

END-OF-LINE TEST AND INSPECTION SYSTEMS

Custom made. In Germany.



Smart automation for reliable quality.

ABOUT US

For over 35 years, L&P has been developing and implementing customized testing and automation systems for industrial applications. From the initial concept through engineering and planning to the turnkey system, we combine automation, testing technology, and quality assurance into reliable turnkey solutions. In doing so, we work closely with renowned manufacturers and technology partners in the fields of PLC controls, robotics, and image processing. Our expertise ranges from automated testing and manufacturing processes to sophisticated vision applications such as presence checks, measurements, surface analyses, and code recognition. We also utilize 2D/3D image processing and AI-based methods, such as deep learning, in the development of custom testing solutions..

OUR AREAS OF EXPERTISE

From automation to integrated quality control

L&P develops and implements customized automation solutions for demanding production and testing processes. We combine robotics, image processing, electrical testing technology, control technology, and precision manufacturing processes to create end-to-end system solutions. Our expertise ranges from automated material feeding and component handling to optical and electrical testing, as well as marking, sorting, and documented quality assurance. Flexible system concepts enable the reliable processing of different product variants and production requirements.



END-OF-LINE INSPECTION TECHNOLOGY

- Combination of visual and electrical inspection
- Job-specific inspection parameters and process data
- Automated marking and marking verification



AUTOMATED QUALITY INSPECTION

- Optical quality inspection using high-resolution vision processing
- Robot-based component handling
- Traceability and automatic Pass/Fail sorting



INDUSTRIAL VISION PROCESSING

- Camera-based inspection of complex component geometries
- Flexible inspection of different component areas
- Automated evaluation of inspection results



PRECISION PRINTING & SURFACE TREATMENT

- High-precision direct printing
- Camera-based print quality control
- Tool-free product changeover



ELECTRICAL FUNCTIONAL TESTING

- Automated testing of switch and lighting functions
- Combination of vision and functional testing
- Barcode identification & traceability



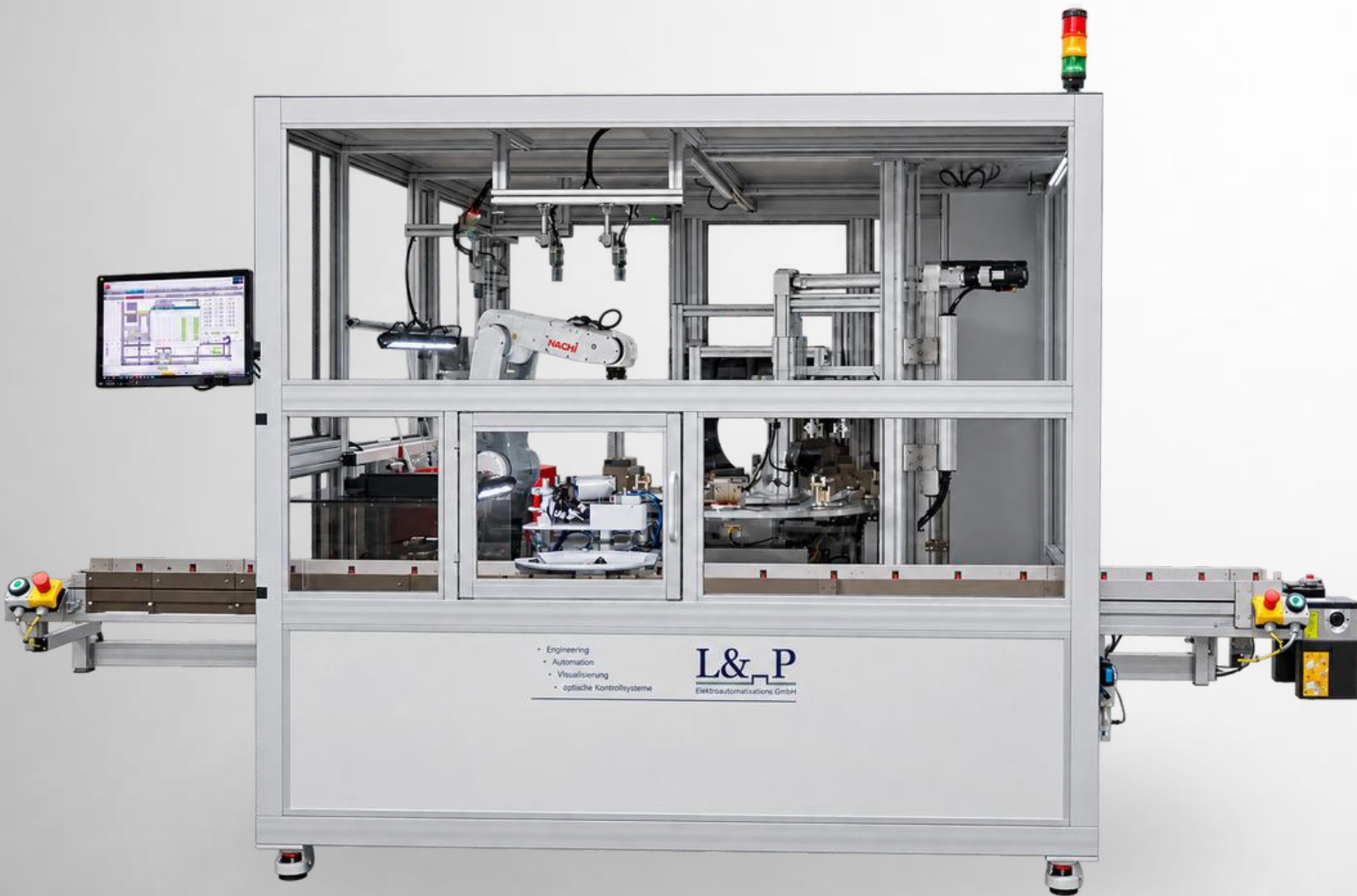
CONTROL PANEL CONSTRUCTION & ELECTRICAL ENGINEERING

- Custom control solutions
- Professional wiring, testing, and documentation
- Integration into complex automation systems

TESTING SYSTEM FOR DRILL BITS AND MILLING CUTTERS

Automated End-of-Line Inspection Using Robotics, Machine Vision, and Precision Measurement Technology

This EOLT inspection system automates the feeding, identification, testing, and sorting of drill bits and milling cutters. Components of various sizes are processed without the need for retooling and are fed to the individual testing stations via a continuous material flow. A 6-axis robot handles the flexible component handling between the feed, QR code reading station, rotary indexing table, and discharge. The 8-position rotary indexing table links the individual inspection steps into a structured, cycled inspection process. Components are picked up, positioned for the respective inspection, and then automatically transferred to the next station in a cycled manner. Combined with industrial image processing and precision optical metrology, this results in a fully automated inspection process with clear pass/fail classification.



AUTOMATED FEEDING & HANDLING

- Automatic separation and feeding of components
- Camera-based position detection
- 6-axis robot for flexible component handling
- Electrically adjustable gripper for different diameters

IDENTIFICATION & PRODUCT ASSIGNMENT

- Automatic scanning of the applied QR code
- Servo rotation unit for precise component positioning
- Scanner with external lighting
- Automatic assignment of component data to the inspection process
- Further processing is authorized only upon successful identification

SMART NIO MANAGEMENT

- Separate NOK handling for different types of defects
- Automatic assignment of defective components
- Camera-based detection of available placement slots
- Precise robot-assisted placement
- Two interchangeable NOK trays enable operation with minimal downtime
- Protected and sensor-monitored work area



PRECISE INSPECTION TECHNOLOGY

Diameter Inspection

- Measurement of components of varying lengths
- Automatic adjustment of the measurement position
- Precise diameter measurement

Vision Test

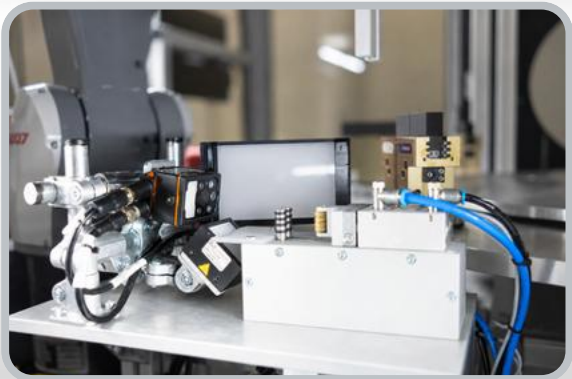
- 360° Inspection of Component Surfaces
- Camera-Based Detection of Quality Characteristics
- Automated Evaluation of Inspection Results

YOUR BENEFITS

- Fully automated inspection process
- Processing of components of various sizes
- 360° surface inspection
- Precise diameter measurement
- Automatic QR code identification
- Automated pass/fail sorting
- Flexible product variants

TECHNOLOGIES

PLC CONTROL · HMI · 6-AXIS ROBOTICS · INDUSTRIAL IMAGE PROCESSING · QR CODE IDENTIFICATION · OPTICAL MEASUREMENT TECHNOLOGY · SERVO TECHNOLOGY · PNEUMATICS · CONVEYOR TECHNOLOGY



AUTOMATED CURRENT TRANSFORMER INSPECTION

Inspect · Label · Track

The EOLT current transformer inspection system from L&P combines robotics, industrial vision processing, and electrical inspection technology into a fully automated inspection process. Current transformers are removed from KLT containers, tested according to order specifications, marked, and then automatically returned to stock. The combination of 100% visual inspection and electrical inspection enables a reliable evaluation of each component. Test and order data are automatically processed and assigned to the respective inspection results.



SYSTEM INTEGRATION

The individual stations of the inspection system are interconnected via a central control and data structure. Thanks to flexible parameterization, different current transformer variants can be processed within a single system design. Test sequences, markings, and process parameters can be customized on a job-by-job basis. This results in a coordinated, comprehensive solution made up of individual automation and inspection components.

YOUR BENEFITS

- 100% Quality Control
- High Process Reliability
- Complete Traceability
- Flexible Variant Processing
- Automated Marking
- Integrated Rework Processes



L&P INTEGRATES INSPECTION AND PRODUCTION

From electrical design and control engineering to robotics, vision processing, and inspection technology, L&P develops integrated automation solutions for demanding production processes. The current transformer inspection system exemplifies our approach: combining technologies, automating processes, and reliably ensuring quality.



TECHNOLOGIES

Robotics · Industrial Image Processing · CT Analyzer · Labeling · PLC Control · Chain Conveyor Technology · Pneumatics

AUTOMATED FEEDING

- KLT Feeding via Conveyor Systems
- Camera-Based Position Detection of Components
- Robot-Assisted Retrieval and Return Placement
- Automated Material Flow

ELECTRICAL & OPTICAL TESTING

- Electrical inspection with CT Analyzers
- Job-Specific inspection Parameters
- Camera-Based 100% Inspection
- Inspection of Housing Contours, Alignment, and Markings

LABELING & TRACEABILITY

- Automated label printing and application
- Camera-based inspection of labeling
- Linking of order, component, and inspection data
- Documentable inspection results

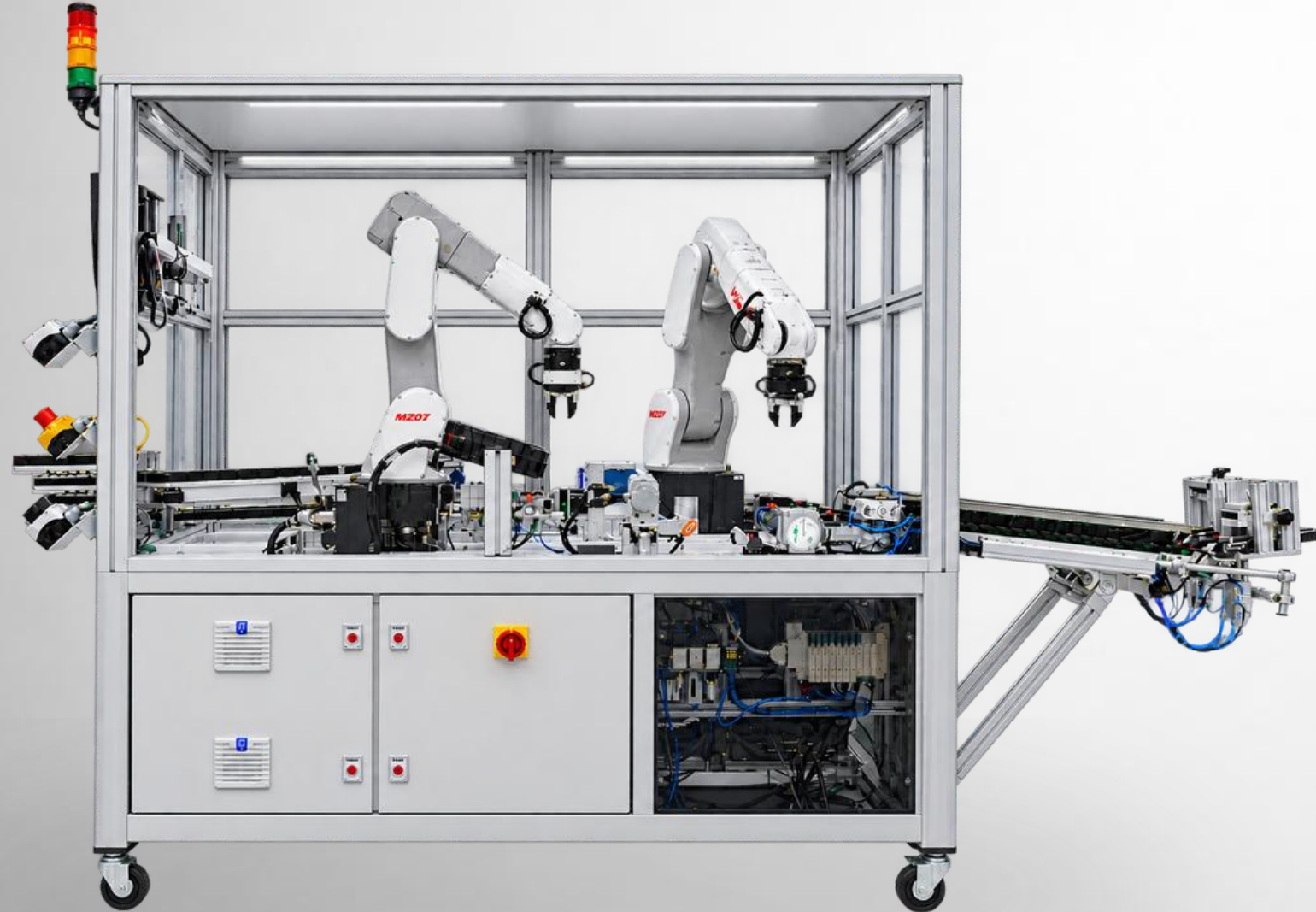
SMART NIO MANAGEMENT

- Automatic removal of defective components
- Targeted routing to rework
- Reintroduction after rework is complete
- Seamless and controlled inspection process

360° INSPECTION OF BOLTS

Automated End-of-Line Inspection · Robotics · Vision Processing · Precision Measurement Technology

The EOLT inspection system from L&P enables fully automated quality control of bolts with diameters ranging from 18 to 65 mm. Two separate feeding systems handle the on-demand separation and delivery of the components. Two 6-axis industrial robots guide the workpieces precisely through the various inspection stations. Relevant quality characteristics are reliably recorded through 360° surface inspection, diameter measurement, and temperature measurement. The subsequent automatic classification and sorting of the components ensures a consistent and reproducible inspection process.



YOUR BENEFITS

- 100% automated quality control
- 360° surface inspection
- Flexible component sizes ranging from 18 to 65 mm
- short cycle time
- Precise robotic handling
- High inspection speed
- Reproducible inspection results
- Automatic pass/fail classification

L&P – PRECISION MEETS AUTOMATION

The bolt inspection system demonstrates how robotics, industrial vision processing, and precision measurement technology can be combined into a seamless end-of-line inspection process. The flexible system architecture allows for the inspection of different component sizes and product variants without requiring a fundamental retooling. The automated feeding, inspection, and classification create an efficient and reproducible quality process that can be reliably integrated into mass production.

AUTOMATED FEEDING & HANDLING

- Two cycle-controlled feeding systems for different component sizes
- Automatic separation of bolts
- Flexible processing of diameters ranging from 18 to 65 mm
- Two 6-axis industrial robots for precise handling
- Electric parallel grippers for secure component pickup
- Fully automated material flow

360° SURFACE INSPECTION

- High-resolution camera-based quality control
- Comprehensive inspection of component surfaces
- Reliable detection of relevant surface features
- Product-specific, configurable inspection sequences
- Automatic evaluation of inspection results
- Reliable classification into OK / NOK Vision

PRECISION MEASUREMENT & PRODUCT INSPECTION

- Automatic diameter inspection
- Temperature inspection of components
- Precision optical measurement technology
- Reproducible measurement results
- Product-specific inspection parameters
- Automatic assignment of inspection results

INTELLIGENT SORTING & QUALITY ASSURANCE

- Automatic classification of inspected components
- Separate ejection of parts rejected by the NOK vision system
- Separate ejection of parts rejected by the NOK diameter measurement system
- Reliable separation of good and defective parts
- Documentable inspection results
- End-to-end quality control without manual re-inspection



CATHETER PRINTING

Medical Technology · Precise Marking · Quality Control

L&P's catheter printing system combines automated handling, surface pretreatment, high-precision printing, and camera-based quality control in a compact manufacturing solution. It was developed specifically to meet the high standards of the medical technology industry and ensures safe, reproducible, and efficient processing of sensitive components.

Thanks to the fully automated material flow, catheters are reliably processed from the raw part to the finished, printed product. An integrated quality inspection ensures that only flawless components leave the production process.



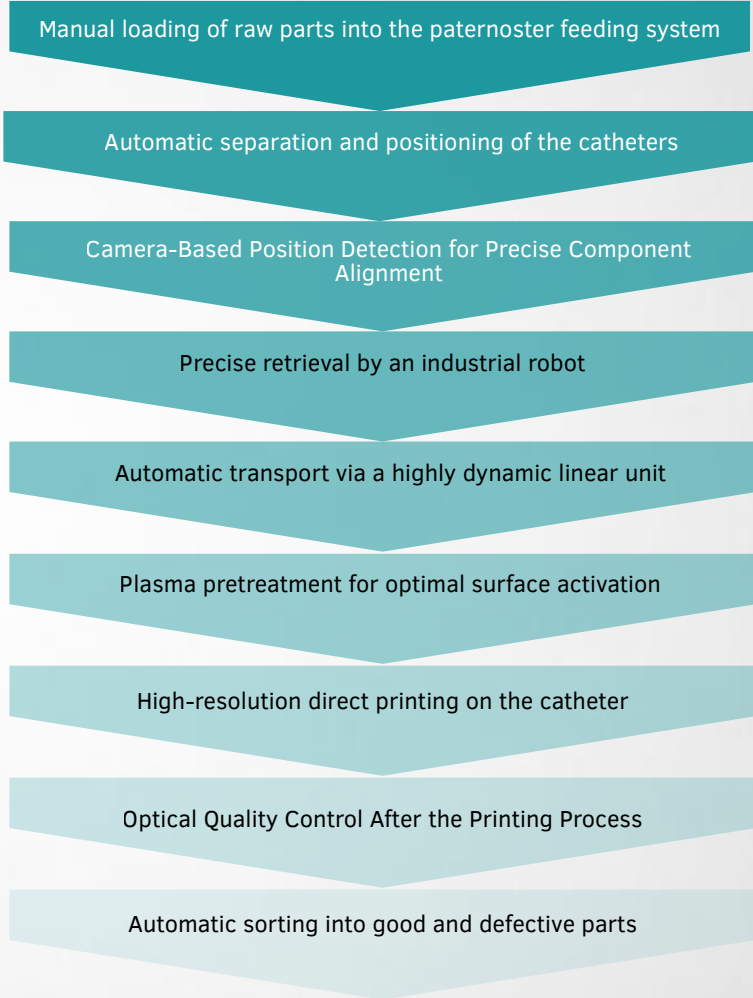
Robot-Assisted Handling

- Industrial robots for precise component handling
- Gentle-on-products gripping system with vacuum technology
- High repeatability
- Fast and reliable process flows



Automatic Paternoster System

- Efficient feeding of raw parts
- Automatic transfer of finished parts
- Continuous material flow
- Minimization of manual intervention

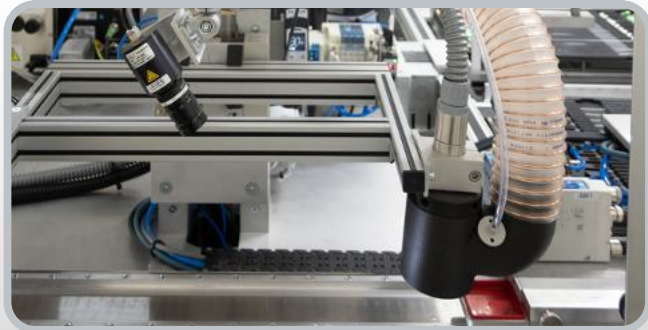


Flexible for different product variants

The system is designed for various types of catheters. Tool-free interchangeable components allow for quick adaptation to different product sizes and geometries. This minimizes setup times and significantly increases production flexibility.

Plasma and Printing Station

- Plasma activation of the component surface
- Ideal for durable printing
- Precise direct printing with high positional accuracy
- Flexible for different product variants



YOUR BENEFITS

- Quick product changeover without tools
- Modular system design
- Centralized user interface
- Ideal for use in regulated production environments
- Integrated plasma pretreatment
- High-quality direct printing
- Camera-based quality control
- Reliable good/bad part separation

Applications

The catheter printing system is ideal for manufacturers of medical plastic components as well as for medical technology companies that have the highest standards for precision, traceability, product quality, and process reliability.

Intelligent Image Processing

- Camera-Based Position Detection
- Process Monitoring During Production
- Automatic Quality Control After Printing
- Reliable Detection of Good and Defective Parts



FORMING OF MEDICAL DEVICE COMPONENTS

Medical Technology · Precision Automation

This system from L&P enables the automated forming of medical technology components and combines precise handling, defined process control, and reliable quality control. The automated process ensures reproducible machining and delivers consistently high process quality. The combination of automated feeding, precise component positioning, and controlled machining results in an efficient manufacturing solution for demanding applications in medical technology.



AUTOMATED COMPONENT FEEDING

- Automated component feeding
- Precise separation and positioning
- Controlled transfer to the machining process
- Continuous material flow
- Gentle product handling

PRECISE FORMING

- Automated forming machining process
- Defined machining parameters
- Reproducible part geometry
- Precise positioning during machining
- Adaptable to different product variants

PROCESS MONITORING & QUALITY

- Monitoring of relevant process parameters
- Verification of defined component geometry
- Reproducible machining results
- Automated quality control
- Reliable detection of deviations

FLEXIBLE PRODUCTION

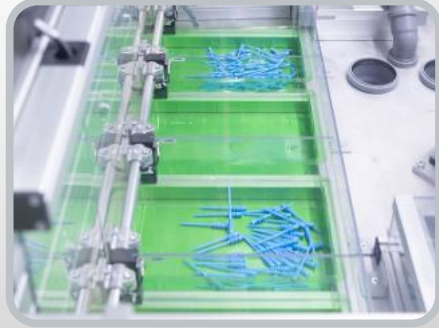
The system is designed to meet the demands of high-variety production. Different components can be processed using customized process parameters and flexible fixture and handling concepts. This allows the automated process to be tailored specifically to different products and customer-specific requirements.

END-TO-END AUTOMATED PROCESS

From the provision of components to the finished, machined unit, the individual process steps are linked together. Automated handling and precise positioning ensure that each component is machined under defined conditions. In this way, L&P combines precision manufacturing technology with automated process control to create a reliable solution for the medical technology industry.

YOUR BENEFITS

- Automated forming processing
- High process reliability
- Reproducible part geometry
- Precise part positioning
- Gentle handling
- Reduction of manual process steps
- Consistent manufacturing quality
- Suitable for demanding medical technology applications
- Flexible handling of variants



LEVER INSPECTION SYSTEM

Automated Quality Control · Parallel Inspection Cells

The lever inspection system from L&P automates the entire quality control process for mass-produced components—from feeding and separation to precise handling, optical inspection, and automatic sorting.

Four inspection cells operating in parallel enable high throughput with consistently reproducible inspection quality. High-resolution cameras, custom-developed gripper technology, and intelligent conveyor systems work together seamlessly.



L&P Automates Quality

L&P combines robotics, vision processing, and automated conveyor technology to create high-performance inspection systems—tailored to high throughput rates and reproducible quality requirements.

ROBOTICS & HANDLING

- Precise component handling by industrial robots
- Custom-designed precision gripper
- Camera-based orientation detection and positioning

MATERIAL FLOW & FEEDING

- Automatic feeding from the material storage
- Part separation and continuous transport
- Intelligent return of unmachined parts

VISION PROCESSING & INSPECTION TECHNOLOGY

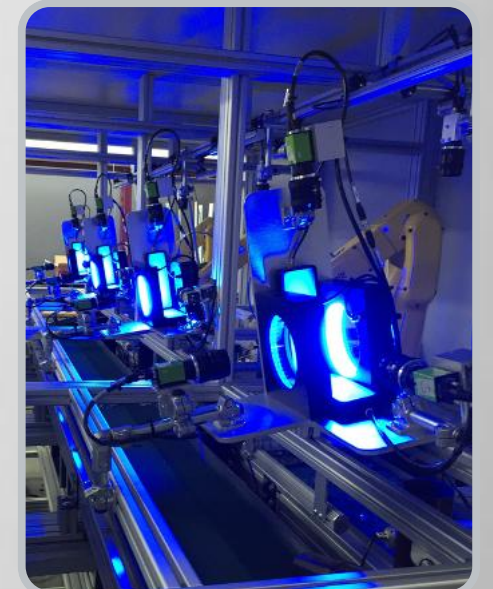
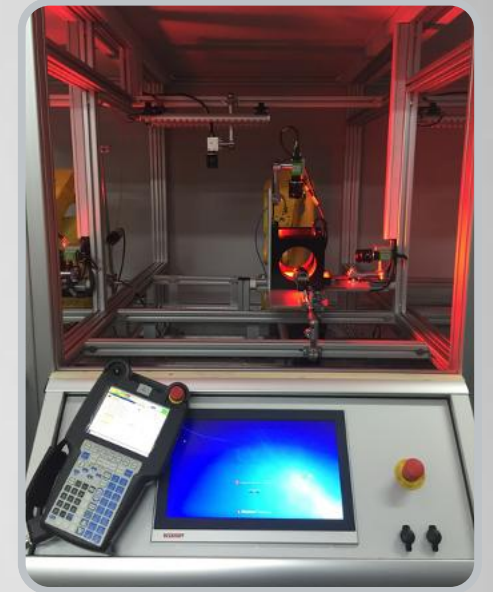
- High-resolution camera-based quality inspection
- Optimized inspection lighting
- Reliable and reproducible defect detection
- Documentable inspection results

AUTOMATIC SORTING

- Reliable “OK” / “NOT OK” Detection
- Automatic Placement of Good Parts
- Reliable Ejection of Defective Parts
- Continuous Material Flow Without Manual Intervention

YOUR BENEFITS

- High throughput
- Reproducible quality
- Fully automated inspection process
- Reduced manual effort
- Reliable pass/fail separation
- 24/7 production operation



“Rotary Table” Principle with Four Stations

Visual and electrical inspection of vehicle door panels to meet the automotive industry's highest quality standards

The DoorCheck inspection system was developed for the fully automated quality control of door panels. By utilizing modern vision processing, electrical functional inspection, and a flexible rotary indexing table system, the system enables reliable and reproducible inspection of various vehicle variants.



The DoorCheck inspection system combines visual and electrical inspections in a single automated inspection process. A central rotary indexing table transports the door panels through the various inspection stations via precision product holders.

In two shielded inspection booths, the components are visually inspected using camera systems and optimized lighting. In addition, electrical function and light inspections are performed via pneumatically actuated contacts. The combination of automated component handling, vision processing, and electrical inspection technology enables reliable and reproducible quality control.

Rotary Indexing Automation

- Central rotary indexing table for automated component transport
- Precise product holders for secure positioning
- Continuous guidance of components through the inspection stations

Industrial Vision Processing

- Camera-based inspection of door panels
- Camera systems positioned above and below the components
- Specified lighting for reproducible inspection results
- Automated evaluation of inspection characteristics

Electrical Functional Inspection

- Automated connection of the door panel
- Pneumatic positioning of the connection module
- Testing of electrical functions and components

Light Inspection

- Separate camera-based inspection of the LED lighting
- Activation of the lighting via integrated test connectors
- Visual inspection of the lighting functions

Tactile Inspection

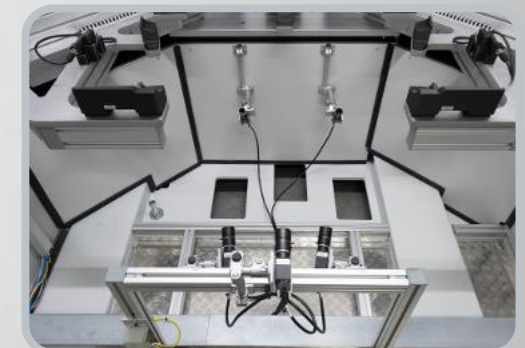
- Pneumatic cylinders for screw detection
- Adjustable feed forces via pressure regulators
- Integrated valve technology for automated control

Process & Quality Assurance

- Automated inspection procedures
- Operation via monitor and keyboard
- Documentation of inspection results via an integrated printer
- Safety system with a laser scanner and photoelectric sensors

YOUR BENEFITS

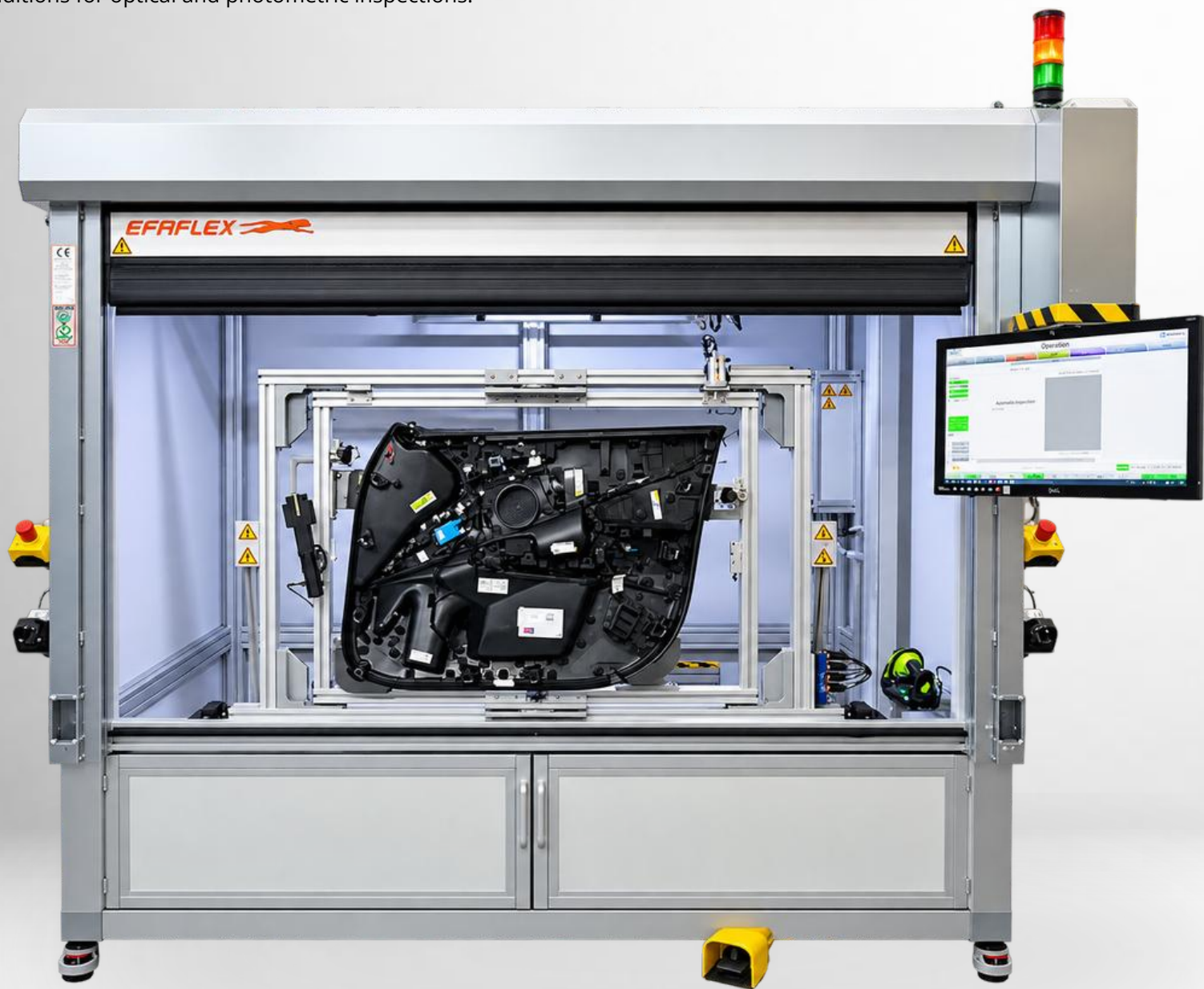
- 100% quality control at the end of production
- Reduction in manual inspection efforts
- Quick changeover to new product variants
- High process and product reliability
- Optimized traceability of inspection data
- Integrated documentation



“Automatic manual workstation” principle with one station

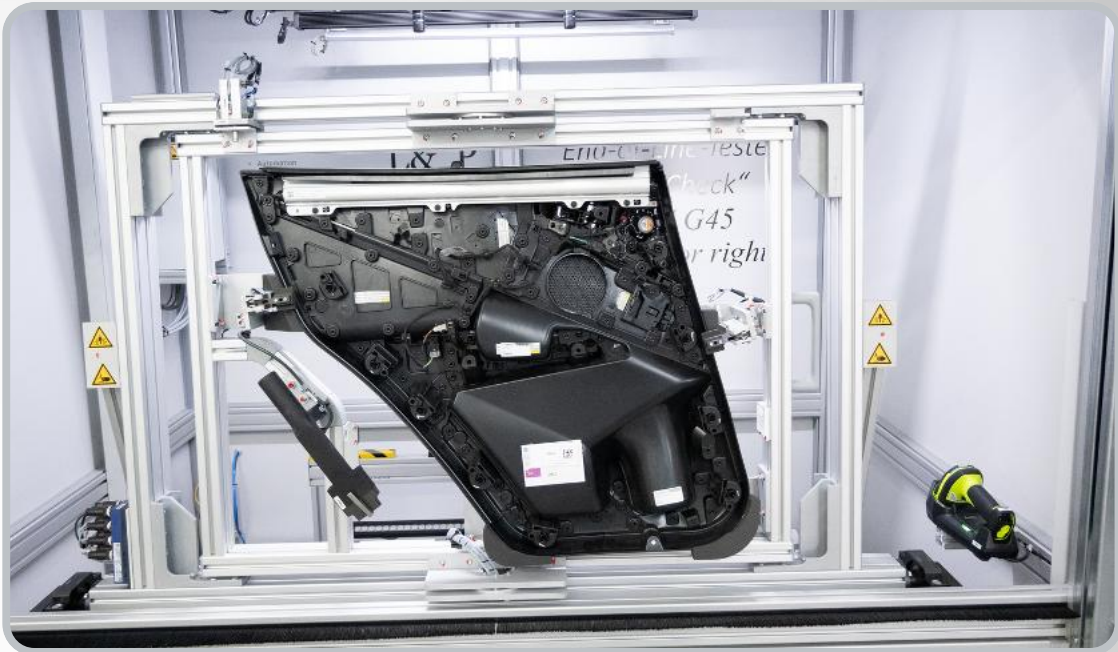
Automated Inspection of Vehicle Door Panels

The EOLT DoorCheck inspection system combines optical and electrical inspections with automated component handling. Vehicle door panels are positioned in precisely contoured holders, secured, and then transferred to the automated inspection position. The combination of a vision system, electrical inspection technology, and servo-motor-driven positioning allows for the inspection of various test characteristics within a continuous inspection sequence. The shielded inspection chamber ensures reproducible conditions for optical and photometric inspections.



YOUR BENEFITS

- Process Reliability
- Comprehensive Inspection
- High-Quality Testing
- Efficient Processes
- Flexibility



Vision & Quality

Camera-based inspection and automatic evaluation of relevant component characteristics

Electrical Inspection

Inspection of switches, lighting functions, and other electrical features

Automated Handling

Pneumatic component clamping and precise servo-motor-driven positioning of the inspection frame

Reproducible inspection conditions

Enclosed test chamber with a lighting system and a high-speed door for photometric testing

Operation & Process Control

HMI operation, integrated machine and vision control, and automatic pass/fail evaluation



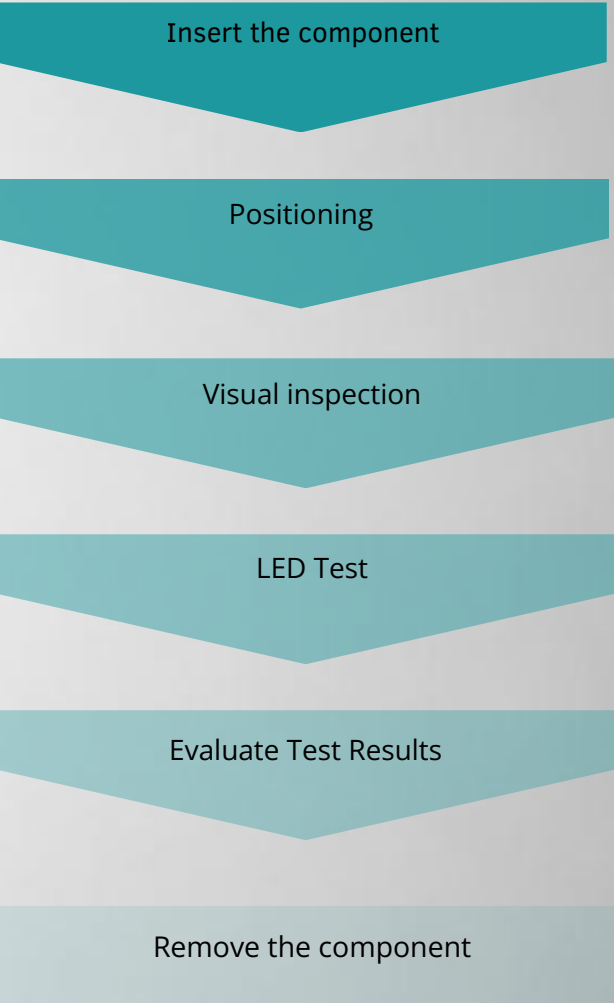
“Traversing EOLT” principle with one station

Automated Optical and Electrical Quality Control

The system developed by L&P is designed for the automated inspection of door panels. It combines camera-based visual inspections with an integrated electrical functional test of LED modules. The precise positioning of the parts and inspection components ensures a reproducible inspection process for reliable quality assurance.



END-TO-END INSPECTION PROCESS



SAFETY & OPERATION

- Integrated Safety Light Curtains
- Safe Loading and Unloading Areas
- Start and Signal Devices
- Emergency Stop Devices
- Centralized Control and Process Monitoring

CAMERA-BASED VISUAL INSPECTION

- High-resolution cameras for automated inspection
- Inspection of surfaces and contours
- Targeted illumination of inspection areas
- Camera and mirror system for hard-to-reach areas
- Reproducible and objective inspection results

YOUR BENEFITS

- Automated and Reproducible Quality Inspection
- Combination of Optical and Electrical Testing
- High Inspection Accuracy Thanks to State-of-the-Art Camera Technology
- Precise Positioning of Parts and Inspection Components
- Inspection of hard-to-reach areas
- Automated LED functional testing
- Integrated safety concept
- Customized to the specific component and testing task

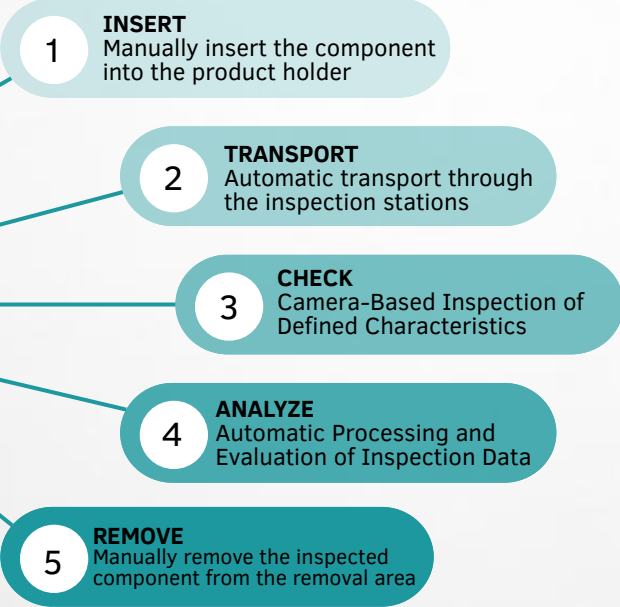
TECHNOLOGIES

VISION SYSTEMS · LED LIGHTING · HMI · SAFETY TECHNOLOGY · ELECTRICAL TESTING TECHNOLOGY · PLC CONTROL · LINEAR AXES · AUTOMATION TECHNOLOGY

“EOLT Continuous-flow system” Principle with Five Stations

Automated Quality Inspection of Bumper

L&P’s end-of-line inspection system enables automated visual quality control of bumpers directly at the end of the production process. The components are manually placed into designated product holders and then transported through the inspection stations via an automated conveyor system. State-of-the-art camera systems, lighting, and adjustable mirror units enable reliable inspection of various component areas and features.



-  **OPTIMIZED INSPECTION LIGHTING**
Targeted lighting and adjustable mirror units make it possible to inspect complex and hard-to-reach areas.
-  **INTEGRATED SECURITY**
Laser scanners, safety doors, and emergency stop devices ensure safe plant operation.
-  **INTUITIVE OPERATION**
Intuitive operation and system control via a modern touchscreen display.
-  **VISUAL INSPECTION**
Camera-based quality control for the automated detection of relevant component features
-  **AUTOMATED TRANSPORT**
Continuous flow system with designated product holders for safe component transport.
-  **INTELLIGENT VISION PROCESSING**
High-performance camera and vision processing systems for the automated evaluation of inspection results.

ERGONOMIC ASSEMBLY AND INSPECTION WORKSTATIONS

Flexible Workstation Solutions for Assembly, Inspections, and Industrial Work Processes

The workbench developed by L&P combines a sturdy aluminum frame with a functionally designed work surface. Thanks to its modular design, the workstation can be flexibly adapted to different tasks and requirements.

The combination of a spacious work surface, an additional storage shelf, integrated lighting, and a mobile design creates a well-organized and ergonomically designed workstation for assembly, inspections, and manual process steps.



CUSTOMIZABLE

The modular design allows the workstation to be adapted to the specific application. Work surfaces, shelves, lighting, and other equipment can be integrated and arranged according to individual requirements. This results in a flexible workstation solution that can be used for both assembly and inspection tasks as well as for preparatory or supporting production processes.

MODULAR DESIGN

- Sturdy construction made of aluminum profiles
- Customizable work surface
- Additional shelving and storage options
- Modular, expandable workstation structure
- Flexible arrangement of components and equipment

MOBILE WORKSTATION SOLUTION

- Electric height adjustment and customizable lighting
- Flexible use within production
- Quick adaptation of the workstation to different processes
- Compact integration into existing production environments
- Mobile design and stable footing thanks to lockable casters

L&P WORKSTATIONS FOR INDUSTRIAL APPLICATIONS

With modular workstation solutions, L&P complements automated systems with functional and ergonomic workstations for manual process steps. The focus is on a well-thought-out combination of design, functionality, and adaptability.

YOUR BENEFITS

- Ergonomic Workstation
- Modular and expandable
- Mobile design
- Sturdy aluminum construction
- Optimized workflow
- Flexible use
- Customizable

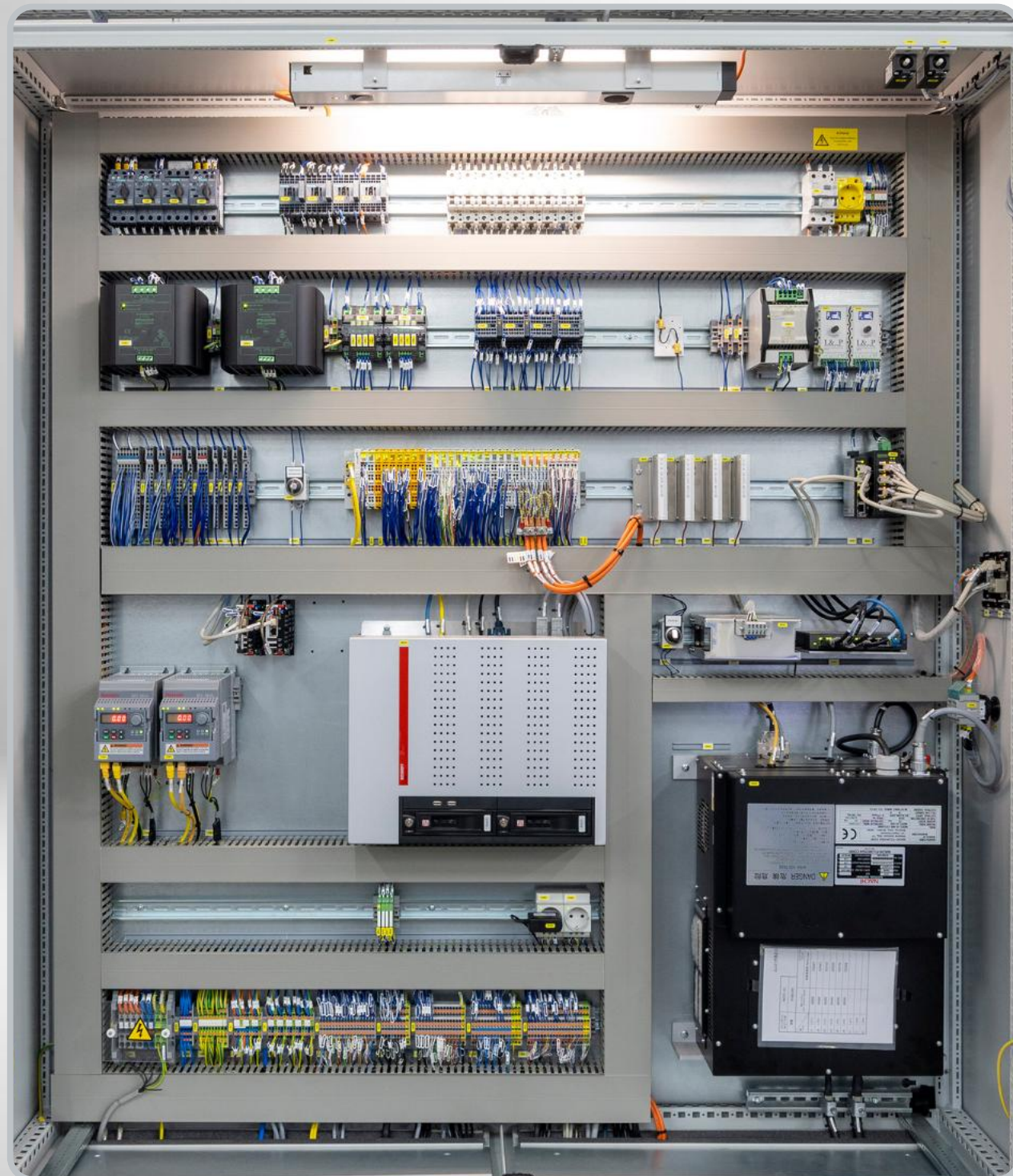


ALUMINUM PROFILE CONSTRUCTION · MODULAR WORKSTATION · CUSTOM CONFIGURATION ·
LIGHTING · MOBILE DESIGN · ERGONOMICS

CUSTOM CONTROL AND ELECTRICAL CABINET SOLUTIONS

From electrical design to a certified control cabinet

L&P develops and manufactures control cabinets and electrical control systems for industrial plants and automation solutions. We combine electrical engineering design, standards-compliant implementation, and practical manufacturing into a comprehensive solution. We support the entire process—from electrical design and component planning through mechanical assembly and wiring to inspection and commissioning. The result is well-organized, service-friendly control cabinets tailored to the specific application.



ELECTRICAL DESIGN

- Electrical Circuit Design
- Layout and Wiring Design
- Component Selection and Sizing
- Structured Control Cabinet Designs
- Documentation of the Electrical Design

CONTROL PANEL MANUFACTURING

- Mechanical Assembly and Machining
- Assembly of Switching and Control Components
- Proper Wiring
- Setup of Terminal and Interface Levels
- Neat and Well-Organized Cable Routing

TESTING & QUALITY

- Inspection of Wiring and Connections
- Testing of Electrical Functions
- Documented Testing Processes
- Preparation for Commissioning and Integration

INTEGRATION INTO AUTOMATION SOLUTIONS

Control cabinets serve as the electrical interface between the control system, sensors, actuators, and the mechanical components of a plant. L&P integrates the electrical equipment into the overall design, thereby laying the foundation for reliable plant control. Thanks to the close integration of electrical engineering, PLC programming, automation, and plant engineering, electrical systems can be taken into account holistically right from the plant planning stage.

OUR SCOPE OF SERVICES

PLANNING → DESIGN → MANUFACTURING → WIRING → INSPECTION → COMMISSIONING

YOUR BENEFITS

- End-to-End Electrical Design
- Custom Control Cabinet Solutions
- Structured and Service-Friendly Design
- Professional Wiring
- Documented Electrical Testing
- Seamless Integration into Automation Systems
- A Single Point of Contact from Planning Through Commissioning



WE AUTOMATE QUALITY.



From the initial concept to the turnkey system, L&P develops customized solutions for automated testing and manufacturing processes.

Engineering · Automation · Visualization · Optical Inspection Systems

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