The camera-based assistance system

Digitalization on the Shopfloor
Digitalization gives the economy new impulses. Manufacturing processes are changing, logistics is being rethought and sales are finding new ways to reach customers. The ever-increasing automation of work processes enables more cost-effective production and, as a result, an increase in competitiveness.

Only those who can make a profit will survive on the market in the long term.

Today, this can no longer be achieved without automation and digitization. Even in domains where, due to their specialization or complexity, human labor is the most efficient way of production, automation is gaining ground through continuous development. Manual production must therefore change and take advantage of the opportunities offered by digitization. The different strengths of man and machine must be combined so that they optimally complement each other.

Expertise is being digitized.

OPTIMUM datamanagement solutions GmbH has been automating and digitizing the processes of leading industrial companies since 1993. The camera-based cognitive assistance system Smart Klaus is based on this experience and expertise and has received several awards.

The system combines database management with camera technology and intelligent industrial image processing. Manual production processes are digitally stored step by step in the Smart Klaus. Using this data, he guides the employees through the production process and simultaneously checks every single step. The specialized knowledge is thereby digitized.

In this way, Smart Klaus seamlessly integrates manual workstations into the digital production of Industry 4.0, making them ready for the future.

More productivity, more quality, more success.

Welcome to the world of digitalization.

Whether production manager, industrial engineer or worker – Smart Klaus convinces on the whole production line.

Sounds good? Here comes Smart Klaus.

Smart Klaus is a camera-based, cognitive assistance system that helps you to master manual processes quickly and without errors.

The manual processes are digitally stored in the Smart Klaus as work and test instructions. He guides your employees step by step through the process and at the same time checks the accuracy of all work steps. This allows your employees to work in a guided and relaxed manner and at the same time do everything correctly.

With Smart Klaus you increase the quality of your products, the productivity of your employees and the competitiveness of your company.

For ease of reading, the masculine 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.
Smart Klaus.

The camera-based cognitive assistance system for manual production.

**SK Receipt**
Smart Klaus for the incoming goods inspection.
SK Receipt identifies, checks, counts and registers articles automatically, even without barcode, QR code or RFID – safely, quickly and error-free.

**SK Ident**
Smart Klaus for automatic optical identification.
SK Ident identifies articles, even without barcode, QR code or RFID, and displays the associated master data – simply and quickly.

**SK Assembly**
Smart Klaus for manual mounting and THT assembly.
SK Assembly guides the worker via screen, simultaneously checks every single placement or assembly step and warns immediately in case of errors.

**SK Inspect**
Smart Klaus for automatic optical inspection.
SK Inspect checks the quality of your products and displays defects on screen.

(The figure shows an example configuration)
Smart Klaus SK Ident identifies articles, even without barcodes, QR codes or RFID, and displays the corresponding master data. The employee places the article on the work table under the camera. Smart Klaus automatically identifies it and correctly matches it from thousands of variants. Previously taught-in features make recognition quick and easy – after a few seconds, Smart Klaus shows which articles it is. As you wish, he reports master data such as description, article number or stock compartment.

Smart Klaus SK Receipt automatically identifies, checks, counts and registers, even without barcode, QR code or RFID. Articles are identified individually with the help of the camera and intelligent image processing and checked for dimensional accuracy and visual characteristics. After each inspection, your employee receives audio-visual feedback. As a result, you only receive correct, defect-free goods and you deliver top quality to your customers.

**SK Receipt**
Smart Klaus for the incoming goods inspection.

**SK Ident**
Smart Klaus for automatic optical identification.

**Your benefit**
- Inspection and work instructions are always up-to-date and fulfilled.
- Goods are reliably identified and automatically registered.
- Faulty goods are reliably detected and sorted out.
- Productivity increases.
- The error rate decreases.
- The training effort for employees is reduced.

**Your benefit**
- Search times are significantly reduced.
- Mix-ups are excluded.
- Material and time expenditure for the attachment of barcodes, QR codes or RFID are no longer necessary.
- The training effort for employees is reduced.
Final inspection in just a few seconds.

Assembling, mounting and checking in one operation.

**SK Assembly**
Smart Klaus for manual mounting and THT assembly.

**Your benefit**
- The inspection and work instructions are digitally stored.
- The latest inspection and work instructions are always applied and followed.
- Waste, rework and complaints are avoided.
- Productivity increases.
- The error rate decreases.
- The training effort for employees is reduced.

Smart Klaus SK Assembly guides the worker step by step through the manufacturing process. He checks every single step in real time and warns immediately if an error occurs.

The manufacturing processes are digitally stored in the SK Assembly step by step. This also includes the criteria by which he can check the correct execution of each work step. The worker is guided through the production process by screen. As soon as a work step is correctly executed, SK Assembly automatically switches to the next step. In the event of an error, he immediately warns the worker and requires a correction.

**SK Inspect**
Smart Klaus for automatic optical inspection.

**Your benefit**
- The inspection and work instructions are digitally stored.
- The latest inspection and work instructions are always applied and followed.
- Complaint rate and complaint costs decrease.
- Inspection times are considerably reduced.
- The training effort for employees is reduced.

Smart Klaus SK Inspect checks the quality of your products and displays defects directly on the screen.

The test pieces are supplied to the SK Inspect either manually or via a conveyor system. SK Inspect checks them on the basis of the taught-in characteristics, marks defective spots on the screen and – if available – triggers automatic ejection. Optionally, the inspection results can be automatically documented including images. Depending on the number of characteristics to be checked, an inspection process takes a few milliseconds up to a few seconds.
Well advised right from the start.

Step by step to Smart Klaus.

1 Your Inquiry
We will reply within 24 hours. Together we discuss your requirements and develop a first solution concept.

2 Feasibility Check
Free of charge we examine the solution concept for technical feasibility. To do this, just send us your sample parts. We will teach them into a demo system and check various implementation possibilities. Within a few days you will receive a professional feedback. If desired, we will create a short video for you, which shows how Smart Klaus works with your sample parts.

3 Live Presentation
We would be pleased to present the results of the technical feasibility study live and offer you the opportunity to test the Smart Klaus yourself. According to your choice, the presentation will take place either in a video conference or as an on-site appointment at our premises.

Rent or Buy
You can either rent or buy Smart Klaus. With a rental system, you can test at a reasonable cost how Smart Klaus improves the quality and productivity of your company in production operation. If you later decide to buy the rental system, we will offset parts of the rental payments made on the purchase price.

Joint Workshop
Smart Klaus changes the processes in your company. Therefore, we offer you a workshop in which we together analyze the requirements of the affected departments.

Aims of the workshop
• Convince yourself and your colleagues personally that Smart Klaus performs well in your processes and with your products
• Your employees get to know Smart Klaus. We also address possible concerns and fears that could accompany the implementation of Smart Klaus.
• Together we will examine how Smart Klaus can be seamlessly integrated into your IT environment.
• We examine the economic feasibility by calculating the profitability of Smart Klaus individually based on your general conditions.

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If you have any questions, please contact us!
Smart Klaus pays off.

Calculate your ROI (Return On Investment).

Smart Klaus is an investment that must pay off. We agree on that. An initial assessment is certainly based on the predicted quality and productivity gains through Smart Klaus.

But have you ever calculated the costs you incur when introducing new products or product variants for the maintenance of inspection and work instructions? How much does the training of the employees cost? What are the expenses for the administration of work orders?

To evaluate these costs, we have printed an exemplary profitability calculation for an assembly workplace on the next page. The figures given are based on practical experience.

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**A ROI calculation by the example of an assembly workplace**

<table>
<thead>
<tr>
<th>Questions</th>
<th>Average value</th>
<th>Calculation example</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the gross annual salary of a worker at this workplace?</td>
<td>30,000 €</td>
<td>180 €</td>
</tr>
<tr>
<td>How long is the daily working time of a full-time job at this workplace in hours?</td>
<td>8.00 h</td>
<td>23 €</td>
</tr>
<tr>
<td>How many hours per week is the workplace being used? (Total time across all shifts)</td>
<td>40.00 h</td>
<td>2,000 h</td>
</tr>
<tr>
<td>How many operating days does this workplace have per year?</td>
<td>250 d</td>
<td></td>
</tr>
<tr>
<td>How many new workers will be trained at one workplace per year?</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>How many hours does it take to train a new worker? (Worker and supervisor)</td>
<td>16.00 h</td>
<td></td>
</tr>
<tr>
<td>How many new variants are being added per year?</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>How many hours are required per variant to create, maintain and distribute the work instructions for this workplace?</td>
<td>8.00 h</td>
<td>180 €</td>
</tr>
<tr>
<td>On how many workplaces does this information refer to?</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>How many hours are needed to train workers at this workplace for a new variant? (Organization &amp; Execution)</td>
<td>8.00 h</td>
<td>180 €</td>
</tr>
<tr>
<td>How many hours per day are required to print, distribute and re-book work orders? (Total time across all shifts)</td>
<td>4.00 h</td>
<td>22,500 €</td>
</tr>
<tr>
<td>What percentage of working time is spent on personnel resource planning? (Which worker can produce what?)</td>
<td>6%</td>
<td>2,700 €</td>
</tr>
<tr>
<td>How high is the absenteeism rate of the employees at this workplace in days per year? (30-40% are caused by stress)</td>
<td>15.00 d</td>
<td>945 €</td>
</tr>
<tr>
<td>How many quality assurance employees do you use proportionally for this workplace?</td>
<td>0.25</td>
<td>11,250 €</td>
</tr>
<tr>
<td>How many production faults occur per week at this workplace?</td>
<td>10</td>
<td>11,700 €</td>
</tr>
<tr>
<td>What is the average expenditure of time in hours arising for reworking a production fault?</td>
<td>1.00 h</td>
<td></td>
</tr>
<tr>
<td>Which material or disposal costs occur per fault?</td>
<td>10.00 €</td>
<td>5,200 €</td>
</tr>
<tr>
<td>How many hours per week are needed at this workplace to document the work results?</td>
<td>4.00 h</td>
<td>4,680 €</td>
</tr>
<tr>
<td>How many complaints per year occur due to errors at this workplace that were not detected and reworked?</td>
<td>10</td>
<td>10,000 €</td>
</tr>
<tr>
<td>What are the costs per complaint? (proportionate contractual penalty, return transport, 8D-report, containment action, compensation delivery)</td>
<td>1,000.00 €</td>
<td></td>
</tr>
</tbody>
</table>

**Summary**

- Savings in work organisation: 27,225 €
- Savings in quality assurance: 42,830 €
- Profit through productivity increase: 9,000 €
- Total ROI: 79,055 €

Download the Excel file ROI Calculation and replace the numbers with your own values!
https://www.optimum-gmbh.de/roi
That’s what our customers say.
Scan the QR Code and experience Smart Klaus in action.

“Smart Klaus supports me every day to work without errors. This gives me a good feeling.”
Liane Rollenbeck, Assembly worker, Gebr. Wielpütz GmbH & Co. KG

“0 ppm is possible with Smart Klaus.”
Walter Kraft, CEO, Drahtzug Stein Drahtwaren

“Smart Klaus integrates manual workplaces into the shopfloor IT environment, setting an important milestone in terms of performance improvement through digitization.”
Prof. Dr. Dipl.-Wirt.-Ing. Andreas Merchiers, Faculty of Economics, Bochum University

“Smart Klaus fits perfectly into our future oriented THT concept due to its high flexibility and is easy and intuitive to use.”
Philipp Lehmann, Manufacturing department, Leesys – Leipzig Electronic Systems GmbH

“The training of new employees is very easy and you can be sure that the quality is guaranteed.”
Robin Scheigele, Industrial Engineer, Enics AG

“The system achieves the accuracy that was hoped for.”
Jürgen Rickert, CEO, NIRA KSV GmbH

“We have increased productivity by 20% with Smart Klaus”
Hermann Mütsch, Head of Production, Ziehl-Abegg SE

“Smart Klaus enabled us to reduce the expenditure time in the incoming goods department by two thirds”.
Peer Putzig, Head of Production, Alfons Markert & Co. KG

Identification and optical measurement of hose couplings
Alfons Markert & Co. GmbH

Identification of difficult to distinguish IC trays
Matrium GmbH

Assembly of automotive filters
MANN & HUMMEL

Identification of injection molded parts
Nira KSV GmbH

Assembly of automotive filters
MANN & HUMMEL

Final Inspection
Automatic optical inspection of injection molded parts
Nira KSV GmbH

Component assembly
Enics AG

Laser-guided THT assembly
Siemens AG

Assembly of oil pipes
Gebr. Wielpütz GmbH & Co. KG

Assembly Assistance
Enics AG

Electronics assembly
Enics AG

Our awards

Innovationspreis Mittelstand 2016

OptiMunich IoT Award 2016

Mittelstand Award 2015

OptiMunich IoT Award 2014