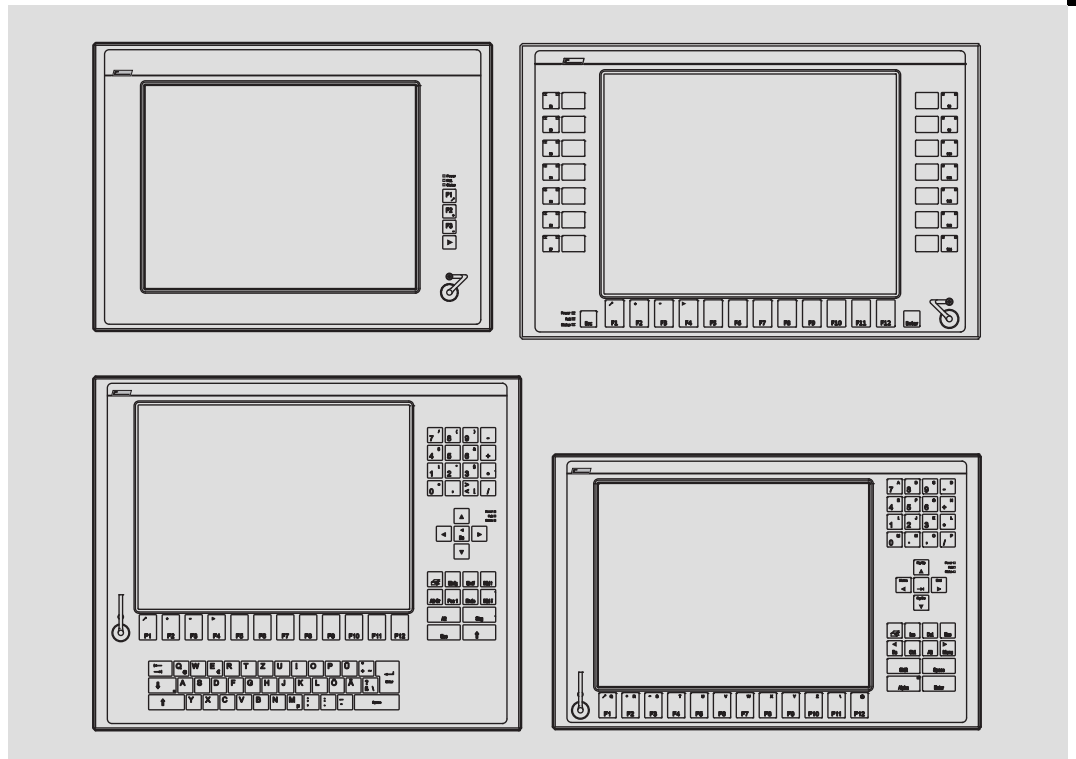


# L-force *Controls*



## Operating Instructions

## Industrial PC



EL 1800 ... EL 9800

Embedded Line Panel PC (EL)



Please read these instructions before you start working!  
Follow the enclosed safety instructions.

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# 1 About this documentation

## Contents

This documentation provides you with information about the intended use of the Industrial PC.

The present manual is part of the "PC-based automation" manual collection which you can find on the DVDs of the same name.

## Target group

This documentation is directed at qualified skilled personnel according to IEC 60364.

Qualified skilled personnel are persons who have the required qualifications to carry out all activities involved in installing, mounting, commissioning, and operating the product.



### Tip!

Information and tools concerning the Lenze products can be found in the download area at

**[www.lenze.com](http://www.lenze.com)**

## Validity

This documentation is valid for:

- ▶ EL 1800, EL 1800s, 1800 TC, 1800s TC
- ▶ EL 1850, EL 1850s, EL 1850 TC, EL 1850s TC
- ▶ EL 2800, EL 2800 TC
- ▶ EL 2850, EL 2850 TC
- ▶ EL 5800, EL 5800 TC
- ▶ EL 5820, EL 5820 TC
- ▶ EL 5850, EL 5850 TC
- ▶ EL 5870, EL 5870 TC
- ▶ EL 9800, EL 9800 TC

# 1 About this documentation







## Document history

### 1.1 Document history

Material number	Version			Description
13504920	4.0	12/2015	TD09	Intel® Atom™ E3845 processor supplemented
13457738	3.0	02/2014	TD06	Added: <ul style="list-style-type: none"> <li>• UL notes (French language)</li> <li>• Note regarding RJ45 cable laying</li> </ul>
13433080	2.0	03/2013	TD29	General revision
13391236	1.3	10/2011	TD29	Note regarding protection against direct solar radiation has been added and the sections "Change battery" and "Change fuse" have been revised.
13370129	1.2	07/2011	TD29	Pin assignment of SUB-D plug corrected
13370129	1.1	02/2011	TD29	First edition

### 1.2 Conventions used

This documentation uses the following conventions to distinguish between different types of information:


Type of information	Identification	Examples/notes
Spelling of numbers		
Decimal separator	Point	In general, the decimal point is used. For instance: 1234.56
Warnings		
UL warnings		Given in English and French
UR warnings		
Text		
Program name	» «	PC software For example: »Engineer«, »Global Drive Control« (GDC)
Icons		
Page reference		Reference to another page with additional information For instance:  16 = see page 16
Documentation reference		Reference to another documentation with additional information For example:  EDKxxx = see documentation EDKxxx




### 1.3 Notes used

The following pictographs and signal words are used in this documentation to indicate dangers and important information:




#### Safety instructions

Structure of safety instructions:



	<b>Danger!</b> (characterises the type and severity of danger) <b>Note</b> (describes the danger and gives information about how to prevent dangerous situations)
---	--

Pictograph and signal word	Meaning
 <b>Danger!</b>	<b>Danger of personal injury through dangerous electrical voltage.</b> Reference to an imminent danger that may result in death or serious personal injury if the corresponding measures are not taken.
 <b>Danger!</b>	<b>Danger of personal injury through a general source of danger.</b> Reference to an imminent danger that may result in death or serious personal injury if the corresponding measures are not taken.
 <b>Stop!</b>	<b>Danger of property damage.</b> Reference to a possible danger that may result in property damage if the corresponding measures are not taken.

#### Application notes

Pictograph and signal word	Meaning
 <b>Note!</b>	Important note to ensure troublefree operation
 <b>Tip!</b>	Useful tip for simple handling
	Reference to another documentation

#### Special safety instructions and application notes

Pictograph and signal word	Meaning
 <b>Warnings!</b>	<b>Safety note or application note for the operation according to UL or CSA requirements.</b>
 <b>Warnings!</b>	The measures are required to meet the requirements according to UL or CSA.

**Safety instructions****General safety information****Scope**

The following general safety instructions apply to all Lenze drive and automation components.

**The product-specific safety and application notes given in this documentation must be observed!**

**For your own safety****Danger!**

Disregarding the following basic safety measures may lead to severe personal injury and damage to material assets!

- ▶ Lenze drive and automation components ...
  - ... must only be used for the intended purpose.
  - ... must never be operated if damaged.
  - ... must never be subjected to technical modifications.
  - ... must never be operated unless completely assembled.
  - ... must never be operated without the covers/guards.
  - ... can - depending on their degree of protection - have live, movable or rotating parts during or after operation. Surfaces can be hot.
- ▶ For Lenze drive and automation components ...
  - ... only use approved accessories.
  - ... only use original manufacturer spare parts.
- ▶ All specifications of the corresponding enclosed documentation must be observed.
 

This is vital for safe and trouble-free operation and for achieving the specified product features.

The procedural notes and circuit details provided in this document are proposals which the user must check for suitability for his application. The manufacturer does not accept any liability for the suitability of the specified procedures and circuit proposals.
- ▶ Only qualified skilled personnel are permitted to work with or on Lenze drive and automation components.
 

According to IEC 60364 or CENELEC HD 384, these are persons ...

  - ... who are familiar with the installation, assembly, commissioning and operation of the product,
  - ... possess the appropriate qualifications for their work,
  - ... and are acquainted with and can apply all the accident prevent regulations, directives and laws applicable at the place of use.



### **Transport, storage**

- ▶ Transport and storage in a dry, low-vibration environment without aggressive atmosphere; preferably in the packaging provided by the manufacturer.
  - Protect against dust and shocks.
  - Comply with climatic conditions according to the technical data.

### **Mechanical installation**

- ▶ Install the product according to the regulations of the corresponding documentation. In particular observe the section "Operating conditions" in the chapter "Technical data".
- ▶ Provide for careful handling and avoid mechanical overload. During handling neither bend components, nor change the insulation distances.
- ▶ The product contains electrostatic sensitive devices which can easily be damaged by short circuit or static discharge (ESD). Thus, electronic components and contacts must not be touched unless ESD measures are taken beforehand.

### **Electrical installation**

- ▶ Carry out the electrical installation according to the relevant regulations (e. g. cable cross-sections, fusing, connection to the PE conductor). Additional notes are included in the documentation.
- ▶ When working on live products, observe the applicable national regulations for the prevention of accidents (e.g. BGV 3).
- ▶ The documentation contains notes for the EMC-compliant installation (shielding, earthing, arrangement of filters and installation of the cables). The manufacturer of the system or machine is responsible for the compliance with the limit values required in connection with EMC legislation.
- ▶ For compliance with the limit values for radio interference emission at the site of installation, the components - if specified in the technical data - have to be mounted in housings (e. g. control cabinets). The housings have to enable an EMC-compliant installation. In particular observe that for example control cabinet doors preferably have a circumferential metallic connection to the housing. Reduce openings or cutouts through the housing to a minimum.
- ▶ Only plug in or remove pluggable terminals in the deenergised state!

### **Commissioning**

- ▶ If required, you have to equip the system with additional monitoring and protective devices in accordance with the respective valid safety regulations (e. g. law on technical equipment, regulations for the prevention of accidents).

**Maintenance and servicing**

- ▶ The components are maintenance-free if the required operating conditions are observed.
- ▶ If the cooling air is polluted, the cooling surfaces may be contaminated or the air vents may be blocked. Under these operating conditions, the cooling surfaces and air vents must be cleaned at regular intervals. Never use sharp objects for this purpose!
- ▶ After the system has been disconnected from the supply voltage, live components and power connections must not be touched immediately because capacitors may be charged. Please observe the corresponding notes on the device.

**Disposal**

- ▶ Recycle or dispose of the product according to the applicable regulations.
- ▶ This device contains a battery. According to European legislation you are obliged to dispose of batteries separately via the take-back systems specified.

## 2.2 Product-specific safety instructions

- ▶ Protect the device against direct solar radiation, since the housing may heat up strongly.
- ▶ The device is classified as a class A device and can cause radio interference in residential areas. In this case, the operator may have to take special measures. Any costs arising from these measures have to be paid by the operator.
- ▶ A touchscreen does not comply with the Ergonomics Directive ZH 1/618. This is why it is only designed for short-time inputs and monitoring functions. For longer inputs, connect an external keyboard.
- ▶ In the event of a fault, unplug the power connector immediately and send back the device to the manufacturer. The address can be found on the self-addressed envelope included in this documentation. Please use the original packaging to return the device!
- ▶ Printed circuit boards which might be damaged by short circuit or electrostatic discharge (ESD) must be handled appropriately.
- ▶ The BIOS of the mainboard is configured by the factory. After the BIOS has been updated, malfunctions are possible. Please address to our service.
- ▶ If the optionally ACU UPS power supply is used:
  - Before commissioning the basic device, establish the connection between the power supply unit and the capacitor/battery pack.
  - Observe that the basic device is only deenergised if the mains cable **and** the supply cable of the capacitor/battery pack have been disconnected.
  - If the basic device is disconnected from the mains for a longer time, the supply cable of a battery pack has to be disconnected, so that the rechargeable batteries are not damaged by a possible exhaustive discharge.
  - If stored, the rechargeable batteries lose energy in the course of time. Thus the rechargeable batteries have to be charged completely by the basic device at the latest after half a year of storage.
  - The rechargeable batteries of the battery pack may not be charged with external battery chargers, but only with the ACU UPS power supply of the basic device!

**2.3 Safety instructions for the installation according to UL****Original - English****Approval**

Underwriter Laboratories (UL), UL508 and CSA C22.2 No. 142-M1987, (UL File Number E236341)

**Ratings**

- ▶ Input 24 V DC, 65 W
- ▶ Max. Ambient Temperature 40 °C
  - EL6xx, EL1xxx, EL5xxx, EL9xxx only
- ▶ Max. Surrounding Temperature 50 °C
  - EL8xx, EL2xxx, EL7xxx only
- ▶ Optional communication ratings:
  - RS232-Connection: max. 3 A
  - USB-Connection: max. 1 A
  - PS/2-Connection: max. 1 A
  - LAN-Connection: Standard ISDN or RJ45
- ▶ Environmental ratings: If these devices are mounted into a door or front cover of an enclosure: Type 1 enclosure.

**Warnings!****Field Wiring Markings**

Wiring Terminal MSTB 2,5/3-STF-5,08:

- ▶ Use Copper Wire only.
- ▶ AWG 18 ... AWG 12 (0.82 mm<sup>2</sup>... 3.3 mm<sup>2</sup>)
- ▶ Torque 5...7 lb-in (0.5 ... 0.6 Nm)

**Power supply**

- ▶ Must be used as isolating source.
- ▶ Rated data: 24 VDC, 4 A max.

**Battery**

- ▶ Replace Battery with any from the list below, Part No. CR 2450 only. Use of another battery may present a risk of fire or explosion.

Recommended CR2450 (R/C, BBVC2) types:

Renata Part.no. CR2450N, Sony Corp. part no. CR2450B, Toshiba part no. CR2450, Varta part no. CR2450, Matsushita part no. CR2450

- ▶ Battery may explode if mistreated. Do not recharge, disassemble, dispose of in fire or heat above 100 °C (212 °F).
- ▶ Dispose of used battery according to the regulation of recycling or waste.

## Original - French

### Homologation

Underwriter Laboratories (UL), UL508 et CSA C22.2 n° 142-M1987, (n° de dossier UL E236341)

### Caractéristiques assignées

- ▶ Entrée 24 V CC, 65 W
- ▶ Température ambiante maximale : 40 °C
  - Uniquement EL6xx, EL1xxx, EL5xxx, EL9xxx
- ▶ Température ambiante maximale : 50 °C
  - Uniquement EL8xx, EL2xxx, EL7xxx
- ▶ Caractéristiques de communication assignées (option) :
  - Port RS232 : maximum 3 A
  - Port USB : maximum 1 A
  - Port PS/2 : maximum 1 A
  - Port LAN : RNIS standard ou RJ45
- ▶ Evaluations environnementales : en cas de montage des équipements dans la porte ou le capot avant d'un coffret de protection : coffret de type 1.



### Warnings!

#### Marquage du câblage à pied d'oeuvre

Bornier de câblage MSTB 2,5/3-STF-5,08 :

- ▶ Utiliser exclusivement des conducteurs en cuivre.
- ▶ AWG 18 ... AWG 12 (0.82 mm<sup>2</sup>... 3.3 mm<sup>2</sup>)
- ▶ Couple de 5 à 7 lb-in (0,5 ... 0,6 Nm)

#### Alimentation

- ▶ Doit servir de source isolante.
- ▶ Caractéristiques assignées : 24 VCC, 4 A max.

#### Batterie

- ▶ Remplacer la batterie par l'un des types répertoriés dans la liste ci-dessous, n° de référence CR 2450 uniquement. L'utilisation d'une autre batterie présente un risque d'incendie ou d'explosion.  
Types CR2450 recommandés (R/C, BBVC2) :  
Renata référence CR2450N, Sony Corp. référence CR2450B, Toshiba référence CR2450, Varta référence CR2450, Matsushita référence CR2450
- ▶ Toute utilisation non conforme de la batterie entraîne un risque d'explosion. Ne pas recharger, démonter, jeter au feu ni exposer la batterie à une chaleur supérieure à 100 °C (212 °F).
- ▶ Eliminer la batterie conformément à la réglementation en vigueur en matière de recyclage ou de traitement des déchets.

### 3 Product description

#### Scope of supply

### 3 Product description

#### 3.1 Scope of supply

Quantity	Name
1	Embedded Line Panel PC
8	Screw clamp fixings EL 1800, EL 1800s, EL 1850, EL 1850s
4	EL 2800
6	EL 2850, EL 5800, EL 5820, EL 5850
5	EL 5870
6	EL 9800
1	Connection plug for voltage supply
1	DVD "PC based Automation"
1	Test report
1	Device pass card



#### Note!

After receipt of the delivery, check immediately whether the items match the accompanying papers. We do not accept any liability for deficiencies claimed subsequently.

#### Claim

- ▶ visible transport damage immediately to the forwarder
- ▶ visible deficiencies/incompleteness immediately to your Lenze representative.

### 3.2 Application as directed

The industrial PC is used as directed if it is solely used for implementing control and operating concepts or for presenting information in usual industrial and commercial fields. A different use, or one beyond these purposes, is not permissible.

A **use that is not intended** also includes a use harbouring fatal risks or dangers which, without the provision of exceptionally high safety measures, may result in death, injury or damage to material assets.

The industrial PC in particular must **not** be used ...

- ▶ in private areas.
- ▶ in potentially explosive atmospheres.
- ▶ in areas with harmful gases, oils, acids, radiation, etc.
- ▶ in applications in which vibration and impact loads occur that exceed the requirements of EN 61131-2.
- ▶ to exercise safety functions, for example
  - in air-traffic control/in flight control systems
  - for the monitoring/control of nuclear reactions
  - for the monitoring/control of means of mass transportation
  - for the monitoring/control of medical systems
  - for the monitoring/control of weapons systems

### 3.3 Device features

	EL x8xx
Design	<ul style="list-style-type: none"> <li>● PC housing made of sheet steel, in the case of passive cooling partly of aluminium</li> <li>● Front frame made of anodised and etched aluminium</li> <li>● Front with polyester foil</li> </ul>
Mounting	<ul style="list-style-type: none"> <li>● For installation in control cabinets, control boards or machine enclosures</li> </ul>
Electrical supply	<ul style="list-style-type: none"> <li>● 24 V DC voltage supply</li> <li>● Lithium battery for buffering the real time clock (RTC)</li> </ul>
Computer unit	<ul style="list-style-type: none"> <li>● ETX module with <ul style="list-style-type: none"> <li>– Intel® Atom™ N270, 1.6 GHz, 512 kB L2 Cache</li> <li>– Chipset: Intel® 945GSE, Intel® ICH7M</li> <li>– Ethernet controller: Intel® 82562V, 10/100 MBit Ethernet</li> <li>– Integrated with Intel® Graphics Media Accelerator (GMA950, DirectX® 9, PS 2.0)</li> </ul> </li> <li>or</li> <li>– Intel® Core™ Duo, 1.66 GHz, 512 kB L2 Cache</li> <li>– Chipset: Intel® 945GM, Intel® ICH7M</li> <li>– Ethernet controller: Intel® 82562VZ, 10/100 MBit Ethernet</li> <li>– Integrated with Intel® Graphics Media Accelerator (GMA950, DirectX® 9, PS 2.0)</li> <li>or</li> <li>– Intel® Atom™ E3845 1.91 GHz 2M Cache</li> <li>– Chipsatz: Integrated in SoC</li> <li>– Ethernet-Controller: Intel® i211 (MAC/PHY) 100 MBit-Ethernet</li> <li>– Integrated with Intel® HD Graphics</li> </ul>
Ports	<ul style="list-style-type: none"> <li>● 1 x PS/2</li> <li>● 1 x LAN (Ethernet)</li> <li>● 3 x USB type A (V 2.0)</li> <li>● 1 x serial (RS232)</li> <li>● 2 x MC card slot</li> <li>● 1 x Compact Flash slot (type I)</li> </ul>

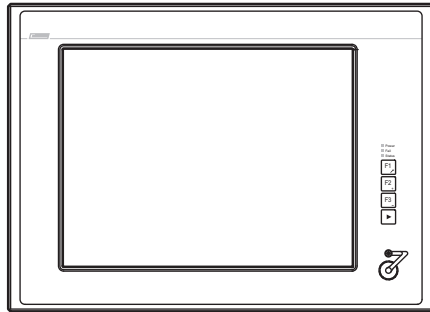
#### Accessories

- ▶ MC card
- ▶ Battery pack (ACCU PACK)
- ▶ Capacitor pack (CAPS PACK)



## Overview

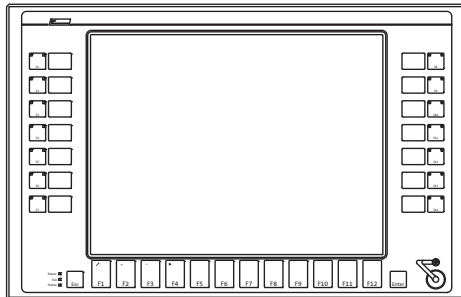
### Panel PC EL 1800 / EL 1800s / EL 2800 / EL 5800 / EL 9800 Thin Client EL 1800 TC / EL 1800s TC / EL 2800 TC / EL 5800 TC / EL 9800 TC



CS57x0-026

- EL 1800 (TC): VGA touchscreen 26.4 cm (10.4")
- EL 1800s (TC): SVGA touchscreen 26.4 cm (10.4")
- EL 2800 (TC): SVGA touchscreen 30.7 cm (12.1")
- EL 5800 (TC): XGA touchscreen 38.1 cm (15")
- EL 9800 (TC): SXGA touchscreen 48.3 cm (19")
- 3 freely assignable function keys

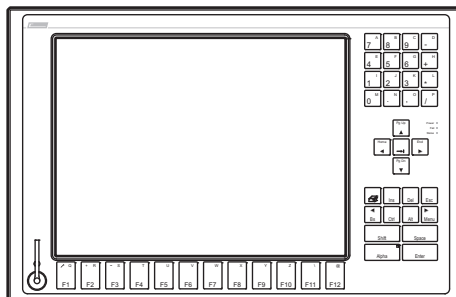
### Panel PC EL 5820 Thin Client EL 5820 TC



ELx7xx-002

- XGA touchscreen 38.1 cm (15")
- 12 freely assignable function keys
- 14 freely assignable special keys

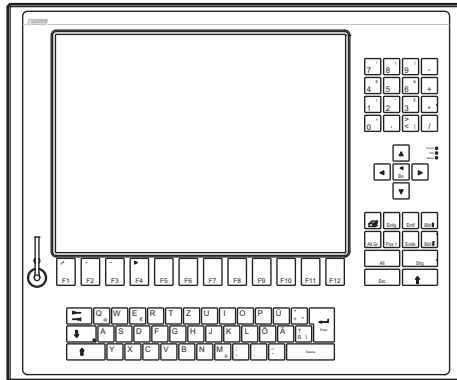
### Panel PC EL 1850 / EL 1850s / EL 2850 / EL 5850 Thin Client EL 1850 TC / EL 1850s TC / EL 2850 TC / EL 5850 TC



CS57x0-028

- EL 1850 (TC): VGA touchscreen 26.4 cm (10.4")
- EL 1850s (TC): SVGA touchscreen 26.4 cm (10.4")
- EL 2850 (TC): SVGA touchscreen 30.7 cm (12.1")
- EL 5850 (TC): XGA touchscreen 38.1 cm (15")
- 12 freely assignable function keys
- Numeric keypad, control keys, level switch-over Alpha

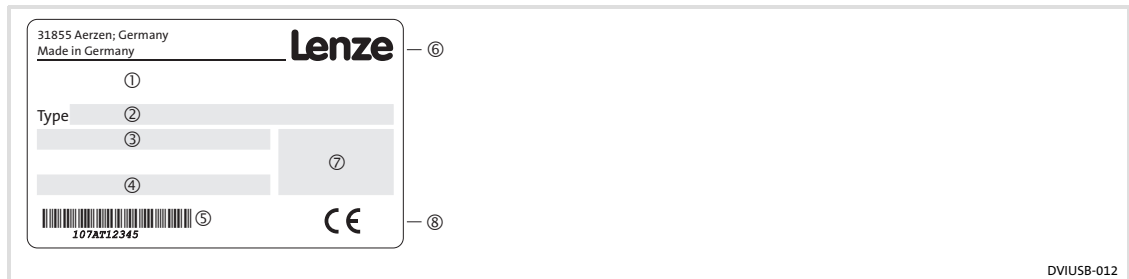
#### Panel PC EL 5870 Thin Client EL 5870 TC



CS57x0-029

- XGA touchscreen 38.1 cm (15")
- 12 freely assignable function keys
- MF2 keyboard

3.4 Identification



- ① Type designation
- ② Type code (catalogue/order no.)
- ③ Technical data
- ④ Customised material number
- ⑤ Bar code with serial number
- ⑥ Manufacturer address
- ⑦ Certification
- ⑧ CE mark

Type code EL x8xx

②																	
EP8GAP	x	x	x	00	x	x	x	x	x	00-	x	x	xx	x	x	x	xxx

Screen diagonal (resolution)  
 3 = 26.4 cm (10.4") / 640 x 480 pixels  
 4 = 26.4 cm (10.4") / 800 x 600 pixels  
 5 = 30.7 cm (12.1") / 800 x 600 pixels  
 6 = 38.1 cm (15") / 1024 x 768 pixels  
 7 = 48.3 cm (19") / 1280 x 1024 pixels

Keyboard  
 1 = standard (4 F keys)  
 4 = F / special keys  
 5 = Num / Alpha / F keys  
 6 = Num / F / special / control keys, DE  
 7 = Num / F / special / control keys, EN

Front design  
 Standard layout, analog resistive touchscreen  
 3 = without front USB socket  
 4 = with front USB socket

Processor  
 C = Intel® Atom™ 1.6 GHz  
 P = Intel® Atom™ E3845 1.91 GHz  
 9 = Intel® Core Duo™ 1.66 GHz (smart cool)

RAM  
 4 = ≥1024 MB  
 5 = ≥2048 MB  
 6 = ≥4096 MB

Internal mass storage  
 0 = no mass storage  
 1 = hard disk, 6.4 cm (2.5"), ≥80 GB, for continuous operation  
 2 = hard disk, 6.4 cm (2.5"), ≥80 GB, ext. temp. range  
 3 = hard disk, 6.4 cm (2.5"), ≥160 GB  
 M = SSD, 6.4 cm (2.5"), > = 80 GB

	②																		
Type code EL x8xx	EP8GAP	x	x	x	00	x	x	x	x	x	00-	x	x	xx	x	x	x	x	xxx
<p>MC card slot 1</p> <p>0 = none</p> <p>9 = MC-CAN2</p> <p>B = MC-CAN2 (with Light API licence)</p> <p>1 = MC-ETH</p> <p>D = MC-ISI</p> <p>C = MC-MPI</p> <p>5 = MC-PBM</p> <p>6 = MC-PBS</p> <p>8 = MC-PND</p>																			
<p>MC card slot 2</p> <p>0 = none</p> <p>9 = MC-CAN2</p> <p>B = MC-CAN2 (with Light API licence)</p> <p>1 = MC-ETH</p> <p>D = MC-ISI</p> <p>C = MC-MPI</p> <p>5 = MC-PBM</p> <p>6 = MC-PBS</p> <p>8 = MC-PND</p>																			
<p>DVD drive</p> <p>0 = none</p> <p>1 = DVD writer drive</p>																			
<p>UPS</p> <p>0 = none</p> <p>1 = ACU UPS control unit</p>																			
<p>External memory card</p> <p>00 = none</p> <p>C3 = Compact Flash ≥512 MB</p> <p>C6 = Compact Flash ≥4 GB</p> <p>C7 = Compact Flash ≥8 GB</p>																			
<p>Operating system</p> <p>0 = none</p> <p>4 = Windows® CE 6 Prof.</p> <p>5 = Windows® Embedded Std. 2009 on Compact Flash</p> <p>6 = Windows® Embedded Std. 2009 on hard disk</p> <p>7 = Windows® XP on hard disk</p> <p>9 = Windows® Embedded Standard 7 P 64bit</p> <p>B = Thin Client</p>																			
<p>Control technology runtime software</p> <p>0 = none</p> <p>1 = LPC1000 (V2.x)</p> <p>2 = MPC1200 (V2.x)</p>																			
<p>Visualisation runtime licence type</p> <p>0 = none</p> <p>1 = VisiWinNET® Compact</p> <p>2 = VisiWinNET® Standard</p>																			

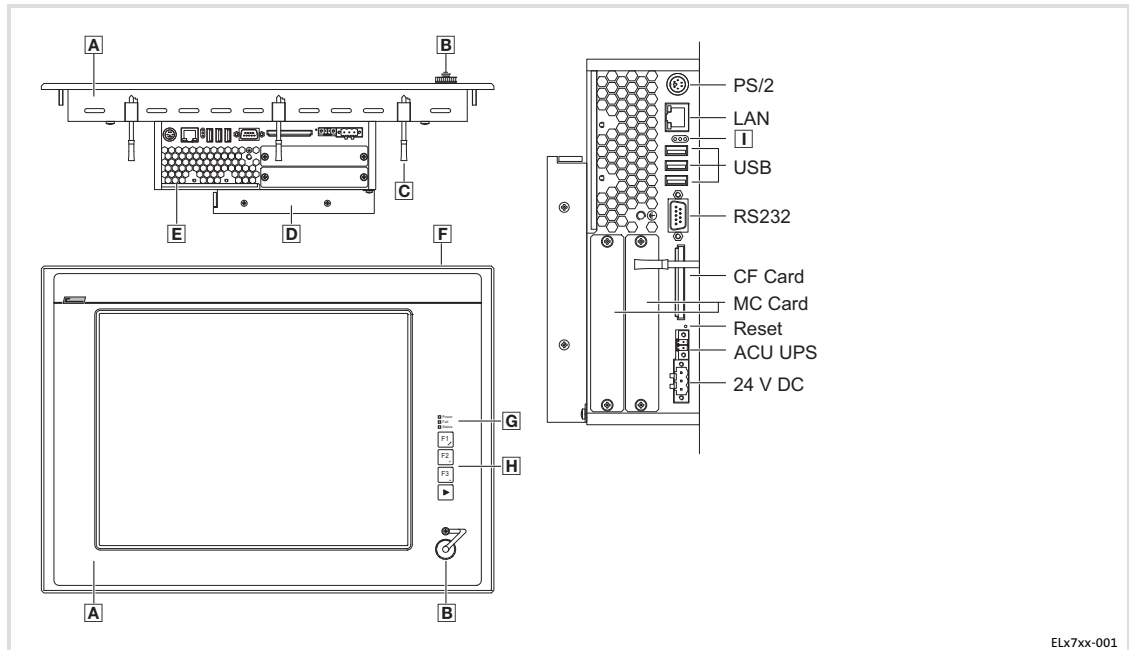
Type code EL x8xx

②																		
EP8GAP	x	x	x	00	x	x	x	x	x	00-	x	x	xx	x	x	x	x	xxx

Number of power tags for visualisation

- 0 = none
- 1 = 50 power tags
- 2 = 100 power tags
- 3 = 250 power tags
- 4 = 500 power tags
- 5 = 1000 power tags
- 6 = 2000 power tags
- 7 = 4000 power tags
- 8 = 64000 power tags

Customer version



Pos.	Description
A	Panel PC / Thin Client (here Panel PC EL 5800)
B	Front face USB port (option)
C	Screw clamp fixings
D	DVD drive (optional)
E	PC
F	Nameplate
G	Front face status LEDs (Power, Fail, Status)
H	Front face control elements
I	Status LEDs (Error, HD, Power)



#### Note!

Further information on the control and display elements can be gathered from the chapter "Operation" (40).

## 3.6 Options

### 3.6.1 ACU UPS control unit


#### Description

The optional ACU UPS control unit in conjunction with a battery pack or capacitor pack extends the industrial PC of the EL 1800-9800, CS 5800-9800, CPC 2800 and 3241 C series by a UPS functionality.


The ACU UPS control unit is either pre-equipped at delivery or can subsequently be added by Lenze service staff.

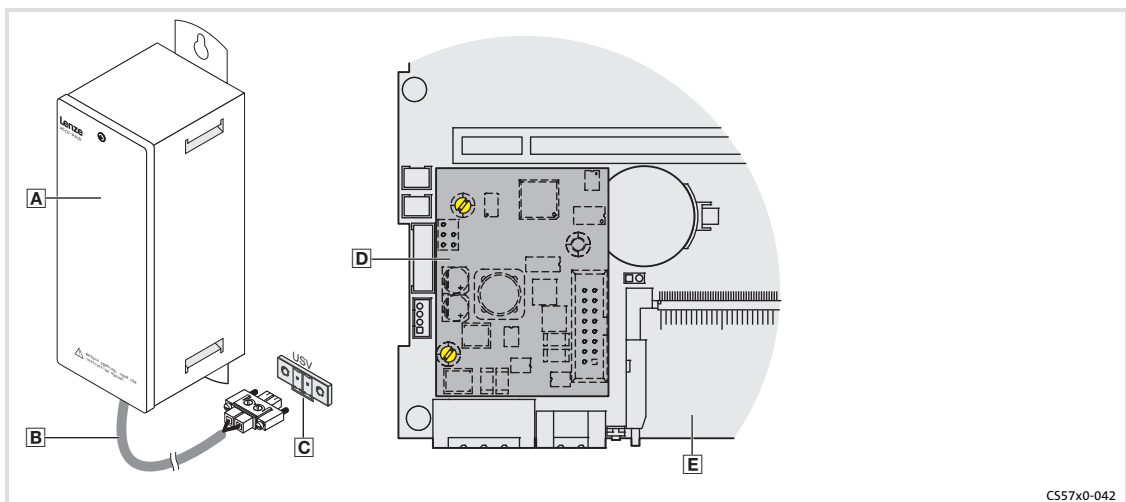
#### Features of the ACU UPS control unit

##### with battery pack (ACCU-PACK)

- Bridges a short mains failure or mains fluctuations and shuts down the PC.
- Software-based configuration
-  Documentation for the battery pack

##### with capacitor pack (CAPS-PACK)

- Provides the possibility of data backup in the event of mains failure.
- Only suitable in conjunction with Windows CE / Windows Embedded Compact.
- Software-based configuration
-  Documentation for the capacitor pack

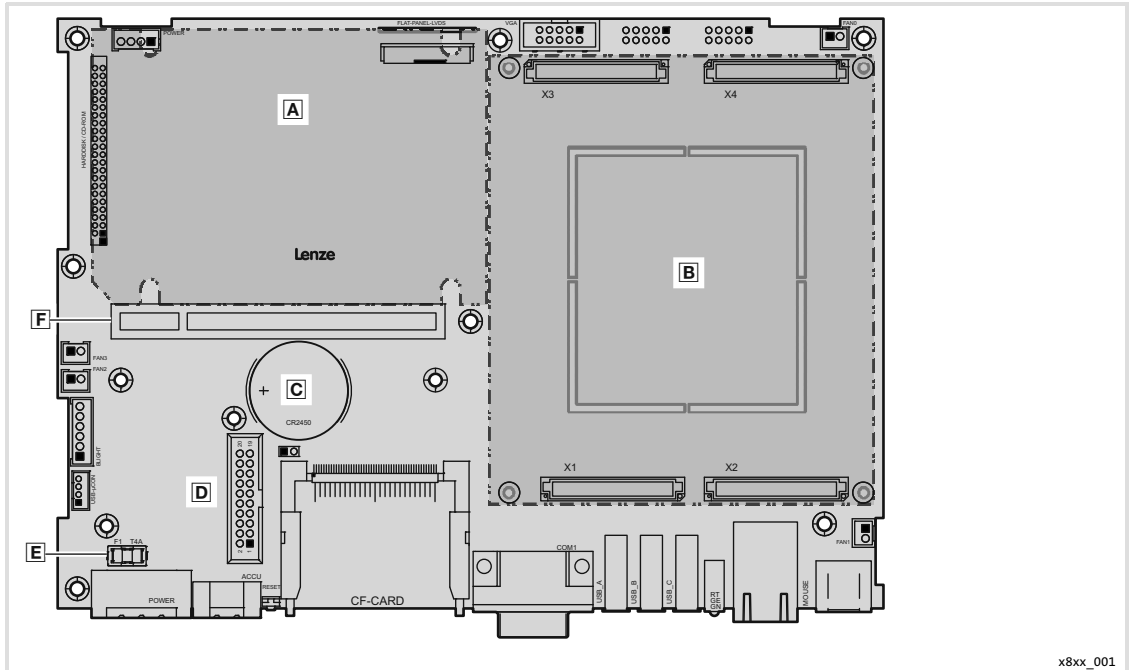


CS57x0-042

- A** 2700 battery pack or 2701 capacitor pack (accessories)
- B** Connection cable (included in delivery of battery pack/capacitor pack)
- C** Port on industrial PC
- D** ACU UPS control unit
- E** Baseboard

### 3 Product description Baseboard

#### 3.7 Baseboard



- A** Hard disk
- B** CPU module
- C** Battery ( 52)
- D** ACU UPS control unit ( 23)
- E** Fuse ( 53)
- F** Socket connector for MC card



## 4 Technical data

### 4.1 General data and operating conditions

#### General data

Conformity and approval			
<b>Conformity</b>			
CE	2014/30/EU	EMC Directive	
Approbation			
UL	UL 508 CSA C22.2	Programmable Controllers (File-No. E236341)	
<b>Other</b>			
RoHS	2011/65/EU	Products are lead-free acc. to directive.	
Protection of persons and devices			
Safety	VDE0805 (EN60950), VDE0870, UL		
Enclosure	EN 60529	IP65 (front) / IP20 (back)	
	UL 508 (NEMA 250)	Type 1 enclosure	
Class of protection		3	
EMC			
Noise emission	EN 61000-6-4	Class A (industrial premises)	
Noise immunity Zone B	EN 61000-6-2	Industrial premises	
		EN 61000-4-2	ESD; severity: 3, i.e. 8 kV in the case of air discharge, 4 kV in the case of contact discharge
		EN 61000-4-3	RF interference (housing) 80 MHz ... 1000 MHz, 10 V/m 80 % AM (1 kHz)
		EN 61000-4-4	Burst, severity: 3
		EN 61000-4-5	Surge, severity 3 *
		EN 61000-4-6	RF conducted 150 kHz ... 80 MHz, 10 V/m 80 % AM (1 kHz)

\* Due to the high-energy single current pulses, a surge requires a suitable external connection with lightning protection elements like for instance lightning conductors and overvoltage arresters.

### Operating conditions

Mounting conditions		
Place of installation		In the control cabinet, screen protected against direct solar radiation
Mounting position		Connections at the bottom
Ambient conditions		
Climatic		
Storage		-10 ... +60 °C
Transport		-10 ... +60 °C
Operation		Depending on the equipment (☐ LEERER MERKER)
Relative humidity		10 ... 90 %, non-condensing
Site altitude		
Storage/Transport		< 12000 m amsl
Operation		< 3000 m amsl
Chemical resistance		
Decor film	DIN 42115	
Touch/display		
Mechanical load capacity		
Decor film	DIN 42115	max. 100 N
Touch/display		
Switching element		



**Note!**

The failure probability of an electronic component increases with the ambient temperature to which the component is subjected. Regarding the serviceability and reliability, particular attention should be paid to the cooling of the device. For every application, you should take care to keep the heating of the device as low as possible.

- ▶ We recommend to use forced-ventilated systems with "Smart Cool" fan control to ensure sufficient heat dissipation.

The fan control monitors the internal temperature of the device and the functioning of the fan. When a preset maximum temperature is exceeded, the control system switches on the fan. When the fan speed falls below a minimum speed, the control system signals a fault.

- ▶ Systems with passive cooling via heatsinks should only be used if it is guaranteed that there is always sufficient convection (e.g. by means of external fan modules in the control cabinets or the installation of the device in air-conditioned areas).

**Permissible ambient temperatures for fanless systems**

Standard device	• With standard hard disk	• With hard disk for continuous operation (24/7) <sup>1)</sup>	• With hard disk for extended temperature range • Up to 1 GB RAM • With CF card	• With DVD writer drive
Processor	[°C]			
Intel® Atom™ N270, 1.6 GHz	5 ... 40	5 ... 45	0 ... 45	5 ... 40
Intel® Atom™ E3845, 1.91 GHz				

**Permissible ambient temperatures for systems with "Smart Cool" cooling**

Standard device	• With standard hard disk	• With hard disk for continuous operation (24/7) <sup>1)</sup>	• With hard disk for extended temperature range • Up to 1 GB RAM • With CF card	• With DVD writer drive
Processor	[°C]			
Intel® Core™ Duo 1.66 GHz at max. 50 % CPU utilisation <sup>2)</sup>	5 ... 45	5 ... 45	0 ... 45	5 ... 40
Intel® Core™ Duo 1.66 GHz at max. 100 % CPU utilisation <sup>2)</sup>	5 ... 40	5 ... 40	0 ... 40	5 ... 40

1) We recommend replacing the hard disk after 30,000 operating hours or after 5 years.

2) The CPU utilisation can be determined via the Windows task manager (register "System performance")

## 4.2

## Electrical data

## Standard device

Supply						
	Voltage [DC V]	Current at 24 V <sup>1)</sup>		Fuse Type	Buffer battery	
		Intel® Core Duo™ [A]	Intel® Atom™ [A]		Type	Service life [years]
EL 1800	24 (+18 ... 30) <sup>2)</sup>	1.5	1.1	53	52	> 6 (25 °C)
EL 1800s						
EL 1850						
EL 1850s						
EL 2800						
EL 2850						
EL 5800		1.6	1.2			
EL 5820						
EL 5850						
EL 5870						
EL 9800						

1) Without ACU UPS control unit, DVD-Drive, MC card, and USB consumer

2) With ACU UPS Control Unit DC +20 ... 30 V

Screen						
	Visible size [cm]	Aspect ratio	Resolution [pixels]	Brightness [cd/m <sup>2</sup> ]	Contrast	MTBF [h]
EL 1800	26.4 (10.4")	4:3	640 x 480	400	1 : 300	40,000
EL 1850			800 x 600	400	1 : 500	50,000
EL 1800s				300	1 : 200	
EL 1850s			38.1 (15")		1024 x 768	250
EL 2800	1280 x 1024			300	1 : 2000	50,000
EL 2850						
EL 5800	48.3 (19")			1280 x 1024	300	1 : 2000
EL 5820						
EL 5850						
EL 5870						

## ACU UPS control unit (option)

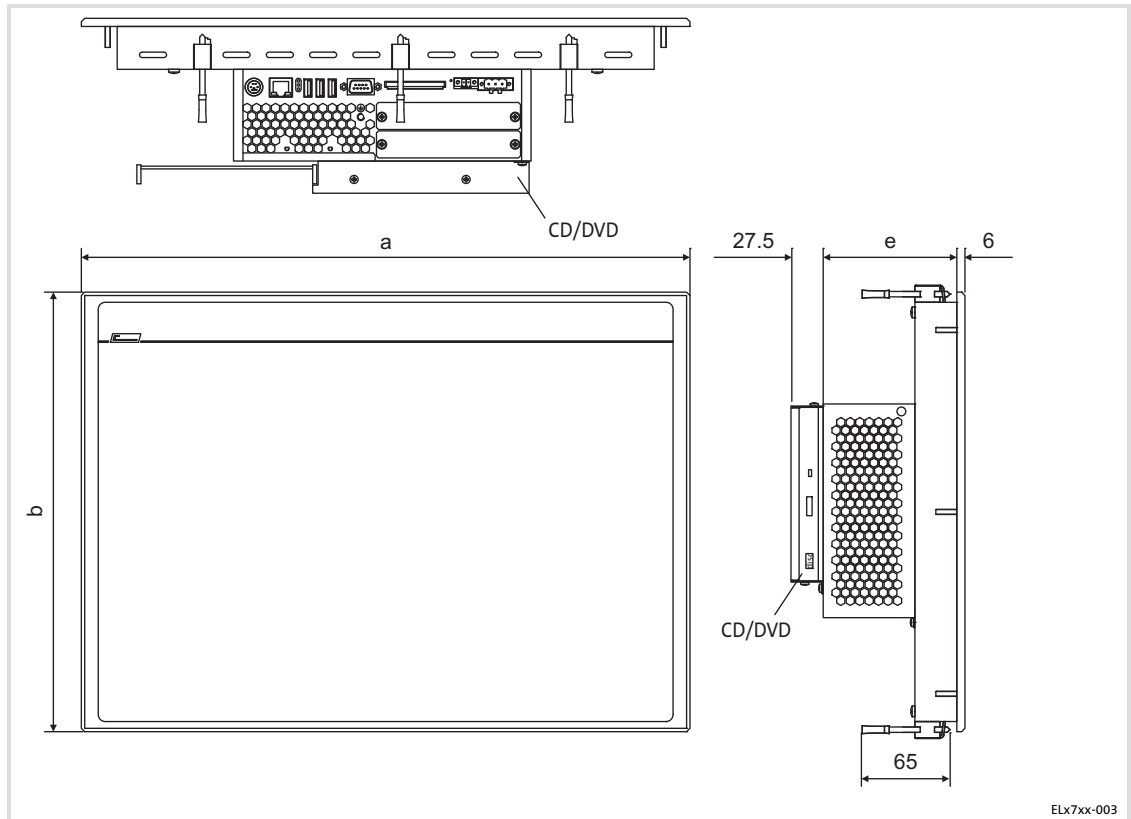
Type	Operating voltage		Max. current		Charging current in operating range [mA]
	[V DC]		[mA]		
			At 5 V	At 12 V	
ACU UPS	12 / 5		10	10 ... 600 <sup>1)</sup>	Approx. 250

<sup>1)</sup> Subject to charging

### 4.3 Mechanical data

Versions and weights			
	Front frame / housing	Touchscreen	Mass *) [kg]
EL 1800	Aluminium/sheet steel	Polyester foil	4.6
EL 1800s			4.6
EL 1850			5.0
EL 1850s			5.0
EL 2800			5.8
EL 2850			6.0
EL 5800			6.6
EL 5820			6.8
EL 5850			6.8
EL 5870			7.6
EL 9800			10.6

\*) Without optional accessories (hard disk, DVD drive, etc.)



ELx7xx-003

All dimensions in millimetres.

Dimensions			
	a	b [mm]	e
EL 1800	325	240	99
EL 1800s			
EL 1850			
EL 1850s	365		
EL 2800	390	300	
EL 2850	425	310	
EL 5800	450	325	
EL 5820	483	310 (7 U)	
EL 5850			
EL 5870		399 (9 U)	
EL 9800	490	400	109

## 5 Mechanical installation

### 5.1 Important notes

The installation must be carried out by qualified, skilled personnel familiar with the applicable national standards.



#### Stop!

##### Sensitive front frame gasket

During mounting, the gasket of the front frame is exposed and can be damaged.

##### Possible consequences:

- ▶ The degree of protection provided by the enclosure mentioned in the technical data is not attained.

##### Protective measures:

- ▶ Handle the gasket with care during mounting.
- ▶ Protect the gasket against ultraviolet rays.
- ▶ Each time before you mount the device, check whether the gasket is intact.



#### Stop!

##### Sensitive touchscreen surface

The touchscreen foil is very sensitive to external forces and can be damaged by improper handling.

##### Possible consequences:

- ▶ The touchscreen foil becomes damaged, scratched or dull.

##### Protective measures:

- ▶ Avoid contact of the touchscreen foil with pointed or hard objects.
- ▶ Always use a touch pen or your fingers to operate the touchscreen. Never use objects such as ballpoint pens, pencils, etc.
- ▶ When removing dirt and fingerprints, observe the notes given in the chapter "Cleaning" (📖 48).



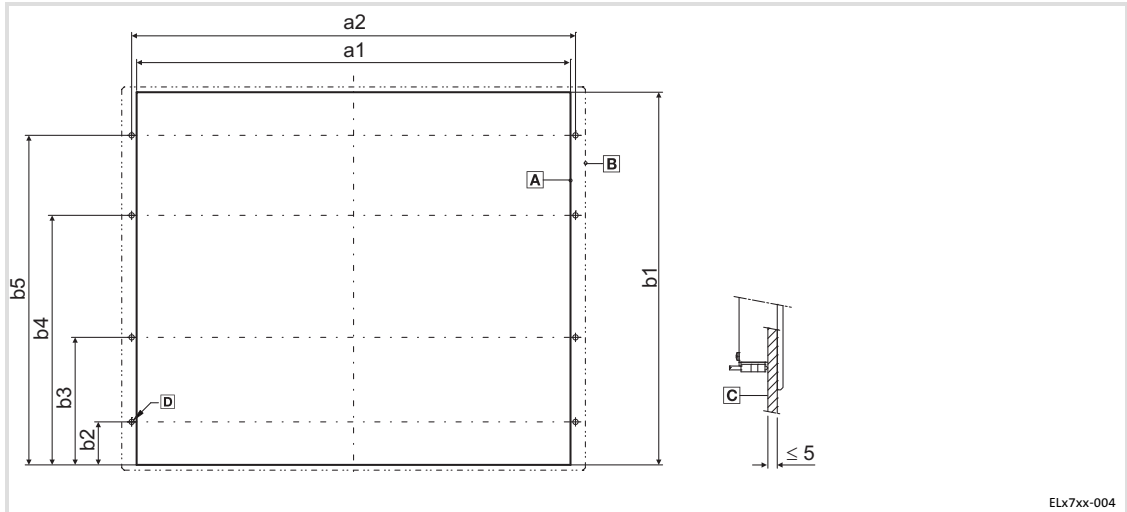
#### Note!

When selecting the place where the PC is to be installed, pay attention to an ergonomic positioning of the screen and to the incidence of light which might cause reflections on the screen.

# 5 Mechanical installation

## Mounting cutout

### 5.2 Mounting cutout



- A** Mounting cutout
- B** Outline of front panel
- C** Control board

All dimensions in millimetres.

Dimensions								
	a1	a2	b1	b2	b3	b4	b5	D
	[mm]							
EL 1800	305.0	-	228.0	-	-	-	-	-
EL 1800s								
EL 1850	343.0	-	228.0	-	-	-	-	-
EL 1850s								
EL 2800	340.0	351.0	288.0	122.0	122.0	0.0	-	6 x Ø5.5
EL 2850	375.0	386.0	288.0	122.0	122.0	0.0	-	
EL 5800	400.0	411.0	313.0	134.5	134.5	0.0	-	
EL 5820	452.0	462.4	299.0	104.9	104.6	15.7	-	
EL 5850								
EL 5870	452.0	462.4	388.2	149.3	149.3	15.9	-	
EL 9800	438.0	451.0	386.0	172.0	172.0	60.0	60.0	8 x Ø4.5

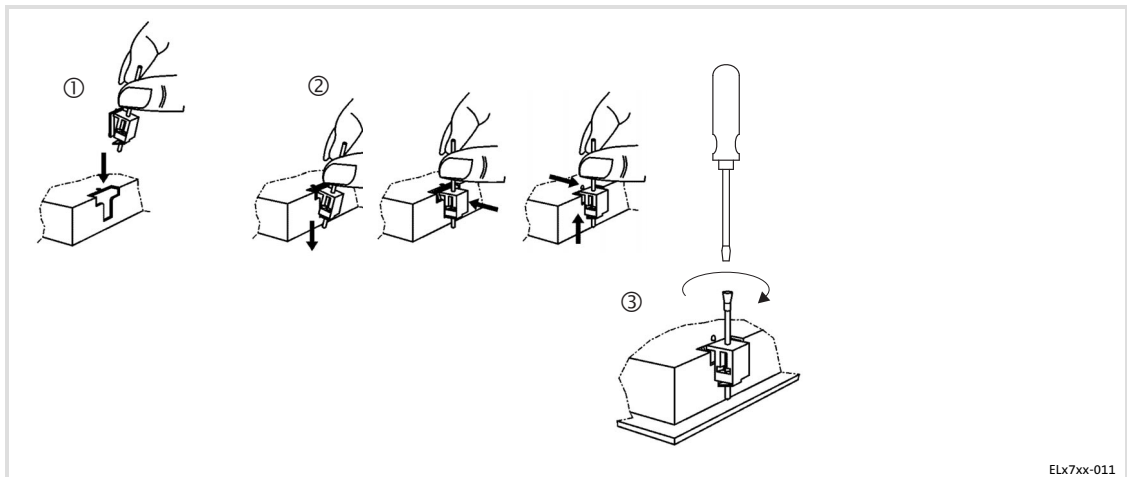


### 5.3 Mounting steps

#### 5.3.1 Panel PC EL 1800(s) / EL 1850(s)

How to perform the installation:

1. Cut the mounting cutout into the control board (📖 32).
2. Check that the gasket under the front panel is located correctly.
3. Place the device in the mounting cutout and secure it against falling-down with one hand.
4. Fit all screw clamp fixings as explained below:



- Insert the screw clamp fixing into the slot in the housing of the device (see above figure).
  - Press the screw clamp fixing downwards, tilt it towards the housing and check that it has firmly snapped into place.
  - Tighten the screw clamp fixing hand-tight with a screwdriver.
5. Check that the device is securely located in the mounting cutout and that the front panel gasket is located correctly.
    - If necessary, realign the device/gasket.
    - If the gasket is not located correctly, protection class IP65 is not achieved on the front of the device!

## 5.3.2

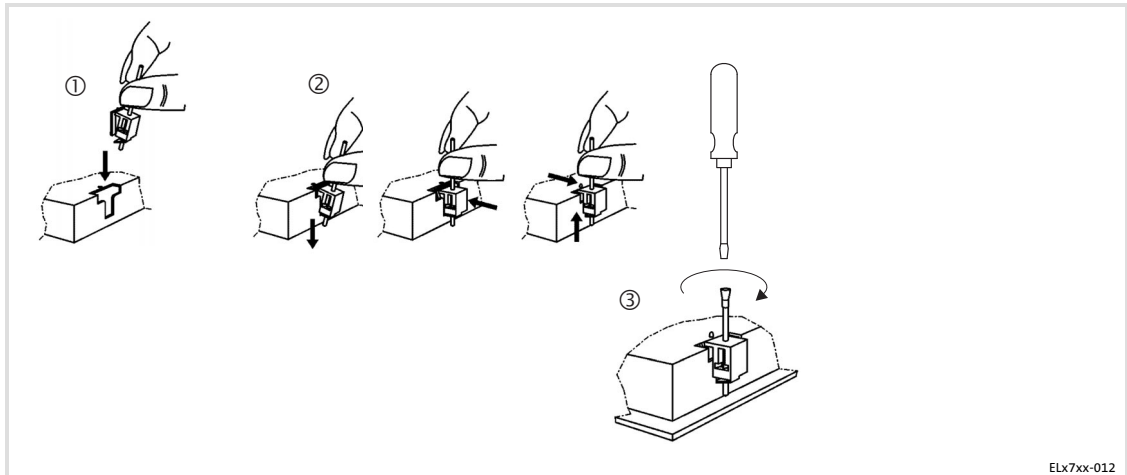
**Panel PC EL 2800 / EL 2850 / EL 5800 / EL 5820 / EL 5850 / EL 5870 / EL 9800****Note!**

Types EL 5820, EL 5850, and EL 5870 can be installed in any control panel and in 19" mounting racks in accordance with DIN 41494.

**Control board mounting**

How to perform the installation:

1. Prepare the control board by cutting the mounting cutout and drilling the mounting holes into it (☞ 32).
2. Check that the gasket under the front panel is located correctly.
3. Place the device in the mounting cutout, secure it by hand against falling down and screw the nuts and washers onto the threaded bolts.
4. Fit all screw clamp fixings as explained below:



ELx7xx-012

- Insert the screw clamp fixing into the slot in the housing of the device (see above figure).
  - Press the screw clamp fixing downwards, tilt it towards the housing and check that it has firmly snapped into place.
  - Tighten the screw clamp fixing hand-tight with a screwdriver.
5. Check that the device is securely located in the mounting cutout and that the front panel gasket is located correctly.
    - If necessary, realign the device/gasket.
    - If the gasket is not located correctly, protection class IP65 is not achieved on the front of the device!

**Installation in 19" mounting racks (only EL 5820, EL 5850, and EL 5870)**

How to perform the installation:ounting rack installation"#

1. Remove the set screws from the back of the front frame.
2. Drill through the blind holes at the back of the front frame using a 6.5 mm drill.
3. Place the device in the 19" mounting rack and screw it.

## 6 Electrical installation

### 6.1 Important notes

The installation must be carried out by qualified, skilled personnel familiar with the applicable national standards.



#### **Stop!**

##### **Short circuit and static discharge**

The device contains components which are endangered in the case of short circuit or static discharge.

##### **Possible consequences:**

- ▶ The device or parts of it will be destroyed.

##### **Protective measures:**

- ▶ Always switch off the voltage supply when working on the device. This particularly applies:
  - Before connecting / disconnecting connectors.
  - Before plugging in / plugging out modules.
- ▶ All persons handling printed circuit boards have to take account of ESD measures.
- ▶ Contacts of plug connectors must not be touched.
- ▶ Printed circuit boards may be touched only at places free from electrical contacts and may be placed only on appropriate materials (e.g. on ESD packaging or conductive foam material).
- ▶ Printed circuit boards may only be transported and stored in ESD packaging.

# 6 Electrical installation

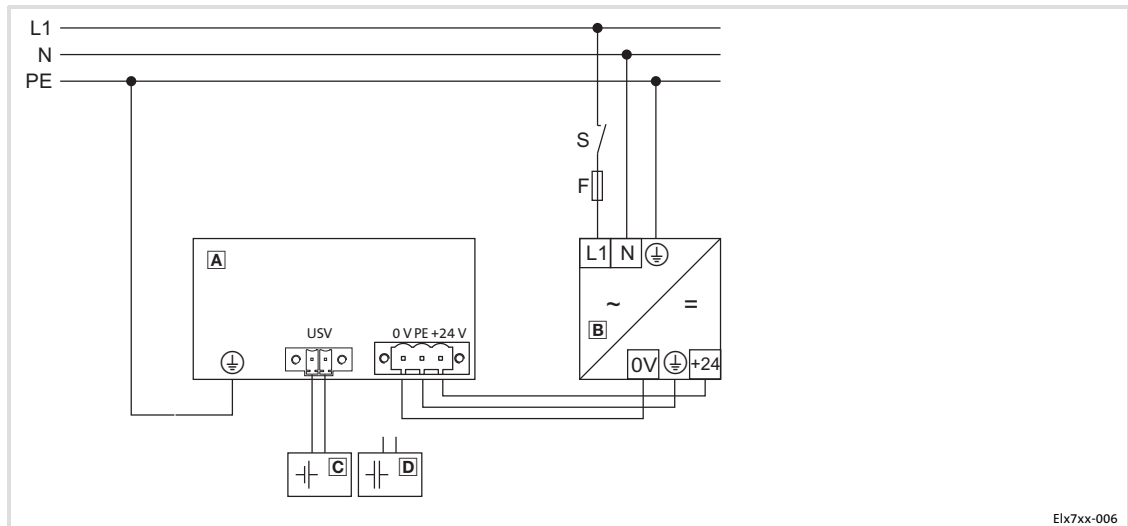
## EMC-compliant wiring

### 6.2 EMC-compliant wiring

Notes on EMC-compliant wiring	
<b>General notes</b>	<ul style="list-style-type: none"> <li>● The electromagnetic compatibility of the system depends on the type of installation and care taken. Especially consider the following:               <ul style="list-style-type: none"> <li>– Structure</li> <li>– Shielding</li> <li>– Earthing</li> </ul> </li> <li>● For installations differing from the one described, the evaluation of the conformity with the EMC Directive requires a check of the system regarding the EMC limit values. This for instance applies to:               <ul style="list-style-type: none"> <li>– Use of unshielded cables</li> </ul> </li> <li>● <b>The compliance with the EMC Directive is in the responsibility of the user.</b> <ul style="list-style-type: none"> <li>– If you observe the following measures, you can assume that no EMC problems will occur during operation and that compliance with the EMC Directive and the EMC law is achieved.</li> <li>– If devices which do not comply with the CE requirement concerning noise immunity (EN 6100042) are operated close to the system, these devices may be electromagnetically affected by the system.</li> </ul> </li> </ul>
<b>Structure</b>	<ul style="list-style-type: none"> <li>● Provide electrical contact between the device and the earthed mounting plate:               <ul style="list-style-type: none"> <li>– Mounting plates with conductive surfaces (zinc-coated, stainless steel) allow permanent contact.</li> <li>– Painted plates are not suitable for an EMC-compliant installation.</li> </ul> </li> <li>● If you use several mounting plates:               <ul style="list-style-type: none"> <li>– Connect as much surface of the mounting plates as possible (e.g. with copper strips).</li> </ul> </li> <li>● When laying the cables, pay attention to the separation of signal cables and mains cables.</li> <li>● Lay the cables as close as possible to the reference potential. Freely suspended cables act like aerials.</li> </ul>
<b>Shielding</b>	<ul style="list-style-type: none"> <li>● Only use cables with braids if possible.</li> <li>● The overlap rate of the shield should be higher than 80%.</li> <li>● For data cables for serial connection, always use metal or metallised connectors. Connect the shield of the data cable to the connector shell.</li> </ul>
<b>Earthing</b>	<ul style="list-style-type: none"> <li>● Earth all metallically conductive components using suitable cables connected to a central earthing point (PE bar).</li> <li>● Maintain the minimum cross-sections prescribed in the safety regulations:               <ul style="list-style-type: none"> <li>– For the EMC, not the cable cross-section is important, but the surface and the contact with a cross-section as large as possible, i.e. large surface.</li> </ul> </li> </ul>

6.3 Connecting the supply and peripheral devices

6.3.1 Terminal diagram supply



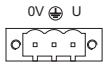

- ▣ A IPC
- ▣ B Power supply unit
- ▣ C Battery pack (Option)
- ▣ D Capacitor pack (Option)



**Note!**

- ▶ Observe the max. permissible input voltage.  
Professionally fuse the device on the input side against voltage fluctuations and voltage peaks.
- ▶ The IPC boots up as soon as the supply voltage is applied.  
After the operating system has been shut down, the IPC switches off automatically. For restarting, the supply voltage has to be disconnected for a short time.

6.3.2 24 V connection (X101)


Figure	Connection	Connection type	Cable type
 IPC001	DC 24 V connection	3-pole Phoenix Combicon socket	Cable (conductor cross-section max. 2.5 mm <sup>2</sup> ) with Phoenix Combicon plug, MSTB 2.5 / 3-STF-5.08
 IPC001	PE connection	M4 threaded bolt	Separate earthing conductor (min. 2.5 mm <sup>2</sup> ) with ring cable lug

## 6


### Electrical installation

Connecting the supply and peripheral devices  
UPS-PACK connection (X102)

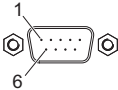
#### 6.3.3 UPS-PACK connection (X102)

Figure	Connection	Connection type	Cable type
 IPC001	Terminal for Battery pack / Capacitor pack	2-pin socket	In the scope of supply of the pack; length 2.5 m; extension available


#### 6.3.4 PS/2 interface (X108)

Figure	Connection	Connection type	Cable type
 IPC001	PS/2 connection	6-pin, mini DIN	PS/2 mouse (a keyboard and a mouse can be connected via a PS/2 Y cable)

#### 6.3.5 Serial interface (X103)

Figure	Connection	Connection type	Cable type
 IPC001	RS232 connection Pin 1: DCD Pin 2: RxD Pin 3: TxD Pin 4: DTR Pin 5: GND Pin 6: DSR Pin 7: RTS Pin 8: CTS Pin 9: RI	9-pin Sub-D plug	Control cable, shielded, with 9-pin Sub-D socket

#### 6.3.6 Ethernet interface (X107)

Figure	Connection	Connection type	Cable type
 IPC001	Ethernet connection 10/100 Mbps Green LED (SPEED): on = 100 MBPS off = 10 Mbps Yellow LED (LINK/ACTIVITY): on or blinking = LINK /ACTIVITY off = no LINK	RJ45 socket	Network cable CAT5 S/UTP or CAT5e S/FTP (recommended), cable length: max. 100 m




#### Note!


If the RJ45 plug connection is exposed to oscillating or vibrating stress:

- ▶ Use a strain relief in the immediate vicinity of the RJ45 socket.
- ▶ Select the contact surface on which the device is mounted as fixing point of the strain relief.
- ▶ Comply with the related minimum bending radius of the cable used.


6.3.7 USB interface (X104, X105, X106)

Figure	Connection	Connection type	Cable type
 <p>IPC001</p>	USB 2.0 host connection Max. load: 5 V/500 mA	USB-A socket	USB cable with USB-A plug

6.3.8 Communication interface (MC card)

Figure	Connection	Connection type	Cable type
 <p>EL100-013</p>	Interface for optional communication card (MC card)	Socket connector	-

6.3.9 USB interface on the front face (option)

Figure	Connection	Connection type	Cable type
 <p>EL100-013</p>	USB 2.0 host connection with IP 65 cover Max. load: 5 V/500 mA	USB-A socket	USB cable with USB-A plug

**Stop!****Sensitive touchscreen surface**

The touchscreen foil is very sensitive to external forces and can be damaged by improper handling.

**Possible consequences:**

- ▶ The touchscreen foil becomes damaged, scratched or dull.

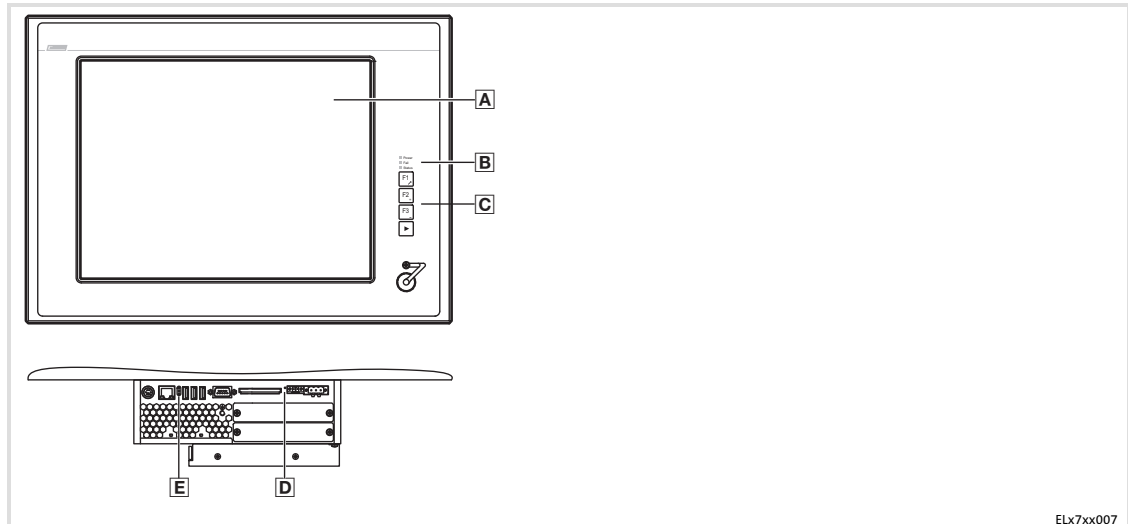
**Protective measures:**

- ▶ Avoid contact of the touchscreen foil with pointed or hard objects.
- ▶ Always use a touch pen or your fingers to operate the touchscreen. Never use objects such as ballpoint pens, pencils, etc.
- ▶ When removing dirt and fingerprints, observe the notes given in the chapter "Cleaning" (📖 48).



7.2 Controls and displays

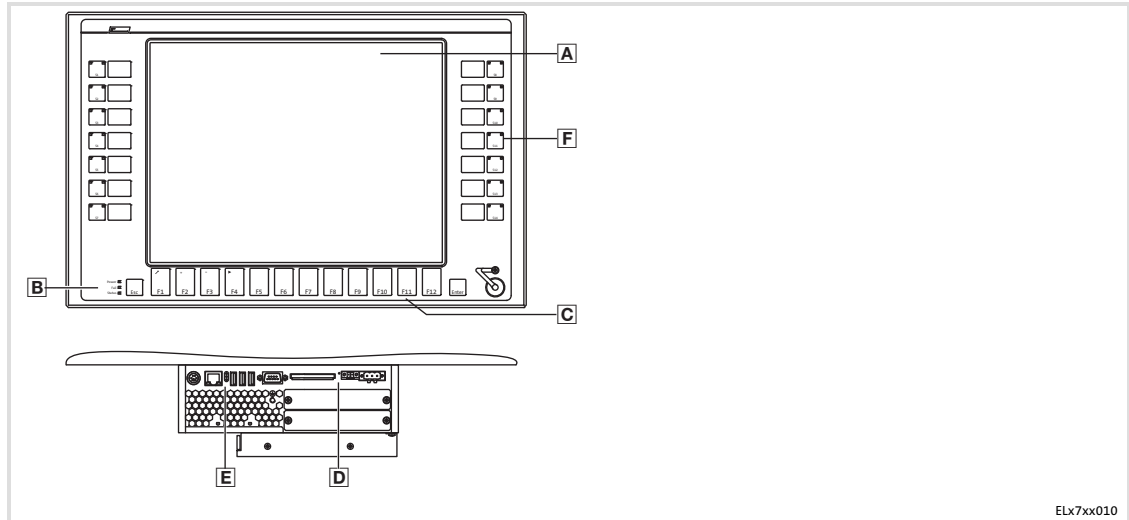
7.2.1 Panel PC EL 1800 / EL 1800s / EL 2800 / EL 5800 / EL 9800



ELx7xx007

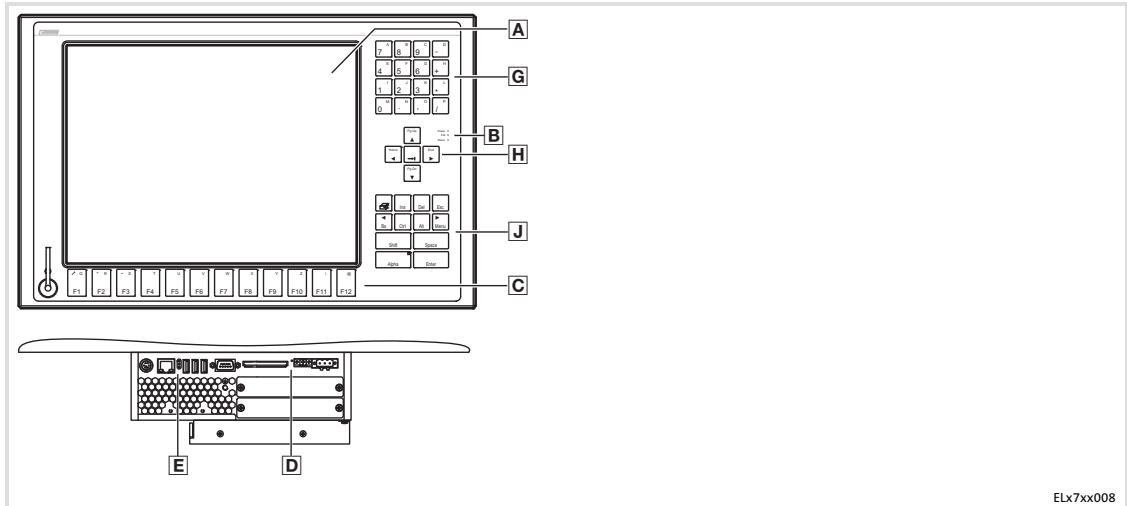
Pos.	Designation	Function	
		Standard mode	Service mode
	Switch on mode:		Press "▶" for 4 s
	Switch off mode:		Press "▶" or wait for 35 s
A	Display	Application-dependent	
B	Status LEDs	<b>Power (green):</b> <ul style="list-style-type: none"> <li>Is ON when the supply voltage is present.</li> </ul> <b>Fail (red):</b> <ul style="list-style-type: none"> <li>Is On when a power supply failure has occurred.</li> <li>Is blinking when the screen signal is missing.</li> </ul> <b>Status (yellow):</b> <ul style="list-style-type: none"> <li>Application-dependent</li> </ul>	
C	Function keys	F1 ... F3: Send key code for Shift-F1 ... Shift-F3	<b>Tool:</b> Application-dependent +: Increase screen brightness -: Reduce screen brightness
D	Reset button	Reset PC (restart)	
E	Status LEDs	<b>Error (red):</b> <ul style="list-style-type: none"> <li>Is lit if a power supply failure has occurred.</li> <li>Is blinking when the screen signal is missing.</li> </ul> <b>HD (yellow):</b> <ul style="list-style-type: none"> <li>Indicates access to a storage medium.</li> </ul> <b>Power (green):</b> <ul style="list-style-type: none"> <li>Is lit when the supply voltage is present.</li> <li>Flashes (---) in the case of a hardware error.</li> <li>Is blinking (---) when the ACU UPS (optional) is being charged.</li> <li>Is blinking (---) when there is a supply voltage failure and the device is being supplied by the ACU UPS.</li> <li>Is blinking (---) when the supply voltage of the ACU UPS is too low (e.g. rechargeable battery is empty or missing).</li> <li>Blinks 4 x per second if the ACCU-PACK causes a short circuit or if the CAPS-PACK is completely discharged.</li> </ul>	

#### 7.2.2 Panel PC EL 5820



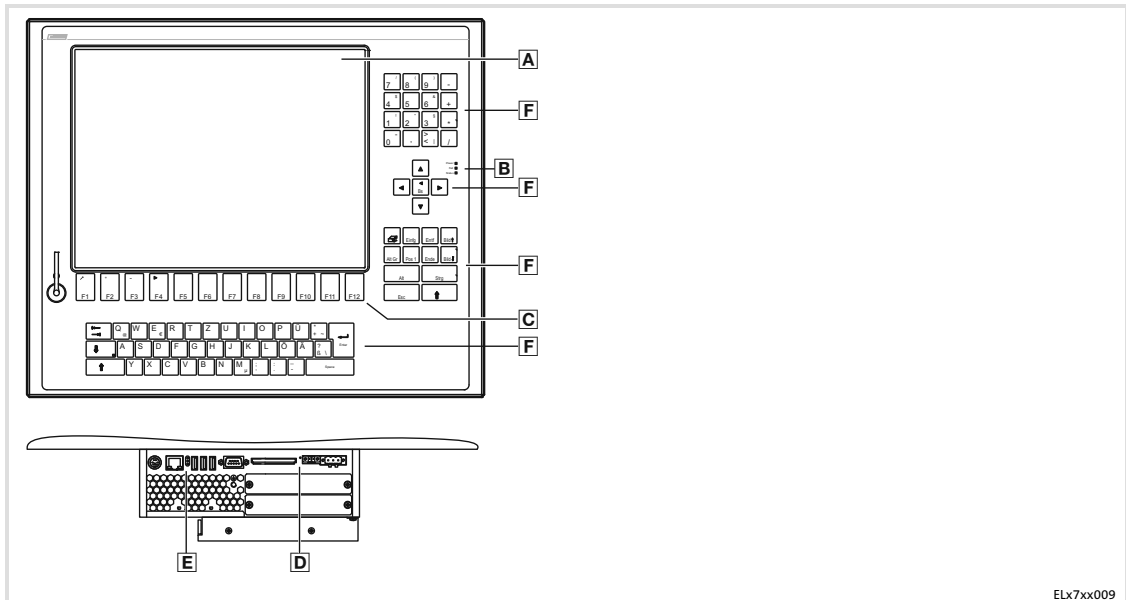
Pos.	Designation	Function	
		Standard mode	Service mode
	Switch on mode:		Press "▶" for 4 s
	Switch off mode:		Press "▶" or wait for 35 s
A	Display	Application-dependent	
B	Status LEDs	<b>Power (green):</b> <ul style="list-style-type: none"> <li>Is ON when the supply voltage is present.</li> </ul> <b>Fail (red):</b> <ul style="list-style-type: none"> <li>Is On when a power supply failure has occurred.</li> <li>Is blinking when the screen signal is missing.</li> </ul> <b>Status (yellow):</b> <ul style="list-style-type: none"> <li>Application-dependent</li> </ul>	
C	Function keys	<b>F1 ... F12:</b> Send key code for F1 ... F12	<b>Tool:</b> Application-dependent +: Increase screen brightness -: Reduce screen brightness
D	Reset button	Reset PC (restart)	
E	Status LEDs	<b>Error (red):</b> <ul style="list-style-type: none"> <li>Is lit if a power supply failure has occurred.</li> <li>Is blinking when the screen signal is missing.</li> </ul> <b>HD (yellow):</b> <ul style="list-style-type: none"> <li>Indicates access to a storage medium.</li> </ul> <b>Power (green):</b> <ul style="list-style-type: none"> <li>Is lit when the supply voltage is present.</li> <li>Flashes (---) in the case of a hardware error.</li> <li>Is blinking (---) when the ACU UPS (optional) is being charged.</li> <li>Is blinking (---) when there is a supply voltage failure and the device is being supplied by the ACU UPS.</li> <li>Is blinking (---) when the supply voltage of the ACU UPS is too low (e.g. rechargeable battery is empty or missing).</li> <li>Blinks 4 x per second if the ACCU-PACK causes a short circuit or if the CAPS-PACK is completely discharged.</li> </ul>	
F	Special keys	<b>S1 ... S7:</b> Send key code for shift-F1 ... shift-F7 <b>S8 ... S14:</b> Send key code for ctrl-F1 ...ctrl-F7	

7.2.3 Panel PC EL 1850 / EL 1850s / EL 2850 / EL 5850



Pos.	Designation	Function		
		Standard mode	Alpha mode	Service mode
	Switch on mode:		Press "alpha key" (LED is on)	Press "menu key"
	Switch off mode:		Press "alpha key" (LED is off)	Press "menu key" or wait for 35 s
A	Display	Application-dependent		
B	Status LEDs	<b>Power (green):</b> <ul style="list-style-type: none"> <li>● Is ON when the supply voltage is present.</li> </ul> <b>Fail (red):</b> <ul style="list-style-type: none"> <li>● Is ON when a power supply failure has occurred</li> <li>● Is blinking when the screen signal is missing.</li> </ul> <b>Status (yellow):</b> <ul style="list-style-type: none"> <li>● Indicates access to a storage medium.</li> </ul>		
C	Function keys	<b>F1 ... F12:</b> Send key code for Shift-F1 ... Shift-F12	<b>F1 ... F12:</b> Send key codes for "Q" ... "@"	<b>Tool:</b> Application-dependent +: Increase screen brightness -: Reduce screen brightness
D	Reset button	Reset PC (restart)		
E	Status LEDs	<b>Error (red):</b> <ul style="list-style-type: none"> <li>● Is lit if a power supply failure has occurred;</li> <li>● Is blinking when the screen signal is missing.</li> </ul> <b>HD (yellow):</b> <ul style="list-style-type: none"> <li>● Indicates access to a storage medium.</li> </ul> <b>Power (green):</b> <ul style="list-style-type: none"> <li>● Is lit when the supply voltage is present.</li> <li>● Flashes (....) in the case of a hardware error.</li> <li>● Is blinking (....) when the ACU UPS (optional) is being charged.</li> <li>● Is blinking (....) when there is a supply voltage failure and the device is being supplied by the ACU UPS.</li> <li>● Is blinking (..) when the supply voltage of the ACU UPS is too low (e.g. rechargeable battery is empty or missing).</li> <li>● Blinks 4 x per second if the ACCU-PACK causes a short circuit or if the CAPS-PACK is completely discharged.</li> </ul>		
G	Numeric keypad	Send key codes for "0" ... "9" and calculation operators	Send key codes for "A" ... "P"	Functionality same as in standard/alpha mode
H	Cursor keys	<b>Without "Shift" key:</b> Move cursor/marker in steps and set tab <b>With "Shift" key:</b> Move cursor/marker to the beginning/end or page by page		Functionality same as in standard/alpha mode
J	Control keys	Standard functions of a MF2 keyboard (For "alpha" and "menu" see "Switch on/off mode")		Functionality same as in standard/alpha mode

7.2.4 Panel PC EL 5870

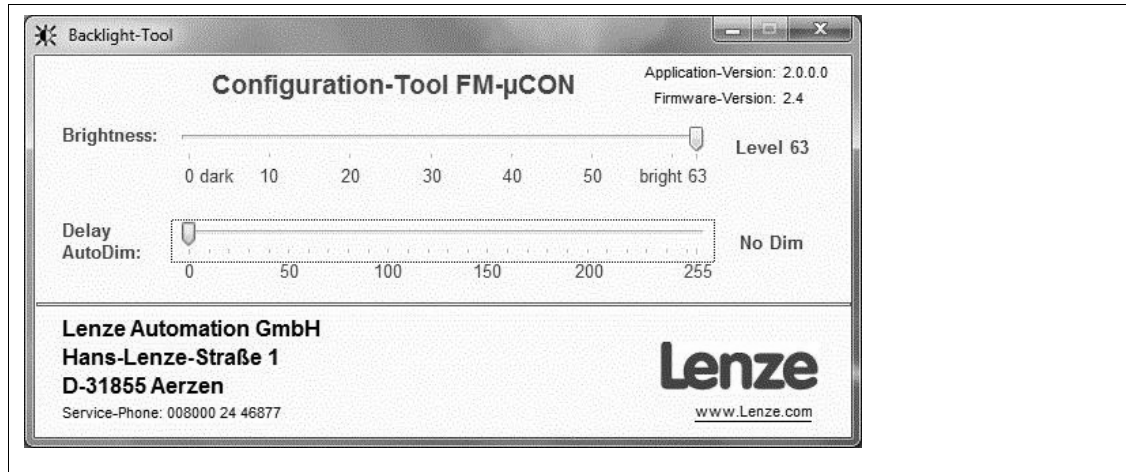


ELx7xx009

Pos.	Designation	Function	
		Standard mode	Service mode
	Switch on mode:		Press "► (F4)" for 4 s
	Switch off mode:		Press "► (F4)" or wait for 35 s
A	Display	Application-dependent	
B	Status LEDs	<b>Power (green):</b> <ul style="list-style-type: none"> <li>Is ON when the supply voltage is present.</li> </ul> <b>Fail (red):</b> <ul style="list-style-type: none"> <li>Is ON when a power supply failure has occurred.</li> <li>Is blinking when the screen signal is missing.</li> </ul> <b>Status (yellow):</b> <ul style="list-style-type: none"> <li>Indicates access to a storage medium.</li> </ul>	
C	Function keys	<b>F1 ... F12:</b> Send key code for Shift-F1 ... Shift-F12	<b>Tool:</b> Application-dependent +: Increase screen brightness -: Reduce screen brightness
D	Reset button	Reset PC (restart)	
E	Status LEDs	<b>Error (red):</b> <ul style="list-style-type: none"> <li>Is lit if a power supply failure has occurred;</li> <li>Is blinking when the screen signal is missing.</li> </ul> <b>HD (yellow):</b> <ul style="list-style-type: none"> <li>Indicates access to a storage medium.</li> </ul> <b>Power (green):</b> <ul style="list-style-type: none"> <li>Is lit when the supply voltage is present.</li> <li>Flashes (---) in the case of a hardware error.</li> <li>Is blinking (---) when the ACU UPS (optional) is being charged.</li> <li>Is blinking (---) when there is a supply voltage failure and the device is being supplied by the ACU UPS.</li> <li>Is blinking (---) when the supply voltage of the ACU UPS is too low (e.g. rechargeable battery is empty or missing).</li> <li>Blinks 4 x per second if the ACCU-PACK causes a short circuit or if the CAPS-PACK is completely discharged.</li> </ul>	
F	MF2 keys	Standard function of a MF2 keyboard	

The "Backlight Tool" program is used to set the automatic dimming and brightness.

User interface of the "Backlight Tool":



## 8 Maintenance



### Stop!

#### Short circuit and static discharge

The device contains components which are endangered in the case of short circuit or static discharge.

#### Possible consequences:

- ▶ The device or parts of it will be destroyed.

#### Protective measures:

- ▶ Always switch off the voltage supply when working on the device. This particularly applies:
  - Before connecting / disconnecting connectors.
  - Before plugging in / plugging out modules.
- ▶ All persons handling printed circuit boards have to take account of ESD measures.
- ▶ Contacts of plug connectors must not be touched.
- ▶ Printed circuit boards may be touched only at places free from electrical contacts and may be placed only on appropriate materials (e.g. on ESD packaging or conductive foam material).
- ▶ Printed circuit boards may only be transported and stored in ESD packaging.

### 8.1 Regular checks

The device is free of maintenance. Nevertheless, visual inspections should be carried out at regular intervals which must not be too long, depending on the ambient conditions.

Please check the following:

- ▶ Does the environment of the device meet the operating conditions specified in the Technical data?
- ▶ Is the heat dissipation of the device not impeded by dust or dirt?
- ▶ Are the mechanical and electrical connections o.k.?

**Stop!****Sensitive surfaces and components**

The device can be damaged if it is not appropriately cleaned.

**Possible consequences:**

- ▶ The housing or the screen gets scratched or dull if you use alcoholic, solvent-containing or scouring cleaning agents.
- ▶ Electrical components can be damaged ...
  - by a short circuit caused by humidity.
  - by static discharge.

**Protective measures:**

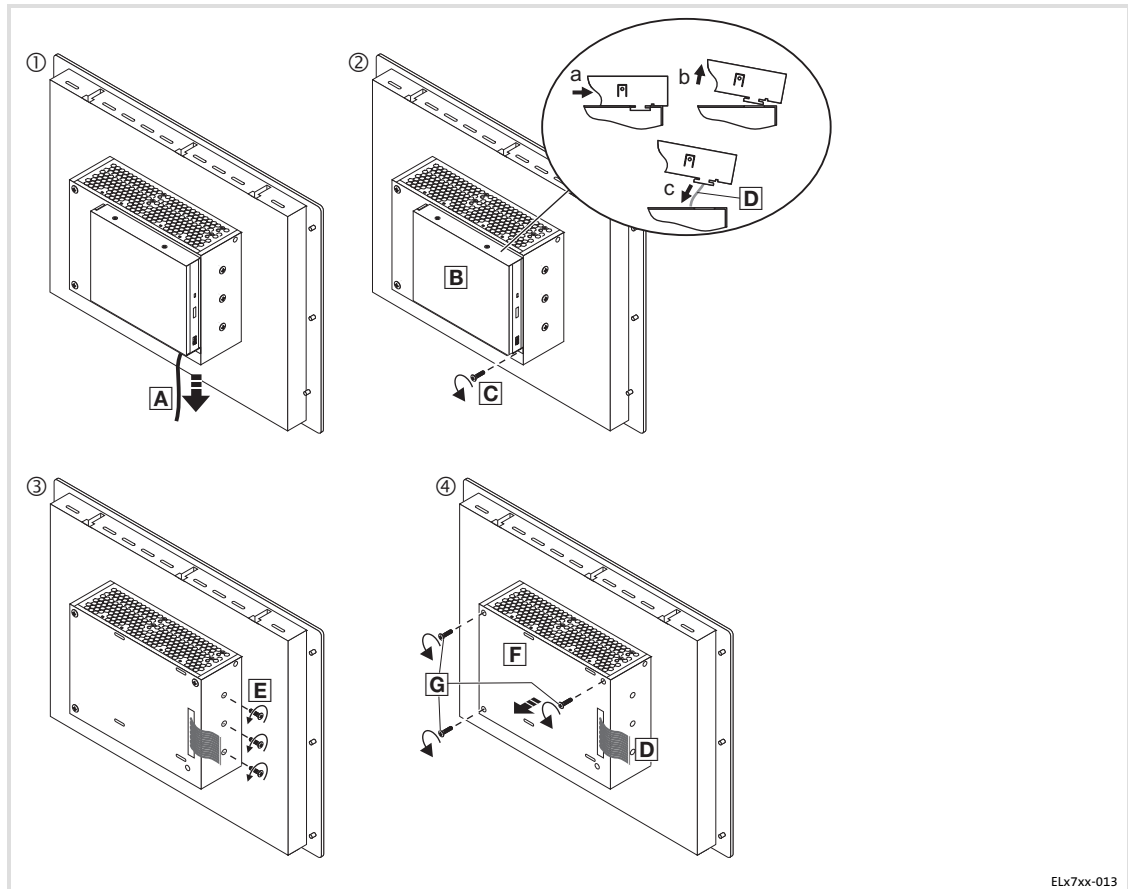
- ▶ Observe the following notes.
- ▶ Before cleaning, disconnect the device from the power supply as otherwise unintentional commands may be activated via the touchscreen, for example a response of the control.
- ▶ Clean the device front (screen and frame) as follows:
  - Use a clean, lint-free and soft cloth.
  - Moisten the cloth with the detergent. Do not spray the detergent directly on the device.
  - Only use water with a fluid addition as detergent or a detergent declared especially for flat screens.
- ▶ Clean the rear side of the device with a clean, lint-free and soft cloth. Do not use liquid or foaming detergent since it may enter the housing or terminals.



### 8.3 Repair

#### 8.3.1 Remove the PC housing

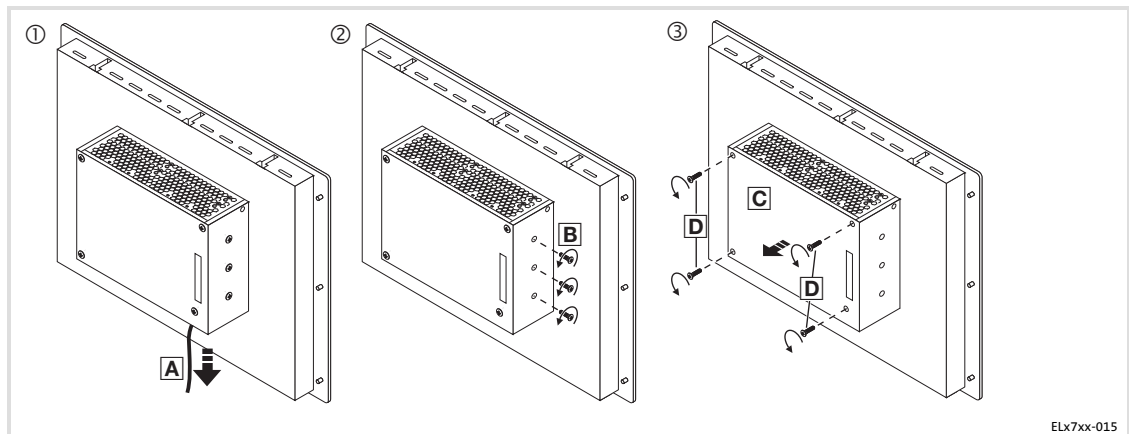
With DVD drive



ELx7xx-013

Proceed as follows when a DVD drive is mounted:

1. Remove the 24 V cable **A** (📖 37)
2. Remove the DVD drive **B**:
  - Loosen the fixing screw **C**.
  - Push the DVD drive to the right.
  - Carefully take off the DVD drive.
  - Remove the ribbon cable **D**.
3. **Only for fanless devices:** Loosen the three screws **E**.
4. Remove the housing **F**:
  - Loosen the three screws **G**.
  - Carefully pull the housing **F** off towards the front while passing the ribbon cable **D** through the housing aperture.

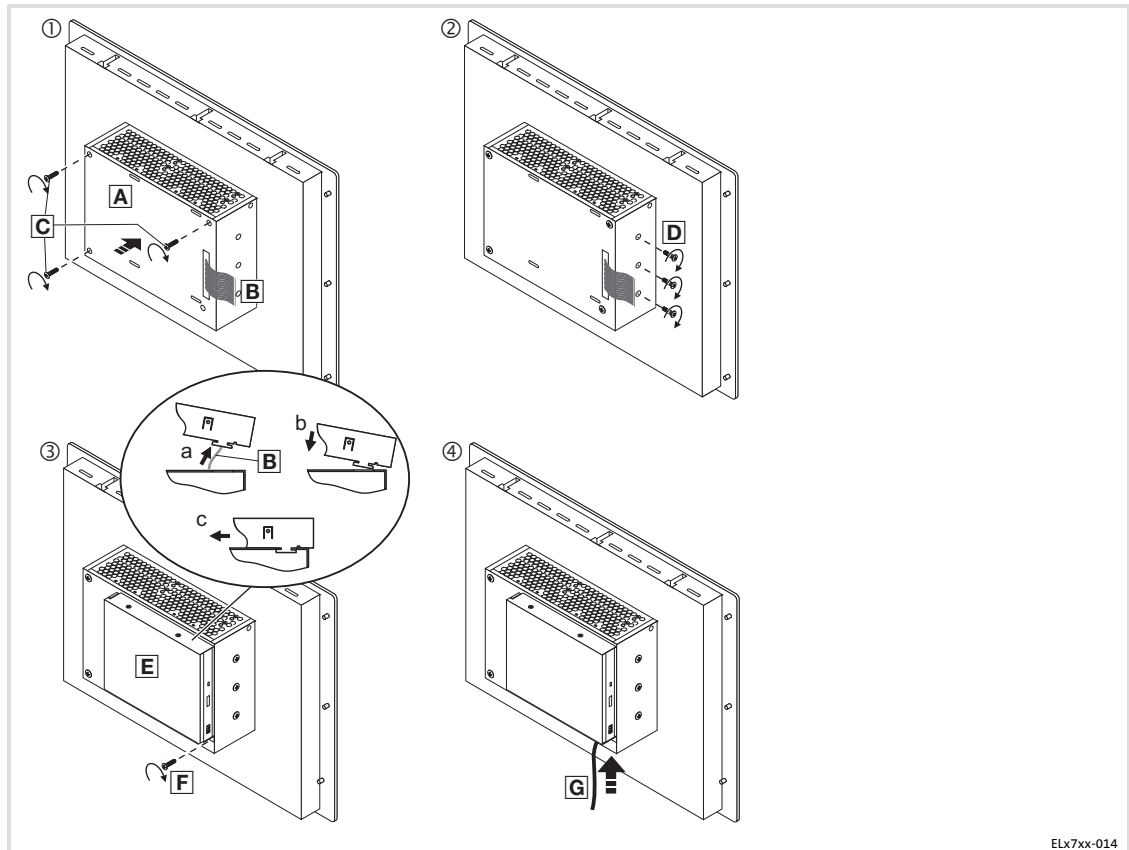
**Without DVD drive**

Proceed as follows when no DVD drive is mounted:

1. Remove the 24 V cable **A** (📖 37).
2. **Only for fanless devices:** Loosen the three screws **B**.
3. Remove the housing **C**:
  - Loosen the four screws **D**.
  - Carefully pull the housing **C** off towards the front.

### 8.3.2 Mount the PC housing

#### With DVD drive

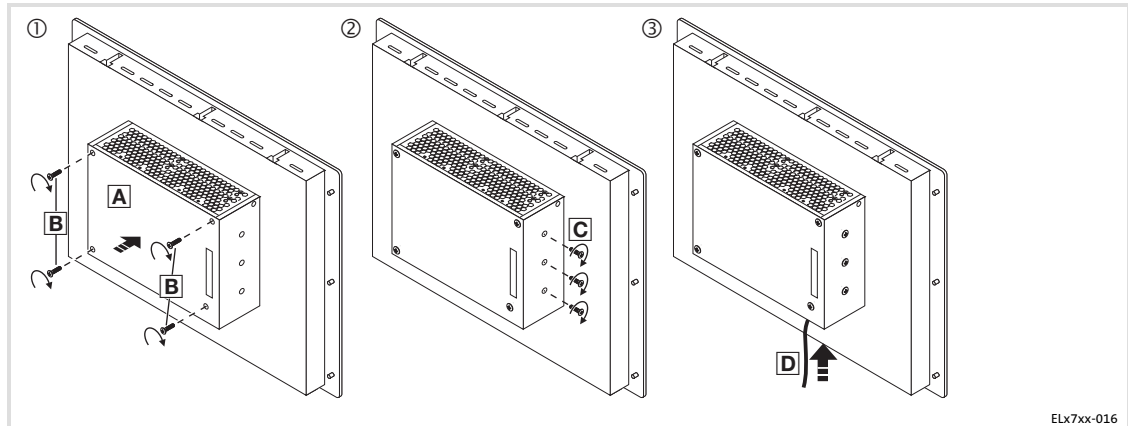


ELx7xx-014

Proceed as follows when a DVD drive is mounted:

1. Mount the housing **A**:
  - Pass the ribbon cable **B** through the housing aperture and carefully place the housing **A** on the housing base.
  - Screw in the three screws **C**.
2. **Only for fanless devices:** Screw in the three screws **D** and tighten them.  
The internal heatsink must be firmly connected with the housing. Otherwise, the heat dissipation will not suffice, and the device might be damaged.
3. Mount the DVD drive **E**:
  - Plug on the ribbon cable **B**.
  - Carefully place the DVD drive **E** on the slots in the housing.
  - Push the DVD drive **E** to the left until it snaps into place.
  - Screw in the fixing screw **F**.

## Without DVD drive



Proceed as follows when no DVD drive is mounted:

1. Mount the housing **A**:
  - Carefully place the housing **A** on the housing base.
  - Screw in the four screws **B**.
2. **Only for fanless devices:** Screw in the three screws **C** and tighten them.  
The internal heatsink must be firmly connected with the housing. Otherwise, the heat dissipation will not suffice, and the device might be damaged.

## 8.3.3

## Battery change

**Danger!****Danger of fire and explosion**

On the baseboard there is a battery for buffering the clock (RTC) when the device has been switched off.

**Possible consequences:**

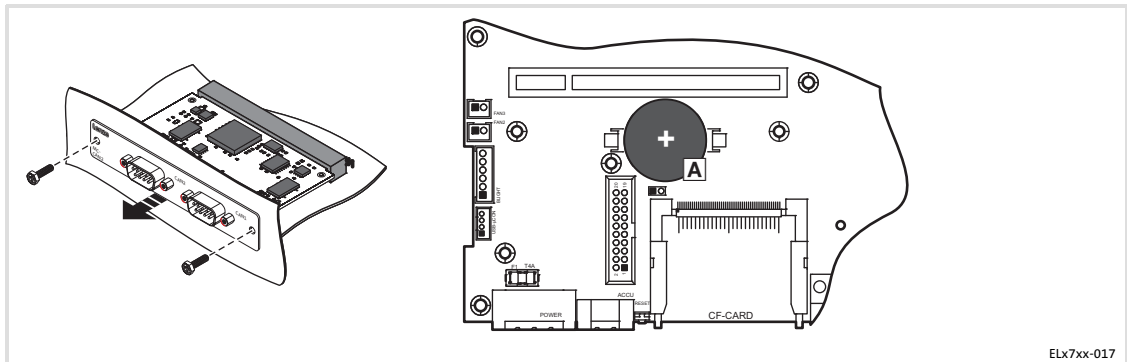
- ▶ The use of other batteries than the approved ones or improper handling can result in a fire, explosion, or environmental damage.

**Protective measures:**

- ▶ The battery may only be replaced by an approved battery type according to the following list.
- ▶ The battery may not be recharged or opened. Furthermore it may not be thrown into a fire or be heated above 100 °C (212 °F).

Approved types:

- ▶ Matsushita CR2450, Renata CR2450N, Sony Corp. CR2450B, Toshiba CR2450, Varta CR2450



How to proceed:

1. Remove the MC Card, if inserted.
2. Remove the old battery **A** from the support.
3. Insert a new approved battery **A** into the support so that the positive pole is at the top.

**According to European legislation you are obliged to dispose of batteries separately, using the take-back systems specified.**

### 8.3.4 Fuse change



#### Stop!

##### Damage of the device by non-permissible fuse possible

The baseboard in the device is protected by a fuse which will be damaged if the supply voltage applied is too high.

##### Possible consequences:

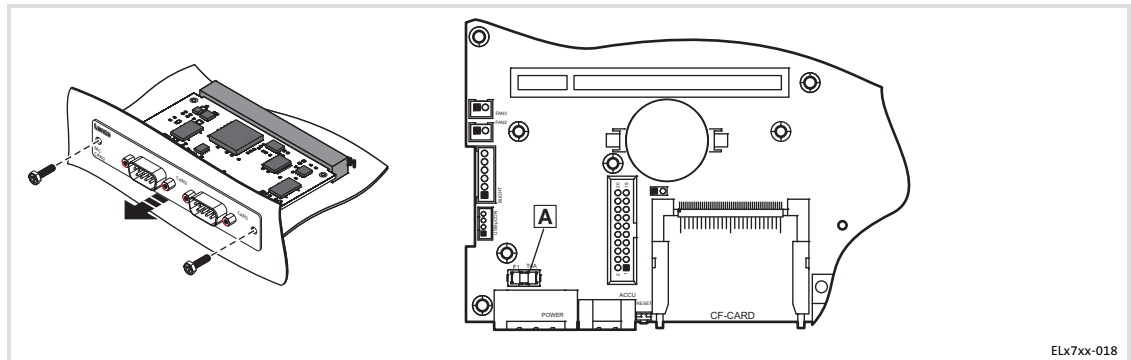
- ▶ The device can be damaged if a non-approved fuse is installed.

##### Protective measures:

- ▶ The fuse may only be replaced by an approved type.

Approved types:

- ▶ Littelfuse 0454 004



How to proceed:

1. Remove the MC Card, if inserted.
2. Remove the old fuse **A** from the support.
3. Insert a new approved fuse **A** into the support.

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