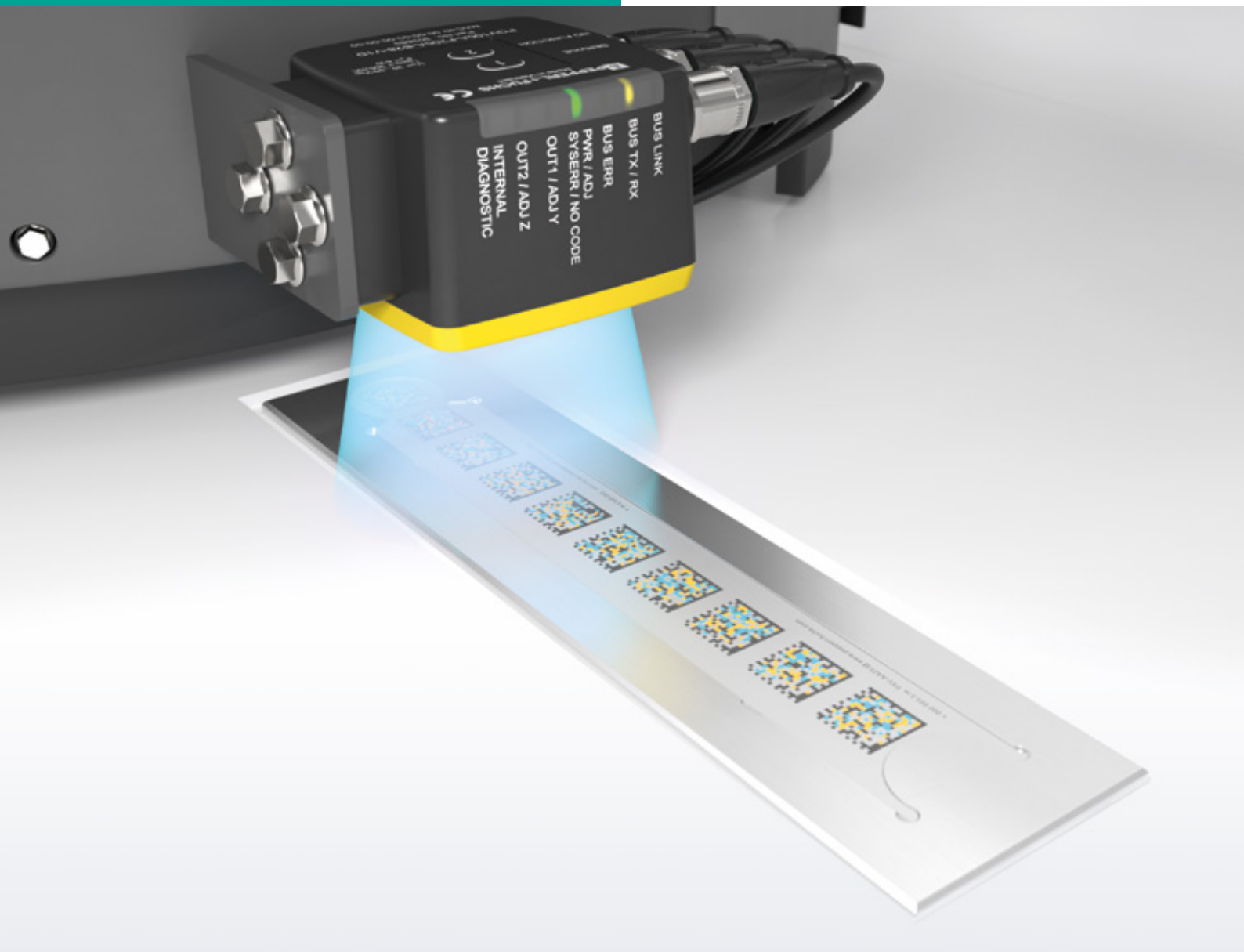
Leading the Way.

From a standard version to a high-end solution—four read heads for top technical performance.

PGV Camera-Based
Track Guidance



Your automation, our passion.

PEPPERL+FUCHS

Technology

Innovation Provides New Perspectives

Pressure from competitors, the need for error-free production, and stringent quality standards—the demands placed on modern factory automation are constantly growing. To stay one step ahead of market requirements, Pepperl+Fuchs develops creative solutions that set new standards for modern technology.

The Perfect Combination: High-End Technology Meets Simple Handling

The PGV positioning system from Pepperl+Fuchs is the first Data Matrix positioning system in the world that combines color tape tracking and exact positioning via Data Matrix codes in one device. Since the PGV provides all the required data, the user can choose freely between navigation by color track, Data Matrix track, and tag mode, depending on the application requirements.

However, this innovative high-end technology does not make the device complicated to operate. On the contrary, the positioning system has been developed by application experts using their practical experience, with practical applications in mind. Their focus was not only on extensive functionality and impressive performance, but above all, on simple, comfortable operation.

In addition to quick, uncomplicated commissioning via plug and play and easy installation, this is reflected, for example, in the high level of flexibility with which applications can be adapted to growing requirements. Different color and code tapes can be used to lay and convert tracks quickly at any time in the event of changes to production processes.

For more information, visit
pepperl-fuchs.com/pf-pgv

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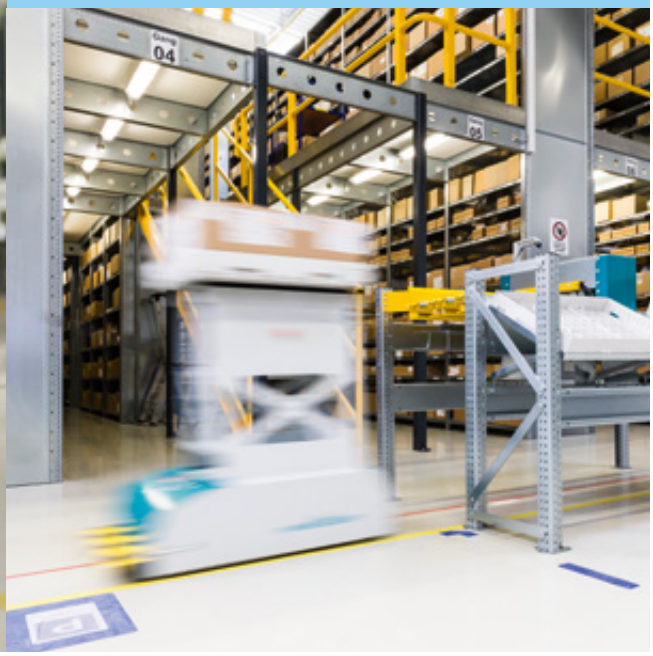

04

Position-Guided Vision

The Benchmark for Optical Track Guidance

Optical color-tape tracking for movement, Data Matrix codes for positioning, and control codes for controlling processes: this unique combination brings together the advantages of two high-performance technologies in a single device, ensuring a high degree of process reliability and efficiency.

Innovative Technology for Auto-Guided Transport Systems

The combination of these two technologies in one device opens up new possibilities for optical guidance of auto-guided transport systems (AGTSs). The specified path is followed automatically while the device continuously reports back the speed and position at the same time.

Combined with continuous status feedback, this provides outstanding performance and more secure and efficient processes.

Open Protocol Ensures Flexible Handling

In practical applications, the PGV positioning system is also incredibly versatile. The open protocol makes the technology suitable for all control systems. Integrated interfaces allow easy and quick connection. All common interfaces, including the switching inputs and outputs, are integrated into the sensor housing.

The camera can be parameterized using the vehicle controller, a parameterization tool, or code cards, which makes commissioning very easy.

Rugged and Reliable

The PGV positioning system has powerful LED lighting, which makes it resistant to environmental influences. Neither ambient light nor highly reflective surfaces impair its performance, making it suitable for a range of applications.

With the PGV positioning system, the optics are purely oriented toward the “region of interest” and optimal lighting is selected for the choice of aperture and shutter time. This means that overexposure is physically ruled out and the ambient light cannot affect the reading performance. This eliminates the need for additional contrast tapes.

A wide range of color tapes and dirty or damaged tracks can be safely read through the large reading window. Track widths from 10 mm to 40 mm are easily detected.

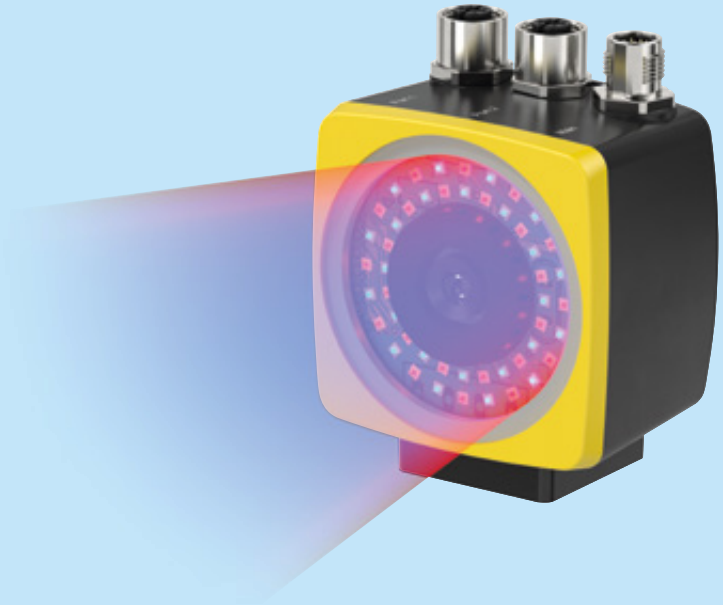
Highlights

- Flexible navigation via color tape, Data Matrix codes, or a combination of both—for maximum investment security
- Process reliability is ensured by reliable tracking even on highly reflective surfaces and in the event of dirt or destruction
- No additional contrast tapes required thanks to unique resistance to ambient light > 100,000 lux
- Easy installation and commissioning with plug and play
- Simple expansion or customization of the systems possible

Excerpt of Technical Data	PGV*F200*	PGV100A-F200*	PGV*F213*	PGV*I*F200
Traversing speed	≤ 8 m/s	≤ 8 m/s	≤ 8 m/s	≤ 8 m/s
Light type	Blue/white	Blue/red	Red	Infrared
Depth of focus	± 20 mm	± 30 mm	± 30 mm -15 mm to +25 mm	± 30 mm
Reading distance	100 mm	100 mm	40 mm 100 mm	100 mm 150 mm
Reading range	120 mm x 80 mm	120 mm x 80 mm	80 mm × 60 mm to 120 mm × 80 mm	120 mm × 80 mm to 170 mm × 105 mm
Cycle time	40 ms	25 ms	10–25 ms	10–25 ms
Latency	60 ms	50 ms	20–50 ms	20–50 ms
Accuracy	± 0.2 mm	± 0.2 mm	± 0.2 mm	± 0.2 mm
Positioning targets	Data Matrix code tape Data Matrix tags Data Matrix control codes Color tape	Data Matrix code tape	Data Matrix code tape Data Matrix tags Data Matrix control codes	Data Matrix code tape Data Matrix tags Data Matrix control codes
Other features	Light control	SIL 3/PL e	Synchronization pulse, timestamp	No visible light

Highly Specialized Portfolio, Suitable for Every Application

The PGV positioning system from Pepperl+Fuchs comprises four basic device versions that are tailored precisely to the different application requirements. The system therefore offers the right read head for every application, from the standard device to the highly specialized safety version.

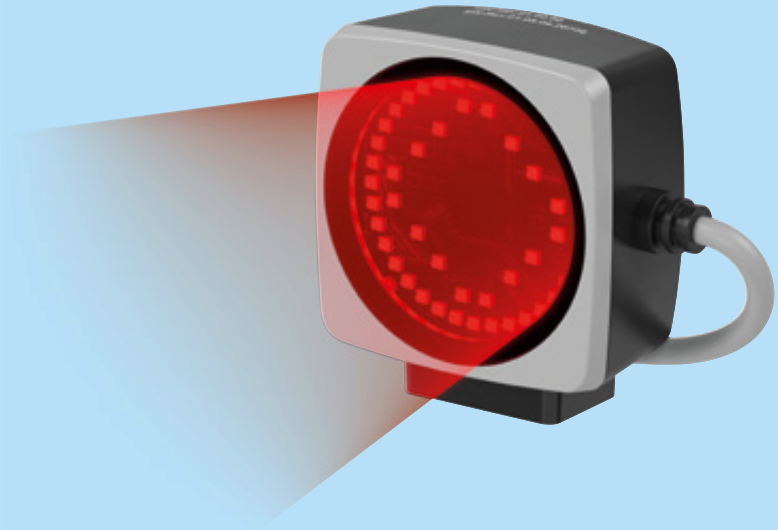


PGV*F200*: The All-Rounder Read Head

The PGV*F200* boasts the ability to choose between navigation via color track tape, Data Matrix code tape, Data Matrix tags, or a combination of these positioning targets. Due to this huge flexibility, the device offers maximum investment security and future-proofing. The extra-large reading window, combined with 2-D image capture, reliably detects damaged or dirty track tapes, and the unique ambient light insensitivity of more than 100,000 lux removes the need for additional contrast tapes. The open protocol of the PGV enables integration into any controller, and the simple installation and commissioning via plug and play ensure highly convenient handling.

PGV100A-F200*: Safe Navigation to SIL 3/PL e Standard with Just One Sensor

The safePGV from Pepperl+Fuchs makes it possible to use a single sensor to achieve safe absolute positioning and identification in line with SIL 3/PL e for the first time. It can be used wherever applications have to meet the highest safety requirements—such as when people may come into contact with the plant and when reliably identifying vehicles and plant areas. The unique combination of a special 2-D read head with a multicolor Data Matrix code tape enables the output of secure data directly from the sensor.



PGV*F213:
Especially Economical and Extra Compact

Where bots (small automated guided vehicles) are used in large numbers, technology-optimized device versions are of particular importance. The PGV*F213 has been specially developed for economical applications and bots in fleet management. The read head works with red light, and navigation is carried out using either Data Matrix tracks or Data Matrix tags. Due to the extra-compact housing design, the device is ideally suited for confined spaces in bots and small AGVs.

PGV*I*F200:
The Infrared Version

The PGV*I*F200 uses invisible infrared light. This device version is therefore especially suitable for positioning in areas where no visible light may be used. The absolutely reliable navigation of this PGV is carried out using either Data Matrix tracks or Data Matrix tags.

The Positioning Targets: From Highly Flexible to Ultra-Rugged

Color tapes, Data Matrix control codes, or Data Matrix tags—Pepperl+Fuchs offers positioning targets in various designs and materials, all of which are matched to the requirements and ambient conditions of the individual application for outstanding precision and maximum reliability in positioning and track guidance.

Adhesive Code Tapes: Simple, Flexible Track Routing

The easy-to-affix color tapes, code tapes, and tags from Pepperl+Fuchs offer the greatest possible flexibility in application. They can be used to change the track with little effort, so changes to the production processes can be implemented quickly and conveniently. The polyester laminate positioning targets are ideal for areas subject to moderate use. In addition, painted track tapes are detected with absolute reliability and offer higher mechanical robustness for more demanding ambient conditions.

Metal Code Bars and Tags: Extra Rugged and Resistant

Where ambient conditions place high demands on devices and materials, Pepperl+Fuchs metal code bars and tags are the optimal solution. The code bars are characterized by extreme resistance to mechanical stress and high durability. They are temperature-resistant, dirt-resistant, and easy to clean. The metal bars are even resistant to contact with chemical cleaning agents and dry ice.

They are available in lengths of 100 mm, 200 mm, and 500 mm and are ideal for curves or dynamic areas. The metal code bars can be glued directly to the floor with little effort, or installed using drive-over or countersunk profile rails for additional mechanical protection. For all three options, a strong adhesive is applied to the underside to enable effortless bonding of the code bars.

Exact positioning and route tracking via Data Matrix code tape

Reliable tracking of different tape widths—from 10 mm to 40 mm

Grid navigation on up to 100,000,000 Data Matrix tags

Seamless tracking of damaged or dirty track tapes and Data Matrix code tapes

Rugged metal Data Matrix code bars and tag plates

Reliable track guidance even on highly reflective surfaces

Exact Positioning: PGV Solutions for All Application Requirements

Whether for real-time positioning in fleet management, positioning under load, or secure identification—the PGV portfolio from Pepperl+Fuchs is characterized by impressive precision and maximum flexibility in its application. Highly accurate absolute positioning of automated guided vehicles is guaranteed at all times.

Real-Time Positioning for Quick Auto-Guided Transport Systems

In large warehouses and distribution centers, hundreds of auto-guided transport systems are often in use at the same time. These systems, known as bots, transport prepacked shipping containers at high speed to the next station. To avoid collisions, the routes of the vehicles must be perfectly coordinated and reliably monitored in real time. This is the only way to ensure that the AGVs can move at full speed a few centimeters away from each other without colliding. The PGV*F213* from Pepperl+Fuchs enables high-precision synchronization between the controllers of the individual bots and the higher-level master controller through a synchronization pulse and timestamp on 2-D image captures.

Highly Precise Alignment When Picking Up Load Carriers

To transport rack systems or trolleys to a specified location, the bots move under the load carrier, lift it up, and reliably transport it to the target location. The challenge here is to clearly identify the right rack and ensure the exact position and orientation when driving under to allow proper pickup and transport without risk of the load tipping. With precise position determination in real time, the PGV*F213* from Pepperl+Fuchs enables both the unambiguous identification of the AGV and the exact alignment of the bot underneath. Maximum process stability is therefore guaranteed at all times. With its compact housing, the device is also ideally suited for the limited installation space in vehicles that need to move around in confined spaces.

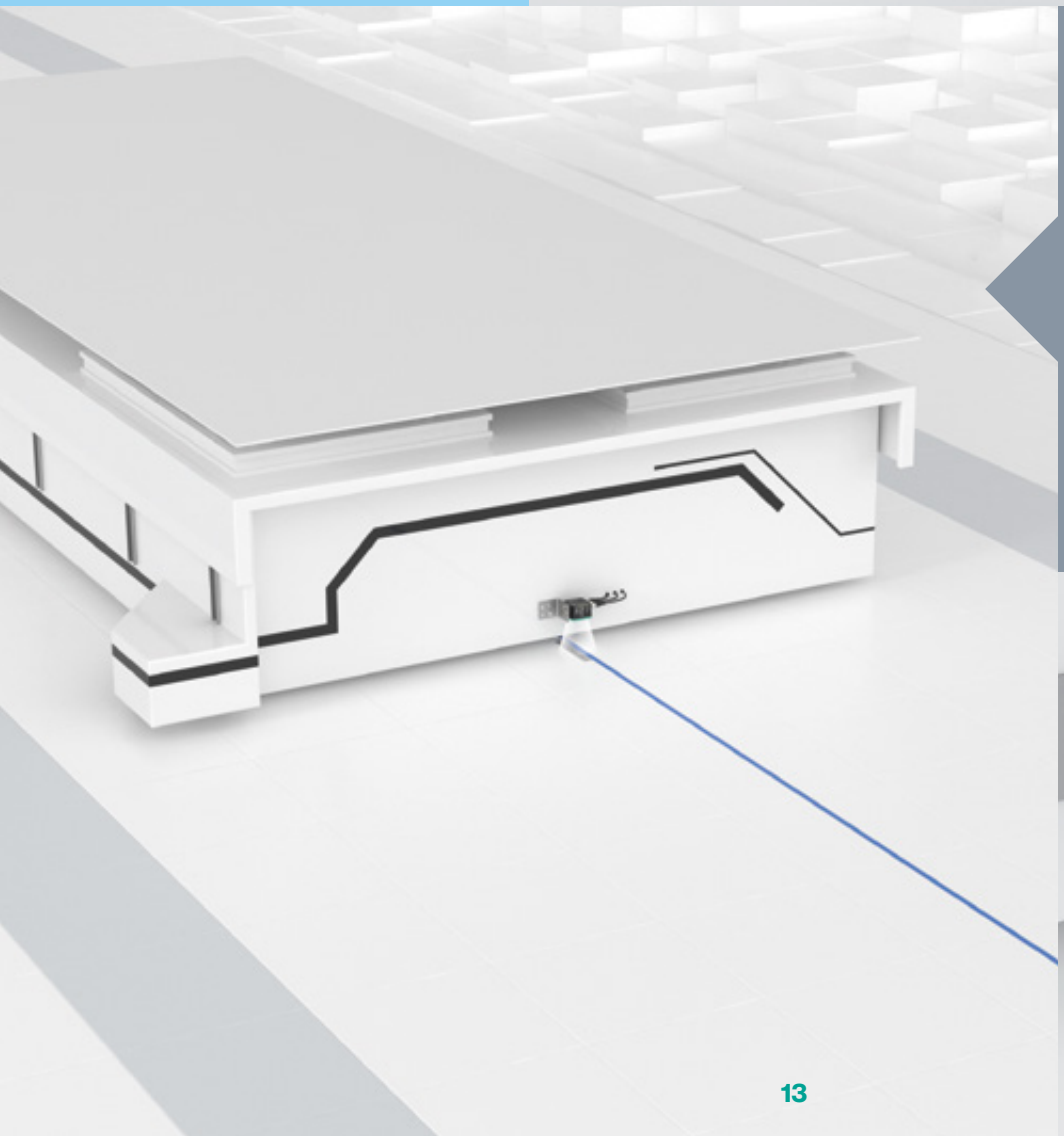
Precise Docking and Reliable Identification Compliant with SIL 3/PL e

To ensure a smooth transfer of load carriers, automated guided vehicles must automatically detect the activated transfer stations and drive to the specified position. This not only requires absolute identification of the right vehicle in the right position—the AGV must also communicate with system components such as an automatic gate controller and an emergency stop circuit in an absolutely secure manner. With an accuracy of up to ± 0.2 mm, the safePGV from Pepperl+Fuchs ensures the prerequisites for the exact positioning of the AGV are met. The safe position signal ensures reliable identification of the AGV and enables secure communication with the higher-level controller.

Infrared Version Ensures Excellent Taste

Food is sometimes stored in absolute darkness. For example, light can affect the flavor of spirits, so exposure to daylight and all artificial light sources should be completely avoided. This means that the sensors used in the storage areas have to do without conventional light. The auto-guided transport systems used to transport the crates containing the bottles to and from dark storage areas navigate using code tapes on the floor to find the correct position. Since the devices have to operate without any harmful light sources, the PGV with infrared light is the perfect solution for these application requirements.

PGV with infrared light for applications where conventional light cannot be used



Trigger-specific control processes along the route of the auto-guided transport system using Data Matrix control codes

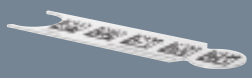
Plastic Positioning Targets

Metal Positioning Targets

Continuous color tape

Data Matrix code tape

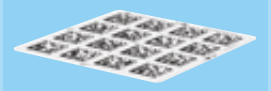
Continuous tape

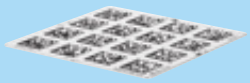


Length: 100 mm, 200 mm, or 500 mm

Data Matrix control codes

Data Matrix tags





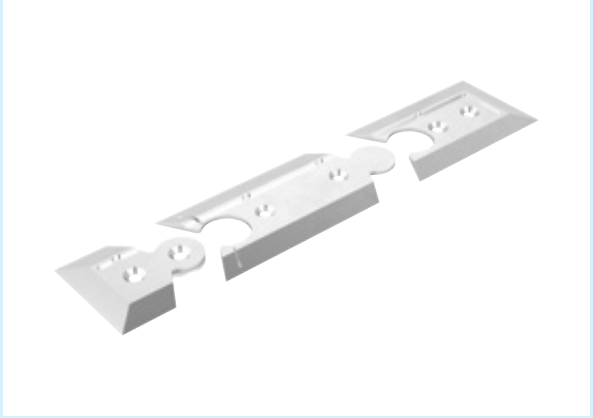
Data Matrix code tape for safety applications

Continuous tape

Length: 100 mm, 200 mm, or 500 mm

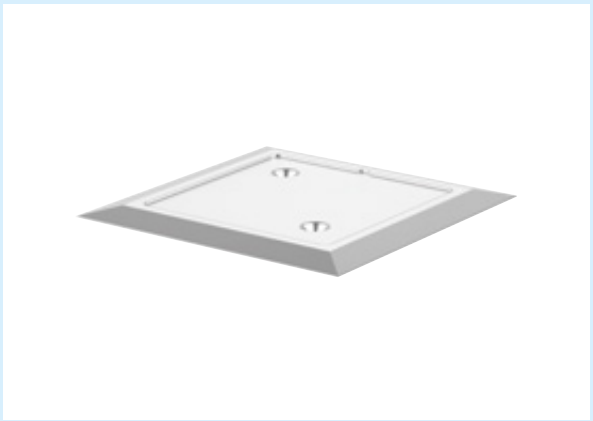
Mounting for Metal Positioning Targets

Countersunk profile rail for metal code tapes with start and end segment

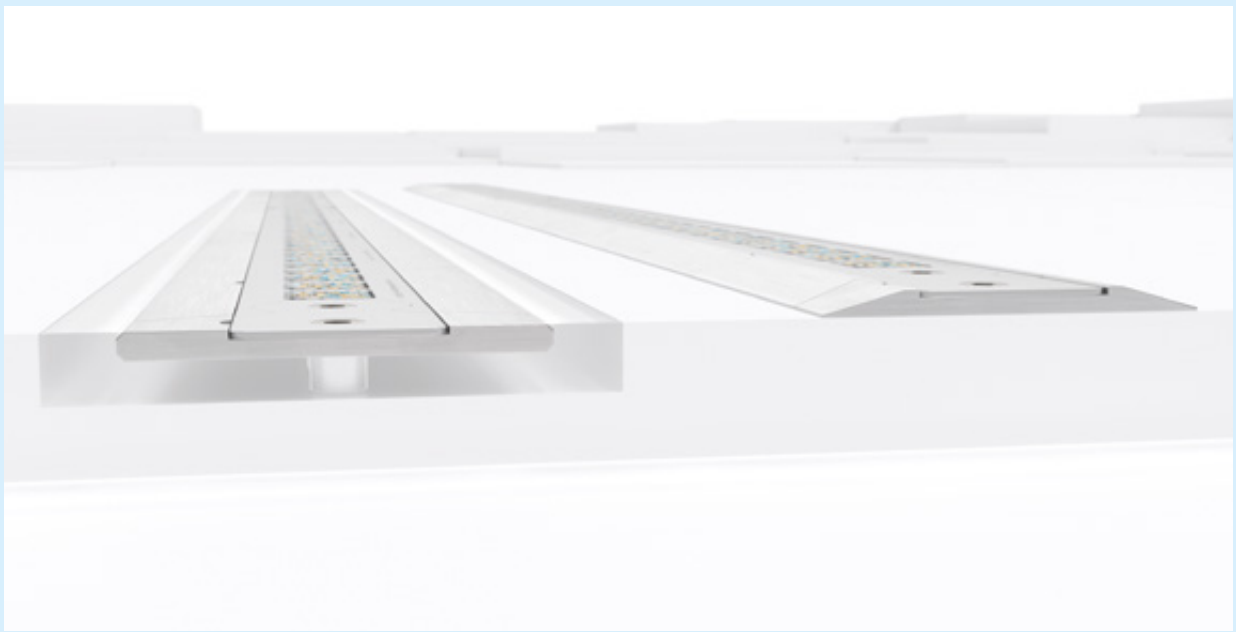


Drive-over profile rail for metal code tapes with start and end segment

Countersunk profile plate for metal tags



Drive-over profile plate for metal tags



Continuous countersunk profile rail for metal code tapes (Length: 100 mm, 200 mm, 500 mm)

Continuous drive-over profile rail for metal code tapes (Length: 100 mm, 200 mm, 500 mm)

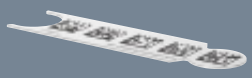
Plastic Positioning Targets

Metal Positioning Targets

Continuous color tape

Data Matrix code tape

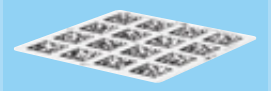
Continuous tape

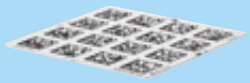


Length: 100 mm, 200 mm, or 500 mm

Data Matrix control codes

Data Matrix tags

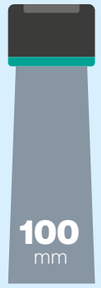
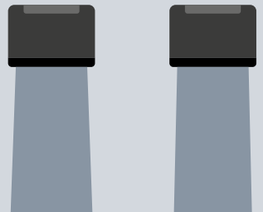
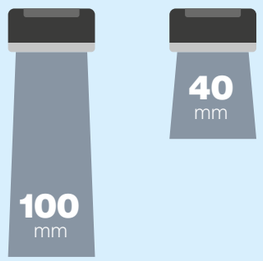
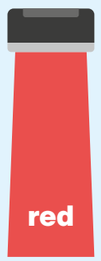
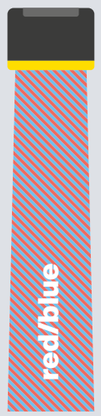




Data Matrix code tape for safety applications

Continuous tape

Length: 100 mm, 200 mm, or 500 mm

Design	Interfaces	Electrical Connection	Reading distance	Light type	Special Features
F200	PROFINET, RS485	M12 connector plug	 100 mm	white/blue	≤8 m/s Traversing speed
F200A	CANopen, EtherNet/IP, PROFIBUS, PROFINET, RS485				
F200	CANopen	M12 connector plug	 100 mm, 150 mm	infrared	IR Infrared light (for plastic positioning targets); ≤8 m/s Traversing speed
F200A	EtherNet/IP, PROFINET				
F213	CANopen, RS485	Fixed cable	 100 mm, 40 mm	 red	Construction depth: 35 mm; 00:00:05 Timestamp; SYNC Synchronization pulse; ≤8 m/s Traversing speed
F200	PROFINET, PROFIsafe	M12 connector plug	100 mm	 red/blue	SIL 3, PL e; ≤8 m/s Traversing speed
F200A					

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