applications in zone 2/zone 22

** SIL3 only in conjunction with fail safe switch amplifier KFD2-SH-EX1

RING-TYPE SENSORS

The RC series from Pepperl+Fuchs has been specially developed to detect materials passing through the ring. These ring-type sensors have inner diameters from 10 mm ... 43 mm with standard or bistable function and a sensitivity designed for common targets.

HIGHLIGHTS:

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

With the Pepperl+Fuchs AS-Interface solutions we are able to provide a simple networking solution that meets the need for low-cost and high-speed digital communications in both hazardous and non-hazardous areas.

AS-INTERFACE SOLUTIONS

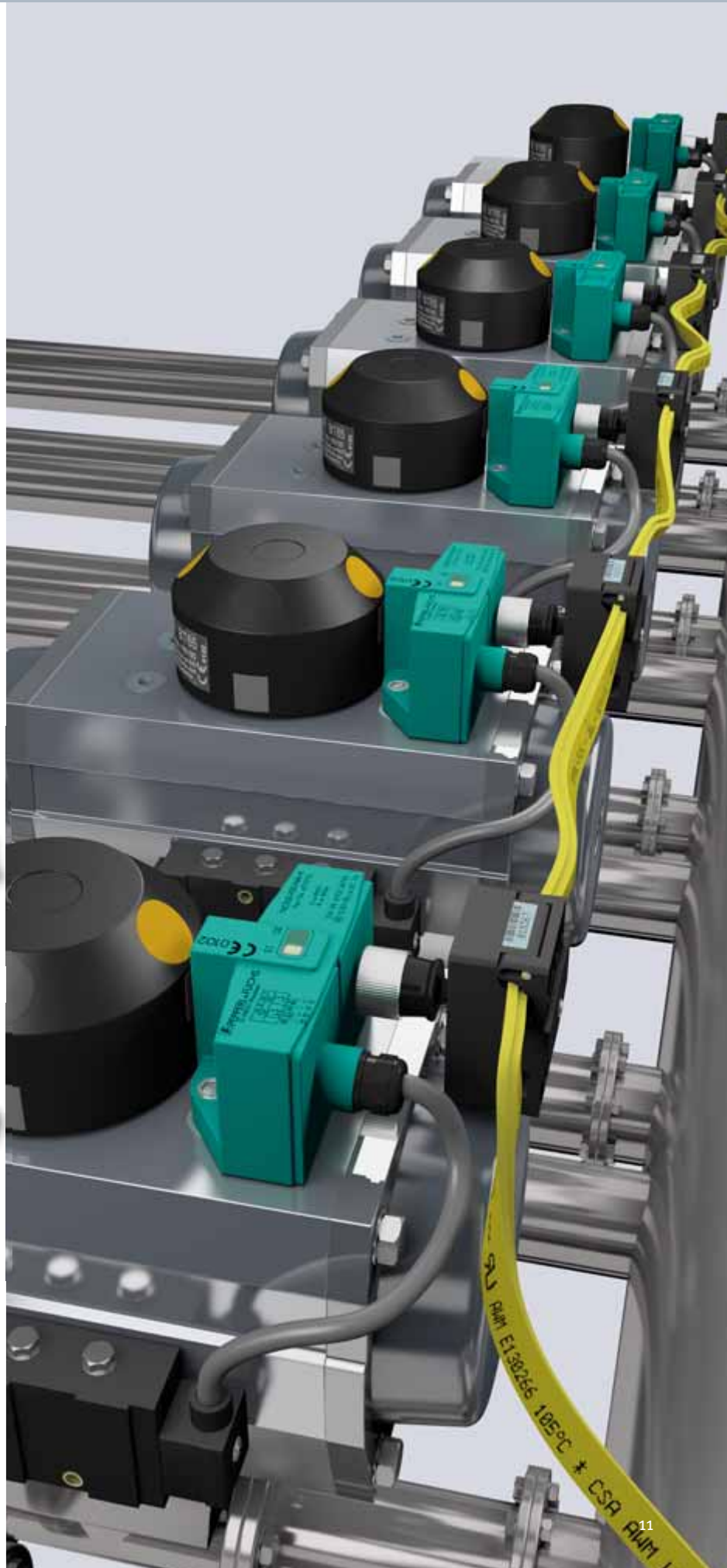
AS-interface is ideally suited for monitoring valve position in both hazardous and non-hazardous areas. By using the certified slave modules, the network can be extended into a zone-1-classified area typically found in the pharmaceutical and chemical industries. Thus, the system can be installed in the field next to the connected components in the potentially explosive area.

HIGHLIGHTS:

- Up to 62 valves can be monitored via one master/gateway module
- Low cost
- High speed – quick and easy to install
- Open standard
- Ex and non-Ex on one network



A wide variety of gateways, field and cabinet mounted modules, pneumatic modules, power supplies, valve position sensors, custom-made solutions and accessories complete the product range.



K-SYSTEM – INTERFACE TECHNOLOGY FOR DIN-RAIL

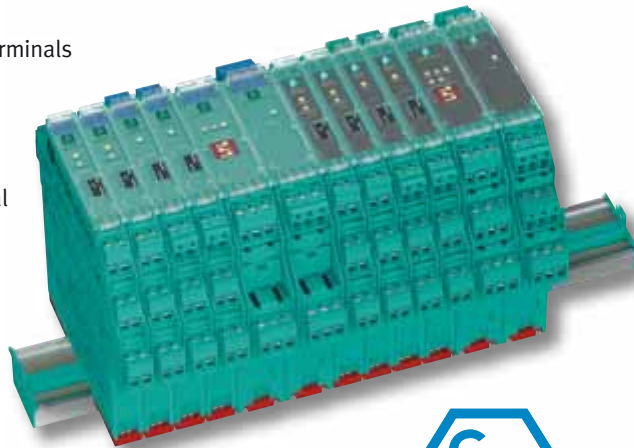
Pepperl+Fuchs is the leading supplier of isolated barriers for intrinsic safety applications and signal conditioners. With its convincing advantages – from the planning stage until startup our K-System guarantees a reliable and economic transfer of signals between the field devices and the control system.

K-SYSTEM – THE WIDEST PRODUCT RANGE FOR ALL KIND OF APPLICATIONS

The K-System modules are suitable for mounting to a 35 mm DIN-rail. K-System is easy to specify, integrate and expand and has become synonymous with safety and reliability.

HIGHLIGHTS:

- Modular housing with removable screw terminals
- Saves time and costs: voltage supply and collective fault message via power rail
- Compact: standard housing widths from 12.5 mm up to 40 mm
- Location independent vertical or horizontal mounting since no ventilation slots are necessary
- Functional safety (SIL2) according to IEC 61508 without added cost
- Standard lead breakage and short circuit monitoring



FUNCTIONAL SAFETY

In addition to reducing safety risks, Pepperl+Fuchs has incorporated SIL2 levels into the standard K-system providing the following additional benefits.

- Uniform documentation – one set of models for all applications
- Worldwide certifications
- Spare parts can be kept to a minimum
- Extensive international support
- Proven technology

SIL3 can be achieved by using Pepperl+Fuchs' SN and S1N sensors in combination with SH series switch amplifiers.



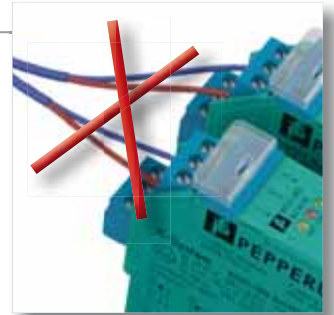
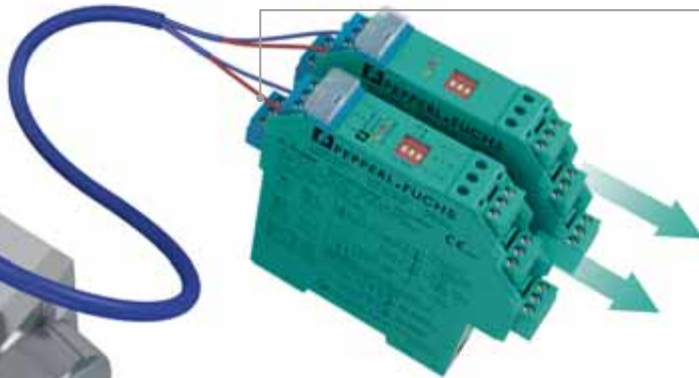
SN sensors with safety function are available for a temperature range from -50 °C ... 100 °C.



SIL
IEC61508



UP TO 50 % SAVINGS IN WIRING COSTS



In many applications there are two binary signals at each measuring station. Pepperl+Fuchs now offers you the option of saving up to 50 % of the cabling costs.

DUAL SIGNAL LOOP NETWORKS – 2:1 TECHNOLOGY

This unique system is ideally suited for applications where two signals are transferred for each node. Examples include:

- Minimum and maximum dial instruments (manometers)
- Magnetic immersion probes in level measurement
- Flow rate measurement via mono stable ring sensors

Position feedback of valves and rotary actuators, particularly in combination with the Pepperl+Fuchs series F25 and F31 dual sensors.



HIGHLIGHTS:

- Up to 50 % reduction in wiring costs for binary signals, e.g. from NAMUR sensors to EN60947-5-6
- With our dual sensors for valve position detection, only one sensor and one loop are needed for both signals.
- Sensors with integrated reverse polarity protection diodes can be operated directly with back to back connection.
- Simple lead monitoring
- Dual loop is available on Pepperl+Fuchs valve couplers that are used in FOUNDATION fieldbus, AS-Interface and PROFIBUS protocols



Measurement devices are suitable for periodic, dynamic processes.

MOTOR DRIVE WITH FREQUENCY CONVERTER/ CURRENT

Devices that monitor the overspeed or under speed condition of a digital signal as well as those that act as a zero speed/standstill monitor are available. Multifunctional devices with frequency-to-current converters or direction monitors support your safety requirements.

HIGHLIGHTS:

- Multifunctional devices
- Wide range of power supplies
- Setup with display and pushbuttons



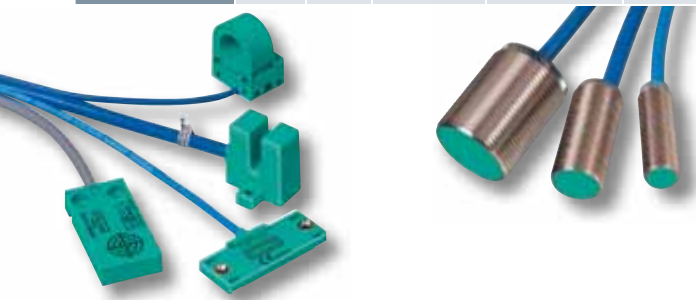
SENSORS FOR HAZARDOUS AREAS

Sensors are essential for the automation of processes in hazardous areas. Apart from the known applications for valve position detection and the monitoring of limit values, Pepperl+Fuchs offers a wide range of sensors for use in hazardous areas, such as inductive, capacitive and photoelectric sensors, safety light curtains and encoders.

INDUCTIVE/CAPACITIVE SENSORS

NAMUR inductive sensors are available in a wide selection of detection ranges, dimensions and rugged housing materials to meet various applications.

Sensor Options	Slot	Ring	Cylindrical	Rectangular	Dual Sensor
Ex i	■	■	■	■	■
Zone 2/22	■		■	■	■
SIL2	■		■	■	■
SIL3	■		■	■	■



MAGNETIC SENSORS

Sensor Options	Cylindrical Housing	V3 Housing
Ex i	■	■



PHOTOELECTRIC SENSORS

Photoelectric sensors are used in a wide variety of industries such as packaging, automotive and material handling.

Apart from the wide range of standard sensors for numerous applications, Pepperl+Fuchs also offers photoelectric sensors for hazardous areas.



Sensor Options	Thru-beam	Retro-reflective	Diffuse	Safety Curtain
Ex i	■	■	■	
Zone 2/22	■	■	■	■



ENCODERS – EX D AND EX I

Rotary encoders provide accurate position measurement and speed feedback. Applications can be found in offshore platforms, packaging machines, etc.



Encoder Options	Incremental	CAN	PROFIBUS	DeviceNet	SSI
Ex d	■	■	■	■	■
Ex i	■				
Zone 2/22	■		■		

CORDSET AND CONNECTION PRODUCTS

Pepperl+Fuchs offers sensors with integral cables or with a quick disconnect. Connectors have the advantage that the sensor can be replaced at any time, saving time and money during maintenance. Wiring mistakes can be eliminated by using pre-wired assemblies. They accommodate oily, dirty and wet industrial environments offering the high protection class IP68/IP69K.

ALWAYS THE RIGHT CONNECTION

When sensors require cordsets or connectors, Pepperl+Fuchs offers products to cover all your applications. When requested, we provide customized solutions.

Bus communication systems very often require specific connectivity products. Pepperl+Fuchs provides you with all necessary accessories to connect your AS-Interface products.



Sensor Options	Straight	Angled	Male	Female	PVC cable	PUR cable	Jumper
M12 field attachable	■	■	■	■			
M12 molded	■	■	■	■	■	■	■
M18 field attachable	■	■	■	■			
RD 24 x 1/8 field attachable	■	■	■	■			
RD 24 x 1/8 molded	■	■	■	■	■		

VALVE CONNECTORS

Our F31 and F31K series dual sensors have a solenoid output. To save time and money, you can connect the solenoid with our sensor using a pre-wired solution. Valve connectors with molded M12 connectors are available in different versions.

	PVC/PUR 0.3 m	PVC/PUR 0.6 m	No LED	LED
Form A	■	■	■	■
Form B/BI	■	■	■	■
Form C/CI	■	■	■	■



FACTORY AUTOMATION – SENSING YOUR NEEDS



Pepperl+Fuchs sets the standard in quality and innovative technology for the world of automation. Our expertise, dedication, and heritage of innovation have driven us to develop the largest and most versatile line of industrial sensor technologies and interface components in the world. With our global presence, reliable service, and flexible production facilities, Pepperl+Fuchs delivers complete solutions for your automation requirements – wherever you need us.

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