PEPPERL+FUCHS

HISTORY OF PEPPER+FUCHS

In 1945 it all started with this small radio repair shop

1945 The radio technician Walter Pepperl and the banker Ludwig Fuchs found a radio repair shop in Mannheim Sandhofen in November. Very early the founders start the production of transformers. In subsequent years, Pepperl+Fuchs becomes a major supplier for industries based in Mannheim.

1955 The radio shop is given up and the company with 40 employees moves into a new building.

1959 The first proximity switch is developed. This is the start in electronics.

1964 First participation in an important industrial fair (Achema in Frankfurt) with a Pepperl+Fuchs stand.

1968 The first exhibition at the HMI Hannover Messe.

1971 The building in Sandhofen bursts at all seams - time to move again for Pepperl+Fuchs. A new company building is erected in Mannheim-Schönau, a modern factory with 10,000 sqm. The manufacturing of transformers is shut down.

1973 In England the first foreign sales organization is founded. From 1980 on, special units for the English market are produced there.

1976 The legal form of the company changes from OHG (general partnership) to GmbH (private limited company) + Co. KG (limited partnership).

1977 The floor space is doubled by an extension taking into account the special requirements for physically handicapped people.

1979 In Singapore the first non-European affiliated company with production facilities is founded in order to gain access to the Asian market and also to remain competitive in Europe. The first step in globalization is taken.

1988 The company is taken over by Michael Fuchs, the son of Ludwig Fuchs, and Claus Michael, the son-in-law of Walter Pepperl. The legal form changes to a GmbH (private limited company).

1990 The company building in Mannheim-Schönau is extended again.

1991 The divisions FACTORY AUTOMATION and PROCESS AUTOMATION are set up.

1991 Pepperl+Fuchs acquires the company RUF in Mannheim and thus adds level control to the product range.

1993 Certification in accordance with DIN EN ISO 9001 for the first time.

1994 The Pepperl+Fuchs Systems GmbH is sold to Honeywell and the field of fail-safe controls is thus given up in order to concentrate on the core business.

1996 Pepperl+Fuchs acquires the company Hohner in Tuttlingen and rounds off the product range with rotary encoders.

1997 PLAMET Kft. is founded in Hungary to supply plastic and metal parts.

2000 The product range is extended and the market position is strengthened by the acquisition of Visolux GmbH in Berlin (optoelectronic components for automation), the Honeywell/USA divisions of Microswitch proximity sensors and photoswitches to better serve the American market. Finally, the addition of Elcon Instruments in Italy shows a new strategic orientation of the Process Automation Division.

2000 Start of manufacture in Bintan/Indonesia.

2003 Purchase of the purge and pressurization systems from Bebco industries EPS in the USA.

2004 New Data Matrix Code product range obtained through the acquisition of Omnitron AG and Position Encoding System, also due to an acquisition.

2005 Expansion of the Systems and Solutions business area within the Process Automation division with display and operating systems of Extec Oesterle GmbH.

2006 Enlargement of the process automation range by purchase of the intrinsic safety business from Cooper Crouse-Hinds GmbH and of the SAS (separator alarm systems) business from OJ Electronics.Takeover of VMT Vision Machine Technic Bildverarbeitungssysteme GmbH and integration into the Factory Automation Division.

2007 In April the construction of the new administration building is started.

2008 Pepperl+Fuchs celebrates "50 years proximity switch". In May 2008, 175 employees are moving in the new and modern building which offers space for approx. 240 employees on 4 floors with a surface of more than 7.000 sqm.

2010 Pepperl+Fuchs acquires proximity sensor business of Siemens. Herewith, Pepperl+Fuchs increases its product portfolio in the field of inductive proximity sensors and photoelectric sensors, and at the same time strengthens its position in the market for ultrasonic sensor technology for factory automation.

2012 Our European Distribution Center is inaugurated in Mannheim.

2012 Pepperl+Fuchs takes over GOVAN Industries in Melbourne/Australia.

2013 Pepperl+Fuchs acquires distribution partner Sensonor Oy in Finland.

2014 Our Solution Engineering Centers are launched worldwide. Tailor made solutions for explosion control are being developed and supplied ready for installation.

2015 The company is taken over by the next generation, Monika Müller-Michael and Michael Fuchs Jr.

2015 Acquisition of Petroleum Safety Products Ind. in Chennai/India and MACtek Corporation in Twinsburg/Ohio

2015 A new distribution site opened in South Africa.

2016 Our Global Distribution Center is officially inaugurated in Singapore. All goods produced at sites in Asia are stored here and distributed to destinations around the world.

2017 With the takeover of ecom instruments, Pepperl+Fuchs complements the portfolio and the know-how in explosion protection with mobile solutions.

2019 Pepperl+Fuchs changes its legal form into a stock corporation (AG). This is the first step to undertake an incremental conversion into a European Company (Societas Europaea) by 2020.

2020 Pepperl+Fuchs changes its legal form into a European Company (Societas Europaea).

2024 Today Pepperl+Fuchs employs approximately 6,850 people in various locations in Germany, USA, Singapore, Hungary, India, Indonesia, Vietnam and the Czech Republic. With more than 80 subsidiaries, the company is a market leader in the development and manufacturing of electronic sensors and components for the global automation market.

About Us

Automation is our world. Perfect application solutions are our goal.

In 1945, Walter Pepperl and Ludwig Fuchs founded a small radio workshop in Mannheim, Germany, based on the principles of inventiveness, entrepreneurial foresight, and self-reliance. The experience they acquired was transformed into new ideas, and they continued to enjoy developing products for customers. The eventual result was the invention of the proximity switch. This innovation represented the starting point of the company's success story.

Today, Pepperl+Fuchs is known by customers around the world as a pioneer and an innovator in electrical explosion protection and sensor technology. Our main focus is always on your individual requirements: With a passion for automation and groundbreaking technology, we are committed to working in partnership with you now and in the future. We understand the demands of your markets, developing specific solutions, and integrating them into your processes.

Head Office

Germany

Sales 2022
1,010 Mio. EUR

Sectors

- Industrial sensors
- Explosion protection

Field of work:

- Industrial automation and machinery process
- Industrial instrumentation
- Electronic
- Mobility

Country Of Origin

- Germany
- Usa
- Singapore
- Hungary
- Indonesia
- Vietnam
- India


6.200
EMPLOYEES
around the world to assist with all your needs
6
MANUFACTURING LOCATIONS
Unlimited
POSSIBLE SOLUTIONS
offered by our experts around the world
50
LOCAL OFFICES
On six continents
50.000
PRODUCTS
available to solve all your application needs
3
HEADQUARTERS
in Europe, the USA and Asia
670
MILLION €
Revenue
2
FOUNDER FAMILIES
privately own 100% of the company
1
COMPANY
solving every challenge
74
YEARS
since the company was founded in Mannheim, Germany
600+
ENGINEERS
developing tomorrow's solutions today

Competitors

- **PROXIMITY SENSORS: BENTLY NEVADA, HONEYWELL , OMRON , SICK , AZBIL , IFM, TRI-TRONICS**
- **PHOTOELECTRIC SENSORS: HONEYWELL , OMRON , SICK , AZBIL , IFM , Allen Bradley, TRI-TRONICS**
- **RADAR SENSORS: BOSCH , E+H , SICK**
- **ROTARY ENDCODERS: BENTLY NEVADA ,OMRON , BAUMER ELECTRICS , SICK , ABB , YASKAWA**
- **INCLINATION AND ACCELERATION SENSORS: BAUMER , IFM , SICK , BENTLY NEVADA**
- **VIBRATION MONITORING: BENTLY NEVADA , IFM , TRI-TRONICS**
- **INDUCTRIAL COMMUNICATIONS: ABB, ROCKWELL AUTOMATION , SIEMENS , SCHNEIDER , EMERSON**
- **IDENTIFICATION SYSTEMS: OMRON , SICK**
- **INTRINSIC SAFTEY BARRIERS: BENTLY NEVADA , ROCKWELL AUTOMATION, STAHL, SIEMENS, SCHNEIDER, EATON, DWYER, E+H**
- **SIGNAL CONDITIONERS: PHOENIX CONTACT , FUJE ELECTRICK, YOKOGAWA, TE CONNECTIVITY, BRUEAL AND KAJAER, ROCKWELL AUTOMATION, E+H , SICK , TRI-TRONICS**
- **REMOTE I/O SYSTEMS: BENTLY NEVADA , PHOENIX CONTACT, OMRON, STAHL, WEIDMULER,SIEMENS, ROCKWELL AUTOMATION , SICK**
- **HART INTERFACE SOLUTION: PHOENIX CONTACT , EATON , EMERSON , E+H**
- **INTRINSICALLY SAFE MOBILE: BARTEC, SCHNEIDER**
- **HMI SYSTEMS: ALLEN BRADLEY , SICK , GE , STAHL , SIEMENS , HONEYWELL**
- **EXPLOSION PROTECTION: BENTLY NEVADA , BARTEC , STAHL , EATON , ENDRESS+HAUSER**
- **POWER SUPPLIES: BENTLY NEVADA , E+H , SICK , TRI-TRONICS , PHOENIX CONTACT, OMRON**
- **LEVEL MEASURMENT: E+H , ROSEMOUNT, WIKA , ABB , SICK**

Pepperl+Fuchs	SICK Sensor Intelligence	Endress+Hauser Group	Tri-Tronics	Kelzal
Pepperl plus Fuchs is a company that manufactures electronic sensors.	SICK Sensor Intelligence is a company that develops, manufactures, and distributes sensors, scanners, controllers, encoders, and related system solutions for enterprises.	Endress+Hauser Group is a company that supplies measuring instrument products.	Tri-Tronics is a company engaged in providing sensors, encoders, and elevator products.	Kelzal is a company that offers visionary engineering solutions.
Manufacturing & Industrial automation electronic components sensors	Manufacturing & Industrial automation electronic components sensors	Retail cables ecommerce electronics fiber optic routers & switches sensors	Manufacturing & Industrial automation electronic components sensors	Manufacturing & Industrial automation electronic components sensors

Potential Customers

Wide variety of industries in the global market. These include branches like mechanical engineering, automotive industry, material handling, packaging, print and paper industry, doors, gates and elevator construction, process equipment, mobile equipment, and renewable energy. oil and gas industry, petrochemical, chemical industry, pharmaceutical industry, as well as wastewater treatment plants, and power technology.

Iranian Customers

Laleh petro- Khorsan petro- Marun petro- Kermanshah petro- Kurdistan petro- Tabriz petro- Marjan petro- Jampilen petro- Buali Sina petro- khark petro- Abadan oil ref- Pardis petro- Spec- Falate ghare- Bushehr Petro- SPGC- Shiraz petro- Hashemi Nezhad Gas ref- POGC- Isfahan oil ref- Fajr petro- Pars petro

CERTIFICATES

- **ISO Certificates**
  - **ISO 9001**
  - **ISO 14001**
  - **ISO/IEC 80079-34**
  - **DIN EN ISO/IEC 27001:2017**
- **Other Certificates**
  - **Cybersecure Product Development Process**
  - **Functional Safety Management System**

PEPPERL FUCHES DEVIDES INTO 2 SECTORS

INDUSTRIAL SENSORS:

For decades, Pepperl+Fuchs has been developing and distributing industrial sensors and sensor systems with the highest quality standards for use in automation technology. The diverse product portfolio offers sensors for standard applications as well as customized solutions. In close cooperation with our experts, you receive the ideal sensor system for your specific requirements!
Our product portfolio of industrial sensors for factory automation is characterized by a high degree of innovation. It consists of inductive, photoelectric, capacitive, magnetic, and ultrasonic sensors. Additionally, we offer you powerful components such as rotary encoders, positioning and identification systems (RFID, Data Matrix, Barcode), AS-Interface as well as suitable accessories. Industrial vision systems and vision sensors round off the comprehensive product range.

State-of-the-art technologies and a global sales and production network make Pepperl+Fuchs the ideal partner for a wide variety of industries in the global market. These include branches like mechanical engineering, automotive industry, material handling, packaging, print and paper industry, doors, gates and elevator construction, process equipment, mobile equipment, and renewable energy.

Explosion Protection:

Pepperl+Fuchs is a leading supplier of automation equipment for a wide range of industries and has been associated with safety in hazardous areas for decades. Our deep expertise enables us to offer a complete range of automation solutions for the process automation industry.

The product portfolio includes intrinsic safety isolators, Zener barriers, signal conditioners, fieldbus technology, Remote I/O, HART interfaces, level measurement, purge & pressurization systems, Human Machine Interfaces (HMI) for hazardous environments, custom cabinets, and junction boxes.

We provide process industry companies all over the world with proven components and tailor-made solutions for a diverse range of applications. The branches that we cover include the oil and gas industry, petrochemical, chemical industry, pharmaceutical industry, as well as wastewater treatment plants, and power technology.

PEPPERL+FUCHS PRODUCTS AT A GLANCE

- INDUSTRIAL SENSORS
    - Proximity Sensors

        - Inductive Sensors
        - Capacitive Sensors
        - Magnetic Field Sensors
        - Proximity Sensors Accessories
    - Photoelectric Sensors

        - Thru-Beam Sensors
        - Retroreflective Sensors
        - Diffuse Mode Sensors
        - Switching Sensor with Measurement Core Technology
        - Fiber Optic Sensors
        - Slot and Slot Grid Sensors
        - Contrast Sensors+Color Sensors
        - Light Grids
        - Distance Sensors
        - Optical Data Couplers
        - Special Sensors
        - Safety Sensors
        - Sensors for Automated Accesses and Entrances
        - Photoelectric Sensor Accessories
    - Industrial Vision

        - 3-D Vision Sensors
        - 2-D Vision Sensors

- Laser Profile Sensors
- Vision Systems
- Event Cameras

- Ultrasonic Sensors

- Thru-Beam Sensors
- Diffuse and Retroreflective Mode Sensors
- Double Sheet Sensors
- Ultrasonic Sensor Accessories

- Radar Sensors

- Rotary Encoders

- Absolute Rotary Encoders
- Incremental Rotary Encoders
- Cable Pulls
- Rotary Encoder Accessories

- Positioning Systems

- Inductive Positioning Systems (PMI)
- Distance Sensors
- Optical Linear Positioning (WCS)
- Camera-Based Linear Positioning (PCV, PXV)
- Camera-Based Track Guidance (PGV)
- Precision Positioning (PHA)

- Inclination and Acceleration Sensors

- Inclination Sensors
- Acceleration Sensors
- Inertial Measurement Units

- Vibration Monitoring

- Vibration Sensors
- Accessories

- Industrial Communication

- Industrial Ethernet
- AS-Interface
- IO-Link

- Identification Systems

- RFID
- Optical Identification

- Displays and Signal Processing

- Pulse Counter Units and Displays
- Process Displays
- Signal Converters
- Switch Amplifiers

- Connectivity

- Sensor-Actuator Cables
- Field Connectors
- Junction Blocks
- Sensor-Actuator Splitters

        - Valve Connectors
        - Sensor-Actuator Receptacles
        - Data Connectors
        - SFP Transceiver
        - Bulk Raw Cable
    - Accessories

        - Sensor Testers+Tools
        - Cable Protection System
        - Mounting Accessories
        - Reflectors
        - Level Limit Switch
        - Wireless Inductive System WIS
- Explosion Protection
    - Intrinsic Safety Barriers

        - Isolated Barriers (K-System)
        - Isolated Barriers (H-System)
        - Zener Barriers
    - Signal Conditioners

        - K-System
        - SC-System
    - FieldConnex Ethernet-APL and Fieldbus Infrastructure

        - Ethernet-APL

- Advanced Diagnostics
- FOUNDATION Fieldbus H1
- PROFIBUS PA
- Ethernet

- Remote I/O Systems

- FB (Zone 1)
- LB (Zone 2, Class I/Div. 2)

- HART Interface Solutions

- K-System HIS
- H-System HIS
- Accessories

- Surge Protection

- Devices for Signal Line Protection
- Devices for Supply Line Protection
- Devices for Fieldbus

- WirelessHART Adapter

- Intrinsically Safe Mobile Devices

- Mobile Computing
- Communication

- Peripherals
- Portable Lights
- Measurement and Calibration

- HMI Systems

- Industrial Monitors
- Industrial Box Thin Clients and Box PCs
- Industrial Tablet Thin Client
- Thin Client Software
- Engineered Solutions
- Peripherals

- Electrical Explosion Protection Equipment

- Terminal and Junction Boxes (Ex e, Ex i, Ex op)
- Terminal and Junction Boxes (Ex d)
- Control Units (Ex e)
- Control Units (Ex d)
- Control Stations (Ex e)
- Control Stations (Ex d)
- Control and Distribution Panels (Ex d)
- Control and Distribution Panels (Ex de)
- Switch Disconnectors and Safety Switches (Ex e)
- Switch Disconnectors (Ex d)
- Cable Glands and Accessories (Ex d, Ex e, Ex i)
- Enclosures (Ex d, Ex e)
- Signaling Devices and Other Products (Ex d, Ex e)
- Plugs and Sockets (Ex de)

- Purge+Pressurization Systems

- Type X Purge System
- Type Y Purge System
- Type Z Purge System

- Ex pxb Purge System
- Ex pyb Purge System
- Ex pzc Purge System
- Enviro-Line Pressurization System

- Power Supplies

- K-System Power Supplies
- Fieldbus Power Supplies
- PS Industrial Power Supplies

- Level Measurement

- Limit Detection
- Continuous Measurement
- Interface Electronics
- Accessories

PRODUCTS EXPLANATIONS

INDUSTRIAL SENSORS => Proximity Sensors => Inductive Sensors

Inductive Sensors

Inductive proximity sensors are the preferred choice for the majority of applications requiring accurate, non-contact detection of metallic objects in machinery or automation equipment. As a pioneer and market leader, Pepperl+Fuchs offers innovative, high quality inductive sensors to meet the needs of the worldwide automation and process control markets. Our experience, flexibility and customer focus continues to allow us to offer custom designed solutions for the most unique and demanding applications.

Standard Inductive Sensor Product features:

- Smooth or threaded stainless housings
- Polarity reversal and short-circuit protected
- LED status indication
- Connection styles include M8, M12 or terminal connection models
- Models with PVC, PUR or silicon cable
- Outputs in 2-, 3-, 4-wire DC, AC, NAMUR, and AS-Interface versions

Application Specific Inductive Sensor features:

- Analog output models with 4-20 mA output signal
- Integrated speed monitor with up to 100 Hz operation
- Pressure resistant cylinder sensors for up to 500 bar
- Sensors approved for gas and dust Ex zones
- Models with stainless steel sensing face
- Protective class of up to IP68/ IP69k (submersible/ high pressure water jet resistant)
- Weld resistant designs with PTFE-coated surface
- Reduction factor of 1, all metals sensed at same distance
- Exclusive ferrous and non-ferrous detection models
- Safety function sensors
- Extended temperature range: -40 °C up to +250 °C

INDUSTRIAL SENSORS => Proximity Sensors

Capacitive Sensors

Capacitive sensors can be used to detect metal objects as well as nearly all other materials. These sensors are often used in applications including level, flow control for detection of liquids, grains and powders.

Standard Capacitive Sensor Product features:

- 12, 18 and 30 mm cylindrical styles of stainless steel or plastic housings
- 5mm thin rectangular and long range 80 mm x 80 mm x 40 mm styles
- Sensor outputs of 3-wire DC and NAMUR output types
- Models with hazardous area approvals

Magnetic Field Sensors

Our magnetic field sensor selection consists of the M12 housing style for traditional magnetic detection applications. Also offered is a non-contact, piston detection sensor for use with steel hydraulic cylinders. These magnetic sensors offer reliable piston magnet detection and are easily mounted, without the need for mounting slots or holes in the cylinder.

INDUSTRIAL SENSORS => Photoelectric Sensors

Thru-Beam Sensors

The emitter and receiver on thru-beam sensors are aligned opposite one another. The advantage of this is that the light reaches the receiver directly and long detection ranges and high excess gain can therefore be achieved. These sensors are capable of reliably detecting almost any object. The angle of incidence, surface characteristics, color of the object, etc., are irrelevant and do not influence the functional reliability of the sensor.

Retroreflective Sensors

The emitter and receiver are aligned in a housing such that the retroreflective sensors are easy to install. Simply position a reflector on the opposite side and align the sensor with it. The standard version featuring a polarization filter combines the installation benefits offered by the retroreflective system with the reliable detection, even of reflective objects, at long detection ranges. The retroreflective sensors for clear object detection are ideal for reliably detecting transparent objects.

Diffuse Mode Sensors

Diffuse mode sensors are particularly easy to install, since only one device has to be fitted and no reflector is required. These sensors operate primarily at close range, feature optimum switching accuracy, and can reliably detect even very small objects. The sensors with background suppression sense only a specific area in front of the sensor. The sensor ignores any objects that are outside of this area. Sensors with background suppression are also insensitive to interfering objects in the background and are still extremely precise. Sensors with background evaluation are always used in applications with a fixed background in the measuring range with which you can align the sensor.

Switching Sensors with Measurement Core Technology

Switching sensors with measurement core technology are based the Multi Pixel Technology (MPT) developed by Pepperl+Fuchs. Thus, multiple operating modes and switching points are easily set up in a single triangulation sensor. These photoelectric sensors can be configured as background suppression sensors, background evaluation sensors, and in window operation mode. Additionally, the sensors are equipped with a standard IO-Link interface which enables users to easily integrate them into versatile applications.

Fiber Optic Sensors

Fiber optic sensors and cables are the perfect solution for applications where the direct mounting of sensors is not possible due to space restrictions, temperature extremes, and so on. Small fiber optic beams are ideal for detecting tiny objects.

Slot and Slot Grid Sensors

With a fast response time, the devices are ideal for detecting tiny objects from long distances. They are frequently used to detect objects on vibrating and oscillating conveyors. Slot grid sensors handle challenging counting and monitoring tasks such as detecting non-guided objects in free fall.

Contrast Sensors and Color Sensors

In the automation of packaging and printing processes, the reliable detection of print and color marks plays a key role in coordinating the various processing steps. Photoelectric contrast sensors are specially designed for such detection tasks.

Light Grids

Light grids are ideal for applications where wider areas need to be monitored. Light grids are much easier to mount, install, and align and are therefore preferred to multiple individual photoelectric sensors. Application areas range from controlling the width, height, and profile of pallets in material handling facilities to detecting position-independent objects, controlling overlap on larger conveyed goods, and monitoring elevator doors.

Distance Sensors

Even the smallest model is suitable for a wide range of measuring and positioning tasks. It operates using laser triangulation and an analog output. All other sensors from the VDM series use Pulse Ranging Technology, offer long sensing ranges, and achieve extremely accurate measurement results. PRT uses high-intensity light pulses to provide a high degree of operating reliability, even under difficult ambient conditions with exposure to ambient light and dust.

Optical Data Couplers

The optical data couplers were designed to establish wireless communication with stock feeders, industrial trucks, automated transportation systems, overhead conveyors and docking stations. Mechanical and problematic RF- and Wi-Fi-based transmissions are avoided as a result. Devices with a variety of operating ranges and transfer rates are available.

Special Sensors

Pepperl+Fuchs developed a number of industry-specific special devices for applications that are functionally not covered by the standard program. The application-specific sensors offer completely new possibilities in optical sensor technology for the user searching for the “right" solution.

Photoelectric Safety Sensors

Personnel protection is becoming increasingly important in automated processes. Wherever machines perform high-risk movements, the relevant health and safety regulations must be observed. Even if the operator is momentarily distracted, shearing, crushing, and impact injuries must be prevented.

Sensors for Automated Accesses and Entrances

Nowadays, it is hard to imagine life without escalators, automatic doors, gates, barriers, and elevators. As if by magic, they open automatically, detect obstacles, and appear to react quite naturally to approaching people and objects.

Photoelectric Sensor Accessories

An extensive selection of accessories complements our photoelectric sensors product line, with application-specific fiber optic cables, mounting brackets, and a broad range of reflectors.

INDUSTRIAL SENSORS => Industrial Vision

Industrial vision is one of the key sensor technologies of the future. The sensors and systems available from Pepperl+Fuchs range from vision sensors to system solutions that are customized according to the needs of your specific application. From the rack fine positioning of automated storage and retrieval systems to sheet verification in print post-processing, Pepperl+Fuchs offers vision sensors that are designed for your specific applications. Light section sensors based on unique SmartRunner technology enable rugged solutions for reliable presence, completeness, and position detection, even for low-contrast objects and in a wide range of lighting conditions.

The specialists at VMT Bildverarbeitungssysteme GmbH, a Pepperl+Fuchs Group company, work with customers to develop the requirements profile and implement highly complex, innovative image processing and laser sensor systems, and complete solutions for sensor-based robot guidance and path correction.

3-D Vision Sensors

The 3-D sensors of the SmartRunner Explorer 3-D series are made for goods inspection on conveyor belts or for pick-and-place applications in robotics. The 3-D vision sensor delivers high-precision 3-D point cloud images in addition to 2-D images, and is available with stereo vision technology or time-of-flight (ToF) technology. Commissioning is performed with the intuitively operable ViSolution software—regardless of what technology or sensor version you choose.

2-D Vision Sensors

Pepperl+Fuchs offers application-specific vision sensor solutions for different fields of application. The sensors are ideal for a wide range of applications such as positioning, tracking, feature recognition, quality control, camera-based identification and optical measurement. Due to their flexible applicability, the universal vision sensors close the gap between simple 2D vision sensors and costly vision systems.

Laser Profile Sensors

Laser profile sensors from Pepperl+Fuchs feature optimal precision and reliability, regardless of surface structure, contrast, and color. Laser profile sensors are perfect for detecting, monitoring, and protecting even the smallest objects.

Vision Systems

Vision Systems represent the most complex stage in image processing and are adapted to the specific customer requirements of the application. VMT Bildverarbeitungssysteme GmbH is the competence center for vision systems.

Event Cameras

The event camera (IP65/- 30° to + 50°C) continuously records the last 60 seconds of the video stream. It provides a 24/7 live view of your application as well as an internal ring buffer to capture a video recording 60 seconds before and after a trigger event. Digital hardware input

allows easy integration for event recording and improved error analysis. Full HMI integration is possible thanks to REST API.

INDUSTRIAL SENSORS => Ultrasonic Sensors

In industrial applications, ultrasonic sensors are characterized by their reliability and outstanding versatility. Ultrasonic sensors can be used to solve even the most complex tasks involving object detection or level measurement with millimetre precision, because their measuring method works reliably under almost all conditions.

No other measuring method can be successfully put to use on such a wide scale and in so many different applications. The devices are extremely robust, making them suitable for even the toughest conditions. The sensor surface cleans itself through vibration, and that is not the only reason why the sensor is insensitive to dirt. The physical principle—the propagation of sound—works, with a few exceptions, in practically any environment.

The measuring method employed by ultrasonic sensors has been viewed as an excessively complex technology, and only used as a “last resort” ... as a solution for particularly difficult applications. Those times have long since passed!

Ultrasonic sensors have proven their reliability and endurance in virtually all industrial sectors.

These sectors include:

- Mechanical engineering/machine tool
- Food and beverage
- Woodworking and furniture
- Building materials
- Agriculture
- Construction
- Pulp and paper
- Material handling
- Level measurement

Diffuse and Retroreflective Mode Sensors

Ultrasonic sensors are most commonly used in the diffuse mode. A single ultrasonic transducer is used as both emitter and receiver and is typically contained in the same housing as the evaluation electronics.

To reliably detect difficult objects, the majority of our diffuse mode sensors can be converted to retroreflective operation via software parameterization. Some ultrasonic sensors are supplied as retroreflective sensors from the outset.

Thru-Beam Sensors

Ultrasonic thru-beam sensors feature an extremely powerful acoustic beam. They offer a large detection range within compact housing dimensions. Unlike diffuse and retroreflective models, these sensors do not continuously switch between transmission and reception modes or wait for an echo signal to arrive. Thus, their response time is considerably faster, resulting in very high switching frequencies.

Double Sheet Sensors

Double sheet sensors are ultrasonic thru-beam sensors that have been optimized specifically for sheet feed applications, including double sheet detection, label counting, and splice detection.

Double sheet and double material sensors distinguish between empty gaps, one, and two layers of material, including paper, metals, wooden boards, and glass panes.

When performing label detection tasks, the sensors can distinguish between the label backing and the base material.

Ultrasonic Sensor Accessories

Compatible accessories offer enormous potential for cost savings. Not only do you save a great deal of time and effort when installing the sensors, but also when servicing them. If products are used in harsh ambient conditions, appropriate Pepperl+Fuchs accessories can be used to extend the service life of the sensors.

INDUSTRIAL SENSORS => Radar Sensors

Industrial radar sensors from Pepperl+Fuchs use electromagnetic waves or radar waves as a physical principle. These radar waves have special properties that make them ideal for automation applications where other sensory principles reach their limits: They are insensitive to interference, propagate close to the speed of light, and are reflected to varying degrees by virtually all materials. At the same time, they are able to penetrate most materials to some degree.

Pepperl+Fuchs industrial radar sensors take advantage of these properties and continuously transmit a frequency-modulated radar wave in the ISM band range from 122 to 123 GHz. This functional principle, known as FMCW radar (frequency modulated continuous wave), makes it possible to cover a wide range of functions with just one type of radar sensor. For example, both distance and speed measurements can be carried out at a distance of more than 25 meters and the direction of movement of target objects can also be detected—without environmental influences such as rain, fog, wind, or dust having a relevant impact on the accuracy of the measurement results.

Three measurement modes allow nearly limitless freedom:

Closest distance: material-independent detection of the object closest to the radar sensor

Best reflection: Detection of the object with the best reflection properties, even through interfering objects

Fastest velocity: Detection of the object moving fastest towards or away from the radar sensor

Radar Sensors for Mobile Machines

With sampling rates of up to 200 Hz, E1-comparable EMC values and an integrated CAN interface (CiA-301-compliant), radar sensors from Pepperl+Fuchs are particularly suitable for integration in mobile machines (e.g., mobile crane, road construction, agricultural machinery). Vehicle-typical connections such as AMP Superseal or DEUTSCH ensure reliable and tight connections at all times. But radar sensors also offer a reliable solution in other application areas, such as collision avoidance for automated guided vehicles (AGVs) on forklifts or even for fill level monitoring in tanks.

INDUSTRIAL SENSORS => Rotary Encoders

Rotary encoders are required wherever physical quantities such as rotational speed, angle of rotation, velocity or acceleration are to be monitored. In combination with cable pulls, they can also measure linear movements and lengths.

Rotary encoders from Pepperl+Fuchs are used in a wide variety of industries—from mechanical and plant engineering to material handling and the renewable energy sector. Whether heavy-duty, offshore or hazardous areas: Pepperl+Fuchs offers the right incremental or absolute rotary encoder for all application requirements. The portfolio is built on several established basic technologies:

Optical vs. Magnetic Scanning

High resolutions can be easily achieved with Pepperl+Fuchs optical rotary encoders. A code disk with radial slits is used for this purpose. An LED sends light through the radial slits to a receiver

located on the other side of the code disc. The rotation of the disk modulates the light, and the receiver converts it into an electrical signal.

The magnetic rotary encoders from Pepperl+Fuchs are particularly robust and therefore ideally suited for use in harsh environments. Due to energy harvesting, the magnetic absolute rotary encoders do not require an external power supply to save their current position. As a result, they perform reliably even in the event of power failures.

Rotary Encoders with Bearing vs. Bearing-Free Rotary Encoders

In addition to rotary encoders with integral bearing, Pepperl+Fuchs also offers a selection of bearing-free rotary encoders. These sensors enable particularly space-saving installation due to their low mounting depth. Thanks to noncontact and wear-free scanning, they also ensure reliable operation even in harsh environmental conditions.

Absolute Rotary Encoders

Absolute rotary encoders are used wherever precise control of motion sequences is required. Pepperl+Fuchs offers a comprehensive portfolio of absolute rotary encoders that provide information for complex control tasks.

Incremental Rotary Encoders

Incremental rotary encoders from Pepperl+Fuchs have a very high resolution of up to 50,000 pulses per revolution. By detecting rotation angles and speeds, they enable precise control of rotary movements.

Cable Pulls

Cable-pull rotary encoders are used for linear position measurement. The modular portfolio from Pepperl+Fuchs offers a wide range of variants—for reliable processes in almost any application.

Rotary Encoder Accessories

Only perfectly matched connection and mounting technology ensures optimal integration of rotary encoders. Pepperl+Fuchs offers the right accessories for every installation environment.

INDUSTRIAL SENSORS => Positioning Systems

Whether high precision, ruggedness, or cost efficiency: the requirements for positioning systems are diverse. To meet these demands perfectly, Pepperl+Fuchs offers a number of solutions and combines the benefits of optical, camera-based, and inductive positioning systems in one portfolio.

Inductive Positioning Systems (PMI)—Noncontact positioning and angle measurement

Distance Sensors—Reliable positioning for material handling

Position Encoding System—Rugged positioning over long distances

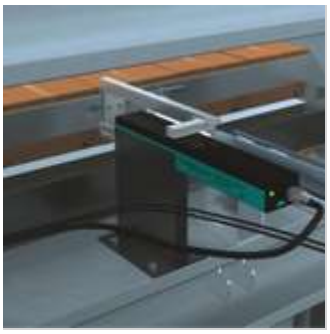
Camera-Based Linear Positioning—High reliability for long-distance measurement

Camera-Based Track Guidance—Reliable navigation of driverless transport systems

Precision Positioning—Cost-efficient, precise positioning of stacker cranes

Electronic CAM Switch Controller (PAX)

Inductive Positioning Systems (PMI)



With noncontact technology, the patented inductive positioning systems (PMI) are especially rugged. They reliably detect linear positions and angles, even in dusty or dirty environments and where there are extreme temperature fluctuations. With inductive technology, no special target is needed—only a simple, steel actuator element. The result is an unlimited range of applications, e.g., detection of crane boom position or metal part positioning in machine building. The PMI inductive positioning system is available in various designs and can be easily integrated into any application layout.

Distance Sensors

Distance sensors from Pepperl+Fuchs are based on innovative Pulse Ranging Technology (PRT) and are used for accurately positioning stacker cranes and shuttles. They are an ideal solution for material handling applications that require many articles to be transferred in a short time and for other applications such as those in automotive manufacturing or electroplating. PRT enables the distance sensors to work with high precision. Distance sensors for positioning tasks include the VDM100 and VDM28.

Optical Linear Positioning (WCS)

The photoelectric WCS position encoding system is rugged and perfect for harsh conditions, even in outdoor areas. It consists of a metal or plastic code rail combined with photoelectric sensors for scanning. With code rail lengths of up to 629 m, the position encoding system is suitable for long distances. Even when there are curves, declines, dips, and lane changes, the WCS reliably detects the exact position. Pepperl+Fuchs offers a special outdoor version for use in areas such as ports.

Camera-Based Linear Positioning (PCV, PXV)

The PXV and PCV Data Matrix positioning systems and the safety absolute positioning system (safePXV) combine a 2-D camera system with multi-redundant Data Matrix code tape. This combination enables precise position detection and is suitable for use in warehouse and conveyor systems or lifting and elevator systems. With code redundancy and large reading windows, the Data Matrix positioning systems reliably detect position even if the code tape is dirty or damaged. With a code tape length of up to 100 km, they are also suitable for expansive installations. The safePXV enables safe absolute positioning according to SIL 3/PL e for the first time with just a single sensor.

Camera-Based Track Guidance (PGV)

The optical position guided vision (PGV) positioning system combines route tracking via colored tape and accurate positioning via Data Matrix codes in one device. It is an ideal solution for the reliable navigation of automated guided vehicles (AGVs), whether in material handling or automotive manufacturing applications. Due to its large reading window, PGV reliably detects colored route tracking tape and paint, even around tight curves or if tape is dirty. In addition, Data Matrix codes can be used for turning, accurately positioning an AGV, and other tasks. The safety absolute positioning system (safePGV) enables safe absolute positioning according to SIL 3/PL e for the first time with just a single sensor.

Precision Positioning (PHA)

The optical PHA positioning system has been specially developed for precise positioning in high-bay warehouses. The PHA's unique camera system uses existing drill holes in rack systems for positioning. This means no additional targets are necessary. With internal illumination and contrast compensation, PHA positions independently of interferences such as dirt, ambient light, or material fatigue. With a temperature range down to -30 °C, PHA can even be used in deep-freeze warehouses.

INDUSTRIAL SENSORS => Inclination and Acceleration Sensors

Whether leveling cranes, monitoring front-loader tilt, or controlling elevators—there are many applications for Pepperl+Fuchs' inclination and acceleration sensors. They ensure precise

measurements, even in harsh conditions. An innovative, two-piece mounting concept makes the F99 series extremely robust: a rugged metal mounting bracket provides the sensor module with impact protection and enables quick and easy replacement of the sensor module if needed. Once installed, the bracket can stay in place without need for new adjustment or calibration. With its corrosion-resistant aluminum housing, the one-piece F199 inclination sensor is just as robust and measures inclination from 0 to 360° with ±0.15° accuracy.

Our inclination and acceleration portfolio offers sensors for each of your needs.

Inclination Sensors

Pepperl+Fuchs' inclination sensors reliably detect inclination angles in factory automation and mobile equipment applications. They are an ideal solution for leveling mobile work platforms, for instance. The sensor continuously monitors the platform's incline and indicates when readjustment is necessary.

Acceleration Sensors

F99 series acceleration sensors monitor strong vibration and acceleration in plants. This makes them an ideal solution for monitoring a wind turbine installation. When a set mechanical vibration limit is exceeded, the system shuts off to avoid damage.

Inertial Measurement Units

The IMU F99 inertial measurement unit has been specially developed for inclination and acceleration detection in dynamic applications. It provides 360° measurement along three axes. An intelligent Sensor Fusion Algorithm compensates for external acceleration and opens up new possibilities.

INDUSTRIAL SENSORS => Vibration Monitoring

From milling machines to pumps to wind turbines—when condition monitoring of machines and plants is necessary, vibration monitoring products by Pepperl+Fuchs help to prevent unplanned downtimes and to ensure personnel and plant protection.

Vibration Sensors

In any plant where vibrations occur, condition monitoring and predictive maintenance play a crucial role in ensuring personnel and plant protection. The vibration sensors by Pepperl+Fuchs feature a particularly large measuring range capable of measuring vibrations of up to 128 mm/second.

Accessories

Discover helpful accessories that include a metal conduit and a protective rubber sleeve to protect the vibration sensors from extreme weather conditions.

INDUSTRIAL SENSORS => Industrial Communication

Fully Networked Communication Ensures Efficient Processes

It is hard to image a time without reliable data flow and transparent communication regarding all production processes. The main objective of industrial communication is to connect all sections of a plant in a single networked system, from the management level right down to the field level. After all, using end-to-end, high-performance data networks increases the

availability and efficiency of machines and plants. Pepperl+Fuchs sensors and field devices can be flexibly integrated into existing systems and provide transparent communication and increased productivity.

Today, industrial network communication also allows all business units to be integrated, making it a central component for the availability of data in the Industrial Internet of Things. To enable the reliable and efficient transmission of large quantities of data across all levels, Pepperl+Fuchs offers high-performance, intelligent components—including a full range of AS-Interface system components, a large selection of industrial Ethernet devices, Ethernet IO modules, various IO-Link devices, IO-Link masters, and interfaces.

Industrial Ethernet

Industrial Ethernet creates a consistent network infrastructure across all business and production levels. It enables the collision-free and transparent transfer of both real-time and IT data. By using Industrial Ethernet protocols, large quantities of data can be made available reliably and in a predictable transmission time...

AS-Interface

The actuator-sensor interface (AS-Interface) replaces conventional wiring technology on the sensor-actuator level. AS-Interface has firmly established itself as a worldwide standard for the cost-effective transfer of power and signals along a single cable. It is an open system and is compatible with all common fieldbus systems...

IO-Link

IO-Link enables seamless communication and digital data transfer from the control level right down to the sensor level. Intelligent devices can be used to their full potential with IO-Link, paving the way for Industry 4.0 in automation technology...

INDUSTRIAL SENSORS => Identification Systems

Keep Material Flows under Control

With many years of experience in industrial sensor technology and factory automation, Pepperl+Fuchs is your specialist for identification systems. Identification systems from Pepperl+Fuchs enable more cost-effective information capture in production and logistics, as well as enhanced information quality. You will always be up to date on complete inventories, and will benefit from comprehensive tracking and tracing features. In addition, you can improve controlling material flows. And since you have accurate process data, you can continuously improve processes, setting new standards in terms of delivery and inventory management.

RFID

Products from Pepperl+Fuchs allow you to use inductive RFID-systems with 125 kHz (LF) and 13.56 MHz (HF) in the near range. RFID radio systems are available with 865 MHz to 926 MHz (UHF) for larger ranges. These systems feature a broad spectrum of ranges, data transfer rates, and designs, enabling you to implement your requirements as necessary.

Optical Identification

Object information is stored as a barcode or a two-dimensional Data Matrix code and is read via laser or digital imaging technology. Barcode and Data Matrix systems are a cost-effective alternative to RFID technology. Pepperl+Fuchs offers a wide range of 1-D and 2-D code readers. The OIT high-temperature IDENT system from Pepperl+Fuchs is a unique product: This system is designed for applications such as drying systems and painting lines. The OIT high-temperature IDENT system uses metal code plates with a hole pattern that are evaluated using industrial imaging technology.

INDUSTRIAL SENSORS => Displays and Signal Processing

Sensors used in the automation industry transmit a wide range of digital and analog signals. In many counting and control processes, these signals need to be clearly displayed, monitored, or processed. To help you find the perfect solution for such applications, we offer a wide range of counters, process displays, signal converters, and switch amplifiers that are all optimized for use with our sensors. The user-friendliness and durability of our products is always a priority at Pepperl+Fuchs.

Pulse Counter Units and Displays

Pulse counter units and displays count, measure, and visualize the number of items, produced quantities, and events. Positions, velocities, flow rates, and rotational speeds can also be displayed, controlled, and monitored.

Process Displays

Process displays are the right choice for displaying, controlling, and monitoring analog signals. With large LED displays and clear operating elements, our units are extremely user-friendly.

Signal Converters

Signal converters from Pepperl+Fuchs convert sensor signals into the format needed for further process steps. The ability to convert signals increases flexibility within your plant.

Switch Amplifiers

Switch amplifiers with different output types are used for secure performance monitoring and evaluation of binary signals. They ensure signal quality, prevent signal noise, and protect against damage caused by overvoltage.

INDUSTRIAL SENSORS => Connectivity

Cables, connectors, and splitters for industrial automation

Automation is our world. However varied automation applications may be, requirements placed on connection technology are just as complex. With the connectivity product portfolio,

Pepperl+Fuchs offers a fully integrated solution where sensors and connection technology form a perfect match.

This portfolio ranges from sensor cables to field connectors, junction blocks, sensor-actuator splitters, panel receptacles, and data connectors. Whether you are at home in mechanical engineering, welding, material handling, mobile applications, or in process industry – by providing you with sensors and the corresponding connection components from a single source, we boost your productivity and increase the availability of your machines and plants.

Sensor-Actuator Cables

At the center of our sensor connection portfolio is the internationally established M8 and M12 connection technology, optimized by Pepperl+Fuchs. Different cable sheathings (e.g. PVC, PUR, PUR Automotive, POC for welding areas), lengths, additional connection types (M23, 1/2", 7/8”), UL approval, and optional LEDs and sheathing colors enable individualized sensor cables. These tailor-made solutions are ideally suited to withstand the mechanical and chemical strain of your industrial application.

Field Connectors

Field connectors give you the flexibility you need to craft the ideal cable length directly on site. Consequently, the focus of our field connector portfolio is on quick installation while at the same time giving you long-term stability for challenging environments. Field connectors are made from metal or plastic and feature M8, M12, and several other common threading types. They are available in straight or angled housing design, with screw or IDC connection, shielded or unshielded.

Junction Blocks

M8 and M12 junction blocks combine robustness with reduced installation effort. They feature a sturdy, fully encapsulated housing in accordance with IP68, are 100% tested, and absolutely reliable in the field. As the trunk cable provides both power supply and signal transmission, our junction blocks drastically reduce the number of terminal blocks, cable glands, and terminal boxes needed in the field. You benefit from modular, flexible, pluggable solutions.

Sensor-Actuator Splitters

Sensor-actuator splitters are built in a fixed (Y- or T-piece) or flexible (Y-cable) housing. Combined with our junction blocks, these splitters make it possible to cost-effectively and easily wire a large number of sensors and actuators. Additionally, they offer an economical solution to loop-through bus signals with minimal cabling effort. Sensor-actuator splitters are built in robust, fully encapsulated IP68 housings and are cURus certified, allowing international use.

Valve Connectors

Valve connectors for industrial applications have to meet many demands regarding quality and flexibility. The operational temperature range, degree of protection, and resistance against oils and greases are as relevant as the right combination of housing design, pole number, noise suppression, and cable type. Our portfolio of DIN EN 175301-803 valve connectors gives you a diverse combination of options that can fill nearly every application requirement.

Sensor-Actuator Receptacles

Pepperl+Fuchs offers a wide range of panel receptacles with metal or plastic housing, different numbers of poles, and different mounting threads. They are in accordance with IP67/68 and available for three different mechanical installation conditions: front panel mounting, positionable front panel mounting, and rear panel mounting. This way, we can provide you with the right solution for every housing design.

Data Connectors

Our broad portfolio of data connectors covers almost any type of industrial interface – from Ethernet, DeviceNet, PROFIBUS, CANopen, and INTERBUS, to USB and RS-232. For Industrial Ethernet, ready-made M12 and RJ45 components with highly durable PUR sheathings are available. For PROFIBUS, CANopen, and DeviceNet, ready-made M12 connectors are available, as well as T-pieces and Y-cables, which serve as passive connecting elements. To terminate the bus line, integrated terminators can be purchased in M12 and SUB-D housing designs.

SFP Transceiver

Small form-factor pluggable (SFP) transceiver from Pepperl+Fuchs are ideally suited for use with managed Ethernet Switches. They are not affected by electromagnetic radiation and enable efficient data transfer at Faster Ethernet or Gigabit speeds across long distances up to 120 km.

Bulk Raw Cable

Available in practical 100-meter rings as well as in small running lengths, Pepperl+Fuchs offers bulk raw cable of industrial quality from German and European cable production, which is ideally suited for use with field-assembled connectors. You can choose from different raw cables variants for use in both indoor and outdoor applications.

INDUSTRIAL SENSORS => Accessories

Electrical and mechanical system components

Pepperl+Fuchs offers many types of accessories for mounting and connecting all sensor types. These accessories not only save time during initial installation – they also save time and labor when sensors have to be serviced or replaced. And when demanding ambient conditions are present, the right accessory from Pepperl+Fuchs can also significantly increase the operating life of your sensor components.

At Pepperl+Fuchs, you'll find everything you need for your sensor systems:

- Plug connectors
- Cordsets
- Mounting accessories
- Multi-port junction boxes
- Reflectors…and more

Explosion Protection=> Intrinsic Safety Barriers

Intrinsic safety barriers from Pepperl+Fuchs limit the energy that is supplied to a circuit and protect hazardous areas from excess energy. By limiting energy to a safe level, intrinsically safe circuits prevent the ignition of potentially explosive atmospheres. This simplifies maintenance and repair of Ex i circuits.

Pepperl+Fuchs offers a variety of intrinsic safety barriers for different requirements. Select between isolated barriers and Zener barriers that ensure safe signal transmission in hazardous areas.

Isolated Barriers

In addition to their explosion protection function, isolated barriers offer galvanic isolation to protect measurement and control circuits from signal distortion and dangerous surges. These interface modules also convert, standardize, and split measurement and control signals.

Zener Barriers

Zener barriers prevent the transmission of excessively high energy levels from the non-explosion hazardous area to the hazardous area. These interface modules are the right choice when galvanic isolation is not needed or otherwise provided.

Explosion Protection=> Signal Conditioners

Signal conditioners protect signal transfer between field devices in safe areas and control systems by galvanic isolation of the loop.

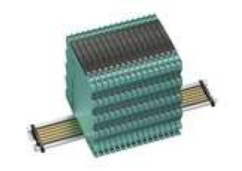
Particularly in case of long transmission paths, signal conditioners avoid compensating currents which may occur from ground loops. Signal conditioners also offer effective protection against electromagnetic disturbance or dangerous over voltages on the signal loops.

Depending on the type, signal conditioners offer additional features like limit switching, transformation from field in standard signals, as well as splitting of signals, which means doubling the input signal.

K-System

These modules are preferred, if both signals from hazardous areas and safe areas are transferred between field devices and the control system.

KC-System



The SC-system offers galvanic isolation in an extremely compact housing and is optimized for application requirements in safe areas.

Explosion Protection=> FieldConnex Ethernet-APL and Fieldbus Infrastructure

Ethernet-APL

Industry 4.0 and the Industrial Internet of Things—what has long been part of everyday life in factory automation has not yet been possible in process automation due to the lack of a standard for the fast transmission of large amounts of data and end-to-end, seamless communication from the field level to higher-level information systems. The gap of an Ethernet suitable for the process industry is closed with Ethernet-APL: a project of well-known manufacturers and associations—unique in the process industry to date—with the goal to standardize the physical layer of the communication system. .

For the first time, Ethernet-APL opens up Ethernet as a basic communication technology for the field of process plants and implements the use of Ethernet-based components even in hazardous areas up to Zone 0/ Class 1, Div.1. The output ports are selectable with ignition type intrinsic safety up to Ex ia IIC. This enables barrier-free accessibility across all hierarchy levels.

Another new feature is that communication and power supply are made available via the same Ethernet 2-wire cable.

In addition, Ethernet-APL brings along all the advantages known from decades of experience in handling electrical signals in the field of process plants:

- Simple installation or familiar 2-wire installation
- Simple connection technology
- Polarity independence
- Flexible planning of the topology
- Support of Trunk-and-Spur technology
- FieldConnex components meet all the infrastructure requirements of the process industry and combine this with highly secure, IIoT-enabled monitoring of the installation.

Advanced Diagnostics

Fieldbus Made Easy – Focus on Users

The fieldbus physical layer of FOUNDATION fieldbus H1 and PROFIBUS PA turns into a manageable asset with the Advanced Diagnostic Module (ADM). The ADM automates commissioning and documentation, monitors the fieldbus segment online, and identifies faults in realtime.

An embedded expert system learns and interprets the electric values and behavior of each segment. Plant maintenance receives early, easy-to-understand warnings. This is supported by the simple user display:

- Commissioning wizard
- Diagnostic display
- Segment monitoring views with NAMUR color indication according to NE 107
- Data export function for analysis of long-term trends

With ADM, fieldbus is now much easier to manage. Information is available from the safety of the control room. Unnecessary trips into the field are avoided for the safety of personnel within the plant.

FOUNDATION Fieldbus H1

An Accepted Standard in Process Automation

FOUNDATION fieldbus H1 (FF H1) supplies power and transmits communication digitally between host systems such as a DCS or a PLC and field instrumentation. Status information and control commands are transmitted between up to 31 participants connected to the same cable. Fieldbus is more than just pure process control. Remote configuration, asset management, and proactive maintenance is all made possible with fieldbus technology.

FieldConnex® is the right system to protect and integrate field device data into DCS. Simplistic by design, the reliable components provide ease of use and durability. Multiple explosion

protection concepts of choice make this the enabling technology for installation, commissioning, and dependable operation.

FF H1 conforms to IEC 61158-2. The Fieldbus Foundation™ is the governing body; it issues guidelines and definitions and ensures interoperability of devices. All constituencies such as plant operators, suppliers, contractors and DCS vendors are represented.

PROFIBUS PA

PROFIBUS PA is part of the popular PROFIBUS family of protocols. Data formats are the same as in PROFIBUS DP making it easy to integrate devices on both networks seamlessly and transparently.

PROFIBUS PA is a fieldbus according to IEC 61158-2 and supplies power and transmits communication digitally between host systems such as the DCS or a PLC and field instrumentation. Status information and control commands are transmitted digitally between the master and up to 31 participants connected to the same cable. PROFIBUS is more than just pure process control. Remote configuration, asset management, proactive maintenance is all made possible with PROFIBUS.

FieldConnex® is the right system for PROFIBUS PA data integration and into the DP-Master. Simplistic by design, the reliable components provide ease of use and durability. Explosion

protection concepts of choice make this the enabling technology for installation, commissioning and dependable operation.

PROFIBUS International is the governing body, it issues guidelines and definitions and ensures interoperability of devices. All constituencies such as plant operators, suppliers, contractors and DCS vendors are represented.

Ethernet

Ethernet Isolator combines intrinsically safe energy limitation and galvanic isolation

The FieldConnex® Ethernet Isolator combines intrinsically safe energy limitation and galvanic isolation into one product. Now Ethernet connections are plug and play in Ex-Zone 1. This compact device is designed especially for temporary installations and mobile apparatus.

The FieldConnex® Ethernet Isolator is most useful for machinery and equipment, that is frequently connected and disconnected during normal operation, or that is installed on a temporary basis. Intrinsically safe energy limitation and galvanic isolation are now possible at 100 Mbit/sec.

Galvanic isolation is built in for a purpose. It eliminates equipotential bonding and solid grounding between the safe area and the connection point in the hazardous area. And what about conduits? Flexible Ethernet cable can be used for installation.

Pepperl+Fuchs is an expert in fieldbus infrastructure and explosion protection. Working with OEMs, our knowledge can enable the integration of intrinsically safe Ethernet into virtually any customer’s apparatus.

Costly and inflexible installation is obsolete and a thing of the past with the Ethernet Isolator. The energy-efficient design produces very low heat dissipation, a definite advantage when cabinet space is tight and costly. And long lasting performance is ensured through the superior electric circuitry – a fundamental benefit of all Pepperl+Fuchs products and a basic requirement for any process automation plant today.

Explosion Protection=> Remote I/O Systems

Remote I/O—Bridging Two Technologies

The advantage of the clear assignment of a signal to a terminal, while integrating existing instrumentation and wiring, in combination with the significantly reduced wiring effort by the use of a bus interface to the control system—remote I/O benefits from the best of two technologies. Therefore it is the ideal and most cost-effective way for the modification or modernization of process plants.

Modular remote I/O systems transmit process data from safe or explosion hazardous areas by connecting binary and analog sensors and actors to the control system via a bus interface. Remote I/O is the right choice when you want to put I/O modules close to the field devices. Due to the reduced wiring effort, you not only save cables, but also time, money, and work effort. Hence, remote I/O field units can be installed in a decentralized location inside hazardous areas while you easily control and monitor sensors and actors from the control room.

You can connect 4 mA … 20 mA devices to remote I/O, including water flow transmitters, valve positioners, pressure transducers, or temperature transmitters. Devices such as thermocouples, resistance temperature detectors (RTDs), mechanical contacts, and visual or audible alarms may also be connected.

Our remote I/O systems are compatible with network protocols like:

- PROFIBUS DP
- PROFINET
- MODBUS RTU
- MODBUS TCP/IP

The two systems offered by Pepperl+Fuchs for the use in Zone 1 or Zone 2, the FB remote I/O- and the LB remote I/O system, have another, very important benefit to offer: keeping the topology of both systems the same across the process control level simplifies planning and carrying out maintenance.

The Gateway to IIoT

The seamless integration of device and process data is a basic requirement of IIoT applications, as well as the handling of big data. By using Ethernet-based communication, the remote I/O PROFINET gateway meets these demands and provides an easy-to-manage, high-performance solution. Building a bridge between the field level and Ethernet-based network structures, it connects any LB and FB station with PROFINET networks.

The Shared Device function, which is standardized for PROFINET, allows several PROFINET controllers to have simultaneous read access to the data of the PROFINET gateway and thus to the field devices. Actuators of a remote I/O unit can each be assigned to different controllers.

Dynamic Reconfiguration allows the I/O modules to be reconfigured or even changed during operation without stopping the PROFINET controller.

FB (Zone 1)

FB remote I/O is certified for mounting in Zone 1, placing the remote I/O system close to field devices, and it is installed in an enclosure. This modular signal conditioning system allows you to interface signals from the field with a control system located in the non-hazardous area via Ex i or Ex e field connections. As new green series, this tried and tested system is presented in a completely refurbished, new design with well thought-out features.

LB (Zone 2, Class I/Div. 2)

LB remote I/O is certified for mounting in Zone 2, Class I/Div. 2 explosion-hazardous areas. This modular signal conditioning system allows you to interface signals from the field with a control system in the non-hazardous area via Non-Ex or Ex i connections. Both circuit types can be mixed in one system. The LB remote I/O system is plugged into a backplane. Alternatively, our Solution Engineering Centers (SECs) can provide the system pre-mounted into a fully certified custom enclosure.

Explosion Protection=> HART Interface Solutions

HART Interface Solutions from Pepperl+Fuchs consist of two HART Multiplexer Systems for multiple signal loops and a HART Loop Converter for single loop applications. The Multiplexer is used to connect HART field devices to Asset Management Systems like AMS Device Manager

from Emerson Process Management. At the heart of HART Interface Solution (HIS), the HART Multiplexer acts like a gateway device, routing communications between the maintenance workstation PC and the HART field devices.

It interrogates each HART device, retrieves device information, and stores it in an internal database. This information is made available by the AMS Device Manager or PACTware. The HART Multiplexer also acts as a message coordinator for communication between the maintenance workstation PC and the HART devices. For a single loop solution, the HART Loop Converter allows access to all process variables provided by a field device and transfers them to conventional 4...20 mA loop. This enables it to make use of the hidden measurements done by many field devices and feed them to conventional DCS Systems.

K-System HIS

HART Interface Solution modules with the form factor of the well-known K-System Intrinsic Safety Barriers.

H-System HIS

HART Interface Solution based on termination board technology.

Explosion Protection=> Surge Protection

In process engineering plants such as refineries with exposed building parts or extensive water management systems, surge events can cause disastrous consequences: from damage or destruction of expensive components and machines to breakdown of complete automation systems—not including risks to personnel.

Besides these dangerous risks to people and environment, overvoltages are still one of the most common causes of damage in electrical plant engineering. They primarily occur due to lightning strikes or switching operations, but also due to the following causes:

- Electrostatic discharge
- Brush fire of large electric machines
- Fluctuations in power supply
- Ground faults / short circuits
- Triggering fuses
- Parallel installation of energy and information technology control systems

Pepperl+Fuchs‘ surge protection modules reliably divert surges and currents to ground and protect people and machines against possible negative consequences. Our product range provides you with powerful surge protection solutions for various applications. Find devices for signal line protection, supply line protection, and fieldbus.

Devices for Signal Line Protection

Devices for signal line protection reliably protect measurement and control signals in interface technology against overvoltages—in both field level and I/O level of control systems. Get to know Pepperl+Fuchs' surge protection modules for use in a variety of operational conditions.

Devices for Supply Line Protection

Devices for Fieldbus

Pepperl+Fuchs offers surge protective devices for FOUNDATION™ fieldbus H1 and PROFIBUS PA. The modules reliably protect measurement and control signals in fieldbus infrastructures—in both, field level and control level.

Explosion Protection=> WirelessHART Adapter

Pepperl+Fuchs offers an adapater to connect sensors to a control system or asset management system with a wireless network. This WirelessHART product supports the installation of field devices from different manufacturers without the need for additional wiring effort and costs.

The WirelessHART adapter can be connected to every conventional HART or 4 mA … 20 mA field device directly or with a short cable. It reads the data of the field device via HART or translate the 4 mA … 20 mA signal to a digital value and transmits the data to the WirelessHART network. This highly flexible solution turns every field device into a WirelessHART field device.

Explosion Protection=> Intrinsically Safe Mobile Devices

By acquiring ecom—the market leader for intrinsically safe mobile devices such as feature phones, smartphones, and tablets for hazardous areas—Pepperl+Fuchs has expanded its portfolio to include a partner that has been a household name in the industry for decades.

From cell phones to smartphones and tablets—all mobile devices are available in versions for use in harsh (industrial) environments. Versions with global ATEX/IECEx certifications for Zone 1/21, Div. 1 and Zone 2/22, Div. 2, mining, country-specific, and radio approvals are also available. Industrial-grade displays and enclosures provide additional safety by protecting the devices from dust and water ingress and making them resistant to impact and vibration. Individual configuration options, service level agreements combined with digital products and services, and comprehensive service provided by trained personnel round out the range of solutions for mobile computing and communication.

This unlocks new potential and increases workflow safety, efficiency, and transparency—whether in conventional applications or for Industry 4.0 scenarios.

Mobile Computing

Whether in the oil and gas industry, refineries, chemical plants, or the pharmaceutical industry—there are almost no limits on the uses for industrial tablets. They are compact and durable, have high-resolution displays and powerful batteries, and offer a user-friendly interface. Housings designed for industrial use provide additional safety by protecting the devices from dust and water ingress and making them resistant to impact and vibration. ecom tablets have ATEX Zone 1/21, Div. 1 and ATEX Zone 2/22, Div. 2 certifications and international approvals according to IECEx and NEC. This means they can retrieve information, collect large amounts of data, and transfer them in real time to higher-level PLCs or directly to a cloud, even in harsh environments.

Communication

With the advent of IoT in industrial environments, companies from a wide range of industries are facing the challenge of capturing and providing large amounts of data, improving the quality of this data, and using resources efficiently. Organizations are increasingly recognizing the benefits of mobile communication solutions. Mobile devices from the Pepperl+Fuchs brand ecom are based on technologies that increase security and efficiency while minimizing costs. With international ATEX and IECEx approvals, the rugged devices are designed for use in harsh industrial environments and Zone 1/21, Div. 1 and Zone 2/22, Div. 2 hazardous areas.

Peripherals

In addition to the mobile computing and communication portfolio, users can choose from a range of complementary peripherals. Intelligent devices such as the intrinsically safe RSM-Ex 01

remote speaker microphone or the CUBE 800 portable camera system extend the range of mobile devices and are ideal for future IIoT applications.

Portable Lights

Measurement and Calibration

Reliable measurement and calibration technology for hazardous areas

Measurement and calibration technology has always been an integral part of the portfolio for intrinsically safe and explosion-proof mobile devices from the Pepperl+Fuchs brand ecom. For many years, the company has also worked closely with Fluke®—the leading manufacturer of electronic measuring instruments and calibrators. To ensure safe use in potentially hazardous areas, ecom has taken over the certification of some Fluke® devices according to global approvals. This ensures that measurement and testing tasks in a wide range of industries can be performed faster, more efficiently, and with the highest precision directly on site.

Explosion Protection=> HMI Systems

VisuNet from Pepperl+Fuchs—Industrial Human Machine Interfaces for Process Automation

From shock and vibration resistance to Good Manufacturing Practice (GMP) cleanability standards, Pepperl+Fuchs offers HMI solutions to meet varying process industry requirements. The VisuNet HMI family includes a wide selection of rugged industrial monitors, industrial box thin clients and box PCs, thin client software, and peripheral devices.

VisuNet operator workstations and monitoring systems are relied on around the world in oil and gas exploration, refineries, chemical and pharmaceutical production facilities. HMIs for industrial applications like these are subjected to moisture, extreme temperature shifts, and the use and abuse of 24/7 operation. To ensure absolute reliability, VisuNet systems are built with industrial-grade components and optimized for extended use in harsh conditions.

Industrial Monitors

The VisuNet industrial monitor portfolio offers a set of core communication technologies in a variety of housing styles—from harsh-duty PC workstations optimized for oil and gas exploration to sleek remote monitor systems for regulated indoor environments like pharmaceutical production. Find an industrial monitor that perfectly meets your requirements.

Industrial Box Thin Clients and Box PCs

Thin clients enable users to access virtualized applications and information from centralized servers. In modern process control, thin clients are a cornerstone of Industry 4.0 / Internet of Things (IoT) and DCS virtualization strategies. Commercial-grade thin clients do not function well in process control areas.

Pepperl+Fuchs offers industrial box thin clients that are tailored to industrial environments. They provide the latest technology inside compact, ruggedized aluminum housings that can withstand the stress of 24/7 operation in challenging ambient conditions. Engineered for extended longevity and reliability, industrial box thin clients from Pepperl+Fuchs feature fanless cooling with no moving parts and temperature ranges from -20 to +60 °C. Industrial box thin clients meet performance requirements for virtualized or web-based infrastructure and support centralized management software for thin client architectures.

Our thin clients are complemented by a range of industrial box PCs, which offer a flexible solution with outstanding cost-to-performance ratio. Equipped with 7th Generation Intel® Celeron and i5 (Kaby Lake) processors and extended RAM configurations, these box PCs are ideally suited for applications that require more computing power.

Industrial Tablet Thin Client

The industrial tablet thin client extends the Pepperl+Fuchs thin client portfolio with a mobile thin client device. It is based on the ruggedized “Pad-Ex” tablet from the Pepperl+Fuchs brand ecom, features RM Shell 5 as firmware and opens up many advantages in the field:

- An eight-generation Intel® Core™ processor plus a widescreen sunlight-readable display ensure smooth and speedy operation at any time.
- The tablet can be easily and quickly integrated into existing networks via Wi-Fi.
- Due to wireless installation, the location of the device becomes irrelevant. Especially in plants with wide spread workstations, users can monitor their process from anywhere.
- The industrial tablet thin client can temporarily replace a local workstation, e.g. in case of failure.
- All advantages of the preinstalled RM Shell 5 plus additional Pad-Ex support such as battery and Wi-Fi status information and a programmable key come with the industrial tablet thin client.
- Supports centralized device management via software “Control Center”.
- Global certificates for use in hazardous areas.

Thin Client Software

VisuNet RM Shell is an innovative thin client firmware pre-installed on every Pepperl+Fuchs VisuNet Remote Monitor (RM) and box thin client. It is engineered by Pepperl+Fuchs to simplify thin client setup and operation of virtualized and conventional workstation-based process control systems. RM Shell replaces the Windows® desktop and reduces the user interface to critical system functions.

Predefined user roles (administrator, engineer, and operator) provide tailored information access to different authorization levels. An app concept allows integration of third-party remote protocols and applications—this enables OEMs to integrate their own apps and adapt VisuNet RMs to their own automation infrastructure.

Usability meets security: Features such as a universal write filter (UWF), USB lockdown, and a built-in Ethernet firewall make VisuNet RMs one of the securest HMI solutions on the market.

VisuNet Control Center takes the usability of VisuNet RMs to the next level by enabling efficient, centralized remote configuration of multiple RMs. This engineering software prevents IT personnel from having to enter hazardous locations for setup and maintenance of systems in the field—everything can be done from the control room.

Engineered Solutions

Off-the-shelf products do not always meet the exact requirements for every application. VisuNet engineered HMI solutions are a simple way to get the exact HMI you need. Whether the requirement is for a remote monitor or an intrinsically safe panel PC, Pepperl+Fuchs can engineer a solution that fits your application and budget.

Our standards for quality, craftsmanship, and value, along with our hazardous location expertise, make Pepperl+Fuchs the right choice for your next industrial HMI.

Talk with a Pepperl+Fuchs HMI design specialist to discuss your requirements and modifications.

Engineered solutions offer many benefits:

- HMI design specialist will design a custom solution based on your requirements
- Comprehensive after-sales support
- Cost saving by customizing standard solutions
- Proposal and quote in just a few business days

Peripherals

A comprehensive range of peripherals complements VisuNet industrial monitors and box thin clients. These devices allow you to optimize VisuNet operator workstations and operator panels for a particular application and further extend your process.

Explosion Protection=> Electrical Explosion Protection Equipment

Pepperl+Fuchs offers a broad portfolio of electrical equipment and solutions for installation and control of machinery and electrical networks in harsh environments and explosion-hazardous areas.

Various types of protection and enclosure variants along with a high level of flexibility allow the design of the most efficient control and distribution solutions for any application and industrial environment.

Experienced project engineers at the Pepperl+Fuchs Solution Engineering Centers—located worldwide—will support the user to find the most efficient solution for his specific requirements.

Terminal and Junction Boxes (Ex e, Ex i, Ex op)

Pepperl+Fuchs offers a large selection of terminal boxes and junction boxes for installation of signal and power distribution networks in explosion hazardous areas. They are certified according to the latest ATEX and other international standards. Types of explosion protection include Ex e, Ex ia, Ex tb, Ex tD, and Ex op pr.

Select from many enclosure sizes and material options such as glass fiber reinforced polyester (GRP), electro-polished stainless steel or aluminum. Our terminal and junction boxes guarantee for reliable operation even in very harsh environments or in locations with increased hygienic requirements. High-quality materials are robust, durable, and resistant against high temperatures. A large selection of terminal and cable gland types and accessories enable any build according to user specification with optimal fit to any application requirements. Terminal boxes and junction boxes come with suitable ingress protection and wide ambient temperature ranges. Their distinctive construction features facilitate easy installation and maintenance.

Terminal and Junction Boxes (Ex d)

In order to protect signal and power distribution networks from harsh environmental conditions and explosion hazards, various types of flameproof terminal boxes and junction boxes are available.

Several enclosure variants and material options as well as customized configuration with terminal and cable gland types allow adaption to any application requirements.

Suitable ingress protection and ambient temperature ranges as well as rugged enclosure materials such as copper-free aluminum and stainless steel ensure long-term durability and safe operation.

Control Units (Ex e)

For operation and monitoring of electrical circuits and machinery in harsh or explosion hazardous environments, versatile control units can be equipped with several operator elements.

A multitude of control functions are available such as pushbuttons, LED indicators, control switches, potentiometers, and ammeters. Product series are available in types of explosion protection Ex e and Ex tb.

Suitable ingress protection and ambient temperature ranges as well as durable enclosure materials such as glass fiber reinforced polyester (GRP), electropolished stainless steel, and polyamide ensure safe and long-term operation.

Control Units (Ex d)

Several product series of flameproof control units are available for operation and monitoring of electrical circuits and machinery in harsh or explosion hazardous environments.

The control units are manufactured from copper-free aluminum which provides optimal protection from most environmental hazards.

Control Stations (Ex e)

For efficient operation and monitoring of multiple electrical circuits and machinery in explosion hazardous areas, control stations can be tailored to exactly meet application requirements.

Suitable ingress protection and ambient temperature ranges plus durable enclosure materials like glass fiber reinforced polyester (GRP) and electropolished stainless steel guarantee reliable operation even in very harsh environments or in locations with increased hygienic requirements.

Control Stations (Ex d)

Control stations in explosion protection types Ex d IIB+H2 and Ex tb allow the safe operation and monitoring of power distribution networks as well as machinery in explosion hazardous areas and demanding industrial environments.

Reliable protection is guaranteed by a wide selection of sturdy flameproof enclosures available in copper-free aluminum and stainless steel. A multitude of operator elements covering all needed control functions can be integrated according to customer specifications.

Suitable ingress protection and ambient temperature ranges allow use in almost any environmental conditions.

Control and Distribution Panels (Ex d)

A wide range of solutions for distribution and control in hazardous areas can be designed based on sturdy flameproof enclosures and appropriately certified operating elements.

Control and distribution panels can contain any kind of electrical equipment or modules for automation of production processes. Each solution is customized exactly to meet the requirements of the specific application. In order to design the optimal solution, the experienced project engineers at Pepperl+Fuchs' Solution Engineering Centers (SECs) will support the customer from the first evaluation of the project through to final inspection and certification.

Control and Distribution Panels (Ex de)

Merging safe protection for non-Ex equipment with the option of fast commissioning and easy modification is the benefit of combining explosion protection types Ex d and Ex e.

A wide range of sturdy flameproof enclosures is available to protect equipment from explosion or environmental hazards while the operator elements and terminals for signal and power connection are easily accessible in Ex e enclosures.

Each ‘bushed’ solution is customized exactly to meet the requirements of the specific application. In order to design the optimal solution, experienced project engineers in Pepperl+Fuchs' Solution Engineering Centers are in close contact with the customer for the duration of the project. Each solution is shipped to the location of operation with full certification and documentation. Commissioning will be fast and easy as there is no need to open the Ex d enclosure on site.

Ex de solutions consist of a combination of a pressure-resistant housing (flameproof Ex d) on top and an increased safety Ex e housing underneath, which includes terminals and control elements in customized installations. The housings are securely connected via a special cable duct. A flange between the housings prevents dirt buildup and moisture penetration.

Components for measuring and control technology, or electrical installation technology, that are not specifically designed for hazardous areas can be installed in the flameproof Ex d housing. In addition to isolated barriers from Pepperl+Fuchs, these components may include DCS and ESD systems or other instruments made to user specifications. The pressure-resistant housing ensures that the non-Ex devices do not pose a threat to the environment. Under ideal conditions, the flameproof Ex d housing is opened as little as possible after initial installation, as special rules under IEC 60079-14 must be observed during opening and closing. The increased safety Ex e housing contains only Ex certified components. This makes it much easier and safer to access than the Ex d housing. Terminals and control and monitoring elements can be serviced or replaced at any time, subject to compliance with the relevant provisions.

In this way, customers can reap the benefits offered by both types of protection: the increased safety Ex e housings allow for easy extension and modification of the control elements that they contain. The controllers in the Ex d housing are ready for use and allow rapid commissioning with little system downtime and reduced maintenance work.

Switch Disconnectors and Safety Switches (Ex e)

Whether for cleaning, maintenance, or repair—with switch disconnectors and safety switches in types of protection Ex e and Ex tb you safely disconnect machines and equipment without the need for specially trained staff. Supporting a maximum current of 25 A or 40 A, these switches in glass fiber reinforced polyester or stainless steel enclosures are suited for gas and dust explosion hazardous areas (Zones 1, 2, 21, and 22).

Due to a wide range of configuration options, they exactly meet your individual switching requirements. Choose your preferred enclosure material and purchase switches with either 3, 4, or 6 main contacts as well as with various auxiliary contact configurations. Threefold padlockable rotary actuators reliably protect personnel during maintenance work. Safety switches developed in accordance with German standards offer particularly high protection against manipulation.

Switch Disconnectors (Ex d)

Whether for cleaning, maintenance, or repair—with switch disconnectors in types of protection Ex d, Ex tb and Ex tD, you safely disconnect machines and equipment without the need for specially trained staff. Supporting different maximum currents and various pole configurations, these devices in aluminum enclosures are suited for gas and dust explosion hazardous areas (Zones 1, 2, 21, and 22).

The product range of switch disconnectors is complemented by our robust motor starters that are available with various power ratings.

Cable Glands and Accessories (Ex d, Ex e, Ex i)

Cable glands and related accessories such as stopping plugs, adapters, breather drains, sealing plugs, and locknuts offer the full flexibility to design a terminal box or control station exactly to the specific requirements of the respective application. All components come in many varieties, high-quality materials and certified according to the relevant explosion protection standards.

Enclosures (Ex d, Ex e)

Our enclosure series form the basis for the design of control and distribution solutions for hazardous areas: from small terminal boxes through control stations to sophisticated control and distribution panels for complex machinery and major applications.

Appropriately certified operating elements covering various control functions can be integrated. Thus, users benefit from the huge variety of electrical or process automation functions which can be utilized in critical industrial applications.

Signaling Devices and Other Products (Ex d, Ex e)

As a world leader in hazardous area products and solutions, Pepperl+Fuchs offers a comprehensive range of high performance signaling products suitable for many industries and applications. The range of audible, visual and combination devices as well as call points has been certified for use throughout the world in gas and dust explosion-hazardous areas. A wide portfolio of different brightness and volume options makes it easy to find the right choice for individual applications. The signaling devices are manufactured from corrosion resistant aluminum or glass fiber reinforced polyester (GRP) making them ideal for use in the harshest industrial environments. They are suitable for wall, ceiling and floor mounting to ensure that they can be mounted in the most suitable location for your project.

The portfolio of signaling devices is complemented by our eletronic earthing system for grounding of mobile devices.

Ask our experts and find the right solution for your application!

Plugs and Sockets (Ex de)

Pepperl+Fuchs' completely plastic explosion-protected Ex de plugs and sockets can be used in hazardous areas to connect and disconnect circuits safely and easily. The devices meet all the requirements of IEC 60309 and are suitable for use in Zone 1/21 and Zone 2/22 applications. The wide range of high-quality products with self-cleaning lamellar contacts and IP66 protection offers a selection for 16 A, 32 A, 63 A, and 125 A applications.

- Ex de and Ex t certified
- Self-cleaning lamellar contacts
- Easy plug-in and removal
- Ambient temperature -40 °C to 45 °C
- Type of protection: IP66 according to EN 60529
- Material: GRP housings
- Can be locked in OFF-position

Explosion Protection=> Purge+Pressurization Systems

Looking for a purge and pressurization system and not quite sure of your options? The purge quick configurator tool will guide you quickly and easily through the most important points.

Configure your Pepperl+Fuchs Bebco EPS Purge and Pressurization Systems

Bebco EPS® purge and pressurization by Pepperl+Fuchs is a household name in the process automation industry. As the leaders in Purging Technology®, we manufacture innovative solutions that are remarkably simple to use and will easily handle just about any application.

With Pepperl+Fuchs' Bebco EPS purging and pressurization, you get:

- State-of-the-art solutions based on more than 20 years of experience – a family of automatic purge and pressurization systems that make hazardous location protection easy
- Technical support – anywhere in the world
- Purge and pressurization systems designed according to ATEX Directive 2014/34/EU, NFPA 496, and ISA 12.4 standards

- Easy integration – compact, low-profile designs that can be internally or externally mounted
- Automatic temperature and leakage control and alarming
- User interface with programming to meet most users' demands

Pepperl+Fuchs offers a full range of purge and pressurization equipment to meet the needs of your application. Another benefit of purging and pressurization is use of the standard Type 4/12 enclosure as the protected enclosure. This saves money, weight, and space over explosion-proof methods. Need a certified solution? The Pepperl+Fuchs Systems and Solutions group can also design custom, certified enclosure solutions.

Type X Purge System

The Pepperl+Fuchs Bebco EPS Type X purge system reduces the classification within the protected enclosures from Division 1 to non-hazardous. General-purpose equipment can be operated within the protected enclosure.

Note: Vents are required for most purge enclosures

The Pepperl+Fuchs Type X purge system is fully automatic and performs critical purging, pressurization and monitoring of the protected enclosure. It is designed according to NFPA 496 and ISA 12.4 standards.

Type Y Purge System

The Pepperl+Fuchs Bebco EPS Type Y purging system reduces the classification within the protected enclosure from Division 1 to Division 2. All equipment used within the enclosure must be Division 2 rated.

Note: Vents are required for most Type Y purge enclosures

The Type Y purge system:

- Allows Division 2 rated equipment to be operated in a Division 1 location
- Controls purging, pressurization & monitoring pressures
- Rated for Class I/ II, Division 1 to Division 2 area applications
- Purge enclosure sizes to 450 cu. ft.
- UL, cUL, FM classifications
- Conforms to NFPA 496 and ISA 12.4 standards

Type Z Purge System

The Pepperl+Fuchs Bebco EPS Type Z purge and pressurization systems provide easy selection, installation, and operation for enclosures located in Division 2 / Zone 2 hazardous areas. The Type Z solutions consist of a control unit, vent, and solenoid valves. The combination of automation and configurable functions support even the most difficult applications.

- Automatic systems for alarm, purging, and power to the enclosure
- Enclosure sizes to 450 cu. ft.
- Conforms to NFPA 496 and ISA 12.4 standards
- ATEX, IECEx, and UL certified systems
- Built-in programming (programmable temperature control / leakage compensation)

Ex pxb Purge System

The Pepperl+Fuchs Bebco EPS Ex pxb purge system reduces the classification within the protected enclosure from Zone 1/ Zone 21 to non-hazardous. General-purpose equipment can be operated within the protected enclosure.

Note: Vents are required for all purge enclosures.

Our Ex pxb purge system is designed according to European requirements—ATEX Directive 2014/34/EU, EN60079-2 and EN61241-4. European protection methods allow multiple techniques to be used when designing hazardous area equipment.

Ex pyb Purge System

The Bebco EPS Ex pyb purge and pressurization system provides reliable protection for operating general-purpose electrical equipment in Zone 1/21 explosion hazardous locations.

The Pepperl+Fuchs Ex pyb purge system is fully automatic and performs critical purging, pressurization and monitoring of the protected enclosure. Our Ex pyb purge systems are designed according to European requirements – ATEX Directive 2014/34/EU, EN60079-2 and EN61241-4. European protection methods allow multiple techniques to be used when designing hazardous area equipment.

Note: Vents are required for all Ex pyb series purging systems.

Ex pzc Purge System

Pepperl+Fuchs Bebco EPS Ex pzc purge and pressurization systems provide easy selection, installation, and operation for enclosures located in Zone 2 and 22 hazardous areas. The Ex pzc solutions consist of a control unit, vent, and solenoid valves. The combination of automation and configurable functions support even the most difficult applications.

- Automatic systems for alarm, purging, and power to enclosure
- Enclosure sizes to 450 cu. ft.
- Conforms to NFPA 496 and ISA 12.4 standards
- IECEx and UL certified systems
- Built-in programming (programmable temperature control/ leakage compensation)

Enviro-Line Pressurization System

Enviro-Line purging units is an enclosure pressurization system for non hazardous areas that operates on a supply of compressed instrument air or inert gas. It regulates and monitors the pressure within the sealed enclosure at a constant pressure in order to prevent the accumulation of damaging and caustic gases and dusts.

The elimination of these gases and dusts extends the life of expensive electrical equipment and instrumentation placed within the Enviro-Line purging unit.

Due to higher pressures inside the electrical enclosure, corrosive environments remain outside. The system maintains a constant 0.5" water pressure inside the enclosure for protection against gas and/or dust.

Explosion Protection=> Power Supplies

Power Supplies for Hazardous Areas

Pepperl+Fuchs has many years of experience in explosion protection and applications involving power supplies installed in hazardous areas. Our power supplies meet the most demanding requirements when high reliability is needed for powering signal circuits—which helps enhance system integrity. They support both digital fieldbus and analog networks.

K-System Power Supplies

Our din rail power supplies convert a 120 V AC or 240 V AC input to 24 V DC, and can be used in combination with power feed modules. The power feed modules snap to the power rail and provide it with a reliable 24 V DC signal. The combination of a power rail, power supply, and power feed module provide a tremendous amount of versatility, simplifies wiring, and reduces wiring expenses.

Fieldbus Power Supplies

FieldConnex® fieldbus power supplies combine the digital control signal with the supply power for the field devices on one two-wire cable. Additionally they offer many hiqh-quality features such as redundancy, galvanic isolation and advanced diagnostics.

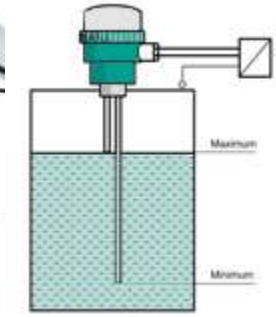
PS Industrial Power Supplies

Explosion Protection=> Level Measurement

Today, level measurement technology is the basis for management and process control in the chemical, petrochemical, environmental and other related industries.

Our comprehensive program enables us to help you solve your particular measurement and control problems and to detect the precise level of any medium, under a wide range of conditions.

Limit Detection

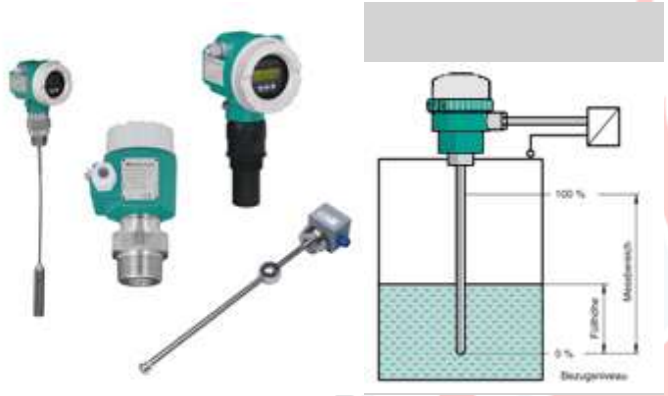


Limit value switches signal whether the medium being monitored has reached, risen above, or fallen below, a set level (VDI/VDE Directive 3519) based on its installation height.

Examples:

- Overflow / dry-run protection
- Minimum-maximum control
- Overspill protection

Continuous Measurement



Level measurement sensors detect the current fill level. This is done by determining the distance from the surface of the medium to the preset reference level. Continuous level measurement allows usage evaluation, loss control, and above all, precise process control (VDI/VDE Directive 3519).

Interface Electronics

In order to prepare a standardized measurement signal for various types of level sensors, the proper interface electronics are required.

In general, a distinction is made between limit value and continuous level control.

Depending on the specific application, our interface electronics are approved for use in Ex areas as well as for overspill protection according to WHG. View a complete product selection for interface electronics under signal conditioners.

SOME TECHNICAL INFORMATION

***WHAT ARE THE PROXIMITY SENSORS?**

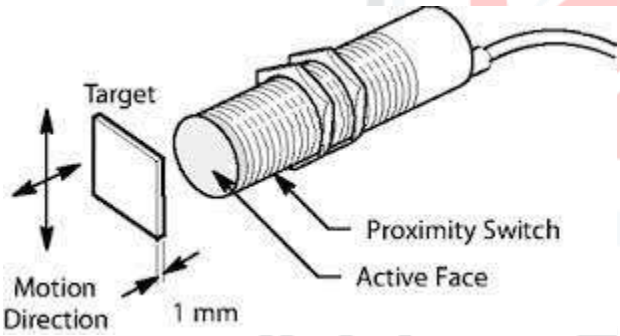
A proximity sensor is a sensor able to detect the presence of nearby objects without any physical contact.

A proximity sensor often emits an electromagnetic field or a beam of electromagnetic radiation (infrared, for instance), and looks for changes in the field or return signal. The object being sensed is often referred to as the proximity sensor's target. Different proximity sensor targets demand different sensors. For example, a capacitive proximity sensor or photoelectric sensor might be suitable for a plastic target; an inductive proximity sensor always requires a metal target.[citation needed]

Proximity sensors can have a high reliability and long functional life because of the absence of mechanical parts and lack of physical contact between the sensor and the sensed object.

Proximity sensors are also used in machine vibration monitoring to measure the variation in distance between a shaft and its support bearing. This is common in large steam turbines, compressors, and motors that use sleeve-type bearings.

A proximity sensor adjusted to a very short range is often used as a touch switch.



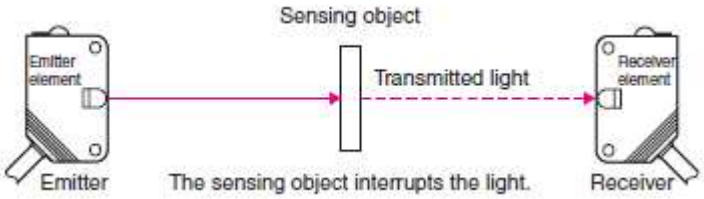
***WHAT ARE THE PHOTO ELECTRIC SENSORS?**

Photoelectric Sensors detect objects, changes in surface conditions, and other items through a variety of optical properties.

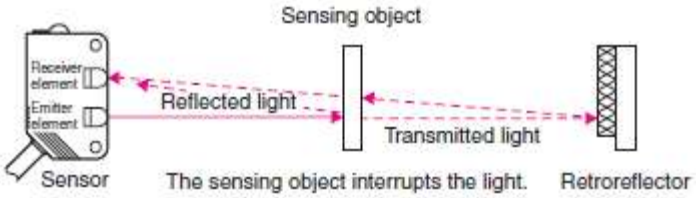
A Photoelectric Sensor consists primarily of an Emitter for emitting light and a Receiver for receiving light. When emitted light is interrupted or reflected by the sensing object, it changes the amount of light that arrives at the Receiver. The Receiver detects this change and converts it to an electrical output. The light source for the majority of Photoelectric Sensors is infrared or visible light (generally red, or green/blue for identifying colors).

Photoelectric Sensors are classified as shown in the figure below. (See Classification.)

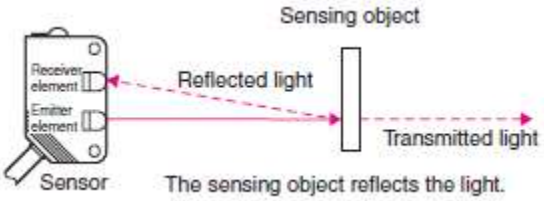
Through-beam Sensors



Retro-reflective Sensors



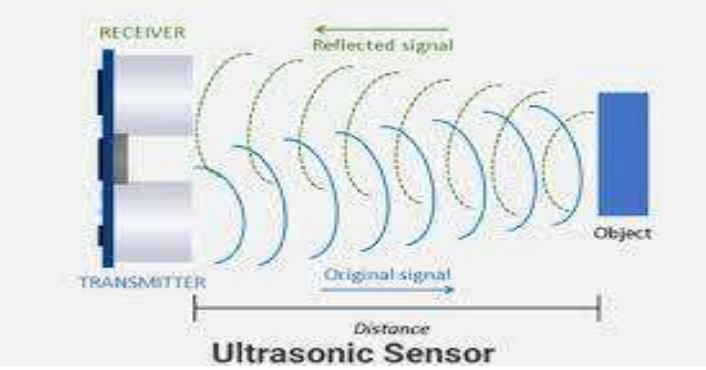
Diffuse-reflective Sensors



***WHAT ARE THE ULTRASONIC SENSORS?**

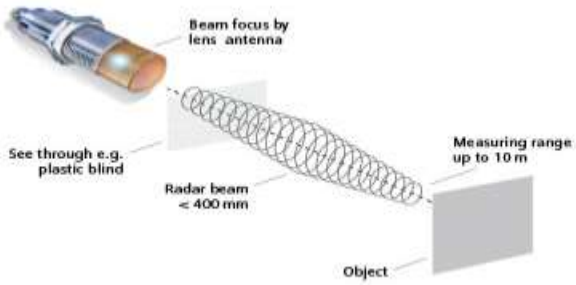
An ultrasonic sensor is an electronic device that measures the distance of a target object by emitting ultrasonic sound waves, and converts the reflected sound into an electrical signal. Ultrasonic waves travel faster than the speed of audible sound (i.e. the sound that humans can hear). Ultrasonic sensors have two main components: the transmitter (which emits the sound using piezoelectric crystals) and the receiver (which encounters the sound after it has travelled to and from the target).

In order to calculate the distance between the sensor and the object, the sensor measures the time it takes between the emission of the sound by the transmitter to its contact with the receiver.



***WHAT ARE THE RADAR SENSORS?**

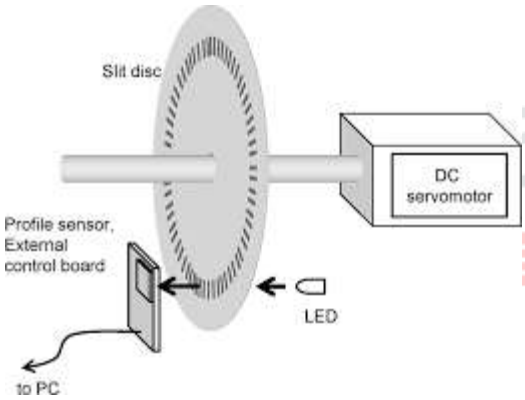
Radar sensors are conversion devices that transform microwave echo signals into electrical signals. They use wireless sensing technology to detect motion by figuring out the object's position, shape, motion characteristics, and motion trajectory. Unlike other sensors, radar sensors aren't affected by light and darkness and with the ability to detect obstructions like glass, it can "see" through walls. When compared to other sensor technology, like ultrasound, radar can sense longer distances and is safe for people and animals.



***WHAT ARE THE ROTARY ENCODERS?**

A rotary encoder, also called a shaft encoder, is an electro-mechanical device that converts the angular position or motion of a shaft or axle to analog or digital output signals.

Rotary encoders are used in a wide range of applications that require monitoring or control, or both, of mechanical systems, including industrial controls, robotics, photographic lenses,[2] computer input devices such as optomechanical mice and trackballs, controlled stress rheometers, and rotating radar platforms.



***WHAT ARE THE POSITIONING SYSTEMS?**

A positioning system is a system for determining the position of an object in space.[1] One of the most well-known and commonly used positioning systems is the Global Positioning System (GPS).

Positioning system technologies exist ranging from worldwide coverage with meter accuracy to workspace coverage with sub-millimeter accuracy.

***WHAT ARE THE INCLINATION AND ACCELARITION SENSORS?**

An inclination sensor is used in situations where accurate positioning or constant monitoring of the angle in relation to gravitational pull is essential. An inclination sensor measures the angle with respect to a horizontal position, whereby an imaginary line from the centre of the earth serves as a reference.

Acceleration sensors or accelerometers let you make precise measurements of vibration or shock for a variety of applications. They are used to measure vibration, shock, displacement, velocity, inclination and tilt. Our accelerometers are based on several different technologies and include piezoelectric, strain gauges, MEMS, and capacitive sensors.All sensors are highly resistant against shock and vibration and are suitable for a wide range of purposes.

***WHAT ARE THE VIBRATION MONITORING SYSTEMS?**

A vibration monitoring system is a tool that looks for irregularities and other anomalies in a machine's health by measuring its vibration levels. It helps to protect the facility, the process and the people. This system can identify anything from unbalance, to misalignment, to a loose part and helps prevent downtime on machines. A vibration monitoring system, even for a single channel, is one of the most effective ways to predict a potential machine problem and provide early warning of machine failure. It is vital to many industries for safety and keeping the process running.

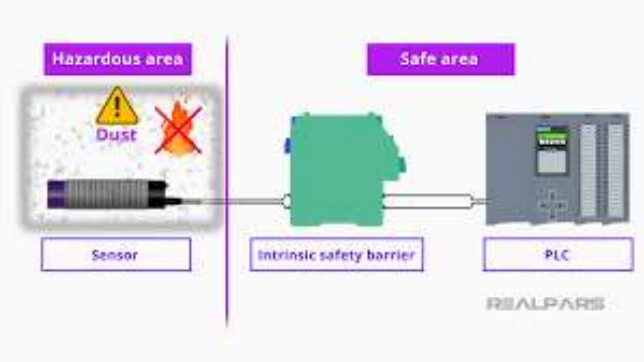
Vibration monitoring systems work by using a method known as vibration trend analysis. Vibration trend analysis is a process that monitors for irregularities in the vibration signature of a machine. When the vibration amplitude goes up or down significantly, under steady state conditions, it is usually an indication that something is changing inside the machine. The overall amplitude is the main indication of a machine malfunction, and is perfectly suited for a 4-20 mA output to a Control System (PLC, SCADA, RTU etc.). The overall amplitude includes the various individual frequency and amplitudes generated by the machine components, its rotation or reciprocating motion, and or process issues. Some monitoring systems record vibration waveforms and identify potential machine issues by revealing abnormalities in the recorded vibrations.

***WHAT ARE THE INDUSTRIAL COMMUNICATIONS?**

The aim of industrial communication is the reliable transmission of data from the field through to the control level. Consistent solutions with Industrial Ethernet, state-of-the-art wireless technologies, and cybersecurity increase the availability and security of the networked systems here.

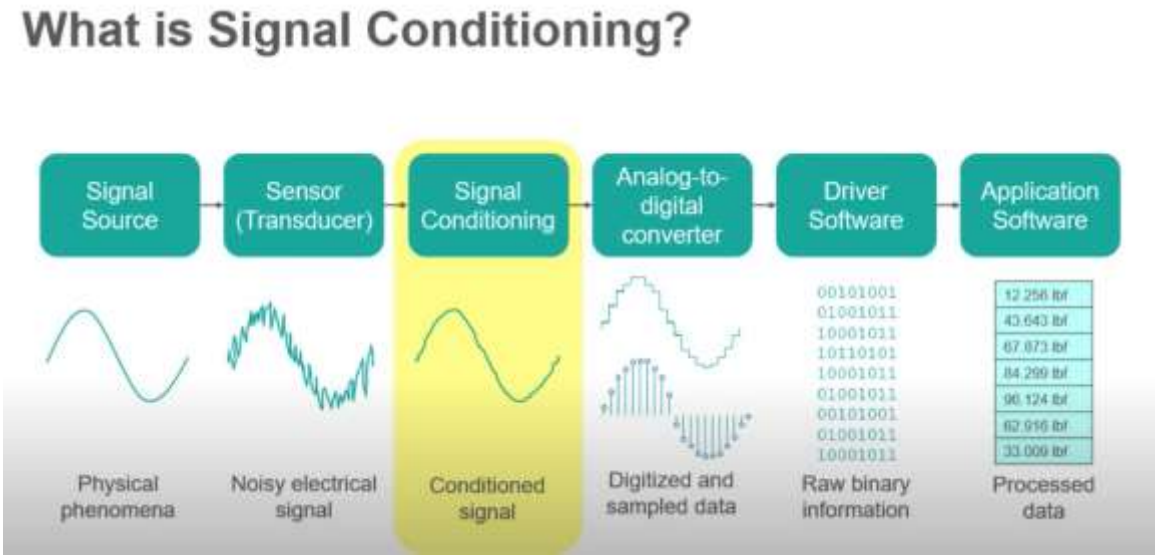
***WHAT ARE THE INTRINSIC SAFTEY BARRIERS?**

Intrinsic Safety Barrier is an isolation equipment that protects electrical devices such as gas/fire detectors, alarms in a hazardous area. It preserves devices from power surges, which can cause the risk to make the device a hazardous source of ignition in the sphere where there are explosive gases.



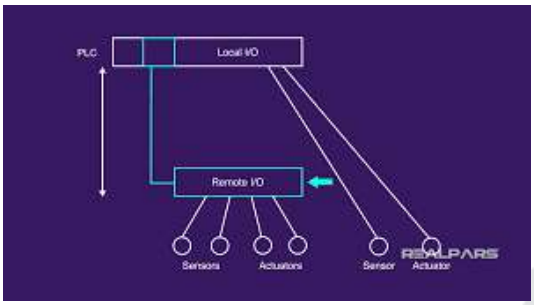
***WHAT ARE THE SIGNAL CONDITIONERS?**

A signal conditioner is a circuit that performs a set of operations on a signal and makes it suitable for further processing. It consists of an input and an output – where the input is, usually, a sensor that measures the environmental and/or structural variable.



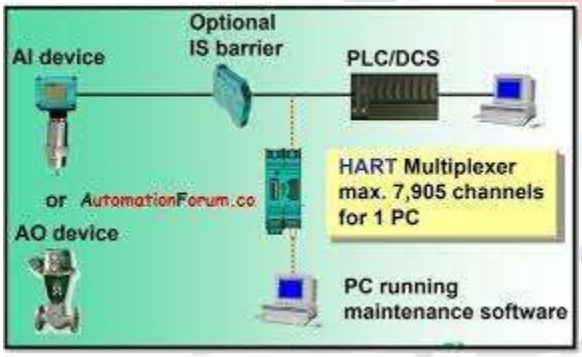
***WHAT ARE THE I/O SYSTEMS?**

Remote I/O is a solution when you want to place I/O modules close to the field devices in order to eliminate long lengths of multi-conductor cable. With Remote I/O, signals can be received from far away sensors and control signals can be sent long distances to control valves, motors, and other final actuators.



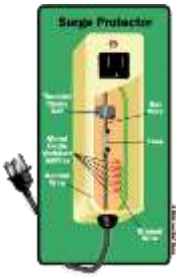
***WHAT ARE THE HART INTERFACE SOLUTION?**

HART® technology is an accompaniment to many of Analog Devices' tailored industrial 4 mA to 20 mA converters. HART technology offers a complementary mode of communication to 4 mA to 20 mA that provides additional information in the form of remote diagnostics and system troubleshooting where it can be used to enhance the safety integrity level rating of a system. ADI offers a family of HART modems and 4 mA to 20 mA converters that can be used together to realize a robust, accurate, and HART Foundation registered solution.



***WHAT ARE THE SURGE PROTECTORS?**

A surge protector limits the voltage supplied to the electrical devices to a certain threshold, by short-circuiting current to ground or absorbing the spike when a transient occurs, thus avoiding damage to the appliances and devices connected to it.



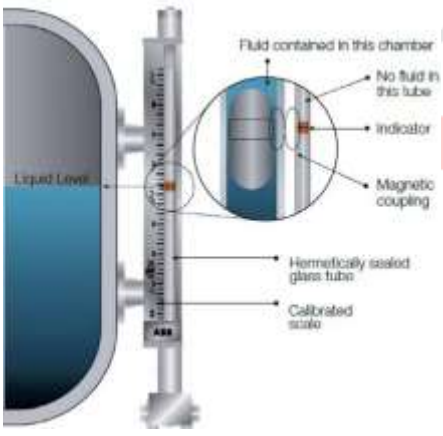
***WHAT ARE THE POWERSUPPLIES?**

A power supply is an electrical device that supplies electric power to an electrical load. The main purpose of a power supply is to convert electric current from a source to the correct voltage, current, and frequency to power the load. As a result, power supplies are sometimes referred to as electric power converters. Some power supplies are separate standalone pieces of equipment, while others are built into the load appliances that they power. Examples of the latter include power supplies found in desktop computers and consumer electronics devices. Other functions that power supplies may perform include limiting the current drawn by the load to safe levels, shutting off the current in the event of an electrical fault, power conditioning to prevent electronic noise or voltage surges on the input from reaching the load, power-factor correction, and storing energy so it can continue to power the load in the event of a temporary interruption in the source power (uninterruptible power supply).

All power supplies have a power input connection, which receives energy in the form of electric current from a source, and one or more power output or rail connections that deliver current to the load. The source power may come from the electric power grid, such as an electrical outlet, energy storage devices such as batteries or fuel cells, generators or alternators, solar power converters, or another power supply. The input and output are usually hardwired circuit connections, though some power supplies employ wireless energy transfer to power their loads without wired connections. Some power supplies have other types of inputs and outputs as well, for functions such as external monitoring and control.

***WHAT ARE THE LEVEL MEASUREMENTS?**

The level measurement is a measurement of fluid level, the measure of height is called a level, like the fluid level in a tank. The measurement of level is very important in a process, so by doing level measurement we can make sure the process is safe. The level measurement is categorized into the top-down and bottom-up level, the top-down measurement is not susceptible to leakage or it can be considered as less leakage process. The top-down measurement could make a contact with the fluid or sometimes it won't, while the bottom-up type makes contact with the process fluid. The level measurement is not only done for fluids it is also used to measure the level of gases and solids.



YOUTUBE LINKS VIDEOS

Proximity sensors:

https://youtu.be/iZkW49IPNF4

https://youtu.be/gz843qlfx0E

https://youtu.be/s2na8CumNR0

https://youtu.be/ghQI6rk4qDw

Photoelectric sensors:

https://youtu.be/RM3SeYjpJdM

https://youtu.be/l1rjErRvbgw

https://youtu.be/QE25-TV1Nm0

Ultrasonic sensors:

https://youtu.be/NEi2K90WYOM

https://youtu.be/sYLMW7QhAJQ

Radar sensors:

https://youtu.be/lw70UzPpc00

Rotary encoders:

https://youtu.be/soImUGrWuhI

https://youtu.be/v4BbSzJ-hz4

Positioning systems:

https://youtu.be/36BD-JwbkhY

Inclination sensors:

https://youtu.be/qFia5MMZMdU

https://youtu.be/pOuvhq6_cg8

Acceleration sensors:

https://youtu.be/4kfzqZpttTA

Intrinsic safety barriers:

https://youtu.be/2zQvaMCfqq8

https://youtu.be/b9DH0Do9Rg4

Signal conditioners:

https://youtu.be/d7y9xg-Bc18

Remote I/O systems:

https://youtu.be/yYn8sA6KC_g

https://youtu.be/urcx_wQ6g8U

Surge Protector:

https://youtu.be/Zc0cD5FvxDQ

https://youtu.be/NnvtTsa6AKQ

power supply:

https://youtu.be/ot9lIXsRXzo

level measurement:

https://youtu.be/VLS7MqKw5mk

https://youtu.be/ylhwPcyieTc