Industry 4.0 – Applications in Practice

Even though industry 4.0 is often referred to as the blueprintfor the future factory, intelligent applications that enable a customizable and highly flexible production, are long since reality.

Fast detection of tags at gates

- User benefit: Reliable and fast verification of cargo on forklifts
- Secure reading of tags on-the-fly regardless of position, condition and distance
- Reliable detection even during fast travel through multiplexed operation of the UHF RFID read/write head Q300 with up to 4 connected antennas
- Lean integration through PoE (Power over Ethernet) and direct integration of external middleware

Control of chocolate production via the molds

- User benefit: Mixed production of different products depending on the casting mold
- RFID tags in each casting mold control the production process
- Fast and unproblematic product changes in flexible systems
- Automatic selection of casting and mold washing program

Over 30 subsidiaries and 60 representatives worldwide!

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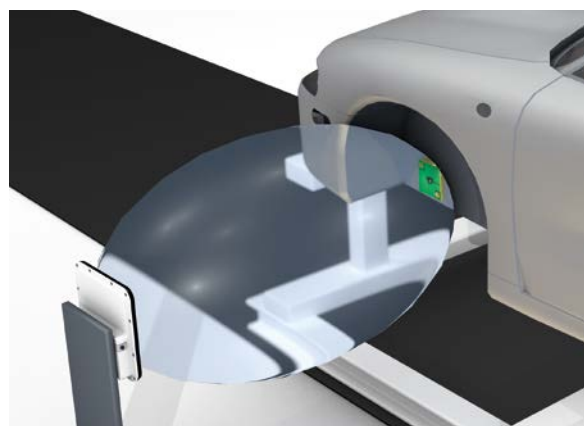
Identification of car bodies

- User benefit: Reliable tracking of the body through the entire production process
- The high-temperature tags withstand temperatures of up to 240 °C, which can occur in coating lines
- No overreaches and no reading gaps in metal environment due to polarization switching of the UHF RFID read/write head Q300
- The UHF tag remains on the car for use in the downstream logistics

Identification of bumpers

- User benefit: Traceability from production to the end customer, optimized production control between suppliers and carmakers
- Bumpers can be identified with RFID tags through the entire production and logistics process
- RFID tag contains all information for controlling the processing machines via OPC server
- Integration of the collected data in ERP and WMS systems

Identification of Cryovessels in the pharmaceutical industry

- User benefit: Avoidance of allocation errors through reliable product identification across multiple sites
- Cryovessels allow clear identification of the container and contents with RFID tags
- Reliable and secure identification even with inaccurate positioned container by 400 mm read/write heads
- Data reconciliation between international locations via cloud

Position detection of the gondola arms in circular rides

- User benefit: Cost reduction, simple central parameterization via I/O-link, as well as increased operational reliability and availability
- Contactless operating linear position sensors with IO-link detect the horizontal location of the gondola arms of a fairground ride
- Increased plant availability by prefailure warning on the linear position sensor
- Cost savings in wiring and construction
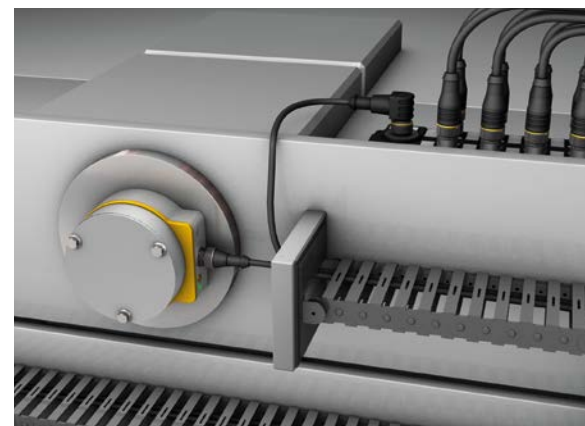
Capturing the swivel movement of a core box girder

- User benefit: Higher machine availability through IO-Link diagnostic functions
- QR24-IO-Link encoder registers the swivel movement of the core box girder in a core shooting machine
- Integrated IO-Link automation of the machine replaces expensive fieldbus solution and allows simple error diagnostics
- Reduction of mechanical breakdowns of the encoder and continuous monitoring of the resonator position
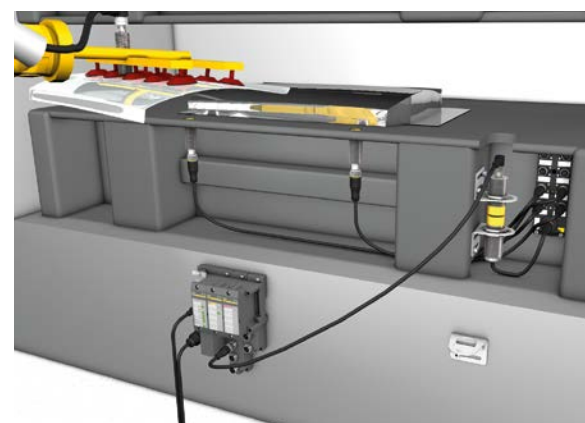
Format changes on presses in the automobile production

- User benefit: Reduced changeover times by automated changing of molds during the process
- New pressing tools are identified contactless by NIC couplers and TBIL-I/O-hub via IO-Link (Application Specific Tag)
- Reduced standstill due to wear-free energy and data transmission
- Inductive coupling for contactless transmission of necessary information and energy

Predictive maintenance of conveyor belts

- User benefit: Increased plant availability through prefailure warning
- Ultrasonic sensor with IO-Link continuously monitors the flow of the conveyed goods
- Signal quality of the sensor indicates whether a severe fault exists or is imminent, as for example a bent or torn-off reflector
- Temperature fluctuations of the ambient are compensated directly thanks to integrated temperature sensor

Monitoring of cabinets and protective housings

- User benefit: Increased plant availability and avoidance of unplanned downtimes
- CCM Cabinet guard continuously monitors correct door closing, temperature and humidity in control cabinets and protective housings - also in hazardous areas
- On exceedance of limits, a signal to higher-level systems is automatically issued
- Data logger captures also gradual changes, such as porous seals

Industry 4.0
Data and Communication Solutions

Industry 4.0 – User Benefits

Increased availability of machines and plants

- Condition Monitoring allows predictive maintenance without unplanned outages, required spare parts can be planned and ordered in time
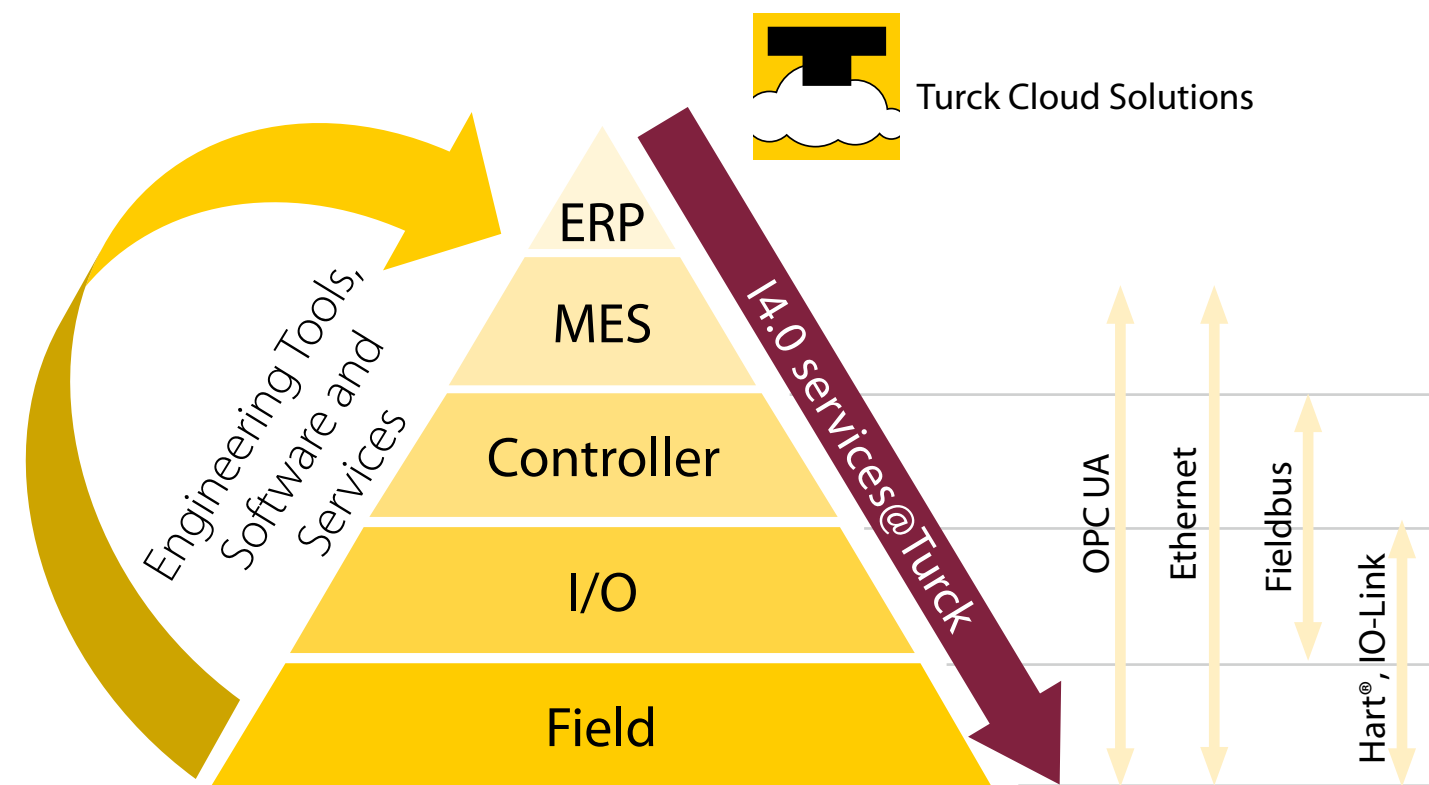
Better quality assurance up to the end user

- Automated quality assurance processes reduce erroneous deliveries
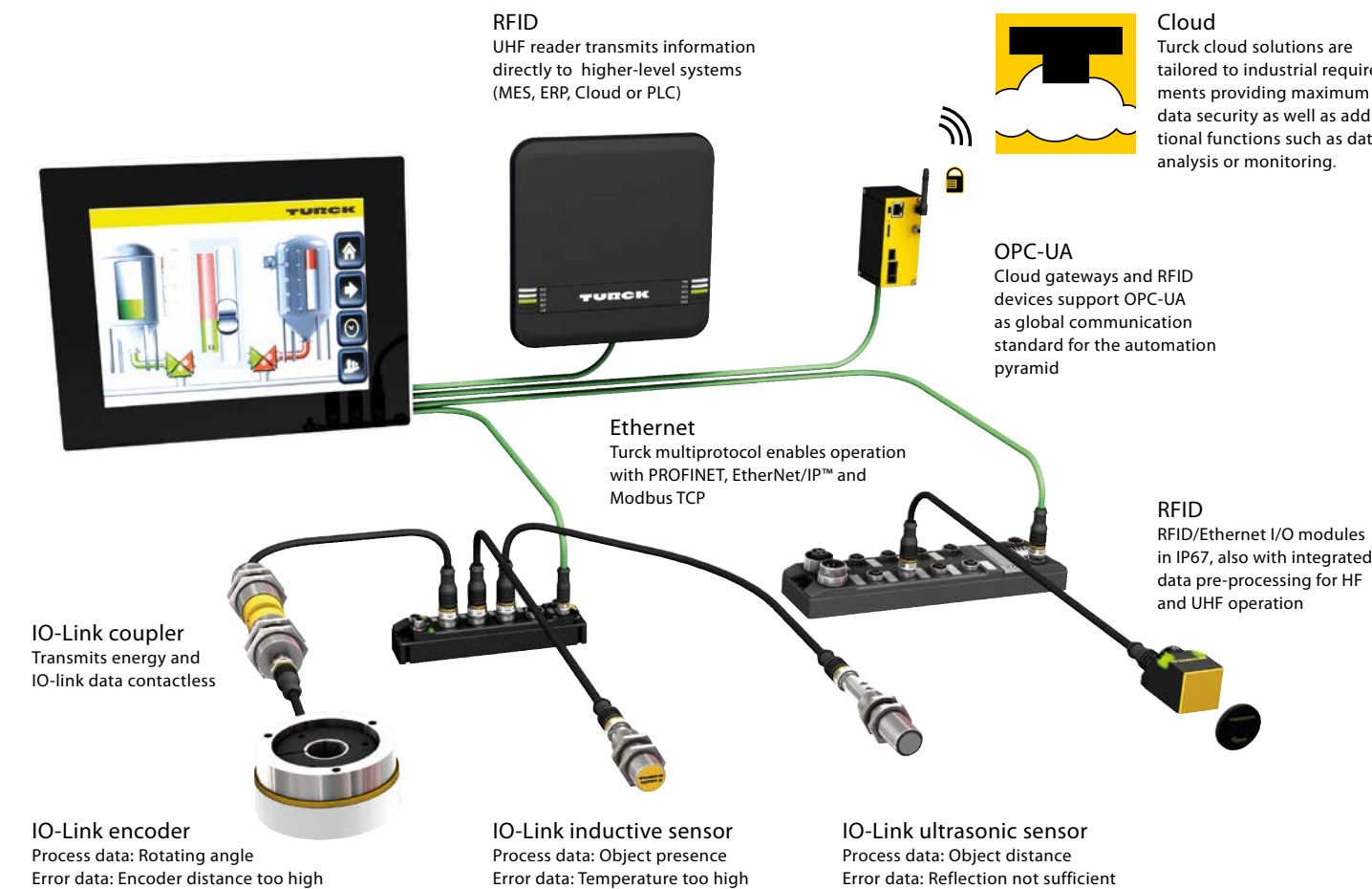- Data acquisition and processing guarantee at any time traceability or optimized production processes

Increased production efficiency in small quantities

- Shorter changeover times for new product variants, e.g. centrally controlled sensors with new limit values/functions
- Increased efficiency through interdisciplinary communication, e.g. information on capacities that feed directly into production planning
- Energy efficiency through improved use of capacity and reduced reject rates thanks to optimized production processes

Turck supports you on the way to industry 4.0 with innovative solutions for the detection, processing, and transmission of relevant production data

Turck Cloud Solutions

Engineering Tools, Software and Services

I4.0 services@Turck

ERP
MES
Controller
I/O
Field

OPC UA
Ethernet
Fieldbus
Hart®, IO-Link

Industry 4.0 – Key Technologies

RFID
UHF reader transmits information directly to higher-level systems (MES, ERP, Cloud or PLC)

Cloud
Turck cloud solutions are tailored to industrial requirements providing maximum data security as well as additional functions such as data analysis or monitoring.

OPC-UA
Cloud gateways and RFID devices support OPC-UA as global communication standard for the automation pyramid

Ethernet
Turck multiprotocol enables operation with PROFINET, EtherNet/IP™ and Modbus TCP

RFID
RFID/Ethernet I/O modules in IP67, also with integrated data pre-processing for HF and UHF operation

IO-Link coupler
Transmits energy and IO-link data contactless

IO-Link encoder
Process data: Rotating angle
Error data: Encoder distance too high

IO-Link inductive sensor
Process data: Object presence
Error data: Temperature too high

IO-Link ultrasonic sensor
Process data: Object distance
Error data: Reflection not sufficient

Whether RFID, IO-Link, OPC-UA, Ethernet or Cloud – as a specialist for the key technologies of industry 4.0, Turck paves the way for you to the intelligent factory of the future.

OPC-UA

OPC-UA is the world's next standard for integrative communication across all levels of the automation pyramid. In close cooperation with science and industry, Turck participated in the development of the standard and has already implemented it in the first products.

RFID

With the RFID system BL ident Turck has implemented solutions for flexible control of production processes, but also for the spare parts/service business, piracy protection or serialization. Together with the IP67 I/O PLC modules from Turck you have available robust solutions with distributed intelligence for data processing or for control tasks.

IO-Link

Turck offers one of the most comprehensive portfolios of IO-Link solutions - ranging from numerous sensors and connectivity to fieldbus and Ethernet I/O systems with IO-Link masters in the protection classes IP20 and IP67. How to benefit from intelligent data acquisition and communication solutions from a single source.

Ethernet

Ethernet is the standard for communication, not only in the IT world, but also in the industrial environment. Turck offers especially user-friendly solutions such as the multiprotocol technology that supports the automatic use of I/O systems in the Ethernet protocols PROFINET, Modbus TCP or EtherNet/IP™.

Industry 4.0 – Data and Communication Solutions

Benefit from the wide range of products: In its extensive portfolio of data and communication solutions, Turck also has the right Industry 4.0 tools for you

TX700/TBEN-PLC – HMIs and block-I/Os with CODESYS-3 PLC

- User benefit: Decentralized intelligence, can be easily integrated to perform control tasks directly at the machine or plant

- TX series: From pure operating and visualization panels TX100 to HMI with integrated CODESYS-3 PLC TX700 for retrofit and industry 4.0 applications
- TBEN-L-PLC: Robust IP67 Block I/Os with CODESYS-3 PLC for intelligent control concepts without control cabinet
- BL20, BL67: Modular IO systems with programmable, intelligent gateway

RFID-Module with integrated middleware and readers with Ethernet and OPC-UA

- User benefit: Block I/Os and Q300 reader communicate directly with higher-level ERP or MES systems via Ethernet TCP/IP and OPC-UA

- Robust I/O block modules and readers in industrial IP67 design
- With up to four external antennas directly on the Q300 reader, ideal for gate applications
- Support of Companion Specification Auto-ID for standardized connection via OPC-UA

ARGEE – FLC functionality for multiprotocol I/O modules

- User benefit: Simple implementation of decentralized intelligence and programming of basic functions without knowledge of a programming language

- Browser-based programming environment ARGEE turns the Turck Ethernet block I/O series TBEN-L, TBEN-S, BL compact and FEN20 into compact controls
- Simple control functions can be outsourced to I/O modules, thus relieving central control and bus communication
- Data exchange with higher-level systems via PROFINET, EtherNet/IP™ or Modbus TCP - three protocols in one module

TBEN – Multiprotocol Ethernet I/O solutions in IP67

- User benefit: Easy integration into systems and diagnostic functions on all data terminals and smartphones thanks to integrated web server

- Robust I/O block modules in protection class IP67/IP69K in TBEN-L and TBEN-S design (ultra-compact)
- Reduction of IP addresses in the system, up to 33 I/O modules with only one IP address thanks to BEEP (Backplane Ethernet Extension Protocol).
- Master to master communication via various Ethernet networks through the spanner series, data flow across networks

Modbus | PROFINET | EtherNet/IP

Data acquisition for condition monitoring

- User benefit: Identification of potential error sources for predictive maintenance without unplanned downtimes

- Additional data from sensors can be used for condition monitoring
- Data transmission of condition monitoring information via conventional infrastructures, wireless networks or via the Turck Cloud
- Solutions for retrofitting existing machines and equipping new machines can be implemented easily and quickly

Extensive IO-Link portfolio – Masters, couplers, hubs, sensors

- User benefit: Fast device replacement, flexible and reliable application through comprehensive configuration and diagnostic options

- Turck offers one of the most comprehensive portfolios of IO-Link solutions – from a variety of sensors and cables and I/O hubs to programmable fieldbus and Ethernet solutions
- Thanks to the "Application Specific Tag", unique identification without the use of additional hardware or barcodes is possible
- Data Storage feature of IO-Link 1.1 offers a plug-and-play replacement of sensors
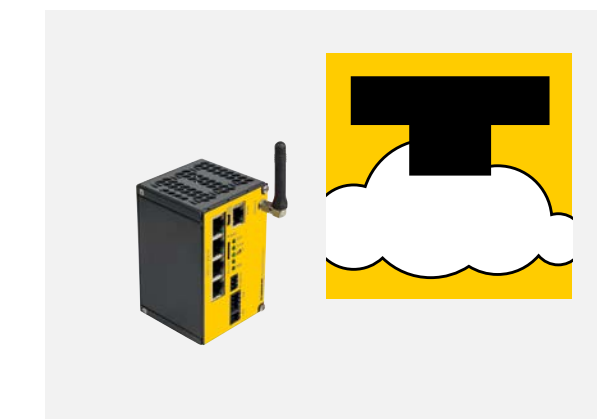
Turck Cloud Solutions

- User benefit: Higher machine availability and worldwide, secure access to machine and system data through web hosting

- Simple and fast integration into existing architectures
- Functions such as monitoring, alarm messaging, reports, trends or location information are already integrated
- Secure transmission protocol and data hosting in numerous variants
- Easy and fast visualization with prefabricated dashboard elements