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Collision Protection for Harbor Cranes

Ultrasonic Sensors Make Moving Around Safer

The Application

Container ships must be unloaded quickly – time is money. Large ships use multiple cranes simultaneously to transport their cargo from a ship to land. For lateral movement along the dock and the side of the ship, the cranes run either on rails or on rubber tires. In both cases, they share the same monorail track, meaning they could hit neighboring cranes on the left or right. A sensor-based control system prevents collisions.

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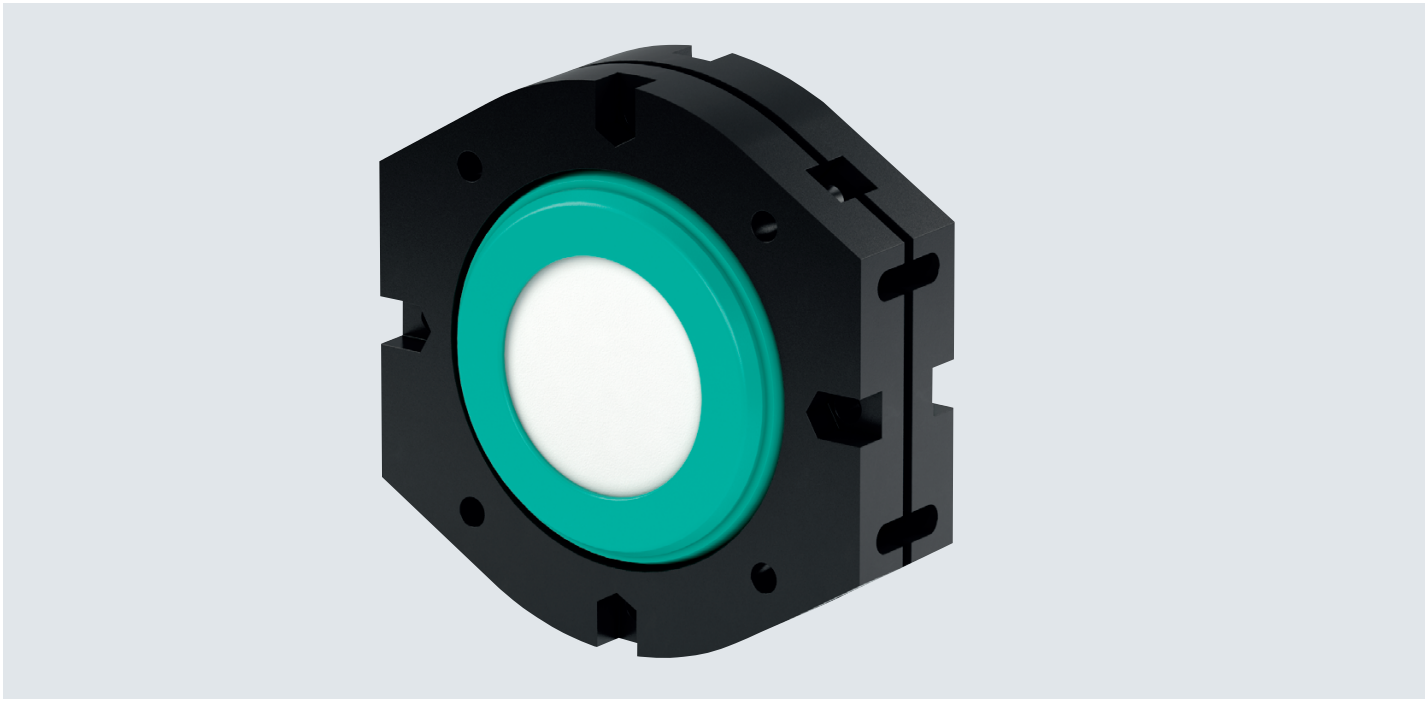

The Goal

Collisions must be prevented between the cranes themselves, as well as with other objects that might cause accidents in their path. The cranes are in use 24/7 and are exposed to all weather conditions including rain, snow, wind, strong sunlight, mist, and salty air. Under these harsh conditions, the sensors must reliably monitor a range of up to 10 m in the direction the crane is moving. There must be no mutual interference between the cranes' individual signaling systems, and no unnecessary stops.

The Solution

One or two ultrasonic sensors are mounted on the crane for each direction it travels. The number of sensors depends on how large the area to be monitored is, and whether you need to detect other vehicles or objects in addition to the cranes. The mounting orientation, synchronization of parallel devices, and use of different ultrasonic frequencies all prevent sensor cross-talk. Typically, ultrasonic sensors with two switching outputs are used. The first switches from normal to slow driving speed, the second triggers the stop. 30GM sensors (6 m detection range) and the F260 series (10 m detection range) are ideal for this application.

The Benefits

The wide, cone-shaped measuring area of ultrasonic sensors ensures complete crane path monitoring. Their operation is unaffected by adverse weather conditions to the greatest possible extend, and they can recognize objects regardless of color, shape, or surface texture. Ultrasonic sensors are completely unaffected by dust, oil, and other buildup. Setting switch points is quick and easy. The same applies for synchronization. The IP67 protection degree enables safe outdoor use.

At a Glance:

- Reliable collision protection
- Monitors the crane's path with one sensor for each travel direction
- Maintenance-free operation
- Unaffected by dusty and dirty conditions or bad weather

More information can be found at:
www.pepperl-fuchs.com/ultrasonic

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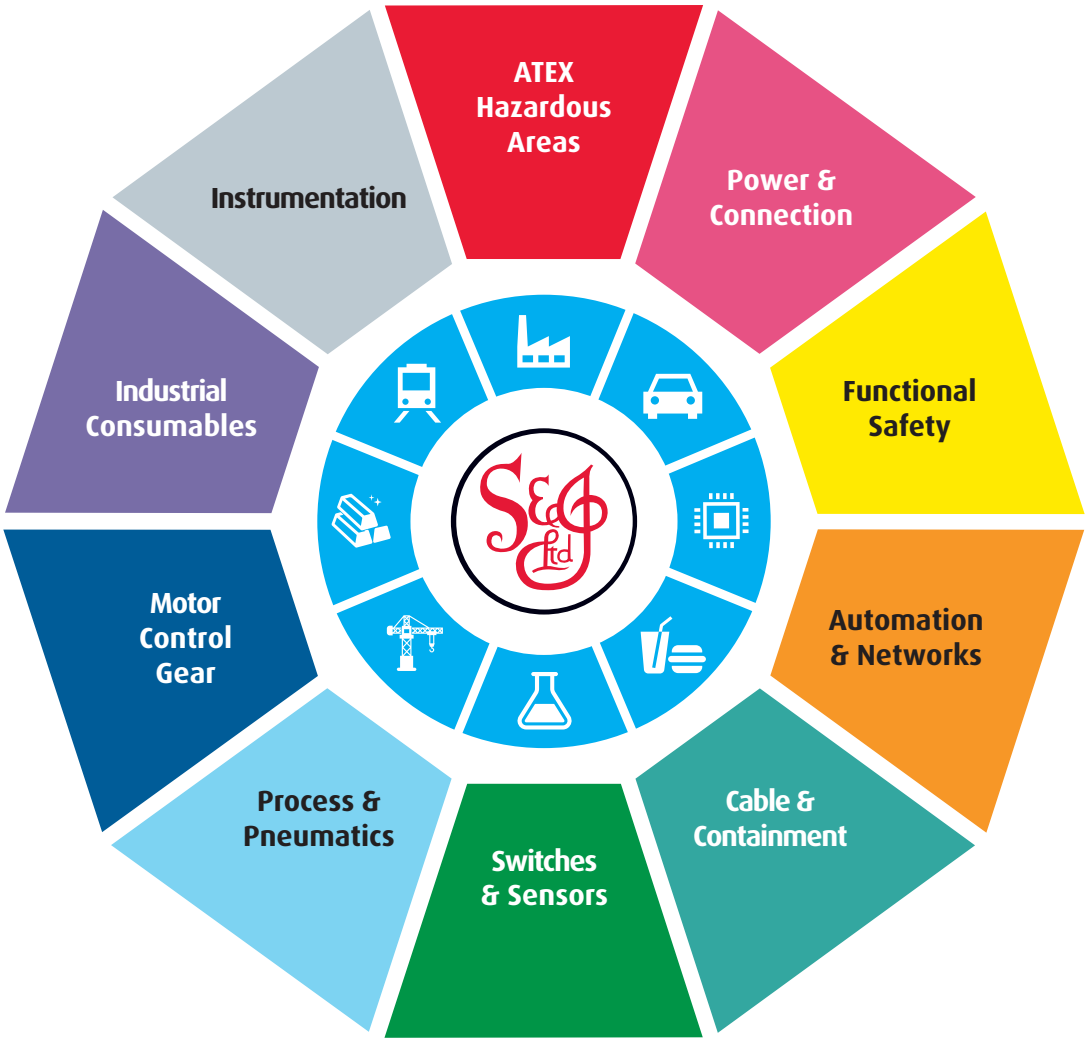

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