Inductive Sensors

Capacitive Sensors
Magnetic Field Sensors

Ultrasonic Sensors

Photoelectric Sensors

Vision Sensors

Position Encoding System WCS

Safety Sensors

Rotary Encoders

Identification Systems

AS-Interface

Logic Control Units

Accessories

VERSATILE AND INDIVIDUAL
PRODUCT OVERVIEW FOR
FACTORY AUTOMATION

PEPPERL+FUCHS
SENSING YOUR NEEDS

As a worldwide leading manufacturer of industrial sensor technology and sensor systems, we are a specialist in the field of Factory Automation with an extensive range of products. The individual products can be tailored to specific application requirements on request.

Our products, which have certification in accordance with ISO 9001, meet the highest quality standards so that they can be used reliably for their intended purpose.

Our sales offices located in all major markets around the world make us the right partner for the global players of Factory Automation. Through our competent contact persons we are able to provide a first-class service around the world. Our local employees have the necessary in-depth product and application knowledge to help you find the solution that best suits your needs.

Target markets:
- Machine and Plant Engineering
- Automotive Industry
- Material Handling
- Print, paper and Finishing
- Packaging Industry
- Process Equipment
- Doors, gates and elevators

Pepperl+Fuchs sets "Signals for the World of Automation".
We invite you to convince yourself of our competence!
Our team of experts is always ready to answer your Factory Automation questions:

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CONTENT

Inductive sensors are the right technical and commercial solution in 99 % of all applications, for the accurate, non-contact detection of metallic objects for ranges up to 100 mm. With Pepperl+Fuchs sensors you are opting for quality and service! Pepperl+Fuchs has already been producing inductive proximity switches for industrial applications since 1958 making them a pioneer in this field. Creativity and decades of experience are the pillars of world-renowned competence in this important product line.

Our inductive sensors are used millionfold in all industrial sectors. The combinations of designs and electrical characteristics are almost inexhaustible.

Inductive sensors

- → Housing made of brass, stainless steel and plastic
- → Reverse polarity protected and tolerant connections respectively
- → Short-circuit and overload resistant outputs
- → Middle or cross LED
- → M8, M12 plug versions or with terminal compartment space
- → Sensors with cable connectors of PVC, PUR or silicon
- → Output in 2/3/4 wire DC, AC, NAMUR and AS-Interface versions
- → 0 or 4 ... 20 mA analog output signal
- → Integrated speed monitor with up to 100 Hz
- → Pressurised sensors for up to 500 bar
- → Approved for gas and dust Ex zones
- → Fixed stop and screwed connector
- → Stainless steel sensing face
- → Reduction factor of 1
- → Protective class up to IP69k (under water and steam jet resistant)
- → Weldable design with PTFE-coated surface
- → Selective switch features for detecting ferrous and non-ferrous materials
- → Safety functions
- → Expanded temperature range: from 40 °C up to +250 °C
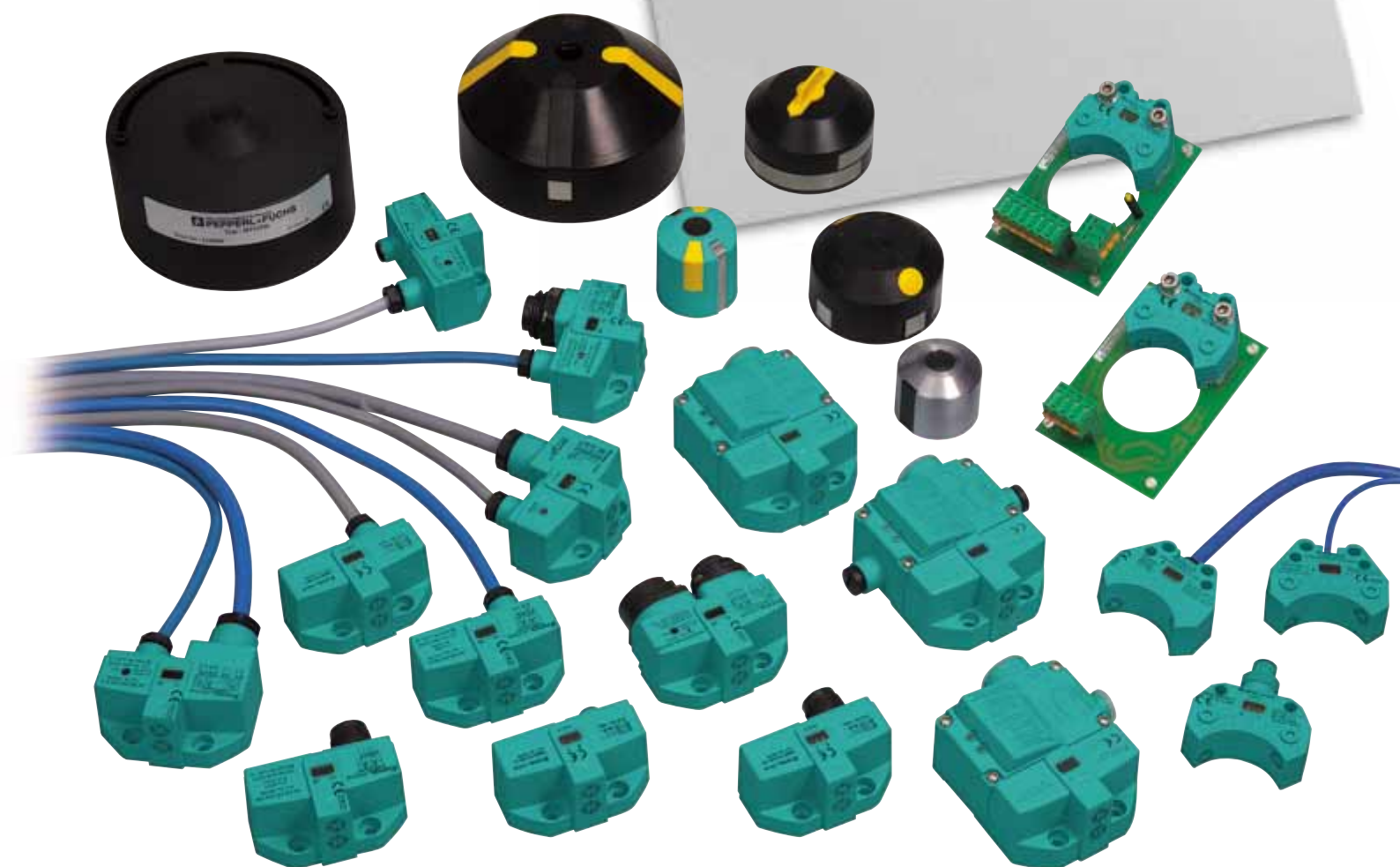- → Length-distance measurement with sensor system F90

POSITIONERS

Positioners are used for monitoring the position of armatures and valves. The positioners of Pepperl+Fuchs combine two devices in a single housing to form a "dual sensor" thereby simplifying installation and reducing maintenance considerably. Due to decades of experience Pepperl+Fuchs has an extensive line of sensors and actuating elements which are as NAMUR versions approved for hazardous areas. Sensors for installation within the "classic box" as well as sensors for "direct mounting" on the actuator are available. Customers have a choice between terminal compartments, connectors or cable connections. The valve can be controlled directly via the sensors thus reducing the amount of installation.
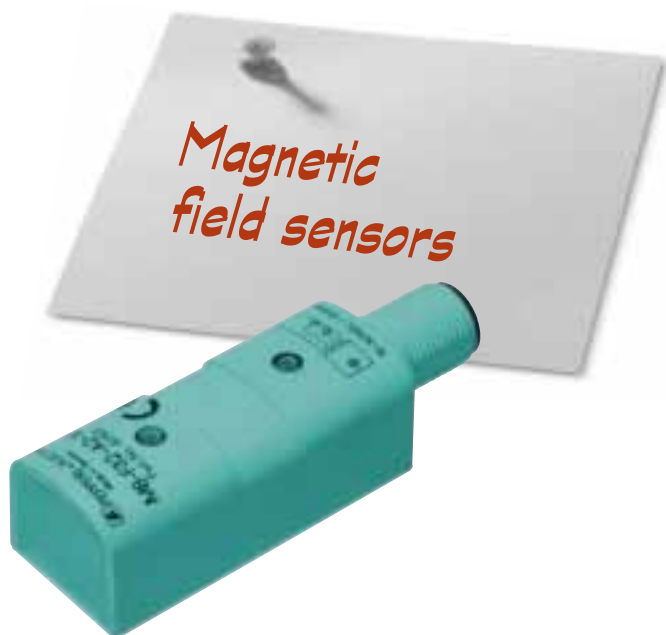
Positioners

—> Direct mounting
—> Installation in a box
—> Circuit board for installation within a box
—> Direct AS-Interface connection
—> Simple and easy installation
—> Integrated valve control

Capacitive sensors

--> Cylindrical housing made of plastic or stainless steel (M12, M18, M30)

--> Super-flat designs with a height of only 5 mm

--> Operating distance of up to 40 mm operating distance for rectangular design 80 mm × 80 mm × 40 mm

--> Approvals for Ex-Zones

Capacitive sensors detect metallic objects as well as nearly all other materials.
They are used in various applications including level or flow control.

Magnetic field sensors

Our magnetic field sensor selection consists of the M12 housing style for traditional magnetic detection applications. Our range also includes a non-contact solution with protective class IP67 for detecting the position of pistons in normal steel cylinders.
The necessary permanent magnets which are attached in small bore holes on the steel cylinder are also available from Pepperl+Fuchs.
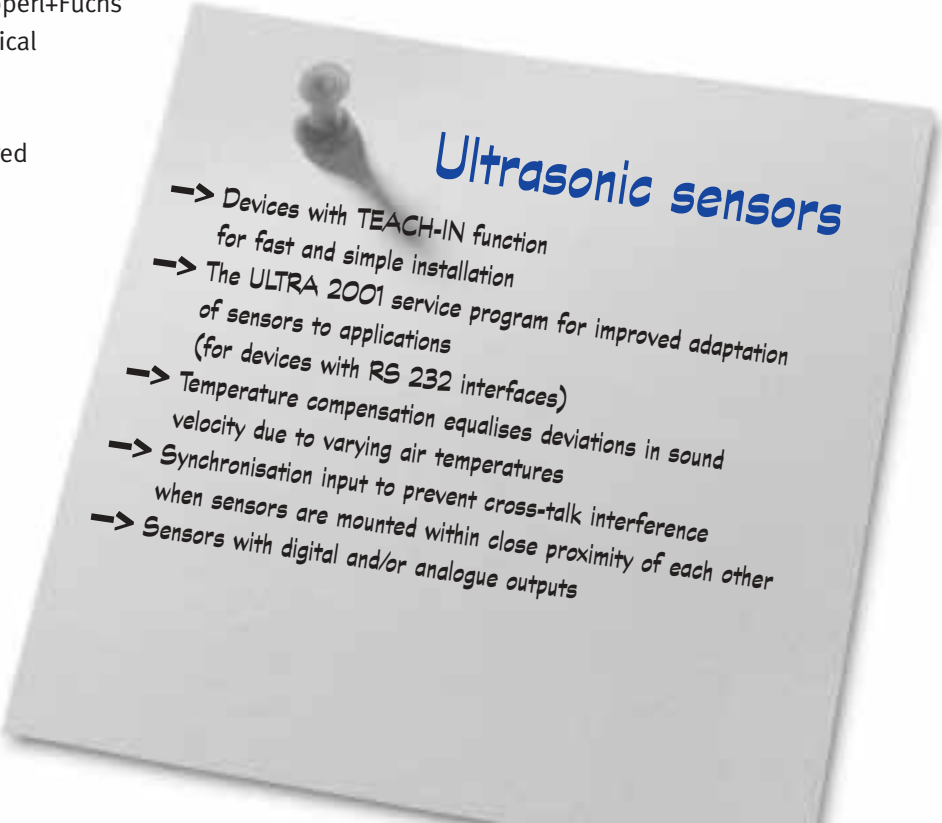
Ultrasonic sensors present the ideal solution for non-contact position and distance measurement in all industrial areas where environmental conditions such as dust, smoke or steam may effect the sensors. Objects consisting of a variety of materials can be detected regardless of colour or shape to within millimetres. The sensor uses very high frequencies that are outside of the human's audible range as a data carrier. The time it takes the ultrasonic wave to pass between the sensor and the object is the value for the distance or the position.

Ultrasonic sensors have proven their reliability and precision especially in the wood and furniture industry, the construction materials industry, farming equipment, construction equipment and in level control applications. However, ultrasonic technology is not only the first choice for applications in rough industrial environments. Ultraschall sensors have also shown their strength in the field of packaging technology, where a wide number of objects need to be detected ranging from small to large, transparent to colourful.

The ultrasonic sensor range of Pepperl+Fuchs encompasses ten different mechanical designs for through-beam, direct detection and reflex operation. Customer-specific solutions – tailored to the specific needs of the application – underscore our technological competence which is characterized by the following features:

Ultrasonic sensors

-> Devices with TEACH-IN function for fast and simple installation

-> The ULTRA 2001 service program for improved adaptation of sensors to applications (for devices with RS 232 interfaces)

-> Temperature compensation equalises deviations in sound velocity due to varying air temperatures

-> Synchronisation input to prevent cross-talk interference when sensors are mounted within close proximity of each other

-> Sensors with digital and/or analogue outputs

Recognition, detection, positioning, classification, counting, notification and monitoring. Nowadays, these processes are largely handled by non-contact photoelectric sensors.

Applications range from the automobile industry, mechanical engineering, and assembly automation, through warehousing and conveyor systems and packaging applications, to the printing and paper industries.

With the VISOLUX brand, Pepperl+Fuchs offers one of the largest lines of photoelectric sensors on the market. We guarantee that you will find the right sensor for your automation applications.

Photoelectric sensors

All possible functional principles:
→ Single-path light beam switches
→ Retro-reflective sensors
→ Direct detection light beam switches
→ Optical fibre devices
→ Print mark sensors and colour sensors
→ Fork-type light beam switches
→ Light grids

Interesting performance characteristics and functionality

Different designs and sizes

The new generation of photoelectric sensors offers the particular added features of **VISO+**, cost effectiveness in supply, rationality in use, and reliability even under critical conditions.

VISO+

→ Especially bright, easily visible display
→ LED green for POWER-ON
→ Modern output stages such as push-pull or AS-i 2.1
→ HF extraneous light interference-resistant
→ Protected against mutual interaction

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Light makes it possible to solve the most difficult detection tasks. These include, for example, measuring distances or data transmission using light. A new field is vision sensor technology for demanding image processing tasks in an increasing number of applications.

Distance measurement units

Electronic distance measurement units work with laser light or high-power LED transmitters and fulfil nearly any needs.

For example, shelf service units and transporters can be positioned to the millimeter with precision and accuracy over large distances. Range measurement to a moving vehicle is also possible.

Data transmission light beam systems

Data transmission light beam systems are used for wireless data transmission using light for bidirectional communication to shelf service units, aisle conveyors, unmanned transport systems or electrical overhead tracks. We have the right solution whether it be for fast data exchange via an 8-bit parallel port or for the Profibus DP!
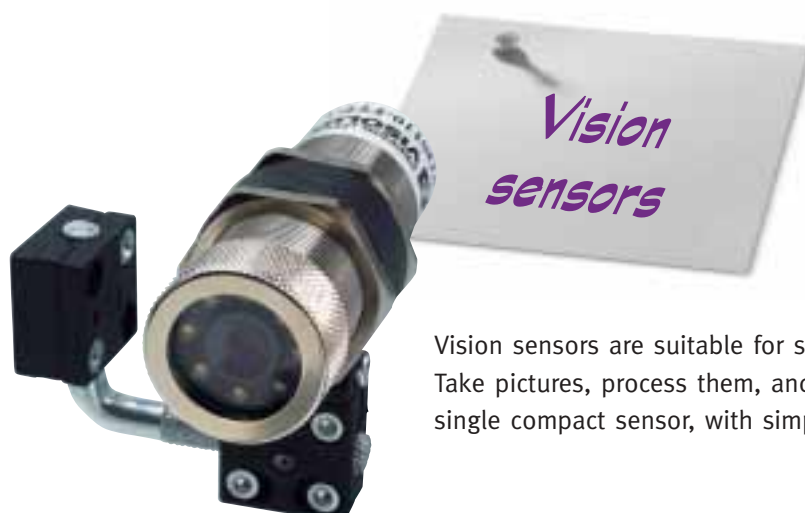
Vision sensors

Vision sensors are suitable for sorting, checking, and evaluating. Take pictures, process them, and deliver results: all functions in a single compact sensor, with simple installation and programming!

The convenient but still safe operation of doors, gates and elevators is the focus of the very extensive product range of Pepperl+Fuchs which is specially designed for this target market. The applications range from the opening pulse generator for automatic doors, power-up control for escalators, monitoring of the entrance areas of industrial doors and gates to the safeguarding of the closing edges of doors in elevators.

opening up possibilities

Elevator light grids
–> for elevator door edge control for more convenient but still safe operation

Microwave motion detector
–> as a flexible opening pulse generator for the door and gate area with direction detection, crossing traffic suppression and "Turtle mode"

Surface optical sensors
–> with a programmable monitoring field as an opening pulse generator and door edge monitoring for automatic doors

Light scanners
–> for detection and safety of personnel with closure of swinging or sliding doors - even in buses and trains

Light barriers
–> with increased range and water tight housing for gate and barrier installations or in an extremely slim housing for mounting in door profiles

Fire protection optical sensors
–> with certification as safety systems for locking systems on fire protection enclosures and fire doors

In order to reach the necessary state of safety when persons or parts of their bodies approach a source of danger, non-contact protective systems are the first choice.

Photoelectric components are used to fulfil protective measures, a fact that is always called for, apart from other possibilities, when the freedom of motion should possibly not be limited.

Safety sensors and contol units

—> All possible functional principles – from the individual safety light sensor to multibeam safety light grid

—> Control units also as a modular system, can be adapted flexibly to the respective application

—> Finger protection, hand protection and body protection

—> Safety category 2 or 4 in accordance with IEC 61496-1 with self-monitoring

—> Diagnosis display allows easy trouble shooting

—> With start and restart inhibit

—> OSSD safety outputs

—> Different muting functions

—> Easy integration in existing machine control

SafeBox

ROTARY ENCODERS

Rotary encoders are necessary in all applications involving the determination of such values as rotation rate, speed, acceleration and course. Primary applications for these sensors are found in mechanical engineering, the conveyor industry, material handling and the packaging industry. Customers are certain to find a suitable device for their application needs from our rotary encoder line. Of course, we are your partner when you need pressure-resistant, intrinsically safe or bus-compatible rotary encoders.

Incremental rotary encoders

Absolute value rotary encoders

Incremental encoders produce a specific number of electrical signals per shaft rotation. The speed of movement is determined by counting these signals for a specific time period. The count represents a measurement of the exceeded angle or the travelled distance by adding the signals beyond a certain reference point. Simply connect a counter or a PLC input card for measurement. Customers may choose a suitable incremental rotary encoder from our extensive product line, which includes many different series of encoders.

Absolute value rotary encoders produce a definite, coded numerical value for each shaft position. Absolute rotary encoders perform counter functions so that subsequent electronics do not have to, thereby eliminating the need for expensive couplers. Complex reference speeds when starting machinery are also unnecessary since the current position value is available at any time. Rotary encoders from Pepperl+Fuchs are available with a large number of interfaces: parallel interface, SSI, AS-Interface, PROFIBUS DP, CAN-open, DeviceNet, Ethernet TCP/IP, Powerlink.

Mechanical designs:
the application area determines the mechanical design.
Pepperl+Fuchs offers a wide portfolio of different mechanical designs, from hollow shaft to recessed hollow shaft to solid shaft. The individual shafts and housing diameters are available in industry-standard sizes.

The automation of material handling plants requires millimetre-accurate information on the position of the transporter or the material handling equipment. With the position encoding system WCS from Pepperl+Fuchs, a reliable and tried-and-tested positioning system is available for the user.

The WCS combines two important features: contactless and absolute.

Two components are sufficient for the positioning in your application –
the code rail and the reading head.
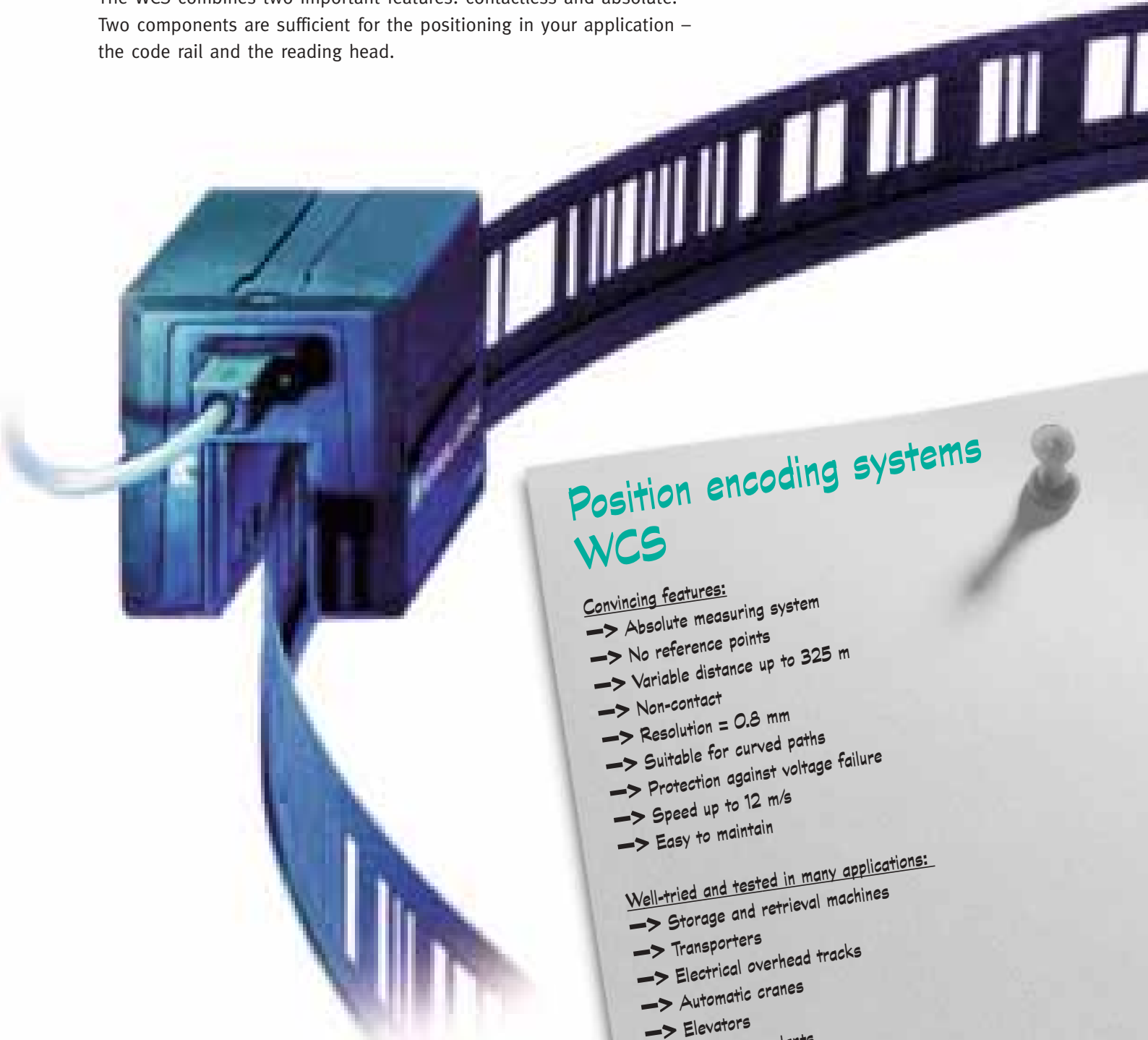
Position encoding systems
WCS

Convincing features:
—> Absolute measuring system
—> No reference points
—> Variable distance up to 325 m
—> Non-contact
—> Resolution = 0.8 mm
—> Suitable for curved paths
—> Protection against voltage failure
—> Speed up to 12 m/s
—> Easy to maintain

Well-tried and tested in many applications:
—> Storage and retrieval machines
—> Transporters
—> Electrical overhead tracks
—> Automatic cranes
—> Elevators
—> Galvanising plants
—> Slewing cranes
—> Lifting devices
—> Vehicle detection

Identification systems are used to identify objects in logistics and to form the first step towards cost optimization and increasing quality: automation of manufacturing processes, reduction of throughput times, quality control, flexibility with configuring the installation and production

The brand name **IDENT** *Control* stands for an innovative identification system which combines the two RFID technologies – inductive and microwave – in a unified operation. The identification system consists of the IDENT Control System with an interface to the Fieldbus, the inductive read/write heads (125 kHz) or microwave antennas (2.45 GHz) and the associated code and data carriers (tags).

- Metal housing for field or switching cabinet use (IP67)
- Connection of up to four inductive read/write heads or microwave antennas
- Interfaces: PROFIBUS, EtherNet, DeviceNet or serial
- Connections are implemented as plugs
- Direct operation via a large display and key functions

- Range for reading and describing the tags: up to 20 cm
- Inductive read/write heads in rectangular and cylindrical design
- Robust and battery-free data carriers in different designs and versions, e.g. in protective class IP69, as a high-temperature carrier (up to 300 °C for 5 min.) or with a memory size of 8 kByte

- Microwave antennas with a read/write distance of up to 4 m and a M12 plug connection
- Robust data carrier with up to 32 kByte of memory
- Multi-tag capability allows several data carriers to be read in the detection-area at the same time

Barcode

Barcode systems scan barcodes and forward the information contained therein e.g. via the PROFIBUS to a control system. Scanning takes place according to the reflection principle by means of ruby light.

The compact readers are available both for near range and for distances with up to a distance of 60 cm – at 1200 scans per second. Generally, barcodes are a fixed code system with minimum costs for the code carrier.

Data Matrix

The two-dimensional Data Matrix Code is up to 1.5 kByte of encoded information in the smallest space.

The special feature: Data Matrix is suitable for directly labelling plastics or metals! The Data Matrix readers capture the code in an image and forward the decoded information after internal evaluation to a higher-level unit. This allows for incredibly high passing speeds and even the information of codes that have been partially destroyed is transmitted reliably. As an extension to the Data Matrix readers, lighting equipment, lenses and evaluation devices are available.

AS-Interface is the standard solution for simple, cost-effective networking of sensors and actuators in the field. In addition to competent advice, Pepperl+Fuchs is also able to offer a complete product family.

AS-Interface

—> Free topology: easily extended, flexible adaptation

—> Works with all field buses

—> Easy, polarity-resistant installation via cable-piercing method

—> Extremely interference immune data transfer on unshielded flat cable

—> Automatic addressing on exchange of devices

—> Extensive diagnostic functions and local display via LED

Masters and gateways

- For PROFIBUS, Interbus, EtherNet, Modbus, DeviceNet, CANopen, CC-Link and serial connection
- With integrated PLC functionality
- For field and switching cabinet installation
- As a single or dual master (for two AS-Interface circuits)
- Enhanced diagnostic functions as well as backlit display with plain text display
- Detection of ground fault and duplicate addressing

Power supplies

- For 2.8 A up to 8 A with overload protection
- Dual power supply for two AS-Interface circuits
- Ground fault detection

Switch on modules

- For field and switching cabinet installation
- For binary and analogue signals
- For the connection of pneumatic valves
- For hazardous areas

Sensors with AS-Interface

- Inductive sensors in many designs
- Optical sensors in many designs
- Rotary encoders
- Limit switches for fill levels

Addressing and diagnosis tools, flat cable and accessories

Technical data of the spec. 3.0	
Access method	Master/Slave
Number of nodes	62 AS-interface slaves (4 input and 4 output modules, analogue modules, sensors)
Address assignment	via Master or with hand-held programmer
Network length	100 m overall length (can be extended with repeaters)
Power supply	approx. 30.5 V DC, max. 8 A total current
Auxiliary energy	24 V DC, max. 8 A total current
Data/message	4 bit bidirectional
Cycle time:	max. 10 ms for the inputs with 62 A/B slaves
Parameter assignment:	possible during current operation
Diagnosis:	possible during current operation

AS-Interface – Safety at Work

According to TÜV certification standards, intrinsically safe system components up to category 4 (as in EN 954-1) or SIL3 (as in IEC 61508) may be connected to an AS-Interface. This can be done on the same flat cable with non-intrinsically safe signals. Cabling costs are minimized and safe input cards are completely unnecessary. A safety monitor dynamically monitors the safety-related nodes. Groupings and logic combinations can be entered in the Windows-based software ASIMON.

ASI INTERFACE
SAFETY AT WORK

When it comes to signal and impulse analysis, Pepperl+Fuchs offers you a broad palette of products.

Counters, Tachometers, Timers

- Display: LED and LCD
- Up to 2 presets with relay or transistor output
- Scalable display values
- Up to 100 kHz frequencies
- Auxiliary power for sensors and rotary encoders
- Designs: 24 x 48, 48 x 48 and 96 x 48 (in mm)

Display devices

- Bright LED display (easily readable at 10 m)
- Scalable over up to 24 mounting points
- 14-bit resolution
- Up to 2 preset values
- Storage of min/max values

Speed monitor

- For example, for checking the motor speed
- As a standstill monitor with an adjustable cutoff frequency via DIP switch

Current frequency converter

- As a measured value transformer of a frequency on current/voltage

Signal converter

- For NAMUR sensors on semiconductor output (npn, pnp)
- For wire sensors with semiconductor output on relay output

Matching mounting accessories as well as accessories for connecting the sensors provide you with an enormous potential for efficiency during installation and adjustment. Diagnostic and installation tools also save time and overhead – not only during initial commissioning but also when service is required!

At Pepperl+Fuchs you will find a comprehensive selection of electrical and mechanical accessories for your sensor system solution:

Accessories

→ Plug connectors in different sizes and versions:
  • M12 (3-pin, 4-pin, 5-pin, 8-pin) or M8 (3-pin, 4-pin)
  • connector or plug straight or angled
  • various cable lengths, e.g. 1 m, 2 m, 3 m, 5 m or 10 m
  • leads: including PVC, PUR, halogen free, screened

→ Mounting aids for rectangular sensors and safety light grids

→ Mounting flanges for cylindrical sensors

→ Passive distributor with M12 mounting stations for sensors and actuators

→ Flexible conduit connectors

→ Matching accessories for each individual product, such as reflectors for retro-reflective sensors or the appropriate connection technology for AS-Interfaces

→ Sensor testers

Are you looking for something definite?

Our service team is ready to answer your questions about Factory Automation:

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Internet: www.pepperl-fuchs.com

FACTORY AUTOMATION – SENSING YOUR NEEDS

Pepperl+Fuchs continously provides new impulses for the world of automation and sets standards for quality and innovative technology. We develop, produce and sell electronic sensors and sensor-systems worldwide. Due to our global presence and the high flexibility in production and services, we offer you individual complete solutions – where you need us. We know what we are talking about – Pepperl+Fuchs is regarded as the company with the world's largest choice of industrial sensor technology for a wide variety of applications.

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