



EMBEDDED IPCs

INSTRUCTIONS FOR USE | **E22 BOX/PANEL**




Original Manual
Document 20146638 EN 01

Preface

The described hard- and software are developments of the KEB Automation KG. The enclosed documents correspond to conditions valid at printing. Misprint, mistakes and technical changes reserved.

Signal words and symbols

Certain operations can cause hazards during the installation, operation or thereafter. There are safety informations in the documentation in front of these operations. Security signs are located on the device or machine. A warning contains signal words which are explained in the following table:

 DANGER	Dangerous situation, which will cause death or serious injury in case of non-observance of this safety instruction.
 WARNING	Dangerous situation, which may cause death or serious injury in case of non-observance of this safety instruction.
 CAUTION	Dangerous situation, which may cause minor injury in case of non-observance of this safety instruction.
NOTICE	Situation, which can cause damage to property in case of non-observance.

RESTRICTION

Is used when certain conditions must meet the validity of statements or the result is limited to a certain validity range.



Is used when the result will be better, more economic or trouble-free by following these procedures.

More symbols

- This arrow starts an action step.
- / - Enumerations are marked with dots or indents.
- => Cross reference to another chapter or another page.



Note to further documentation.
www.keb.de/nc/search



Laws and guidelines

KEB Automation KG confirms with the EC declaration of conformity with the CE mark on the unit name plate, that the device complies with the essential safety requirements. The EC declaration of conformity can be downloaded on demand via our website. Further information is provided in chapter "Certification".

Warranty

The warranty on design, material or workmanship for the acquired device is given in the current terms and conditions.



Here you will find our current terms and conditions.
www.keb.de/terms-and-conditions



Further agreements or specifications require a written confirmation.

Support

Through multiple applications not every imaginable case has been taken into account. If you require further information or if problems occur which are not treated detailed in the documentation, you can request the necessary information via the local KEB Automation KG agency.

The use of our units in the target products is beyond of our control and therefore exclusively the responsibility of the machine manufacturer, system integrator or customer.

The information contained in the technical documentation, as well as any user-specific advice in spoken and written and through tests, are made to best of our knowledge and information about the application. However, they are considered for information only without responsibility. This also applies to any violation of industrial property rights of a third-party.

Selection of our units in view of their suitability for the intended use must be done generally by the user.

Tests can only be done within the application by the machine manufacturer. They must be repeated, even if only parts of hardware, software or the unit adjustment are modified.

Copyright

The customer may use the instruction manual as well as further documents or parts from it for internal purposes. Copyrights are with KEB Automation KG and remain valid in its entirety.

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Glossary

0V	Earth-potential-free common point	MCM	American unit for large wire cross sections
1ph	1-phase mains	MTTF	Mean service life to failure
3ph	3-phase mains	MTTF _D	Mean time to dangerous failure
AC	AC current or voltage	NN	Sea level
ASCL	Asynchronous sensorless closed loop	PA	Potential equalization
AWG	American wire gauge	PE	Protective earth
B2B	Business-to-business	PELV	Protective Extra Low Voltage
CAN	Fieldbus system	PFD	Term used in the safety technology (EN 61508-1...7) for the size of error probability
CODESYS	Operating system of the standard control and programming environment	PFH	Term used in the safety technology (EN 61508-1...7) for the size of error probability per hour
CODESYS Safety-PS	Safety programming system	PLC	Programmable logic controller
COMBIVERT	KEB drive converters	Port	Part of a network address to the assignment of TCP and UDP connections
COMBIVIS	KEB start-up and parameterizing software	POU	Program Organization Unit
DC	DC current or voltage	RJ45	Modular connector with 8 lines
DIN	German Institut for standardization	Safety Package	Plug in for COMBIVIS studio 6 with safety functionally
EMC	Electromagnetic compatibility	Safety PLC	Safety programmable logic controller
Emergency stop	Shutdown of a drive in emergency case (not de-energized)	Safety PLCopen	Library of the certified basic level safety blocks
Emergency switching off	Switching off the voltage supply in emergency case	SELV	Safety Extra Low Voltage (<60V)
EN	European standard	SFF	Safe failure fraction
EtherCAT	Real-time Ethernet bus system of the company Beckhoff	SIL	The security integrity level is a measure for quantifying the risk reduction. Term used in the safety technology (EN 61508 -1...7).
Ethernet	Real-time bus system - defines protocols, plugs, types of cables	USB	Universal serial bus
FE	Functional earth		
FSoE	Functional Safety over EtherCAT		
GND	Reference potential, ground		
HFT	Hardware fault tolerance		
Head module	Description for the bus coupler or small control in the KEB-I/O EtherCat system		
HMI	Human machine interface (touch screen)		
IEC	International standard		
IP xx	Degree of protection (xx for level)		
KEB-I/O EtherCAT SPS/I/O system	Small control system from the KEB-I/O module family		
KEB-I/O EtherCAT System			

Standards for control & automation

DGUV regulation 3	Electrical installations and equipment
DIN 46228-1	Wire-end ferrules; Tube without plastic sleeve
DIN 46228-4	Wire-end ferrules; Tube with plastic sleeve
DIN IEC 60364-5-54	Low-voltage electrical installations - Part 5-54: Selection and erection of electrical equipment - Earthing arrangements, protective conductors and protective bonding conductors (IEC 64/1610/CD)
DIN VDE 0100-729	Low-voltage electrical installations - Part 7-729: Requirements for special installations or locations - Operating or maintenance gangways (IEC 60364-7-729); German implementation HD 60364-7-729
EN 1037	Safety of machinery - Prevention of unexpected start-up; German version EN 1037
EN 55011	Industrial, scientific and medical equipment - Radio frequency disturbance characteristics - Limits and methods of measurement (IEC/CISPR 11); German version EN 55011
EN 55021	Interference to mobile radiocommunications in the presence of impulse noise - Methods of judging degradation and measures to improve performance (IEC/CISPR/D/230/FDIS); German version prEN 55021
EN 60204-1	Safety of machinery - electrical equipment of machines Part 1: General requirements (VDE 0113-1, IEC 44/709/CDV)
EN 60439-1	Low-voltage switchgear and controlgear assemblies - Part 1: Type-tested and partially type-tested assemblies (IEC 60439-1); German version EN 60439-1
EN 60529	Degrees of protection provided by enclosures (IP Code) (IEC 60529)
EN 60664-1	Insulation coordination for equipment within low-voltage systems Part 1: Principles, requirements and tests (IEC 60664-1)
EN 60721-3-1	Classification of environmental conditions - Part 3-1: Classification of groups of environmental parameters and their severities - Section 1: Storage (IEC 104/648/CD)
EN 60721-3-2	Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities - Section 2: Transportation and handling (IEC 104/670/CD)
EN 60721-3-3	Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities; section 3: Stationary use at weatherprotected locations; Amendment A2 (IEC 60721-3-3); German version EN 60721-3-3
EN 61000-2-1	Electromagnetic compatibility (EMC) - Part 2: Environment - Section 1: Description of the environment - Electromagnetic environment for low-frequency conducted disturbances and signalling in public power supply systems
EN 61000-2-4	Electromagnetic compatibility (EMC) - Part 2-4: Environment; Compatibility levels in industrial plants for low-frequency conducted disturbances (IEC 61000-2-4); German version EN 61000-2-4
EN 61000-4-2	Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test (IEC 61000-4-2); German version EN 61000-4-2
EN 61000-4-3	Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test (IEC 61000-4-3); German version EN 61000-4-3
EN 61000-4-4	Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test (IEC 61000-4-4); German version EN 61000-4-4
EN 61000-4-5	Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement

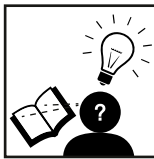
EN61000-4-6	techniques - Surge immunity test (IEC 61000-4-5); German version EN 61000-4-5 Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields (IEC 61000-4-6); German version EN 61000-4-6
EN61000-4-34	Electromagnetic compatibility (EMC) - Part 4-34: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests for equipment with mains current more than 16 A per phase (IEC 61000-4-34); German version EN 61000-4-34
EN 61131-2	Programmable controllers - Part 2: Equipment requirements and tests (IEC 61131-2)
EN61373	Railway applications - Rolling stock equipment - Shock and vibration tests (IEC 61373)
EN61439-1	Low-voltage switchgear and controlgear assemblies - Part 1: General rules (IEC 121B/40/CDV); German version FprEN 61439-1
EN61508-1...7	Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 1...7 (VDE 0803-1...7, IEC 61508-1...7)
EN61800-2	Adjustable speed electrical power drive systems - Part 2: General requirements - Rating specifications for low voltage adjustable frequency a.c. power drive systems (VDE 0160-102, IEC 61800-2)
EN61800-3	Speed-adjustable electrical drives. Part 3: EMC requirements and specific test methods (VDE 0160-103, IEC 61800-3)
EN61800-5-1	Adjustable speed electrical power drive systems - Part 5-1: Safety requirements - Electrical, thermal and energy (IEC 61800-5-1); German version EN 61800-5-1
EN61800-5-2	Adjustable speed electrical power drive systems - Part 5-2: Safety Requirements - Functional (IEC 22G/264/CD)
EN62061	Safety of machinery - functional safety of electrical, electronic and programmable electronic safety-related systems (VDE 0113-50, IEC 62061)
EN ISO 13849-1	Safety of machinery - safety-related parts of control systems - Part 1: General principles for design (ISO 13849-1); German version EN ISO 13849-1
UL61800-5-1	American version of the EN61800-5-1 with „National Deviations“

1 Basic Safety Instructions

This instructions for use contains the information necessary for the intended use of the described product (control unit, operating material, software etc.).

The safety instructions can be supplemented by local, country or application-specific safety instructions. This list is not exhaustive. Non-observance will lead to the loss of any liability claims.

ATTENTION



Hazards and risks through ignorance.

- ▶ Read the instruction manual!
- ▶ Observe the safety and warning instructions !
- ▶ If anything is unclear, please contact KEB !

1.1 Target group

This manual is written for qualified personnel from construction, project planning, service and commissioning. Qualified personnel for the purpose of this instruction manual must have the following qualifications:

Knowledge and understanding of the safety instructions.

- Knowledge of automation technology.
- Knowledge of functional safety.
- Skills for the installation and assembly of electrical equipment.
- Detection of hazards and risks of the electrical drive technology.
- Understanding of the function in the used machine.
- Knowledge of the operation of the operating system Windows.
- Knowledge of the [DIN IEC 60364-5-54](#).
- Knowledge of national safety regulations (e.g. [DGUV regulation 3](#)).

1.2 Transport, storage and proper use

The transport is carried out by qualified persons in accordance with the environmental conditions specified in this manual. The devices shall be protected against excessive strains.



Electronic devices contain electrostatic sensitive components.

- ▶ Avoid contact.
- ▶ Wear ESD-protective clothing.

Do not store the devices

- in the environment of aggressive and/or conductive liquids or gases.
- with direct sunlight.
- outside the specified environmental conditions.

1.3 Installation

DANGER



Do not operate in an explosive environment!

- ▶ The device is not intended for the use in potentially explosive environment.

To prevent damages to the device:

- Make sure that no components are bent and/or isolation distances are changed.
- The device must not be put into operation in case of mechanical defects. Non-compliance with the applicable standards.
- Do not allow moisture or mist to penetrate the unit.
- Avoid dust permeating the device. Allow for sufficient heat dissipation if installed in a dust-proof housing.
- Note installation position and minimum distances to surrounding elements. Do not cover the ventilation openings.
- Assembly according to the specified degree of protection.
- Make sure that no small parts fall into the device during assembly and wiring (drilling chips, screws etc.). This also applies to mechanical components, which can lose small parts during operation.
- Check the reliable fit of the device connections in order to avoid contact resistances and sparking.
- The safety instructions are to be kept!

1.4 Electrical connection

DANGER



Voltage at the terminals and in the device!

Danger to life due to electric shock !

- ▶ Never work on the open device or never touch exposed parts.
- ▶ For any work on the unit switch off the supply voltage and secure it against switching on.
- ▶ Install suitable protective devices for personal protection.
- ▶ Never bridge upstream protective devices (also not for test purposes).
- ▶ Install all required covers and protective devices for operation.

For a trouble-free and safe operation, please pay attention to the following instructions:

- The electrical installation shall be carried out in accordance with the relevant requirements.
- Cable cross-sections and fuses must be dimensioned according to the design of the machine manufacturer. Specified minimum / maximum values may not be fallen below /exceeded.
- With existing or newly wired circuits the person installing the units or machines must ensure the EN requirements are met.

- When using components without isolated inputs/outputs, it is necessary that equipotential bonding exists between the components to be connected (e.g. by the equipotential line). Disregard can cause destruction of the components by equalizing currents.

1.4.1 EMC-compatible installation

Observance of the limit values required by EMC law is the responsibility of the manufacturer of the installation or machine.



Notes on EMC-compatible installation can be found here.
<https://www.keb.de/fileadmin/media/Manuals/emv/0000neb0000.pdf>



1.5 Start-up and operation

When the device is installed in machines, startup (i. e. the start of the intended use) is prohibited until it is determined that the machine complies with the machine directive; *EN 60204-1* must be observed.

- During operation, all covers and doors shall be kept closed.
- Use only approved accessories for this device.
- Never touch terminals, busbars or cable ends.

1.6 Maintenance

The following maintenance work has to be carried out when required, but at least once per year by authorized and trained personnel.

- ▶ Check unit for loose screws and plugs and tighten if necessary.
- ▶ Clean devices from dirt and dust deposits. Pay attention especially to cooling fins and protective grid of the fans.
- ▶ Examine and clean extracted air filter and cooling air filter of the control cabinet.

1.7 Preventive Maintenance

⚠ DANGER



Unauthorized exchange, repair and modifications!

Unpredictable malfunctions!

- ▶ The function of electronic devices can be affected by the setting and parameterisation. Never replace without knowledge of the application.
- ▶ Modification or repair is permitted only by KEB Automation KG authorized personnel.
- ▶ Only use original manufacturer parts.
- ▶ Infringement will annul the liability for resulting consequences.

1.8 Disposal

Devices with safety function are limited to a service life of 20 years. Then the devices must be replaced and disposed by way that they do not come into circulation again.

Electronic devices of the KEB Automation KG are exclusively professional devices for further industrial processing (so-called B2B devices). Thus the marking does not occur with the symbol of the crossed-out wheeled bin, but by the word mark and the date of manufacture.

Unlike devices mainly used in private households, these devices may not be disposed at the collection centres of public sector disposal organisations. They must be disposed after the end of use in accordance with national applicable law to environmentally correct disposal of electrical and electronic equipment.

The packaging must be feed to paper and cardboard recycling.

2 System Description

C6 E22 BOX/PANEL is an industrial fanless Panel / Box PC based on the Intel Bay Trail SoC platform with 10W Celeron quad cores processor and 22 nm manufacturing process.

2.1 Key features

- Industrial fanless Panel / Box PC (operating temperature 0÷50°C) with Intel® Celeron® J1900 processor
- Up to 8GB of DDR3 1333MHz RAM in one SODIMM module
- Wide range of 16 mln colors LED backlight TFT LCD displays.
 - 4:3 aspect ratio: 10.4“, 12.1“, 15.0“.
 - 5:4 aspect ratio: 17.0“, 19.0“.
 - 16:9 aspect ratio: 15.6“, 18.5“, 21.5“, 24.0“.
 - 16:10 aspect ratio: 10.1“, 12.1“.
- Featuring KEB STANDARDS.
 - Standard cut -out for Panel PCs and monitors
 - Front panel in two different versions
 - Galvanically isolated power supply
 - Integrated Micro UPS
- Supported O.S. certified by KEB:
 - Microsoft Windows Embedded Standard 7P 32 bit.
- Slim version for reduced depth installation (SL version).
- Embedded add-on boards for optional communication ports.
- Optional PCI/PCIe slot (S1 version).
- 2 Gigabit Ethernet ports
- 1 UBS 3.0 port
- 18-32VDC isolated power supply

2.1.1 New KEB Standards

2.1.1.1 Front panels in different variants

The system can be arranged with the front panel in aluminium, aluminium with true flat technology and Multi Touch.

2.1.1.2 KEB CUTOUT

This PC family is compatible with KEB Cut-Out: a unique cut-out for each different size of LCD to ensure interchangeability among different Panel PC and Monitor families and future mechanical compatibility, facilitating the user in updating its fleet.

2.1.1.3 Isolated Power Supply

Isolated Power supply with galvanic isolation to prevent:

- Common mode noise at low/medium frequencies on the power supply line
- Ground loop noise
- Extra-voltage caused by lightning
- Power supply with grounded positive terminal (e.g. Japan)

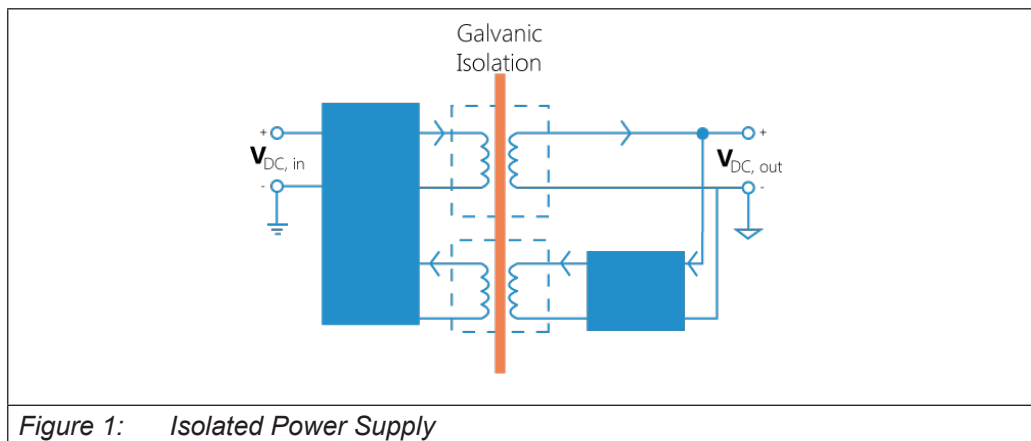


Figure 1: Isolated Power Supply

2.1.1.4 Fieldbusses

One PCI slot is available for KEB fieldbuses, I/Os and NVRAM cards.

2.1.2 Option cards





The system can be optionally equipped with KEB design add-on cards. They provide additional resources for the system: one or two serial ports, a USB connector, etc.

2.1.3 LCD LED backlight

LCD with LED backlight technology; the system is equipped only with the new generation LCD with LED technology.

2.2 Package

C6 E22 BOX/PANEL package consists of:

C6 E22 BOX/PANEL	
KEB Start up sheet	
Depending of LCD size: <ul style="list-style-type: none"> • n.10 (8+2 spare) clamps with grub screw (on 10.4" - 12.1" - 15.0" models) • n.10 (8+2 spare) clamps with grub screw (on 15.6" - 15.6" - 17.0" models) • n.12 (10+2 spare) clamps with grub screw (on 18.5" – 19.0" models) • n.16 (14+2 spare) clamps with grub screw (on 21.5" - 24.0" models) 	
n.2 hex keys	
n.1 Power supply plug	
<i>Table 1: Package</i>	

2.3 Front panels

The system is available with two different kinds of frontal panel:

- Full aluminium.
- Aluminium with True Flat technology and Multi Touch (capacitive).

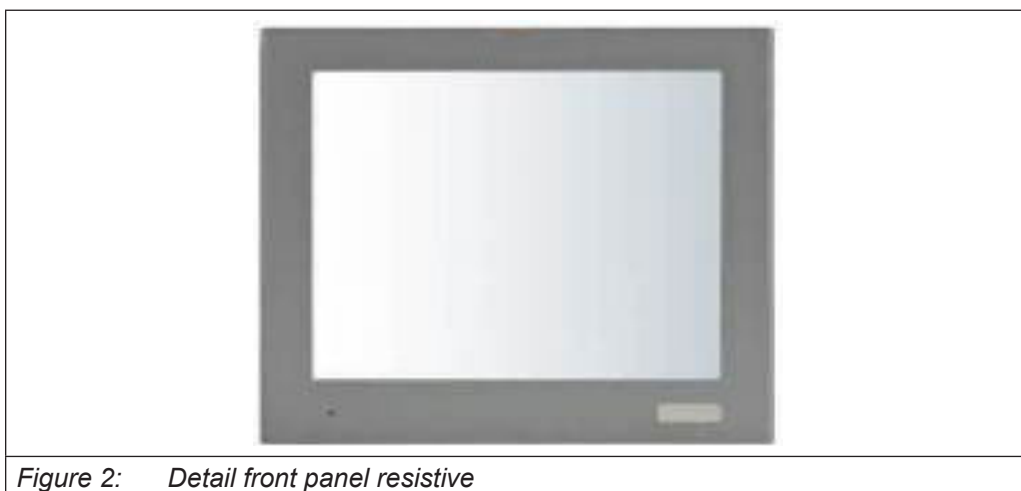


Figure 2: Detail front panel resistive



Figure 3: Detail front panel capacitive

2.3.1 Full aluminium front panel

C6 E22 PANEL (resistive) is available in the following sizes:

- 10.1" wide
- 10.4"
- 12.1"
- 12.1" wide
- 15.0"
- 15.6" wide
- 17.0"
- 18.5" wide
- 19.0"
- 21.5" wide
- 24.0" wide

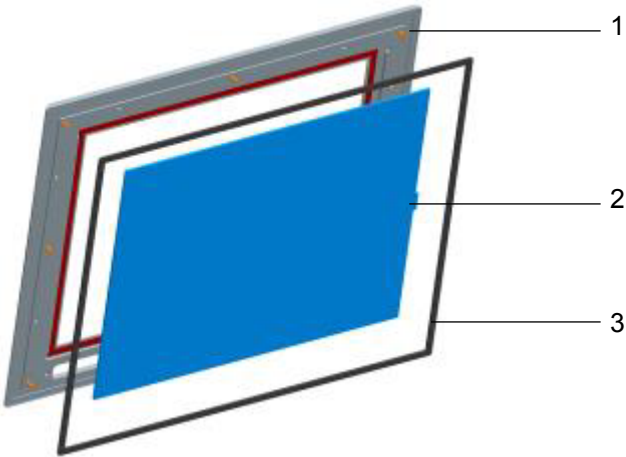


- | | |
|---|----------------------------|
| 1 | Full aluminium front panel |
| 2 | Touchscreen display |
| 3 | IP66 protected USB |
| 4 | On/Off/Standby/UPS LED |

Figure 4: Detail front panel (resistive) in the figure is shown as an example a 15.0" display

The full aluminium front panel has a “step” between the front panel and the touchscreen.

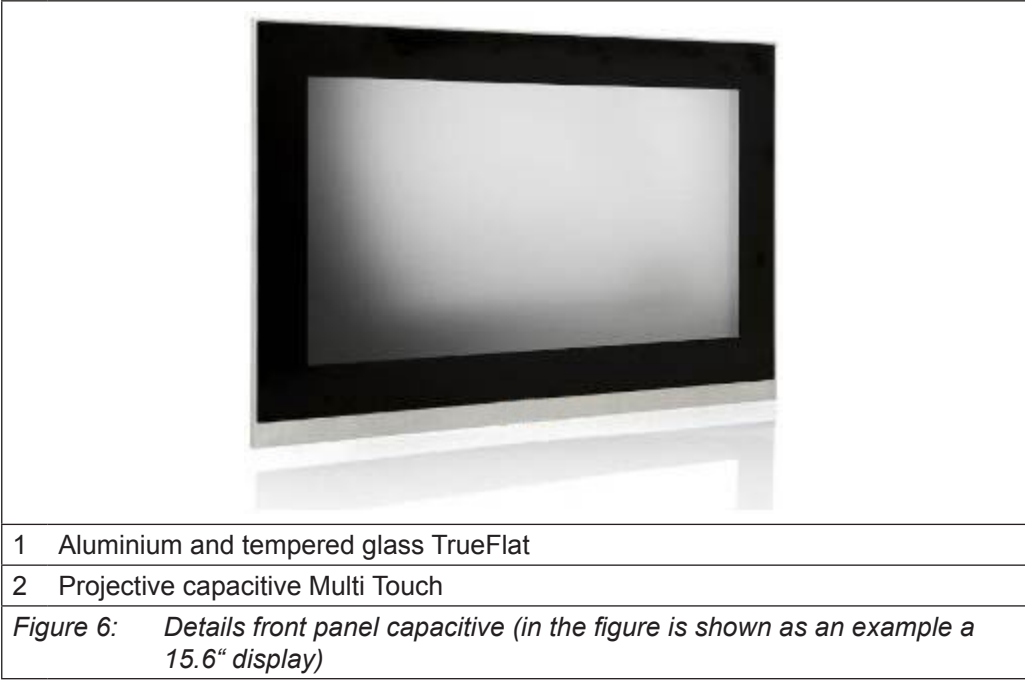
	
Features	
Index of protection	IP66
Back Seal type	EPDM
Metal housing	EN AW-5754, H22 EN 485-1
Table 2: Features front panel resistive	

	
1	Metal housing
2	Touchscreen
3	Back seal
Figure 5: Construction detail	

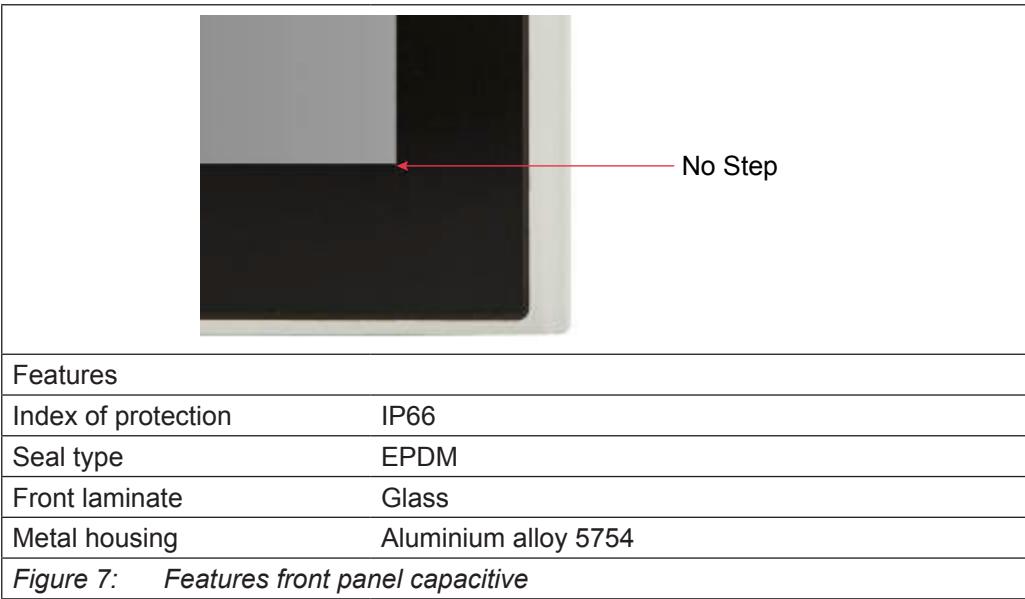
2.3.2 Front panel capacitive

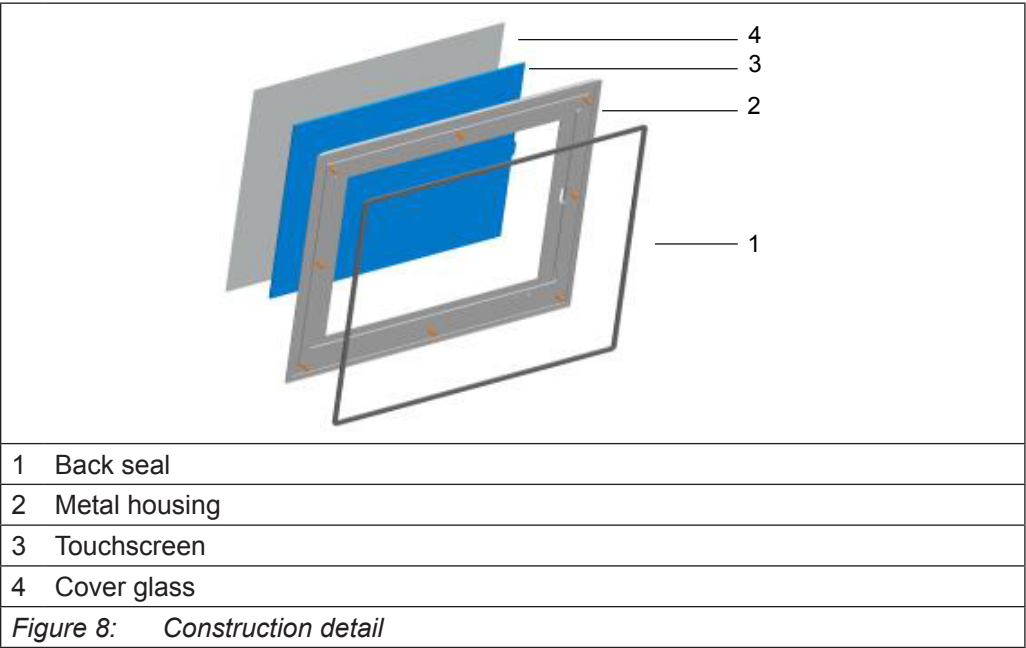
C6 E22 Panel capacitive (aluminum and glass front panel with true flat technology with Multi Touch touchscreen) is available in the following sizes:

- 15.6" wide
- 18.5" wide
- 21.5" wide
- 24.0" wide



The front panels with true flat technology contain a Projective capacitive Multi Touch touchscreen that is handled by a USB controller within the system.





2.3.3 LCD aspect ratio

There are different LCD aspect ratios depending of the frontal panel sizes:

Panel size	Aspect ratio
10.4"	4 : 3
12.1"	4 : 3
15.0"	4 : 3
17.0"	5 : 4
19.0"	5 : 4
10.1" wide	16 : 10
12.1" wide	16 : 10
15.6" wide	16 : 9
18.5" wide	16 : 9
21.5" wide	16 : 9
24.0" wide	16 : 9



Figure 9: 4 : 3 aspect ratio example



Figure 10: 5 : 4 aspect ratio example



Figure 11: 16 : 9 (wide) aspect ratio example

2.3.4 Front USB 2.0

The USB 2.0 port on the front panel is protected by anti-flame silicone rubber cover. The silicone rubber is soft enough, to guarantee an IP66 degree of protection, when completely closed.

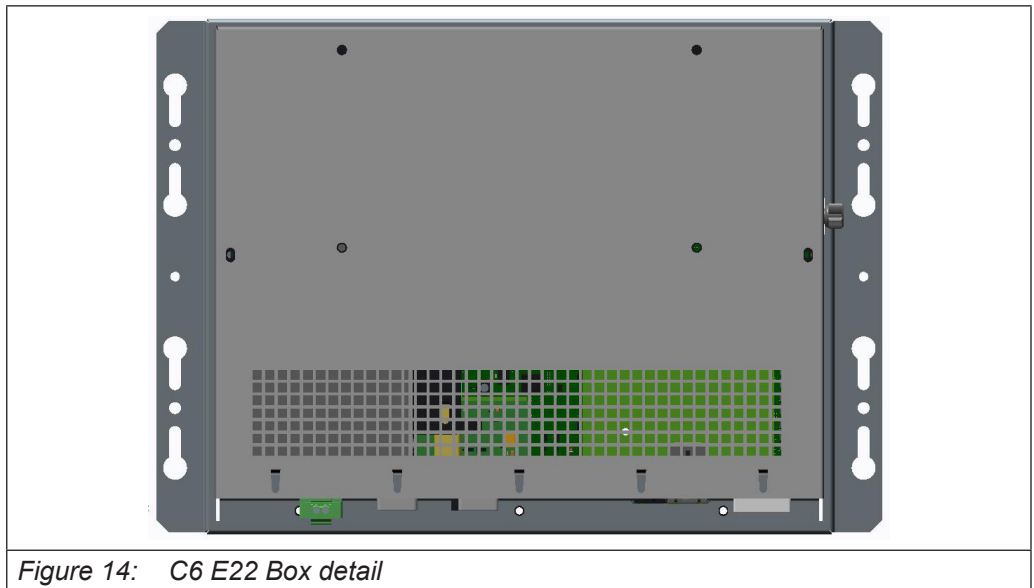


Figure 12: Front USB detail

2.3.4.1 Opening the cover




2.4 C6 E22 Box




2.5 SL - S1 different depths / add-on slots

C6 E22 BOX/PANEL is available in two different depths according to the expansion slots option:



C6 E22 BOX/PANEL “SL” (Slim Size) has no PCI/PCle slot.

Figure 15: „SL“ detail



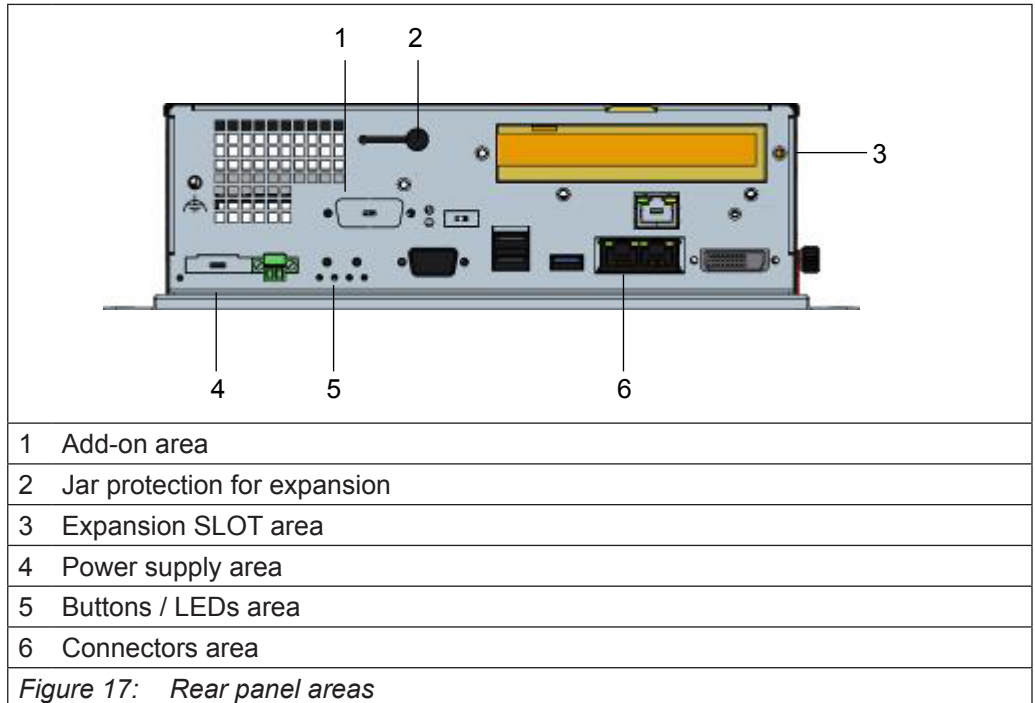
C6 E22 BOX/PANEL “S1” is provided with one expansion slot: PCI or PCIe x1.

Figure 16: „S1“ detail

Expansion Slot / Versions	SL	S1
Expansion Slot	No expansion slot	1 board of: <ul style="list-style-type: none">• 1 x RS232/422/485 opto + 1 x USB Further board: <ul style="list-style-type: none">• 1 x LAN Gigabit
PCI / PCIe	No expansion slot	1 board of: <ul style="list-style-type: none">• NETcore X APCI• CAN RAW PCI

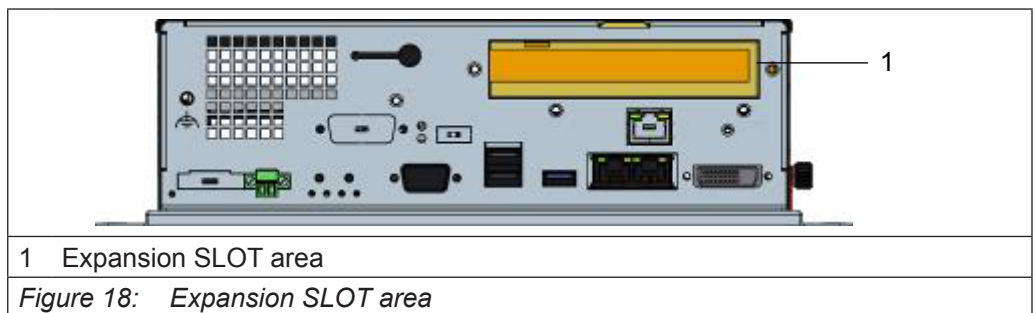
2.6 Rear panel areas

In the rear panel we find the following areas:

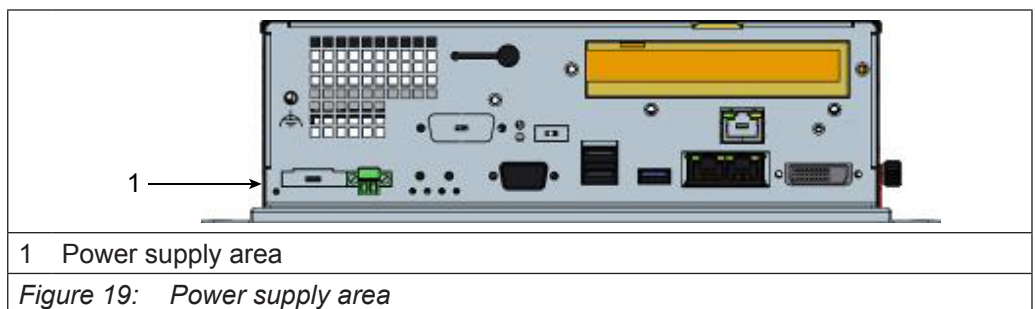


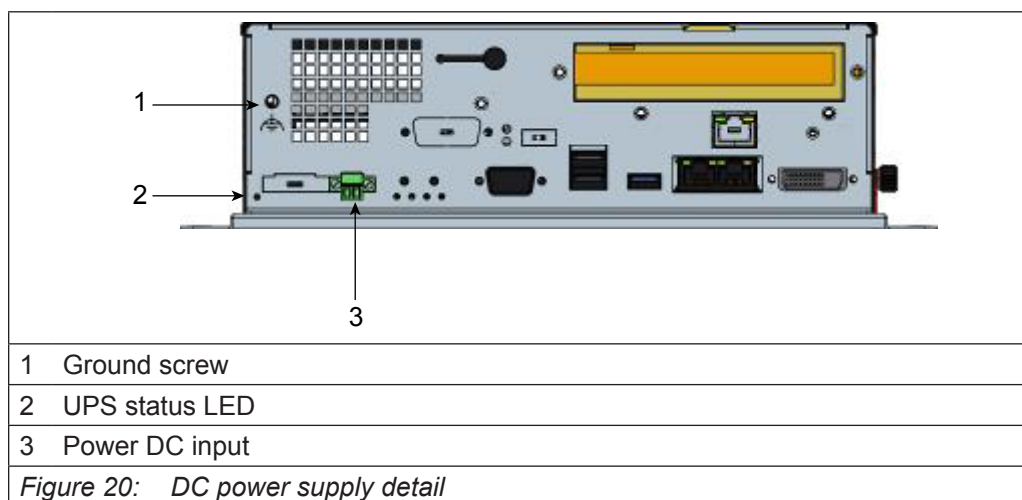
2.6.1 Expansion SLOT area

C6 E22 BOX/PANEL "S1" is provided with one expansion slot in different PCI/PCIe combination.

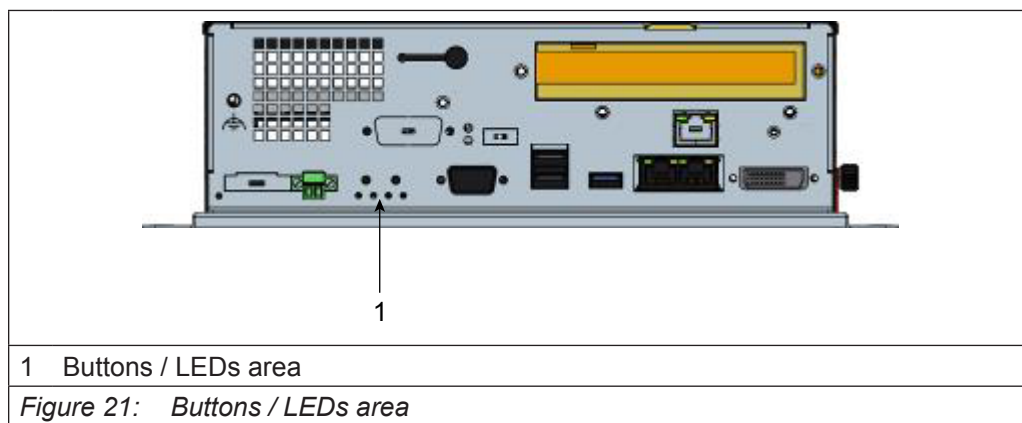


2.6.2 Power supply area

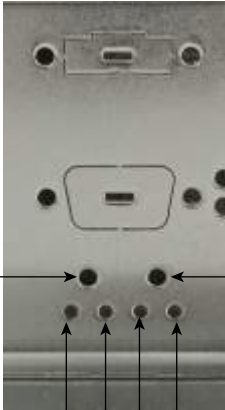




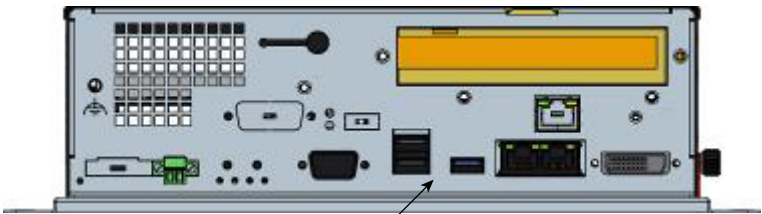
2.6.3 Buttons / LEDs area

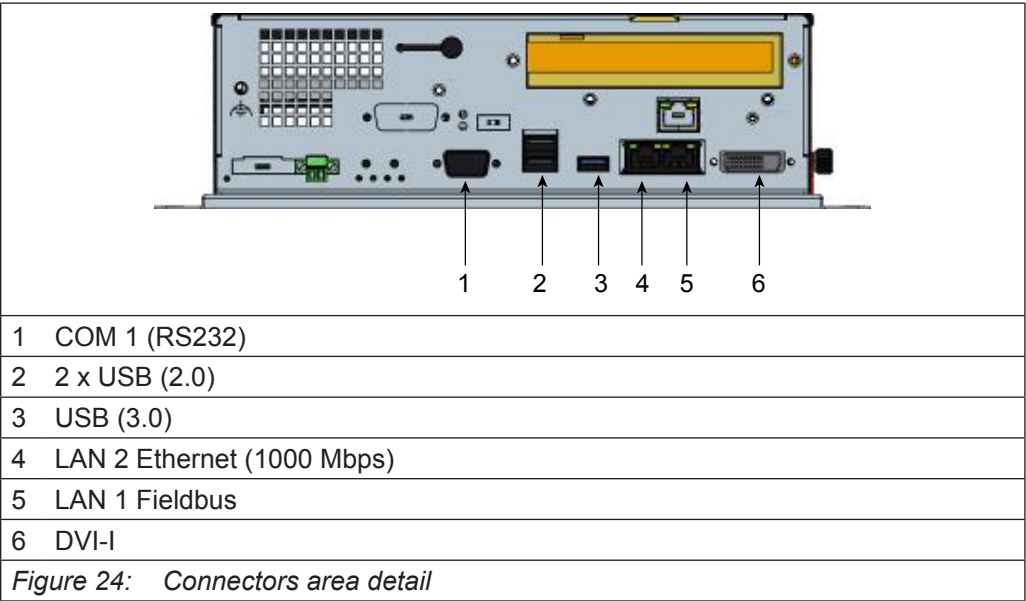


The buttons / LEDs area accommodates the following buttons / LEDs:

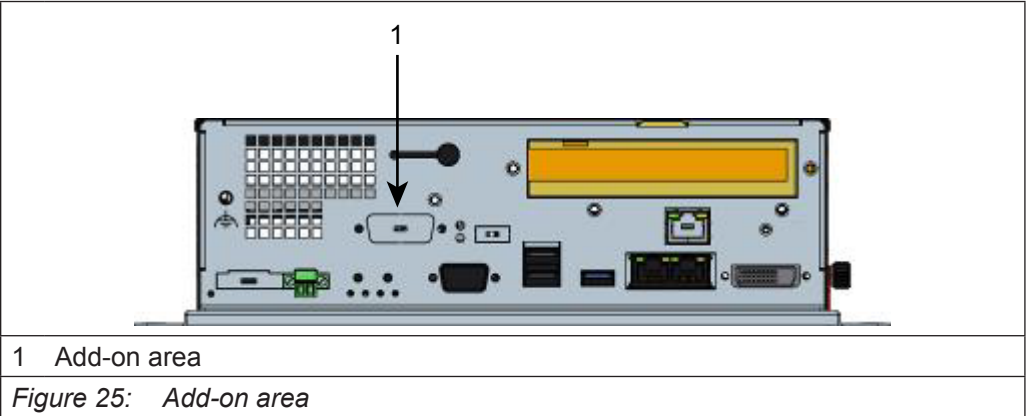
		
1	Reset	Act as hardware system reset without any interaction with the operating system.
2	Over Temperature / Battery fault LED	Red ON: Over temperature Red Blink: Battery is fault
3	Watchdog LED	Reserved for future use.
4	HD LED	Amber: Access to hard disk
5	On / Off / Standby	Green ON: device is powered Amber ON: device is shutdown OFF: device is not powered
6	Watchdog Reset	Reserved for future use.
<i>Figure 22: Buttons / LEDs area detail</i>		

2.6.4 Connectors area

		
1	Connectors area	
<i>Figure 23: Connectors area</i>		



2.6.5 Add-on area

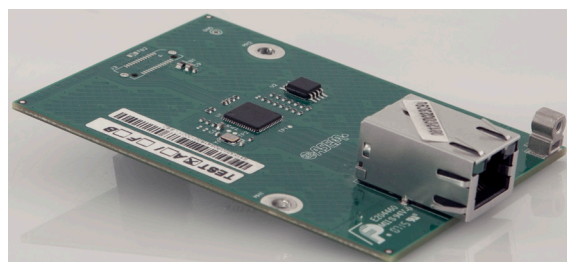


The expansion area can accommodate the following ports:

Opto-isolated COM3 and
USB4



Ethernet 10/100/1000 Mbps



2.6.6 Micro-UPS

UPS (uninterruptable Power Supply) devices are normally used to provide the continuity in the power supply circuitry to electronic devices where the electronics itself or the user's application hosted by the devices is critical from the possibility of a sudden loose of power. The Micro-UPS is designed to be used in combination with CONTROL Soft PLC. The Micro-UPS module is installed on the internal power supply unit.

Energy storage	4 super-capacitors 28F 2.7V connected in series.
Charging time	15s
Typical operating time	Greater than 500ms
Maintenance	None
Installation	Built-in electronics and super-capacitors
Local memory directly managed by the power supply	Non volatile 512KB MRAM for Soft PLC retain feature; real available memory 64KB for RETAIN segment + 128KB for PERSISTENT segment
System's actions taken when in UNDER_VOLTAGE	LCD is switched OFF USB power supply is switched OFF
Handling of retentive data in KEB CONTROL runtime implementation	<p>When receiving the UNDER_VOLTAGE signal the CPU starts a 20ms timer. When the timer is elapsed the system checks again the UNDER_VOLTAGE. If the signal is still active the system checks for the MICRO_UPS_VCAP_OK. If this signal is high the super-capacitors are ready and the peripherals are switched off (see previous point).</p> <p>The memory data block (128KB) is copied the MRAM memory.</p> <p>In case the super-capacitors are not ready, no data is saved to avoid possible data corruption. The data saving process can be estimated never exceeding 250ms at maximum.</p> <p>After the data copy has been completed if the UNDER_VOLTAGE signal is still active the system is turned off; if the UNDER_VOLTAGE signal is OFF the system is restarted automatically.</p> <p>In case of a shutdown command the data is saved and the system turned off. Note: Sleep mode is not supported.</p>
User's application compatibility	<p>Applications can subscribe μUPS "power-down event" form μUPS APIs.</p> <p>Note: No shutdown command is sent to the OS, hence no files nor databases can be automatically closed without proper handling of the event.</p> <p>Note: If CONTROL runtime has to manage retain variables the user's "event-application" must work on a priority level greater than 10.</p> <p>Note: Please contact KEB support for further details about APIs availability and use.</p>
Software utility	Micro-UPS diagnostic utility (available on request).
Table 3: Micro-UPS data	

2.6.7 Labels position

On the rear panel the following labels are present.



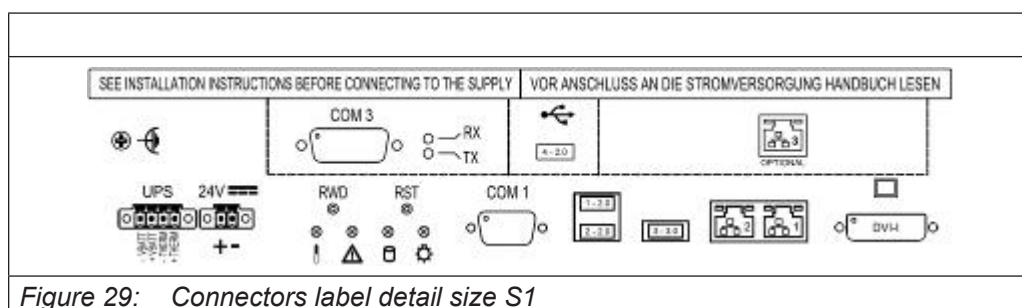
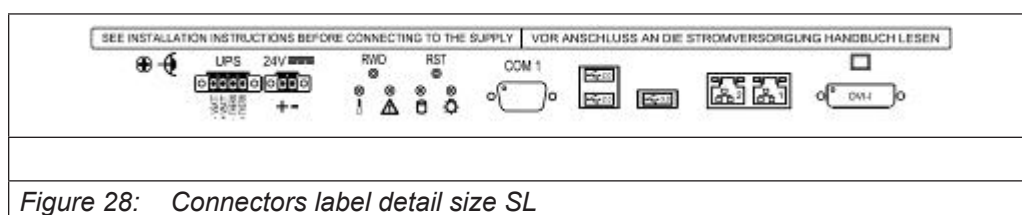
1	Marking label
Figure 26: Marking label	

2.6.7.1 Marking label

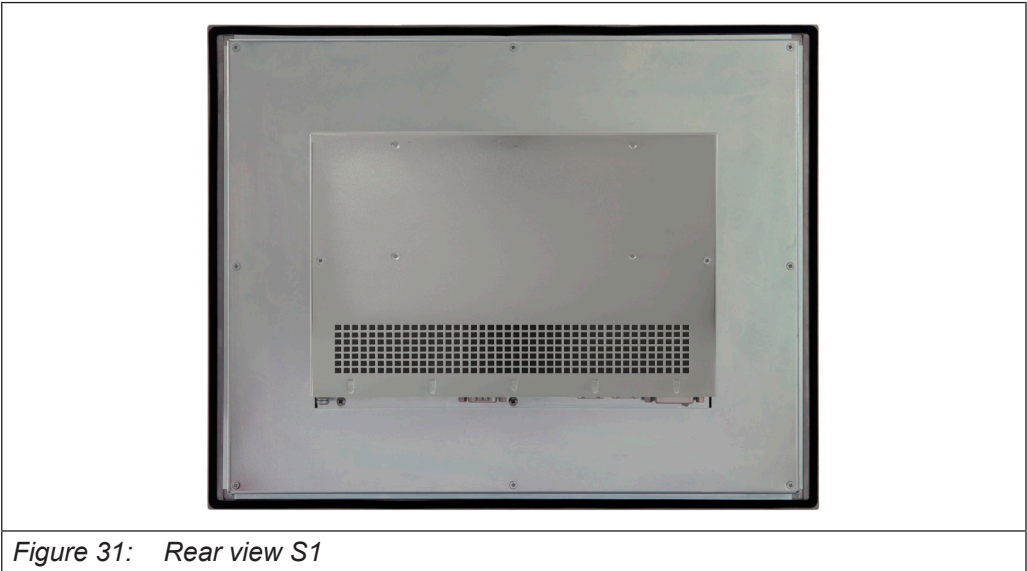
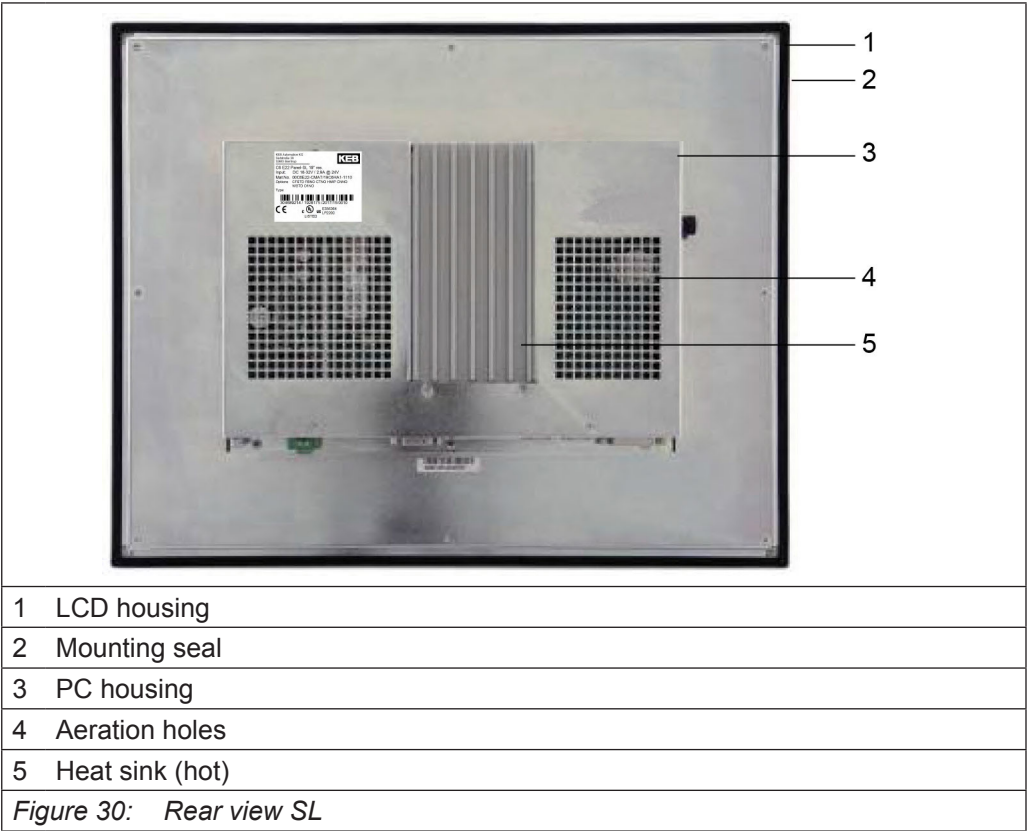


1	Model
2	Electrical information
3	Bar code
4	Serial number
5	CE marking
6	UL marking (E-file No.)
Figure 27: Marking label detail	

2.6.7.2 Connectors label size SL - size S1



2.7 Rear view



⚠ DANGER

Do not touch the heat sink!
The heat sink may be hot!

2.8 Side view



1	Aeration holes
2	Heat sink (hot)
3	CFast slot
4	Recess for mounting clamps
Figure 32: Rear view SL - side view	

⚠ DANGER

Do not touch the heat sink!
The heat sink may be hot!

2.9 Touchscreen

C6 E22 PANEL is provided with a 5-wire resistive touchscreen and with a controller integrated on the motherboard. The touch screen may only be actuated by finger tips or with the touchscreen pen (stylus). The operator may also wear gloves but be careful to avoid any hard particle in the glove (metal, glass and so on).

Touchscreen is available as standard 5-wire resistive touchscreen.

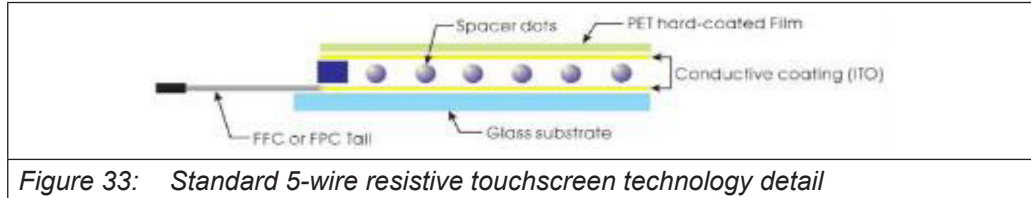
	Standard touchscreen resistive	Multi Touch capacitive
C6 E22 Panel resistive	✓	/
C6 E22 Panel capacitive	/	✓
Table 4: Touchscreen		

⚠ WARNING

Do not use e. g. screw-drivers to use the touch-screen!
Any hard parts that comes in contact with the touchscreen may damage it.

2.9.1 5-Wire resistive technology

Touch surface is made of PET hard coated Film (Hardness: 3H).



2.9.2 Multi Touch technology

Tempered glass and aluminium frame for the TrueFlat Multi Touch front panel:

- Projected capacitive touchscreen (P-CAP).
- Up to 4 finger operation.
- Gestures support.



3 Installation and connection

3.1 Preparation for installation

3.1.1 Select the mounting location

- Avoid direct sunlight exposure.
- Make sure that C6 E22 BOX/PANEL is properly (ergonomically) accessible to the operator.
- Choose a suitable mounting height.
- Ensure that the aeration holes are not covered.

3.2 Checking the package contents

- Check the package content for visible signs of transport damage and for completeness.
- In the case of damaged parts, contact your KEB representative. Do not install parts that were damaged during the shipment.

3.3 Checking the operating conditions

- Read carefully the standards, approvals, EMC parameters and technical specifications for operation of the device. This information is available in the following sections:
 - a) Certificates and approvals.
 - b) Electromagnetic compatibility.
- Check the mechanical and climatic ambient conditions for operation of the device. Follow the instructions for use of the device.
- Adhere to the permissible rated voltage and the associated tolerance range:

3.4 Mounting

In general, C6 E22 BOX/PANEL device is suitable for installation in several mounting conditions, such as:

- Mounting cabinets
- Control cabinets
- Switchboards
- Consoles

However, some important mounting rules must be followed, in order to avoid thermal and mechanical problems.

WARNING

For installation in control cabinets and in particular, in closed containers, make sure the ambient temperature complies with the requirements!

3.5 Avoid damages due to overheating

- All C6 E22 BOX/PANEL systems are designed for vertical position mounting.
- An inclined installation reduces the thermal convection and the maximum permissible ambient temperature for C6 E22 BOX/PANEL operation. Please contact KEB for details. C6 E22 BOX/PANEL may otherwise be damaged and its certifications and warranty will be void.
- The ambient temperature must be between 0°C and 50°C, as measured 5 cm from all openings of the system where there is air entrance.
- Provide space around the system for air recirculation and heat exchange.
- Keep at least 5 cm of free space behind (z) and to the sides (x) of the PC cell; above (y) and below (y) 10cm are needed. Refer to 3.5.1 for a description.
- Make sure that the grids on PC cell for air exchange are free from objects and from the cables and far from other obstacles to the air flow.
- For example, when the system is installed in cabinets with no air-conditioning, it is necessary to ensure the exchange of air from outside through at least two openings:
 - a) An opening should be placed under the PC cell; it must be large enough to allow the correct air flow from outside.
 - b) An large enough opening must be positioned above the PC cell, in order to allow the outflow of the hot air.
 - c) Of course, it must be checked that the measured ambient temperature (see above) complies with the required limits.
- Alternatively, it is possible to use lateral openings, subject to the condition that their vertical dimension is long enough to ensure the required heat exchange.
- When the system is placed in air conditioned cabinets, the conditioning system must provide the air circulation with proper ventilation.
- When the system is installed in closed cabinets, it is still necessary to ensure that the maximum ambient temperature is 50°C.
- Mounting angle:
 - a) The system is intended to be mounted vertically.
 - b) For inclinations up to 20°, it is necessary to decrease the maximum operating temperature of 5°C. Therefore, the maximum ambient temperature is 45°C.
 - c) For other installation modes, contact KEB Automation KG

3.5.1 Checking installation distances

To ensure adequate heat transfer, it is necessary to leave the following open spaces around the system:

- X direction 5 cm (min.) for each side.
- Y direction 10 cm (min.) for each side.
- Z direction 5 cm (min.).



Mounting the clamps requires a space at least 20 mm on the outer perimeter of the frame display.

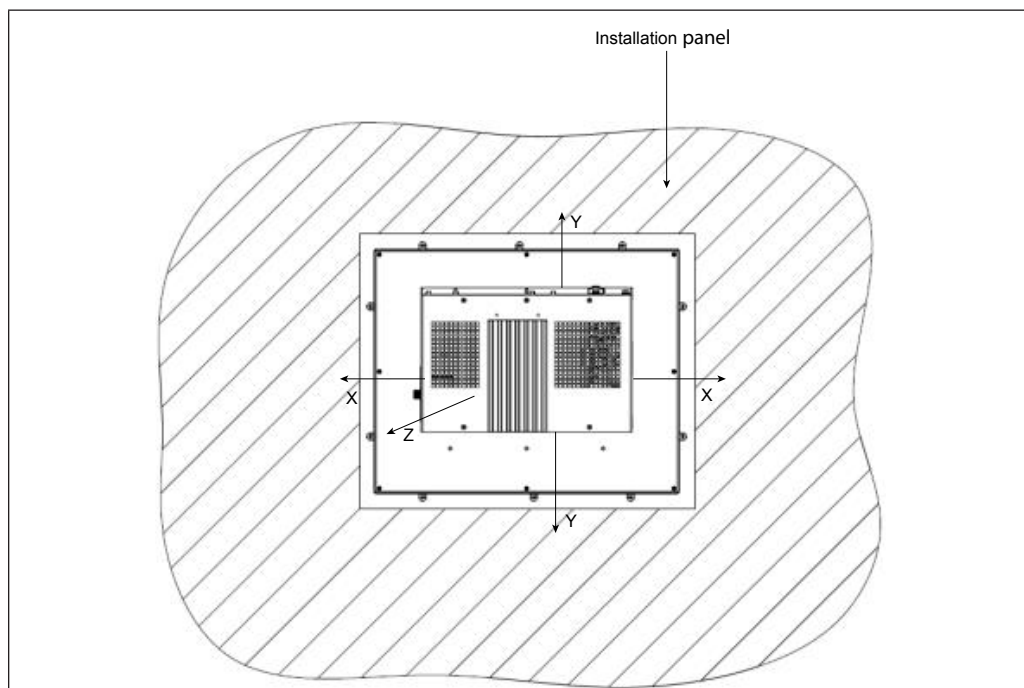


Figure 35: Installation distances

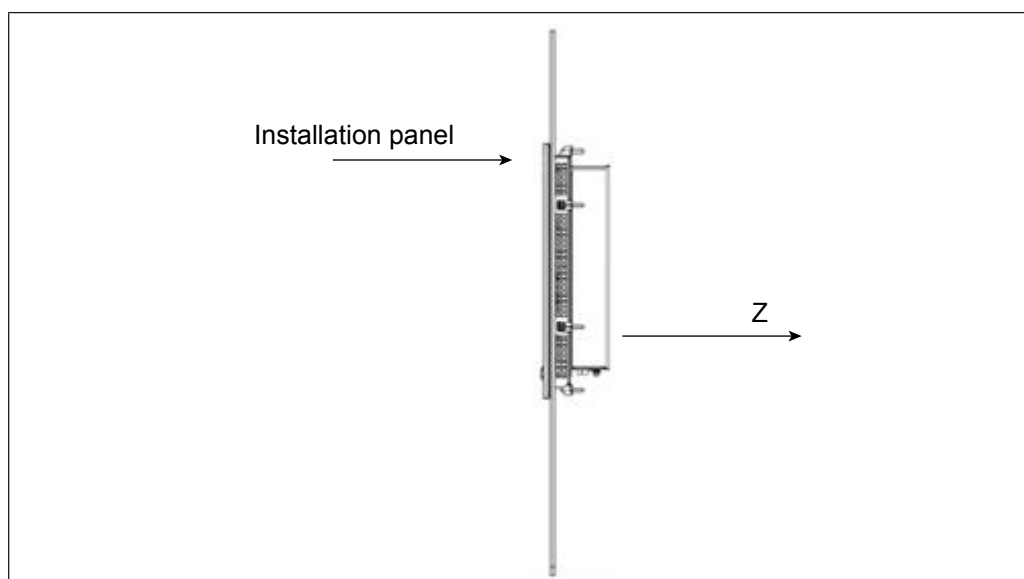
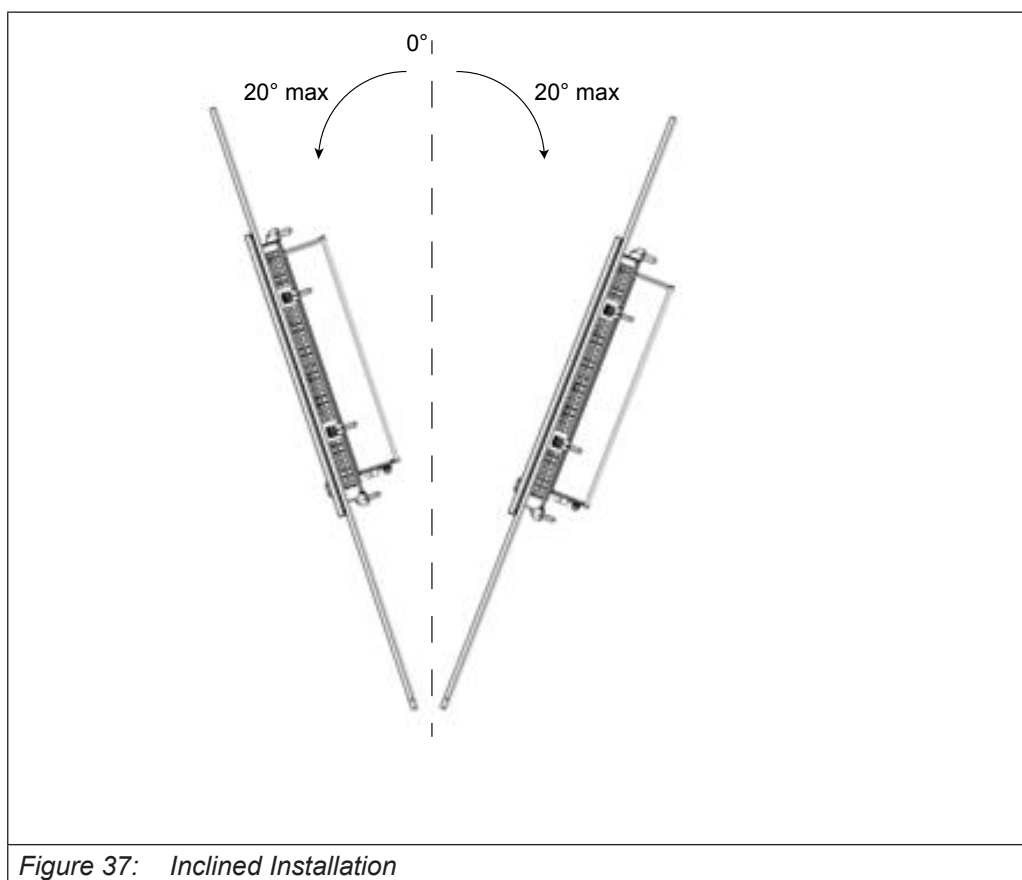


Figure 36: Installation distances - side view



3.6 Selection of the installation panel

In order to ensure a proper mounting of the system, the material of the installation panel (with the installation panel cut-out) must be stable.

To obtain the degree of protection described below, the material of that mounting panel must not deform, due to the use of clamps.

3.6.1 Degrees of protection

The front degree of protection of the system (IP) is guaranteed only if the following conditions are satisfied:

- The material thickness of the installation panel (with the mounting cut-out): 2mm to 6 mm.
- Maximum deviations: ≤ 0.5 mm. That condition must be met after installation, in order to guaranteed proper operation of the mounting seal.
- Allowed surface roughness in the area of the mounting seal: ≤ 120 microns (Rz 120).

3.7 System and cut-out dimension

3.7.1 C6 E22 Panel resistive

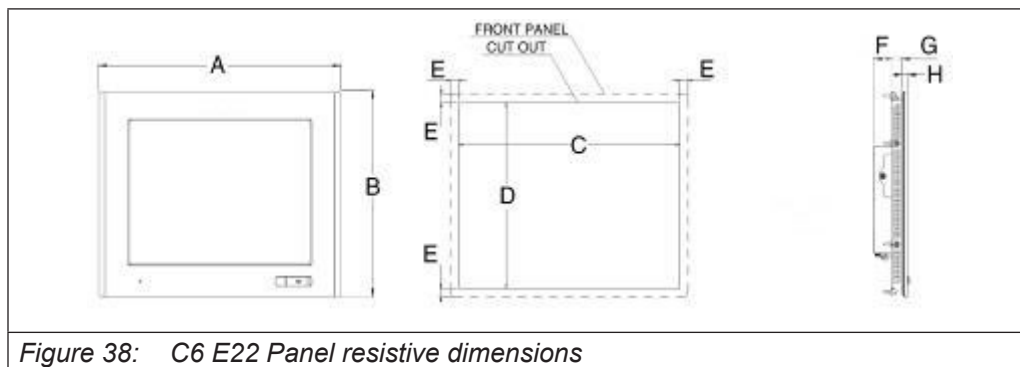


Figure 38: C6 E22 Panel resistive dimensions

LCD TFT	A	B	C	D	E	F (SL/S1)	G	H
10.1" W	293	212	277	196	8	29/77	19	5
10.4"	300	245	280	225	10	29/77	19	5
12.1"	335	270	315	250	10	29/77	19	5
12.1"W	331	234	315	218	9	29/77	21	5
15"	390	315	370	295	10	29/77	19	6
15.6" W	430	275	410	255	10	29/77	19	6
17"	455	355	435	335	10	29/77	21	6
18.5" W	500	320	480	300	10	29/77	21	6
19"	490	388	470	368	10	29/77	23	6
21.5" W	579	367	559	347	10	29/77	23	6
24" W	640	402	620	382	10	29/77	21.3	8

Table 5: C6 E22 Panel resistive dimensions

3.7.2 C6 E22 Panel capacitive

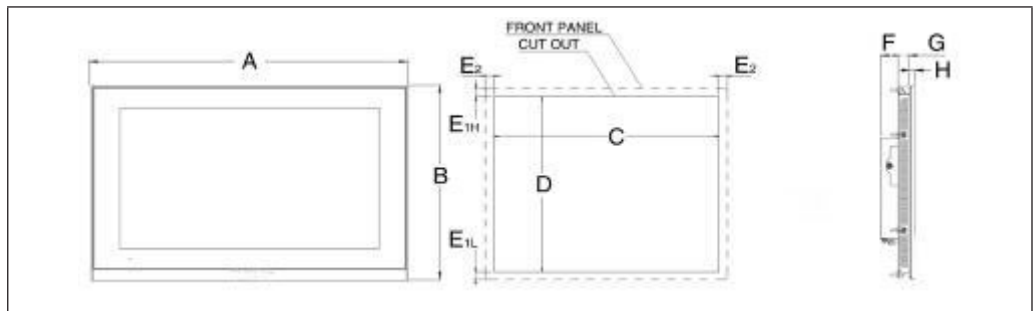


Figure 39: C6 E22 Panel capacitive dimensions

LCD TFT	A	B	C	D	E1L:E1H/E2	F (SL/S1)	G	H
10.1" W	293	212	277	196	8:8/8	29/-	20	5
12.1" W	331	222.5	313	216	9:9/9	29/77	22	5
15.6" W	433	280.5	410	255	15:10.5/11.5	29/77	36	6
18.5" W	503	320.5	480	300	10:10.5/11.5	29/77	36	6
21.5" W	581.5	367.5	559	347	10:10.5/11.5	29/77	36	6
24.0" W	640	402	620	382	10:10/10	29/77	21	8

Table 6: C6 E22 Panel capacitive dimensions

3.7.3 C6 E22 Box

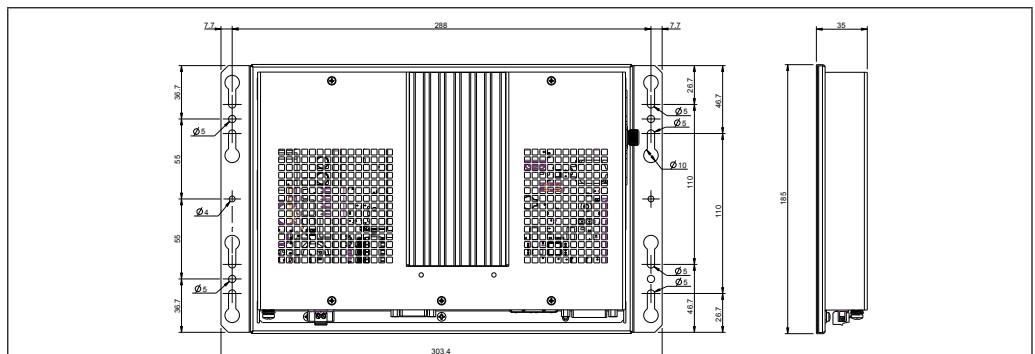


Figure 40: C6 E22 Box SL dimensions

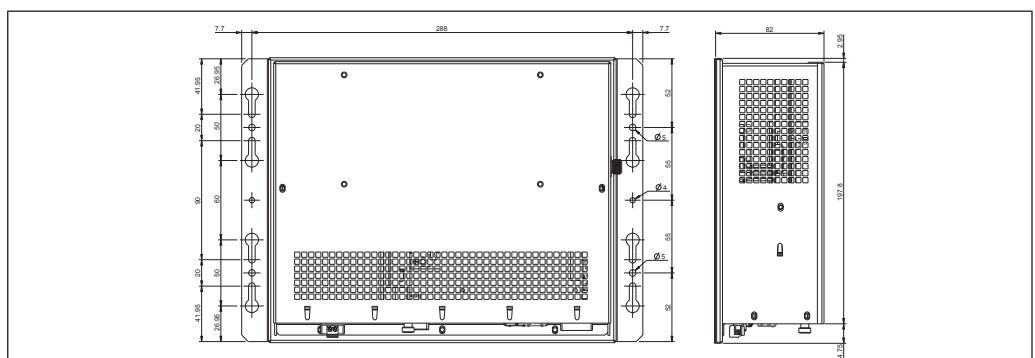


Figure 41: C6 E22 Box S1 dimensions

3.8 Mounting the device

3.8.1 Position of the mounting clamps

- To obtain the declared degree of frontal protection for the system, it is necessary to follow the positions of the clamps shown below.
- The table below shows the number and the position of the clamps for each C6 E22 PANEL size.



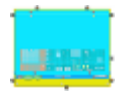



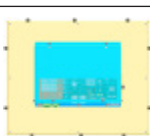
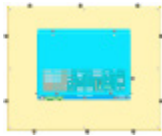
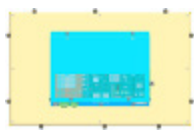


LCD size	Clamp	Quantity	Clamp position
10.1"		8	
10.4"		8	
12.1"		8	
15.0"			
15.6"		10	
17.0"			
18.5"			
19.0"			
21.5"		14	
24.0"		14	

Table 7: Position of the mounting clamps

3.8.2 Tools to tighten the mounting clamps

- 1.5 mm provided hexagonal key.

3.8.3 Procedure

- Insert C6 E22 PANEL into the mounting cut-out from the front.



Figure 42: Installation



Mounting the clamps requires a space at least 20 mm on the outer perimeter of the frame display.

- Insert the mounting clamps into the housings of the device.



Figure 43: Installation



Figure 44: Installation



Mounting the clamps requires a space at least 20 mm on the outer perimeter of the frame display.

- Tighten the mounting clamps with the hex key provided with (14 x 91 x 1.5 mm).

WARNING

The max. permissible torque for the mounting clamps is 0.2 Nm.
That means: tighten the mounting clamps only until the front gasket is fully compressed. Do not tighten the mounting clamps more. If the maximum permissible torque limit is exceeded, C6 E22 mechanical housing may be permanently damaged.



Figure 45: Installation

- Repeat the previous steps for all mounting clamps.

3.9 Connecting C6 E22 BOX/PANEL

3.9.1 Notes on connection

- C6 E22 BOX/PANEL must be installed in accordance with the indications contained in these operating instructions.

Follow the above instructions:

- Connect the system to the ground wire.
- Connect the power cable.

3.9.2 Grounding and bonding

Whenever two pieces of equipment connected to each other are far apart, it is possible that their ground connections could be at a different potential level. The data cable screens connecting the equipment's chassis on one end and the C6 E22 BOX/PANEL chassis on the other end can therefore be subject to a high current circulation capable of destroying the interface. To overcome this hazard such current must be steered away from the interface. To achieve this goal the following methods can be used:

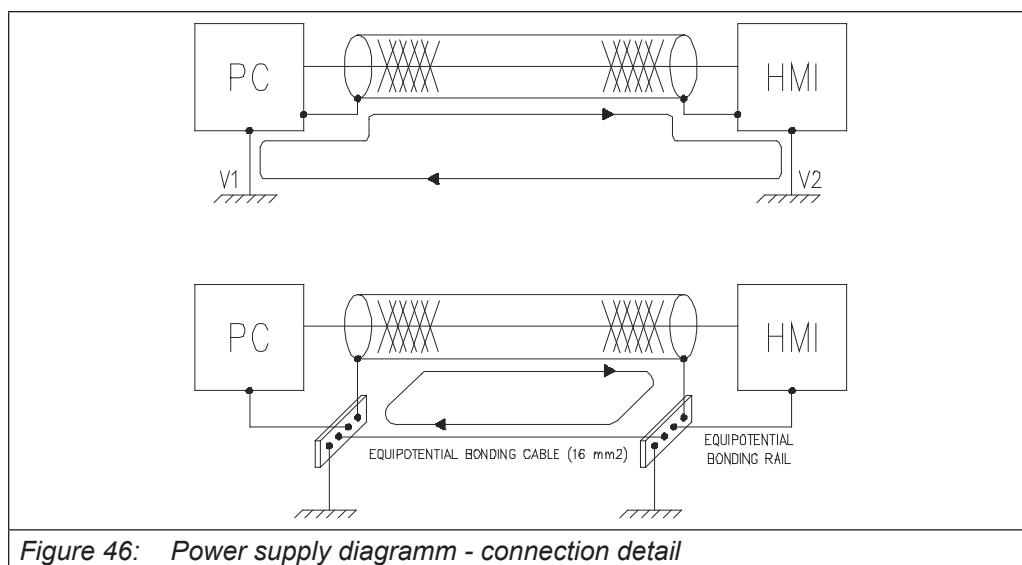


Figure 46: Power supply diagramm - connection detail

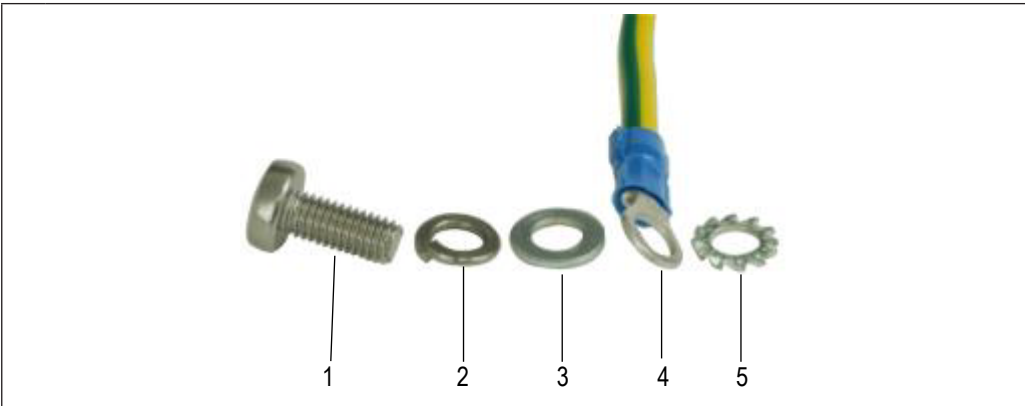
1. Use an equipotential bonding cable (16mm²) to connect the equipment' ground to the C6 E22 BOX/PANEL ground.
2. Connect the data cable screens to the equipotential bonding rail on both sides before connecting the cable to the interfaces.

- On the rear, locate the ground screw.



Figure 47: Power supply connection detail

- Insert the earthing eyelet terminal between the washers in the following sequence:



1	Screw
2	Spring washer
3	Plain washer
4	Eyelet terminal
5	Toothed washer

Figure 48: Power supply connection detail

3.9.3 Power supply isolation

The C6 E22 BOX/PANEL power supply is galvanic isolated, which means that its output is electrically separated from its input. This feature has several benefits:

- increases the noise immunity of the system
- avoids input short circuits in systems with the power supply grounded
- breaks ground loops, which may cause interferences in the video signals.

3.9.4 Power supply connection

The device may be connected to a 24 VDC (18V÷32V) power supply which satisfies the requirements of safe extra low voltage (SELV) in accordance with IEC/EN/DIN EN/UL60950-1.

- Remove the two poles plug connector from the system.
- Connect the positive and the negative poles (also refer to the label on the back of the system) to their respective terminals of the two pole plug connector. Use wires with a cross-section of 1.5 mm² (AWG16). Always check that the voltage drop along the supply wiring is not excessive and the input voltage remains above the minimum required (18V) in the worst load condition.
- Connect the ground cables (PE) to the earthing points.



Figure 49: C6 E22 BOX/PANEL detail

3.9.5 Power connector assembly

The system is equipped with a connector cup to be installed on the two poles power connector. To properly assemble the connector, please follow these instructions:



Figure 50: Power connector assembly

- Insert the cable tie in the cup, as shown in the picture.



Figure 51: Power connector assembly

- Slide the cable tie, as shown in the picture.

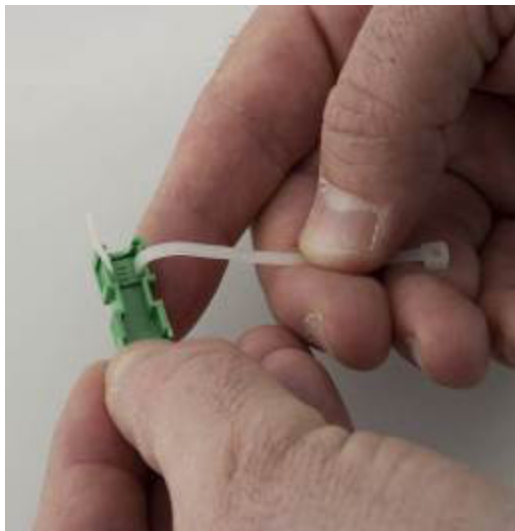


Figure 52: Power connector assembly

- Place the two poles plug connector in the cup, as shown in the picture.

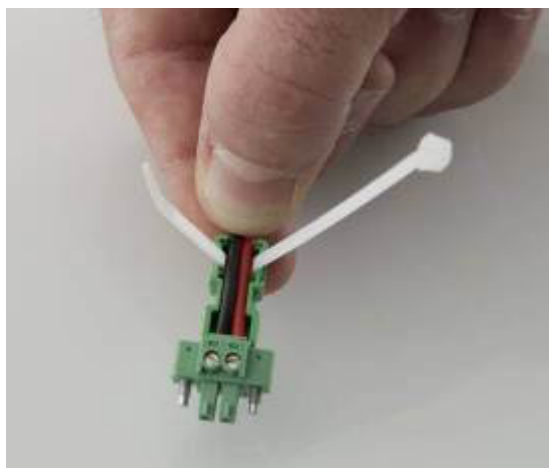


Figure 53: Power connector assembly

- Tighten the cable tie.



Figure 54: Cup installation

- Cut the excess part.

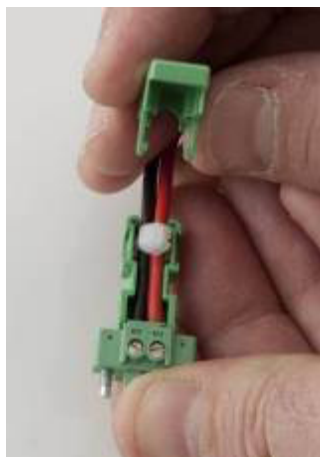


Figure 55: Cup installation

- Insert the white label and close the cup as shown in the picture.

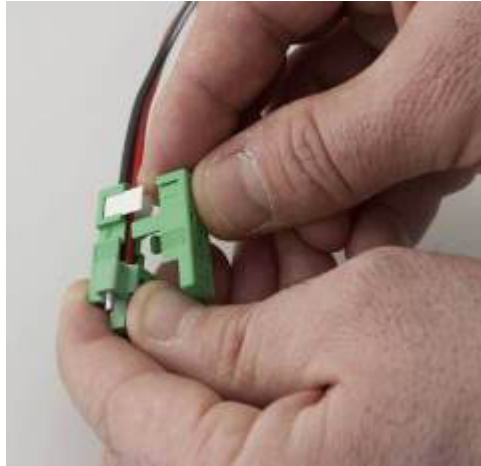


Figure 56: Cup installation

- Example of a correctly installed cup.

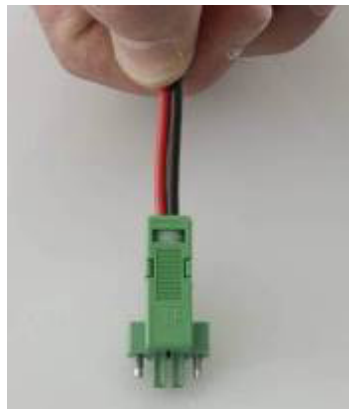
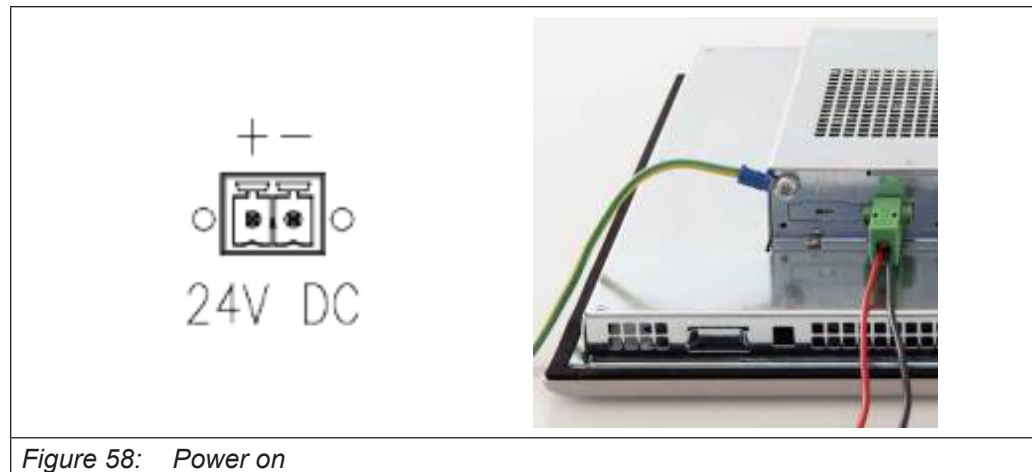


Figure 57: Power connector assembly

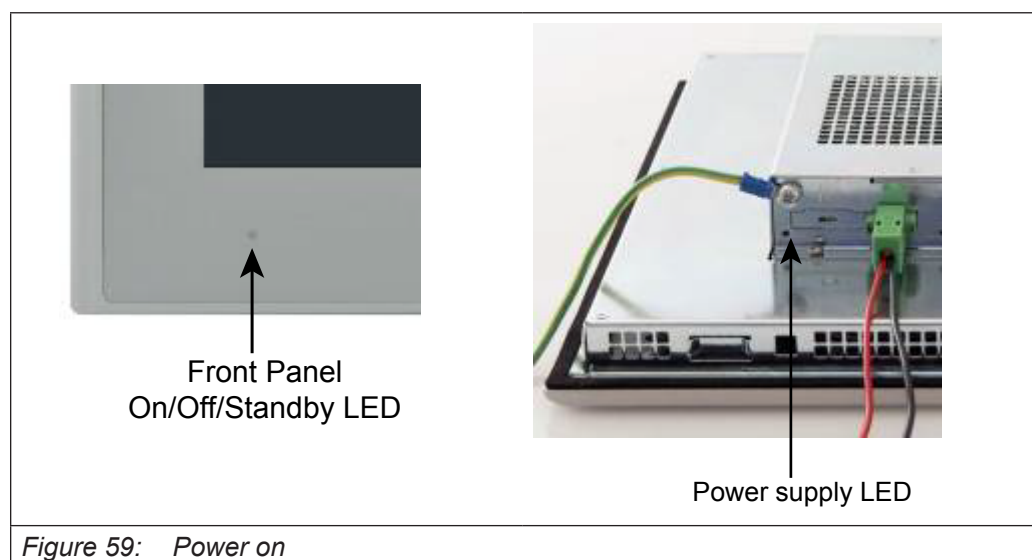
3.9.6 Power on

- Connect the power supply cable to C6 E22 BOX/PANEL.
- Fix the power connector as indicated in the picture. Use the lateral screws of the power connector.



The system begins bootstrapping.

- The front panel On/Off/Standby LED will turn on.



- The yellow LED turns on for less than a second. After that, a persistent green LED indicates the normal operation.

3.9.6.1 Power supply LED

System power state	Green	Yellow	Notes
ON	ON	OFF	Power is taken from the input power supply
OFF	OFF	OFF	No power supply
Battery fault	OFF	ON	Check the battery connection
UPS active	Blinking	OFF	Power is taken from the battery pack
<i>Table 8: Power supply LED</i>			

3.9.6.2 Front On/Off/Standby LED

System power state	Green	Yellow	Notes
OFF	OFF	OFF	The system is not powered.
Suspend To Disk	OFF	ON	It is safe to turn off power supply. Operating system shutdown procedure is terminated.
Full On or Suspend To RAM	ON	OFF	System core is full-on or it is in a low power state keeping current session information into RAM.
UPS	Blinking	OFF	System core is full-on. Main power is missing and UPS is powering the system.
<i>Table 9: Front On/Off/Standby LED</i>			

4 Operating systems

4.1 EWF implementation in the Windows Embedded Standard 7 images

All the KEB Windows Embedded Standard 7 images have a built-in support for Enhanced Write Filter (EWF).

EWF protects a volume from write access.

Its two major components are the EWF Overlay and the EWF Volume:

- **EWF Overlay:** EWF protects the contents of a volume by redirecting all write operations to another storage location. This location is called an overlay. An EWF overlay can be in RAM, or on another disk partition. An overlay is conceptually similar to a transparency overlay on an overhead projector. Any change that is made to the overlay affects the picture as it is seen in the aggregate, but if the overlay is removed, the underlying picture remains unchanged.
- **EWF Volume:** In addition to the EWF overlay, an EWF volume is created on the media in unpartitioned disk space. This EWF volume stores configuration information about all of the EWF-protected volumes on the device, including the number and sizes of protected volumes and overlay levels. Only one EWF volume is created on your device, regardless of how many disks are in the system. If your media does not support multiple partitions, you can save the EWF configuration information in the system's registry (RAM Reg Mode, KEB's choice)

EWF has been configured by KEB for protecting the C: volume, using RAM Reg Mode. So, the overlay is in RAM and the EWF volume location is in system registry.

When EWF will be enabled, every write operation for C: will be redirected to an Overlay in RAM.

No data will be persistently stored into the C: volume.

In case of a reboot or of a system restart after a power failure, the overlay will be reset and all the data written in the previous session will be lost. The view of the C: volume will be the same, after every reboot.

Having a non-persistent C: will force the customer to manage at least another volume (a separate D: partition, another storage device, a network share) that contains persistent data for the application.

This second volume will not be protected from power failures, but will not contain information that is vital for system booting.

On KEB Windows Embedded Standard 7 images, EWF is disabled by default at shipment and it must be enabled by the customer, in case it is needed.

4.2 KEB Write Filter Manager (KEB-WF_MGR)

4.2.1 Introduction

KEB Write Filter Manager bases on the Enhanced Write Filter (EWF) from Microsoft for Windows Embedded Standard 7 (WES7).

4.2.2 How EWF works

EWF protects a volume from write access. This is realized by an EWF Overlay: EWF protects the contents of a volume by redirecting all write operations to another storage location. This location is called an overlay. An EWF overlay can be in RAM, or on another disk partition. An overlay is conceptually similar to a transparency overlay on an overhead projector. Any change that is made to the overlay affects the picture as it is seen in the aggregate, but if the overlay is removed, the underlying picture remains unchanged.

When EWF is enabled for a volume, every write operation to that volume will be redirected to an overlay in RAM and no data will be persistently stored into the volume. In case of a reboot or of a system restart after a power failure the overlay will be reset and all the data written in the previous session will be lost. The view of the volume will be the same, after every reboot. Thus the content of the volume is protected by any damage which can be caused by power fails otherwise.

4.2.3 Protectable Volumes

Volume	Protectable	Intention
C:\	Yes	Holds the operating system (including the registry) and the installed programs. Should be protected to ensure that the system never becomes unbootable.
D:\DATA	No	For free data storage, future use
E:\CFAST	Yes	Holds the Control and HMI applications. Should be protected to ensure that the applications never become invalid.

4.2.4 KEB EWF configuration

On KEB devices RAM overlay is used and the EWF configuration is stored in the registry of the WES7 operating system, which resides with the operating system on volume C:\. This implies that changes to the EWF configuration are only possible if the EWF for volume C:\ is disabled or the changes to C:\ will be committed. Otherwise they will be discarded after a reboot. The following table shows the dependencies between the volumes:

		Registry Drive (holds the registry): C:\								
		Status	EWF enabled				EWF disabled			
		Boot Command	ENABLE	DISABLE	COMMIT	NO_CMD	ENABLE	DISABLE	COMMIT	NO_CMD
Status	(Boot) Command									
Dependent Drive: e.g. E:\	EWF enabled	Enable	in this state	for drive C:	not available in this		state	for drive C:	in this state	
		Disable			x	-	x			x
		Commit			x	x	x			x
		Commit and Disable live			x	x ¹⁾	x			x
	EWF disabled	Enable	not available	not available	x	-	x	not available	not available	x
		Disable			not available in this		state			
		Commit			not available in this		state			
		Commit and Disable live			not available in this		state			

x possible
 - not possible
 x¹⁾ possible, but EWF enabled again after reboot

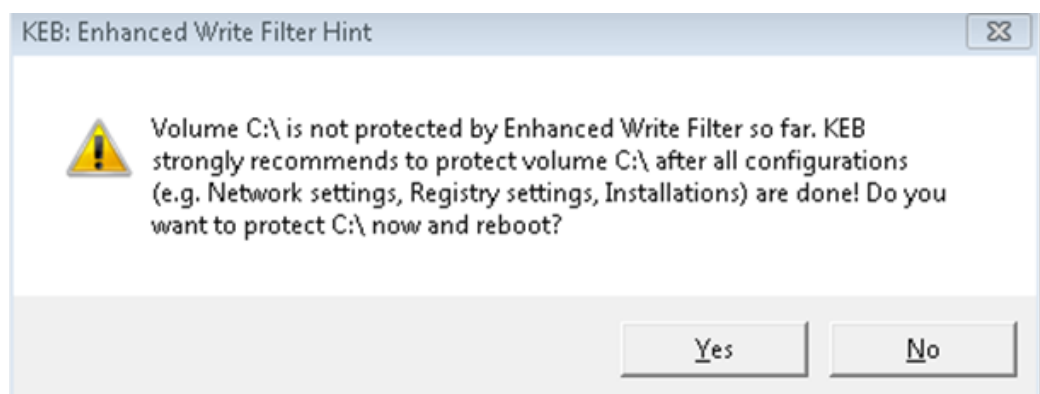


These dependencies are handled by the KEB_WF_Mgr internally. Thus it is not necessary to understand this table completely or to use it as a reference when using the EWF, but keep in mind that there are dependencies because some internal operations of the KEB_WF_Mgr has to be confirmed by the user.

4.2.5 Delivery state of EWF on KEB devices

On KEB Windows Embedded Standard 7 image, EWF is disabled by default at shipment because some settings has to be made on the drive respective in the registry by the user (e.g. IP address setting).

Every time WES7 starts with EWF disabled for volume C:\ the user is reminded to enable the EWF by the following message box:



After all settings to the registry are done you can directly active the EWF for volume C:\ by clicking 'Yes'. The device will reboot immediately and the EWF is enabled for volume C:\.

If you click "No" the message box is closed but will be appear again after the next reboot. Please note that the volume E:\ which holds the application data is not protectable by this way.

4.2.6 Using KEB_WF_Mgr

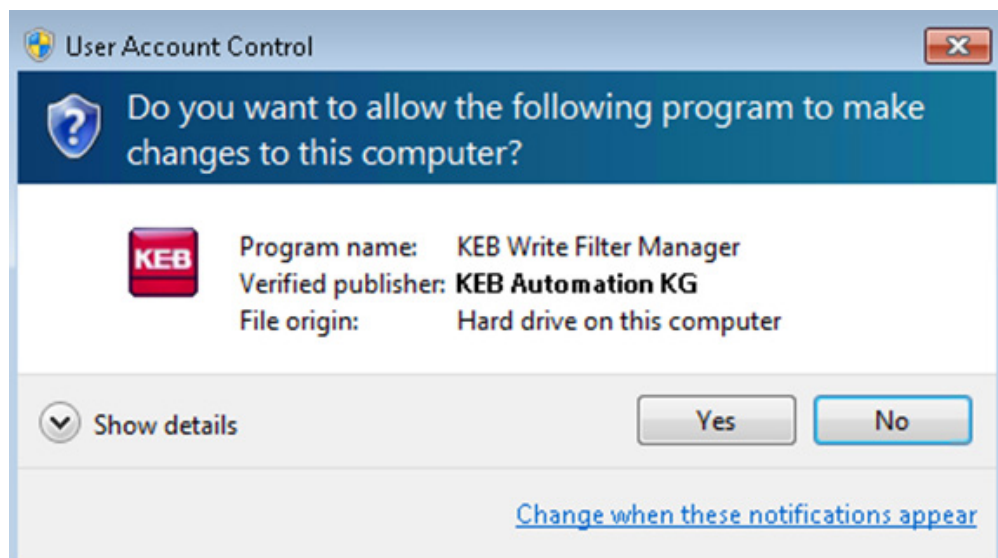
To disable EWF or to enable it for other volumes KEB_WF_Mgr should be used (also command line tool “ewfmgr” from Microsoft exist, but usage is not recommended by KEB).

Start the KEB_WF_Mgr by double-click the icon on the desktop:

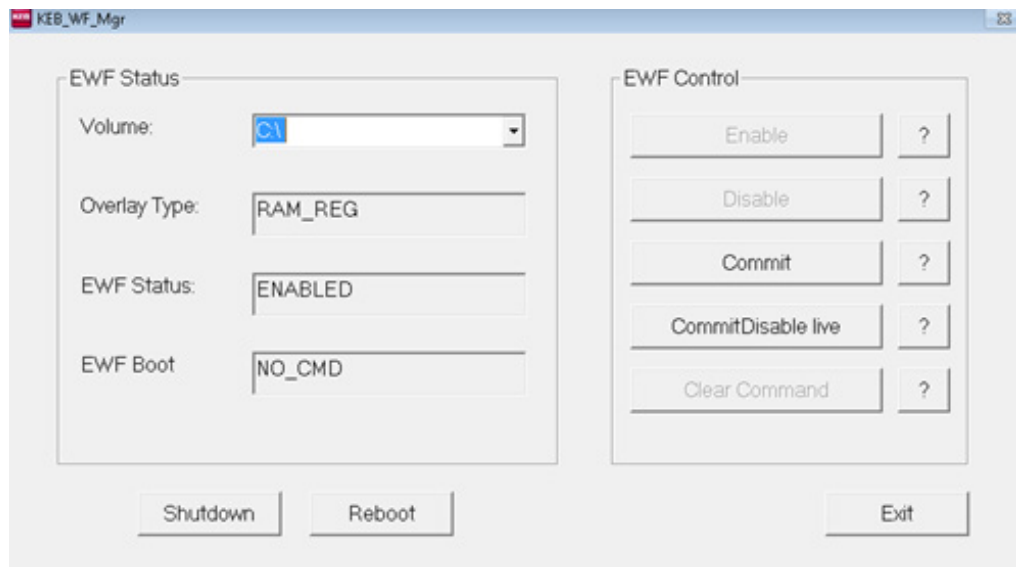


The desktop link will start the program which resides in the path „C:\Program Files\KEB\IPCTools“ then.

The program needs “elevated rights”, thus please confirm the question from the User Account Control with “Yes”:



The program’s GUI appears with volume C:\ preselected in the following view (assuming that EWF for volume C:\ has been enabled by the message box already before).



Under the Volume: you see the states of the selected volume as read-only fields:

- **Overlay Type:** On KEB devices always RAM-REG
- **EWF Status:** Current status of the EWF
- **EWF Boot:** Command which will be performed with the next reboot

On the right side you see the EWF Control commands, each with a help button aside (the commands which are not available in the current constellation are greyed and disabled):

- **Enable:** Enables a currently disabled overlay on the specified EWF-protected volume. This function requires a reboot.
- **Disable:** Disables a currently enabled overlay on the specified EWF-protected volume. This function requires a reboot.



This function is not available at all for the volume C:\ which holds the registry, because the change in the registry for the new state of EWF cannot become persistent. Use 'CommitDisable live' instead to disable EWF for C:\

- **Commit:** Commits all current level data in the overlay to the EWF-protected volume. This function requires a reboot. After the reboot the EWF status of the volume is still "ENABLED".

⚠ WARNING

All changes on the volume since the last reboot become effective. Do not execute this if you are not sure about the extent of the changes.

- **CommitDisable live:** Immediately commits all current level data to the EWF-protected volume and then disabled EWF. This function does NOT require a reboot.

⚠ WARNING

All changes on the volume since the last reboot become effective. Do not execute this if you are not sure about the extent of the changes.

⚠ WARNING

The changes become effective immediately with reboot and thus without the possibility to undo this command by “Clear Command”.

- **Clear Command:** Clears a pending command for the volume that would have occurred on the next restart.

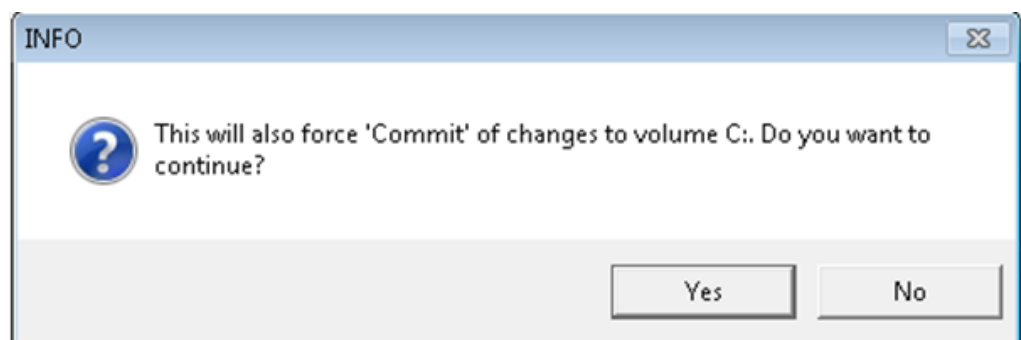
4.2.7 Dependent Volumes (typically E:\)

As mentioned other volumes than C:\ (typically and in the following E:\ which is the CFast on KEB devices) are dependent from C:\ to change their configuration, because it is stored in registry which resides on C:\ and thus registry is also protected against any change if the EWF is enabled for C:\.

If EWF is disabled for C:\ all commands for the dependent volumes can be used independently.

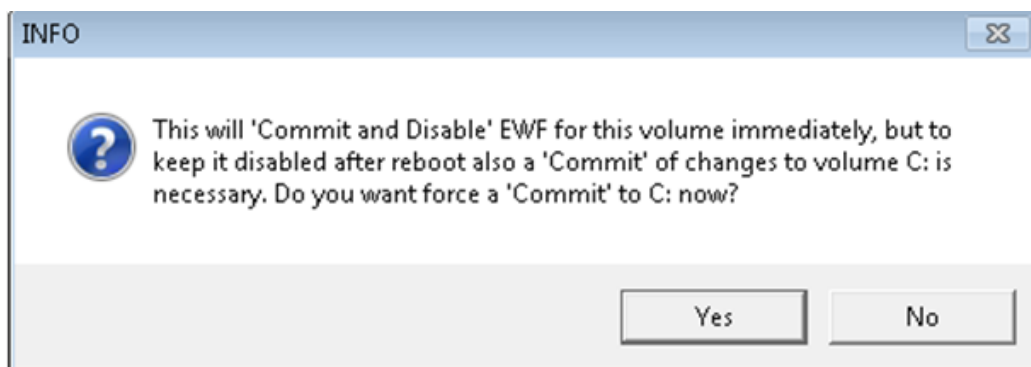
Otherwise, if EWF for C:\ is enabled, the following rules are effective:

- **Enable and Disable:** if one of these commands is used the following message box asks if the Commit command for C:\ should also be set. It is recommended to confirm with “Yes” because otherwise the Enable or Disable has no effect. The message will not appear if the Boot Command for C:\ “Commit” already.

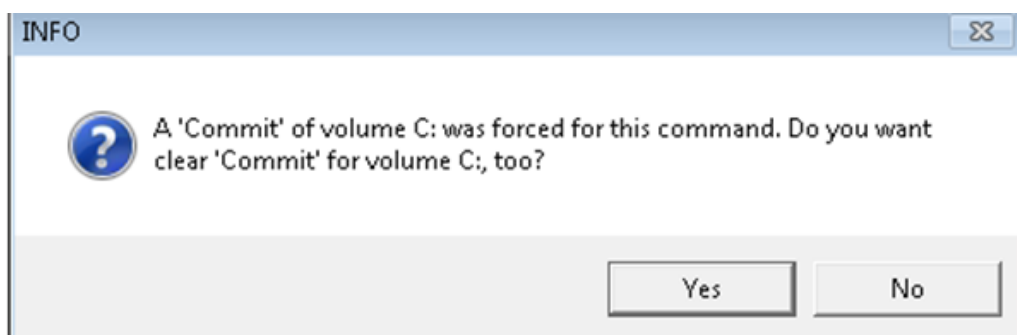


- **Commit:** this command is independent from volume C:\ because the status of E:\ (EWF disabled) is untouched. But Commit needs a reboot to become effective.

- **CommitDisable live:** The command commits and disables immediately. To keep the EWF for the volume disabled after reboot a “Commit” to volume C:\ is necessary. The following message box asks if the Commit command for C:\ should also be set. It is recommended to confirm with “Yes”. The message will not appear if the Boot Command for C:\ “Commit” already.



- The **Clear Command** can reset the Commit without any dependency but for Enable/Disable it asks to clear the implicitly set of Commit for volume C:\, too:

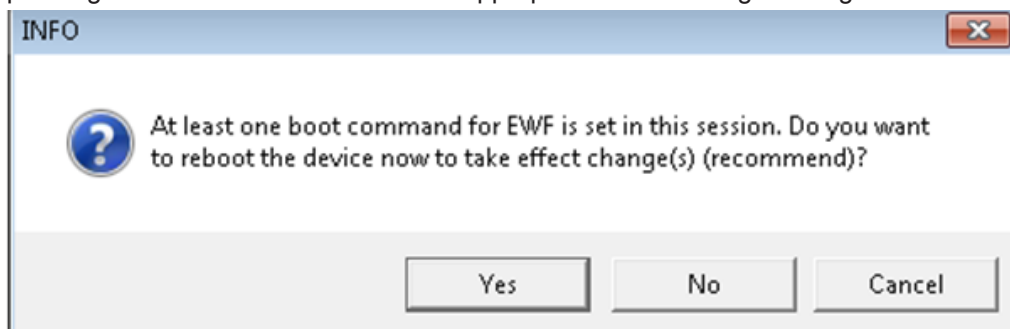


Normally you should confirm with “Yes” because the Commit for volume C:\ was only set to take effect for the change of E:\.

4.2.8 Leave the KEB_WF_Mgr

A Shutdown or Reboot of the device can be initiated directly from the KEB_WF_Mgr to take effect for pending boot commands by using the particular buttons.

The program can also be left by the Exit button. In this case the program checks for pending boot commands and shows if appropriate the following message box:



It is recommended to choose **“Yes”** to ensure that no subsequent changes of the system are committed accidentally, which could be happened if you quit the message box with **“No”**.

If you choose **“Cancel”** the exit of the program is discarded and you can continue to work in the KEB_WF_Mgr.

4.3 KEB Windows Embedded Standard 7 Image

4.3.1 Introduction

KEB has created a “Windows Embedded Standard 7 (WES7) image for C6 E22 with special features that support you in the work with the device.

4.3.2 User Accounts

There are two user accounts implemented in the KEB WES7 image: AutoLogon and remote. The following table shows the details for the accounts:

Account	AutoLogon	remote
Administrator	Yes	Yes
Password		remote
Remote access	Not possible	Yes
Intention	Automatic logon after reboot	Remote Desktop connection

WARNING

The default password for “remote” account should be changed to an individual password for security reasons!

Normally the AutoLogon should be continuously used as the standard logon because only a logon without password reaches immediate start of Control and HMI application after boot of the device, which is generally the desired behavior for a machine control device. Because in WES7 a remote logon as an account without password is not possible there is no security risk regarding the missing password for AutoLogon.

Of course own user accounts can be created, but this is not the default approach destined by KEB.

4.3.3 Ethernet Address

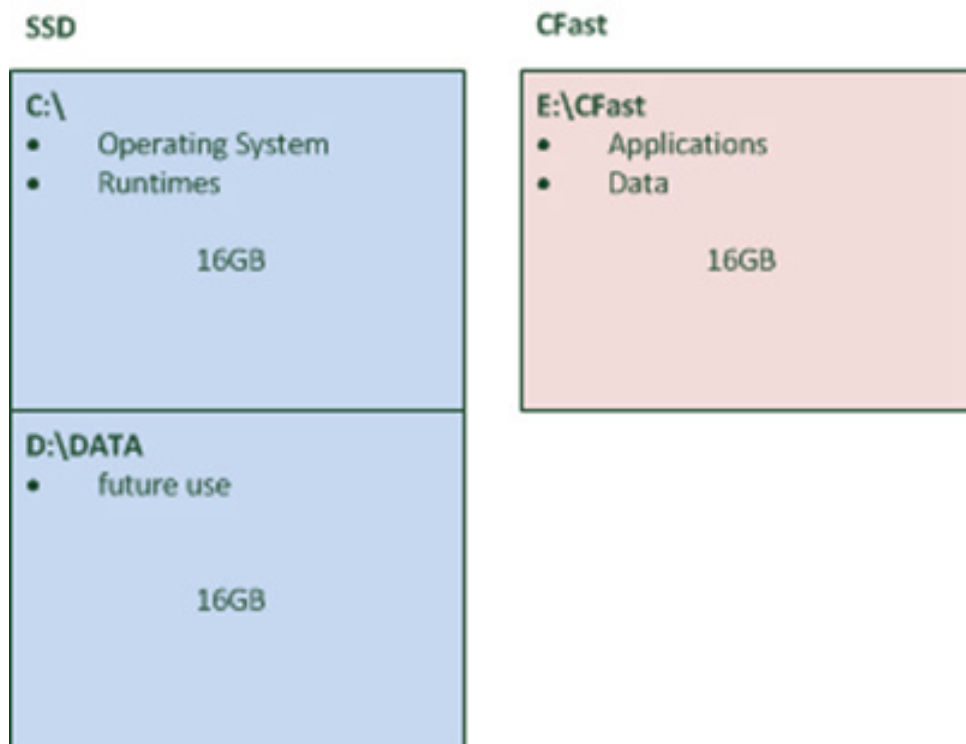
The C6 E22 is configured to get an IP address from a DHCP server. If no DHCP server is available in the network the device uses the IP address 192.168.0.100. Thus it is also possible to connect directly to the device without a network infrastructure with a development PC by configuring the Ethernet adapter of the development PC with another 192.168.0.xxx address.



Switching to the IP address 192.168.0.100 by the C6 E22 can take several minutes because the device waits this time for the possible DHCP address assignment.

4.3.4 Usage of storage memories

The C6 E22 is delivered with two hard disk drives, a SSD and a CFast card. The SSD is divided into two volumes C:\ and D:\ of its half size each. On C:\ the Operating System and the runtimes (Control, HMI, Connect) are located. D:\ is reserved for future use. The applications and data are separated and located on the CFast (E:\). Because the CFast is easy to remove the applications can be transferred to an exchange device easily.



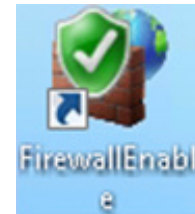
4.3.5 Firewall

The WES7 firewall is enabled in the delivery state. This protects the device against many types of network based attacks. KEB has configured the WES7 firewall thus that all foreseen network connections are allowed. The Control runtime and the HMI runtime are allowed to open all network ports because for both programs a rule in the firewall exists.

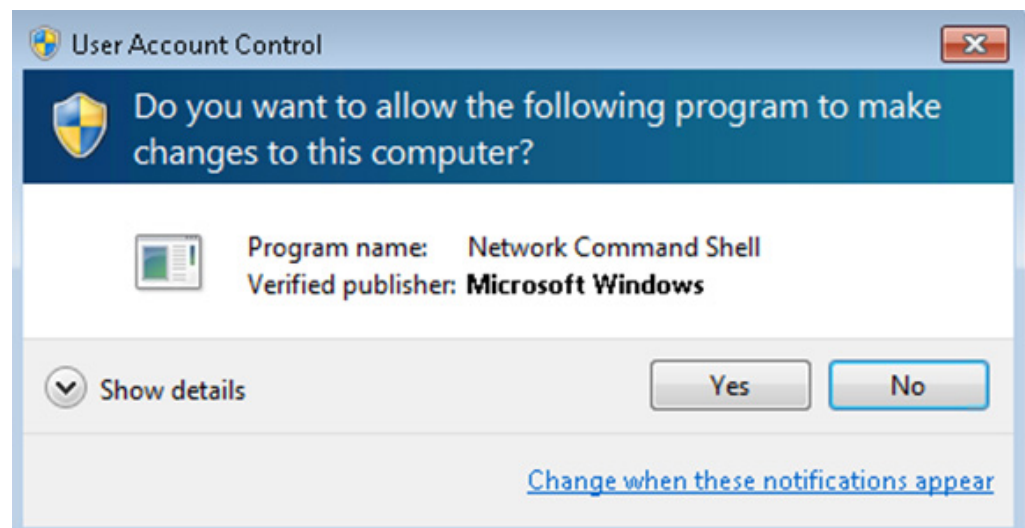


This is the recommended way to configure a firewall: allow (trusted) programs to open any port instead of allow ports to be opened by any program.

However, in case of assumption that the firewall blocks desired network communication there is an easy way to disable the firewall completely for testing. On the desktop you find a “FirewallDisable” shortcut which does this and also a shortcut for enabling the firewall again.



The commands need “elevated rights”, thus please confirm the question from the User Account Control with “Yes”:



⚠ WARNING

It is not recommend to disable the firewall permanently. If the test with disabled firewall confirms that the desired network communication is possible with disabled firewall you should implement an appropriate rule in the firewalls configuration (preferred for a program instead of for a port) and enable the firewall again. How to implement firewall rules can be referred on the appropriate web sites from Microsoft for Windows 7 firewall.

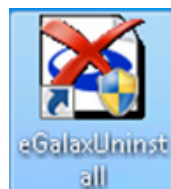
4.3.6 eGalax Touch Driver

On all C6 E22 devices except the panel devices with capacitive touch the eGalax driver is installed. This driver supports all touch controllers of C6 E22 panel devices and external C6 monitors from KEB. But it does not support Multi Touch functionality. Multi Touch functionality is only possible with capacitive touches and it requires the Windows Embedded Standard 7 internal Microsoft touch driver.

This driver, in turn, is not able to operate resistive touch displays. The following table gives an overview:

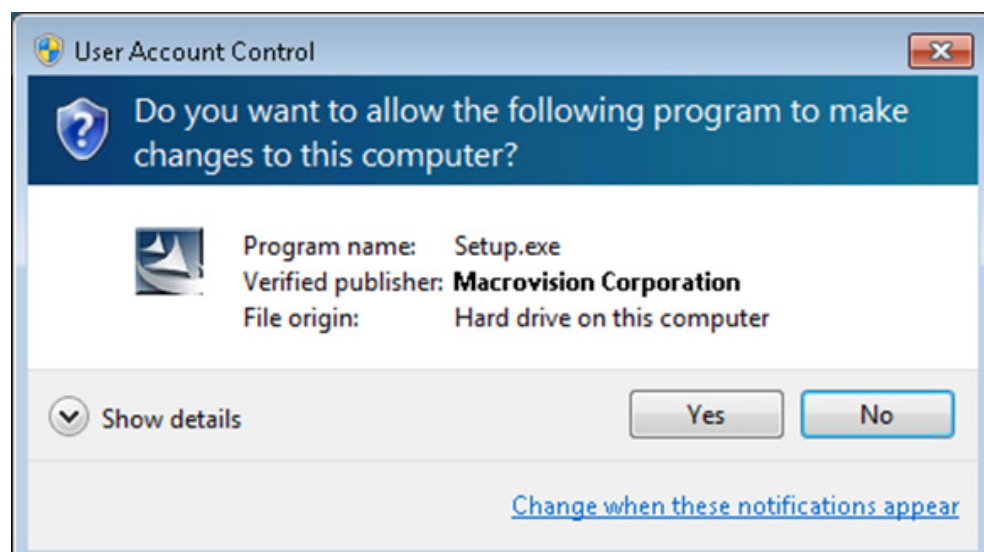
	Resistive	Capacitive
Single Touch	eGalax driver	eGalax driver
Multi Touch	Not possible	Microsoft touch driver

On C6 E22 panel devices the appropriate driver is installed. For C6 E22 Box and Book-mount devices this preselection could not be done ex works because the used external C6 monitor is not known at the time of production. Thus the eGalax driver is installed on those devices. If they are used in combination with capacitive C6 monitors (and Multi Touch functionality is desired at all) it is necessary to uninstall the eGalax driver. The Microsoft touch driver becomes active than automatically after 2 reboots. To uninstall the eGalax driver you find an "eGalaxUninstall" desktop shortcut which does this and also a shortcut for installing the eGalax again.



Because the used touch technology is predetermined for C6 E22 Panel devices the desktop shortcuts are not placed on the desktop on these devices.

The commands need "elevated rights", thus please confirm the question from the User Account Control with "Yes":



Reboot the device twice finish the switch to the Microsoft driver.

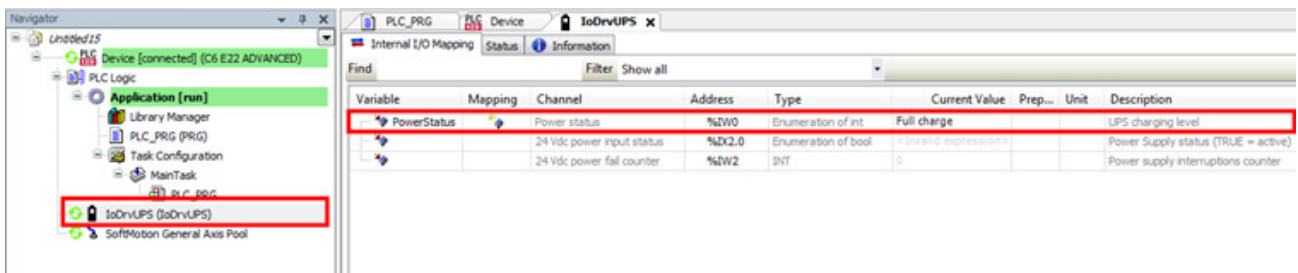
4.3.7 Micro-UPS Handling

As also mentioned in the hardware related parts of this manual all C6 E22 devices are equipped with a micro-UPS to ensure storage of Retain and Persistent variables of the Control application in case of power lost.

To avoid inconsistent data sets the Retain and Persistent variables will be stored only if the μ UPS is charged completely. Otherwise the capacity could not be sufficient to store all variables and consistency of the data set cannot be ensured.

The load time of the micro-UPS is about 15 s for C6 E22, thus normally the micro-UPS is always charged until the Control application is started after a boot of the device. But for security and to keep the Control application easy portable to devices this longer charging time the charging level should be evaluated in the Control application.

For this an "Internal I/O Mapping" named "IoDrvUPS" is automatically available with the C6 E22 device in KEB COMBIVIS studio 6.

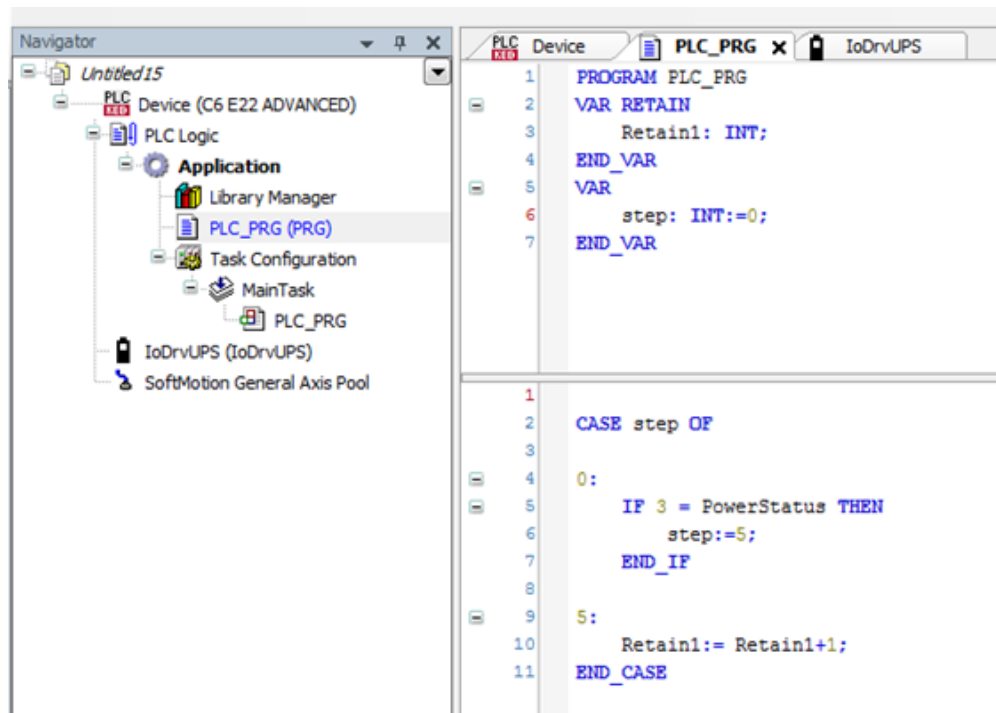


To evaluate the „Power status“ inside the Control application a variable has to be defined, e.g. „PowerStatus“.

The values of Power status are:

0	Unit isn't available (must not appear on functional C6 E22)
1	Low charge
2	Half charge
3	Full charge

The Machine application should wait until the micro-UPS is fully charged before any operation is performed which changes Retains or Persistents. This can be achieved with an implementation comparable with the following example:



The other “Internal I/O Mapping” variables “24 Vdc power input status” and “24 Vdc power fail counter” cannot be used in a sensible manner, because the PLC is configured to stop after a short voltage drop already.

4.3.8 Ip-Scan

Ip-Scan is an IP address scanner from KEB to find other KEB devices in the network. This requires that Ip-Scan runs also on the device which should be found. Because the C6 E22 should be findable by Ip-Scan (which is also integrated in COMBIVIS studio 6) Ip-Scan is started automatically on the device after boot.

4.3.9 Windows Updates

The Windows Update service is disabled by KEB because it influences the realtime behavior of the system.

KEB recommends to enable the Enhanced Write Filter (EWF) for volume C:\ to protect the Operating System against any change and damage in productive phase, thus windows updates would be discarded anyway.

WARNING

Necessity of windows updates for security reasons depends on an overall concept of security for the field of application and is the responsibility of the user of this device.

4.3.10 Serial Interface

The C6 E22 can be equipped with an optional serial interface (COM port). For C6 E22 bookmount COM 3 is used, for box and panel device COM1 is used.

By default the COM port is configured to the RS232 protocol. For box and panel devices only this protocol can be used. Only for bookmount devices also RS422/RS485 is possible.

To switch the protocol setting for a bookmount device it is necessary to enter the BIOS. This is done by pressing "F2" key during boot up. You can change the protocol setting if you navigate to "Advanced/Super IO Configuration". There you find the settings for the COM ports.

Navigate to the "Mode" setting for "COM C" and change it to "RS422" respective "4-wire RS485". Leave the BIOS with "F10" key to save the changes.

In Windows and/or the COMBIVIS studio 6 application no changes are necessary.

5 Maintenance and service

C6 E22 BOX/PANEL is provided with a CFast slot. The CFast slot connector is operated in a push-push mode.

The CFast can be installed / removed only when C6 E22 BOX/PANEL is off. Otherwise, operating system, program and data files contained in the CFast may be permanently damaged.



Figure 60: CFast slot cover removal

⚠ WARNING

Use only KEB approved CFast cards for industrial application!

Any hard parts that comes in contact with the touchscreen may damage it.

- All the CFast cards intended for other uses (for example: digital cameras and other consumer products) may not have the endurance, the performance and the security features (as data reliability in case of a sudden power-off) required for an industrial application.

⚠ WARNING

Potential data loss!

- Do not remove the CFast card while data are being accessed. Data on the CFast card may be lost if you remove it, while C6 E22 BOX/PANEL is accessing its data.

- Remove the cover as indicated in the figure.



Figure 61: CFast slot detail

⚠ WARNING

Potential system corruption !

- Do not remove the CFast card while C6 E22 BOX/PANEL is running. Operating system and program files may be damaged and the C6 E22 BOX/PANEL may stop proper operations.

5.1 Installation

- Insert (push) the CFast card into the slot as indicated in the figure. For proper insertion, the rear label of the CFast should be visible.

⚠ WARNING

CFast card orientation !

- The CFast slot does not permit a wrong insertion. Apply only a reasonable force, during the insertion. Check the CFast card orientation if too much force should be necessary for insertion.



Figure 62: CFast installation

5.1.1 Removal

- Push and release the CFast card, as indicated in the figure.

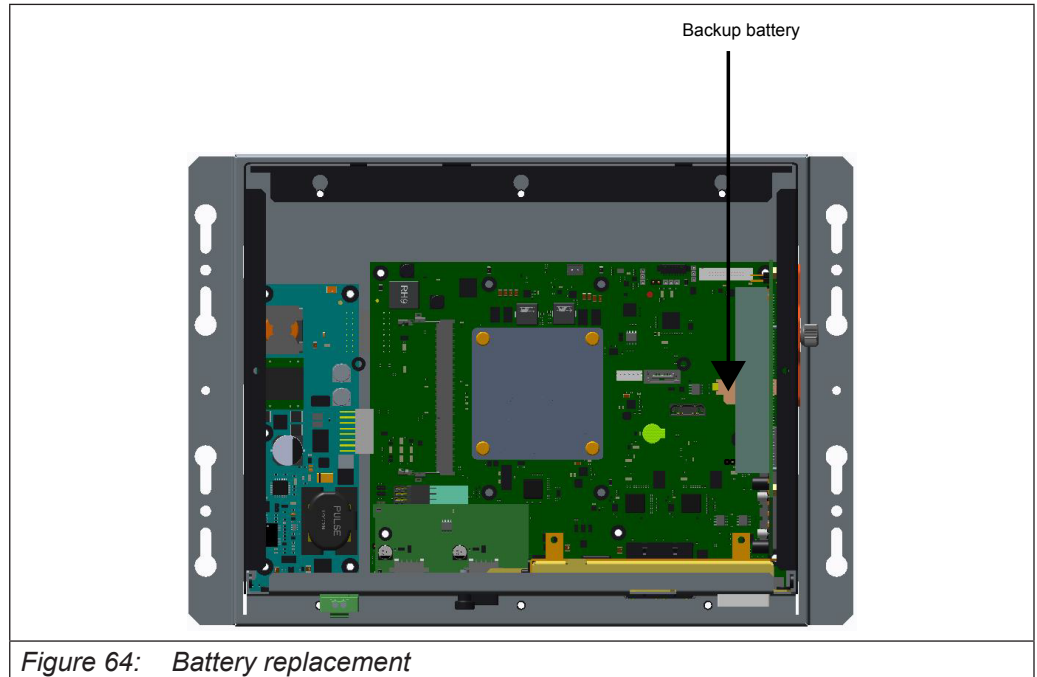


Figure 63: CFast removal

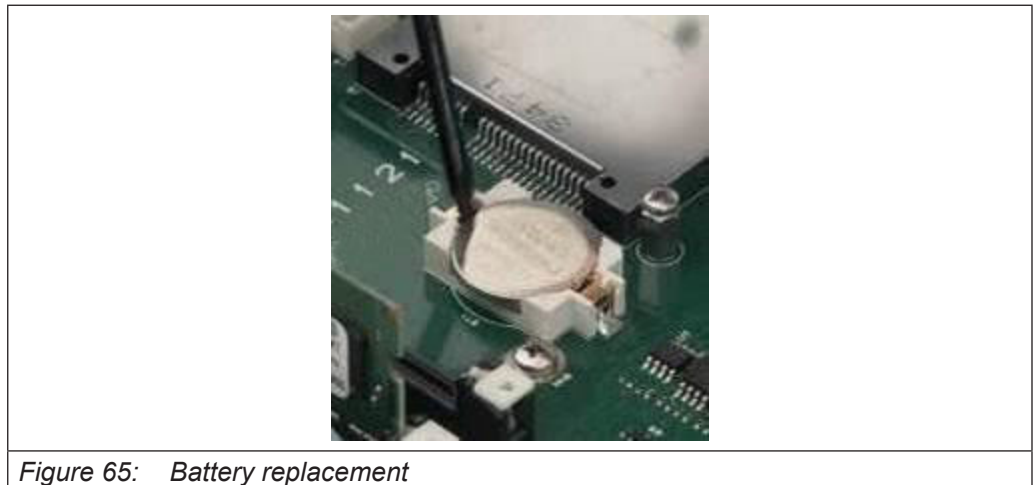
- Extract the memory card from the slot.

5.2 Backup battery replacement (CR2032 3V)

- Remove the battery and replace it with one of the same model (Lithium CR2032 3V Coin).



- Follow the above sequence.



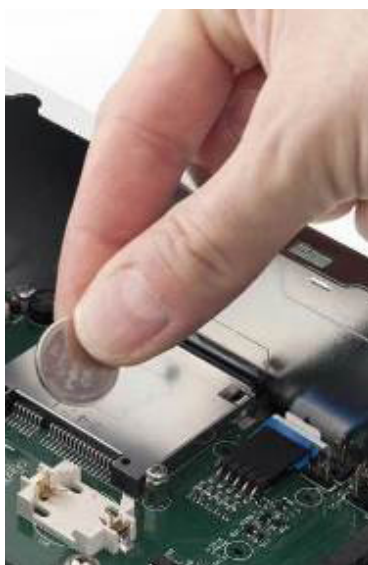


Figure 66: Battery replacement



Figure 67: Battery replacement

Insertion of a battery:

When inserting a new battery,

- Take care to first insert one edge of the battery under the two golden grapple, and then press the other battery edge to lock it into the plastic holder.
- Do not force the battery straight horizontally into the holder or it will crush down the two golden grapple!
- At first power on after a battery replacement, do not turn off the power for at least 20 seconds.
- The board need this time to make a self-restart as a one shot configuration procedure.
- If power is lost within this time, remove the battery and repeat the replace procedure.

5.3 Touchscreen calibration

C6 E22 PANEL is designed in order not to require any user touchscreen calibration. However, that may be required in some special cases, such as operating system update. Please, follow these instructions.

- Go to Control Panel or Click on system tray icon and open eGalax setup application.

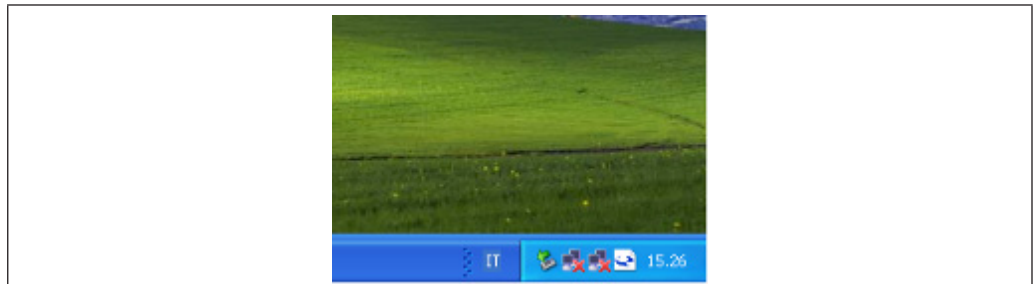


Figure 68: Calibration of the touchscreen

- Select 'Tools' tab

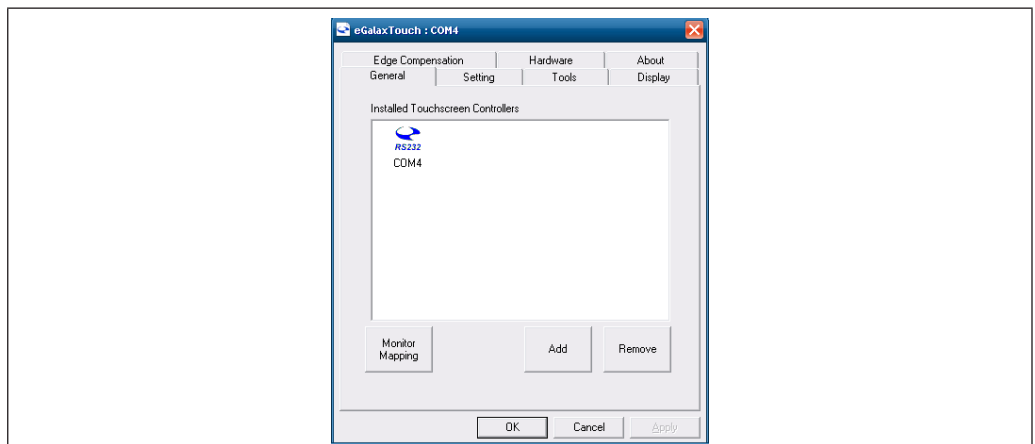


Figure 69: Calibration of the touchscreen

Select '4 point calibration'.

A more accurate option is available: 'Linearization'.

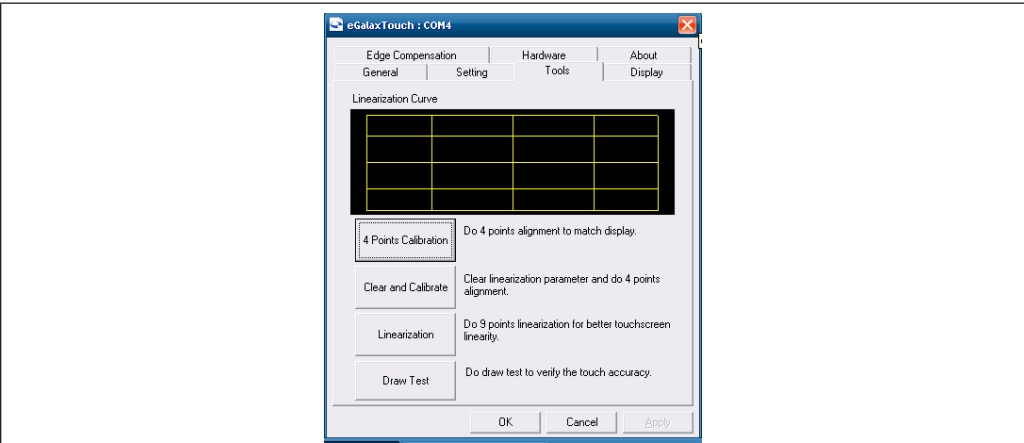


Figure 70: Calibration of the touchscreen

- User should follow the guide to touch and hold the blinking symbol in the calibration window until it shows "OK" to make sure that the utility can gather enough data for computation.

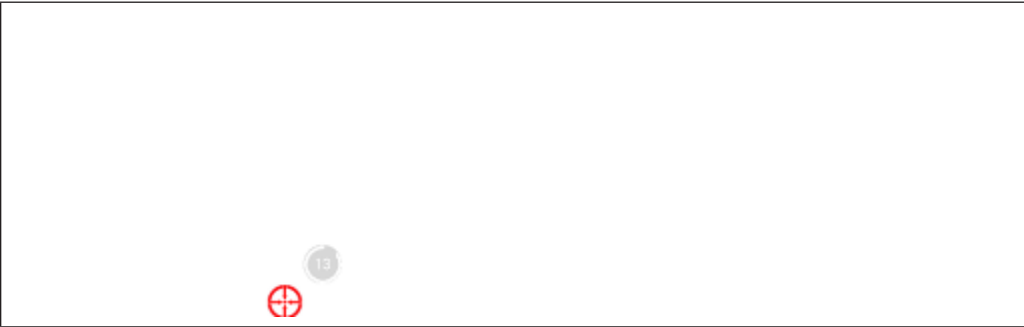


Figure 71: Calibration of the touchscreen

5.3.1 Touchscreen Application Tips

Using a touchscreen with your finger has several implications on application usage. Here are some useful suggestions.

Use large buttons and a simple interface

Avoid complex user operations like double-clicks, scroll bars, drop-down menus, use of multiple windows or dragging. Remember that not all the operations that can be done using a mouse are equally comfortable using a touch screen.

Give the user feedback as soon as the screen is touched.

An immediate feedback on a successfully touch operation is very important to the user. The feedback can be either visual (changing button aspect / 3D effects) or audio ("beep" or "click" on touch).

Turn the cursor off

It will help the user to focus on the entire screen, without being distracted by the cursor pointer.

Run your application full screen

Remove title and menu bars, to use the entire display area.

Avoid using a black background

Bright backgrounds, possibly containing a pattern, are the better choice for reducing glare and for hiding fingerprints.

5.3.2 Maintaining & cleaning

C6 E22 BOX/PANEL is designed for maintenance-free operation except for the replacing of the battery backup when necessary. It is recommended to clean the touchscreen with a damp cleaning cloth and an appropriate display cleaning solution.



Clean the front panel of the system with a soft damp cloth only.

WARNING

Cleaning operation!

- ▶ Do not use detergents, solvents, cleaners or objects that could scratch the surface.
 - ▶ Switch off the power before any cleaning operation, in order to avoid any unintended functions.
-

5.3.3 Procedure

Procedure as follows:

- a) Switch off the C6 E22 PANEL device or lock the touch screen.
- b) Spray the display cleaning solution onto a cleaning cloth.
- c) Do not spray directly onto the display.
- d) Clean the display from the screen edge inwards.

5.4 Technical support & repairs

KEB offers wide-ranging, complete after-sales technical support. The staff who deal with this handle questions on the entire range of products skillfully, quickly, and efficiently.

You can phone our staff in the service department, and they will give you complete, prompt advice on how to resolve your problems.

telephone:	+49 5263 401 0
fax:	+49 5263 401 116
e-mail:	COMBICONTROL@keb.de

5.5 Recycling and disposal

C6 E22 BOX/PANEL can be recycled due to the use of materials with low environmental impact. Contact a certified disposal service company for environmentally sound recycling and disposal of your old devices.

6 Technical specifications

6.1 LCD characteristics

Size (inch)	10.1" W	10.4" SVGA	12.1" WXGA
Type	Color LCD TFT	Color LCD TFT	Color LCD TFT
Resolution (pxl x pxl)	1280x800	800x600	1280x800
Colors	16.7M	16.2M	16.2M
Pixel pitch (mm)	0,1695x0,1695	0,264x0,264	0,204x0,204
Backlight	LED	LED	LED
Luminance (cd/m ²)	400	400	400
Contrast	800:1	700:1	1000:1
Viewing angle typ. (°)	85°:85° (L/R)	80°:80° (L/R)	88°:88° (L/R)
	85°:85° (U/L)	70°:70° (U/L)	88°:88° (U/L)
Lifetime (min.)	100.000h	50.000h	50.000h

Table 10: LCD characteristics

Size (inch)	12.1" SVGA	15.0" XGA
Type	Color LCD TFT	Color LCD TFT
Resolution (pxl x pxl)	800x600	1024x768
Colors	16.2M	16.2M
Pixel pitch (mm)	0,3075x0,3075	0,297x0,297
Backlight	LED	LED
Luminance (cd/m ²)	500	500
Contrast	800:1	1500:1
Viewing angle typ. (°)	80°:80° (L/R)	85°:85° (L/R)
	80°:60° (U/L)	85°:85° (U/L)
Lifetime (min.)	100.000h	50.000h

Size (inch)	15.6" WXGA	17.0" SXGA
Type	Color LCD TFT	Color LCD TFT
Resolution (pxl x pxl)	1366x768	1280x1024
Colors	16.7M	16.7M
Pixel pitch (mm)	0,252x0,252	0,264x0,264
Backlight	LED	LED
Luminance (cd/m ²)	400	350
Contrast	500:1	1000:1
Viewing angle typ. (°)	85°:85° (L/R)	85°:85° (L/R)
	80°:80° (U/L)	80°:80° (U/L)
Lifetime (min.)	50.000h	50.000h

TECHNICAL SPECIFICATIONS

Size (inch)	18.5" WXGA	19.0" SXGA	21.5" FHD
Type	Color LCD TFT	Color LCD TFT	Color LCD TFT
Resolution (pxl x pxl)	1366x768	1280x1024	1920x1080
Colors	16.7M	16.7M	16.7M
Pixel pitch (mm)	0,300x0,300	0,294x0,294	0,248x0,248
Backlight	LED	LED	LED
Luminance (cd/m ²)	300	350	300
Contrast	1000:1	1500:1	5000:1
Viewing angle typ. (°)	75°:75° (L/R)	85°:85° (L/R)	89°:89° (L/R)
	70°:70° (U/L)	85°:85° (U/L)	89°:89° (U/L)
Lifetime (min.)	50.000h	70.000h	50.000h

Size (inch)	24.0" WXGA
Type	Color LCD TFT
Resolution (pxl x pxl)	1920x1080
Colors	16.7M
Pixel pitch (mm)	0,276x0,276
Backlight	LED
Luminance (cd/m ²)	300
Contrast	5000:1
Viewing angle typ. (°)	89°:89° (L/R)
	89°:89° (U/L)
Lifetime (min.)	50.000h



Pixel errors in the TFT display are production-caused and represent no complaint-reason (according to ISO 13406-2, class II).

All displays are Color TFT-LCD with LED backlight designed for industrial application.

6.2 C6 E22 PANEL resistive - Technical data

Case	Panel mount	
Front panel	Aluminum ▪ KEB logo sticker	
Touchscreen	5 wires resistive technology ▪ on board controller	
Frontal protection	IP66	
Power supply	24V DC Input voltage: 18÷32V DC Isolated	
Micro UPS	KEB µUPS is designed to be used in combination with CONTROL Soft PLC. The Micro UPS module is installed on the internal power supply unit.	
Motherboard	Type "All-In-One" MB 954	
Watchdog	Time programmable	
Intel platform Processor	Intel® Celeron® J1900 ▪ 2,00 GHz (2,42 GHz Burst), 2MB L2 cache ▪ 4 cores, 4 threads ▪ Soldered on-board	
Operating System certified by KEB	Microsoft Windows Embedded Standard 7E/7P 32/64 bit	
	Other operating systems, such as VxWorks, QNX, etc., have not been certified by KEB but they are reasonably supported by the Intel platform after verification of compatibility	
Operating System not supported by Intel platform	Microsoft Windows XP / 2000 / 98 / NT ▪ Microsoft Windows CE 5 / 6	
Video controller	Intel® HD Graphics integrated into Intel® Celeron™ microprocessor ▪ 688MHz ▪ I/F digital LVDS a 8bit/color	
Video RAM (shared)	Dynamic Video Memory Technology ▪ Memory quantity is automatically selected by operating system (max 1720 MB)	
System memory	DDR3-1066 type ▪ 1 SODIMM module ▪ min 1GB ▪ max 8GB	
Mass storage interfaces	SL	1 x mSATA 2, 3Gb/s
	S1	1 x mSATA 2, 3Gb/s
CFast slot	1 x slot CFast (bootable) external access	
Bus expansions slots on riser card (S1)	1 x PCI or 1 x PCIe x1 ▪ half size boards with 3W max consumption ▪ alternative to each other	
Rear access interfaces	2 x Ethernet 10/100/1000 Mbps (RJ45), Intel® I210 1 x USB 3.0 (Type A) 2 x USB 2.0 (Type A) 1 x DVI-I Single Link (max resolution: DVI-D/VGA 1920x1080 FullHD)	
Rear access serial interfaces	1 x RS-232 (DB9M)	
Environmental specifications	Operating temperature: 0° ÷ +50°C, 0°C ÷ +45°C with 24x7 HDD, +5°C ÷ +45°C with standard HDD Storage temperature: -20° ÷ +60°C Humidity: 80% (non-condensing)	
Approvals	CE (EN 55022, EN 61000-3-2/3, EN 55024, EN 60950-1) cULus LISTED (UL508)	
Standard warranty	12 months ▪ Warranty management by KEB headquarters	
Table 11: C6 E22 BOX/PANEL technical data		

TECHNICAL SPECIFICATIONS

Options	SL	S1	
SSD mSATA >Note 3*	•	•	SSD mSATA, MLC
CFAST	•	•	CFAST SATA2
communication ports	/	•	1 x RS232/422/485 optoisolated serial port (DB15M) 1 x USB 2.0 port > note 4
	/	•	1 x Ethernet 10/100/1000Mbps, Intel® I210
<i>Table 12: Common options</i>			

Note*:

For power consumption calculation we recommend to read the tips on paragraph 6.5. The power values does not include the absorbed power of USB devices connected to the ports.

Note 1*: Glass Film Glass (GFG) touch-screen option.

Note 2*: UPS functionalities are ensured with Microsoft Win32/64bits operating systems only.

Note 3*: mSATA SSD and 2,5" SSD/HDD devices cannot be installed together.

Note 4*: Communication ports signed by note 4 cannot be installed together.

6.3 C6 E22 PANEL capacitive - Technical data

Case	Panel mount	
Front panel	Aluminum and tempered glass TrueFlat ▪ KEB logo serigraph printed	
Touchscreen	Capacitive 4 finger - Multi Touch	
Frontal protection	IP66K	
Power supply	24V DC Input voltage: 18÷32V DC Isolated	
Micro UPS	KEB micro-UPS is designed to be used in combination with CON- TROL Soft PLC. The micro-UPS module is installed on the internal power supply unit.	
Motherboard	Type "All-In-One" MB 954	
Watchdog	Time programmable	
Intel platform Processor	Intel® Celeron® J1900 ▪ 2,00 GHz (2,42 GHz Burst), 2MB L2 cache ▪ 4 cores, 4 threads ▪ Soldered on-board	
Operating System certified by KEB	Microsoft Windows Embedded Standard 7E/7P 32/64 bit	
	Other operating systems, such as VxWorks, QNX, etc., have not been certified by KEB but they are reasonably supported by the Intel platform after verification of compatibility	
Operating System not supported by Intel platform	Microsoft Windows XP / 2000 / 98 / NT ▪ Microsoft Windows CE 5 / 6	
Video controller	Intel® HD Graphics integrated into Intel® Celeron™ microprocessor ▪ 688MHz ▪ I/F digital LVDS a 8bit/color	
Video RAM (shared)	Dynamic Video Memory Technology ▪ Memory quantity is automati- cally selected by operating system (max 1720 MB)	
System memory	DDR3-1066 type ▪ 1 SODIMM module ▪ min 1GB ▪ max 8GB	
Mass storage interfaces	SL	1 x mSATA 2, 3Gb/s
	S1	1 x mSATA 2, 3Gb/s
CFast slot	1 x slot CFast (bootable) external access	
Bus expansions slots on riser card (S1)	1 x PCI or 1 x PCIe x1 ▪ half size boards with 3W max consumption ▪ alternative to each other	
Rear access interfaces	2 x Ethernet 10/100/1000 Mbps (RJ45), Intel® I210 1 x USB 3.0 (Type A) 2 x USB 2.0 (Type A) 1 x DVI-I Single Link (max resolution: DVI-D/VGA 1920x1080 FullHD)	
Rear access serial interfaces	1 x RS-232 (DB9M)	
Environmental specifications	Operating temperature: 0° ÷ +50°C, 0°C ÷ +45°C with 24x7 HDD, +5°C ÷ +45°C with standard HDD Storage temperature: -20° ÷ +60°C Humidity: 80% (non-condensing)	
Approvals	CE (EN 55022, EN 61000-3-2/3, EN 55024, EN 60950-1) cULus LISTED (UL508)	
Standard warranty	12 months ▪ Warranty management by KEB headquarters	
Table 13: C6 E22 PANEL technical data		

TECHNICAL SPECIFICATIONS

Options	SL	S1	
SSD mSATA >Note 2*	•	•	SSD mSATA, MLC
CFAST	•	•	CFAST SATA2
communication ports	/	•	1 x RS232/422/485 optoisolated serial port (DB15M) 1 x USB 2.0 port > note 3
	/	•	1 x Ethernet 10/100/1000Mbps, Intel® I210
<i>Table 14: Common options</i>			

Note*:

For power consumption calculation we recommend to read the tips on paragraph 6.5. The power values do not include the absorbed power of USB devices connected to the ports.

Note 1*: UPS module is supported by Microsoft Win32/64 operating systems.

Note 2*: mSATA SSD and 2,5" SSD/HDD devices cannot be installed together.

Note 3*: Communication ports signed by note 3 cannot be installed together.

6.4 C6 E22 Box Technical data

Case	Wall and DIN rail mount	
Power supply	24V DC Input voltage: 18÷32V DC Isolated	
Micro UPS	KEB micro-UPS is designed to be used in combination with CONTROL Soft PLC. The micro-UPS module is installed on the internal power supply unit.	
Motherboard	Type "All-In-One" MB 954	
Watchdog	Time programmable	
Intel platform Processor	Intel® Celeron® J1900 ▪ 2,00 GHz (2,42 GHz Burst), 2MB L2 cache ▪ 4 cores, 4 threads ▪ Soldered on-board	
Operating System certified by KEB	Microsoft Windows Embedded Standard 7E/7P 32/64 bit	
	Other operating systems, such as VxWorks, QNX, etc., have not been certified by KEB but they are reasonably supported by the Intel platform after verification of compatibility	
Operating System not supported by Intel platform	Microsoft Windows XP / 2000 / 98 / NT ▪ Microsoft Windows CE 5 / 6	
Video controller	Intel® HD Graphics integrated into Intel® Celeron™ microprocessor ▪ 688MHz ▪ I/F digital LVDS a 8bit/color	
Video RAM (shared)	Dynamic Video Memory Technology ▪ Memory quantity is automatically selected by operating system (max 1720 MB)	
System memory	DDR3-1066 type ▪ 1 SODIMM module ▪ min 1GB ▪ max 8GB	
Mass storage interfaces	SL	1 x mSATA 2, 3Gb/s
	S1	1 x mSATA 2, 3Gb/s
CFast slot	1 x slot CFast (bootable) external access	
Bus expansions slots on riser card (S1)	1 x PCI or 1 x PCIe x1 ▪ half size boards with 3W max consumption ▪ alternative to each other	
Rear access interfaces	2 x Ethernet 10/100/1000 Mbps (RJ45), Intel® I210 1 x USB 3.0 (Type A) 2 x USB 2.0 (Type A) 1 x DVI-I Single Link (max resolution: DVI-D/VGA 1920x1080 FullHD)	
Rear access serial interfaces	1 x RS-232 (DB9M)	
Environmental specifications	Operating temperature: 0° ÷ +50°C, 0°C ÷ +45°C with 24x7 HDD, +5°C ÷ +45°C with standard HDD	
	Storage temperature: -20° ÷ +60°C	
	Humidity: 80% (non-condensing)	
Approvals	CE (EN 55022, EN 61000-3-2/3, EN 55024, EN 60950-1) cULus LISTED (UL508)	
Standard warranty	12 months ▪ Warranty management by KEB headquarters	

Table 15: C6 E22 BOX technical data

Options	SL	S1	
SSD mSATA >Note 2*	•	•	SSD mSATA, MLC
CFAST	•	•	CFAST SATA2
communication ports	/	•	1 x RS232/422/485 optoisolated serial port (DB15M) 1 x USB 2.0 port > note 3
	/	•	1 x Ethernet 10/100/1000Mbps, Intel® I210
<i>Table 16: Common options</i>			

Note*:

For power consumption calculation we recommend to read the tips on paragraph 6.5. The power values do not include the absorbed power of USB devices connected to the ports.

Note 1*: UPS module is supported by Microsoft Win32/64 operating systems.

Note 2*: mSATA SSD and 2,5" SSD/HDD devices cannot be installed together.

Note 3*: Communication ports signed by note 3 cannot be installed together.

6.5 Power consumption

This paragraph contains the information needed to self-calculate the absorbed power of any system configuration.

6.5.1 Absorbed power calculation

It is possible to calculate the maximum absorbed power for each system configuration by adding together the power consumption value of one item of each sections listed in the "Basic system" table plus the power consumption value of the options eventually installed and listed in the "Options" table.

6.5.2 How to define power consumption

The 24V DC power consumption unit is Watt [W] and it is indicated into the column POWER which is calculated according to the following criteria:

- All the power consumptions are calculated considering the maximum absorbed power of each component. The power consumption sum is multiplied by the coefficient that represents the internal power supply efficiency.
- The Intel® CoreT microprocessors with Turbo mode, rise up their typical power consumption for short time period (5-10sec).
- The LCD power consumption value is referred to the maximum LCD brightness.
- The SSD, CF or CFast power consumption value depends on the storage size. For easy calculation, we have reported the power consumption of the biggest storage size available in the price list and in the configurator.
- The power consumption values of USB devices connectable to the systems are not included into the basic configuration power consumption value. The connected USB devices effective consumption has to be considered and added to the total power consumption value. We underline that a USB 2.0 device can consume 3,3W max and a USB 3.0 device can consume 5,9W. These values are calculated multiplying the maximum ports power consumption defined into the USB standard (2.5W and 4,5W) by the coefficient that represent the internal power supply efficiency.
- The power consumption of the basic systems configuration with expansion slots, includes the maximum power absorption admitted for any possibly installed boards.

6.5.2.1 Basic system

Section	Item	Power (W)
Motherboard	MB954	2.6
Processor	Intel® Celeron® J1900 ▪ 2,00 GHz (2,42 GHz Burst), 2MB L2 cache ▪ 4 cores, 4 threads ▪ Soldered on-board	13.1
Display	10.1" LCD	5,5
	10.4" LCD	6.8
	12.1" LCD (SVGA)	11.9
	12.1" LCD (WXGA)	13.3
	15.0" LCD	19.4
	15.6" LCD	19.0
	17.0" LCD	28.8
	18.5" LCD	24.4
	19.0" LCD	36.3
	21.5" LCD	35.2
	24.0" LCD	39.2
Ram Memory	1 GB	2.6
	2 GB	3.3
	4 GB	3.9
	8 GB	4.6
Internal Power Supply	24VDC	0.0
	24VDC with integrated μ UPS	0.7
Expansion Slots	S1	3.9

Table 17: Basic system consumption

6.5.2.2 Options

Section	Item	Power (W)
SSD mSATA	SSD mSATA, MLC	2.0
CFAST	CFAST SATA 2	1.3
I/O ports	1 x RS232/422/485 (DB15M) optoisolated	1.3
	1 x USB 2.0	
	1 x Ethernet 10/100/1000Mbps, Intel® I210	1.3

6.5.3 How to choose the 24 V DC Power Supply

This section contains tips to select the 24V DC power supply for C6 E22 BOX/PANEL.

- The nominal output power should be 25% larger than C6 E22 BOX/PANEL drained power.
- The output voltage rise time has to be less than 100ms.
- Consider the working temperature and the thermal de-rating of the power supply.

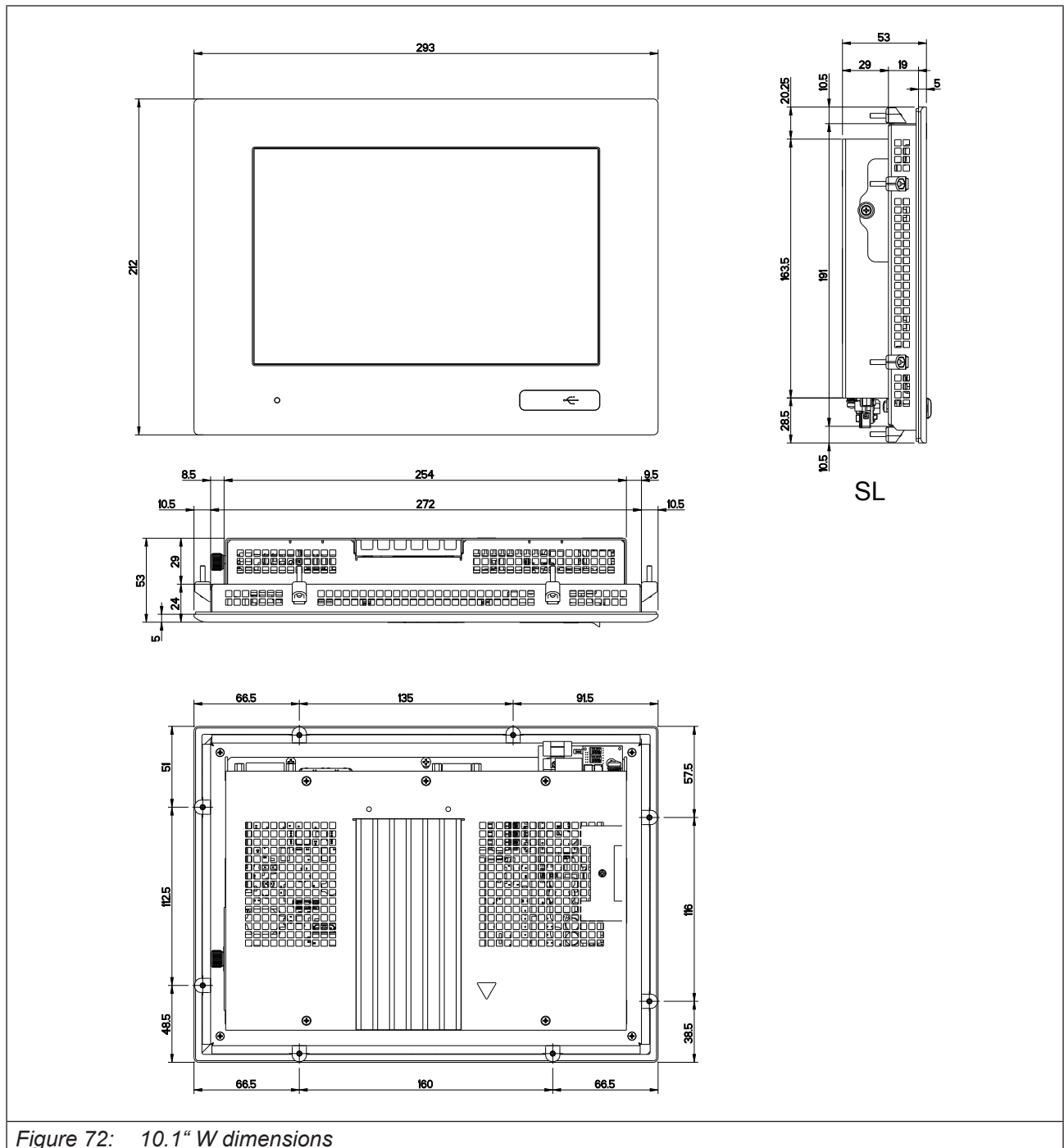
7 Drawings

7.1 Drawings

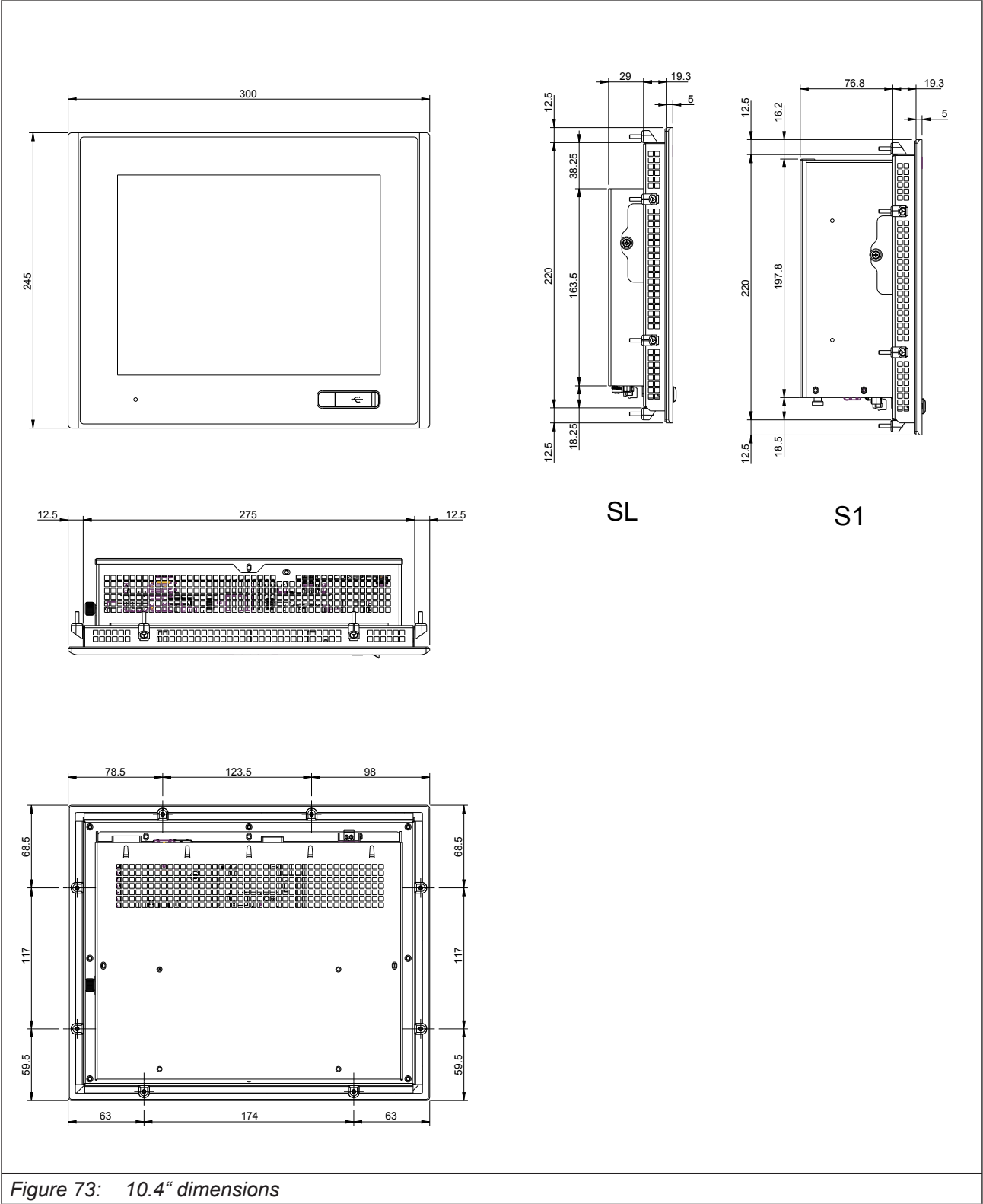
The following drawings are compliant to the “First-angle projection” of the European Standards (represented by the following symbol).



7.1.1 C6 E22 PANEL / SL / 10.1“ W



7.1.2 C6 E22 PANEL / SL-S1 / 10.4"



7.1.3 C6 E22 PANEL / SL-S1 / 12.1"

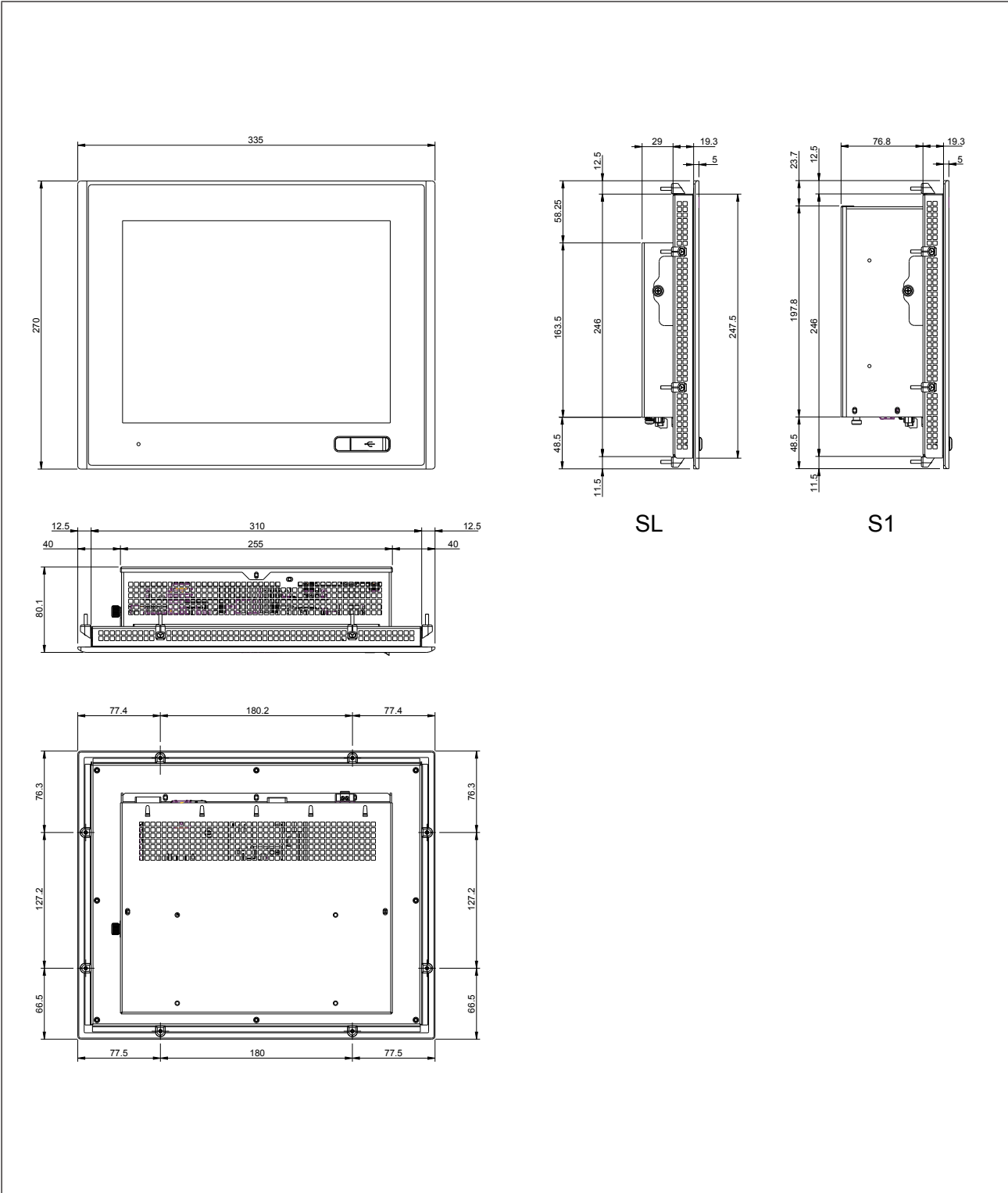
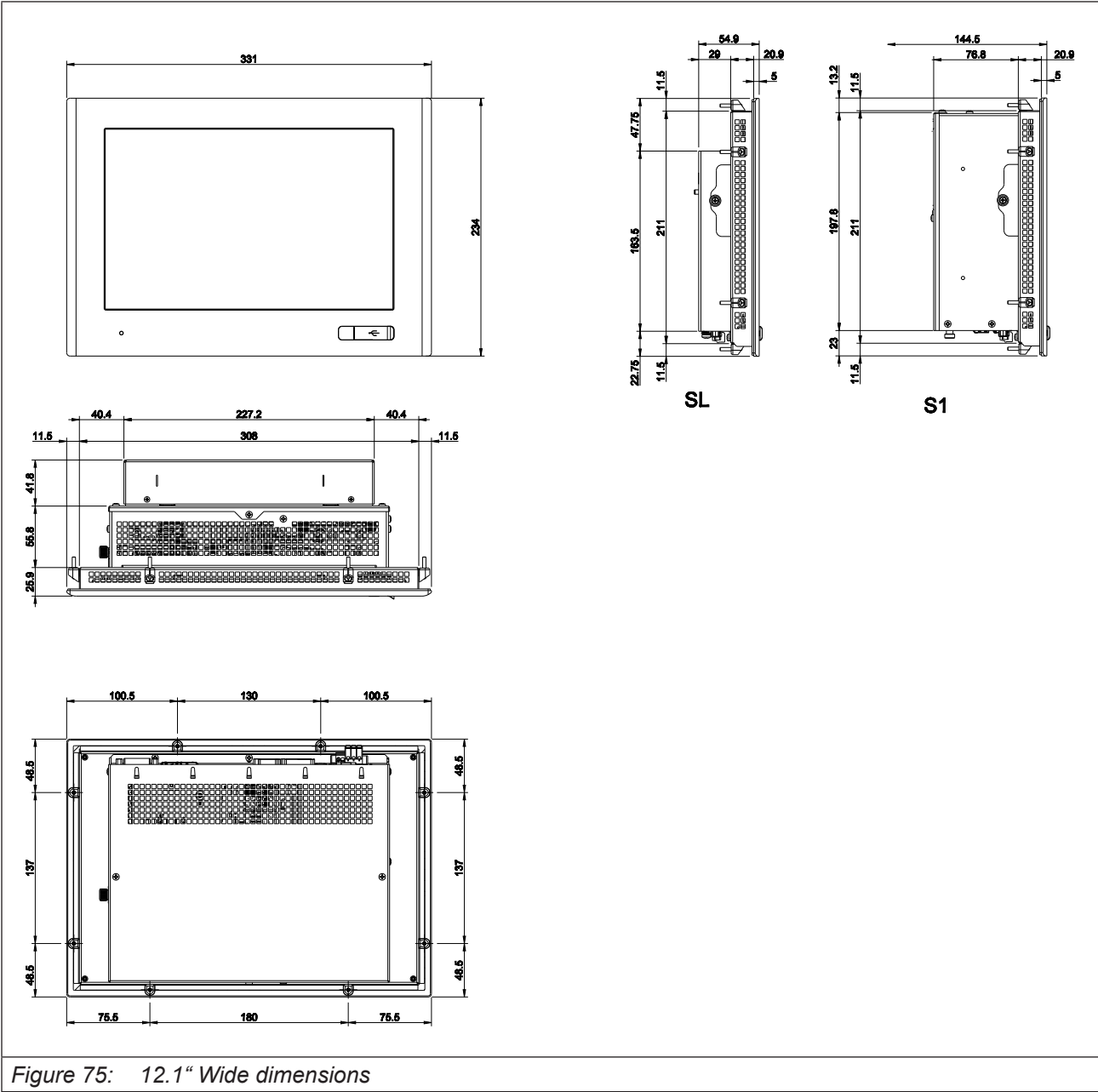


Figure 74: 12.1" dimensions

7.1.4 C6 E22 PANEL / SL-S1 / 12.1" W



7.1.5 C6 E22 PANEL SL-S1 / 15.0"

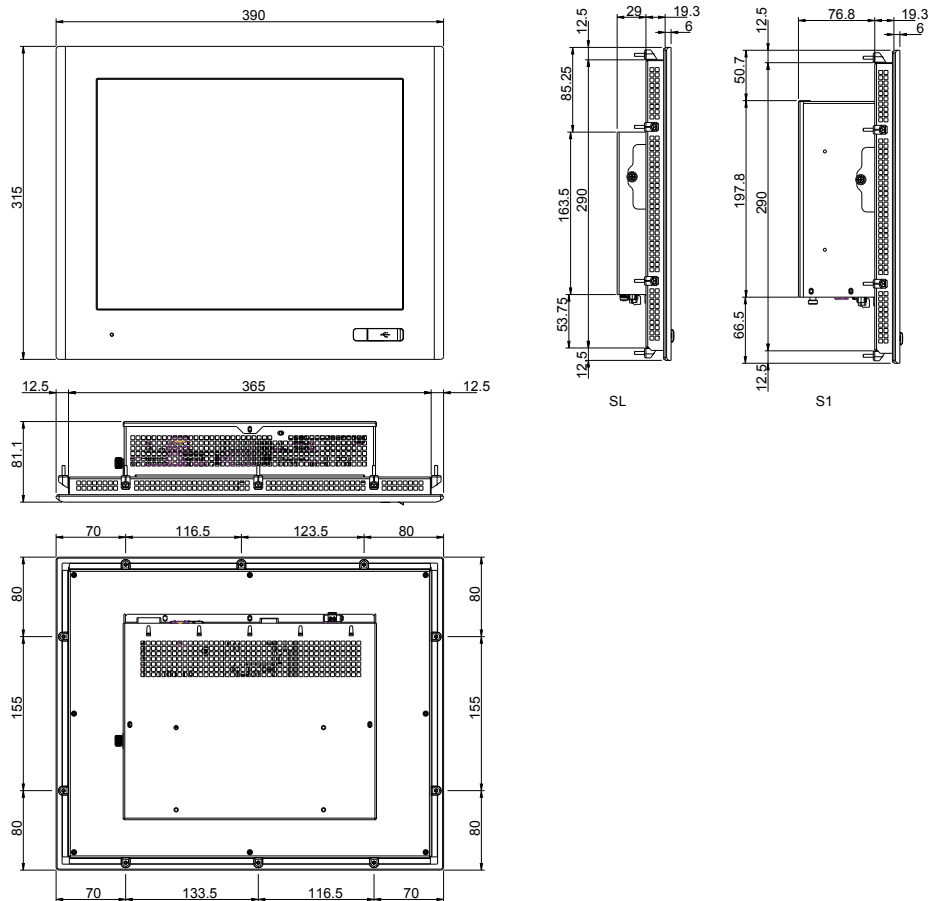


Figure 76: 15.0" dimensions

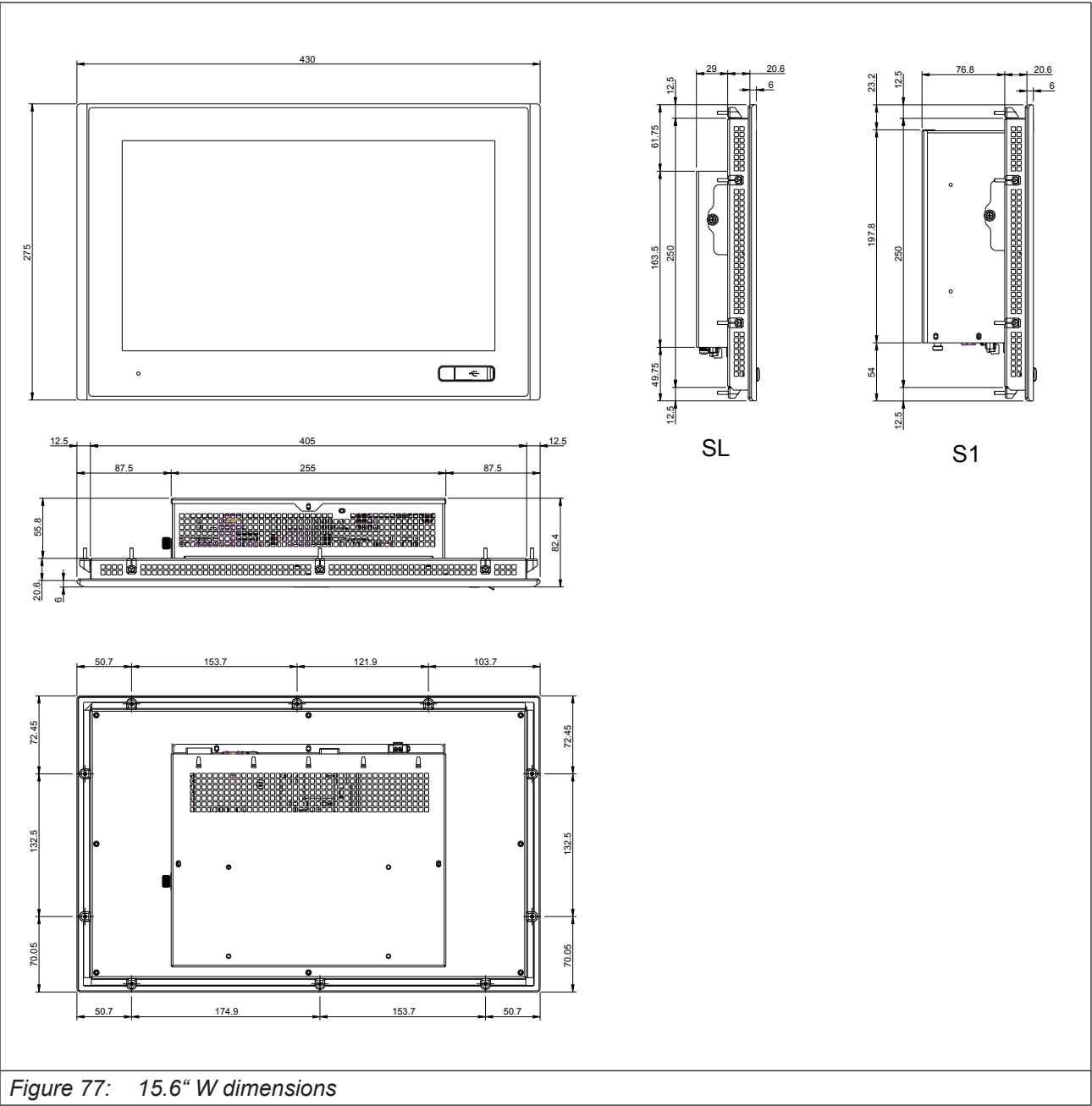


No USB frontal is present on TFX models.



TFX panel dimensions 398 x 315.

7.1.6 C6 E22 PANEL / SL-S1 / 15.6" W



7.1.7 C6 E22 PANEL / SL-S1 / 17.0"

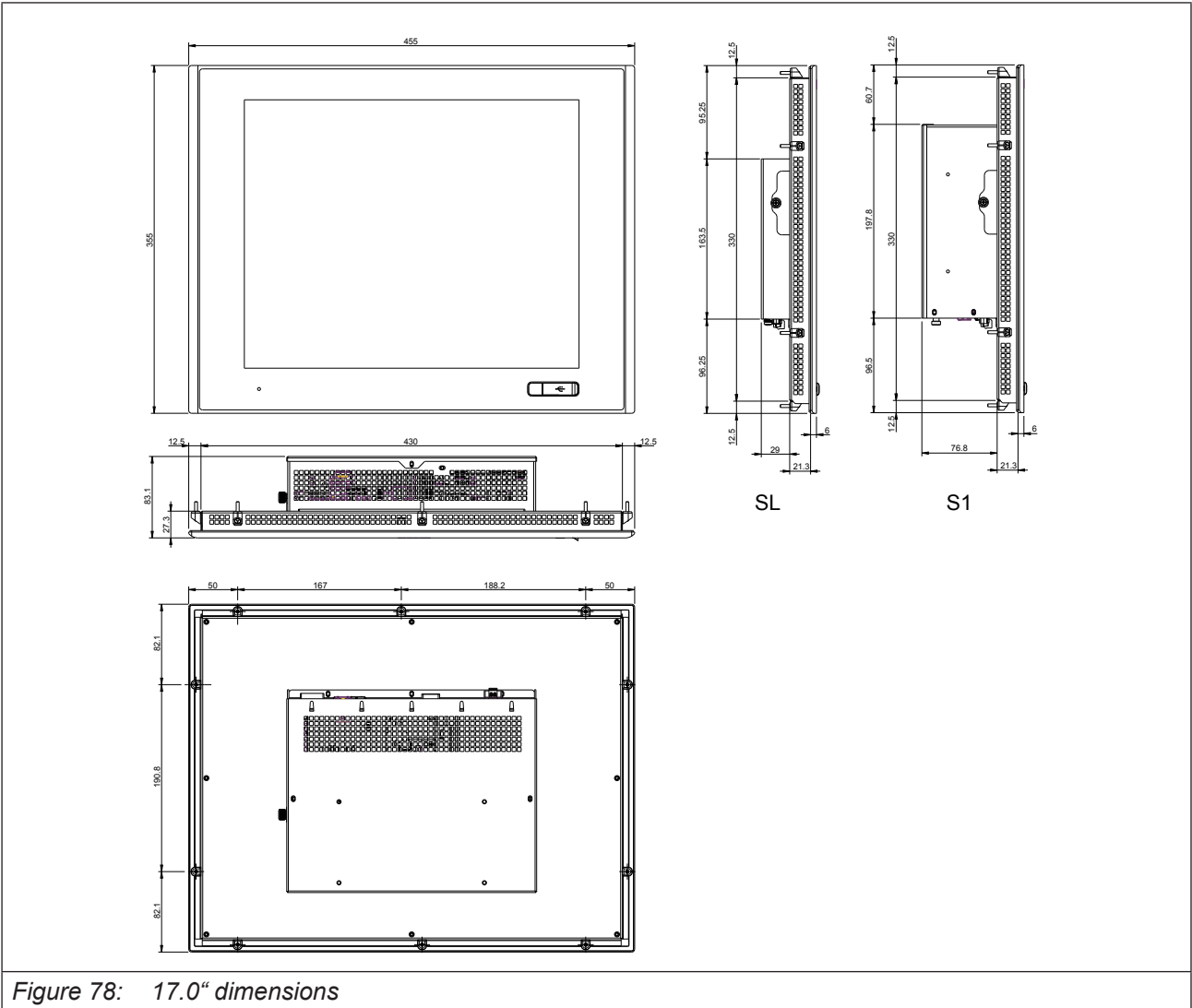
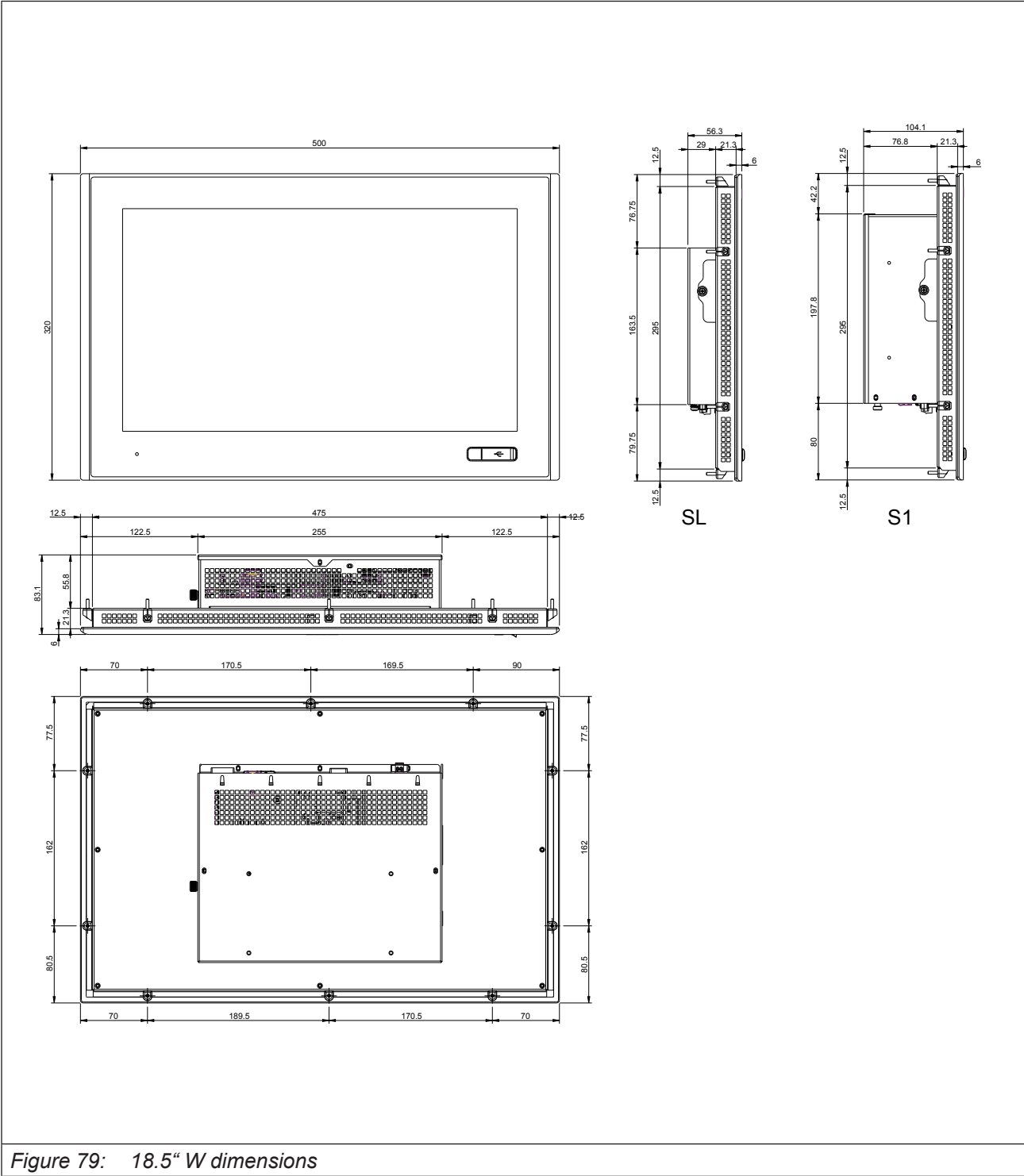
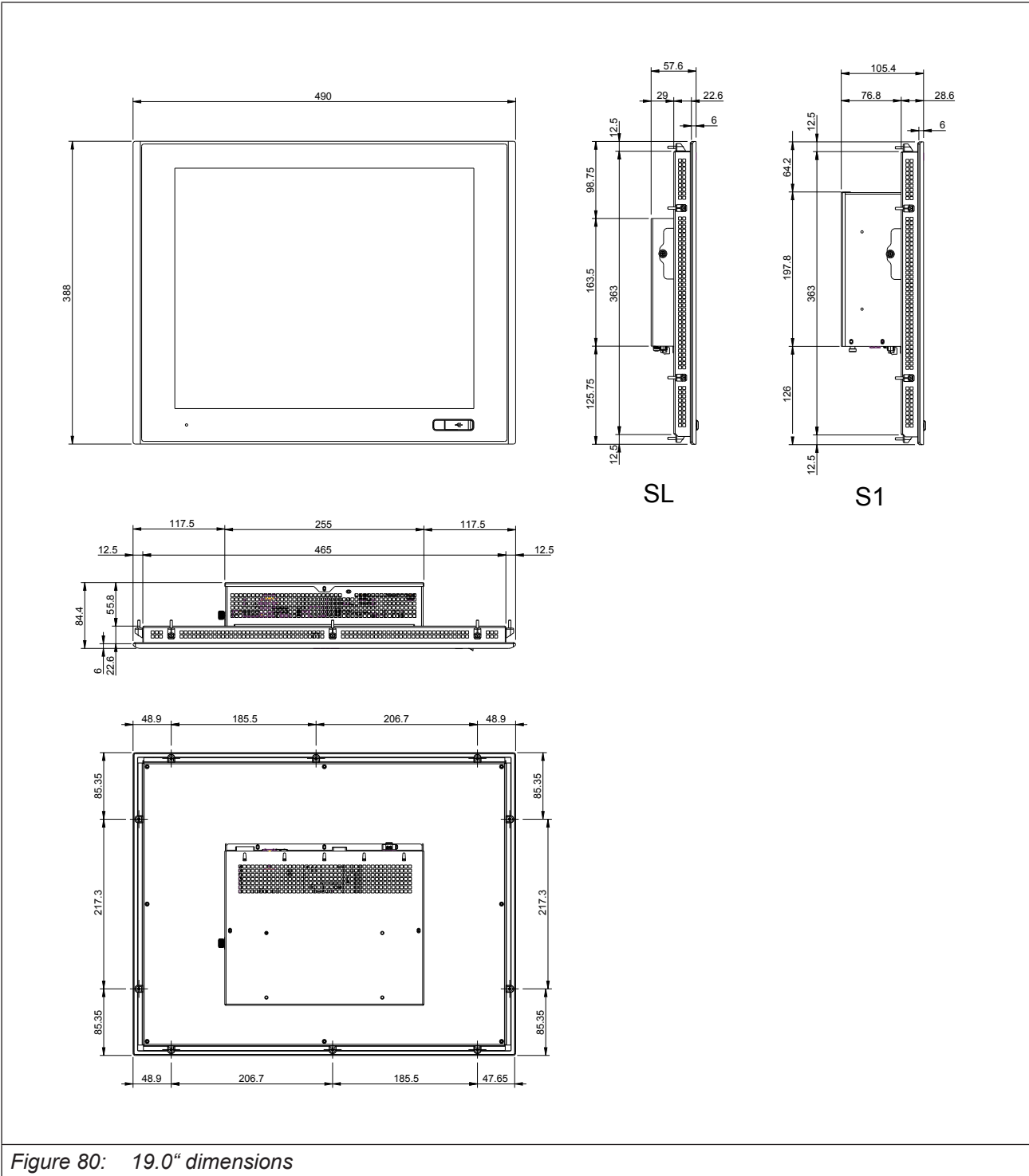


Figure 78: 17.0" dimensions

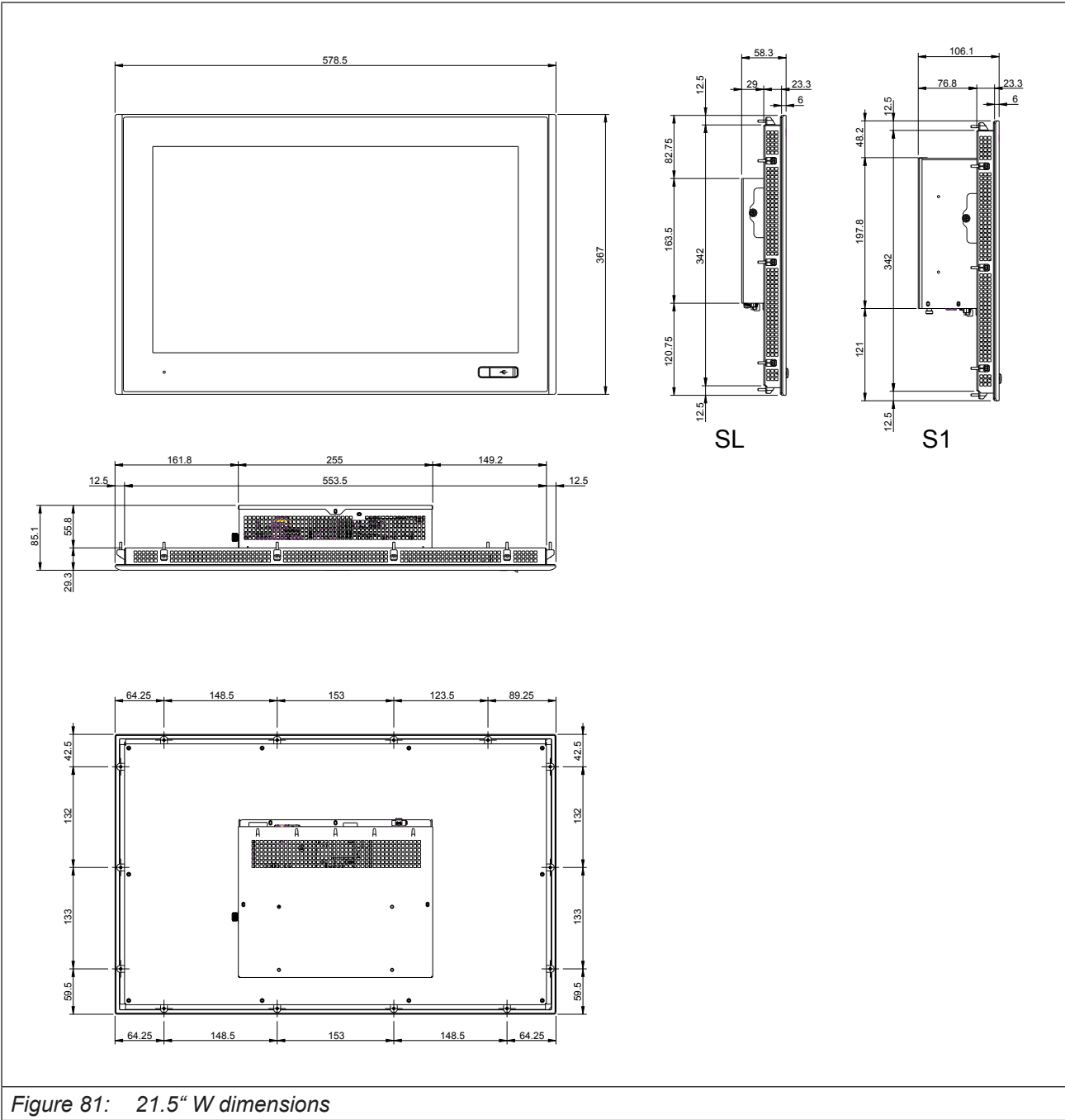
7.1.8 C6 E22 PANEL / SL-S1 / 18.5" W



7.1.9 C6 E22 PANEL / SL-S1 / 19.0"



7.1.10 C6 E22 PANEL / SL-S1 / 21.5" W



7.1.11 C6 E22 PANEL / SL-S1 / 24.0" W

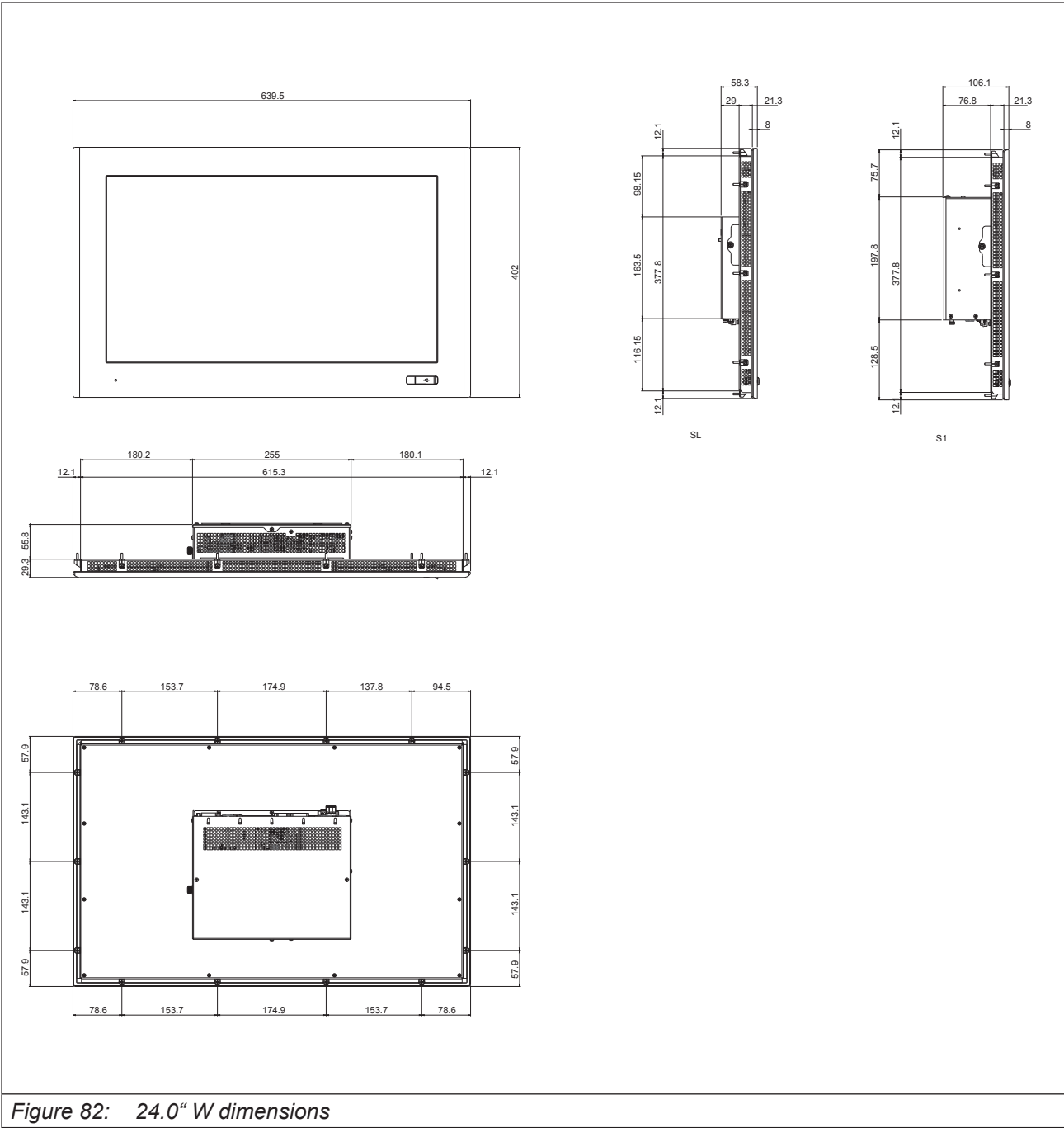
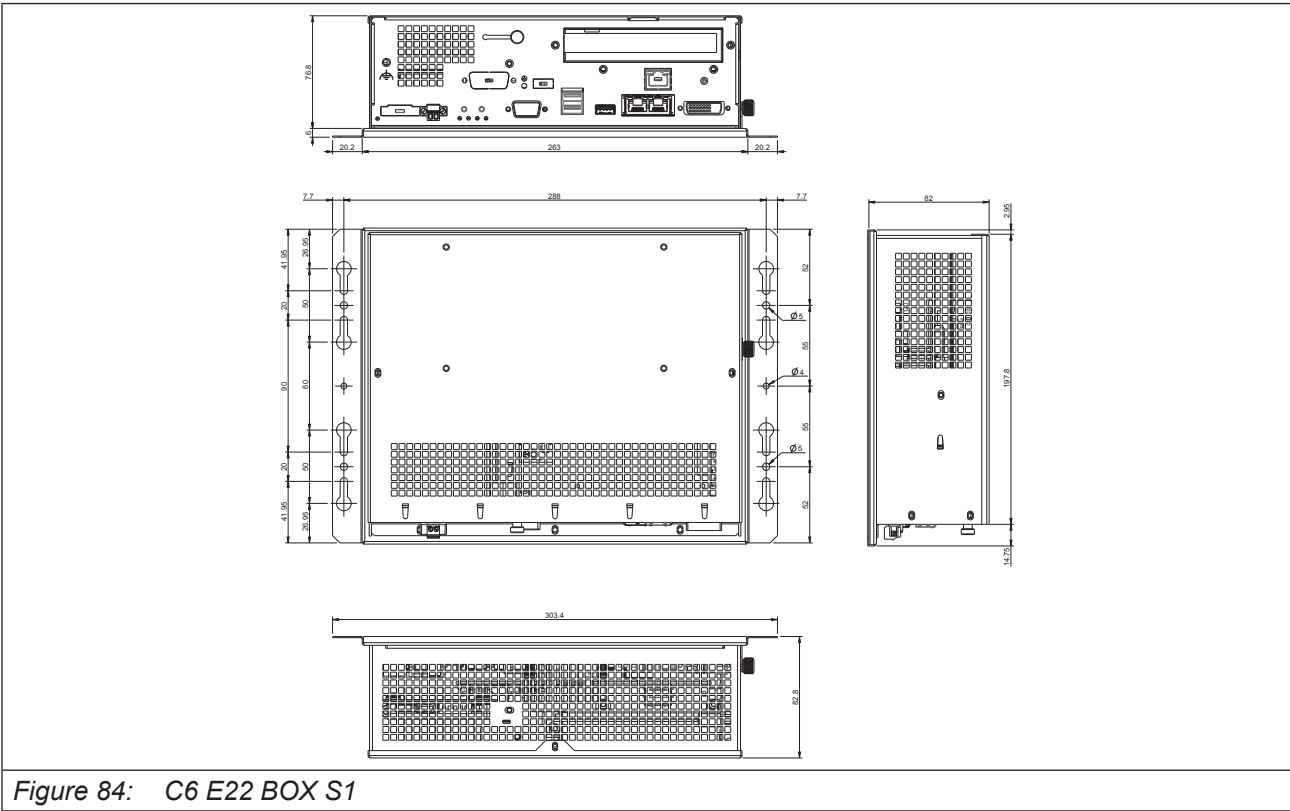
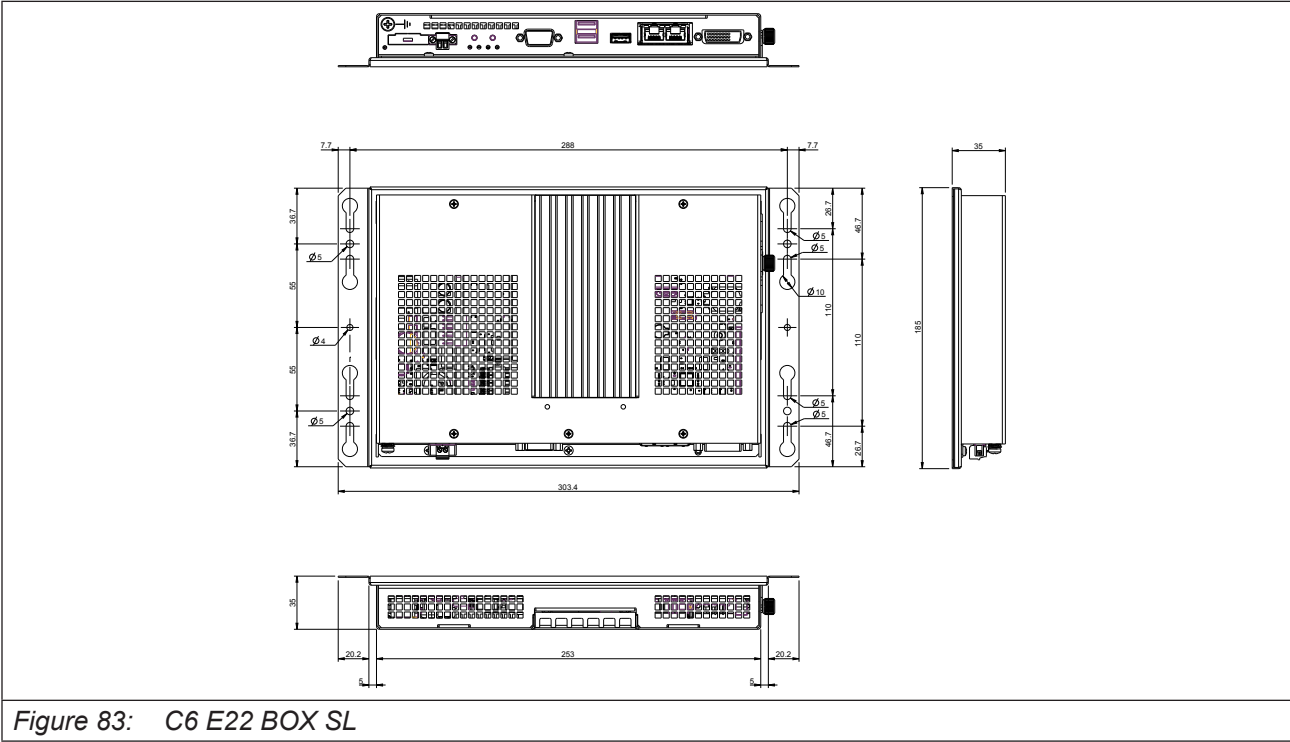


Figure 82: 24.0" W dimensions

7.1.12 C6 E22 Box SL-S1



7.2 LED description

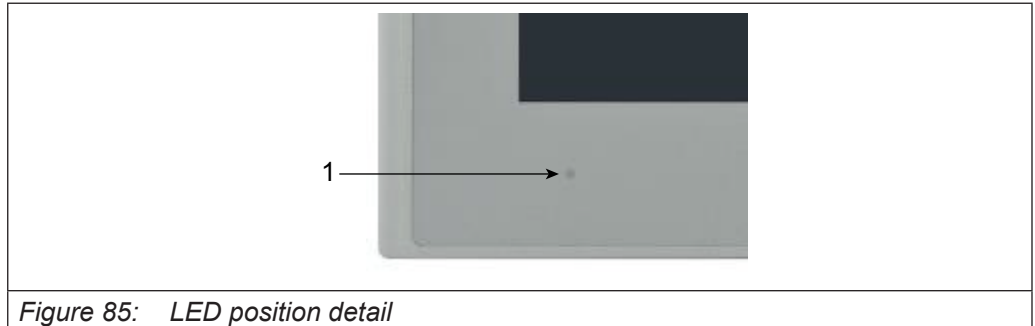
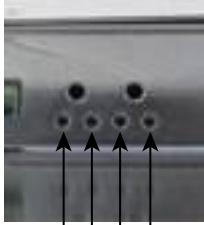


Figure 85: LED position detail



	LED Reference	Color	Function	Ext. / Int.
1	Front LED	Yellow/Green	On/Off Standby/μUPS	External
2	DL4	Red	Thermal Alarm	External
3	DL2	Red	Watchdog	External
4	DL3	Yellow	Mass Storage Device	External
5	DL1	Green	Power On / standby	External
/	DL5	Green	Touchscreen	Internal

Figure 86: LED position detail

7.2.1 DL4 - Thermal Alarm LED

This LED is used to notify a thermal alarm coming from inside C6 E22 BOX/PANEL. Two temperature are measured by mean of Super I/O Nuvoto NCT6106D hardware monitor integrated circuit:

- Motherboard close to CPU temperature.
- Motherboard temperature at the input aeration.

Measuring point	Thermal limit
CPU	100°C
Mother board	80°C

In case this LED is on, please shut off the system and check its cooling and power consumption.

7.2.2 Front LED - On/Off/UPS LED

This LED is used to give information about the power state of the system.

System power state	Green	Yellow	Notes
OFF	OFF	OFF	The system is not powered.
Full On	ON	OFF	System core is full-on.
μUPS	Blinking	OFF	System core is full-on. Main power is missing and μUPS is powering the system.

Table 18: Front LED - On/Off/UPS LED

DL1 and Green front LED have the same behaviour.

7.2.3 DL2 - Watchdog LED

This LED is used to notify that Watchdog timer has expired. In addition, depending on setting of JP jumper, as the Watchdog timer expires a system reset may occur or not.

DL4 LED may be reset to OFF state pressing SW2 switch.

7.2.4 DL1 - Power On / Standby LED

System power state	Green	Yellow	Notes
OFF	OFF	OFF	The system is not powered.
Full On	ON	OFF	System core is full-on.

Table 19: Power On / Standby LED

7.2.5 DL3 - Mass Storage Devices LED

This LED is on when access to mass storage devices (HDD, SSD, CF) is taking place through IDE channels (PATA or SATA).

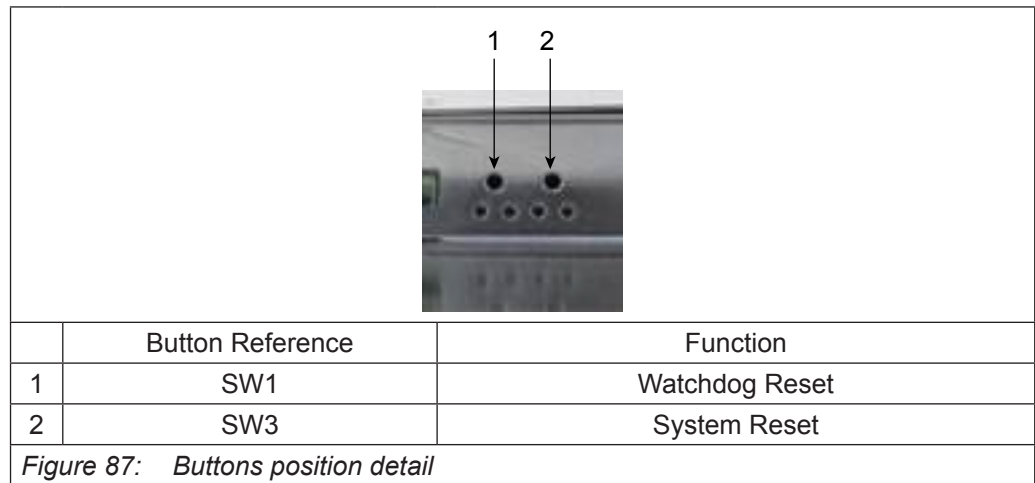
7.2.6 LAN LED

On connectors panel, near LAN connectors there two pairs of LEDs. Each LED is related to one LAN connector and gives information as following table depicts.

LED Reference	Color	Function		Ext. / Int.
LED Reference	Color	LAN	Function	Additional notes
LED SX	Green	LAN1 i210	Link/Activity	ON: link established Blinking: data transfer OFF: no link
LED DX	Yellow Green	LAN1 i210	Speed	Yellow ON: 1Gbps Green ON: 100Mbps OFF: 10Mbps

Table 20: LAN LED

7.3 Buttons description



7.3.1 SW3 System Reset button

This is the main reset of the system. Pressing this button the system resets its state, starts executing BIOS and then boots operating system.

To reset the system please press SW3 once.

7.3.2 SW2 Watchdog Reset button

This button is used to reset Watchdog LED (DL4) to OFF state. Watchdog LED is used to notify that Watchdog timer has expired. In addition, depending on setting of JP8 jumper, as the Watchdog timer expires a system reset may occur or not.

To reset the Watchdog LED please press SW2 once.

7.4 External connectors description

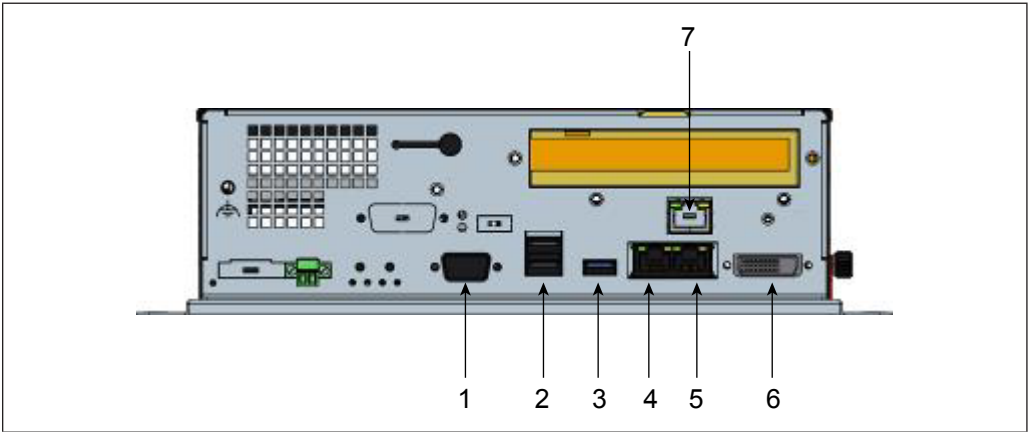


Figure 88: External connectors



Figure 89: External connectors



	Connector Reference	Function
1	J2	COM 1 (RS232)
2	J3	USB (2.0)
3	J4	USB (3.0)
4	J6 SX	LAN 2 (10/100/1000 Mbps)
5	J6 DX	LAN 1 (10/100/1000 Mbps)
6	J7	DVI-I
7	J30	LAN 3 (10/100/1000 Mbps)
8	J22	CFast
9	J31	USB 2.0 Type A socket

Figure 90: Buttons position detail

7.5 Technical support & repairs

KEB offers wide-ranging, complete after-sales technical support.

You can either phone or send an e-mail to our staff in the service department, and they will give you complete, prompt advice how to solve any issues.

telephone:	+49 05263 401 0
fax:	+49 05263 401 116
e-mail:	COMBICONTROL@keb.de

8 Certificates and approvals

8.1 EU Declaration of conformity

EU DECLARATION OF CONFORMITY



Document No. / month.year: ce_ca_remv-C6H-a_en / 01.2018

Manufacturer: KEB Automation KG
Südstraße 38
32683 BARNTRUP
Germany

Product type	Control type	yyC6Hxx – xxxx
	Control size	yy = 00 for Stand Alone PC or yy = 10 to FF for TouchPanel PC
	Voltage category	x = any letter or number 24 Vdc

The above given product is in accordance with the following directives of the European Union


Number: **EMC : 2014 / 30 / EU**
Text: Directive on the approximation of the laws of the Member States relating to electromagnetic compatibility.

Number: **Hazardous Substances: 2011 / 65 / EEC**
Text: Directive on the approximation of the laws of the Member States relating to the restriction of the use of certain hazardous substances in electrical and electronic equipment.

Responsible: KEB Automation KG
Südstraße 38
32683 BARNTRUP

Place, date Barntrup, 28. December 2017

Issued by:


I. A. W. Hovestadt / Conformance Officer


W. Wiele / Technical Manager

This declaration certifies the conformity with the named directives, but does not contain any assurance of quality.

The safety instructions, described in the instruction manual are to be followed.

EU DECLARATION OF CONFORMITY



Annex 1

Document-No. / month.year: ce_ca_remv-C6H-a_en / 01.2018

Product type	Control type	yy C6H xx – xxxx
	Control size	yy = 00 for Stand Alone PC or yy = 10 to FF for TouchPanel PC x = any letter or number
	Voltage category	24 Vdc

The conformity of the above given product to the European Directive 2014/30/EU (for electromagnetic compatibility) is given by complete approval / testing to the following European harmonized standards. For not exceeding the required limits or minimum levels of immunity it is necessary to use observe the given wiring specifications from available instruction manual.


EN - Norm	Text
EN 55032	Electromagnetic compatibility of multimedia equipment – Emission Requirements
Version 2015	
EN 61000 – 3 – 2	Electromagnetic compatibility – Part 3-2 Limits – Limits for harmonic current emissions (equipment input current ≤ 16A per phase)
Version 2014	
EN 61000 – 3 – 3	Electromagnetic compatibility – Part 3-3 Limits – Limits of voltage changes, voltage fluctuations and flicker in public low voltage systems, for equipment with rated current ≤ 16A per phase
Ausgabe 2013	
EN 61000 – 6 – 2	Electromagnetic compatibility (EMC) – Part 6-2:
Ausgabe 2005	Generic Standard – Immunity standard for industrial environment
EN 55024	Information technology equipment – Immunity characteristics – Limits and methods of measurement
Ausgabe 2010	
+ A1 aus 2015	

The conformity of the above given product to the European Directive 2011/65/EU (for restrictions of the use for certain hazardous substances in electrical and electronic equipment) is given by qualification of components and manufacturing process within the ISO 9001 QM system. The necessary information and declarations are documented and memorized.

The above given product was developed, manufactured and tested within an internal quality management system. This ISO 9001 QM system was approved by:

Notified body:	TÜV - CERT
Adress:	Zertifizierungsstelle des RWTÜV Steubenstrasse 53 D - 45138 Essen
No. of approval	041 004 500
Dated:	20.10.1994
Valid until:	December 2018

8.2 UL Approval

	UL certification is indicated by the adjacent logo and the E-file number on the nameplate of KEB products. The instructions in the manual must be observed.
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Programmable Controllers

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KEB AUTOMATION KG

E479848

Suedstrasse 38
32683 Barntrup, GERMANY

Investigated to ANSI/UL 508

Open type, Programmable controllers Model(s) 00C6CA1-0100, 00C6CA1-0200, 00C6CB1-0100, 00C6CB1-0200, 00C6CB1-0300, 00C6CB1-0400, 00C6CB1-0500, 00C6CB1-0600, 00C6CB1-0700, 00C6CB1-0800, 00C6CB1-0900, 00C6CB1-1000, 00C6CB1-1100, 00C6CB1-1200, 00C6CB1-1300, 00C6CB1-1400, 00C6CB1-1600, 00C6CB1-1700, 00C6CB1-1800, 00C6CB1-1900, 00C6CB1-2000, 00C6CB1-2100, 00C6CC1-0100, 00C6CC1-0200, 00C6CC1-0300, 00C6CC1-0400, 00C6CC1-0500, 00C6CC1-0700, 00C6CC1-0800, 00C6CC1-0900, 00C6CC1-1000, 00C6CC1-1100, 00C6CC1-1200, 00C6CC1-1300, 00C6CC1-1400, 00C6CC1-1500, 00C6CC1-1600, 00C6CC1-1700, 00C6CC1-1800, 00C6CC1-1900, 00C6CE1-0100, 00C6CE1-0200, 00C6CF1-0100, 00C6CF1-0200, 00C6CH1-0100, 00C6CJ1-0100, 00C6HA1-xxxx, 00C6HB1-xxxx

Programmable controllers Model(s) aaC6HA1-xxxx Where "a" may be any character for different sizes of panel display.

aaC6HB1-xxxx Where "a" may be any character for different sizes of panel display.

Investigated to UL 61010-1 and UL 61010-2-201

Programmable Automation Controller, PAC Model(s) C6 Smart, xxC6Gxx-xxxx

Investigated to

Industrial PC Model(s) 00C6HC1-xxxx

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8.3 RoHS Declaration of Conformity

	Conforms to: EN 50581: Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances RoHS Directive 2011/65/EU
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