Precise Position Data and Speed Measurement for AGVs

Compact and rugged rotary encoders provide reliable measurement results

At a Glance

- Sensors that precisely self-monitor for accurate position data
- Highly accurate speed measurement
- Rugged devices with a high degree of protection for use outdoors and in harsh environments
- Compact design for flexible integration in the application
- Simple integration in the controller without complex protocol



The Application

In production and warehouse logistics, automated guided vehicles (AGV) and autonomous mobile robots (AMR) take on a variety of transport tasks. Precise navigation of such autonomous units is required to ensure smooth processes. Here, odometric procedures—the measurement of wheel revolutions or individual steps—provide important data for determining the position. This information is especially vital for cornering and evasive maneuvers.

The Goal

Transport operations should be carried out as quickly as possible, with the respective destinations being reliably approached. Since obstacles can arise and the environment is often subject to constant change, great flexibility and quick responses are required when navigating the transport route. The vehicles and robots must be able to follow the controller specifications when driving straight ahead and when cornering. The sensors must self-monitor the vehicle position to provide precise position data at all times.



The Solution

While optical sensors perform the task of spatial orientation, the autonomous vehicles require additional data to precisely determine their own position. To improve position determination, two measuring systems can be combined, for example a rotary encoder and a 2-D laser scanner. To reliably compensate for measurement tolerances and deviations, ENI58IL, TVI40, or MNI series rotary encoders are mounted on the wheels of the vehicle. Accurate position data can be derived from the precise measurement of the rotational speed. ENI58IL devices have a high resolution (up to 5000 pulses). The TVI40 series is especially compact and cost-effective. The MNI series allows noncontact and bearing-free detection with a magnetic scanning method. The devices are very compact and reach up to 327,680 pulses.

The Benefits

Speed control based on the rolling speed of the wheels is much more accurate than using a laser scanner or acceleration sensor. The higher the accuracy when determining the rolling speed, the higher the accuracy when calculating the vehicle speed and distance traveled. These devices reliably deliver highly accurate measured values; the resolution can be selected according to the respective requirements. Compact designs allow for simple integration. Integrating the devices into the controllers is also easy, because no complex protocol is required between the sensor and the controller.

Technical Features

ENI58IL

- Optical scanning method
- Rotational speed up to 12,000 rpm
- Resolution up to 5000 pulses
- Temperature range: –40 °C ... +85 °C
- Degrees of protection: IP65, IP67
- Shock/vibration resistance: 300 g/30 g
- Interface: push-pull or RS-422, universal current driver

TVI40

- Optical scanning method
- Rotational speed up to 6000 rpm
- Resolution up to 1024 pulses
- Temperature range: –10 °C ... +70 °C
- Degree of protection: IP54
- Max. shaft load: axial 20 N, radial 30 N
- Interface: push-pull or RS-422

MNI

- Magnetic scanning method, noncontact
- Rotational speed up to 30,000 rpm
- Resolution up to 327,680 pulses*
- Temperature range: –40 °C ... +100 °C
- Degree of protection: up to IP68
- Interfaces: push-pull or RS-422

*pulse count depends on different factors



For more information, visit: **pepperl-fuchs.com/px-incr-encoder**