Honeywell

Application Note

Limitless™ Wireless Solutions on Automotive Factory Floors

Background

Automotive factory floors (AFF) have many applications that can benefit from wireless switch technology. As auto makers update processes and make lines more efficient, wireless technology can be a key element for improving reliability, cost of operations and production speed.

Engine block transmission case machining centers, engine block boring tables, automated assembly lines, engine block conveyors travelling from heat treating, automated robots, and operator line switches are just a few AFF applications requiring switches for safe, successful operation. Traditionally, hard-wired switches have had to battle wear and tear due to heat, constant wire flexing, metal shards and cutting fluids that all contribute to the degradation of the wiring. This leads to expensive product replacement and factory downtime.

Challenges

Engine Block Transmission Case Machining Centers

A switch is used for verification that an engine block is locked securely within a machining center during production. The switch is placed on a moveable head or fixture, which rotates during the manufacturing process, changing planes as needed. This causes constant flexing of the wire during fixture rotation, and metal chips and cutting fluid eventually abrade and break the wires, causing production downtime.

Engine Block Boring Tables

The switches on a fixture table often rotate during the boring and decking operation inside a machining cell. The flexing of the wire in a wired switch product, as well as the flying debris resulting from production, wear down the integrity of the wire shielding.

Automobile frames travel down the assembly line through robotic arms.

Engine blocks move down the assembly line for machining.

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Automotive Assembly Lines

Switches on an automated assembly line identify pallet placement position at each assembly station, which can add up to hundreds of stops within an automotive line. Traditionally, wired switches are located under the conveyor and the wire is run through a tunnel located in the floor under the line. If the wiring fails, it is often difficult to access the wire for troubleshooting. Re-tooling and reconfiguration is not only costly, but any extended downtime adds up quickly in lost revenues.

Another assembly line application challenge involves body clamps, which hold and verify the vehicle body position on a conveyor. The integrity of wired technologies on the moving parts can be compromised, again causing costly re-tooling and reconfiguration expenses.

Engine Block Conveyor from Heat Treating

Automotive factory managers often battle wire damage due to excessive heat. One example is the switch on conveyors that carry engine blocks from the heat treating process ovens to machining lines. The heat affects the wires and connectors, leading to thermal fatigue and maintenance issues.

Automated Robots on Assembly Lines

Assembly line robots play an important role in factory line productivity. Switches are essential to safe robot operation, ensuring that the minimum and maximum arm positions are kept within specified parameters for safe and efficient performance. Due to the constant movement, wires and connectors suffer degradation, and re-configuration is difficult and costly when these components fail.

Operator Line Switches

Switches with manual actuators are located at various stations within an automated assembly line. Operators trigger the switch when a problem occurs on the line. A tethered wire connection often limits access to the switch and adds wire complexity. Wireless simplifies re-tooling and reconfiguration.

Solutions

Compared to traditional wired solutions, Honeywell's Limitless™ platform of wireless solutions offer far greater flexibility in terms of remote actuation, faster response, and flexibility in switch placement, at a greatly-reduced cost. The Limitless™ line of products eliminates the wires, and the challenges from harsh environments found on automated factory floors.

With its diagnostics capability, a Limitless ™ wireless switch and receiver allow easy trouble-shooting and flexible reconfiguration options, a true benefit when changing out an automobile line. Reliability, security and user-friendly attributes, along with reduced maintenance, lower installation costs and flexibility are changing the automated factory floor.

Switches are essential to safe robot operation, ensuring that the minimum and maximum arm positions are kept within specified parameters.

Automotive assembly lines utilize robotic arms for precision and efficiency.

Switches are located at various stations within an automated assembly line.

Based on 802.15.4 point-to-point communications and configuration for up to 14 devices to communicate with one receiver module, the Limitless™ line of products come in multiple configurations and are customizable to a wide variety of applications.

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Limitless™ WGLA Series Global Limit Switch	Limitless™ WLS Series Heavy-Duty Limit Switch	Limitless™ WPMM Series Monitor	Limitless™ WDRR DIN-Rail Receiver
			

Benefits

- Enables wireless presence/absence detection in applications/machinery where wiring is challenging or not feasible
- Integration of existing wireless technology with the superior reliability of Honeywell's MICRO SWITCH™ limit switch series
- Ability to reconfigure and network multiple switches, easily allowing addition, subtraction or relocation of Limitless™ switches
- Reduces installation/maintenance costs with no wires, conduit, strain relief, clips, connectors or connection boxes
- RF board operating in 2.4 GHz globally license-free frequency band; WPAN 802.15.4
- In excess of 305 m [1000 ft] line-of-sight communication

• EN50041 metal enclosure • IP67; NEMA 1, 4, 12, 13 • Multiple operating heads and lever options • -40 °C to 85 °C operating temperature (side rotary); -25 °C to 85 °C operating temperature (all other actuators)	• EN50041 metal enclosure • IP67/IP68; NEMA 1, 3, 4, 6, 6P, 12, 13 • Unique all-metal drive train • Twin shaft seals (rotary) • Zinc head and body are phosphate treated and epoxy finished making it less susceptible to effects from environmental exposure • Full complement of operating heads and levers • -40 °C to 85 °C operating temperature; -30 °C to 85 °C operating temperature (wobble sticks)	• Provides a visual, audio and NPN, PNP, totem pole, or relay output based on a signal received from a Limitless™ input • Up to sixteen configurable outputs for up to 16 Limitless™ inputs • Field pairing allows for rapid configuration • Snap-in panel or screw-mount design • -40 °C to 85 °C operating temperature	• Selectable NPN, PNP, totem pole or relay out • 14 configurable normally open or normally closed outputs for up to 14 Limitless™ inputs • Field pairing allows for rapid adding or subtracting inputs for quick configuration • DIN-Rail or screw-mount design • -20 °C to 70 °C operating temperature (all other actuators)

Find Out More

To learn more about Limitless™ wireless limit switches, contact a Honeywell representative today at **1-800-537-6945** or visit **www.honeywell.com/limitless**

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