Kemro

# OP 450-LD/A
# Operating panel
# Project engineering manual V1.06

**Translation of the original instructions**

KEBA®
Automation by innovation.

Document : V1.06 / article no.: 1000931
Filename : op450apjen.pdf
Pages : 56

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## Record of Revision

| Version | Date | Change in chapter | Description | changed by |
|---|---|---|---|---|
| 1.00 | 03-2009 | | Newly created | kalt |
| 1.01 | 08-2009 | Mounting- and installation instructions | Attachment of patterned foil | kalt |
| 1.02 | 01-2010 | Operating panel description | Updating variant -2xxx, without foil , product name changed | rb |
| 1.04 | 08-2010 | EG directives and standards, Declaration of conformity | updated to EN 61131-2:2007 | hasl |
| | 04-2011 | Several changes | Structure of document, classification Kemro | ekr |
| 1.06 | 10-2012 | several | Hint "not for end customers" added, various minor updates, new structure, accessoires updated | fstl, swb |


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# 1 Introduction

## 1.1 Purpose of the document

This document describes the structure, installation and connection of the operating panel OP 450-LD/A.

***Information***

*This manual is not adressed to end costumers! Necessary safety notes for the end costumer have to be taken into the costumer manual in the respective national language by the machine builders and system providers.*

## 1.2 Preconditions

This document contains information for following persons with corresponding preconditions:

| Target group | Prerequisite knowledge and ability |
|---|---|
| Project engineer | Technical basic education (advanced technical education, engineering degree or corresponding professional experience),<br>Knowledge about:<br>● the method of operation of a PLC,<br>● safety regulations,<br>● the application. |
| Start-up technician | Technical basic education (advanced technical education, engineering degree or corresponding professional experience),<br>Knowledge about:<br>● safety regulations,<br>● the method of operation of the machine or system,<br>● fundamental functions of the application,<br>● system analysis and troubleshooting,<br>● the setting options at the operating devices. |
| Service technician | Technical basic education (advanced technical education, engineering degree or corresponding professional experience),<br>Knowledge about:<br>● the method of operation of a PLC,<br>● safety regulations,<br>● the method of operation of the machine or system,<br>● diagnosis possibilities,<br>● systematic error analysis and troubleshooting |


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## 1.3 Intended use

The operating panel is designed for complex operating tasks in the industrial sector in conjunction with a control of the KeControl product family from the KEBA. The typical applications areas include injection molding machines, robots, presses, machine tools and similar.

The assembly must only be used for the above-mentioned applications and only in connection with recommended or approved third-party equipment.

The operating panel was developed, manufactured, tested and documented in accordance with the appropriate safety standards. Therefore, the products do not pose any danger to the health of persons or a risk of damage to other property or equipment under normal circumstances, provided that the instructions and safety precautions relating to the intended use are properly observed.

## 1.4 Notes on this document

This manual is integral part of the product. It is to be retained over the entire life cycle of the product and should be forwarded to any subsequent owners or users of the product.

***Information***

*This manual also applies to identically constructed and functional identically costumer variants of the OP 450-LD/A.*

*Because of the fact that costumer variants may differ in their appearance (e.g. with a different front cover) from the KEBA standard variant, the pictured devices used in this manual may differ in their appearance from the devices used by you.*

### 1.4.1 Contents of the document

- Device layout
- Mounting and installation
- Connection
- Configuration
- Operation
- Programming notes
- Disposal
- Technical data
- EC directives and standards

### 1.4.2 Not contained in this document

- Description of the mask creation
- Description of the KeView ViewStandard visualization system.


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- Key evaluations with functions from the IEC-library.

## 1.5 Documentation for further reading

| Doc.No. | Designation | Target group |
|---|---|---|
| DE: 1000725<br>EN: 1000726 | XE 040/A, XE 040/B<br>Input/Output module<br>Project engineering manual | Project engineer, start-up technician and service technician |

Moreover, the following documents are to be observed depending on the system solution used:

If you are using the KeStudio U2 tool suite:

| Doc.No. | Designation | Target group |
|---|---|---|
| DE: 65352<br>EN: 65353 | K2-200 automation system<br>System manual | Start-up technicians and service technicians may install and maintain a K2-200 system using these manuals. |

If you are using the KeStudio U3 tool suite:

| Doc.No. | Designation | Target group |
|---|---|---|
| DE: 1000868<br>EN: 1000869 | System manual Kemro automation system | Start-up technicians and service technicians may install and maintain a K2-200 system using these manuals. |


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# 2 Safety notes

## 2.1 Representation

At various points in this manual you will see notes and precautionary warnings regarding possible hazards. The symbols used have the following meaning:

**DANGER!**

- **indicates an imminently hazardous situation which will result in death or serious bodily injury if the corresponding precautions are not taken.**

**WARNING!**

- **indicates a potentially hazardous situation which can result in death or serious bodily injury if the corresponding precautions are not taken.**

**CAUTION!**

- **means that if the corresponding safety measures are not taken, a potentially hazardous situation can occur that may result in property injury or slight bodily injury.**

**CAUTION**

- **CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in damage to property.**

- **This symbol reminds you of the possible consequences of touching electrostatically sensitive components.**

***Information***

*Useful practical tips and information on the use of equipment are identified by the “Information” symbol. They do not contain any information that warns about potentially dangerous or harmful functions.*

## 2.2 General safety instructions

**WARNING!**

**The following areas of application for the operating panel are expressly forbidden:**

- **Use in areas where there is a risk of explosion or fire**
- **Use in the mining sector**
- **Use in the open air**


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**CAUTION**

- **The device is defined as "open type" equipment (UL 508) or as "offenes Betriebsmittel" (according to EN 61131-2) and must therefore be installed in a control cabinet or in a suitable housing. Therefor stick to the chapter "Mounting and installation instructions".**

**CAUTION**

**Destruction of the operating panel for improper handling!**

- **Install or remove the operating panel only while the power supply is switched off!**
- **The system manual is additionally required for programming of the module.**
- **Any manipulations to the operating panel will also result in loss of warranty.**

  **Exception:**

  **Excluded from this is maintenance work that is expressly allowed by KEBA.**
- **The keys of the OP 450-LD/A must not be operated with sharp-edged or peaked items (e.g. screwdriver) since this damages the keys.**

## 2.3 Safety instructions for personal safety

**WARNING!**

**Danger of personal injury due to electric shock!**

- **Supply the device exclusively from power sources that have a safety extra-low voltage or protective low voltage (e.g. SELV or PELV according to EN 61131-2).**
- **Connect only voltages and power circuits to connections, terminals and interfaces up to 50 V rated voltage that have a secure disconnect for hazardous voltages (e.g. with sufficient isolation).**

**WARNING!**

**The modules present on the operating panel are not designed for safety-relevant control tasks (e.g.: shutdown in case of an emergency). For safety-relevant control tasks and personnel security, additional external safety measures must be implemented to ensure the system remains in a safe operating condition even in the event of a fault. For further information, see EN ISO 13849-1.**

**CAUTION!**

**Fire hazard during module failure!**

- **Provide suitable fuses for the 24 V DC power supply of the operating panel for the final application. The max. permitted fuse is 10A.**


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# 3 Operating panel description

The operating panel is designed for operating and visualization tasks and for the operation on a KeControl PLC (CPU module).

The control can be connected to maximally one operating panel. The connection to the control occurs via the graphic interface (graphics) of the operating panel.

The operating panel consists of a housing with graphic display ready for installation, a front plate and has the following equipment:

**Key features**

- 10 membrane keys with LEDs (not the variant-2xxx, there are no membrane keys).
- 16 inputs (not EN 61131-2 conform), for the connection of external switching elements such as toggle switches etc.
- 22,5 mm opening for the installation of an operating or signaling element in the front plate
- Graphics interface (graphics) for the control with PL (Panel Link): Up to 30 m transmission range of the operating panel from the control.
- Display: 12,1" TFT, 256.000 colors
- Touchscreen

Additionally product variant OP 450-LD/A owns an integrated RFID-device (**R**adio **F**requency **ID**entification).

As visualization system, KeView ViewStandard is used, which is projected with the tool KeView ViewEdit. The visualization application is located centrally on the PLC.

## 3.1 Operating panel enhancements

The range of functions of an operating panel can be enhanced with the KEBA components listed below. Separate manuals are available for these components.

**Please observe the application area and the safety notes for these products in the separately available manuals.**

**Input/Output modules XE 040/A and XE 040/B**

These modules make additional digital inputs/outputs available (not according to EN 61131-2). The connection to an operating panel is via a serial RS-485-A interface (SI0).

| XE 040/A | XE 040/B |
|---|---|
| • 24 digital inputs<br>• 8 digital outputs | • 16 digital inputs<br>• 16 digital outputs |


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## 3.2 Front view

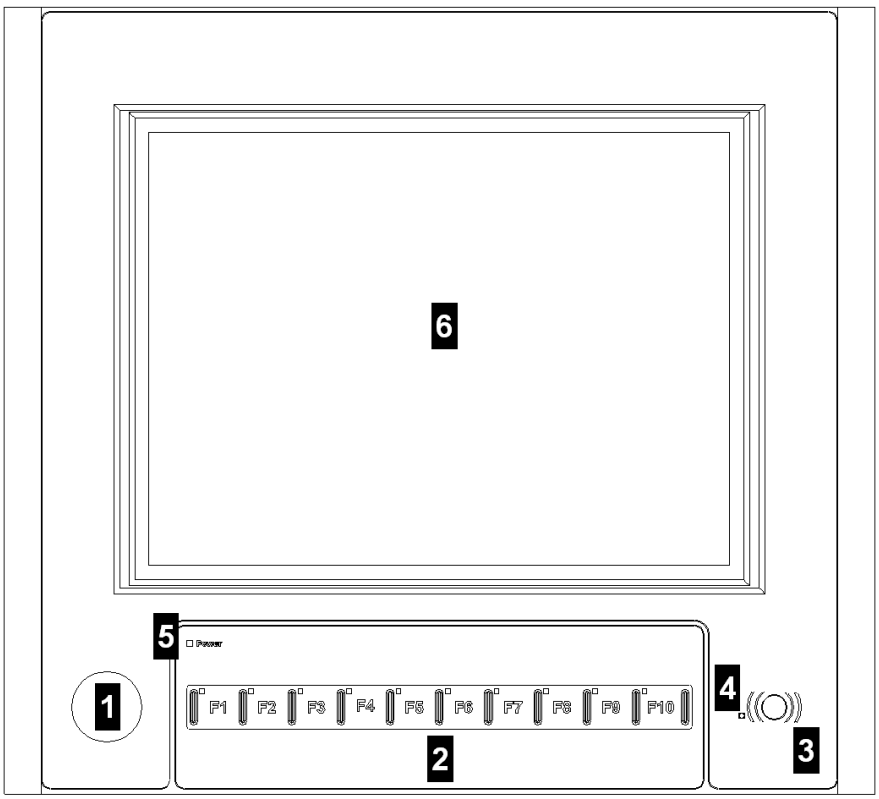


Fig.3-1: Device layout of the operating panel OP 450-LD/A

| | |
|---|---|
| 1 ... Opening for operating or signaling elements, can be provided with blank plugs. | 2 ... 10 membrane keys with tactile feedback |
| 3 ... RFID antenna (optional) | 4 ... RFID status LED (optional) |
| 5 ... Power-LED | 6 ... 12.1" TFT display (256,000 colors, SVGA, 800 x 600 pixel) with touch screen |


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## 3.3 Rear view

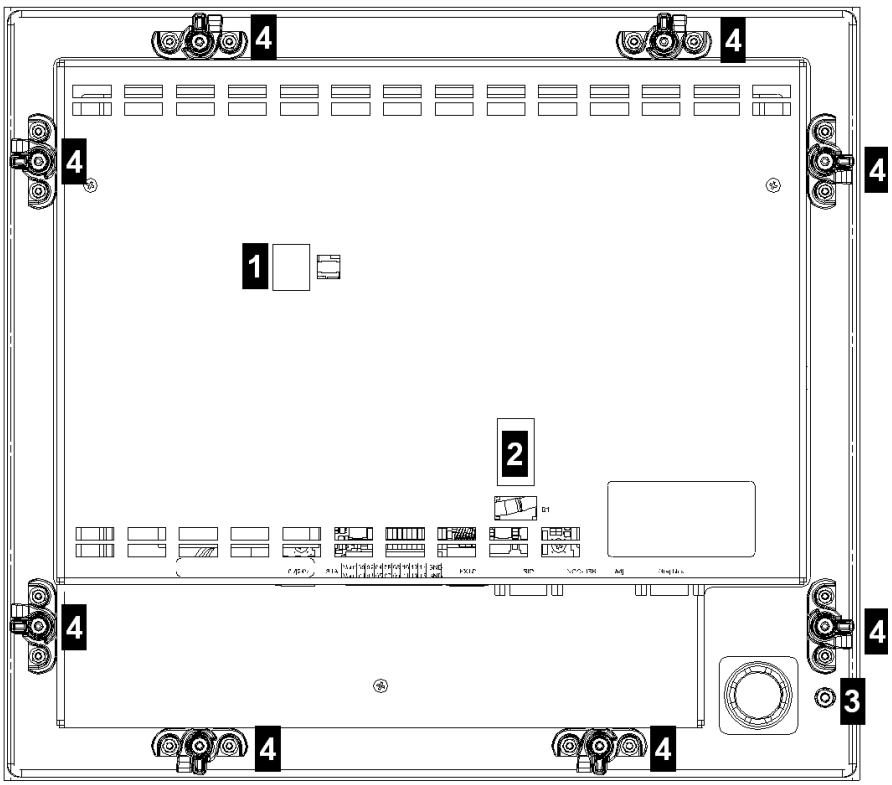


Fig.3-2: Device layout on the operating panel back side (shown without wiring)

| | |
|---|---|
| 1 ... Address switch for RFID module (optional) | 2 ... DIP switch for the address setting of the operating panel |
| 3 ... Ground bolt for protective earthing | 4 ... Locking units |


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## 3.4 Device dimensions

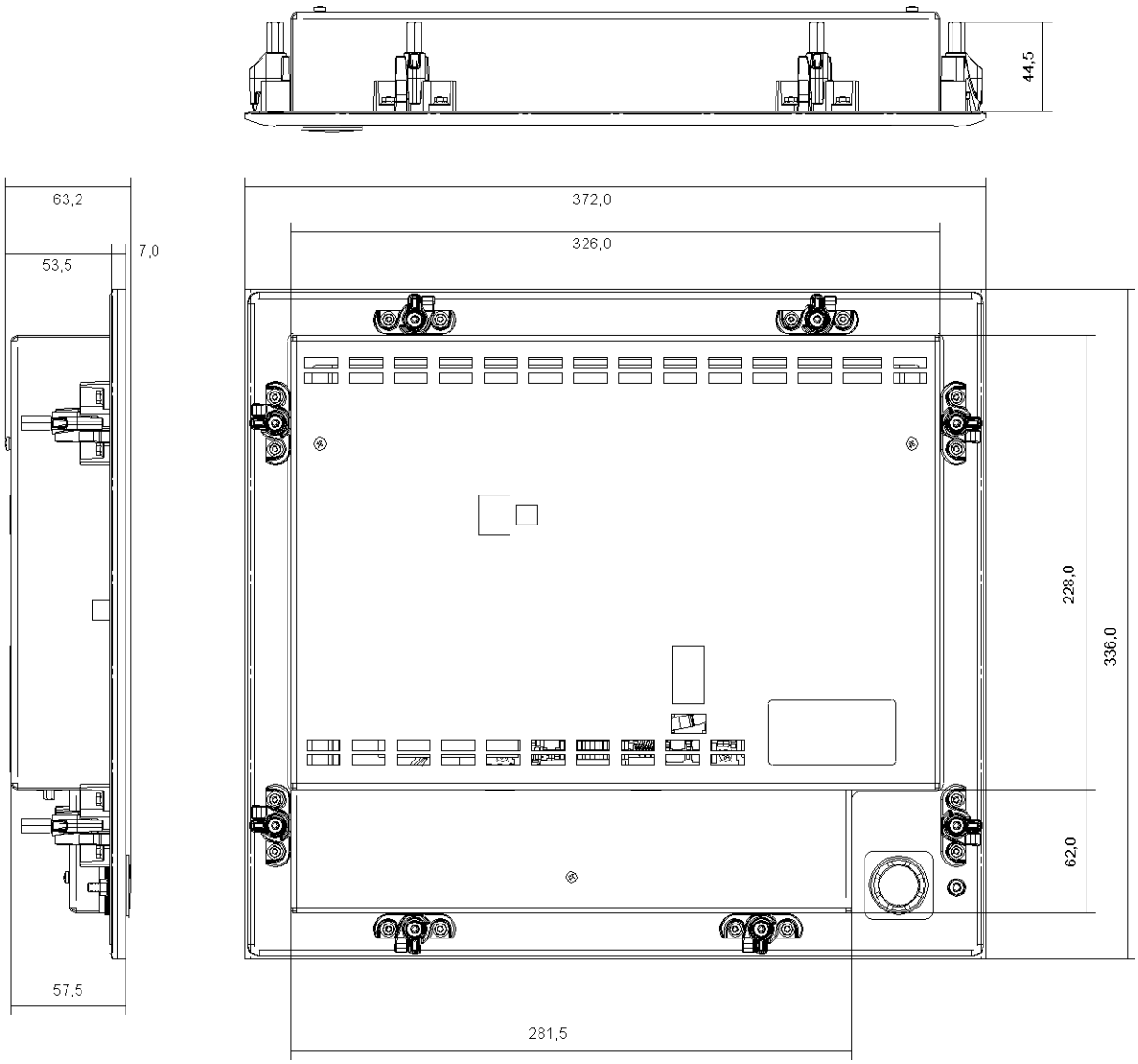


Fig.3-3: Dimensions of the operating panel OP 450-LD/A (specifications in mm)

## 3.5 Ordering information

### Ordering information legend

| Abbreviation | Significance |
|---|---|
| OP | Operating panel (**O**perating **P**anel) |
| CP | CPU module of the KeControl control |
| LVDS | **L**ow **V**oltage **D**ifferential **S**ignaling |
| PL | **P**anel **L**ink |


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### 3.5.1 Operating panel

| Description | Designation | Comment | Order number |
|---|---|---|---|
| Operating panel | OP 450-LD/A-0000 | - | 76949 |
| Operating panel | OP 450-LD/A-0010 | - | 77019 |
| Operating panel | OP 450-LD/A-2000 | variant without membrane keypad | 84387 |

### 3.5.2 Accessories

The following accessories are available for the operating panel.

#### Cables general

| Description | Designation | Comment | Order number |
|---|---|---|---|
| RS-485-A cable (for SI0) | XW 030-010 | 1 m | 65560 |
| RS-485-A cable (for SI0) | XW 030-050 | 5 m | 65157 |
| Connecting cable CP - OP (for graphics) | XW 041-040 | 4 m, not oil-resistant | 69182 |
| Connecting cable CP - OP (for graphics) | XW 041-050 | 5 m, not oil-resistant | 69189 |
| Connecting cable CP - OP (for graphics) | XW 041-070 *) | 7 m, not oil-resistant | 76487 |
| Connecting cable CP - OP (for graphics) | XW 041-100 *) | 10 m, not oil-resistant | 69220 |

*) For LVDS up to incl. display size 12.1"

#### Additional cable for PL

| Description | Designation | Comment | Order number |
|---|---|---|---|
| Connecting cable CP - OP (for graphics) | XW 041-150 | 15 m, not oil-resistant | 69221 |
| Connecting cable CP - OP (for graphics) | XW 041-200 | 20 m, not oil-resistant | 76963 |
| Connecting cable CP - OP (for graphics) | XW 041-250 *) | 25 m, not oil-resistant | 76962 |


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| Description | Designation | Comment | Order number |
|---|---|---|---|
| Connecting cable CP - OP (for graphics) | XW 041-300 *) | 30 m, not oil-resistant | 76946 |
| Connecting cable CP - OP (for graphics) | XW 041-500 *) | 50 m, not oil-resistant | 88206 |

*) Up to incl. display size 12.1"

***Information***

*If image interferences like incorrect colored lines occure while the panel is operating, the solid bond from the panel connector to the panel has to be enhanced. For this purpose the graphic cable´s braid has to be uncovered and connected to the panel case in an high-frequency, low impedance way.*

### Connector

| Description | Designation | Comment | Order number |
|---|---|---|---|
| Y-Adapter | XW 042-002 | For connection cable to CP 23x | 72080 |
| 20-pole female connector | - | For 16 inputs for the connection of external switching elements such as toggle switches etc. | 72262 |
| 2-pole plug | - | For OP power supply (0V \| 24V DC) | 67613 |
| Plug set XT 120/A | - | • 20-pole female connector and<br>• 2-pole plug | 72236 |

### Input / Output modules

| Description | Designation | Comment | Order number |
|---|---|---|---|
| Digital Input / Output module | XE 040/A | 24 digital inputs<br>8 digital outputs | 74156 |
| Digital Input / Output module | XE 040/B | 16 digital inputs<br>16 digital outputs | 75076 |

### Miscellaneous

| Description | Designation | Comment | Order number |
|---|---|---|---|
| RFID tag (card) | XC 140/A | - | 74665 |
| RFID key pendant | XC 240/A | - | 74710 |
| RFID wristband chip | XC 340/A | - | 74662 |


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| Description | Designation | Comment | Order number |
|---|---|---|---|
| Blank plugs | XA 010/A | - | 77105 |
| USB feedthrough | XE 015/C | cannot be ordered yet | 77097 |
| Locking unit | OP 4xx locking unit | - | 80116 |


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# 4 Displays and operating elements

## 4.1 Keypad and LED assignment

The following image shows the assignment of the KEY- and LED-Codes on the keypad. The KEY- and/or LED-Code is required to activate the keys and LEDs through the software.

***Information***

*The LEDs of the membrane keys blink as long as no connection between the operating panel and control was established.*

Variants of -2xxx are designed without membrane keypad. For these panel variants KEY- or LED-code are not required.

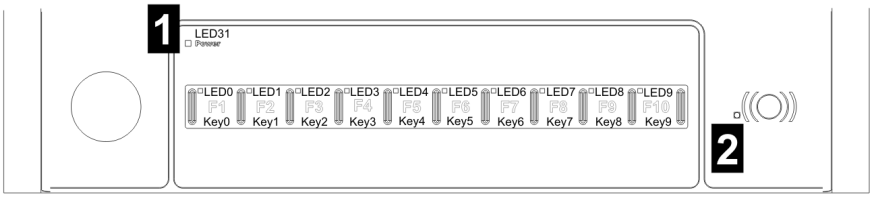


Fig.4-1: Button and LED codes of the operating panel

| | | |
|---|---|---|
| 1 | ... | Power-LED |
| 2 | ... | RFID status LED (optional) |

## 4.2 Power-LED

The green power LED is located on the front side of the operating panel. The activation of the power LED occurs via the firmware of the operating panel and is not parameterizable.

| Power LED, green | Significance | Cause of fault/Remedy |
|---|---|---|
| Off | Operating panel not ready for operation. | • Firmware not present or damaged → Perform firmware update<br>• Power supply not present → Check power supply. |
| Continuous light | Operating panel ready for operation → Connection to control ok and hardware started up. | - |
| flashing | Connection to the control failed. | Check connection to the control. |


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| Power LED, green | Significance | Cause of fault/Remedy |
|---|---|---|
| flashing slowly (2 s period duration) | Connection to the touch controller failed. | Internal error → Contact service technician |
| flashing quickly (1 s period duration) | Touch defect | Internal error → Contact service technician |

## 4.3 Status LED (operating panel back side)

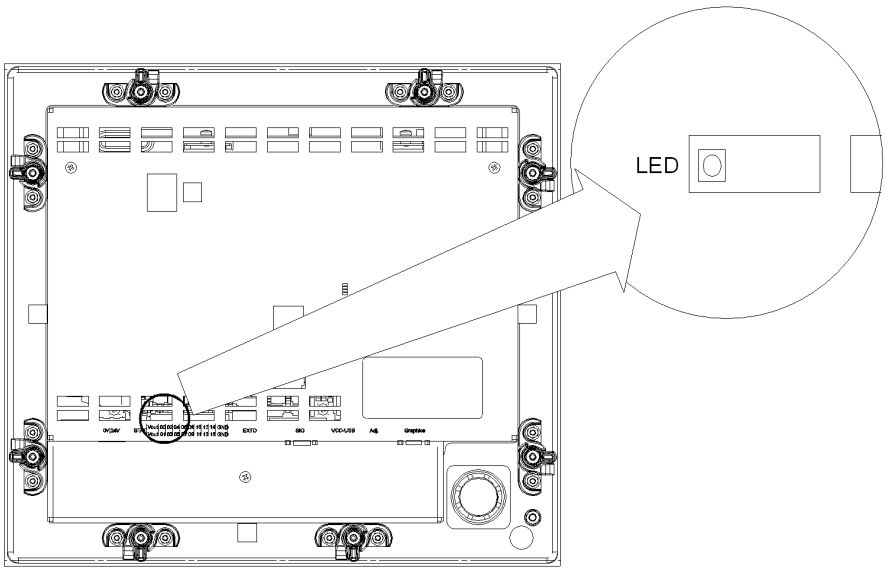


Fig.4-2: Status LED on the operating panel back side

There is a status LED in SMD design (surface-mounted device) on the main printed circuit board of the operating panel that is visible on the operating panel back side through a ventilation opening.

| Status LED | Significance | Cause of fault/Remedy |
|---|---|---|
| red, continuous light | Operating panel not ready for operation. | Firmware not present or damaged → Perform firmware update. |
| green, continuous light | Operating panel ready for operation → Connection to control ok and hardware started up. | - |
| orange, continuous light | Connection to the control failed. | Check connection to the control. |
| | Connection to the touch controller failed. | Internal error → Contact service technician. |
| orange, blinking | Touch defect | Internal error → Contact service technician. |

### Start-up behavior

When the power supply is connected, the status LED only lights up red briefly and then immediately switches over to continuous orange light. If, however, the orange continuous light stage is not reached, the firmware is not started


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up and there is thus a firmware error. After successful establishment of the connection, the status LED lights up green.

## 4.4 RFID status LED (only OP 450-LD/A-xx1x)

The RFID status LED is located on the front side of the operating panel and indicates the states of the RFID card detection:

| LED status | Meaning |
|---|---|
| red, slowly flashing<br>(3s period duration) | RFID card not recognized or not authorization.<br>Causes:<br>● RFID card is defective<br>● RFID card is not loaded with the correct data |
| green, slowly flashing<br>(3s period duration) | RFID card detected. |
| red, continious light | No firmware present, hardware does not start up.<br>Remedy:<br>● Contact manufacturer |
| orange, continiouse light | No connection to the control.<br>Remedy:<br>● Check the cabling |
| LED off | Connection ok. |

The RFID status LED signalizes the same states during startup as the status LED of the operating panel.

## 4.5 Touchscreen

An analog-resistive touchscreen is used which serves for the input and navigation in the visualisation system KeView ViewStandard.

### Operation

The touch screen may be operated with a finger (with or without glove) or a touch stylus. For long durability of the touch screen, the following points should be observed:


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**CAUTION**

**Damage to the touch screen for improper handling!**

- **Use only a soft cloth with mild detergent (e.g. soapsuds) to clean the touch screen. See *chapter 9.3 "Cleaning the touch screen" on page 49*.**
- **When operating with gloves, ensure that no metal filings or sharp objects (sand, grinding paste, etc.) are embedded in the surface of the glove.**
- **The touch screen may not be operated with sharp, metallic objects or with ball point pens or pencils.**
- **The touch screen my not be exposed to continuous direct sunlight.**

***Information***

*Light pillowing of the touch film can occur in rare instances. This is allowed and does not lead to any restriction of the functionality and service life.*

***Information***

*If there is a linebreak at touch detected, the touch input is deactivated and the cursor starts jumping between two fixed positions.*

*The product has to be send to KEBA for repair.*


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# 5 Mounting and installation instructions

## 5.1 General instructions

**CAUTION**

- **Damage to the operating panel when mounting to unsuitable mounting surface!**
- **For reasons of stability and also for tightness reasons, the back side of the device must be fitted to a completely closed bearing surface (door of switch cabinet).**
- **The operating panel and touch screen could be damaged if the mounting surface is not level (depending on the operating panel version). Therefore the mounting surface should neither be bent or warped.**
- **The mounting surface must have an evenness of ≤ 0.5 mm. This evenness must be given during operations, as well as during mounting and storage.**

## 5.2 Attachment of the patterned foil (only OP 450-LD/A-3xxx)

The operating panel variant OP 450-LD/A-3xxx is delivered without a keypad overlay. This allows the device design to be modified individually.

Designable Patterned foils can be purchased from KEBA. In case of using a different foil, KEBA does not assume warranty. The panel thereby loses its CE conformity and UL control mark.

For attaching the keypad overlay, consider the following mounting instructions.

### 5.2.1 Mounting instructions

***Information***

*All the pictures shown in this chapter are example graphics. The operating panel you use may differ in its appearance.*

**Workplace**

For affixing the overlay, an ESD-protected workplace according to IEC 61340-5-1:2007 (ESD-pad and ESD-wristband) must be used.

To avoid damage of the keyboard, the mounting must take place at a temperature of 23°C ± 2°C and relative humidity of 40% ± 20%.


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## Mounting of the patterned foil

### CAUTION

- **Touching the adherend per hand or with other objects results in damaging the keyboard!**
- **It is not possible to detract the keyboard overlay and fix it again.**

1) Detract the adhesive film and the protective foil from the keyboard (right to left) with a maximum speed of 10 mm/s.

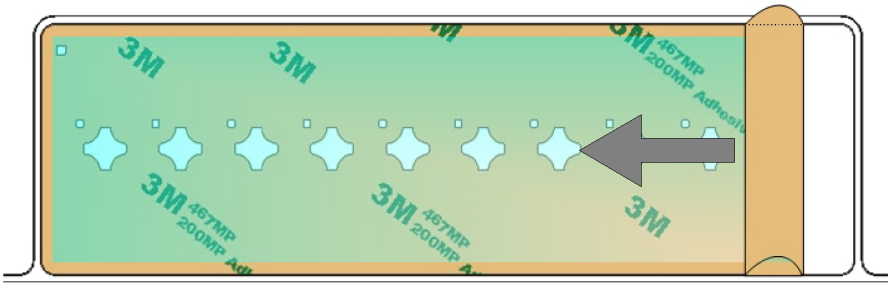


Fig.5-1: Step 1: Detracting the adhesive foil

2) The patterned foil has to be aligned to the keyboard. When aligning, the foil must rest against the aluminium bar.

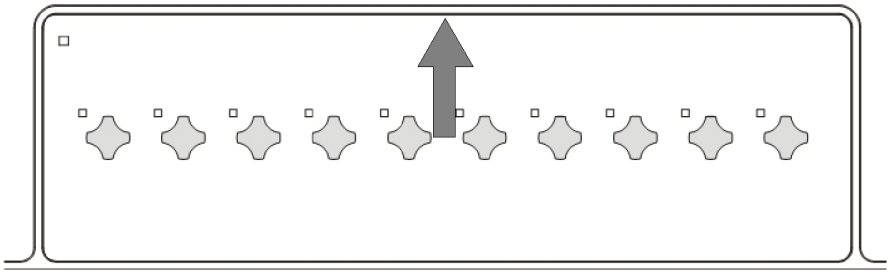

Fig.5-2: Step 2: Alignment of the patterned foil

3) To avoid blistering, the foil has to be impressed from the top to the bottom onto the adherend. Contemporaneously flatten the overlay.

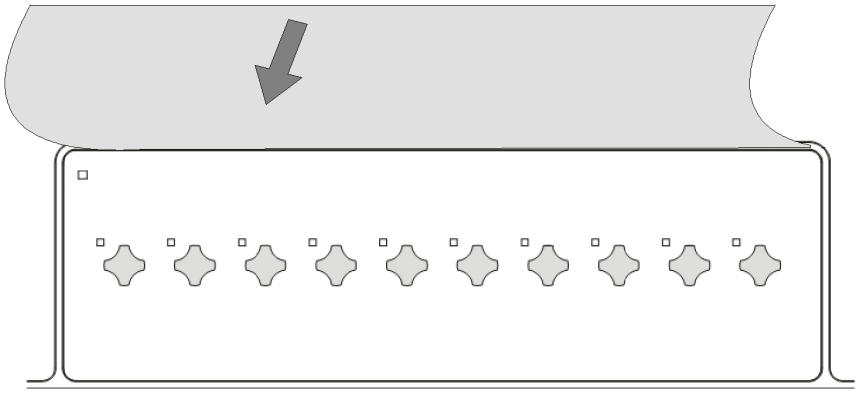

Fig.5-3: Schritt 3: Dekorfolie aufkleben


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4) After finishing the mounting a visual inspection and function check has to be done.

### 5.2.2 Faulty mounting

Inappropriate mounting of the patterned foil may result in restricting the functioning of the panel. Therefore return the panel to KEBA for reparation in case of faulty mounting.

***Information***

*KEBA assumes no liability for potential damage due to the adhesive bounding of the keypad overlay.*

**CAUTION**

- **In case of inappropriate adhesive bounding and the resultant damages the panel does not accord to the relevant norms and loses its CE conformity and UL control mark.**

## 5.3 Space requirements

### 5.3.1 Opening

**CAUTION**

**Damage due to instable mounting**

- **To guarantee a permanent, stable mounting of the operating panel, the material around the opening must be sufficiently stable (e.g. aluminium, steel) and have a material thickness of 2 mm to 6 mm.**

The following dimensions are recommended for the the opening of the operating panel:


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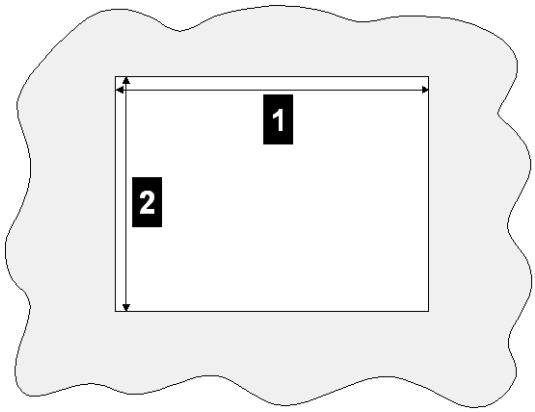


Fig.5-4: Opening

| | |
|---|---|
| 1 | ... Width: 360 mm |
| 2 | ... Height: 324 mm |

In each case, the tolerance is +/- 0.5 mm.

### 5.3.2 Required space

The following free spaces must be provided to ensure sufficient air circulation and to prevent contact with other objects:

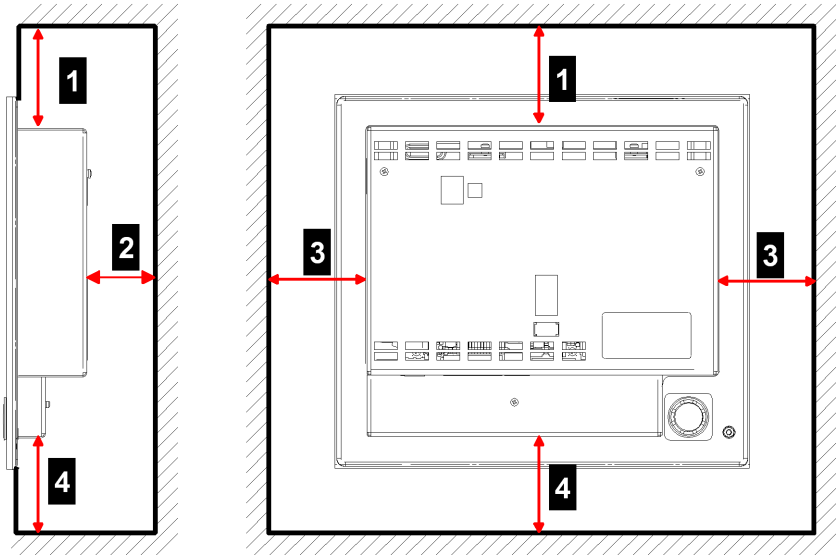


Fig.5-5: Required free spaces

| | | | |
|---|---|---|---|
| 1 | ... 50 mm | 2 | ... 30 mm |
| 3 | ... 50 mm | 4 | ... 50 mm |


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### 5.3.3 Maximum installation inclination

A vertical installation of the operating panel is recommended. The following maximum deviations are permitted:

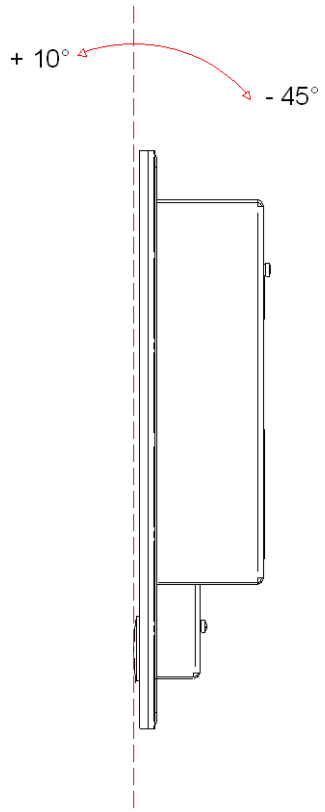


Fig.5-6: Maximum installation inclination

Consult with KEBA for any deviating installation positions.

***Information***

*The optimum image quality is achieved with a user viewing angle of 90° centred to the display surface.*

## 5.4 Preparation

- Getting the required tools ready (socket wrench size 7.0 mm).
- Making the opening (observe specified dimensions).

### 5.4.1 Sealing

To ensure protection type IP 65 (front-side), the operating panel must be installed on the mounting surface with an **evenness of ≤ 0,5 mm** .


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**CAUTION**

- **All unused openings on the operating panel must be covered by blank plugs intended for this purpose or by using suitable blink covers since tightness cannot otherwise be guaranteed.**
- **Before installing the operating panel, check the surrounding caulking strip for damage. Only with an undamaged caulking strip is the front-side protection class IP 65 ensured.**

## 5.5 Mounting the operating panel

**CAUTION!**

**Risk of injury when mounting the operating panel!**

- **When screwing on the operating panel, observe that it is well fastened and does not tilt forward out of the mounting opening.**

The operating panel is mounted as follows:

1) Unpack the operating panel.
2) Insert the operating panel into the opening.


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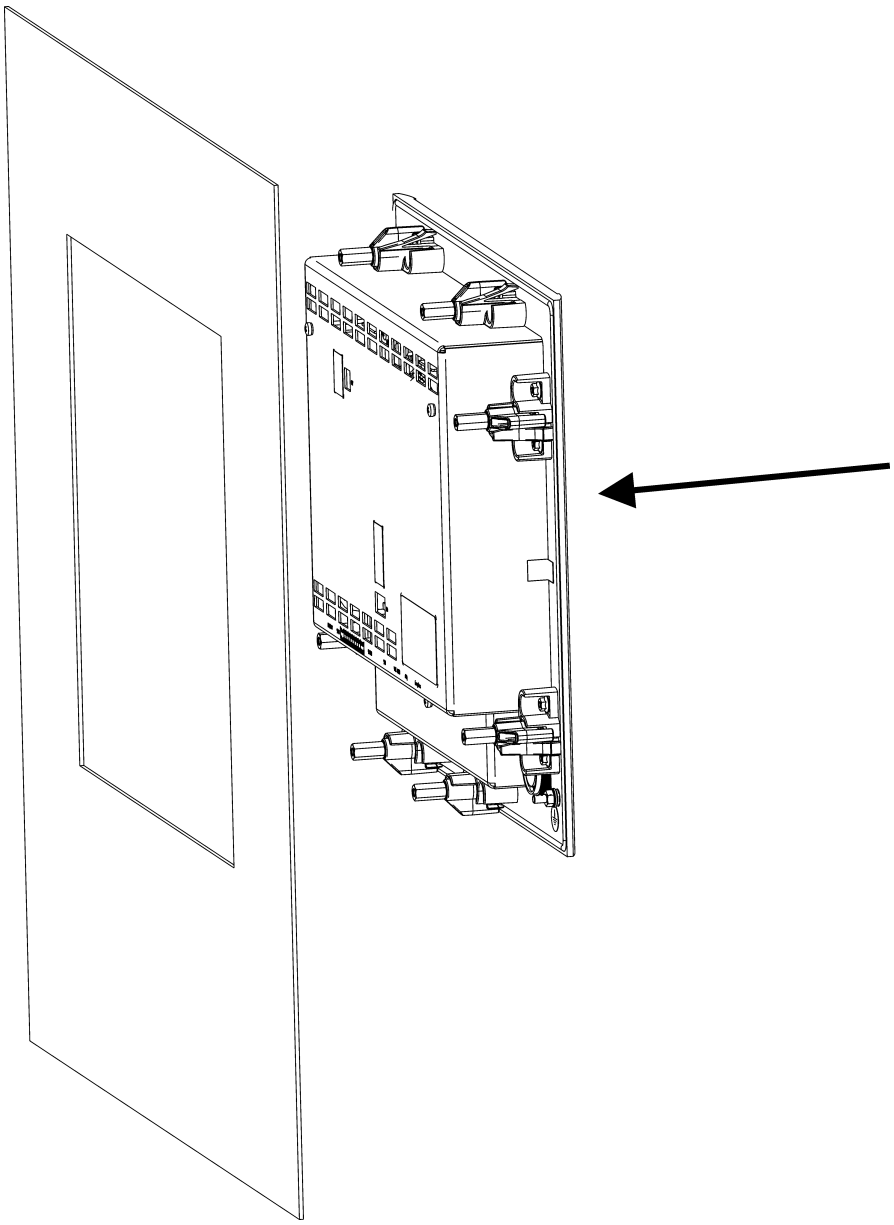

Fig.5-7: Inserting the operating panel

The operating panel is automatically held in place by the locking hooks.


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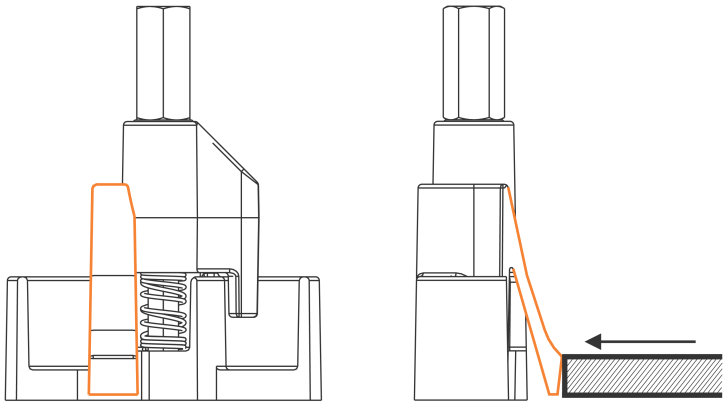

Fig.5-8: Locking hooks

3) Turn mounting clamp on the back side of the panel by 90°. To do this, first loosen the hexagon distins (M4x15) of the locking units.

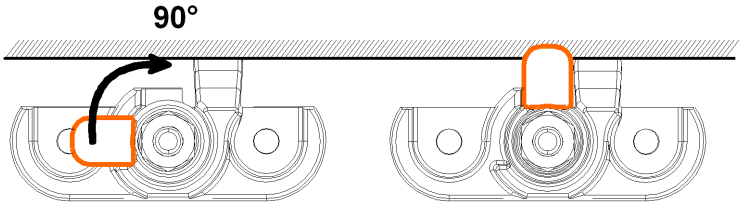


Fig.5-9: Mounting clamp

4) Fix locking units by tightening the hexagon distins (M4x15) using a socket wrench (size 7.0 mm) at the back side of the panel.

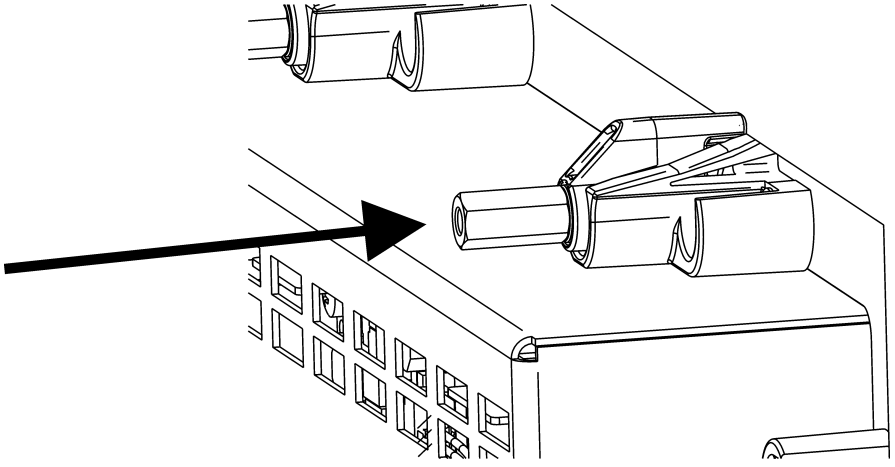

Fig.5-10: Hexagon distins

## CAUTION

**Damage to the locking units for improper mounting**

- **The hexagon distins may be fixed with a maximum torque of 2 Nm .**


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## 5.6 Removing the operating panel

1) Disable the power supply.
2) Remove all electrical plugs from the operating panel.
3) Disconnect the ground cable from the ground bolt.
4) Loosen the locking units by loosening the hexagon distins.
5) Press locking hooks and slide operating panel forwards.

The operating panel can now be slid out from the back side through the opening.

***Information***

*Two persons are necessary for removing the operating panel since the operating panel is slid out from the back side and removed from the front side.*

**CAUTION**

**Damage of the operating panel for improper handling!**

- **Do not use pointed objects or other tools to loosen the operating panel from the front side of the opening.**

## 5.7 Air conditioning, ventilation

The operating panel has ventilation slots for heat dissipation. If the permissible ambient temperature is not exceeded, no external fan will be needed. Make sure that the ventilation holes are not covered.

**CAUTION**

**High ambient temperature can destroy the operating panel!**

- **The temperature inside the control cabinet may not be higher than the maximum permitted operating temperature of the operating panel. Please refer to the technical data for this. If this cannot be guaranteed through natural heat dissipation, an air conditioning of the control cabinet must be provided.**

### 5.7.1 Use of air filters

***Information***

*The operating panel must be installed in an appropriate housing to guarantee that no degree of soiling greater than 2 according to EN 61131-2 occurs.*

It is recommended to install the module in a dustproof, closed control cabinet. Fan openings of the control cabinet must be equipped with air filters. The filter


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elements must be cleaned or replaced regularly (see *chapter 5.3.2 "Required space" on page 28*).


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# 6 Connections and wiring

## 6.1 Pin assignment

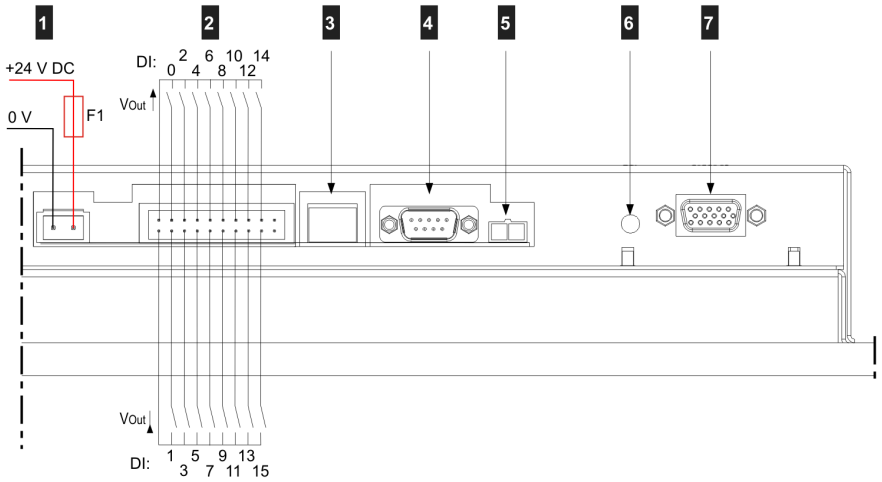


Fig.6-1: Pin assignment and pin position

| | |
|---|---|
| 1 ... 0V \| 24 V: Power supply operating panel (24 V DC, 2-pole) | 2 ... Digital inputs (16), for the connection of external switching elements such as toggle switches etc. |
| 3 ... EXT0: External interface for the connection of an RFID module is not used, when an RFID module is installed. | 4 ... SI0: RS-485-A interface |
| 5 ... VCC_USB: USB module supply +12V DC *) | 6 ... Adj.: Adjust equalizer (setting for transmission range), only for operating panels with PL. |
| 7 ... Graphics: Graphics interface for the control | |

*) Exclusively for KEBA USB modules.

## 6.2 Power supply operating panel (0V | 24V)

The operating panel is supplied by 24 V DC.

**WARNING!**

**Please observe the safety-relevant information in the *chapter 2.3 "Safety instructions for personal safety" on page 13*.**


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### 6.2.1 Connection diagram

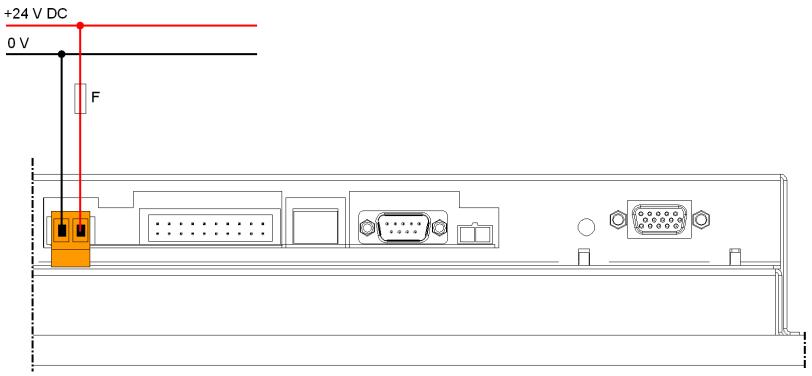


Fig.6-2: 24 V DC connection diagram

### 6.2.2 Plug specification

Connection terminals: 2-pin male connectors (Weidmüller SL-SMT 5.08). The necessary female connectors are not included in the scope of delivery of KEBA.

Cross section according to manufacturer specifications:

| Connectable conductor | Cross-section |
|---|---|
| Clamping range min. | 0.13 mm² |
| Clamping range max. | 3.31 mm² |
| AWG, min. | 26 |
| AWG, max. | 12 |
| single-wire, min. H05(07) V-U | 0.2 mm² |
| single-wire, max. H05(07) V-U | 2.5 mm² |
| finely-stranded, min. H05(07) V-K | 0.2 mm² |
| finely-stranded, max. H05(07) V-U | 2.5 mm² |
| with wire sleeves according to DIN 46 228/1. min. | 0.2 mm² |
| with wire sleeves according to DIN 46 228/1. max. | 2.5 mm² |
| with AEH with collar DIN 46 228/4 min. | 0.2 mm² |
| with AEH with collar DIN 46 228/4 max. | 2.5 mm² |

Ordering data, see chapter "Ordering information".

### 6.2.3 Cable specification

Cable type: Unshielded cable


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### Cross-section

The actual permissible wire cross-section is specified by the electrical conditions of the connected equipment an the female connectors used:

- Max. load current and required heat dissipation through the connected wire at maximum ambient temperature.
- Permissible voltage drop for error-free operation of the connected equipment.

## 6.3 Protective earthing

If required for reasons of electrical safety for the end usage, the metal parts of the operating panel must be grounded via the grounding bolt (M4) that is located on the operating panel back side (yellow grounding point).

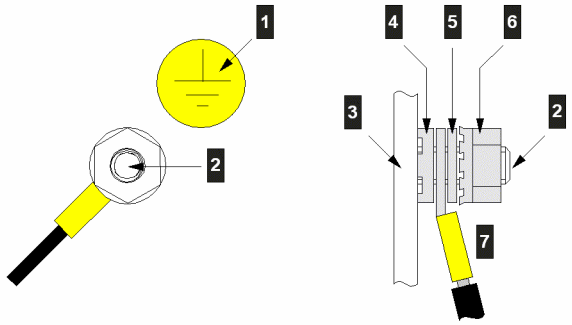


Fig.6-3: Ground bolt on the operating panel back side

| | |
|---|---|
| 1 ... Yellow grounding point (adhesive label) | 2 ... Ground bolt |
| 3 ... Front panel | 4 ... Grounding washer |
| 5 ... Washer | 6 ... Hexagon nut with toothed washer |
| 7 ... Cable lug with protective ground cable | |

**CAUTION**

**Damage for improper handling!**

- **The hexagon nut with toothed washer may be tightened with a maximum torque of 2 Nm.**
- **The ground bolt may not be subjected to pressure or tensile load.**

### Material

Ground bolt: Stainless steel 18/8 (AISI 300) passivated.

## 6.4 Digital inputs

The operating panel offers a 20-pole plug bar block e.g. for connection of 16 external toggle switches.


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***Information***

*These digital inputs are not EN 61131-2 conforming and may not be utilized for machine/system functions that require the EN EN 61131-2 conforming digital inputs. For such cases, use the conforming digital inputs of the control.*

***Information***

*For the selection of the switching elements, the chapter 11 "Technical data" on page 51 specifications in section "digital inputs" are to be taken into account.*

**WARNING!**

**The digital inputs are not designed for safety-relevant control tasks (e.g. shut-down in emergency). For safety-relevant control tasks or for personnel security, additional external safety measures must be realized to ensure the system remains in a safe operating condition even in the event of a fault. For additional information, please see *chapter 2.3 "Safety instructions for personal safety" on page 13*.**

The digital inputs may only be used for the integration of switches and buttons or switching elements exclusively. The connection of sensors and other equipment is not allowed.

The nominal voltage of the switch element must amount to 24 V DC. 5 mA is typically applied by the switching element for closed contact. This is to be taken into account for the selection of the switching element (e.g. minimal required current for elements with silver contacts).

The digital inputs may only be supplied with the intended power supply on the operating panel of 24 V DC "$V_{Out}$", an external supply of the digital inputs is not allowed.

### 6.4.1 Plug specification

Connection terminals: 20-pole male connector (Weidmüller SL-SMT 5.08). The necessary female connectors are not included in the scope of delivery of KEBA.

Cross section according to manufacturer specifications:

| Connectable conductor | Cross-section |
|---|---|
| Clamping range min. | 0.08 mm² |
| Clamping range max. | 1 mm² |
| AWG, min. | 28 |
| AWG, max. | 18 |
| single-wire, min. H05(07) V-U | 0.2 mm² |
| single-wire, max. H05(07) V-U | 1 mm² |
| finely-stranded, min. H05(07) V-K | 0.2 mm² |


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| Connectable conductor | Cross-section |
|---|---|
| finely-stranded, max. H05(07) V-U | 1 mm² |
| with wire sleeves according to DIN 46 228/1, min. | 0.13 mm² |
| with wire sleeves according to DIN 46 228/1, max. | 0.34 mm² |
| with AEH with collar DIN 46 228/4, min. | 0.13 mm² |
| with AEH with collar DIN 46 228/4, max. | 0.34 mm² |

### 6.4.2 Cable specification

Cable type: Unshielded cable

#### Cross-section

The actual permissible wire cross-section is specified by the electrical conditions of the connected equipment an the female connectors used:

- Max. load current and required heat dissipation through the connected wire at maximum ambient temperature.
- Permissible voltage drop for error-free operation of the connected equipment.

## 6.5 RS-485-A interface (SI0)

When using a CPU module as RS-485-A master, the SI0 interface for the connection for max. 3 RS-485-A slave participants, such as Input/Output module (XE 040/x) or keypad module (OI 4xx) etc. can be used. For multiple bus participants, the bus terminating resistor for the last participant must be activated.

The activation of the but terminating resistor is done using DIP switch or termination bracket.

#### But termination via DIP switch

If the operating panel is the last participant, the bus terminating resistor for the RS-485-A interface is to be activated. To do this, the DIP switch is set to ON or the termination bracket is to be realized (see *chapter 6.5.1 "Cable specification" on page 40*).

#### Addressing

An addressing occurs via the DIP switches 1 and 2 on the back side of the operating panel. The operating panel used the address 0x10h in the delivery state. Other devices connected to this interface cannot be operated with this address.

#### Connection example for the addressing and bus termination

In the following connection example, the input/output module XE 040/x is the last bus participant and must be configured with an active terminating resistor.


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In this case, the terminating resistor of the operating panel must be deactivated since it is not the last participant (DIP switch 6=OFF).

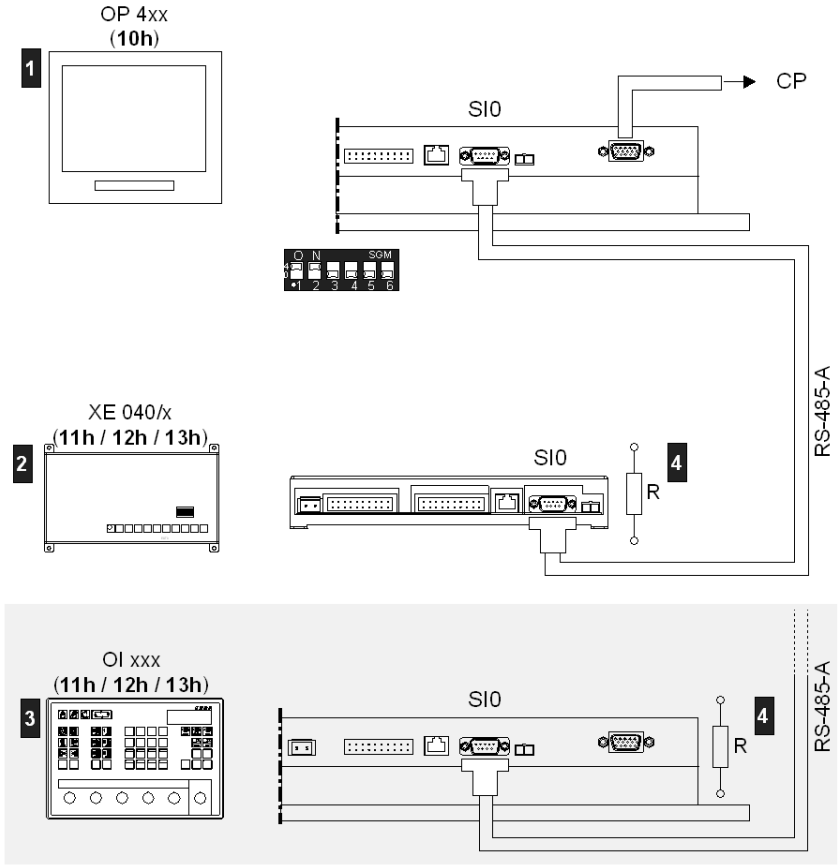


Fig.6-4: Connection example for the RS-485-A interface

| | |
|---|---|
| 1 ... Operating panel OP 4xx, schematic representation (address: 10h) | 2 ... Input/Output module XE 040/x (address: 11h, 12h or 13h) |
| 3 ... Instead of the XE 040/x, a keypad module OI xxx is also possible (address: as with XE 040/x) | 4 ... Terminating resistor |

### 6.5.1 Cable specification

Cable type: shielded, twisted pair data cables with a characteristic impedance of 100 - 120 Ω. The connector casing must be completely conductive. The cable shielding must connect surface-to-surface with the shield cover of the plug.


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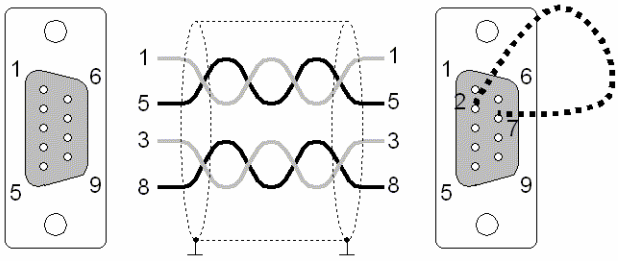


Fig.6-5: PIN assignment (on the cable both sides 9-pole DSUB female connector)

| PIN no. | Signal designation |
|---|---|
| 1 | GND |
| 2 | Termination bracket (bus termination on the device) |
| 3 | RS485_B |
| 4 | n.c. |
| 5 | GND |
| 6 | n.c. |
| 7 | Termination bracket |
| 8 | RS485_A |
| 9 | n.c. |

For further information (wiring guidelines) please refer to the System manual -> Connections and wiring -> Interfaces -> RS-485/422.

**Bus termination using termination bracket**

Alternatively to the DIP switch, the bus termination of the RS-485-A interface can also occur by soldering up a termination bracket. The bracket is to be soldered on the connector of the last bust participant between pins 2 and 7.

## 6.6 Adjust equalizer (Adj.)

The adjust equalizer is a rotary switch for the display adjustment for operating panels with PL (Panel Link) versions. Operating panels with LVDS versions are not equipped with this.

If the image display is not sharp at longer cable lengths, the adjust equalizer can be used to adjust the signal for improving the image signal.

## 6.7 Graphic interface (Graphics)

The graphic interface Graphics (15-pole DSUB female connector) is used to connect the operating panel via a connection cable XW 041-xxx to the control.


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### 6.7.1 Cable specification

Only cables from KEBA are to be used.

Connecting cable, type: XW 041-xxx (graphic/RS-485-A cable).

Ordering data, see chapter "Ordering information".

**Maximum cable lengths**

| Operating panel | Graphic interface (Graphics) | Length (resolution) |
|---|---|---|
| OP 450-LD/A | PL | 30 m (SVGA, 800 x 600) |

## 6.8 Connection example (CP - OP)

The operating panel can be connected to all CP modules that have a DVI connection ("PANEL / SI0").

A 15-pole DSUB cable is used (XW 041-xxx) is used as connecting cable.

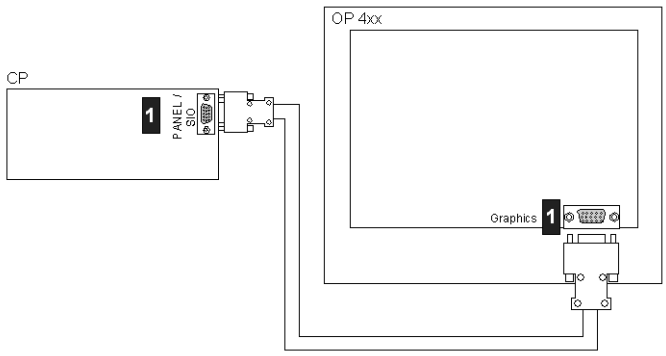


Fig.6-6: Operating panel OP 4xx with CP

1 ... 15-pole DSUB female connector

***Information***

*Only cables recommended by KEBA may be used! These cables are available in different lengths (order numbers, see chapter "Ordering information" on page 17).*


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# 7 Configuration

## 7.1 Address setting for the operating panel

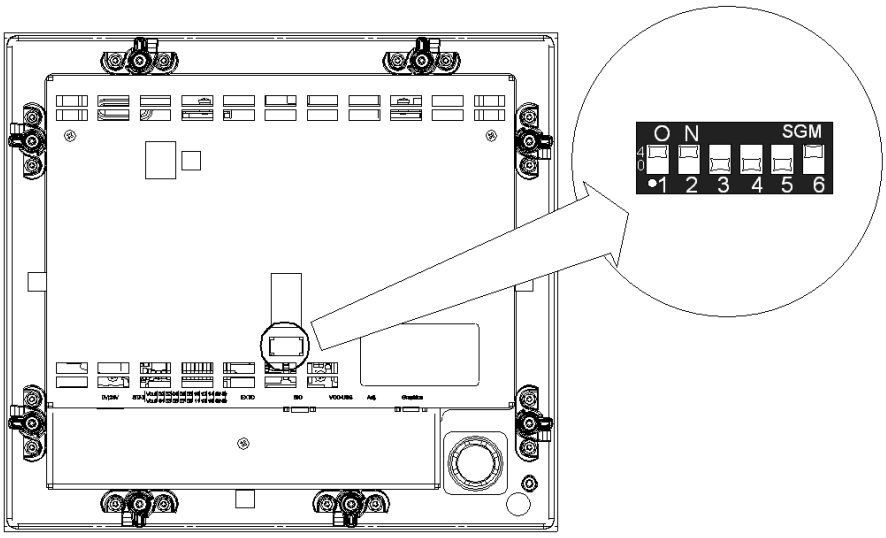


Fig.7-1: Position and setting of the DIP switch on delivery (schematic representation)

The following table shows the possible settings of the DIP switch located on the back side of the operating panel. The DIP switch setting printed in bold depict the delivery state.

| DIP-Switch | Function |
|---|---|
| 1=OFF, 2=OFF | 13h |
| 1=OFF, 2=ON | 12h |
| 1=ON, 2=OFF | 11h |
| **1=ON, 2=ON** | **10h** |
| 3-5 | no meaning |
| **6=ON** | Terminating resistor for RS-485-A interface **running** |


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## 7.2 Address setting for the operating panel

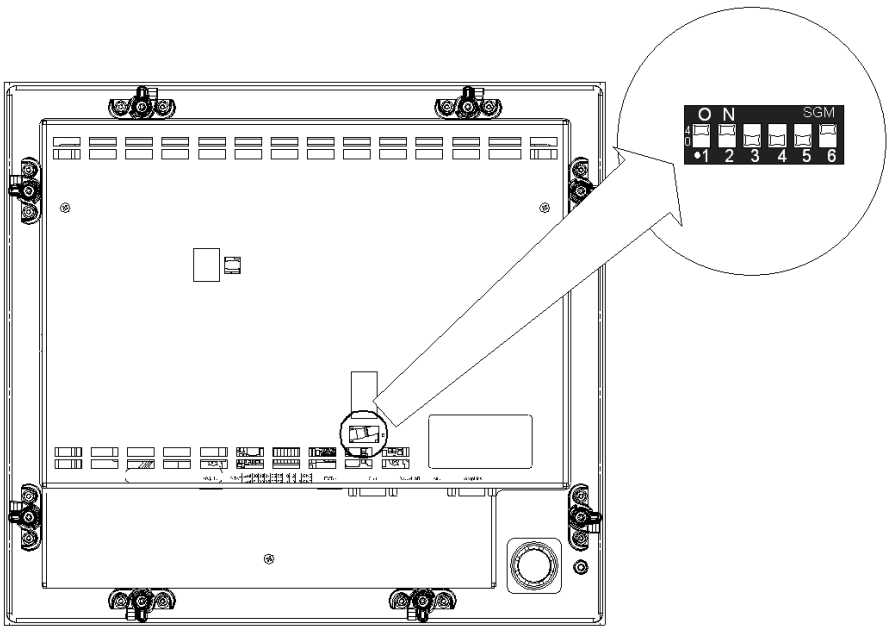


Fig.7-2: Position and setting of the DIP switch on delivery (schematic representation)

The following table shows the possible settings of the DIP switch located on the back side of the operating panel. The DIP switch setting printed in bold depict the delivery state.

| DIP-Switch | Function |
|---|---|
| 1=OFF, 2=OFF | 13h |
| 1=OFF, 2=ON | 12h |
| 1=ON, 2=OFF | 11h |
| **1=ON, 2=ON** | **10h** |
| 3-5 | no meaning |
| **6=ON** | Terminating resistor for RS-485-A interface **running** |

## 7.3 Address setting of the RFID unit (only OP 450-LD/A-xx1x)

If multiple RFID units are present on in the complete system, a HW addressing using DIP switch is required. The DIP switch for this is located on the back side of the panel. A maximum of 4 addresses can be set (delivery state: 14h).


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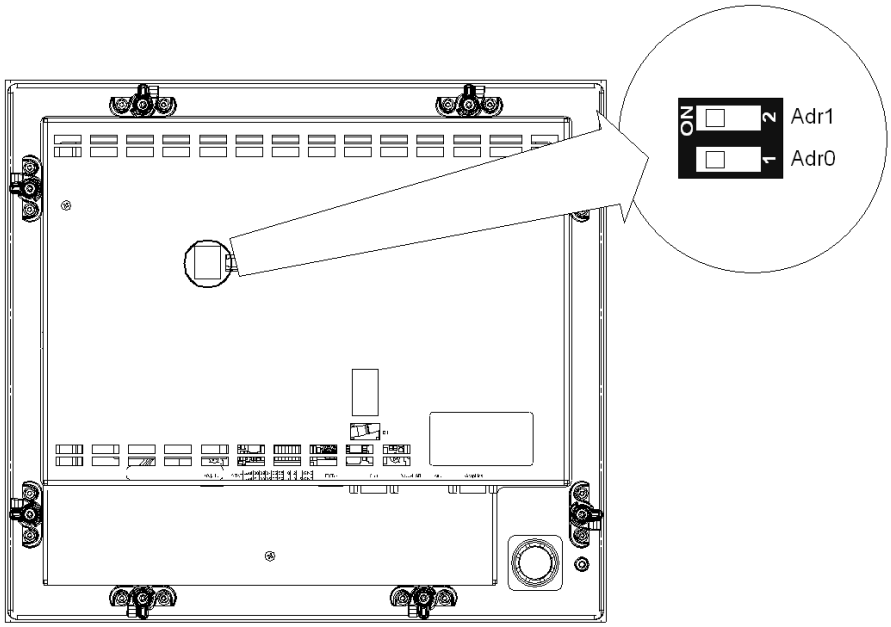


Fig.7-3: Address setting RFID unit (schematic diagram)

### DIP switch address setting

| Adr0 | Adr1 | Address |
|---|---|---|
| 0 | 0 | 17h |
| 0 | 1 | 16h |
| 1 | 0 | 15h |
| **1** | **1** | **14h** |


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# 8 Operation and handling

## 8.1 Removing the display protective film

1) Loosen the protective film from the display at a corner.

Fig.8-1: Detailed diagram 1: Remove the protective film

2) Pull off the film at an angle of approx. 180° (see following image).

Fig.8-2: Detailed diagram 2: Remove the protective film

***Information***

*On operating panels with touch screen, the protective film may not be pulled off upwards at an angle of 90° because this will lead to an unallowed mechanical loading and possible damage of the touch screen.*

*After the protective film has been pulled off, it should not be applied again to the display since it can no longer adhere evenly.*

## 8.2 RFID unit (only OP 450-LD/A-xx1x)

The RFID unit is used for contact-free login and logout of a user via RFID card and is utilized for the user identification. This replaces the login of a user via the input of a username and password.


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### 8.2.1 Functionality

For identification, the user of an RFID card needs to come near the area of the RFID antenna on the front side of the operating panel with their RFID card. If the RFID card of the user is detected, the LED on the front side lights up green.

The data recorded by the RFID unit can be processed for the user administration in the KeView ViewStandard visualisation system.

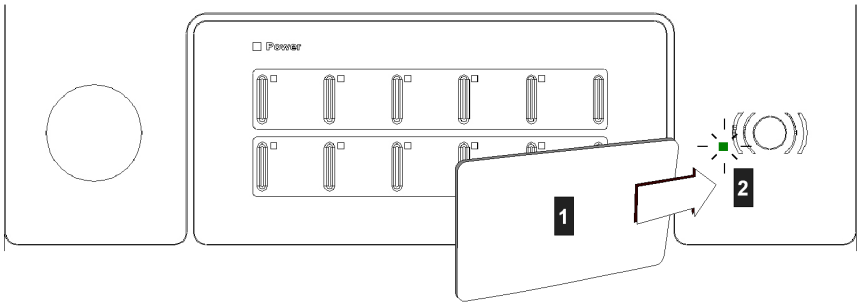


Fig.8-3: Touchless identification of a user with RFID card

| | |
|---|---|
| 1 | ... RFID card |
| 2 | ... RFID status LED |

**CAUTION**

**Instructions for proper handling of RFID cards:**

- **It is not allowed to kink the RFID cards.**
- **It is not allowed to make a hole into the RFID card.**
- **The cards get defect in case of a tear.**

**In case of improper handling, the RFID cards lose their function.**

### 8.2.2 Range and detection

The range between RFID card and RFID antenna amounts to the range with the RFID card XC 140/A available from KEBA typical 40 mm.

A detection of the card is indicated by the RFID status LED lighting up green (for 3 sec.) on the front side of the operating panel.

The simultaneous detection of multiple RFID cards is not provided. If multiple RFID cards are in the detection range at the same time, only one of the cards is detected or a faulty detection occurs which leads to the RFID status LED lighting up red.

## 8.3 Software

The operating panel is used as a display and/or input medium. The visualisation runs centrally on the control.


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The KeView ViewStandard visualisation system is used. For the visualization application the tool [Konnte nicht in genstrings finden: key: ViewEdit sprache: en] can be used.


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# 9 Maintenance

The device will not trigger any error messages. Faulty devices must be exchanged and shipped to KEBA for repair.

## 9.1 Firmware update

New firmware versions are installed via firmware update of the control. See system manual.

## 9.2 Packaging, shipment

The device is wrapped into protective packaging material for shipment. For reasons of environmental protection KEBA appreciates receiving the original packaging material for multiple use.

The protective packaging does not qualify as adequate transport packaging and hence is not suited for transportation via carrier haulage or airplane. Appropriate transportation packaging is required for these types of shipment.

## 9.3 Cleaning the touch screen

The surface should be cleaned with a moist, clean, soft cloth and glass cleaner. The glass cleaner should be sprayed onto the cloth and not directly onto the surface.

The surface coating of the touch screen is resistant to the following solvents:

**Solvent**

| | | |
|---|---|---|
| Heptan | Alcohol | Toluene |
| Acetone | Methyl ethyl ketone | Unleaded gasoline |
| Hydrochloric acid | Turpentine | Gear oil |
| Oil SAE | Diesel | |
| Antifreeze | Isopropanol | |

**Exception**

40 percent sodium hydroxide causes slight white discolorations.


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# 10 Disposal

## 10.1 Disposal of the module

**CAUTION**

**Please observe the regulations regarding disposal of electric appliances and electronic devices!**

- The symbol with the crossed-out waste container means that electrical and electronic devices including their accessories must not be disposed of in the household garbage.
- The materials are recyclable in accordance with their labeling. You can make an important contribution to protecting our environment by reusing, renewing and recycling materials and old appliances.


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# 11 Technical data

## 11.1 In general

| | |
|---|---|
| Nominal supply voltage: | 24 V DC (voltage limits according to EN 61131-2) |
| Max. switch-on current: | 10 A |
| Maximum power consumption (without / with RFID): | 29 W / 30 W |
| Power consumption own consumption (without / with RFID): | 12 W / 13 W |
| Max. power consumption (digital inputs): | 3 W at 24 V DC (optional) |
| Max. power consumption (USB module): | 14 W at 12 V DC (optional) |
| Display: | 12.1“ TFT color, 256,000 colors, 800 x 600 pixel (SVGA) |
| Touchscreen: | Yes, analog resistive |
| Membrane keypad: | 10 membrane keys with tactile feedback and LED (not available for variant--2xxx) |
| Status display: | 1 Power-LED |
| Equipment class: | III (according to EN 61131-2) |
| Protection class: | Front side: IP 65 (if installed correctly)<br>Back side: IP 20 |
| Programming language: | KeView ViewStandard |

## 11.2 Environmental conditions

| | |
|---|---|
| Operating temperature: | +5 °C to +55 °C |
| Storage temperature: | -30 °C to +70 °C |
| Relative humidity of air: | 5 % to 95 % (non condensing) |
| Vibration resistance: | According to EN 61131-2 |
| Shock resistance: | According to EN 61131-2 |

## 11.3 Digital inputs

| | |
|---|---|
| Number: | 16 (DI0-DI15) (not EN 61131-2 compliant) |
| Rated voltage: | 24 V DC |
| Applied contact current: | 5 mA (supply exclusively by Vout) |
| Galvanic isolation: | No |
| Status display: | None |
| Min. update cycle: | 60 ms |


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## 11.4 Interfaces

| | |
|---|---|
| Serial interface: | 1 |
| • Type: | RS-485-A |
| • Data transmission rate: | 115 kbit/s |
| Graphic interface: | 1 |
| • Type: | PL (**P**anel **L**ink) |
| • Transmission range of the operating panel from the control: | up to 30 m |

## 11.5 Option RFID unit (OP 450-LD/A-xx1x)

### 11.5.1 In general

| | |
|---|---|
| Nominal supply voltage: | 12 V DC |
| Maximum power consumption: | 1 W (power made available by OP 3xx) |
| Power consumption own consumption: | 1 W |
| Power output: | None |
| Reading range: | 40 mm from front plate |
| Antenna installation: | Fixed installation in the front plate |
| Communication protocol: | According to ISO 15693 or ISO 18000-3, Euromap 65 suitable |
| Protection class evaluation unit: | IP 20 |
| Signaling: | Status LED on the is antenna print, can be read off the front plate of the operating panel. |

### 11.5.2 RF signal

| | |
|---|---|
| Frequency: | 13.56 MHz |
| Transmission power: | 200 mW (max. 250 mW) |
| Scanning rate: | Configurable (Standard: 10 scans / second) |

### 11.5.3 Interfaces

| | |
|---|---|
| Serial interface: | |
| • Type: | RS-485-A |
| • Baud rate: | 115 kbit/s |

## 11.6 Mechanical properties

| | |
|---|---|
| Height: | 336 mm |
| Width: | 372 mm |
| Depth: | 63,2 mm |
| Weight (without / with RFID): | 4,02 kg / 4,06 kg |
| Housing: | Metal |


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| | |
|---|---|
| Front plate: | Aluminium |
| Decor film: | Polyester |
| Seal: | circumferential round cord |


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# 12 EC directives and standards

## 12.1 EC directives

| | |
|---|---|
| Guideline 2004/108/EG | EU guideline on electromagnetic compatibility |
| Guideline 2011/65/EU | RoHS guideline |

## 12.2 Standards

To check the conformity of the product with the directives, the following non-binding legal European standards were applied:

### 12.2.1 General procedures and safety principles

| | |
|---|---|
| EN 61131-1:2003 | Programmable controllers - Part 1 |

***Information***

*This product was developed for the use in industrial areas and can cause radio interference when used in residential areas.*

### 12.2.2 EMC guideline

| | |
|---|---|
| EN 61131-2:2007 | Programmable controllers - Part 2 |

### 12.2.3 Electrical safety and fire protection

| | |
|---|---|
| EN 61131-2:2007 | Programmable controllers - Part 2 |

### 12.2.4 Environmental and surrounding conditions

| | |
|---|---|
| EN 61131-2:2007 | Programmable controllers - Part 2 |

## 12.3 Standards for the American market

### 12.3.1 UL test for industrial control equipment

| | |
|---|---|
| UL 508, 2005 | Industrial Control Equipment |

## 12.4 Integrated RFID-Module

Valid for product variant OP 450-LD/A-xx1x


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### 12.4.1 EC Directives

| | |
|---|---|
| Guideline 1999/5/EG | Regulation for radio installations and telecommunication equipment |

### 12.4.2 Standards

The conformity with the regulations of the Directive 1999/5/EG about radio installations and telecommunication equipment is verified by the adherence to the following harmonized European norms:

| | |
|---|---|
| EN 300330-2 | Electromagnetic compatibility and radio spectrum matters (ERM); Radio equipment with short range (SRD; Radio equipment with operating frequencies in the range of 9 kHz to 25 MHz and induction loop systems in the range of 9 kHz to 30 MHz |
| EN 301489-01 | Electromagnetic compatibility for radio spectrum matters (ERM); Electromagnetic compatibility for radio equipment and –services<br>Part 1: Common technical requirements. |
| EN 301489-03 | Electromagnetic compatibility for radio spectrum matters (ERM); Electromagnetic compatibility for radio equipment and –services; Part 3: Specific conditions for short range radio devices (SRD) for the use on frequencies between 9 kHz and 40 Ghz |
| EN 50364 | Limit of the exposition of persons to electromagnetic fields of devices that are operated in the frequency range of 0 Hz to 10 GHz and used in the electronic article monitoring (en: EAS), high-frequency identification (en: RFID) and similar applications. |
| EN 60950-1 | Information technology installations – safety; Part 1 |

### 12.4.3 Other standards and recommendations

In addition, the following non-binding standards/recommendations were called upon in partial aspects:

**EUROMAP – European Committee of Machinery Manufacturers for the Plastics and Rubber Industries**

| | |
|---|---|
| EUROMAP 65 | Technical Recommendations (see also http://www.euromap.org) |


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# 13 Declaration of conformity

The declaration of conformity of this product is available on request from KEBA.


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