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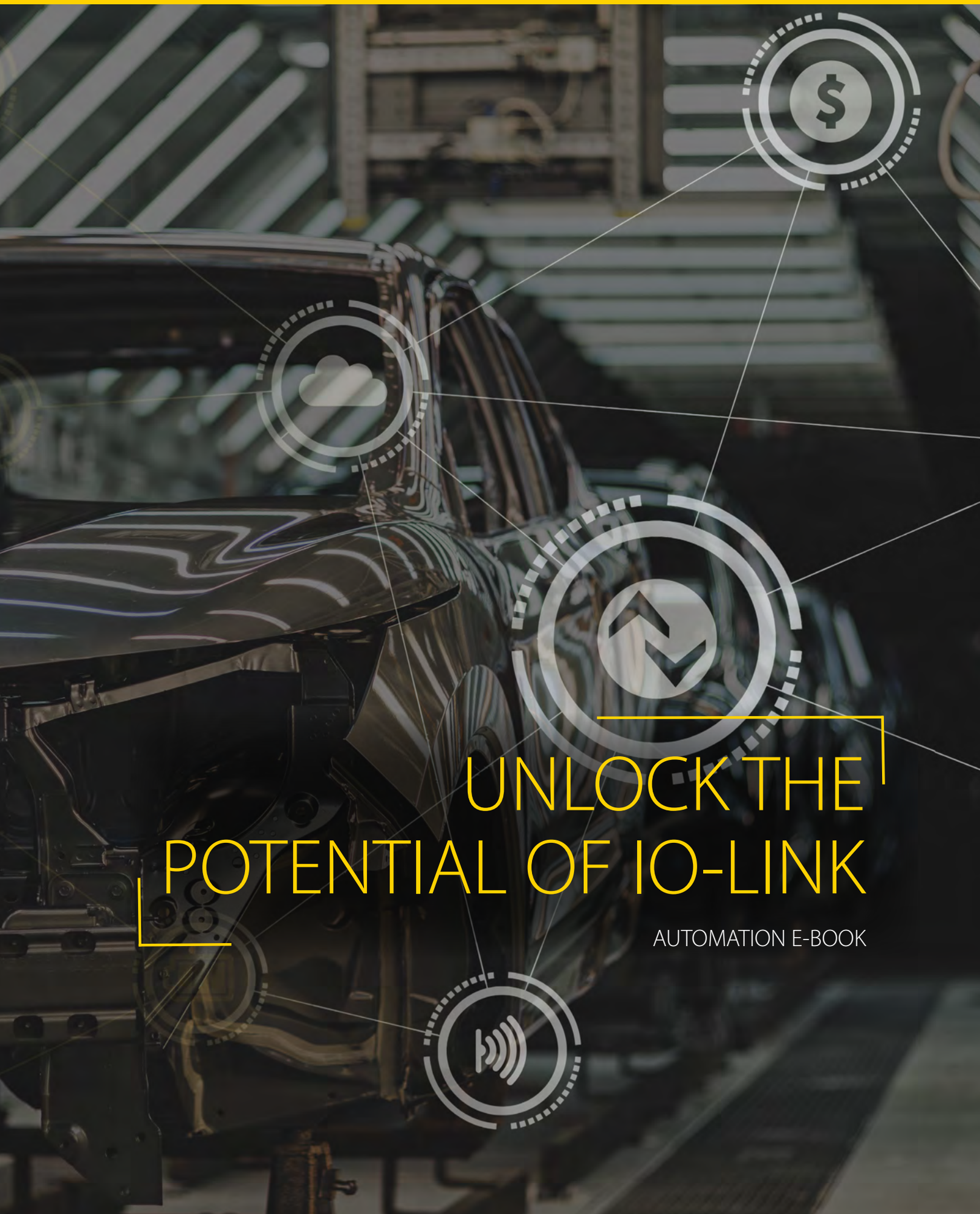


UNLOCK THE POTENTIAL OF IO-LINK

AUTOMATION E-BOOK

CONTENTS

CAPABILITIES AND LIMITATIONS OF IO-LINK

IO-LINK UNLIMITED

As a specialist in smart sensor technology, Turck brings intelligence to the machine, thus creating the link to Industry 4.0 and IIoT. In an interview with Andreas Gees from the trade magazine elektroAutomation, Turck's Product Marketing Manager Sai Seidel-Sridhavan and Aurel Buda, Director Product Management Factory Automation Systems, discuss the role of IO-Link as the basic technology in the portfolio and what further developments can be expected in this technology.

READ THE ARTICLE

TAP INTO THE WEALTH OF DATA AVAILABLE VIA IO-LINK DOWN TO FIELD-LEVEL DEVICES.

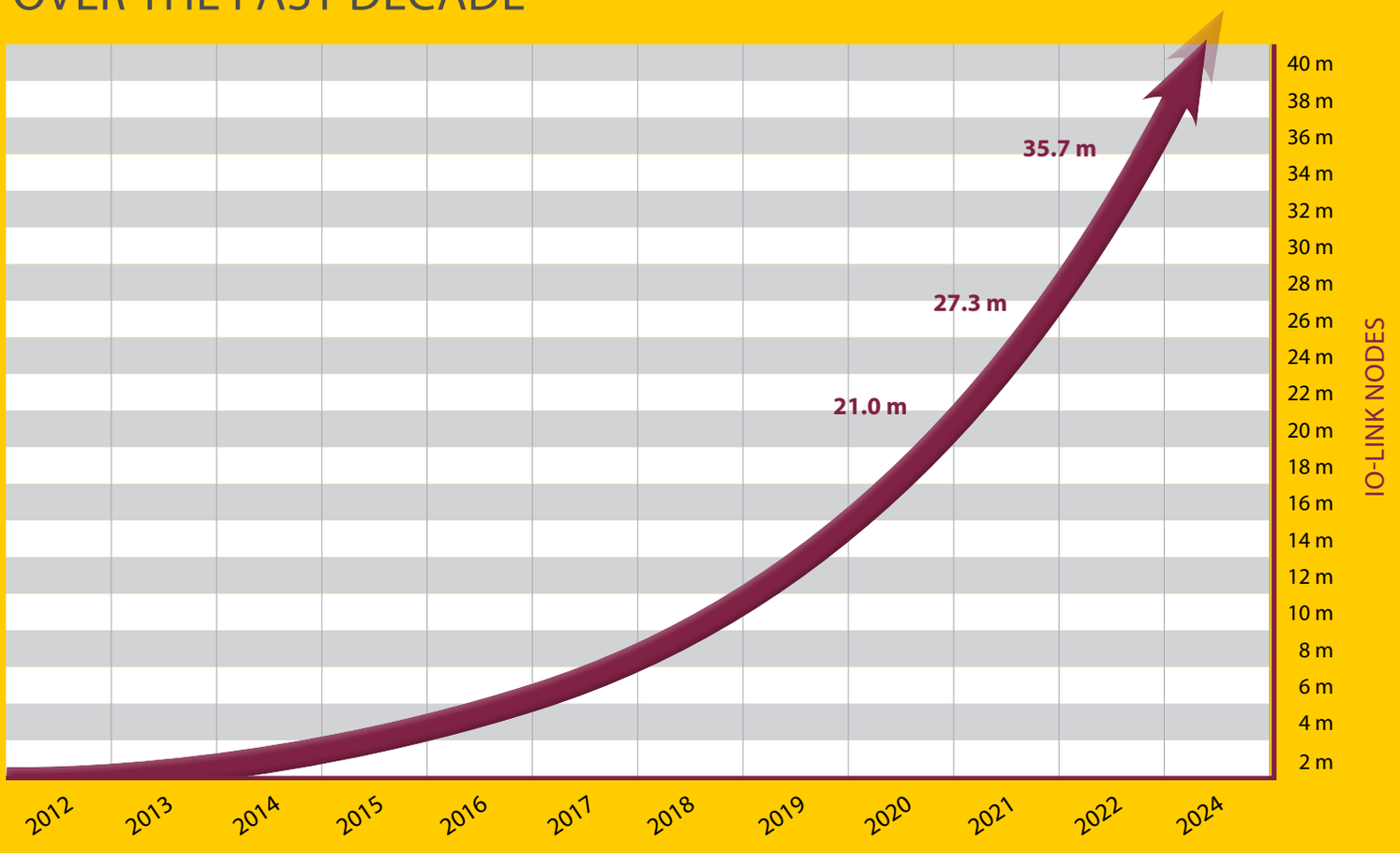
Standard industrial sensors on machines are your eyes and ears on the shop floor. Yet despite the critical role of these devices in your production process, they don't tell the full story. For example, while they can provide error codes, they don't offer many details into the nature of the error. And while they are monitorable via built-in LED lights, they can't be monitored remotely.

What if there was a way to get your standard sensors and actuators to provide a fuller picture without driving up your costs engineering time or system complexity? This is where IO-Link comes in.

THE RISE OF IO-LINK

Now, it is increasingly becoming the preferred method for delivering device data in North America — and for good reason.

GROWTH OF IO-LINK NODES
OVER THE PAST DECADE

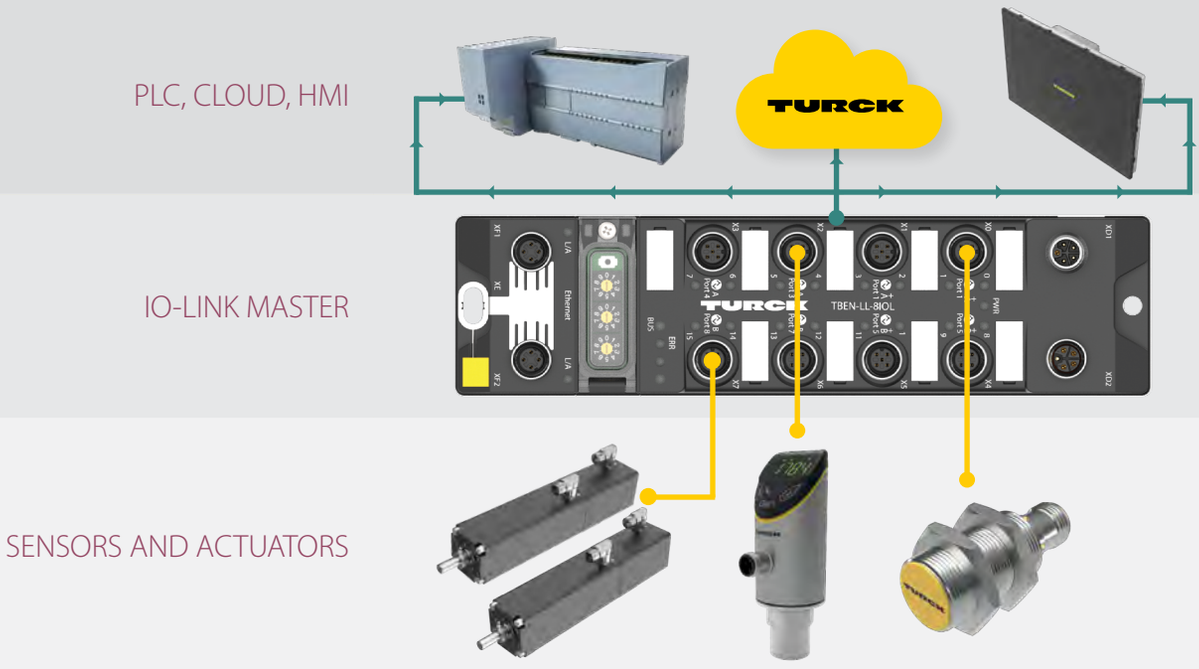


Source: PI North America

INTEREST IN IO-LINK HAS BEEN GAINING SPEED SINCE IT WAS LAUNCHED IN THE EARLY 2000s.

By connecting sensors and actuators to an industrial fieldbus or Ethernet, IO-Link closes the communication gap between your control and field devices, enabling your previously quiet sensors to provide you with valuable device data. This protocol also gives you consistent diagnostic information down to the field level, creating a "last mile" connection for all your sensors and actuators. IO-Link is now the leading sensor and actuator interface across the globe.

WHAT IS IO-LINK?



IO-Link is the first internationally standardized input/output (I/O) technology for sensor and actuator communication according to IEC 61131-9. A fieldbus-independent, point-to-point protocol, it creates a connection between the following:

- IO-Link devices, or the sensors and actuators that have identification data, such as type designations, serial numbers and parameters. This information can be read or written via the IO-Link protocol, enabling the controller to change parameters during operation.
- The IO-Link master, which provides the interface to the higher-level controller, typically the PLC or human-machine interface (HMI). The master typically sends the device data to the controller using an industrial Ethernet protocol, such as EtherNet/IP, PROFINET, OPC UA or Modbus TCP.

IO-Link is bidirectional, able to work two ways over short distances. Flexible yet powerful, it can exchange 2 to 32 bytes of data between the IO-Link master and devices for each cycle, with the minimum cycle time being 400 microseconds (µs) for 2 bytes.

In terms of the connectors, an unshielded three- or five-conductor cable, less than 20 meters in length, enables the connection between the IO-Link master and field devices. To process binary switch signals and measurement values, the master can have one or more IO-Link ports, which use standard M5, M8 or M12 connectors.

"In North America, most applications are based on reduced wiring and infrastructure costs because IO-Link is the easiest way to network infrastructure to sensors and actuators. But it can do so much more when you start using IO-Link data to meet Industry 4.0 objectives."

Sai Seidel-Sridhavan,
Director Product Marketing & Training

THE BENEFITS OF IO-LINK

ENABLE DEVICE-LEVEL CONDITION MONITORING

IO-Link makes status and diagnostic information available for field devices, extending service internals and reducing downtime. It also supports remote access for configuration and monitoring.

UNLOCK PREDICTIVE MAINTENANCE

Stay up to date on all device process parameters, which the controller displays. This visibility makes efficient, cost-saving practices — like predictive maintenance and asset management — possible.

MAKE FASTER PARAMETER CHANGES

IO-Link lets you quickly make changes to device parameters and manage multiple processes, each with its own parameter sets for switching thresholds, gain and sensitivity and more.

READ WHITE PAPER

REDUCE LABOR-INTENSIVE MANUAL CONFIGURATIONS

View, change and store device data using simple software tools or directly through the PLC, while the parameter storage function on the IO-Link master further simplifies the new device configuration process.

IMPROVE DATA QUALITY

IO-Link replaces the need to transfer analog or discrete data. In analog systems, sensor data must undergo multiple A/D conversions before reaching the PLC. IO- Link reduces the number of conversions to one — at the sensor itself.

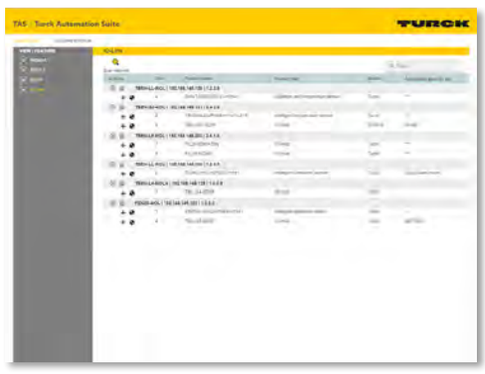
LOWER YOUR MACHINE COSTS

IO-Link reduces machine costs in several ways. It uses standard, inexpensive cabling and eases integration into larger systems. These cost benefits will continue to grow in complex, highly dense I/O applications.

TAS IO-LINK VIEW

See an overview of IO-Link masters in the network as well as connected IO-Link devices with Turck Automation Suite (TAS). Easily read device information and execute device actions like wink, open master, open IODD configurator and open device monitor. Get a filtered view on selected IO-Link devices.

MORE INFORMATION ABOUT TAS



UNLOCK DATA WITH IO-LINK

Since the onset of the IIoT, manufacturers have been trying to squeeze as much data as possible out of their equipment to improve their productivity and efficiency. As a result, automation equipment became much more complicated, and it was becoming increasingly difficult to keep up with all the cables used for digital and analog sensors.

IO-Link overcomes these challenges, making simple sensors "smart" in the sense that they can now communicate more than just one parameter — whether high or low, on or off, etc. — and then translate that data into actual values.

Instead of indicating whether the temperature is high or low, for example, a temperature sensor that uses IO-Link can now provide temperature readings.

To learn more about all the ways IO-Link unlocks the data already in your field devices:

PLAY VIDEO

CAN SMART MACHINES BE THIS EASY?
ON-DEMAND WEBINAR

WATCH THE WEBINAR

Nick Clute, Webinar Host
Turck Corporate Trainer

ADVANCED FUNCTIONS OF IO-LINK

IO-Link offers several advanced functions that can provide you with additional insights into the status and health of your field devices:

PARAMETER STORAGE

If you connect a replacement device to your system, IO-Link will automatically upload the correct parameters to facilitate installation and programming.

DEVICE VERIFICATION

IO-Link will verify that a replacement device is the correct product — an especially helpful feature if sensors look physically similar. It can also verify the device type, manufacturer and serial number.

ADVANCED SENSOR DIAGNOSTICS

IO-Link lets you read additional information on a sensor's history and health in an application. For example, if you detect a weakened signal in a non-contact rotary sensor, then you know to schedule maintenance early.

ACYCLIC READ AND WRITE PARAMETER ACCESS

As a digital communication interface, IO-Link offers the ability to read and write parameters from upper-level fieldbus devices like the PLC, giving the fieldbus controller full control of the IO-Link device.

APPLICATION-SPECIFIC TAGS

You can define "application specific tags" to improve the identification of IO-Link devices within the system. This feature is useful in tool-changing applications to identify and verify the correct tooling, for example.

TEMPERATURE SENSOR DATA

A temperature sensor with IO-Link could provide additional data such as operating hours, switching counter, temperature in non-temperature sensors, and field strength.

SEE THE PRODUCTS

TURCK IO-LINK PRODUCTS

Turck offers one of the most comprehensive IO-Link portfolios worldwide. Its products include sensors, cables, active IO-Link junction boxes and interfaces for various industrial fieldbus protocols, including Turck Multiprotocol Ethernet products.

IO-LINK APPLICATIONS

IO-Link Junction Boxes in Gearbox Plant Reduce Costs and Assembly Time

A gear manufacturer uses Turck IO-Link junction boxes to connect hundreds of sensors and actuators in its plant, achieving many benefits.

LEARN MORE

IO-Link Gateway and Junction Boxes Boost Production Flexibility

When a systems integrator was tasked with constructing a new production line, it turned to Turck to design the I/O system.

LEARN MORE

IO-Link Sensors Prevent Identification Errors in Pharmaceutical Manufacturing

Sterilization machines equipped with Turck IO-Link sensors can accurately identify containers as they travel along conveyors.

LEARN MORE

IO-Link Ultrasonic Sensor Unlocks Preventive Maintenance on Conveyors

With its IO-Link interface, the RU IP67 ultrasonic sensor increases plant availability and unlocks preventive maintenance in conveyor applications.

LEARN MORE

OPENING THE DOOR
TO THE IIOT

IO-Link reduces the cost of automating machines, simplifying wiring and improving your plant diagnostic capabilities. Another advantage is the easy commissioning process. For PROFINET systems, Turck is integrating its IO-Link devices into the configuration files of the Turck IO-Link master. Integrating and configuring Turck IO-Link devices is thus a significantly faster process and requires no additional programming. To learn more about the ways IO-Link creates new IIoT opportunities:

READ THE GUIDE

IO-LINK SAFETY

An extension of IO-Link, IO-Link Safety, released in 2017, adds a safety communication layer to the existing master and device layers, which are now the FS-Master and FS-Device. This standard has opened the door to the future of IO-Link for industrial applications and will introduce new devices that can communicate safety signals directly over IO-Link. Devices will also extend the advantages of IO-Link into functional safety systems by facilitating highly dense safety I/O hubs, simplifying wiring and implementing more complex safety sensors.

"IO-Link Safety is a game changer. It will enable the creation of device-centric safety infrastructures that are independent of individual manufacturers and fieldbus protocols."

Michael Flesch,

Product Manager, Safety Systems

REAL-TIME CONDITION MONITORING VIA IO-LINK

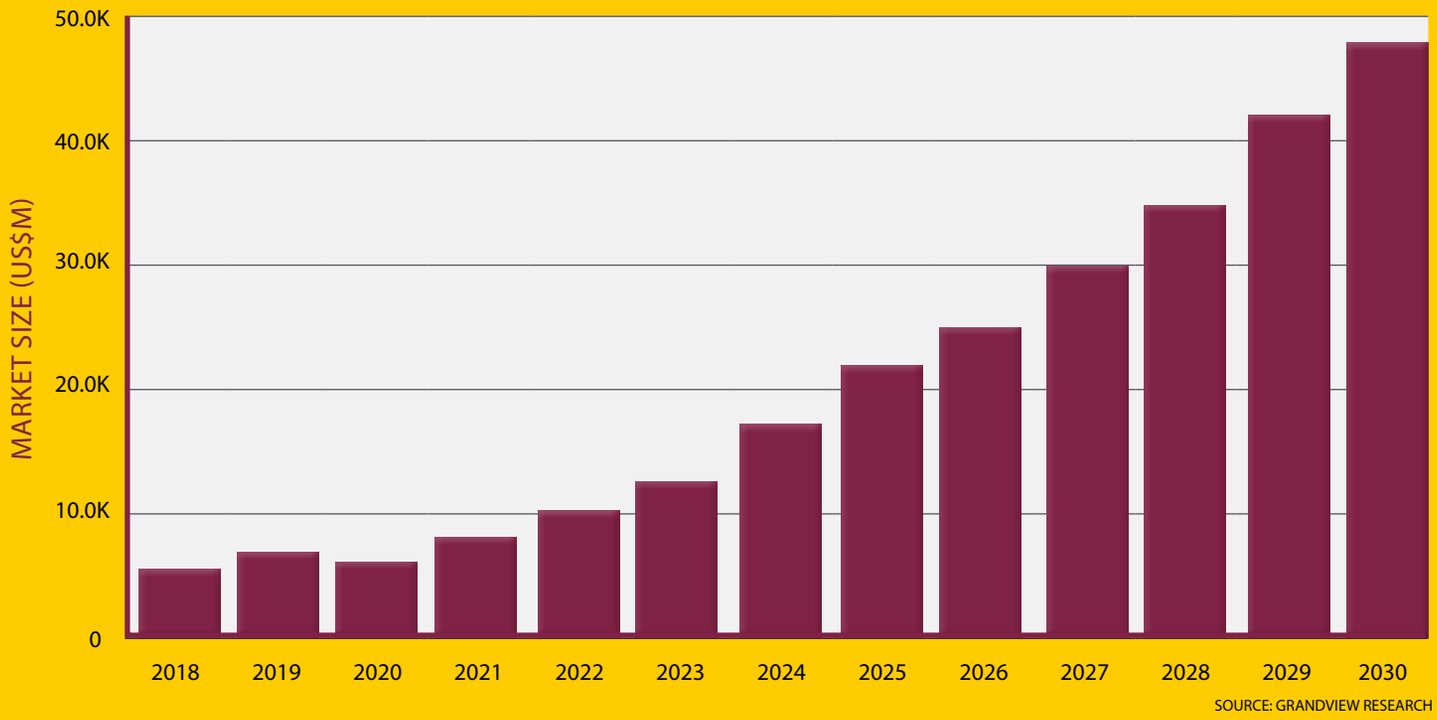
LONGER RUNNING MACHINES & REDUCED COSTS ARE JUST A FEW OF THE BENEFITS.

Condition monitoring has two key objectives: high system availability and optimum maintenance intervals. From reactive repair to status-based maintenance, read the whitepaper to determine the best strategy for your machines and lines to eliminate points of failure.

READ WHITE PAPER

THE FUTURE OF IO-LINK

GLOBAL IO-LINK MARKET SIZE & OUTLOOK



SOURCE: GRANDVIEW RESEARCH

“Single Pair Ethernet will open up new application possibilities for IO-Link — carrying data over longer ranges with higher data rates and volumes.”

Aurel Buda,
Director Product Management, Factory Automation