Automatic Warehouse Positioning and Collision Prevention

Industries: Crane / Logistics
Application type: Positioning

Description

A company specializing in engineering, projects, maintenance, and consultancy focuses on lifting systems for both indoor and outdoor applications. With its own engineering department, the company is able to translate specific customer requirements into practical lifting solutions.

For this application, an automatic warehouse system was developed for a customer in the automotive industry. The system travels on ground-mounted rails and is equipped with a tall mast on which a lifting system is installed. This configuration allows the machine to retrieve goods from the warehouse at heights of up to 30 m using forks.

At the customer's site, the automatic warehouse is controlled by a Siemens PLC communicating via PROFINET. This required the position sensor used for accurate spatial positioning in front of the storage racks to also communicate via PROFINET. Based on the required measuring distance and accuracy, the Dimetix DEN-10-500 laser distance sensor was selected for this positioning task.

This IP65-rated sensor provides a measurement accuracy of 1 mm and a repeatability of 0.3 mm. The measuring range is up to 100 m on natural surfaces and extends to 500 m when a reflective foil is used. The decisive factor for the selection, however, was the sensor's ability to communicate via PROFINET, EtherNet/IP, and EtherCAT, combined with its immediate availability.

In addition, a solution was required to prevent cranes traveling on the same rail from colliding with each other. Such protection is mandatory under applicable legislation and regulations and can be implemented in various ways. In this case, a laser distance sensor with two easily adjustable switching points was chosen.

In the automatic warehouse, the first switching point causes the crane to slow down when the measured distance indicates that it is approaching another crane. The second switching point causes the system to stop completely, thereby preventing a collision, provided the opposing system is also equipped with the same protection.

The sensor used for this safety function is the DBN-50-050, offering a measurement accuracy of 5 mm, a repeatability of 1.8 mm, and a measuring distance of up to 50 m.

Dimetix Sensors – the solution for applications with high precision requirements

Thanks to the clearly arranged product portfolio the evaluation of a suitable Dimetix Laser Distance Sensor is simple and uncomplicated.

Dimetix sensors offer numerous features, which are integrated in each and every device as standard, including, among others, various interfaces like SSI, RS-422/485, RS-232 and 2 digital outputs.
Optionally, the Industrial Ethernet interfaces PROFINET, EtherNET/IP and EtherCAT are also available. Furthermore, all devices are IP65-protected and impress with a weight of less than 500 grams!

Particularly noteworthy, however, is the accurate measurement of 1 millimeter over distances of up to 500 meters, even under the most extreme conditions. This is possible with the sensors of the types DPE, DEN and DEH.

No less interesting are sensors of types DAE, DAN and DBN. Preferably, they can be used for projects which do not require a range over 500 meters or are cost-sensitive.

	DPE-10-500	**DPE-30-500**	**DEN-10-500**	**DEH-30-500**
PARTNUMBER	500630	500636	500637	500638
SPECIFICATION				
Typical accuracy ≅ ± 2σ	± 1 mm	± 3 mm	± 1 mm	± 3 mm
Mensurierung range on natural surfaces	0.05…~100 m	0.05…~100 m	0.05…~100 m	0.05…~100 m
Measuring range on reflective foil	~0.5…500 m	~0.5…500 m	~0.5…500 m	~0.5…500 m
Max. measuring rate	250 Hz	250 Hz	100 Hz	100 Hz
Operating temperature	-40…+60°C	-40…+60°C	-10…+50°C	-10… +60°C

	DAE-10-050	**DAN-10-150**	**DAN-30-150**	**DBN-50-050**
PARTNUMBER	500633	500632	500634	500635
SPECIFICATION				
Typical accuracy ≅ ± 2σ	± 1 mm	± 1 mm	± 3 mm	± 5 mm
Mensurierung range on natural surfaces	0.05…~50 m	0.05…~100 m	0.05…~100 m	0.05…~50m
Measuring range on reflective foil	~40…50 m	~40…150 m	~40…150 m	
Max. measuring rate	100 Hz	100 Hz	100 Hz	10 Hz
Operating temperature	-40…+60°C	-10…+50°C	-10…+50°C	-10…+50°C