



Smart Klaus  
**The camera-based worker assistance system**



## SMART KLAUS

### Digitalisation of your manual processes

Smart Klaus is the camera-based assistance system for manual production. It accompanies employees in their daily tasks from **incoming goods right through to outgoing goods**. All processes are fully documented.

Reliable performance as well as **permanent and automatic inspection** make Smart Klaus an indispensable solution. For maximum efficiency and precision in your production.

Maximise your productivity and minimise your error rate down to 0 ppm. With Smart Klaus, your manual processes become: **EASIER. FASTER. BETTER**

## OUR PRODUCT

### One solution for the entire value chain

Smart Klaus is a modular system and offers a custom-fit solution for every application – across all sectors.



#### SK Receipt

Incoming  
goods  
inspection



#### SK Ident

Automatic  
optical  
identification



#### SK THT

THT  
assembly



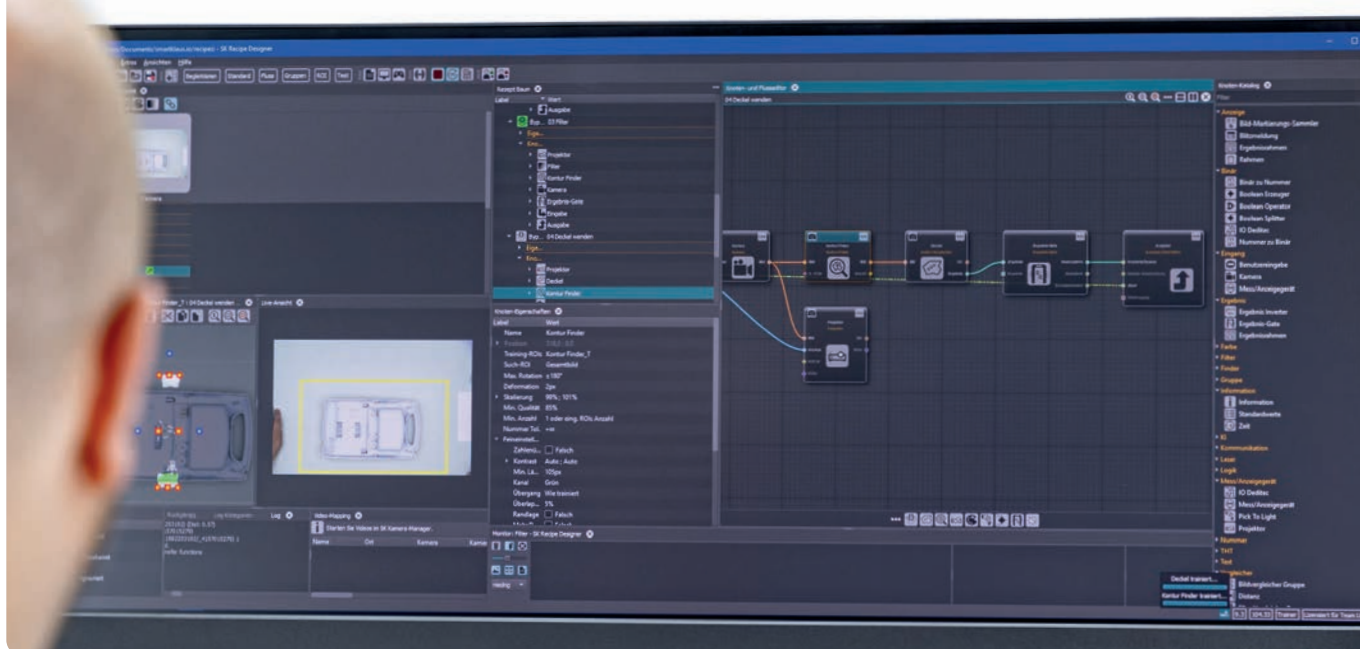
#### SK Assembly

Manual  
mounting



#### SK Inspect

Automatic  
optical  
inspection



## YOUR BENEFITS

### Everything at a glance



#### No defects and top quality

- Permanent optical inspection in real time with immediate feedback



#### Simple and safe worker guidance

- Audiovisual step-by-step instructions
- Errors are detected and can be corrected directly
- Training effort for new employees is significantly reduced
- No programming knowledge required
- Additional operating terminal: The interactive touch interface provides an overview of all work steps



#### Digital documentation and optimisation of processes

- Automatic documentation of all work steps
- Seamless tracing of quality
- Automatic production data acquisition (OEE)
- Centrally stored data is always up-to-date and retrievable
- Manufacturing information can be flexibly adapted



#### Increasing productivity and profits

- Time expenditure and additional costs for complaints and 8D reports are eliminated
- No more material loss due to errors
- Productivity increase thanks to flexible staff deployment
- Reduced induction period for new employees
- Digital and central data collection:  
Analytical insights into the productivity of your production lines (OEE)

# HOW SMART KLAUS WORKS

## Step by step

Smart Klaus guides workers step-by-step through production processes using digital work instructions and permanent visual inspection.

Depending on the workplace, the work area is captured by one or more cameras. The recordings are analysed and interpreted by a combination of deterministic algorithms and artificial intelligence.

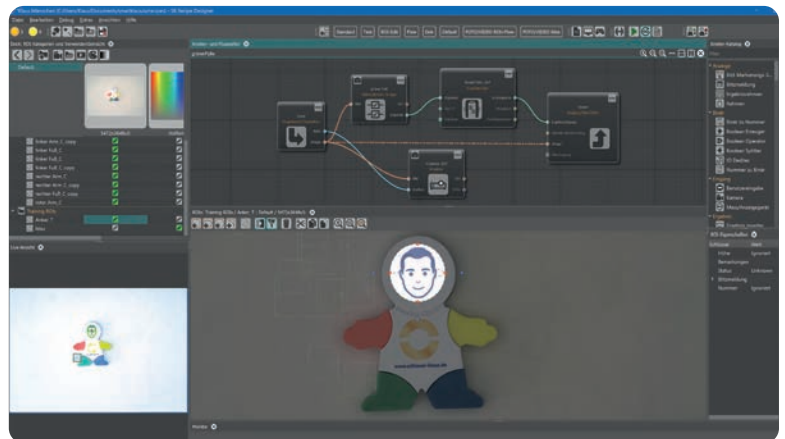
The intelligent image processing software checks whether a work step has been carried out correctly and gives direct feedback. Feedback is given in real time after each step:

**An audiovisual hint in case of errors or confirmation in case of correctness.**

## TEACH IN

The camera takes pictures of individual parts and consecutive work steps. The administrator then determines the relevant features with which the image processing software should match the live image. This way, Smart Klaus knows exactly which parameters have to be taken into account in the production process.

On average, teaching in a work step takes one minute per feature.

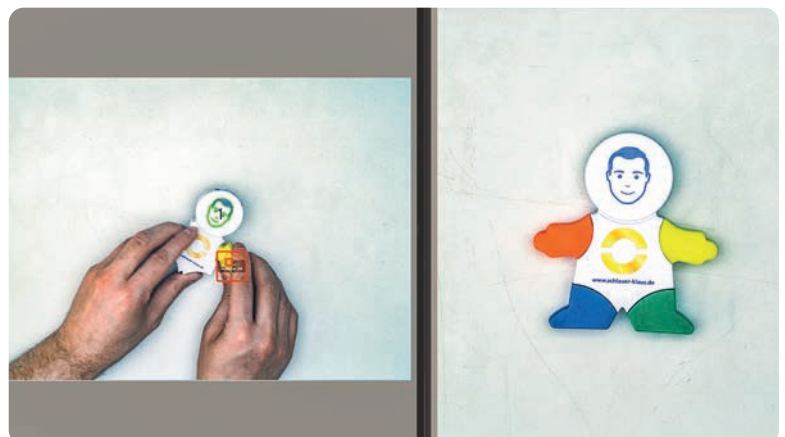


## INSTRUCTIONS

Mounting instructions appear on the control display. This can be supplemented by notes or video sequences.

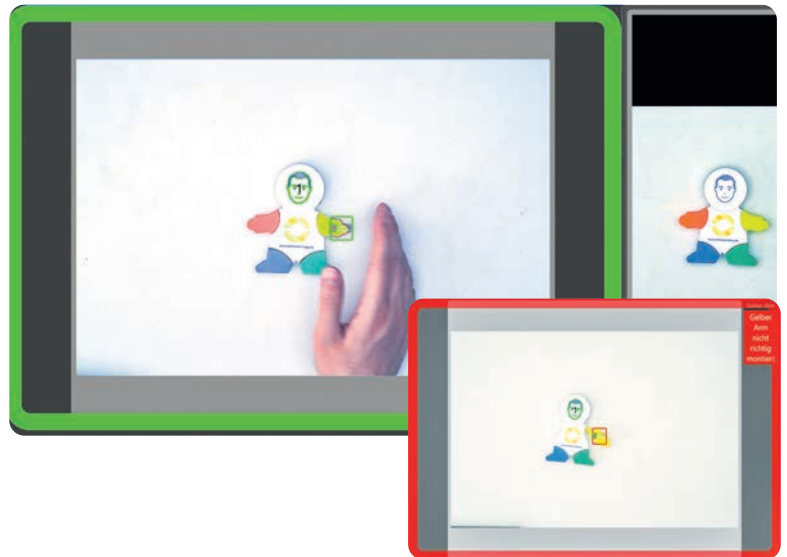
In parallel, the camera records the activity of the worker in real time and displays the live image on the control display.

With the help of augmented reality, the worker is shown in the live image where they have to work



## CHECK

The image-processing software compares certain features from the live image with those of the taught-in reference image. In this way, deviations are detected and the correctness of the work step is checked in real time. If deviations occur, they are marked as errors with a red frame (with the help of augmented reality) in the live image. Once the error is corrected, the frame turns green and the process continues automatically.



## IDENTIFY

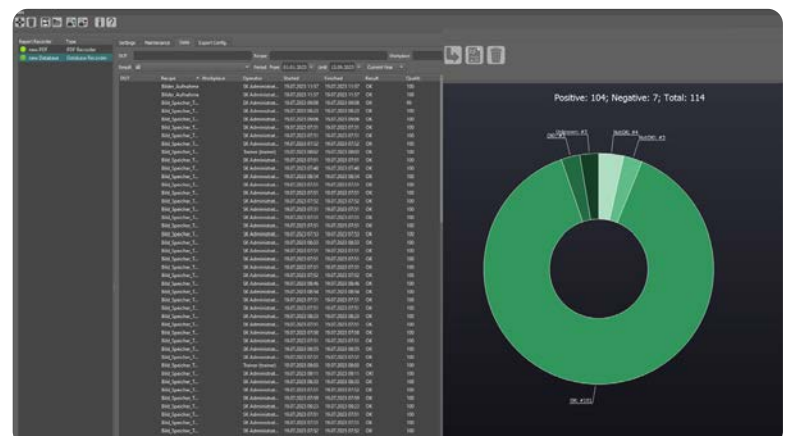
Smart Klaus clearly identifies items from thousands of entered variants and displays all associated master data. Previously taught-in features make identification easier, faster and better.

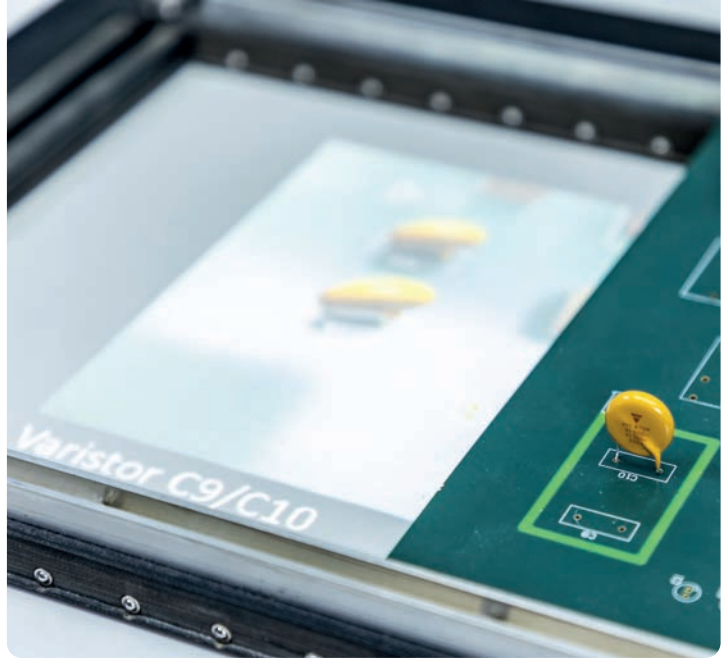


## DOCUMENT\*

Individual work steps and test results can be documented automatically and with images. The test reports can be called up at any time and provide insights into the productivity of entire processes.

\*This is an extension of the basic software.





## EXPANSION OPTIONS

### For the ideal workplace

Smart Klaus offers a wide range of expansion options.

These can be individually selected and combined, and therefore adapted to the specific needs of each workplace – making work even more efficient and relaxed.



#### **Automatic documentation (and dashboard)**

The camera positioned above the workplace continuously collects recordings of the work processes. These are automatically documented in a test report. The entire production process can therefore be transparently traced at any time.



#### **RGB backlight for contrast enhancement**

In some applications, it is necessary to determine the contour of an item exactly. This requires a high contrast between the item and the underlying work surface.



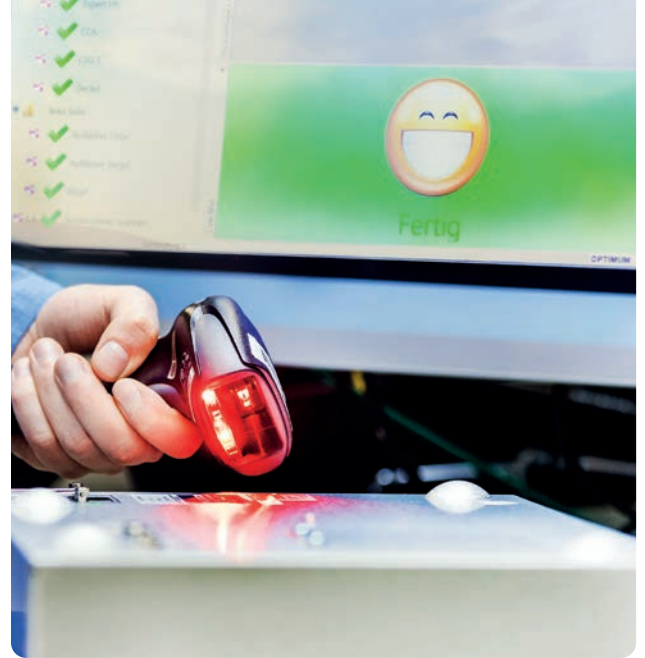
#### **Interface to your ERP, MES and PPS system**

Smart Klaus features documented OPC UA and TCP/IP interfaces to allow communication with other IT systems. These interfaces can be customised based on the customer's requirements.



#### **Connecting external digital tools**

Smart Klaus features an interface for connecting external tools. This means that individual characteristics, such as the torque with which a screw was tightened, can be digitally documented and verified.



### Connecting external digital measuring tools

Characteristics such as weight or electrical resistance cannot be determined optically. If this data is needed, digital measuring tools can be connected via an interface. These then transmit the necessary information directly, digitally and securely to the system.



### Projector

With the help of a projector, the display of the Smart Klaus can be projected directly onto the work table. Workers are shown any work instructions or errors directly on the work surface. The ergonomic positioning optimises the work flow – physical strain such as constantly looking up is eliminated.



### Pick-by-Light

The workstation is expanded with individually configurable removal compartments. These are equipped with LED displays or lights that can emit numerical or visual signals. Workers are guided by the Pick-by-Light plug-in, in addition to the work instructions on the screen. Manufacturing and testing processes are therefore made even simpler and safer.



### Light barriers and light curtains

Light barriers can be connected to the system. If, for example, an impulse/trigger is transmitted to the Smart Klaus, this triggers a new work step.

# THE SK MODULES

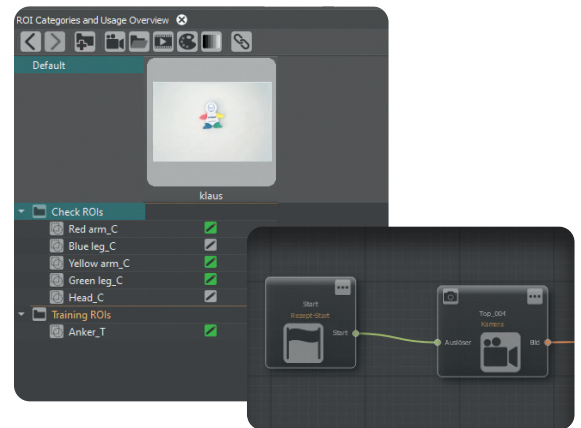
## The modular structure

The modular design makes it possible to select exactly the right function for each production line.  
The fifth generation of Smart Klaus consists of the following modules:



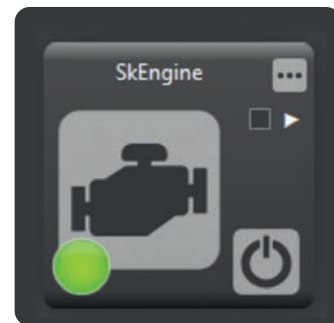
### SK RECIPE DESIGNER

This application is required in order to create production or testing processes. In this programme function, individual parts are taught in and production sequences are precisely defined. A graphical representation and icons provide a clear and easy-to-understand structure.



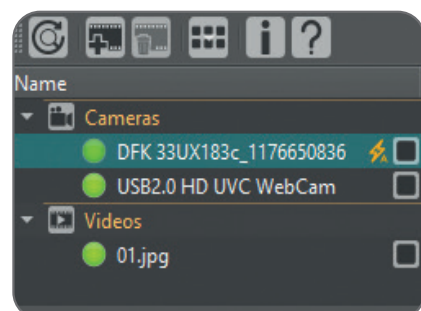
### SK ENGINE

The SK Engine is a background application that enables the check function. If this is started, the created recipes can begin at the assembly or test line.



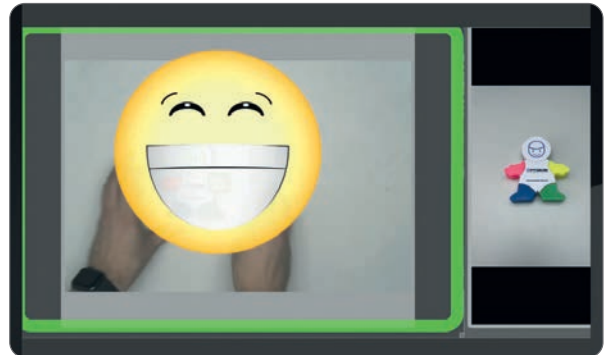
### SK CAMERA MANAGER

The SK Camera Manager manages all connected cameras and camera add-ons.



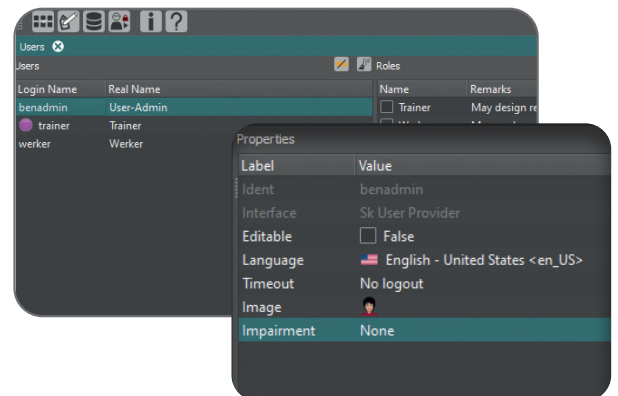
## SK DISPLAY

The SK display shows camera activity in real time and provides automatic feedback. All relevant steps are shown to the workers on this screen and, if required, notes and error messages are displayed.



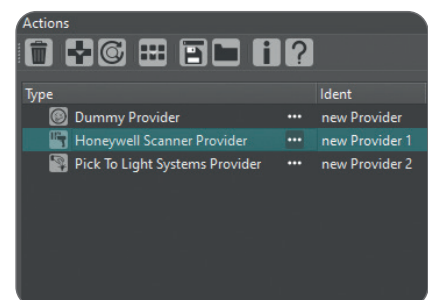
## SK USER MANAGER

All user rights are managed in this application. Individual authorisations for mounting or testing processes can be set here. As an option, Smart Klaus can be connected to an LDAP directory service.



## SK GAUGE MANAGER

The SK Gauge Manager manages all available gauges and display devices that can be used in a recipe. These include: Scale, calliper, digital IO, Pick-by-Light and more.

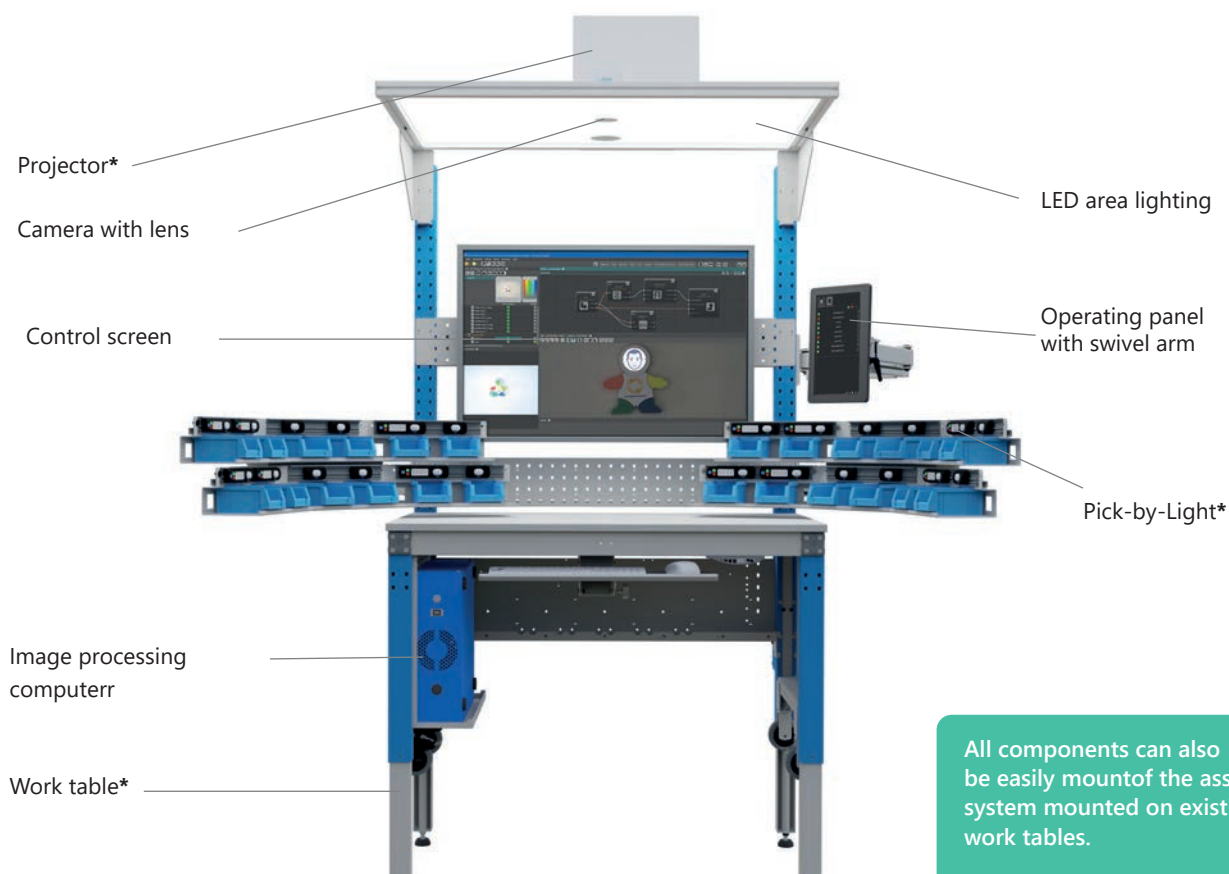


## SK CONTROLLER

The 13" control panel, which is attached separately, is the interactive user interface for the end of the work. This is where logging in and out, recipe selection, recipe start and other interactions take place.



## TECHNICAL DATA



All components can also be easily mounted on the assistance system mounted on existing work tables.

\*Expansion option

### Image processing computer

|                         |                                                                                                                                      |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| Dimensions (L x W x H): | 550 x 440 x 155 mm                                                                                                                   |
| Weight:                 | 15 kg                                                                                                                                |
| Power supply range::    | 110-230 V, 50/60 Hz                                                                                                                  |
| Power consumption:      | max. 1,500 W inclusive peripheral devices                                                                                            |
| Protection:             | 10 A at 230 V, 16 A at 110 V                                                                                                         |
| Processor:              | AMD Ryzen 7 5800X, 3.8 GHz, 8 Kerne 16 Threads <sup>1)</sup>                                                                         |
| RAM                     | 16 GB                                                                                                                                |
| Hard disk:              | 2 x 240 GB, configured as RAID 1                                                                                                     |
| Operating system:       | Windows 10 Enterprise LTSC <sup>1)</sup>                                                                                             |
| External connections:   | 6 x USB 3.2<br>2 x USB 3.2 Typ-C<br>2 x USB 2.0<br>2 x RJ45 GigaBit4<br>switched cold device socket (C13,<br>insgesamt max. 1,000 W) |

## Camera

|             |                               |
|-------------|-------------------------------|
| Resolution: | 20 MPixel (5.472×3.648 Pixel) |
| Framerate:  | 18 fps at full resolution     |

## Field of view and detection accuracy

The camera's field of view and detection accuracy depends on the working distance and focal length of the lens used. The specified values for the field of view apply to a working distance of 1,200 mm. The values for the detection accuracy are empirical values from practical experience in which Smart Klaus operates reliably in typical industrial environments.

Below this, the values that can be achieved under ideal environmental conditions are given in brackets..

|                       |                     |                     |                     |                     |
|-----------------------|---------------------|---------------------|---------------------|---------------------|
| Focal length:         | 12 mm               | 16 mm               | 25 mm               | 35 mm               |
| Field of view:        | 1,200 x 860 mm      | 970 x 640 mm        | 610 x 400 mm        | 430 x 290 mm        |
| Recognition accuracy: | 1.6 mm<br>(0.23 mm) | 1.5 mm<br>(0.17 mm) | 0.7 mm<br>(0.11 mm) | 0.5 mm<br>(0.08 mm) |

Other focal lengths are available on request.

## Lighting

|                                  |                                              |
|----------------------------------|----------------------------------------------|
| Dimensions (L x W x H):          | 1,200 x 800 x 140 mm (without camera holder) |
| Weight:                          | 15 kg                                        |
| Power consumption:               | 70 W                                         |
| Luminous flux:                   | approx. 7,000 Lumen                          |
| Illuminance on the work surface: | approx. 2,500 Lux                            |
| Light colour:                    | 6,000 K (cold white)                         |

The lighting is designed for easy attachment to typical industrial aluminium profiles

## Monitors

|                   |                                                                  |
|-------------------|------------------------------------------------------------------|
| Operating panel:  |                                                                  |
| Surface:          | Anti-reflective and chemically hardened                          |
| Screen size:      | 13 inches                                                        |
| Resolution:       | Full HD, 1,920 x 1,080                                           |
| Touch technology: | Projected capacitive, 10-Punkt Multi-Touch (operable with glove) |
| Control Monitor:  |                                                                  |
| Screen size:      | 29 inches                                                        |
| Resolution:       | 2,560 x 1,080 Pixel                                              |

## STEP BY STEP TO SMART KLAUS



### Does Smart Klaus fit into your production?

We'll find out for you simply and easily  
with our feasibility check!

Submit sample parts and receive  
expert feedback – live or via video!

Rent or buy?  
Discover your options for easy  
access – without any risk!



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