Rugged Pallet Detection for Autonomous Forklifts

R2400 2-D LiDAR Sensor for Compact 360° Sensing

At a Glance

- Compact design with a height of just 81 mm for tight installation spaces
- Full 360° environmental detection for flexible mounting and optimized processes
- Robust metal construction for reliable performance even under mechanical stress
- Precise pallet-foot detection due to high angular resolution of up to 0.05° and optimized light spot geometry

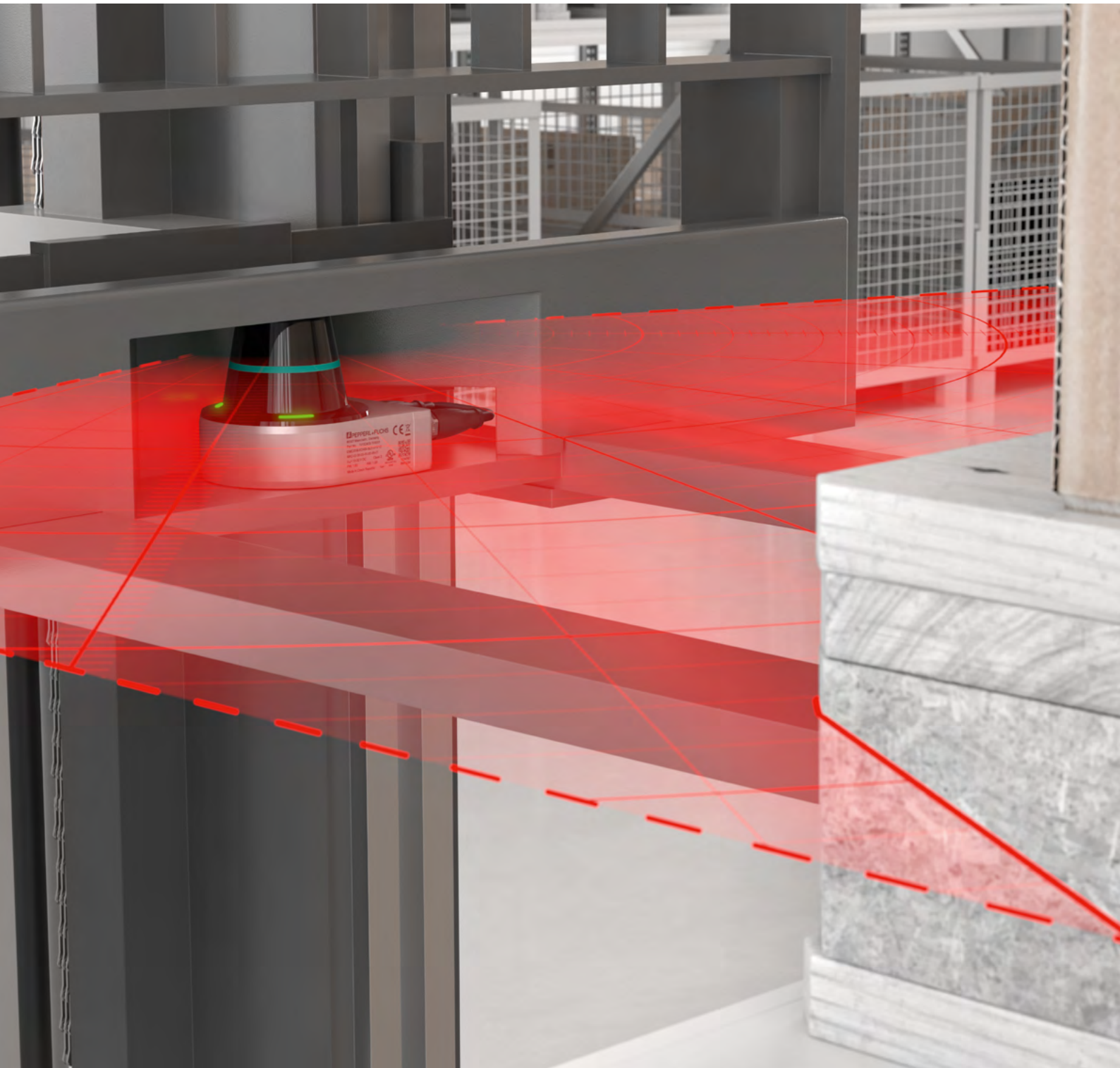


The Application

In logistics automation, automated guided vehicles (AGVs) are used to transport pallets efficiently and autonomously. To reliably pick up the load, the vehicle must precisely detect the pallet feet and position the forks exactly. The sensor is mounted directly on the fork carriage and detects the area in front of the vehicle during load pickup.

The Goal

The key challenge lies in combining a compact form factor, rugged design, and precise measurement technology. The sensor must be integrated into the confined installation space of the fork carrier, withstand mechanical stresses, and still deliver reliable measurement data for precise fork positioning. At the same time, the solution must be cost-effective and low-maintenance.







The Solution

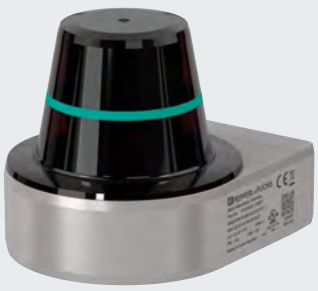
The R2400 2-D LiDAR sensor combines compact dimensions with industrial ruggedness. With a height of just 81 mm, it can be easily integrated into the fork carrier. Full 360° all-around detection enables flexible sensor alignment regardless of the mounting situation. Due to a high angular resolution of 0.05° and precise angular accuracy, the pallet feet are reliably detected. Precise alignment holes ensure a reproducible sensor position, which allows for quick commissioning without recalibration in the event of a replacement.

The Advantages

The durable metal construction, featuring a sturdy sensor housing and high-quality bearings, ensures a long service life and consistent measurement performance, even under mechanical stresses such as vibrations. Users benefit from reliable and reproducible pallet detection, which prevents misalignment and optimizes material flow. The compact design significantly reduces integration effort. The optical separation of the transmitter and receiver minimizes maintenance-related downtime, as dirt or condensation on the cover does not significantly affect measurement quality. This results in extended maintenance intervals and reduced service costs over the entire product life cycle.

Technical Features

- Measuring range: 25 m at 90% reflectivity, 10 m at 10% reflectivity, 40 m with reflector
- Scanning angle: 360° for full 360-degree coverage
- Scan rate: 10–20 Hz for dynamic applications
- Angular resolution: up to 0.05° for high-resolution point clouds
- Repeat accuracy: < 16 mm
- Compact height of 81 mm for integration into confined spaces



For more information, visit: **pepperl-fuchs.com/px-R2400**