Unbinding Factory Automation Communication With IO-Link Wireless

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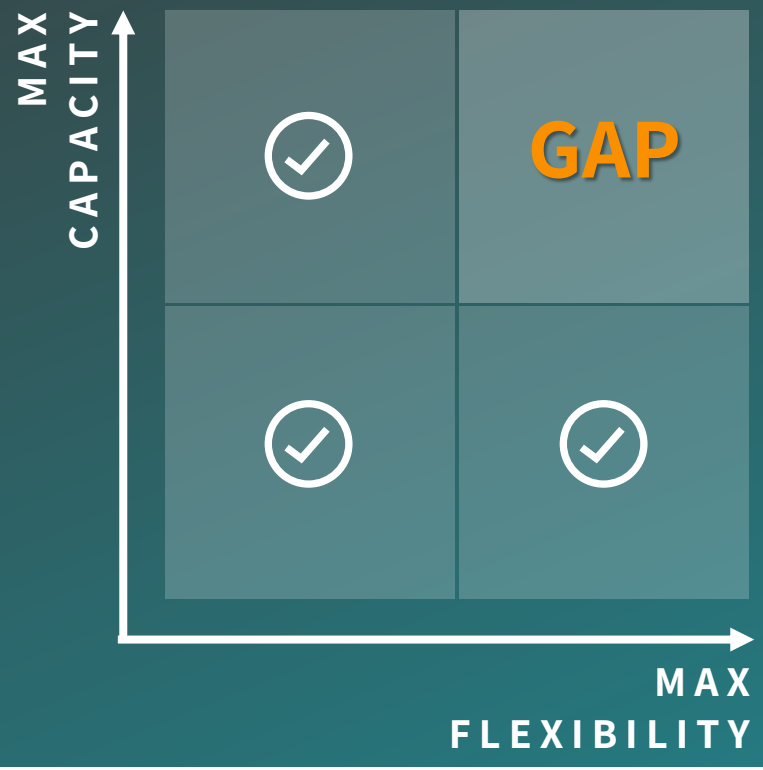
Flexible & Fast Manufacturing

PROBLEM:

TRADEOFF BETWEEN SPEED & FLEXIBILITY



KEY DRIVERS:

Mass Customization & Adaptivity

Lack of Skilled Operators

Sustainability

Business Intelligence

THE NEED:

FASTER & MORE FLEXIBLE MACHINES

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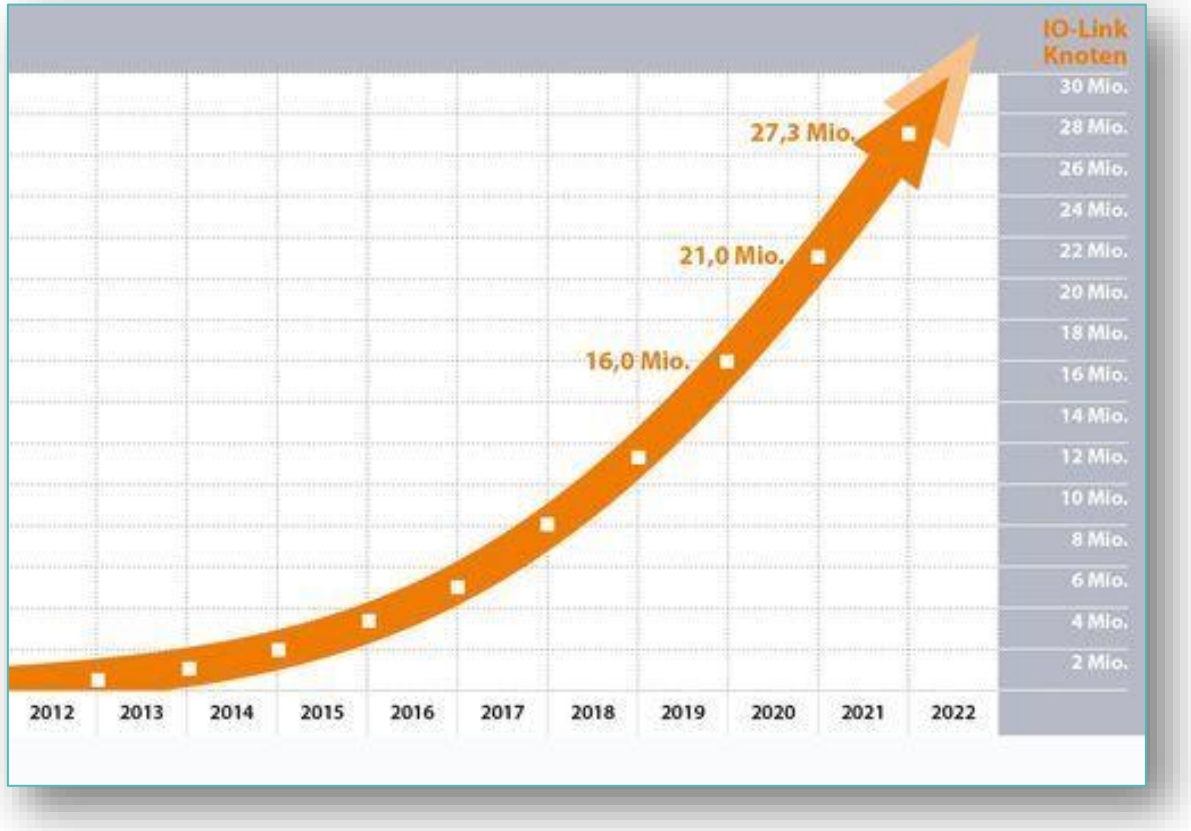
WHAT IS IO-LINK?

- Low cost
- Reasonable coverage distance (20m) on standard sensor cable
- Suitable data rate (4.8 … 230.4 kBaud)
- Easy to use
- Point-to-point (no Fieldbus)
- Star topology (no meshing)
- Seamless process model integration

Closes digital communication gap between Fieldbus and lowest field level



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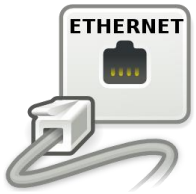
INDUSTRIAL WIRELESS COMMUNICAITON

IT (ENTERPRISE)

WIRED COMMUNICATION



WIRELESS COMMUNICATION

Wi Fi™

OT (MANUFACTURING FLOOR)

WIRED COMMUNICATION

PROFINET® PROFIBUS®
EtherCAT® IO-Link
Modbus CC-Link
EtherNet/IP

WIRELESS COMMUNICATION

IO-Link wireless

Other Wireless Networks CANNOT Meet the Harsh Industrial Requirements for Latency, Reliability and Scalability

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IO-LINK WIRELESS - BREAKING THE LIMITS

Wired communication is **not feasible** for a variety of motion control solutions

Cabled communication is **complex** and requires **maintenance**

Cables limit **flexibility** and **agility**

Wireless communication designed for factory automation

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IO-LINK WIRELESS - BREAKING THE LIMITS

UNIVERSAL
IEC Global Standard

FAST
LOW LATENCY - 5msec

RELIABLE
CABLE GRADE – 1 e-9 PACKET ERROR RATE

SCALABLE
HUNDREDS OF WIRELESS DEVICES PER MACHINE

DETERMINISTIC

Wireless Communication

Designed for Factory Automation

Enabling Flexible & Faster Manufacturing

High-performance machine digitization

In-Machine Wireless Connectivity

Intelligent Edge Solutions

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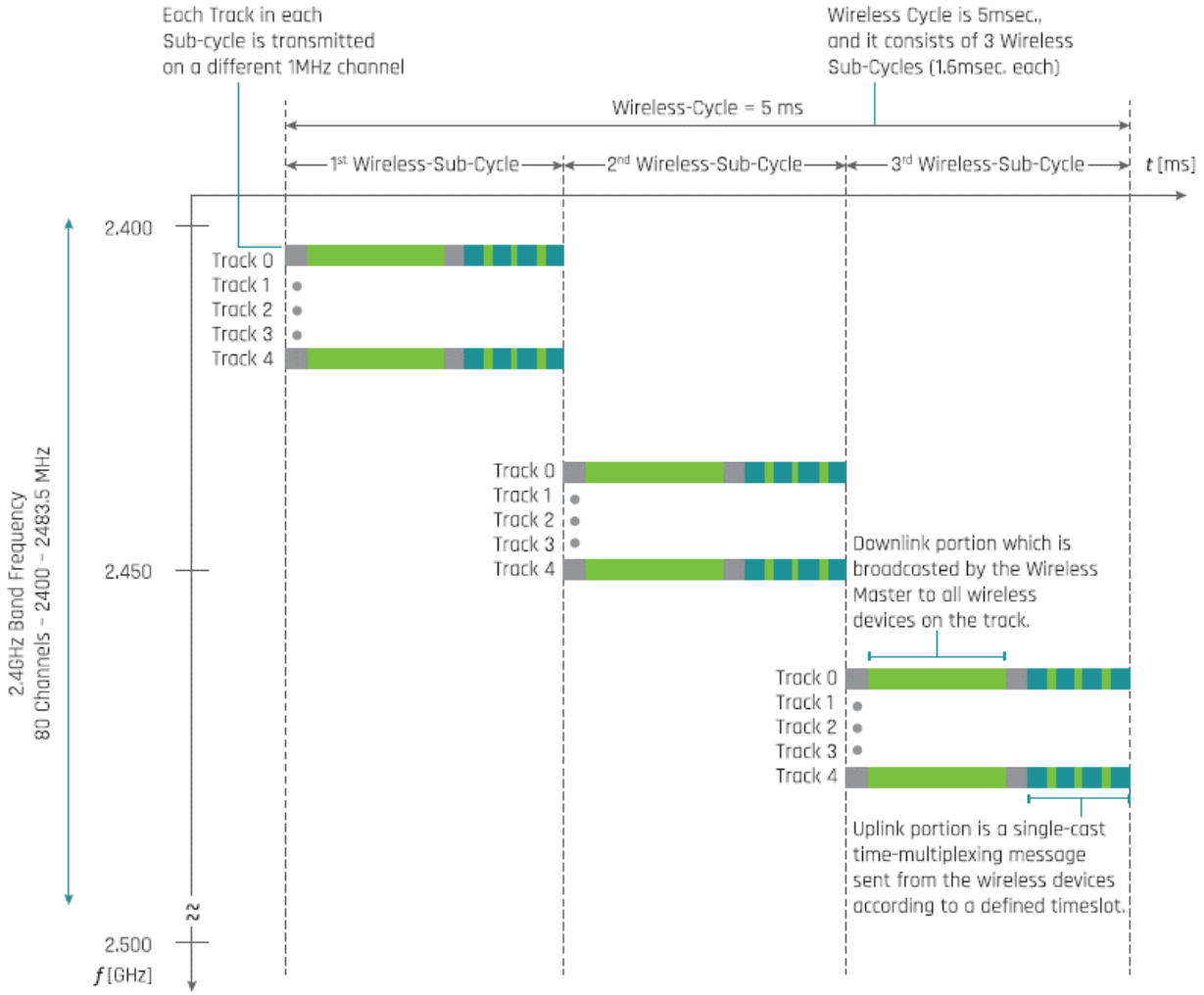
IO-LINK WIRELESS - OVERVIEW



- Immunity - Modulation
- Blacklisting
- Frequency Hopping
- Coexistence
- Up to 40 nodes per Wireless Master
- Interoperable – IO-Link compatible

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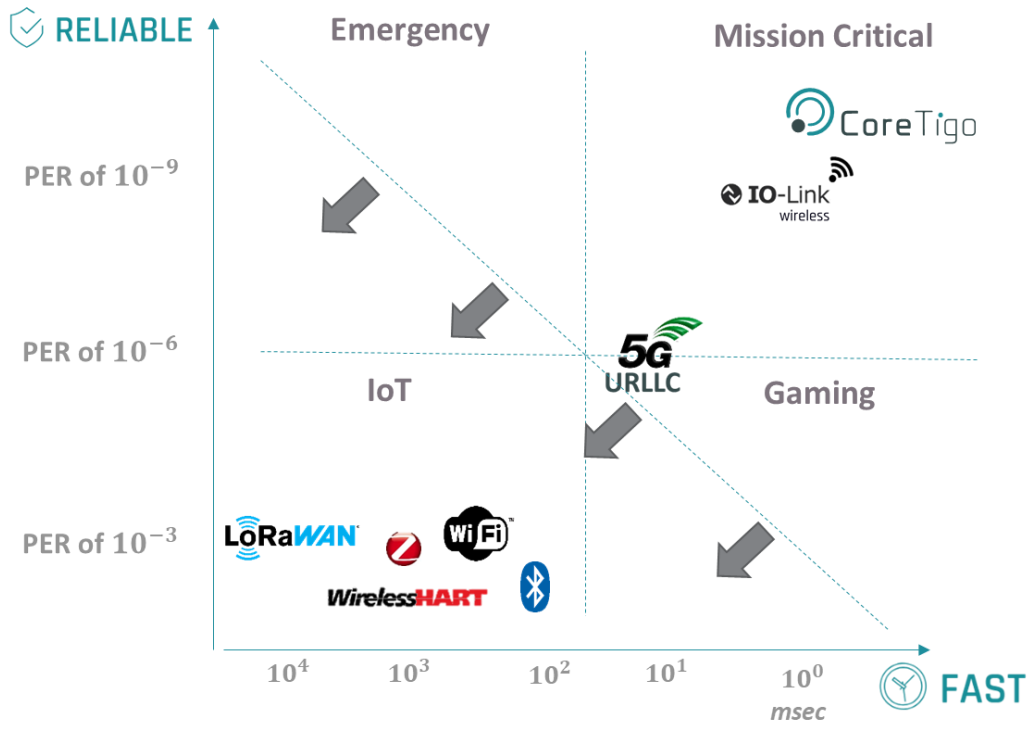
IO-LINK WIRELESS - BREAKING THE LIMITS



IO-Link

BENEFITS

- Universal interface
- Seamless "plug and play"
- Realtime diagnostics
- Supports 4-20mA, 0-10v, 24V I/O via Hub

IO-Link Ecosystem

SIEMENS SICK Rexroth Bosch Group ifm
BALLUFF OMRON Rockwell Automation
Schneider Electric FESTO MITSUBISHI ELECTRIC

>250 Members and Growing

EXTENSION OF THE IO-LINK STANDARD

IO-Link wireless

Designed for Machines

- Wireless is transparent to the PLC and I/O
- Motion Control use-cases: sensors/actuators on movers or conveyers
- Easy to deploy in retrofit applications – IoT platform
- Leverage the IO-Link eco-system: compatible with IO-Link

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CORETIGO SOLUTION

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Software

TigoEngine

MQTT

On-premise Applications

Cloud-based Applications

Control & Monitoring

PLC

PROFINET

EtherCAT

EtherNet/IP

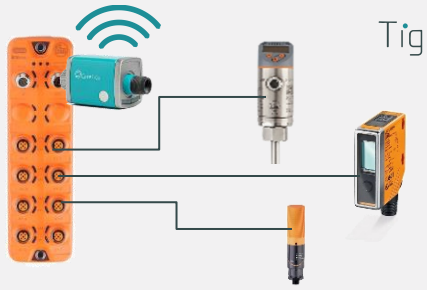
OPC UA

TigoMaster
IO-Link Wireless Master

OPC UA

IO-Link wireless

Sensors & Actuators



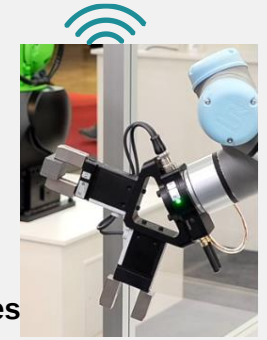
TigoBridge

IO-Link Wireless Bridge & Hub

TigoHub

TigoAir 2

IO-Link Wireless Embedded Devices



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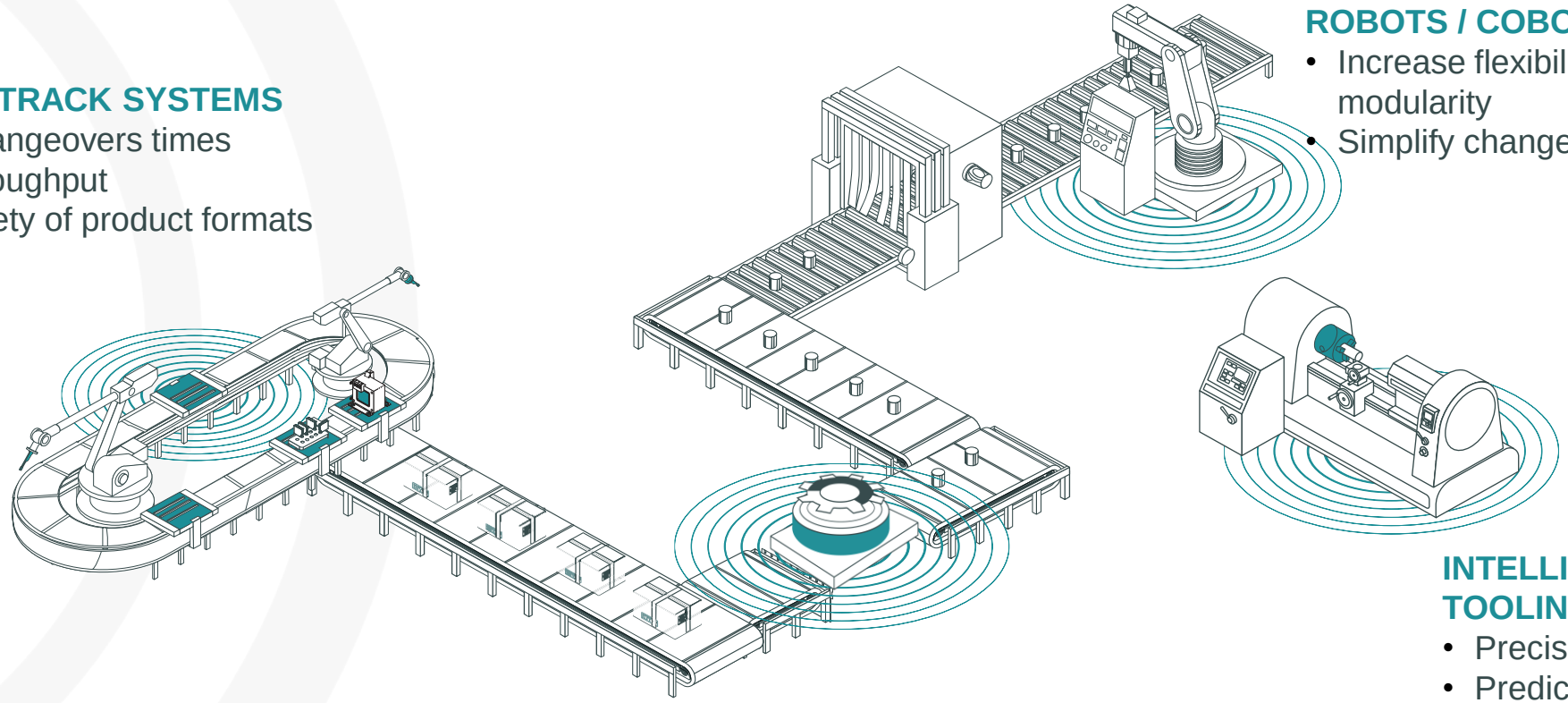
INCREASING FLEXIBILITY & INDEPENDENCE ACROSS THE FACTORY

TRANSPORT TRACK SYSTEMS
- Minimize changeovers times
- Increase throughput
- Support variety of product formats



ROBOTS / COBOTS
- Increase flexibility & modularity
- Simplify changeovers

INTELLIGENT MACHINE TOOLING
- Precise measurements
- Predictive maintenance
- Machine optimization

POWER OPTIONS
- Inductive Power
- Battery
- Wired 24VDC

ROTARY TABLES / CAROUSELS
- Enable actions in motion
- Reduce maintenance costs
- Reduce complexity

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PACKAGING - THE ADAPTIVE MACHINE

PACKAGE DESIGN

Limited Designs

High Cost & Time to Market for new Designs

Ultimate Design Flexibility

Broad range of package designs

Flexible and modular machine design

THROUGHPUT

Manual Changeovers

Non-optimal capacity

Optimal Capacity & Operation

Automatic changeovers

Actions done while in constant motion

IO-LINK WIRELESS FOR MACHINES

DATA MGT.

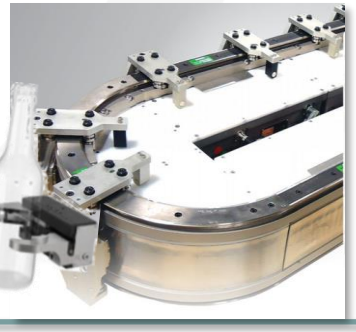
Wireless Master
& Gateway

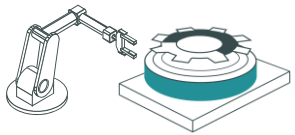
PLC

REAL-TIME EDGE GATEWAY

Synchronized, Real-time, Reliable wireless
communication for Control & Monitoring

IO-Link
wireless





SMART FLEXIBLE EDGE DEVICES

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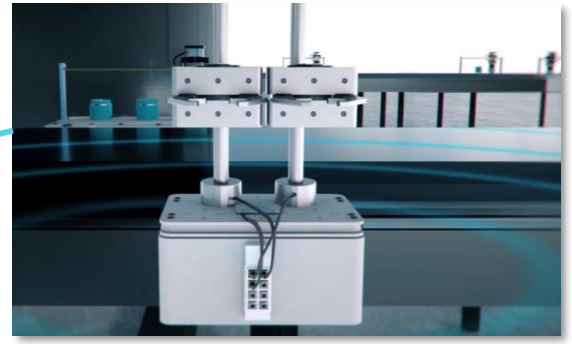
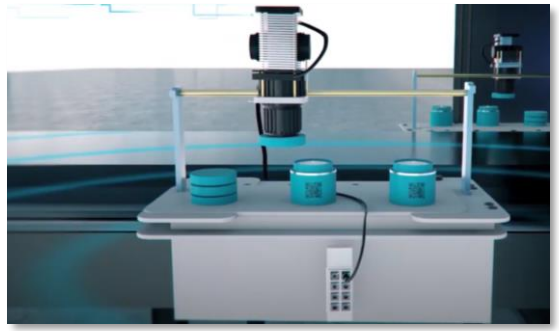
IO-LINK WIRELESS – ENABLING DESIGN FOR ADAPTIVITY

IO-Link wireless





- Reduced Footprint
- Improved Hygiene
- Predictive Maintenance
- Increased Capacity
- Minimal Changeover Time
- Variety of Package Designs

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MACHINE TOOLING CHALLENGE

Collect Data at the Clamping/Tooling point while machining

Rapid Rotation Speed

6,000 RPM

Harsh Conditions

CNC, Milling, Grinding Mahcines

Design

Low power, small footprint

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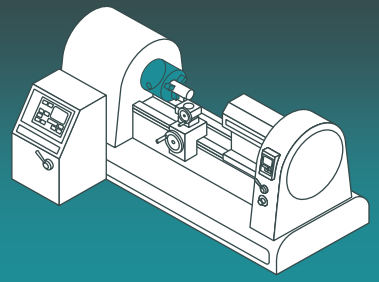

INTELLIGENT TOOLING

PRECISION

Manual Setup and Positioning

Ultimate Setup Flexibility

Precise automatic setup

Part confirmation validation

OPTIMIZATION

Manual Clamping Tuning and Ineffective Maintenance

Optimal Capacity & Operation

Predictive Maintenance

Machine tuning based on analytics

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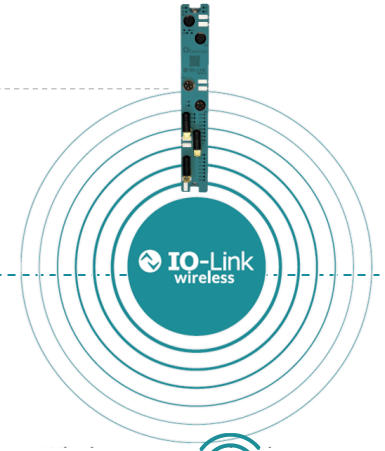
IO-LINK WIRELESS - INTELLIGENT TOOLING SOLUTION

CLOUD APPLICATION

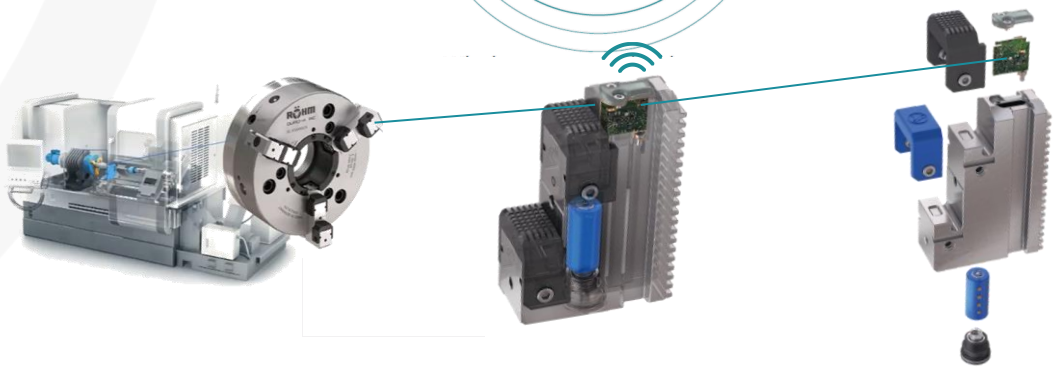
Edge Gateway
Wireless Master

REAL-TIME MASTER & EDGE GATEWAY

PLC/HMI



SMART FLEXIBLE EDGE DEVICES



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IO-LINK WIRELESS FOR ROBOTICS

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CHALLENGE

- Smart end effectors data communication requires cables, cable accessories and Master
- Adds cost to solution and limits flexibility

SOLUTION

- Integrated IO-Link Wireless Bridge embedded in end effector (e.g. gripper, vacuum pump)

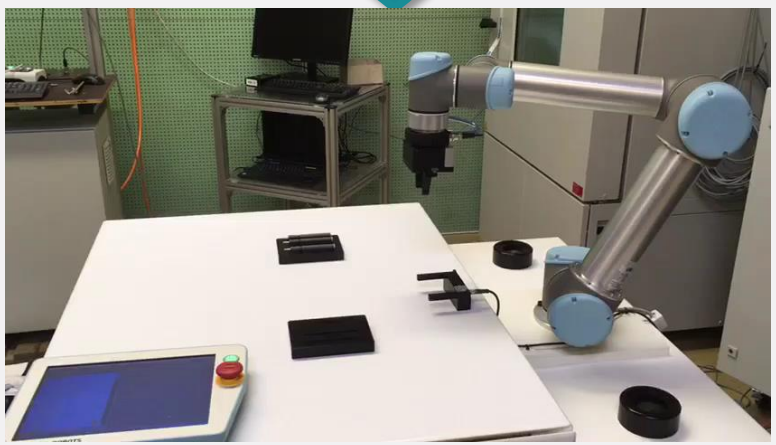
360/720
Full Flexibility

Interoperable
with IO-Link/
Digital/Analog
End-effectors

5msec.
Low Latency

Cost effective and simple to deploy

BEFORE



AFTER

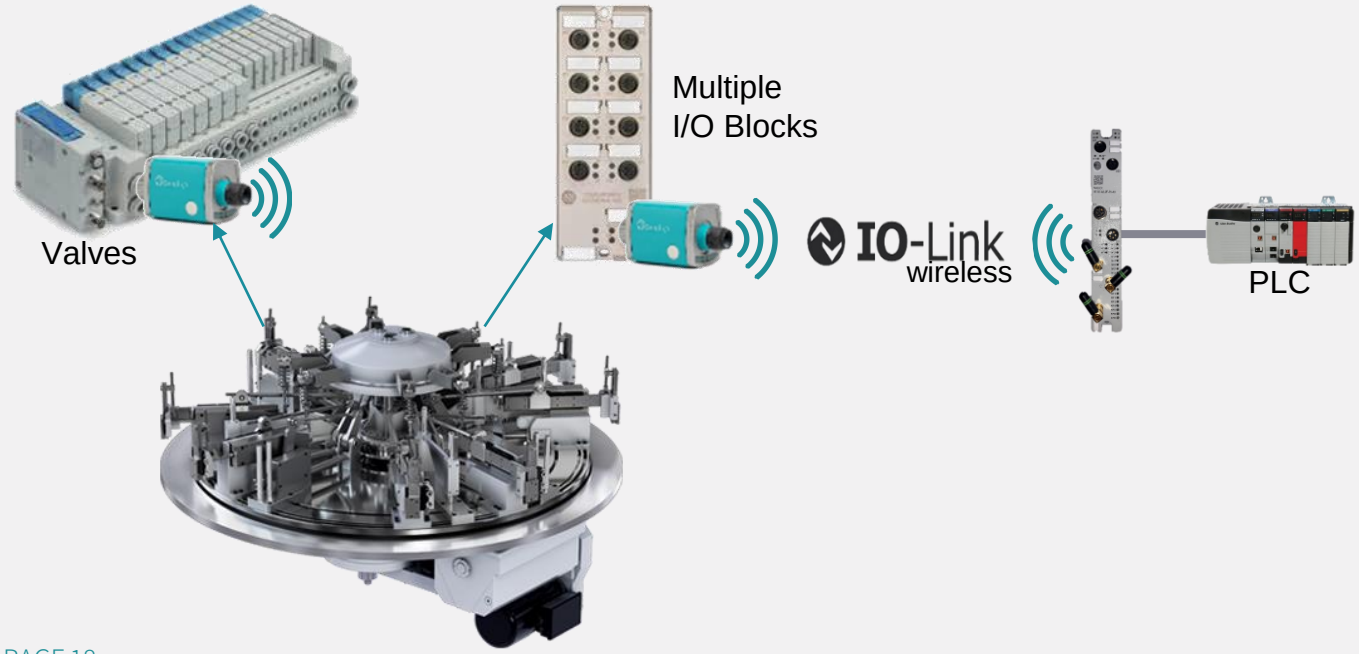
IO-LINK WIRELESS FOR ROTARY TABLES / CAROUSELS

ROTARY TABLES & CAROUSELS

- Complex cable layouts and slip rings
- Expensive to maintain and replace

WIRELESS BENEFITS

- Incorporate wireless sensors (e.g. load cells, vibration sensors) and actuators (e.g. clamps, valves) directly onto the moving and rotating components
- Reduce maintenance operations, increase flexibility and enable simple future add-on of multiple I/O’s



IO-LINK WIRELESS FOR MACHINE RETROFIT

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RETROFIT

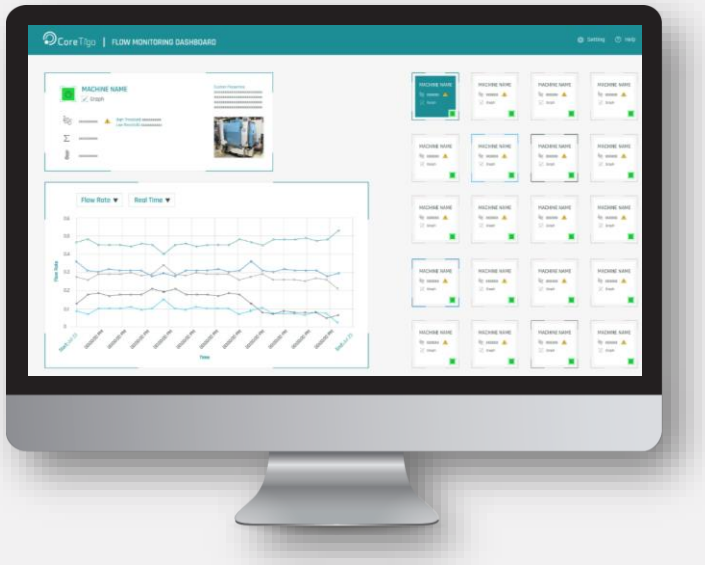
- Wireless connectivity enables cost effective retrofit of existing machines by adding a variety of sensors and devices
- Simplify relocation and upgrades of existing machines
- Scale data collection easily for analytics and predictive maintenance

Ease of Use
Any I/O device

Condition Monitoring
to PLC and cloud

Scalable
100‘s of devices & Coexistence

$$$
Deployment savings

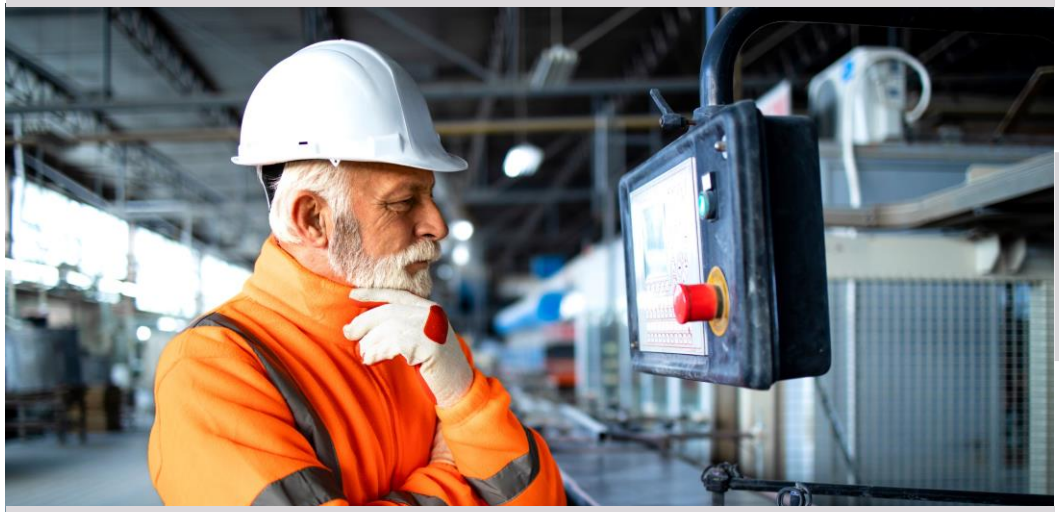


IO-Link wireless

Immediate integration to off-the shelf IO-Link Flow Sensor

IO-LINK WIRELESS – ENABLING DIGITAL TRANSFORMATION

- Lack of flexibility & visibility
- Dependence on skilled operators



- Decreased capacity and throughput
- Human related errors
- Non-optimized performance & maintenance

More Flexible & Independent Machines

Your Machines Can Do More

CoreTigo

THANK YOU!

CoreTigo

Flexible & Fast Manufacturing

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