

02/2009

SENSING YOUR NEEDS

The Factory Automation
Newsletter

The Future of the
Photoelectric Sensor
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Nominated for the GIT
Security Award 2010
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$$S = \frac{c \cdot t}{2}$$

$c = 299.792\,458 \text{ m/s}$

PRT

Pulse



Dear Reader,

Good ideas are always welcome, particularly when times are difficult. Innovative solutions are the only way of opening up new markets or expanding existing ones.

This is the sort of challenge we relish! This edition of our customer magazine contains product innovations that will help you fine tune your machines and plants. Whether efficiency, costs, increasing production quality, or better safety standards are your objectives, just about the only way to meet these objectives is to use improved sensors. Sensors are the eyes and ears of a machine, and improved machine control can only be achieved if the feedback from the process is first rate.

The wealth of sensing innovations extends from diffuse mode sensors with time-of-flight measurement to code readers and safety rotary encoders. Our inclination sensor, which is now available with a CAN interface, opens up an entirely new range of automation applications.

I'm certain the following pages will convince you once again that Pepperl+Fuchs is the partner of choice for sensors!

Dr. Peter Adolphs
Management

The Future of the

COMPANY NEWS Measurement instead of Det



Price and reliability are decisive factors in many diffuse mode photoelectric sensor applications. Historically, the sensing range of diffuse mode sensors was heavily dependent on the color of the object being detected. Sensors with background suppression are more suitable, as they use triangulation to perform geometrical suppression, based on the alignment of the transmitting and receiving elements. However, the housing dimensions of these sensors created limitations in terms of accuracy and sensing range.

These limitations would be eliminated if the time of flight was evaluated instead. Light propagation time measurement using PRT (Pulse Ranging Technology) makes this possible at a reasonable price, and is an indicator of the photoelectric sensor's future development.

PRT is not entirely new, as low-cost devices based on phase correlation principles have been available for years. However, these devices have disadvantages in terms of measuring

Photoelectric Sensor

ection



Measurement instead of detection - VDM28 with PRT and additionally IO-Link

accuracy, sensitivity to extraneous light or multiple target capability. These limitations are overcome by direct time-of-flight measurement. With PRT, high-speed electronics are used for direct measurement of the time between transmission, and reception of a brief, high-energy laser pulse. Due to the pulse's high energy density, the system offers much higher immunity to extraneous light. The ability to receive multiple reflected pulses makes it possible to discriminate accurately between several targets in the photoelectric sensor's field of view. Both are significant advantages compared with the phase correlation method commonly used up to now.

With the VDM28 sensor, Pepperl+Fuchs eliminates the dividing line between diffuse mode sensors with adjustable sensing distances, and analog sensors. The VDM28 sensor can be used as a diffuse mode sensor, or an analog sensor, depending on the application. Diverse parameterization options enable the sensor to be optimized to a particular application.

This "all-in-one" philosophy requires a low-cost but powerful interface that is able to transmit switching signals and analog values quickly, and also enables the bidirectional transfer of parameters. The preferred interface solution is IO-Link, as both the transmission method and protocol can be implemented with very minor costs compared with a switching output. IO-Link is compatible with conventional switching outputs, so the VDM28 sensor can also be used on the digital inputs of the PLC.

PRT with IO-Link – the future of the photoelectric sensor has begun!

For additional information please visit our site at:
www.pepperl-fuchs.com/10802

New ML100

PRODUCT Photoelectric Sensor Series

The ML100 is a series of photoelectric sensors designed for universal use in factory automation projects. Thru-beam sensors, retro-reflective sensors, diffuse-mode scanners, and scanners with background suppression are available. All technological aspects feature an optical performance that makes these photoelectric sensors the best on the market. This is achieved by the use of powerful thin-film LED technology. The results are long sensing ranges and excellent visibility of the red light spot. This is an extremely important feature when it comes to the simple and time-saving alignment of the sensors during the commissioning phase.

The ML100 is the only photoelectric sensor on the market with all-metal threaded bushings. This means the screws are easily positioned. The bushings also provide the highest tightening torque and maximum protection against overtightening.

All the sensors have 2 indicator LEDs. A green LED indi-

cates Power On, a yellow LED indicates the status on the optical front ends of the sensors. The indicators follow the conventions used in Europe. A great deal of emphasis was placed on ensuring that the LEDs were clearly visible from every direction.

For additional information please visit our site at: www.pepperl-fuchs.com/10822



New ML100 photoelectric sensor series

Retro-Reflective Area Sensor with 6 Light Beams

APPLICATION Object detected irrespective of its shape and position



Retro-reflective area sensor RLG28

One challenge in material handling is to be able to reliably detect the front edge of an object, irrespective of its shape. Simple photoelectric sensors generally do this well. Misshapen objects are often not properly detected as they generally have a single-point detection area.

The new RLG28 retro-reflective area sensor uses 6 light beams simultaneously instead of one. Its connections are totally compatible with those of the single beam standard photoelectric sensor, so the single beams are easily replaced.

The RLG28 photoelectric sensor creates a 60 mm wide detection area and recognizes any object more than 12 mm in size, irrespective of its shape, position and surface. Constant object detection within the entire detection area is guaranteed up to a distance of 4 m.

This new sensor technology is much more suitable for certain applications than the single beam sensors or expensive light grids. This means that incorrect switching when a gap is detected and the readjustment caused by varying object shapes are now things of the past.

For additional information please visit our site at: www.pepperl-fuchs.com/10814

Nominated for the GIT Security Award 2010

PRODUCT Safety Incremental Rotary Encoder up to SIL3 / PLe

Hit the brakes and win – This may sound paradoxical, but it is, however, possible with the world's first and only TÜV-certified Safety Incremental Rotary Encoder RVS58S, which can be used up to safety category SIL3/PLe. In many production process situations, it is possible to increase productivity with reduced speed. Shutting down machines costs time and money. It is more efficient to protect a plant



GIT Logo description:
A great success for Pepperl-Fuchs. A jury that includes safety experts and representatives from ZVEI, VDMA, BHE, and TÜV Hessen has nominated the RVS58S with certified functional safety from Pepperl+Fuchs. It is one of ten products nominated under the "Safe Automation" category.

in such a way that standstills for safety reasons are not necessary during maintenance and operation. As no additional sensors are required for RVS58S and standard interfaces are used, construction and programming are reduced to a minimum. The RVS58S opens up enormous potential for optimizing safety and productivity. Benefit today from that which sets the standard for the future!

For additional information please visit our site at:
www.pepperl-fuchs.com/10810

World's first and only Safety Incremental Rotary Encoder up to SIL3 / PLe

Robust Design, Easy to Use

PRODUCT Assistance Functions Ensure Reliability

The MNI40 magnetic incremental rotary encoder is a robust measuring system with intelligent diagnostic and adjustment functions. Assistance functions are particularly useful during installation and function testing because they provide information on the correct assembly and functioning of components using a two-color LED. The simple red/green indicator clearly identifies all the relevant status information. The integral self-test incorporates the magnetic wheel into the function testing process in order to meet requirements for quality assurance. The integration of these functions reduces installation times and test equipment costs and offers greater potential for optimizing overall production costs. The internal sensor tests simultaneously increase quality standards during commissioning and operation without requiring additional measures.

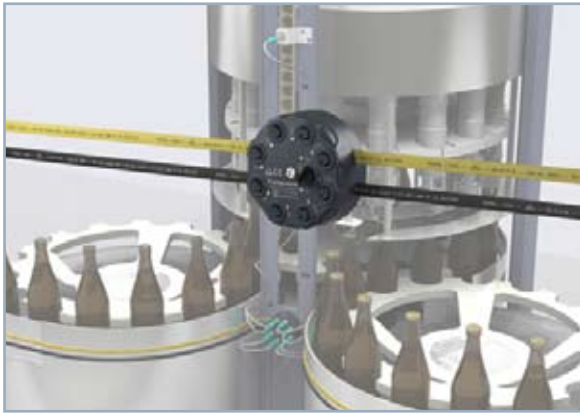
For additional information please visit our site at:
www.pepperl-fuchs.com/10806



Lower costs, improve quality: the MNI40 magnetic incremental rotary encoder

AS-i G11 Module – It’s All Happening!

PRODUCT Perfect IP68/69k protection for every machine and plant



Compact G11 AS-i module based on clean design guidelines

The G11 AS-i module is designed to keep out dirt! The AS-Interface module’s housing has a clean design that prevents dirt buildup, and is sealed to provide IP68/69k protection.

The top section of housing is hermetically sealed with an embedded O-ring, ensuring maximum protection. The G11 AS-i module is 85 mm in diameter and 33 mm in height. It can be integrated in any machine, even when space is limited. The module’s round design makes it easy to position with the flat cable. A central screw ensures an even contact pres-

sure and easy installation. Because the AS-i module is so well sealed, it can be steam cleaned without fear of water ingress.

The module can supply up to 4 amps at the outputs, and up to 2 amps at the M12 port. If the output is overloaded, it is switched off and a red diagnostic LED indicates an overload situation. To provide even greater flexibility, the AS-i module can be directly connected to an AS interface using flat cable or an M12 connecting plug. An individual module can be fitted with a short spur, saving half the cable length.

For additional information please visit our site at: www.pepperl-fuchs.com/10804

Hubtex Chooses Pepperl+Fuchs

APPLICATION Side loader and F99 inclination sensor

Fork inclination display on the HIT2 (HUBTEX Information Terminal) of an electric HUBTEX multiway side loader

HUBTEX Maschinenbau GmbH & Co.KG., which is based in Fulda, makes customized industrial trucks, side loaders and special equipment for heavy and bulky materials. The electrically powered HUBTEX multiway side loader with load ranges from 1.5 – 50.0 tons is a typical example of their equipment. It can easily manage bar stock material, sheet packs, particle board, tools, cable drums, rollers, and oversized pallets whether they are located in narrow-aisle racking installations or freely accessible indoor and outdoor areas.

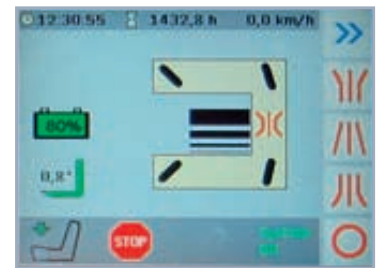
If lift heights are very high or when the driver is unable to see the exact fork inclination in the rack, the F99 inclination sensor from Pepperl+Fuchs can easily solve the problem.

The F99 sensor is mounted to the mast of the electric multiway side loader and transmits the fork inclination to the HUBTEX Information

Terminal in the driver’s cab. The driver in the cab can select the predefined lift height at the touch of a button and store up to 99 positions. He is aware at all times of the exact fork inclination.

The inclination sensor and the HUBTEX Information Terminal speed up the storage and retrieval of the goods in the racks and the loading and unloading of trucks. The system guarantees increased levels of safety at work and ensures that goods are not damaged.

For additional information please visit our site at: www.pepperl-fuchs.com/10812



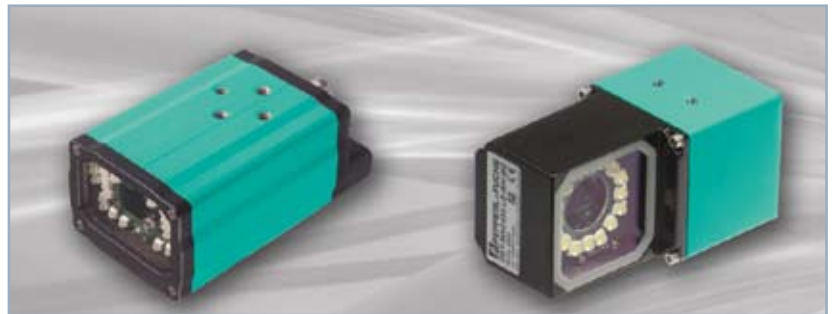
Two High-Performance Code Readers

PRODUCT For all current 1D and 2D codes

With the MAC423-MC and MAC335, Pepperl+Fuchs is launching two innovative stationary readers that can read all common 1D and 2D codes (26 different code symbologies). The MAC423-MC is currently the most powerful code reader made by Pepperl+Fuchs and includes the following features:

- Up to 30 read operations per second at speeds of up to 10 m per second.
- Large read range from 80 mm to 250 mm
- Intuitive operating software via a web browser (the software is already incorporated in the device and no installation is needed)
- Error characteristics memory
- Code quality output
- Multi-code reading
- VGA output for direct monitor/display connection
- Ethernet port
- Robust, die-cast zinc housing

The MAC335 is a high-performance, compact code reader. Its high resolution of 1.3 megapixel enables it to



MAC423-MC and MAC335

read both very small and large codes without having to change settings. The JavaScript functionality, which is unique in this sector of the market, enables the reader to be linked into all common programs and permits evaluations to be carried out on the reader itself.

Both code readers are easy to parameterize using the standard Vision-Configurator user interface. The readers also feature IP65 protection.

For additional information please visit our site at: www.pepperl-fuchs.com/10808

ENCYCLOPAEDIA

PRT – Pulse Ranging Technology

PRT is Pulse Ranging Technology, a direct measurement method for measuring distance. PRT is the most accurate industry-grade distance measuring process.

PRT is an advanced optical measuring method. A laser diode transmits short pulses of light that are reflected by the target object, and then recaptured by a light-sensitive receiver. The power of a single pulse is up to one thousand times more intense than the power of pulses generated by sensors that emit permanent light beams.

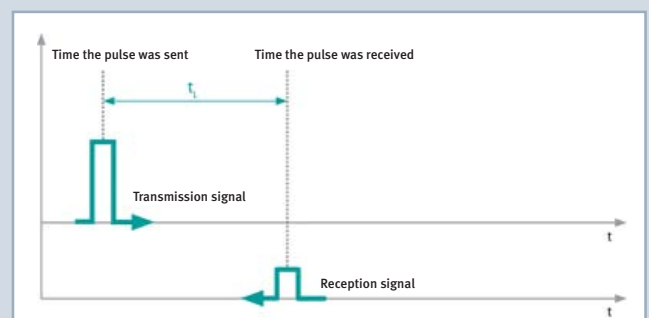
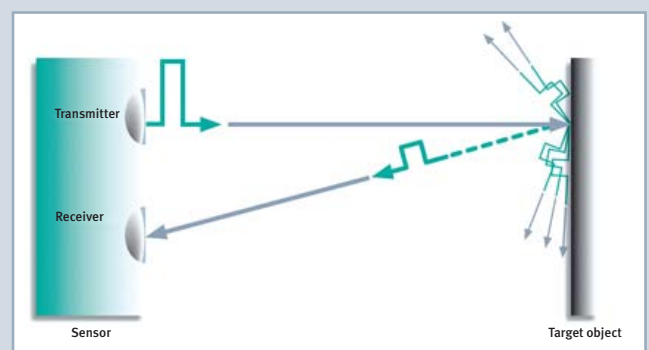
The times at which the pulse was sent and received are accurately measured.

The exact distance (s) from the object is calculated using the measured values (t_L) and the speed of light (c).

$$S = \frac{c \cdot t_L}{2}$$

In modern sensors, this procedure is repeated up to 250,000 times per second.

For additional information please visit our site at: www.pepperl-fuchs.com/10820



Robust Sensors for Mobile Applications

From Protection Class IP69K to e1 Type Approval

Mobile equipment includes numerous commercial vehicle types as well as machinery from the construction, agricultural, transport and dockyard sectors.

switches with cylindrical and cube-shaped designs. With their noise immunity of 100 V/m, the sensors exceed the value of the required 30 V/m by more than 300%.



Harsh ambient conditions make extreme demands on sensors used in the mobile equipment environment.

Sensors for mobile equipment must withstand dirt and moisture, vibration and extreme temperatures – while functioning reliably at all times.

However, sensors are only suitable for the commercial vehicle and mobile sectors if they bring together a number of exceptional properties. The main focus is on stricter leak tightness ratings such as IP67 and IP69K, which can withstand not only all weather and atmospheric conditions, but also treatment with high-pressure cleaners. Only robust mechanical designs with high vibration and shock resistance can withstand these extreme conditions.

A more stringent standard for electromagnetic compatibility came into effect in 2009. Sensors with the new e1 type approval (EUB component type approval) may be installed in any vehicle type and licensed by the Federal Motor Vehicle Authority without requiring .

Sensor specialist Pepperl+Fuchs has designed sensors specifically for the mobile equipment market. These were developed with e1 approval and also conform to the more demanding IP69K degree of protection. The inductive systems include proximity

On cranes, excavators, the prongs of forklifts, and on tilting loading surfaces, the degree of tilt must be monitored frequently. The F99 series of inclination sensors is designed for such applications. Devices are available for monitoring two inclination axes with measuring ranges from 0° to 360°. Parameterization can be performed either via CANopen or using teach-in buttons.

The new PMI series of angle sensors and position measurement sensors are ideal for many outdoor applications involving commercial vehicles and machinery. Non-contact sensing means that there is no wear, even when the sensors are in constant use. The PMI360D measures angles from 0° to 360°, while the F110 length measuring systems have detection ranges up to 210 mm, 360 mm, 510 mm, and 810 mm.

Pepperl+Fuchs can also supply customer-specific versions with made-up automotive connectors.

For additional information please visit our site at: www.pepperl-fuchs.com/10816

EVENTS

**SPS/IPC/Drives Nürnberg
Germany
24.11.-26.11.2009**

**Hannover Messe Industrie
Germany
19.04.-23.04.2010**

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