

Vision Solutions for secure Material Flow and Quality Assurance



The Eckelmann FactoryWare® Portfolio
for every Industry and every Product!



The vision solutions from the Eckelmann FactoryWare® Portfolio

As a development partner for systems and customer-specific processes in production and logistics, Eckelmann designs hardware and software vision systems for reliable material flow and quality assurance.

Counting &
Detection



Inspection



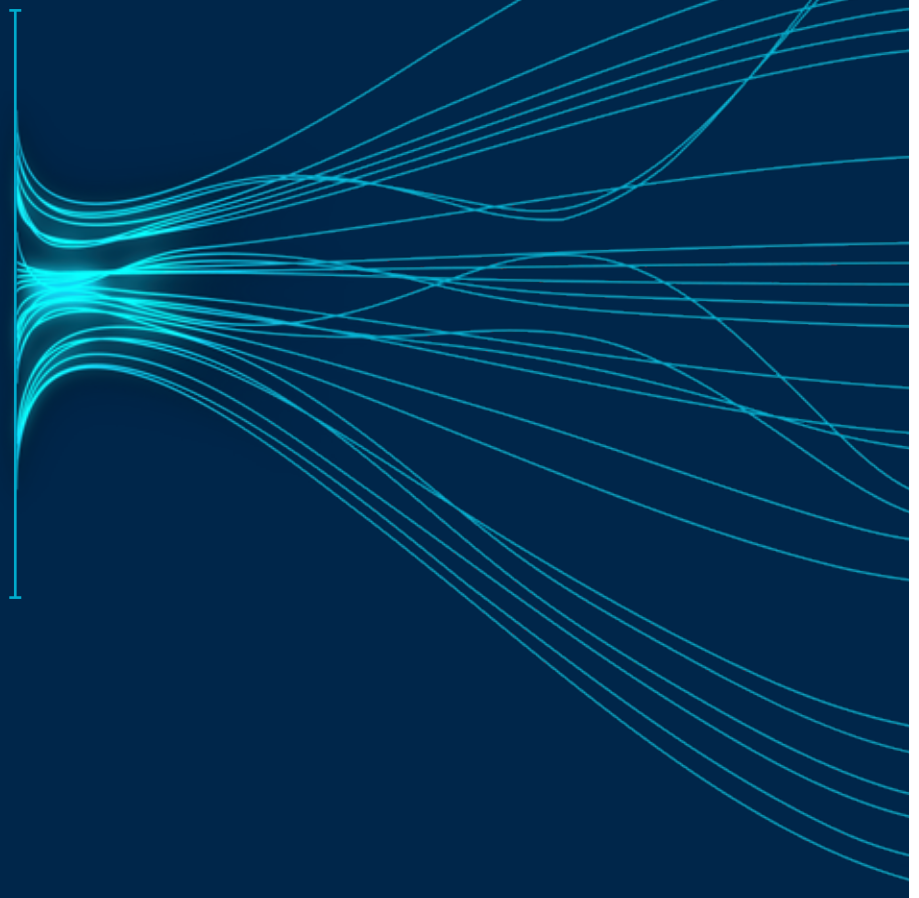
Tracking



Return
Identification



Load Control



CONTENT

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- 8 E°CI Series** (Counting & Inspection)
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Hard- and software development plus AI-supported image processing

Modern, automated image processing, sensors, and AI replace manual, time-consuming work stages and redefine tasks such as efficiency, quality, and precision! As a development partner for systems and customer-internal processes, Eckelmann uses vision systems to design secure goods flow and quality assurance – **for every product and every industry.**



"In the future, image processing processes will shape success and competitiveness by monitoring customer-specific logistics and production processes!"

Stefan Becker
Authorized signatory and Head of the Automation Projects Business Unit
at Eckelmann.

Counting, inspecting, sorting, tracking, and loading control: the components are perfect when used individually or in combination!

Eckelmann is a specialist in regulated environments: ISO 13485 as a supplier for medical technology, DIN standard 62304 (medical device software), processes for GMP/GAMP 5, and the manufacture of electrical systems in accordance with CE, UL, and UKCA.

Retrofitting with vision systems: innovation and efficiency for existing systems

Retrofitting existing systems with modern machine vision products from the Eckelmann FactoryWare® portfolio is a cost-effective way to future-proof systems in any industry. Retrofitting with vision technology is an ideal solution for implementing product tracking and batch tracking.

YOUR ADVANTAGES

- Minimal planning effort
- Customized automation
- Optimization of quality control
- Increased productivity
- Precise defect detection / inspection
- Data transparency
- Integration with ERP systems

The E°CD Series: counting and detection for logistics

The E°CD Series is the perfect solution for mass measurement and quality assurance of stacked containers in distribution logistics and serves to optimize supply chain processes. It can be used at goods receipt or goods issue.



Counting & Detection

This application saves time and money – and also improves safety for people and goods: With its automated solution for the digital recording and counting of reusable containers, Eckelmann reduces manual input errors and increases throughput. The process-reliable counting and recording takes just a few seconds, compared to 20 to 30 minutes or more of manual work in the past, depending on the container.

The E°CD automatically identifies, records, and counts containers stacked on pallets in a matter of seconds – even mixed pallets.



YOUR ADVANTAGES

- Automated recording and counting of palletized goods
- Counting and detection of standard crates, half pallets, and pallets – CHEP, Euro, and more
- Reduction in manual input errors
- Higher throughput and lower labor costs / low personnel costs
- Reliable inventory control including detection of foreign containers and foreign pallets
- Seamless documentation and traceability
- Paperless processing and fewer complaints during billing
- Low installation and setup costs thanks to delivery of a pre-installed system

The E°CD Series: recognition and counting made easy

Containers and pallets are recognized and identified using 1D or 2D barcodes, plain text reading, contours, and colors. The results are made available to the logistics depot for further processing in higher-level systems.

Counting &
Detection

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Eckelmann provides complete system development from a single source: if necessary, the required interfaces for connection to in-house systems at the customer's premises are developed. Available as a basic model and customized solution: as your tasks grow, the E°CD can be expanded with additional mechanical and software modules and tailored to suit your specific reading and evaluation requirements.

A small selection of common container types from various industries that we record and count: food, pharmaceuticals, automotive, manufacturing, and many more!



Case Study IFCO Systems: industrial washing centers for pooling products

On behalf of pooling service providers such as IFCO Systems GmbH, Eckelmann developed an automated solution for the digital recording and counting of reusable containers: the E°CD Series.



Counting & Detection

Since 2010, more than 20 of these systems have been in use throughout Europe for pooling service providers in various washing depots. IFCO Systems GmbH is one of the leading suppliers of returnable reusable containers for the food industry (Reusable Packaging Containers, RPCs).

Eckelmann supplies pairs of columns for automated mass recording and counting of RPCs, Small Load Carriers, and other stacked container or packaging units.

THE ADVANTAGES

- Automated bulk recording of pallets with stackable containers of various designs, such as folding crates or reusable boxes
- Use at goods receipt or goods issue
- System size designed for standard truck door widths in logistics depots
- The image recognition system communicates with higher-level systems such as ERPs or document management systems
- Documentation, traceability, and paperless processing

Intelligent vision systems

- Shape recognition of crates
- Shape corrections of crate stacks
- Label recognition – reading of product ID (DMC, EAN, etc.)
- Detection of foreign containers
- Quantity recording of mixed folding crates by crate type
- Quantity comparison with delivery note information



"Eckelmann devices are very reliable, easy to use, and our employees are great at working with them. This has made our operations more reliable, increased throughput, and made everything run more smoothly."

Malte Koch

Operations Manager, ETERNITY SYSTEMS

E°Octopus: interconnected counting gates from the E°CD Series

E°Octopus is a patent-pending automated system in which E°CD vision systems (Counting & Detection) work in parallel to detect, count, and assign palletized loading units from a delivery at multiple counting gates in an interconnected network.

Counting &
Detection

123

The system enables the simultaneous processing of a transport load via any number of E°CDs. When passing through the counting gates, the loading units are recorded, counted, and checked for errors and completeness. This optimizes the loading and unloading processes of trucks.

The data is centrally assigned to the delivery. All integrated E°CDs can be viewed and monitored via E°Octopus with a user-friendly HMI or control station.

YOUR ADVANTAGES

- Parallel recording of a truck load via multiple gates
- E°CD vision systems **record, count, sort, and check** palletized loading units of a delivery in parallel at multiple counting gates
- **Simultaneous processing** of a transport load via any number of E°CDs
- **Monitoring and evaluation** of all integrated E°CDs via E°Octopus
- E°Octopus handles **data transfer to ERP systems**



E°CI Series: 100% automated quality control for production

The E°CI Series (Counting & Inspection) is used for automated anomaly and multi-feature detection in products and containers. Regardless of the product and industry, this inspection checks for cracks, leaks, fill levels, or contamination immediately after filling the finished product, even before packaging.



Inspection

The E°CI Series is used, for example, for the automated, reliable inspection of pooling products (reusable containers and pallets) in the food industry. It rejects defective, contaminated, and foreign containers.

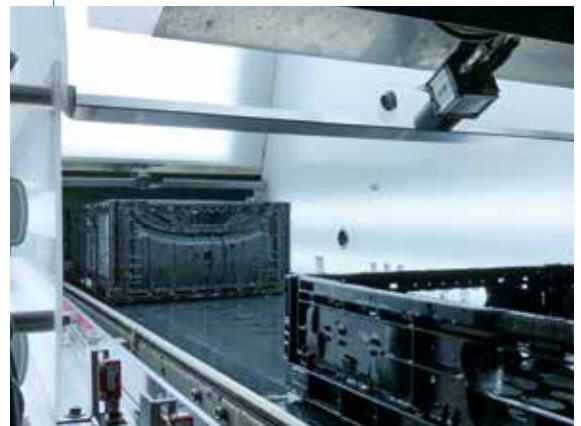
The vision components are adapted to individual customer applications and the goods to be inspected. Manual sorting is reduced, process reliability in quality control is significantly increased, and the shipment of containers in NIO status is reduced to a minimum.

YOUR ADVANTAGES

- **Defect detection on the visible surfaces** of the presented goods is available as an option
- **Process reliability:** clear, fast counting of containers / multi-feature inspection
- **Vibration- and shock-free conveying**
- **Reduction of manual input errors**
- **Reduced workload and cost savings**
- **Adjustable tolerance limits**
- **Paperless documentation and traceability**
- **Data exchange** with higher-level IT systems possible
- **Configurable hygiene and quality criteria**
- **Optimization of inventory recording**
- **Reduction of complaints** in the event of delivery of defective containers or goods
- **Easy integration** into production processes / low installation and setup costs thanks to delivery of a pre-installed system
- **Short commissioning**, training, and maintenance times

E°CI Series

Counting & Inspection
FactoryWare Portfolio



The inspection tunnel of the E°CI Series can be integrated into existing conveyor systems in a space-saving manner without having to interfere with their control systems.

Food



Inspection



Conveyor technology monitoring

- Conveyor belt monitoring for inspection residues or glove residues
- Conveyor belt status (obstructions)

Reject monitoring

- Cold cuts
 - Slice / cut quality (burrs, thickness tolerance via reference ruler)
- Baked goods
 - Degree of browning, crust formation. Recommended settings: oven time, temperature
 - Shape & volume, cutting, score depth
 - Topping, sprinkling, glazing, coating
 - Dough condition before the oven (distance, sticking, position, volume)
 - Tray / sheet layout (missing spaces, incorrect spacing) for OEE recording
- Convenience
 - Pizza topping monitoring / contamination
 - Filling control, e.g., sushi bowls or ready meals
 - Printing quality control, e.g., printing inks, printing position
- Vegetables
 - Pre-product quality before, during, and after processing
- Dairy products
 - Fill level monitoring: overfilling or underfilling of yogurt cups or bottles
 - Contamination of cheese wheels



Packaging quality control

- Inspection of labels, barcodes, expiration dates, batch numbers, etc.
- Inspection of seal seams, closures, inserts, and tamper-evident signs (leaks, contamination)
- Deformations, cracks, dents on cups and lids
- Sealing / clamp closure and more

Transport containers

- Reusable container deformations/reusable container contamination

Pharma | Medicine | Biotech



Inspection

Conveyor technology monitoring

- System monitoring for inspection residues or glove residues
- System status (congestion)

Product inspection & production control

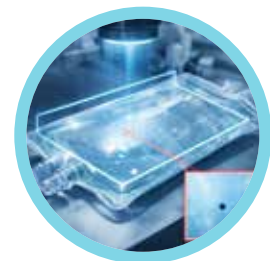
- Pharmaceutical products
 - Tablets and capsules: Check for breaks, discoloration, incorrect shape, or dosage errors
 - Vials and ampoules: Check for cracks, leaks, particle contamination
 - Transdermal patches, insulin pens: Check for correct shape, size, and integrity
 - Kit inspection: Ensure completeness and correct arrangement of components in pharmaceutical kits
 - Parenteral drug inspection: syringes, vials, ampoules, cartridges, check for cosmetic defects and particles
- Medical devices
 - Check insulin pens, catheters, syringes, implants for shape, material defects, cracks, or contamination
 - Dimensional accuracy and surface quality
- Laboratory and diagnostics
 - Detection of pathological patterns in image data, e.g., skin changes

Packaging & label inspection

- Inspection of labels, barcodes, expiration dates, batch numbers
- Inspection of blister packs, vials, ampoules, infusion bags
- Checking seals, closures, inserts, and tamper-evident features
- Checking for correct labeling, sealing, and completeness

Transport containers

- Deformations in reusable containers
- Contamination of reusable containers



Industrial production

Inspection



Conveyor technology monitoring

- System monitoring for inspection residues or glove residues
- System status (congestion)

Product inspection

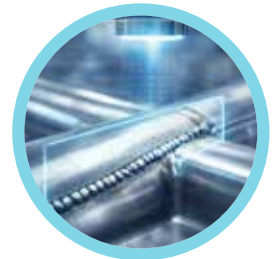
- Detection of surface defects: scratches, cracks, dents, color deviations
- Dimensional accuracy / shape accuracy, position and location detection
- Inspection of weld seams, adhesive joints, paintwork, material contamination

Object detection and sorting

- Classification by shape, color, size
- Automatic sorting and ejection of defective products

Transport containers

- Deformations in reusable containers
- Contamination of reusable containers



With the Innovation Unit Vision AI, Eckelmann is establishing a special unit for intelligent image processing using AI. Its mission: to use image processing processes and machine vision to shape the production and processes of the future!

Logistics



Inspection

Conveyor technology monitoring

- System monitoring, e.g., belt and belt conveyor inspections

Incoming goods inspection

- Detection and classification of containers and products
- Checking for damage or incorrect labeling
- Inspecting for contamination of goods
- Automatic measurement and counting of pallets and containers
- Detection of loading conditions and fill levels

Object detection and sorting

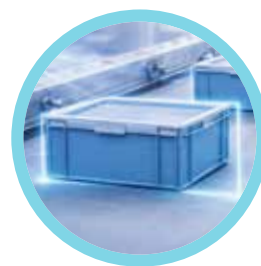
- Classification by shape, color, size
- Automatic sorting and ejection of defective products

Packaging inspection

- Checking labels, barcodes, expiration dates, batch numbers
- Checking seals, closures, inserts, and tamper-evident signs

Transport containers

- Reusable container deformations
- Reusable container contamination



E°CT Series: reliable reading and capturing of 1D or 2D codes

The E°CT Series (Counting & Tracking) is a modular solution for tracking and tracing in automated environments. It captures 1D or 2D codes even when there are no gaps between fast-moving objects.

Tracking



For the modular E°CT, which is easy to install, two code scanners with an easy-to-install Ethernet connection are used for each conveyor line. The scanners read container codes redundantly on both sides. The recorded code data of the containers is forwarded to a PC. There, a data record with a time stamp and identification of the recording location and conveyor line is created. The system is factory-configured for 16 reading points (8 lines) with an average conveyor speed of 3,000 containers/line. Data records are buffered for approximately 3 months and can be accessed at any time on the PC.

YOUR ADVANTAGES

- **Automated tracking and tracing:** Scanners read container codes on both sides redundantly.
- **Buffering of information** and secure data acquisition via local database
- **Customization** and integration with existing systems possible
- Optional display outside the machine network via network or Internet connection or convenient **remote maintenance** possible
- Optional mobile phone and Wi-Fi connections ensure **stable data transmission** even in adverse on-site conditions
- **Secure communication** even in the absence of an Internet connection or in the event of a power failure



E°CT Series

Counting & Tracking
FactoryWare Portfolio

E°RI Series (Return Identification): recording the volume of returns

In 2025, almost one in four packages ordered online was returned to retailers either in full or with some of the goods. In the previous year, there were 530 million returns nationwide in Germany. Around 90% of these were in the fashion, electronics, health, and home goods sectors.



Return Identification

Returns of around 550 million shipments are forecast for this year. Eckelmann specializes in the clear allocation of returned goods using image recognition. With the E°Returns Identification (E°RI Series), returns of different sizes are identified with AI support – over 2000 packages per hour.

Returns are enormous cost drivers in e-commerce and fixed-site retailers. Eckelmann offers efficient returns identification.

YOUR ADVANTAGES

- Identification and status recording of returns – also with AI
- Status recording of incoming goods
- Additional recognition of barcodes, OCR
- Throughput of >2000 items / hour
- Various items sizes and shapes
- Interface to ERP

E°RI Series

Return Identification
FactoryWare Portfolio



E°LC Series (Load Control): documentation of loaded and secured goods

The E°LD Series is used to inspect pallets before loading. Cameras detect whether the pallets are secured, loaded correctly, and identify any defects. Loading is documented row by row in the truck using cameras. This documentation can be compared with the delivery note.

Load Control



The technically correct loading of freight is a crucial safety factor in preventing shipment damage – but it also helps to make ideal use of the space in the truck. The crossbars of the E°Load Control (E°LD Series) take care of this task in the outgoing goods area! Special vision solutions Control crossbars take care of this task in the goods issue department! Special vision solutions document the loading and securing process from different angles in the goods issue department.

YOUR ADVANTAGES

- The E°LC (Load Control) provides evidence of transport-ready preparation
- Documentation of loading processes
- Modular system for documenting the area in front of and inside the truck
- Photo documentation of the goods being shipped / comparison with the delivery note
- Traversing solution for photo documentation of the loaded and secured goods in the truck
- Interface to ERP

E°LC Series

Load Control
FactoryWare Portfolio



Engineering is our Nature!

Like chameleons, we use our unique 360° panoramic view to develop precise vision solutions from the FactoryWare portfolio and install them at our customers' sites. At Eckelmann, more than 250 engineers, computer scientists, and natural scientists work and conduct research every day to design a sustainable, networked world!

Chameleons have a concave lens that allows for optimal focusing and detail recognition. We, too, focus reliably, accurately, and cost-effectively.

**"We take nature
as our model
to create benefits
for people!"**

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