



Digitalization in manual production means for us:

**The human being  
in the center of  
attention.**

## SMART KLAUS

The camera-based assistance system  
for manual manufacturing processes

Greater **quality.**  
Greater **productivity.**  
Greater **focus on people.**

# OPTIMUM

datamanagement solutions



## About OPTIMUM

OPTIMUM datamanagement solutions GmbH specializes in intelligent image processing, combining database management with camera technology. The team of IT experts from Karlsruhe, Germany has been optimizing the processes of leading industrial companies for over 25 years. Today, OPTIMUM is the market leader in camera-based assistance systems.

OPTIMUM's latest offering is Smart Klaus. This multi award-winning innovation speeds up manual production processes, improves quality and reduces employee stress. Smart Klaus digitally supports employees as they carry out complex, manual processes, increasing both product quality and employee productivity.

**Easier, faster and better.**

Smart Klaus constitutes the interface between the analogue, manual workspace and the digital world of modeling, planning, quality control and reporting. It translates analogue production data into a digital database. As Smart Klaus digitalizes a manufacturing process, it builds a knowledge database that enables products to be manufactured at any time and anywhere in the world, all to one universal standard.

We consider ourselves the enablers of Industry 4.0 helping our customers achieve sustainable success. In the process, we look beyond individual process steps and never lose sight of the big picture. We define and optimize our own processes to constantly improve our performance and services – and always place people at the center of our work. We attach great importance on offering employees in manual production a guided, inspiring, and stress-free workspace.

For reasons of easier readability, the male language form is used in this brochure for personal nouns and pronouns. However, this does not imply any discrimination against the female or other sex, but should be understood as gender-neutral in the sense of linguistic simplification.



**Greater quality,  
greater productivity,  
greater focus  
on people.**

**Lower costs,  
relaxed employees,  
happy customers.**

Sounds good?  
Allow us to introduce Smart Klaus.

Smart Klaus is a camera-based assistance system that helps you optimize complicated manual processes quickly and accurately. The Smart Klaus system guides employees through each work step, ensuring everything is done right the first time. With Smart Klaus you improve the quality of your products, the productivity of your employees, and the competitiveness of your company.



Smart Klaus has impressed everyone involved in production – from production managers and technical planners to line workers.

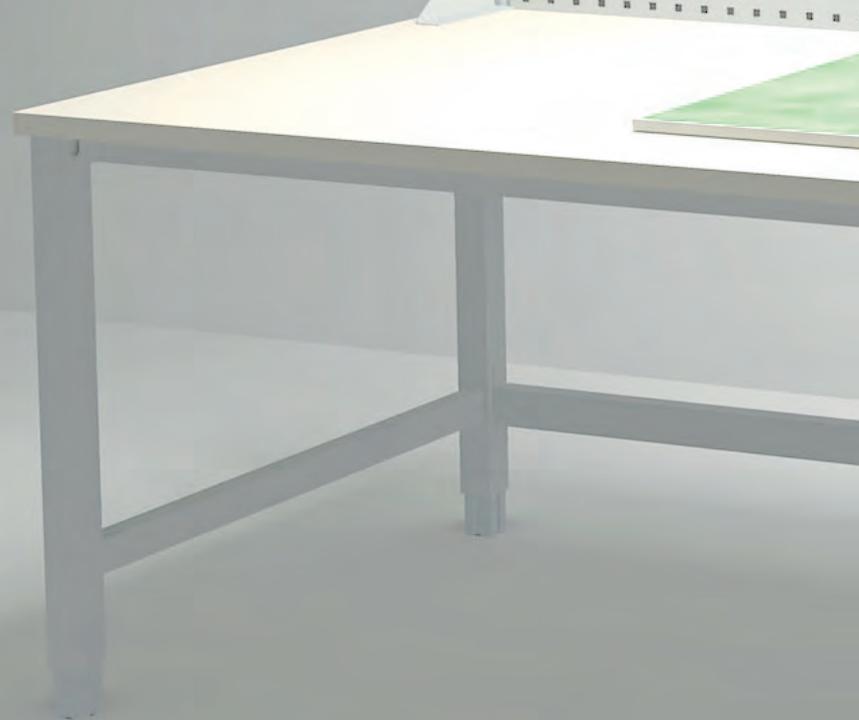
# SMART KLAUS

The camera-based assistance system for manual production.

**OPTICAL IDENTIFICATION**

**ASSEMBLY**

**END-OF-LINE INSPECTION**



### Lighting

Energy-efficient LED panels (120 x 80 cm) ensure optimal illumination of the work surface, with a luminance of 2000 lux.



### Camera and lens

A single or multiple USB 3.0 industrial camera with 1/2" CMOS sensors and first-class lenses provide perfect results in industrial image analysis.

### RGB underlighting

Underlighting can be used to improve contour recognition. The colored light alternates and provides system feedback directly to the operator's work surface.



### HD touch monitor

Direct and easy operation, even with work gloves. With individual instructions and acknowledgement for each work step.

### Keyboard

The system can alternatively be operated by keyboard instead of the HD touch monitor.



### Image processing computer

An industrial-grade, high-performance computer with a 4 GHz quad-core processor and hyper-threading technology as well as all necessary in- and outputs.

### Expansion options

Digital I/O module with optocoupler inputs and MOSFET outputs.

With its modular construction, Smart Klaus can be integrated – as well as retrofitted – into any workstation. Expansions and additional modules can also be retrofitted seamlessly at any time.

This way, your system grows in line with new tasks and adapts to any challenge. High-quality materials and components ensure both reliability and longevity.

### Accessories:

We offer a range of accessories for specific tasks and applications. These include barcode and RFID readers, digital measuring tools such as torque wrenches, calipers with integrated Bluetooth technology, and industrial scales. Just contact us.

# Thousands of parts without a barcode?

Smart Klaus detects them with ease.

## You're surely familiar with the following:

You must identify, sort, and store items without barcodes.

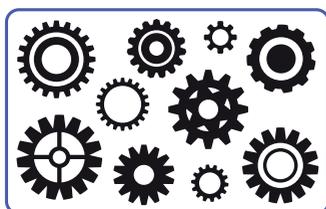
Even experienced employees need drawings and measuring instruments to identify those items that are difficult to tell apart. Inexperienced employees might not be familiar with all of the items. This results in long processing times, a large number of errors and a significant investment in staff training.

## Here's how Smart Klaus identifies your items:

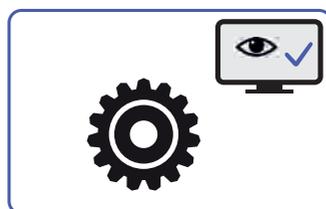
Your employees place the items onto the worktable and underneath the camera. Smart Klaus identifies the articles on the basis of previously learned characteristics within a few seconds and displays the necessary item data.

If required, the item data can be printed out using a label printer. The next time they use the item, staff will immediately know what it is.

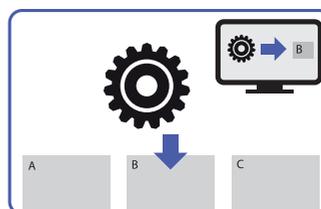
## OPTICAL IDENTIFICATION



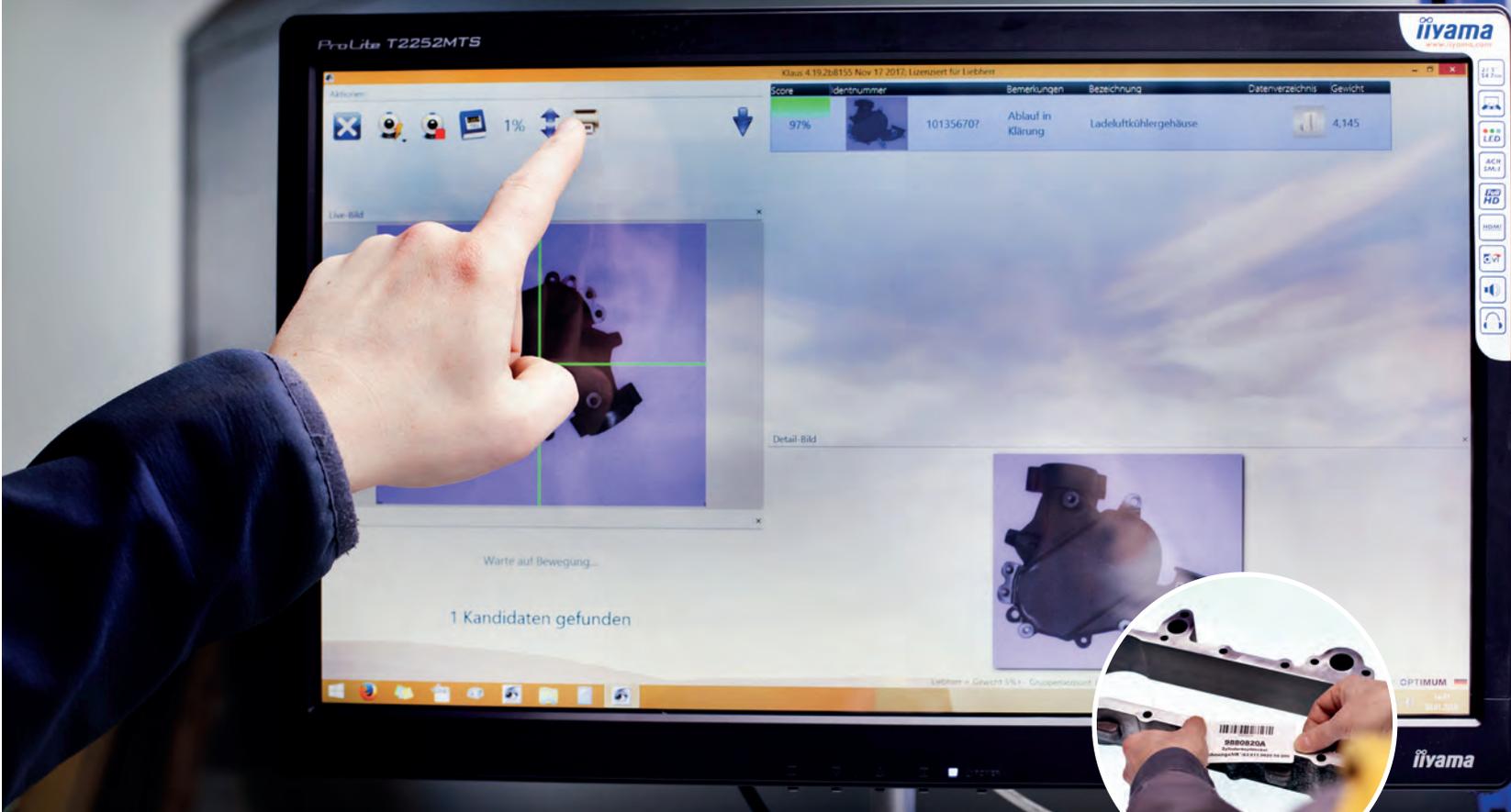
PRODUCT VARIETY



IDENTIFY



ASSIGN



## HERE'S HOW YOU BENEFIT:

Save time and do everything right.

- ✓ A significant rise in productivity at perfect quality.
- ✓ Fast, easy and reliable identification of items in a matter of seconds.
- ✓ Even inexperienced employees can identify items just as quickly and reliably as their experienced colleagues.
- ✓ Learning effect: over time, employees learn which details make up the difference.
- ✓ Development of a knowledge database: the digital knowledge collected by the system can be shared worldwide across all locations. This makes it possible to manufacture the product anywhere in the world to the same standard.

# Assemble complex components without errors?

In a completely relaxed and safe manner.

## You've surely encountered the following assembly situation:

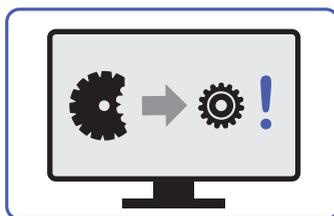
Growing complexity, great variant diversity, and increasing customer demands turn the manual assembly of components into a real challenge for you and your employees. You continuously spend time and money on maintaining assembly instructions and training your employees; and still you can't rule out errors and the costs of rework.

## Here's how Smart Klaus guides you through the assembly process:

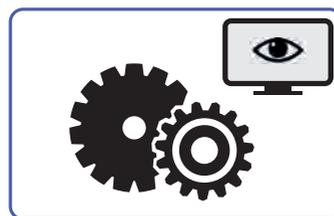
Via the HD touch monitor, Smart Klaus accompanies your employees step-by-step through the assembly process. After correct assembly of the right component, the system will acknowledge the assembly step and automatically switch to the next. If there is a mistake, employees receive a visual and audible signal to remedy their error immediately.

If required, all test results can be stored together with the associated images. This way, the assembly process is documented completely – for excellent proof of quality to your customers.

## ASSEMBLY



**INSTRUCT**



**CHECK**



**CONFIRM**



**DOCUMENT**



## HERE'S HOW YOU BENEFIT:

### Easier, faster, better.

- ✓ A productivity boost with employees processing more products in less time
- ✓ No assembly errors and therefore no rework, plus comprehensive post-production improvements. 8D reports are now a thing of the past.
- ✓ Augmented reality: real-time feedback and display on the monitor during assembly.
- ✓ Smart Klaus assumes the complete responsibility for quality. This reduces the stress on employees while increasing productivity.
- ✓ All complexities are mapped within the system, so any employee can carry out a new step without the need for additional training. They simply follow the instructions as set out by Smart Klaus.
- ✓ All work instructions for all variants are available in a digitalized form and automatically displayed correctly for each work step.
- ✓ The work instruction is identical to the test program, ensuring that each step is executed correctly.
- ✓ No more contractual penalties and return transports as a result of customer complaints.

# Completely accurate checks?

Smart Klaus takes care of it in mere seconds.

## You've surely encountered the following quality control situation:

To reliably control the quality of manufactured products, employees need experience, competence and great focus. Even spot checks take up a lot of time. They are also unreliable as errors are more frequent later in the day and increase if employees are stressed. Processes are either documented manually or in a separate QA system, which is time-consuming to use.

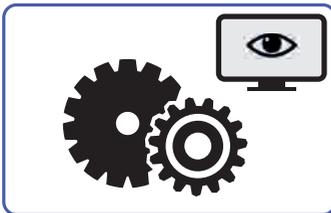
## Here's how Smart Klaus guides you through the end-of-line inspection:

During the final digital end-of-line inspection, Smart Klaus verifies within seconds in a single step whether the correct items have been assembled at the correct position.

Your employees can simply check if all components have been signed off with a green tick on the monitor. If a part is missing or has been positioned incorrectly, the assistance system emits an audible signal and the product is removed.

Each check result is recorded on request. This makes it easy to prove that your products are of the highest quality.

## END-OF-LINE INSPECTION



**CHECK**



**CONFIRM**



**DOCUMENT**



## HERE'S HOW YOU BENEFIT:

All's well that automates well.

- ✓ You are given complete control and your error rate drops towards zero.
- ✓ The responsibility lies with the system. Faulty components can be discharged directly.
- ✓ Greater customer satisfaction thanks to faster deliveries and higher quality. And all this boosts your competitiveness.
- ✓ Employee training is no longer necessary - Smart Klaus already knows what to do.
- ✓ All features are checked using a single camera.



## Documentation on request.

Everything has been done right.

Smart Klaus can optionally be fitted with a documentation module. This enables any production process to be documented, demonstrating to customers that each step is completed to the highest quality.

### The benefits of documentation:

- It can be used as a proof of quality for customers and makes it quick and simple to reassure customer that production was completed to specification.
- Images of each manufactured product are stored for verification purposes as a digital shadow of the product itself.
- The documentation feature can also be used to optimize the Smart Klaus inspection processes. If the documentation, for example, shows that errors are frequently reported during a certain process step, even though it was performed correctly, the administrator can use the documented images to optimize the inspection processes. If there are any actual errors, the administrator can identify the underlying cause in the process with greater ease. Elaborate 8D reports and contractual penalties are a thing of the past.
- Documentation takes place in parallel to the checks and does not come with any additional effort.
- You can make the digital data available to your customers, which saves them time during the incoming goods inspection.



# Zero-defect manufacturing.

With Smart Klaus.

**Have a look at our videos on how Smart Klaus is being used.**

Simply scan the QR code with your smartphone!



Gain an insight into how our customer **AlfonsMarkert** uses Smart Klaus to reduce inspection times by two-thirds. Scan here for the video:



Gain an insight into how our customer **ZIEHL-ABEGG** ensures zero-defect electronics manufacturing and increases productivity by 20%. Scan here for the video:



[bit.ly/2ThXOrh](https://bit.ly/2ThXOrh)



Gain an insight into how our customer **Miele** secures its assembly processes. Scan here for the video:



[bit.ly/2BUYF7D](https://bit.ly/2BUYF7D)



Gain an insight into **image processing** using Smart Klaus. Scan here for the video:



[bit.ly/2XqzMJV](https://bit.ly/2XqzMJV)



[bit.ly/2IOdxU](https://bit.ly/2IOdxU)

# Smart Klaus pays off.

Let us calculate how much you can save every year with Smart Klaus!  
Use our ROI calculation as a work document to help plan your consulting activities.

## 1. Savings per Smart Klaus workplace

Work steps saved	Time required in person-days (PD)	Annual savings (at staff costs of € 180 per person per day)
Reduced expenses for the training of newly hired employees (10 PD for employees, 5 PD for supervisors)	15 PD	= € 2.700
Reduced expenses for the organization and implementation of training courses for new variants	12 PD	= € 2.160
Reduction of sick days attributable to stress (30–40% of sick days are attributable to excessive mental burden)	6 PD	= € 1.080
Omission of complaint costs	50 pcs x € 300	= € 15.000
Omission of manual quality assurance	100 PD	= € 18.000

## 2. Savings in work organization

Reduced expenses for the creation, maintenance, and distribution of updated work instructions	20 PD	= € 3.600
Elaborate personnel planning „Which employee can produce which product?“ (approx. 10 minutes per workstation and day of operation)	5 PD	= € 900

## 3. Savings through increased productivity

Time savings through increased productivity	50 PD	= € 9.000
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**Profitability (ROI)**

per workspace and year\*

**= € 52.440**

\* This sample calculation roughly illustrates the annual savings that you can realize with Smart Klaus. The data are based on empirical values from different projects in different industries. To obtain a more accurate estimate, simply replace our assumptions with the corresponding values from your company. Basics of calculation and assumptions

- The operating time of the production is 8 hours per day on 250 operating days per year.
- The working time is 200 working days per person and year after deduction of vacation, holidays and sick days.
- The personnel costs amount to 36,000 € per person and year, including the employer's share of the social security contributions.
- From this, the personnel costs per person and working day amount to 180 € (36,000 € / 200 working days).
- There are 50 complaints per workplace and year.
- The costs per complaint amount to 300 € for (proportionate) contractual penalty, return transport, follow-up inspection, 8D report, remedial measures, replacement delivery.
- The increase in productivity through the use of Smart Klaus is 20%.



# Relaxed employees, happy manager, loyal customers.

## Industries:

Smart Klaus is used at companies in the following industries:

- Electronics manufacturing
- Car manufacturers and automotive suppliers
- Medical technology
- Aeronautics and space technology

## References:

Our best references:

- Miele Werk Bürmoos GmbH
- Liebherr-Ettlingen GmbH
- HOSA Aircraftcompletions GmbH
- ZIEHL-ABEGG SE
- AUDI AG

## Awards:



## What our customers say:

**„Our productivity increased by 20 percent thanks to Smart Klaus.“**

Hermann Mütsch  
Production Manager at Ziehl-Abegg

**„Smart Klaus makes 0 ppm possible“**

Walter Kraft, Managing Director  
Drahtzug Stein Drahtwaren

**„Smart Klaus helps me to do my work flawlessly every day – which gives me a good feeling!“**

Liane Rollenbeck, Assembly Employee  
Gebr. Wielpütz GmbH & Co. KG



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