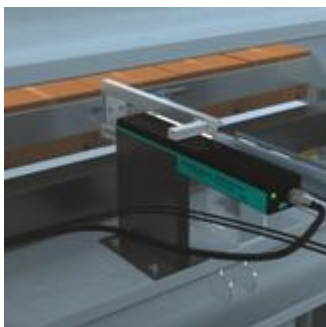


Positioning Systems



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)—Noncontact Positioning and Angle Measurement

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—Reliable Positioning in Material Handling

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 **R1000** and the **R200 with PRT**.



Position Encoding System—Rugged Positioning over Long Distances

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. For **safety applications**, Pepperl+Fuchs combines the advantages of the WCS



Camera-Based Linear Positioning—High Reliability for Long-Distance Measurement

The PXV and PCV Data Matrix positioning systems and the safety versions 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. With



Camera-Based Track Guidance—Reliable Navigation of Driverless Transport Systems

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—Cost-Efficient, Precise Positioning of Stacker Cranes

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.