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.

**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.

**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.

**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.

**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

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.

1. 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.

2. 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.

3. 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 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.

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.
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.

**Reliably prevent errors with photoelectric sensors**

Not every quality inspection requires smart systems. Simply using photoelectric 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.

**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.

**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.
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.

**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.
Condition monitoring ensures regular or permanent monitoring of the machine condition. This lets you utilize your machines more efficiently and proft 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.

**CONTINUOUS MACHINE CONDITION MONITORING**

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.
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.

**AUTOMATION SOLUTIONS FOR OPTICAL PRODUCTION PROCESSES**

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 Balluff’s Industrial Internet of Things (IIoT) and smart control systems. Whatever your wishes are, we realize 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 an email: Smart_Manufacturing@Balluff.de. We are happy to assist you.

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**Product Details**

- **LED stack light with BNI0085**
  - LED stack light with BNI0085 acoustic mode
  - SIMPLE, SMART, EFFICIENT

- **BNI00C7**
  - LED stack light with BNI0085 acoustic mode
  - Interface: BNI0085
  - SIMPLE, SMART, EFFICIENT

- **BNI00LJ**
  - LED stack light with BNI0085 acoustic mode
  - Interface: BNI0085
  - SIMPLE, SMART, EFFICIENT

- **BAE00TM**
  - LED stack light with BNI0085 acoustic mode
  - Interface: BNI0085
  - SIMPLE, SMART, EFFICIENT

- **BOS026R**
  - LED stack light with BNI0085 acoustic mode
  - Interface: BNI0085
  - SIMPLE, SMART, EFFICIENT

- **BMP0004**
  - LED stack light with BNI0085 acoustic mode
  - Interface: BNI0085
  - SIMPLE, SMART, EFFICIENT

- **BTS0002**
  - LED stack light with BNI0085 acoustic mode
  - Interface: BNI0085
  - SIMPLE, SMART, EFFICIENT

- **BSP00Y5**
  - LED stack light with BNI0085 acoustic mode
  - Interface: BNI0085
  - SIMPLE, SMART, EFFICIENT

- **BTA0052**
  - LED stack light with BNI0085 acoustic mode
  - Interface: BNI0085
  - SIMPLE, SMART, EFFICIENT

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**Technical Details**

- **Visualization of machine conditions in various process steps.**
- **Flexible signal processing, light and color binary modes.**
- **Serial important warning and diagnostic signals with additional acoustic signals.**
- ** kontaktless control, no mechanical wear.**
- **Cost-saving: intelligent light used in various functions.**
- ** Protects against unexpected events in the machine.”**
- **Reliability: high system availability through precise and high-quality diagnostics.**

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**Additional Information**

- **Smart_Manufacturing@Balluff.de.**
- **We are happy to assist you.**
- **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.**
**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

**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

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**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)

**BIS V processor unit – technology-independent RFID platform**

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- Connect various devices: freely configurable IO-Link master port V1.1

**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

**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
SEIZE THE OPPORTUNITIES OF THE INDUSTRIAL INTERNET OF THINGS WITH BALLUFF

The future of automation is digital and interlinked. As your automation partner we accompany you step by step on the path to the smart factory. And all the while we keep your competitive ability in view. Build on our expertise and experience, let us master the Industrial Internet of Things (IIoT) together. For higher productivity, more efficiency and transparent manufacturing.

When it comes to generating and transporting data we have many years of experience with outstanding success. It is on this basis that Balluff provides you with a constantly growing portfolio of smart devices. Through the use of software we generate true added value for your production environment. And in conjunction with our individual services you get holistic automation solutions – all with the goal of technological advancement.

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 a custom tailored total IIoT package. By using standardized interfaces and protocols we ensure that you can run our solutions in your existing IIoT infrastructure and on common platforms. To this end we of course make use of the communication standard IO-Link. Because IO-Link is ideally suited for the IIoT.

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

Questions? Our experts are eager and ready to assist you.