CoreTigo

Boosting Operational Excellence with Reliable, Scalable, Flexible and Cost-Effective Industrial-Grade Wireless Solutions

APPLICATIONS AND USE CASES

CoreTigo's solution addresses the true need for wireless communication of sensors, actuators and devices at the field level in the factory that cannot be addressed today by existing wireless networks. We are providing the first wireless platform that fits the harsh industrial automation demands for low latency, reliability and scalability.

ROBOT END EFFECTORS

Cabling limits the motion and flexibility of end effectors (e.g. grippers, vacuum pumps) attached to robots/cobots and is cumbersome to deploy. A wireless solution embedded inside the sensor/actuator eliminates the cables and accessories required to run all along the robotic arm. Such a solution increases flexibility, and reduces overall complexity and cost.

ROTATING COMPONENTS

Cabling limits the motion and flexibility of rotating and dynamic components. Rotating devices with sensors and actuators can now be wirelessly connected to reduce complexity, increase flexibility, and add intelligence.

COMPLEX CABLING LAYOUTS

Mobile rail guided equipment such as large linear robots or drag chains with large cable braids limit mobility and tend to break/tear. A wireless solution reduces maintenance costs and unexpected downtime.

MACHINE RETROFIT & DEPLOYMENT

Wireless connectivity enables simple and cost effective retrofit and revamp of numerous devices on existing machines, simplifies relocation and upgrades, and new machine deployment
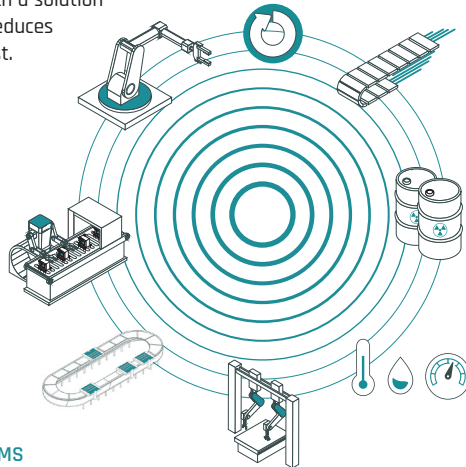
HAZARDOUS ENVIRONMENTS

In hazardous and hygienic industrial environments (such as food & beverage), wireless solutions are important for reducing costs associated with very expensive cabling deployments and maintenance, contamination and safety.

TRANSPORT TRACK SYSTEMS

In order to simplify customization/setup of workpieces in a flexible and agile manner, the moving shuttles on transport track systems need to be smarter. It is required to have a low latency and reliable wireless data communication for the sensors and actuators on the shuttles. Current tracks only enable power distribution to the shuttles. A wireless solution enables each shuttle to wirelessly communicate for control and monitoring independently.

LINEAR ROBOTS

Linear robots require complex cable layouts to support the rapid dynamic motion and flexibility while moving workpieces across a machine's area and in between production stages. Such cables tend to tear and lead to downtime and maintenance costs (e.g. press shop). Providing wireless data communication to the sensors and actuators connected to the linear robots reduces unplanned downtime, maintenance costs and complexity.

CONDITION MONITORING & IIOT

Wireless solutions make it more cost effective and simple to deploy sensors for condition monitoring (e.g. pressure, level, temperature sensors). An IIoT gateway further extends the connected enterprise by exposing manufacturers to a greater quantity of data from anywhere in the factory.

CORETIGO PRODUCT PORTFOLIO

Tigo**MASTER**

TigoMaster 2T SOM

An embedded module (21x60mm) for designing and building a 2-Track IO-Link Wireless Master. Includes IO-Link Wireless radios, CoreTigo's Master software stack.

TigoMaster 2TH

IO-Link Wireless Master IP67 technology platform by Hilscher. Supports two tracks of IO-Link Wireless (16 IO-Link Wireless Devices). CoreTigo TigoMaster 2T SOM is embedded in the platform.

Tigo**ENGINE**

TigoEngine

Engineering Tool for system setup and configuration, network analytics & diagnostics, and monitoring.

Tigo**STARTER**

Evaluation Kit

CoreTigo IO-Link Wireless Development Kit. Includes IO-Link Wireless Master, Devices, additional hardware and accessories, and SDK.

Tigo**AIR**

TigoAir SOM

An embedded module (11x17mm) for designing and building IO-Link Wireless sensors, actuators or I/O hubs. Includes IO-Link Wireless radio and an upper-layer stack with an MCU that can run the device application.

Tigo**BRIDGE**

TigoBridge SOM

An embedded module for designing and building IO-Link Wireless sensors and actuators. Converts IO-Link and Digital data to IO-Link Wireless.

TigoBridge

IO-Link Wireless Bridge with IP67 Enclosure. Converts IO-Link and Digital data to IO-Link Wireless. Includes M12 connectors for data and power.

IO-LINK IS NOW WIRELESS!

The Smart Factory requires intelligent, flexible and efficient connectivity at all levels. IO-Link Wireless communication suits these requirements and is especially advantageous where wired solutions are impractical, ineffective or cost-prohibitive.

IO-LINK WIRELESS HIGHLIGHTS

LOW LATENCY
1.6msec (5msec cycle with 3 repetitions)

RELIABLE
Deterministic, 6 Orders of Magnitude More Reliable than Any Wireless

SCALABLE
Up to 40 Wireless Devices per Master, 120 per Cell

INDUSTRIAL-GRADE
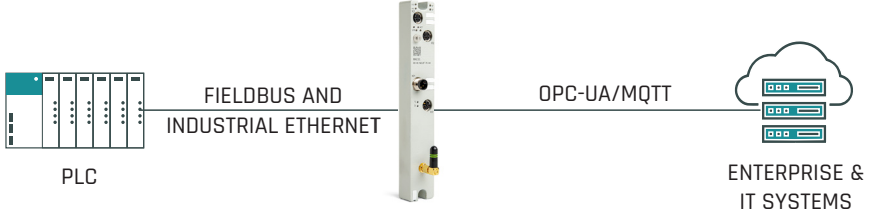Designed for Factory Automation, International Standard IEC 61131-9
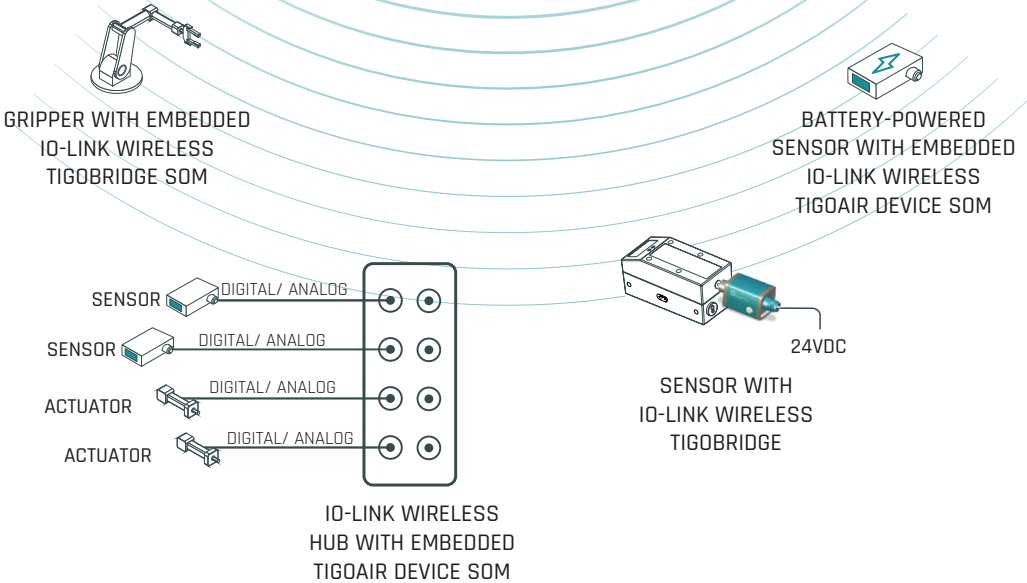
FLEXIBLE
Increased Flexibility and Mobility

COST EFFECTIVE
Cable Reduction Simple Setup

IO-LINK WIRELESS ARCHITECTURE

PLC

FIELDBUS AND
INDUSTRIAL ETHERNET

OPC-UA/MQTT

ENTERPRISE &
IT SYSTEMS

IO-Link
wireless
Tigo**MASTER**

GRIPPER WITH EMBEDDED
IO-LINK WIRELESS
TIGOBRIDGE SOM

BATTERY-POWERED
SENSOR WITH EMBEDDED
IO-LINK WIRELESS
TIGOAIR DEVICE SOM

SENSOR   DIGITAL/ ANALOG

SENSOR   DIGITAL/ ANALOG

ACTUATOR   DIGITAL/ ANALOG

ACTUATOR   DIGITAL/ ANALOG

24VDC

SENSOR WITH
IO-LINK WIRELESS
TIGOBRIDGE

IO-LINK WIRELESS
HUB WITH EMBEDDED
TIGOAIR DEVICE SOM

WIRELESS STANDARD-BASED COMMUNICATION SOLUTIONS DESIGNED FOR FACTORY AUTOMATION

IO-Link
wireless

- ■ **REDUCE CABLING COSTS**
- ■ **REDUCE MAINTENANCE COSTS**
- ■ **REDUCE COMPLEXITY**
- ■ **INCREASE FLEXIBILITY**

- ■ **REDUCE DOWNTIME**
- ■ **IMPROVE MTBF**
- ■ **SCALE DATA COLLECTION**
- ■ **IMPROVE SAFETY**

CoreTigo is leading the revolution of wireless critical communication for the Industrial IOT market. Through the reinvention of existing network and connectivity concepts, our solutions reduce complexity of industrial automation systems, create a safer manufacturing environment, enable flexible access to more valuable data across the enterprise, and increase operational efficiency. CoreTigo's technology is based on the IO-Link Wireless standard and creates a more connected industrial world that is not bound by cables in the most reliable, scalable and cost-effective manner.

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IO-LINK WIRELESS FOR PACKAGING MACHINERY

Packaging Machine Builders are facing new challenges and requirements in a world where mass customization and dynamic customer demands are key. Flexibility, higher throughput and downtime reduction are all common requirements as packaging machine designs drive towards Industry 4.0.

Flexible manufacturing systems need the ability to rapidly change-over to new product types, to change the order of operations executed on a part, as well as adjust to significant changes in volume and capacity. Packaging machines need to be modular, adaptive and agile more than ever. Tradeoff between capacity and flexibility is no longer an option.

The following overview discusses the challenges of being able to provide reliable communication while in constant motion and how this is solved with IO-Link Wireless.

IO-LINK WIRELESS – CABLE-GRADE WIRELESS CONTROL & MONITORING

As machine designs become more complex, cabled communication has exhibited some limiting factors in achieving these completely. Wired communication is not feasible for many motion control solutions that are moving and rotating rapidly. Cables lead to maintenance and unplanned downtime due to wear and tear, and they also lead to complex deployments that are not cost-effective.

A key ingredient which has been missing for machine builders is wireless communication that is fit for high performance and fast motion applications. Conventional wireless solutions are not suitable for the harsh demands of low latency, scalability to support hundreds of sensors and actuators within a single machine area, and cable-grade reliability. In order to address this need, IO-Link Wireless was created and designed specifically as a standard for high performance wireless factory automation communication. IO-Link Wireless enables access at the lowest level of automation, on the machine, with seamless and vendor agnostic cable-free communication.

WIRELESS COMMUNICATION BENEFITS FOR PACKAGING MACHINERY

IO-Link Wireless is fit for real-time control and monitoring on fast moving machine components in harsh factory environments. Therefore, it is leveraged for a variety of solutions throughout the design and development stages of packaging machines:

• Wireless communication for sensors and actuators that can travel with independent movers on transport track systems

• Wireless communication for end effectors and linear tracks of robots and collaborative robots

• Wireless control and monitoring of sensors & actuators on modular cells, rotary tables and other dynamically rotating machine components

• Wireless sensor data collection for predictive maintenance, machine performance optimization and analytics

• Connectivity for machine components that need to be de-coupled and run independently

The following benefits gained from IO-Link Wireless are enabling machine builders to address the challenging requirements of manufacturers both for greenfield and brownfield machine deployments:

• Support a broad range of package variations (size, weight, shape, material) within a single machine

• Reduce and eliminate changeover and setup time between different package types

• Reduce cost and time to market for applying new package designs

• Increase machine capacity by performing actions while in constant motion

• Machine footprint reduction

• Simple to upgrade/adapt for future products

• Predictive maintenance & downtime reduction

• Reduce maintenance cost – less mechanical parts, less wear out, preventive maintenance

• Hygienic design – reduce cables, chains, conveyor belts

• Simplify machine tear down and onsite assembly

SOLUTION EXAMPLE: WIRELESS AUTOMATION OF INDEPENDENT MOVER TRANSPORT TRACKS

Independent mover transport track systems are a key element in the design of new machines in industries such as consumer packaged goods, food & beverage and automotive. However, the independent movers on these tracks are limited by the constraints of hard-wired I/O and communication for real-time control and monitoring directly on the mover. For example, controlling vacuum pumps or grippers that are placed on the movers in order to grab and hold different types of products and to adjust automatically to different weight, size and shape of a product being handled while it's in motion. They also lack the ability to communicate ongoing sensor data for predictive maintenance and analytics on each mover, such as vibration, proximity and weight.
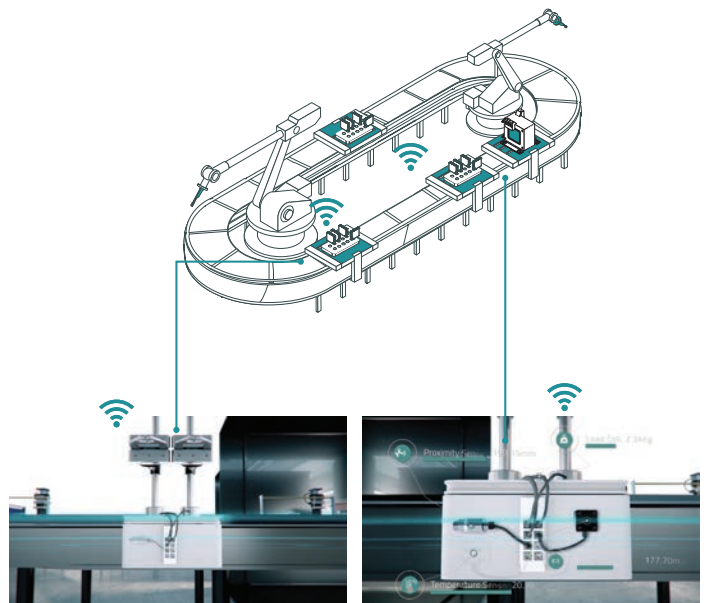
This is simply not feasible to achieve on fast-moving, independent transport systems that typically move at speeds of 2-4 meters per second. In the same manner that power needs to be provided to the movers on these transport tracks via inductive power without any contact and without any cables, so does the communication. IO-Link Wireless provides a perfect solution, it's designed to meet a very low latency, with synchronization rates between the movers of +/-10 microseconds, it ensures cable grade reliability which is one million times more reliable than other conventional wireless systems such as Wi-Fi or Bluetooth.

Scalability is also a critical factor; such a wireless system is expected to support in some cases hundreds of sensors and actuators on the movers in a single machine area, and to maintain robustness at very high speeds and harsh environments.

Independent movers can now be equipped directly with both sensors and actuators without any additional external robotics or equipment. This is done by adding an IO-Link Wireless device to the actuator on the mover. The mover can now independently manipulate objects with a variety of tools such as a gripper or a vacuum pump. The devices on the mover can all have the same function or each mover can have different functions, depending on what is needed for the application.

Such a solution enables products to be processed while in constant motion in the most agile and synchronized manner. Less mechanical components are needed outside the movers, thus reducing machine footprint and maintenance. Changeover and tooling setup time are eliminated due to the fact that the gripper's or the pump's configuration is done over the air directly from the PLC. Condition monitoring capabilities can also be easily added with multiple sensors on each mover.

All these are driving adaptive manufacturing even further by enabling small batches and high capacity with maximum production line flexibility to handle different product types and configurations.

SOLUTION EXAMPLE: WIRELESS CONTROL & MONITORING OF ROBOTS, COBOTS AND ROTATING COMPONENTS

The packaging process includes rotary applications with multiple work cells stationed around a rotating platform that typically have sensors and I/O at each station. It is common for these machines to use electro-mechanical slip rings to distribute power. Given that these slip rings are installed around the primary axis, they are expensive to maintain and replace, requiring the machine to be disassembled. Machines with rotary tables can benefit from a wireless solution for communication by incorporating wireless sensors and I/O directly onto the moving and rotating components, thus reducing maintenance operations and enabling simple future add-on of multiple I/O's.

Robots and collaborative robots are used across the packaging line for loading, unloading and placement of products/packages. Communication to the end effectors on these robots requires external cabling which can be complex to deploy and not cost effective. It also limits the motion and flexibility of the robotic arm and adds to the total payload. With IO-Link Wireless, end effectors such as grippers or vacuum pumps may easily turn to wireless devices. A wireless solution eliminates the cables and accessories running along the robotic arms, thus increasing flexibility, reducing maintenance costs and unexpected downtime.
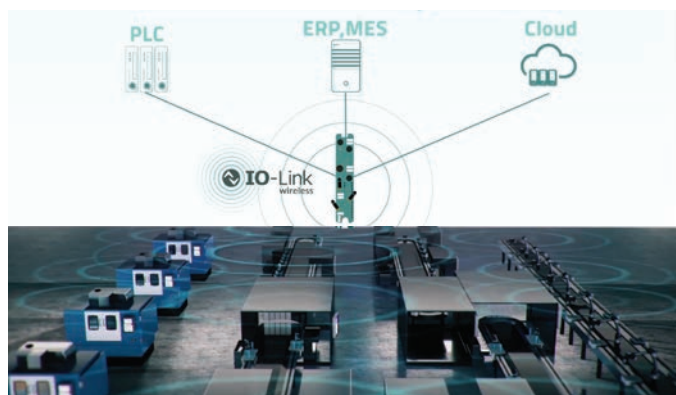
Mobility of robots along the packaging line is achieved via linear tracks. Due to the complex environment, the constant motion and the length of the cables, these cables tend to tear. A torn cable stops the machine's operation, which leads to maintenance costs, unplanned downtime and delays in manufacturing. A cable-grade wireless communication solution can mitigate such risks and enable continuous machine operation.

SOLUTION EXAMPLE: RETROFIT FOR PREDICTIVE MAINTENANCE & ANALYTICS

Manufacturers are required to focus on analytics to stay competitive and successful. Measuring and analyzing the packaging line performance can improve the quality of a product, reduce waste, increase line speed, prevent unplanned downtime and enable manufacturers to set future priorities.

Packaging lines are required to collect a vast amount of meaningful data from numerous sensors in the most cost-effective manner on existing and new machines. An industrial wireless solution enables ongoing data collection from packaging machines from hundreds of sensors within a single machine area.

Standard industrial sensors can easily turn to IO-Link Wireless sensors, which promise reliable data transmission, while coexisting with other wireless networks in the factory. IO-Link Wireless sensors are also designed to operate in very harsh environments with many interferences, vibrations and noise. Wireless connectivity enables simple and cost effective retrofit and revamp of numerous devices on existing machines, simplifies relocation and upgrades, and new machine deployment.

SOLUTION EXAMPLE: HYGIENE CONCERNS IN FOOD & BEVERAGE MANUFACTURING

Hygienic design is critical in several industries such as food & beverage manufacturing where it is required to comply with food safety regulations and prevent contaminations. Hygiene secures a business' reputation, ensures high quality products and retains customers.

Wireless solutions reduce the amount of cabling in a machine and the overall amount of mechanical components such as conveyor belts and chains. This reduces the costs associated with cabling deployments, maintenance, spare parts and contamination concerns.

SUMMARY

Packaging machines play a vital role in the lifecycle of a product, and as such they need to be equipped with technology that enables them to satisfy the needs of both machine builders and manufacturers. Wireless technology is quickly becoming a key solution that fills the challenging connectivity gaps in factory automation and on-machine flexible communication. Secure, robust, and fast wireless communication contributes significantly to a machine's flexibility, modularity, agility, cost effectiveness and adaptivity.

The value of wireless communication to machine builders can be seen throughout numerous stages of the machine design, machine development, the actual delivery, deployment and ongoing support at the manufacturer's facility. On top of that, the manufacturing facilities themselves benefit from the wireless technologies implemented on the machine by eliminating changeovers, reducing downtime and maintenance, reducing footprint, and enabling full flexibility and modularity.

CoreTigo is providing the broadest portfolio on the market of IO-Link Wireless hardware and software products. Innovative and unique wireless communication solutions are developed for packaging machinery through partnerships with machine builders, industrial equipment manufacturers (such as transport track manufacturers, sensor manufacturers, gripper/pump manufacturers) and leading manufacturing facilities. These systems are driving operational excellence and adaptive manufacturing while stretching the performance of machines to new levels.

IO-LINK WIRELESS INDUSTRIAL SOLUTIONS BY CORETIGO

Factory Automation Retrofit Wireless Solutions

Robotics & Machine Tooling Wireless Solutions

Wireless Transport Track System Solutions

For further information, please contact us at **info@coretigo.com**
www.coretigo.com

ABOUT CORETIGO

CoreTigo is unbinding the industrial space by providing high-performance IO-Link Wireless communication solutions for machine builders, system integrators and industrial equipment manufacturers. CoreTigo's products enable the design and retrofit of machines and production lines that were not possible before. These solutions increase flexibility, adaptivity and modularity, resulting in cost effectiveness, increased productivity and downtime reduction. Embraced by industrial leaders, the IO-Link Wireless global standard, fit for harsh factory environments and motion control applications, provides cable-grade connectivity for millions of sensors, actuators and industrial devices worldwide.