BALLUFF

Components for the IIoT

THE ARCHITECTS OF SMART MANUFACTURING

innovating automation

Open the gates for smart production

STEP BY STEP TO THE FACTORY OF THE FUTURE

Using smart solutions from Balluff you can lay the foundation for the factory of the future. Using Balluff allows you to implement intelligent production – smart manufacturing – step by step, because we accompany you professionally into the digital world.

We stand at your side with our expertise, whether your objective is traceability and transparency or smart communication via IO-Link. We ensure automated asset management, efficient robotic equipment and reliable condition monitoring.

With our solutions you increase the uptime of machines, minimize downtimes and ensure product quality. They enable an optimal production process and open the gates to the modern, flexible production of the smart factory. Learn how.

ROBOTICS

The significance of robotics to modern production continues to grow. Robotics bring reliability and quality and provide for high efficiency at fast cycle times. This requires that the dynamics of motion be ensured, the control function of the sensors be guaranteed, and that fast format changes are possible. This is how the level of automation continues to rise for the factory of the future.

SMART COMMUNICATION

The bi-directional communication standard IO-Link is the prerequisite for every faster, more flexible, more efficient, and more adaptable production. IO-Link represents a high-performance infrastructure and is the first step toward seamless communication from the sensor into the internet. This smart communication is indispensable for the factory of the future.

TRACEABILITY

Traceability of each step in the process chain enables transparent production. This transparency supports efficient production because traceability creates lean production processes, ensures high product quality and opens the gates for self-controlling processes.

CONDITION MONITORING

The ability to continuously check the machine status requires condition monitoring. This lets you utilize machines efficiently and prevents possible production stoppages. Condition monitoring creates planning security, reduces repair effort and cost, and saves actual money.

QUALITY ASSURANCE

Industrial image processing enables automated quality assurance and provides for efficient production processes - down to lot size 1. This makes it an essential component for modern, flexible production.
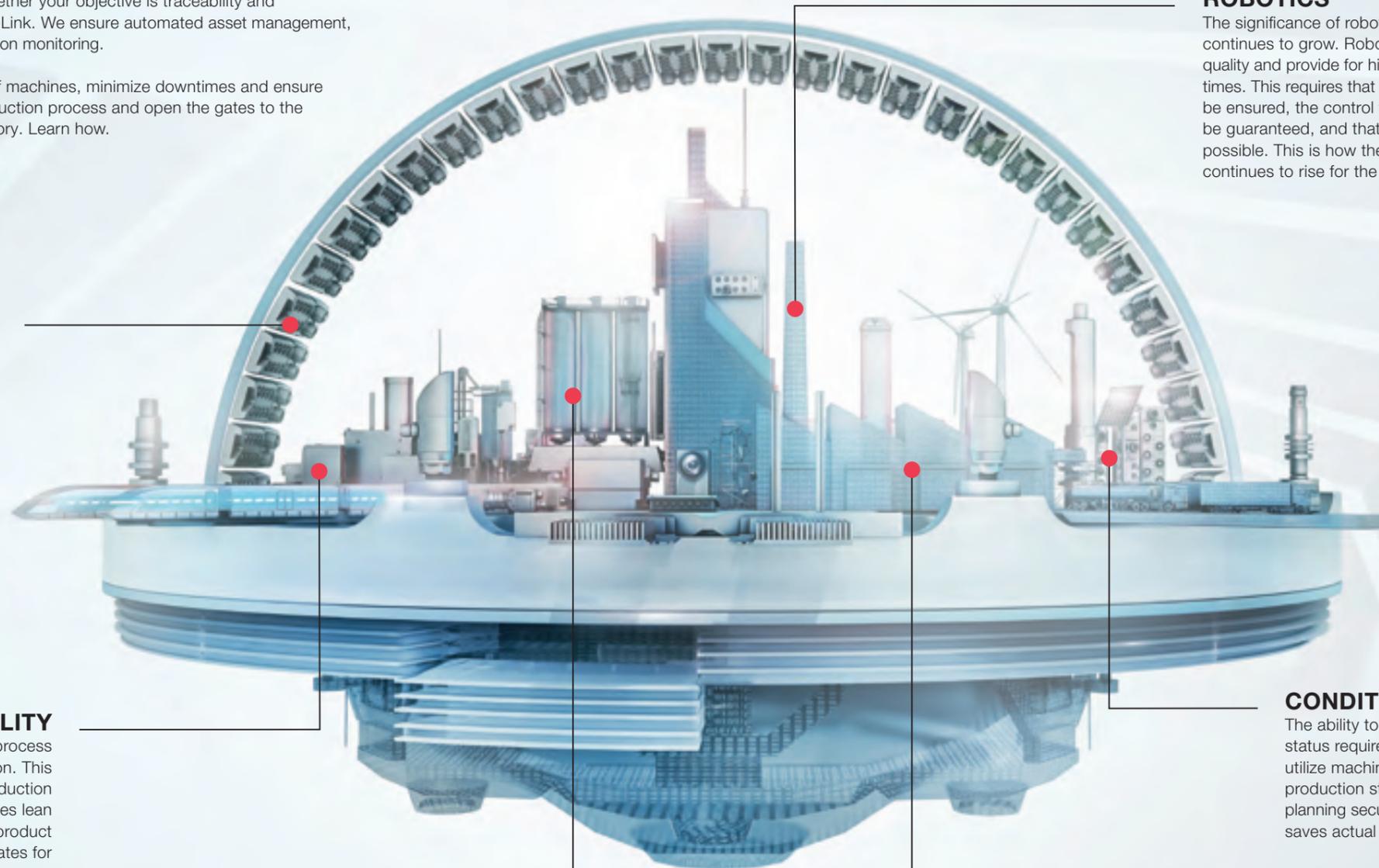
ASSET MANAGEMENT

Asset management ensures efficient maintenance and supports flexible production. This, in turn, increases machine uptime and reduces stoppages to a minimum. The result is reliable plant operation for smart manufacturing.

Smart communication

IO-LINK –
THE FOUNDATION
FOR INTELLIGENT
MANUFACTURING

Intelligently combining industrial networks with the bi-directional IO-Link communication standard is the ideal solution for ever faster, more flexible, more efficient, and more adaptable production.

IO-Link not only integrates all the sensors in the fieldbus level, but also enables lean wiring and equipment concepts, in which even analog signals can be transmitted noise-free by digitizing them. We offer you a high-performance infrastructure for reliably managing your growing volume of data. This transports your data through the entire manufacturing process and is the first step for enabling seamless communication from the sensor into the internet.

These are the best prerequisites for IO-Link to distinguish itself as the enabler for the IIoT because smart communication is indispensable for the factory of the future.

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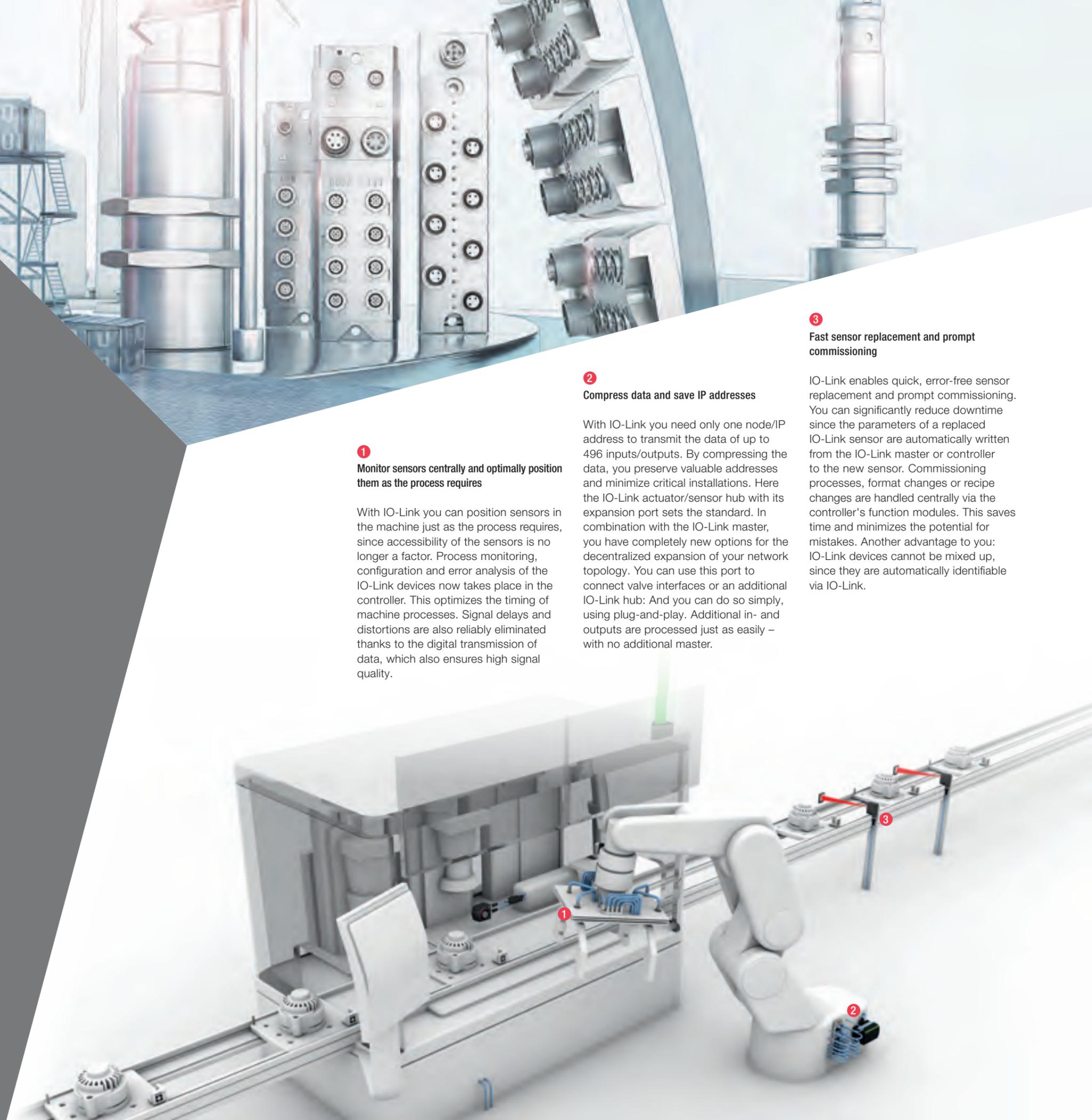
Monitor sensors centrally and optimally position them as the process requires

With IO-Link you can position sensors in the machine just as the process requires, since accessibility of the sensors is no longer a factor. Process monitoring, configuration and error analysis of the IO-Link devices now takes place in the controller. This optimizes the timing of machine processes. Signal delays and distortions are also reliably eliminated thanks to the digital transmission of data, which also ensures high signal quality.

❷

Compress data and save IP addresses

With IO-Link you need only one node/IP address to transmit the data of up to 496 inputs/outputs. By compressing the data, you preserve valuable addresses and minimize critical installations. Here the IO-Link actuator/sensor hub with its expansion port sets the standard. In combination with the IO-Link master, you have completely new options for the decentralized expansion of your network topology. You can use this port to connect valve interfaces or an additional IO-Link hub: And you can do so simply, using plug-and-play. Additional in- and outputs are processed just as easily – with no additional master.

❸

Fast sensor replacement and prompt commissioning

IO-Link enables quick, error-free sensor replacement and prompt commissioning. You can significantly reduce downtime since the parameters of a replaced IO-Link sensor are automatically written from the IO-Link master or controller to the new sensor. Commissioning processes, format changes or recipe changes are handled centrally via the controller's function modules. This saves time and minimizes the potential for mistakes. Another advantage to you: IO-Link devices cannot be mixed up, since they are automatically identifiable via IO-Link.

Traceability

TRANSPARENCY FOR THE SMART FACTORY

Traceability is becoming increasingly important for efficient production. Traceability creates transparency and is indispensable for the factory of the future with self-controlling processes.

Traceability means recording every step of a process chain so that it can be traced. This is accomplished with RFID, which automatically documents the production history of all production parts and all of the materials and equipment used here - including time, place, and process. You have real-time access to all the information. This transparency enables lean production processes, ensures high product quality and prepares the way to self-controlling processes. With over 30 years of RFID expertise, we offer comprehensive know-how for implementation.
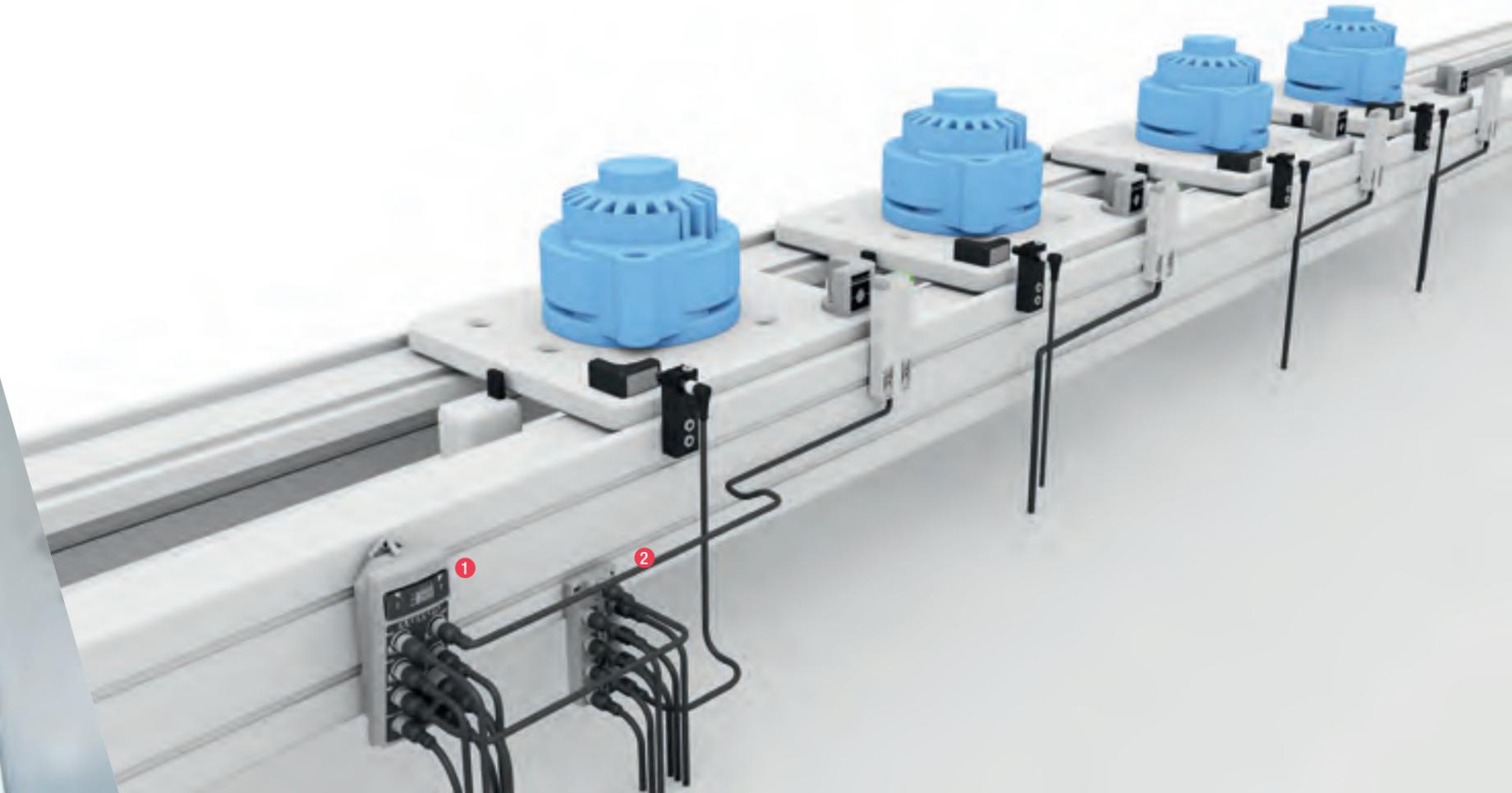
1

A single processor unit for LF, HF and UHF

Our rugged BIS V processor unit provides fast data transmission, short cycle times and increased data security in all applications. This lets you use different RFID technologies – LF, HF and UHF – at the same time on a single processor unit. This single processor unit is all you need to handle any application. Whatever industry you are in, this high-performer features perfect electromagnetic compatibility and works with all common bus systems worldwide.

2

Bundle sensor data and simplify network structure

BIS V comes with four ports that can be individually configured and operated simultaneously with up to four read/write heads. Additionally, you can connect IO-Link capable sensors and actuators or a sensor hub with up to 16 sensors to the integrated IO-Link master port. Now you can bundle sensor data in the simplest way possible in any network technology. Your network structure becomes more efficient, while you save time and money.

Quality assurance

AUTOMATING QUALITY ASSURANCE

Industrial image processing is indispensable for modern, flexible manufacturing. It ensures product quality and enables efficient manufacturing processes down to lot size 1.

Balluff solutions pave the way to a versatile, high-performance range of applications for automated quality assurance. The possibilities for industrial image processing offered by our growing product portfolio are virtually unlimited, whether for visual quality inspections, identification or positioning tasks. And best of all, our image processing products are simple to set up and intuitive to operate. Using our smart vision solutions you can reliably improve the quality of your production.

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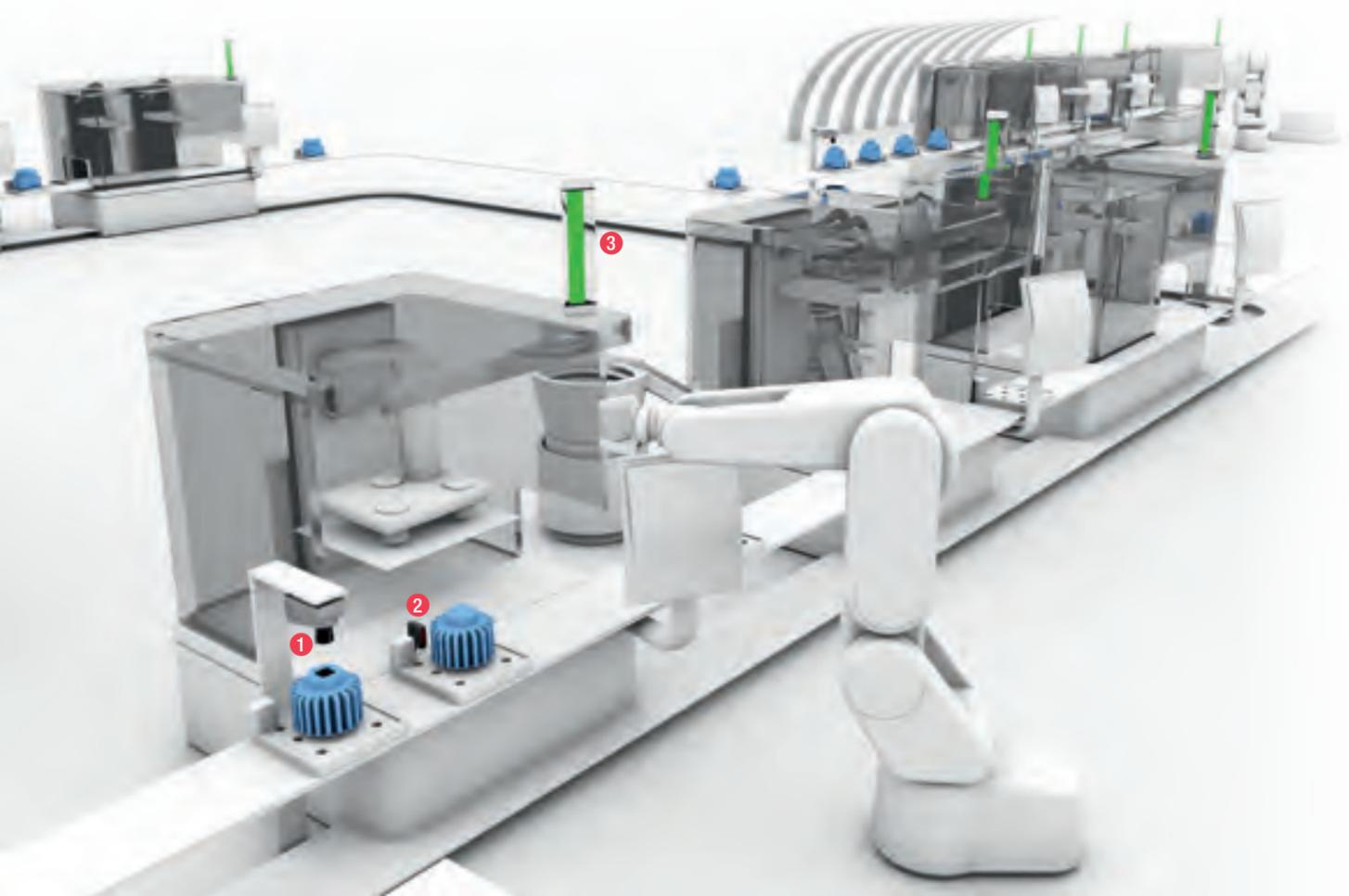
SmartCamera offers diverse quality inspections

Our SmartCamera with fieldbuses and IO-Link offers you a wide range of possible applications. It takes over visual quality controls of finished parts, including their production. For example, it checks if size, distance, position and orientation are correct, or if the parts are complete and fault-free. This means you can discover and correct process errors early in each individual production step. The result is less scrap and reduced follow-on costs.

❷

Reliably prevent errors with photoelectric sensors

Not every quality inspection requires smart systems. Simply using photo-electric sensors can reliably eliminate production errors.

For example, using a color sensor is an outstanding way to check whether an inspected component is the right color. If so, it automatically moves to the next processing step. Proactively preventing defects supports an efficient process.

❸

SmartLights are a convenient way to visualize the process

Using the IO-Link master interface allows you to monitor the process directly – without the need for a PLC. All you need is our IO-Link SmartLight stack light which visualizes trends and sequences. Based on the color scale of their LED display, you get a view of what is happening and are always up-to-date on the process. Thanks to IO-Link installation is fast using plug-and-play. And with IO-Link the SmartLight is fast and easy to configure and it can even be changed on-the-fly.

Asset management

ENSURE MACHINE AVAILABILITY AND PLANT OPERATION

Efficient asset management supports high machine availability and reliable equipment with minimal stoppages. Maintenance effort is drastically reduced while increasing production flexibility.

Asset management solutions from Balluff provide you with reliable and always up-to-date information – using RFID as the key technology. For example, our tool management solutions eliminate error-prone, manually kept tool logs. In addition, our plug-and-play retrofittable versions for tool identification make optimal tool utilization easy. RFID also ensures unambiguous detection, matching and traceability of the produced workpieces. Our 13.56 MHz HF system BIS M is an established standard. Learn about our reliable portfolio of solutions for your asset management.
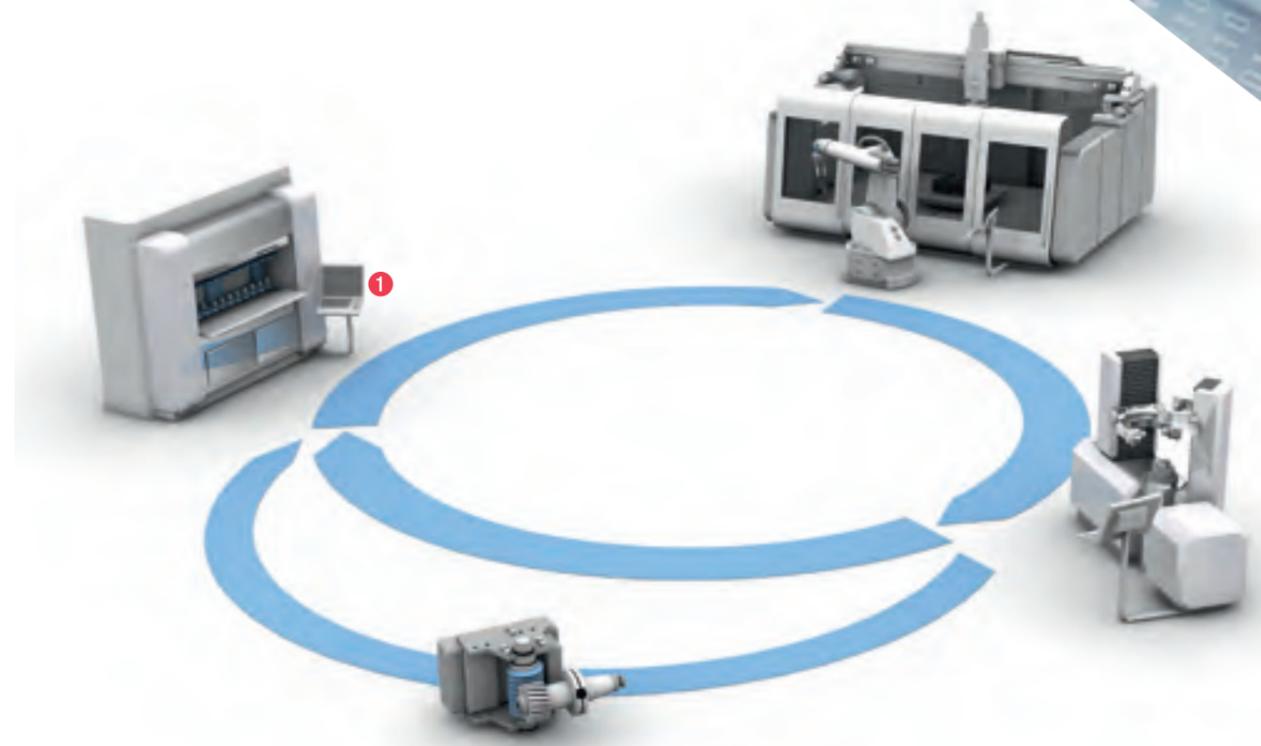
1

All tool data always available

BIS C RFID systems in LF or BIS M in HF from Balluff always provide the CNC controller in milling machines and machining centers with the correct tool data. Reliably identified and transmitted parameters form the basis for optimal tool management. Instead of error-prone, manually kept tool logs, the data is continually recorded when loading and unloading the tool so that continued use of the tool can be controlled.
The actual tool dimensions are stored, for example, so that they can be automatically read into the tool table for the CNC controller.

Optimal utilization of molds

Connected Mold-ID from Balluff provides condition-based maintenance of your tools without cumbersome and error-prone tool logs. Because Mold-ID stores all the relevant data, such as drawing number, number of shots, last maintenance or lifetime, automatically on the injection molding tool. You can call up and review this data at any time. Inability to plan and absence of availability resulting from manual tool handling are a thing of the past. Mold-ID lets you make optimal use of your injection molding tools.

The best part: Mold-ID from Balluff lets all machines be upgraded individually, without the manufacturer and regardless of the location. This is because Mold-ID is an autonomous system.

①

Multi-functional sensor increases equipment productivity

Unscheduled stoppages and faults in the production process can be avoided using the new BCM multi-functional condition monitoring sensor from Balluff. You can even reduce failures in critical areas such as bearings, gear units, fans, pumps or control cabinets to increase plant productivity. This intelligent sensor provides you with condition information, which you can use for automating cost-intensive manual inspections. This condition data is also an important component of the IIoT for implementing smart and flexible manufacturing.

To accomplish this our condition monitoring sensor detects various physical variables such as vibration, temperature, relative humidity and ambient pressure, processes the data and provides the desired information via IO-Link to a higher level system. And like other IO-Link devices, the sensor can detect its own condition and communicate it. Now you are continuously informed of its temperature, number of operating hours and start cycles.

Condition monitoring

CONTINUOUS MACHINE CONDITION MONITORING

Condition monitoring ensures regular or permanent monitoring of the machine condition. This lets you utilize your machines more efficiently and profit from the greatest possible planning security. You prevent unplanned stoppages and avoid costly production downtime.

Condition monitoring from Balluff, for example, continuously checks physical variables, such as ambient temperature, vibration or the surrounding pressure, analyzes the results and passes the information on to the controller, so you are always informed of the current machine condition. Since you can easily visualize the values, use of sensors is made easy.

This lets you detect malfunctions of individual machine components early. And you can identify possible errors before they reach a critical extent. With condition monitoring from Balluff, you prevent possible machine stoppages, reduce repair expense and save therefore actual money.

Robotics

AUTOMATION SOLUTIONS FOR OPTICAL PRODUCTION PROCESSES

Robotics has become an indispensable aspect of industrial manufacturing. Production robots automate repetitive actions, reduce error rates to negligible levels and allow employees to concentrate on more valuable tasks. It is no wonder that the significance of robotics has increased in manufacturing. Automated production solutions ensure high efficiency, safety and quality, and give you a competitive advantage.

Modern robot systems need many sensors – primarily in the robot arm. However, they require minimum mass in order to ensure the dynamics and minimize energy consumption. Cumbersome wiring of multi-conductor cables often conflicts with the requirement for high efficiency.

Using technologies and solutions from Balluff you can easily overcome these hurdles and enjoy maximum utilization of your production.

1

Contactlessly transmit power and data

Inductive couplers are a windfall for robotics because they simultaneously send both data and power over an air gap. The benefits to you are numerous. The risk of cable breakage is virtually eliminated. The contacting of mechanical connectors is eliminated, and the robot has a continuous radius of movement of 360 degrees.

2

Prompt gripper exchange means fast format changes

Our inductive couplers with IO-Link guarantee fast gripper changes and increase the up-time of your system. This is because the signal is transmitted directly following the gripper change, so that production can continue without interruption. The speed and flexibility of use support frequent format changes. The result is that you can produce even small batches efficiently.

Products and systems for the Industrial Internet of Things

SIMPLE, SMART, EFFICIENT

Balluff accompanies you step by step into the digital world. We offer you numerous solutions that clear your path to the factory of the future. You can choose between intelligent single components and smart retrofit systems. Whatever your requirements, our solutions meet them with ease of handling and simple integration, economical pricing and guaranteed high quality.

Questions? Simply turn to one of your personal contact persons or send us an email: Smart_Manufacturing@Balluff.de. We are happy to assist you.

Profinet fieldbus module with IO-Link
BNI005H

- Economical collection of sensor data using decentralized installation technology
- Monitor additional data such as counter function, temperature values (depending on sensor)
- Ethernet-based: faster than Profibus but can be perfectly combined

Inductive sensor with IO-Link interface
BES04FK

- Distance detection using integrated ancillary function
- Short-circuit protected, non-contact, wear-free and insensitive to contamination

Infrared temperature sensor with IO-Link interface
BTS0002

- Non-contact temperature measurement from 250 °C
- Rugged M30 stainless steel housing with IP67 protection provides wide range of application use
- Numerous functions and settings through IO-Link interface
- Alternatively available with 4...20 mA interface
- Reliably detect even moving objects

Magnetic field positioning system
BMP0004

- Numerous applications: continuous monitoring of the piston position in the smallest spaces using analog voltage and current output as well as an IO-Link interface
- High process security: low temperature drift and very good electromagnetic compatibility
- Modular concept provides flexibility: covers a variety of cylinders over a stroke of up to 256 mm
- Reliable results: application-specific linearity and repeat accuracy

LED stack light with acoustic mode
BNI0085

- Visualization of machine conditions in various modes (segment, runlight, level and color circle mode)
- Send important warning messages with additional acoustic signal
- IO-Link interface for simple, flexible control, no mechanical rebuild

Heartbeat® power supply
BAE00TM

- Decentralized installation for local control
- IO-Link interface for monitoring of the current consumption
- Diagnostics using Heartbeat® status indicator
- LEDs for indicating load/ stress levels and lifetime
- All parameters can be incorporated into the overall system diagnostics

Heartbeat® power supply
BAE00LJ

- For installation in the control cabinet
- Ideal for harsh environments: short-circuit protected and single-phase
- IO-Link interface for monitoring of the current consumption
- Diagnostics using Heartbeat® status indicator
- LEDs for indicating load/ stress levels and lifetime
- All parameters can be incorporated into the overall system diagnostics

Photoelectric multi-function sensor
BOS026R

- Added functions for monitoring: reduces the load on the controller, periodic acquisition of additional data using counter function and frequency monitor
- IO-Link for teach-in
- Four different operating modes can be set

Industrial Controller
BAE00WC

- Monitor sensor data
- Fast, direct representation of production status as well as simple configuration of machine vision products or other sensors

Safe I/O module Profisafe with IO-Link
BNI0098

- Machine protection in one system is accomplished by connecting the automation and safety technology using IO-Link
- Safe signal acquisition and communication
- Parameters set easily from controller
- Secure information acquisition through direct transfer from master to controller

Pressure sensors with display
BSP00Y5

- Flexible use with selectable outputs: analog, digital, IO-Link
- Highly impervious even in harsh environments: highest sealing in the market (IP67, optional IP69K) and broad temperature range (–40...+125 °C)
- Additional diagnostics functions: operating hours and pressure spike counter as well as indication for internal temperature changes

IO-Link converters for analog signals
BNI00C7

- Convert analog in-/output signals in IO-Link
- Voltage/current signal, Pt sensor or thermocouple configurable
- Various current/voltage interfaces available (0...10 V, 5...10 V, –10...+10 V, 0...5 V, –5...+5 V, 0...20 mA, 4...20 mA)
- Selectable resolution (10...16 bits)
- IP67 protection rating for harsh ambient conditions

SmartLight Indicator
BNI00EC

- Flexible: six independent, extremely bright multi-color LED segments
- Versatile: multi-segment mode for representing one, two, three, or six independent segments
- Secure: runlight mode visualizes whether, for example, workstation is ready or still processing
- Innovative: level mode for displaying a position or level with 360° or 720° rotation
- Cost-saving: combine two SmartLight indicators (daisy-chain) with just one IO-Link port needed
- Reliable: IP65 housing can be installed on machine, for unambiguous indication of the point of use

Magnetic encoder with IO-Link interface
BML0904

- Simple connection via IO-Link
- Distance detection up to 8 m, maximum accuracy
- Great flexibility through extensive parameterization functions as well as diagnostic and status information via IO-Link
- Simple to install, reliable operation with a generous read distance of up to 1.3 mm
- Optional analog measurement output for control applications

Easy Tool-ID 2.0
BSG001W

- Reduce setup times and faulty entries: send tool data fast and reliably via USB
- All data shown in plain text: check all the tool data on the touch display
- Optimal tool utilization: manual update of the tool data via the touch display
- Retrofitting with little effort: simple configuration via web browser, no machine tool manipulation, short downtimes

SmartCamera for machine vision applications
BVS002A

- Versatile with numerous interfaces: Gigabit Ethernet, Profinet, Ethernet/IP, IO-Link, digital in-/ outputs
- Fast familiarization thanks to simple tool operation
- Create any test plan for flexible utilization
- Secure, application-specific results management for the machine controller
- Prompt access in networked locations (remote control)

Inductive couplers for IO-Link signal transmission
BIC000C

- Non-contact transmission of data and power
- No mechanical wear – eliminates cable breaks in dynamic applications
- Additional diagnostics function: internal temperature monitoring
- Up to 120 W capacity depending on form factor

Industrial cameras for automation processes
BVS002P

- Flexible, application-optimized use of multiple industrial cameras
- Optimized image data transmission
- Fast data processing based on the user-friendly BVS Cockpit interface
- Standardized process interfaces TCP IP/UDP or Profinet
- Remote control in networked locations

Condition monitoring sensor for permanent condition monitoring
BCM0002

- Multiple variables in one device: vibration, temperature, relative humidity, ambient pressure
- Integrated processing circuitry with configurable data processing
- Configurable events and status indications
- Quick and easy to connect, ease of integration using IO-Link
- Compact form factor for when space is at a premium

BIS V processor unit – technology-independent RFID platform
BIS0187

- Connect PC-based systems: two process interfaces (TCP/IP and USB)
- High flexibility: one device for all established RFID technologies (LF, HF, UHF)
- Powerful: suitable for high memory and high speed data carriers
- Meets the highest industrial requirements with aluminum die-cast housing
- Connect various devices: freely configurable IO-Link master port V1.1

UHF Short Range read/write head
BIS015Y

- Fast startup at the press of a button using Auto-Set-up
- Optimal adaptation to the identification task using integrated Power-Scan function
- Numerous software commands for expanded UHF functionality
- Function and status LEDs visible from any direction for optical identification of operating status
- Can be combined with all BIS V interface variants (except CC-Link)

Capacitive smart level sensor with IO-Link
BCS018A

- Detect levels without contact through the walls of non-metallic containers
- For highly conductive media such as acids and bases
- Smart level 50 technology compensates for foam and buildup
- For housing thicknesses up to 10 mm
- Operating modes: Standard IO mode (SIO), IO-Link mode

#B_IIoT

USE BALLUFF TO SEIZE THE OPPORTUNITIES OF THE INDUSTRIAL INTERNET OF THINGS

The future of automation is digital and networked. As your automation partner we accompany you step by step on your path to the smart factory. We always keep your competitive ability at the forefront. Build upon our expertise and experience, and let us approach the Industrial Internet of Things together.

For higher productivity, greater efficiency and transparent manufacturing

We have many successful years of experience in generating and transporting data and a constantly growing portfolio of smart devices. We use software to deliver true added value for your production environment. And together with our individualized services we can provide you holistic automation solutions – all with the goal of technological progress.

Utilize the potential of the Industrial Internet of Things – together with Balluff

Our portfolio ranges from the IIoT capable hard- and middleware, to software and systems solutions, to custom-tailored IIoT total packages. Through standardized interfaces and protocols, we ensure that you can use our solutions in your existing IIoT infrastructure and on familiar platforms. And we focus on the IO-Link communication standard. Because IO-Link is ideally suited for the IIoT.

All this makes Balluff an enabler and solutions provider for the Industrial Internet of Things.

Questions? Our experts are here to help.

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