Smart Klaus

SK Ident
Smart Klaus for automatic optical identification
Automatic optical identification of difficult to distinguish items: simple and fast, even without barcode, QR code or RFID.

Smart Klaus SK Ident identifies items and displays the corresponding master data.

Items are identified with the help of the camera and the image processing software on the basis of optical characteristics from thousands of different variants within seconds. As you wish, it displays master data such as the item number, item description or stock compartment or prints out a label with this data. Time-consuming leafing through catalogs and searching electronic documents is no longer necessary.

Best practice with SK Ident

The model SK Ident of Smart Klaus is used when items without barcode, QR code and RFID are to be identified quickly. Examples are the identification of returns of consignments or consignment goods, the identification of components during the repair of machines and systems or the labeling of items in the outgoing goods department.

The characteristics for identification can be captured and edited by the administrator of Smart Klaus himself. Programming knowledge is not required.

The results of the identification are displayed on Smart Klaus’ monitor and, if required, transferred to an ERP system\(^1\). In addition, Smart Klaus can automatically document and save the result of the identification\(^2\).
**Mix-ups are excluded**

The characteristics stored in Smart Klaus describe each item uniquely. Small differences between various items are recognized equally. Even with many characteristics none is overlooked or missed.

**Identification results are reproducible**

The permitted limit values and tolerances are stored in the Smart Klaus and are therefore independent of the operator’s daily form.

**Identification results can be automatically documented**

All of the detected characteristics can be saved together with the captured images as a documentation.

**Productivity increases – error rate decreases**

*Routine work* is monotonous, stressful and therefore error-prone to people. This is exactly why Smart Klaus is the ideal support for humans. After all, he always carries out routine tasks *with constant speed and precision*, regardless of his daily form.
Optical identification

The characteristics of the test specimen are compared with the characteristics stored in the database. Smart Klaus provides a large number of comparison algorithms to detect and compare e.g. colors, shapes, patterns and texts. An integrated edge detection allows the comparison of contours, interfaces to external digital measuring devices and tools allow the integration of values (e.g. weight, electrical resistance) which are not optically recognizable.

Simple Teach-in

Items are taught-in by taking a pattern with Smart Klaus’ camera and saving the images in his database. The administrator then marks the characteristics that should be used for the identification and enters the master data to be output during the identification. Teaching a test position takes about a minute, the training of an administrator about half a day.
RGB underlight for contrast enhancement

In some applications it is necessary to determine the exact contour of an item. This requires a high contrast between the item and the underlying work surface. To increase process reliability in such cases, an RGB underlight can be used. The light color can be set from the test procedure of Smart Klaus, so that the optimal contrast color can be used for each test specimen.

Connection of external digital measuring tools

Sometimes individual characteristics, such as weight or electrical resistance, cannot be determined optically. In these cases, Smart Klaus has an interface for connecting external measuring tools. The external measurements are integrated into the identification routine of Smart Klaus.

Interface to your ERP system for seamless integration of Smart Klaus into your IT

Smart Klaus has a documented TCP/IP interface for communication with other IT systems. Since there is no standardized protocol for data exchange between ERP and peripheral systems, a customer-specific program is also required to translate the data structure of Smart Klaus and the ERP system into each other.

1) Automatic interfaces to other IT systems are optional and must be implemented customerspecific.
2) The automatic generation of the documentation is an optionally available add-on module.
Technical data

Image processing computer

<table>
<thead>
<tr>
<th>Dimensions (L x W x H):</th>
<th>500 x 420 x 110 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight:</td>
<td>10 kg</td>
</tr>
<tr>
<td>Power supply range:</td>
<td>110-230 V, 50/60 Hz</td>
</tr>
<tr>
<td>Power consumption:</td>
<td>max. 1,500 W inclusive peripheral devices</td>
</tr>
<tr>
<td>Protection:</td>
<td>10 A at 230 V, 16 A at 110 V</td>
</tr>
<tr>
<td>Processor:</td>
<td>Intel i7-9700K, 3.6 GHz, 6 Cores, 12 Threads</td>
</tr>
<tr>
<td>RAM</td>
<td>8 GB</td>
</tr>
<tr>
<td>Hard disk:</td>
<td>2 x 240 GB, configured as RAID 1</td>
</tr>
<tr>
<td>Operating system:</td>
<td>Windows 10 Enterprise LTSC 2019</td>
</tr>
<tr>
<td>External connections:</td>
<td>2 x RJ45 GigaBit</td>
</tr>
<tr>
<td></td>
<td>5 x USB 2.0</td>
</tr>
<tr>
<td></td>
<td>2 x USB 3.0</td>
</tr>
<tr>
<td></td>
<td>2 x USB 3.1</td>
</tr>
<tr>
<td></td>
<td>4 switched cold device socket (C13, total max. 1,000 W)</td>
</tr>
</tbody>
</table>

Camera

<table>
<thead>
<tr>
<th>Resolution:</th>
<th>18.1 MPixel (4,912 x 3,684 Pixel)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Framerate:</td>
<td>21 fps at full resolution</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Focal length:</th>
<th>16 mm</th>
<th>12 mm</th>
<th>8.5 mm</th>
<th>3.5 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field of view:</td>
<td>320 x 240 mm</td>
<td>640 x 480 mm</td>
<td>960 x 720 mm</td>
<td>2,240 x 1,680 mm</td>
</tr>
<tr>
<td>Recognition accuracy:</td>
<td>0.6 mm (0.06 mm)</td>
<td>1.3 mm (0.1 mm)</td>
<td>2.0 mm (0.2 mm)</td>
<td>4.5 mm (0.4 mm)</td>
</tr>
</tbody>
</table>

Other focal lengths are available on request.
**Lighting**

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

<table>
<thead>
<tr>
<th>Dimensions (L x W x H):</th>
<th>1,200 x 800 x 140 mm (without camera holder)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight:</td>
<td>15 kg</td>
</tr>
<tr>
<td>Power consumption:</td>
<td>70 W</td>
</tr>
<tr>
<td>Luminous flux:</td>
<td>ca. 7,000 Lumen</td>
</tr>
<tr>
<td>Illuminance on the work surface:</td>
<td>ca. 2,500 Lux</td>
</tr>
<tr>
<td>Light colour:</td>
<td>6,000 K (cold white)</td>
</tr>
</tbody>
</table>

**Touch-Monitor**

| Screen diagonal:              | 21.5 inch                                   |
| Resolution:                   | 1,920 x 1,080 Pixel                        |
| Touch technology:             | Projected capacitive, 10-point Multi-Touch  |
|                              | (can be operated with gloves)              |

The assistance system is available with or without work table. All components can also be easily mounted on existing work tables.
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This document is subject to errors and modifications