» User's Guide «

KBox A-101

User's Guide (Version 1.00)
1056-1828

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2. Introduction

Kontron Europe would like to point out that the information contained in this manual may be subject to technical alteration, particularly as a result of the constant upgrading of Kontron Europe products. The attached documentation does not entail any guarantee on the part of Kontron Europe with respect to technical processes described in the manual or any product characteristics set out in the manual. Kontron Europe does not accept any liability for any printing errors or other inaccuracies in the manual unless it can be proven that Kontron Europe is aware of such errors or inaccuracies or that Kontron Europe is unaware of these as a result of gross negligence and Kontron Europe has failed to eliminate these errors or inaccuracies for this reason. Kontron Europe expressly informs the user that this manual only contains a general description of technical processes and instructions which may not be applicable in every individual case. In cases of doubt, please contact Kontron Europe.

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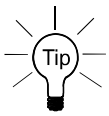
2.1. Symbols used in this Manual

Symbol	Meaning
	This symbol indicates the danger of injury to the user or the risk of damage to the product if the corresponding warning notices are not observed.
	This symbol indicates a hot surface that should not be touched without taking care. Ignoring this warning may lead to serious burns to the skin.
	This symbol indicates that the product or parts thereof may be damaged if the corresponding warning notices are not observed.
	This symbol indicates general information about the product and the user manual.
	This symbol indicates detail information about the specific product configuration.
	This symbol precedes helpful hints and tips for daily use.

3. Important Instructions

This manual provides important information required for the proper operation of the KBox A-101!

This chapter contains instructions which must be observed when working with the KBox A-101.

3.1. Warranty Note

Due to their limited service life, parts which by their nature are subject to a particularly high degree of wear (wearing parts) are excluded from the warranty beyond that provided by law. This applies to the CF card, for example.

3.2. Exclusion of Accident Liability Obligation

Kontron Europe shall be exempted from the statutory accident liability obligation if the user fails to observe the included document: "General Safety Instructions for IT Equipment" the hints in this manual or eventually the warning signs label on the device.

3.3. Liability Limitation / Exemption from the Warranty Obligation

In the event of damage to the device caused by failure to observe the included document "General Safety Instructions for IT Equipment", the hints in this manual or eventually the warning signs label on the device, Kontron Europe shall not be required to honor the warranty even during the warranty period and shall be exempted from the statutory accident liability obligation.

4. Safety Instructions

Please consider the instructions described in the included "General Safety Instructions for IT Equipment".

4.1. Electrostatic Discharge (ESD)

A sudden discharge of electrostatic electricity can destroy static-sensitive devices or micro-circuitry. Proper packaging and grounding techniques are necessary precautions to prevent damage. Always take the following precautions:

1. Transport boards in static-safe containers such as boxes or bags.
2. Keep electrostatic sensitive parts in their containers until they arrive at the ESD-safe workplace.
3. Always be properly grounded when touching a sensitive board, component, or assembly.
4. Store electrostatic-sensitive boards in protective packaging or on antistatic mats.

4.1.1. Grounding Methods

The following measures help to avoid electrostatic damages to the device:

1. Cover workstations with approved antistatic material. Always wear a wrist strap connected to workplace as well as properly grounded tools and equipment.
5. Use anti-static mats, heel straps, or air ionizes to give added protection.
6. Always handle electrostatic sensitive components by their edge or by their casing.
7. Avoid contact with pins, leads, or circuitry.
8. Turn off power and input signals before inserting and removing connectors or connecting test equipment.
9. Keep work area free of non-conductive materials such as ordinary plastic assembly aids and styrofoam.
10. Use field service tools such as cutters, screwdrivers, and vacuum cleaners which are conductive.
11. Always place drives and boards PCB-assembly-side down on the foam.

4.2. Hot Surface Warning

Please observe the warning label "Hot Surface" (refer to Fig. 7 and Fig. 17, pos. 3) in the area with cooling fins of the chassis. The chassis of KBox A-101 gets hot during operation. The marked surfaces with "Hot surface" labels, should not be touched without appropriate precautions. Risk of burns to the skin!

The material inside of the cabinet, where the KBox A-101 system will be mounted, must keep at least flammability class of UL 94-5VB. Don't put flammable materials under the device!

5. Electromagnetic Compatibility (Class A Device)

5.1. Electromagnetic Compatibility (EU)

This product is intended only for use in industrial areas. The most recent version of the EMC guidelines (EMC Directive 2004/108/EC) and/or the German EMC laws apply. If the user modifies and/or adds to the equipment (e.g. installation of add-on cards) the prerequisites for the CE conformity declaration (safety requirements) may no longer apply.

Warning!
This is a class A product. In domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

5.2. FCC Statement (USA)

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

5.3. EMC Compliance (Canada)

The method of compliance is self-declaration to Canadian standard ICES-003:

(English): This Class A digital apparatus complies with the Canadian ICES-003.

(French): Cet appareil numérique de la class A est conforme à la norme NMB-003 du Canada.

6. Scope of Delivery

- ❑ KBox A-101 (corresponding to the ordered system configuration)
- ❑ Rubber feet (self-adhesive)
- ❑ Phoenix power plug connector (for DC power supply) with 2x UNC4/40 (6.4 mm) pan head screws
- ❑ General Safety Instructions for IT Equipment

Optional Parts

- ❑ Mini-PCIe WLAN card (internally installed) with 2x WiFi antennas
  or Mini-PCIe PROFIBUS adapter
- ❑ LPCtoCAN adapter
- ❑ RS422/485 adapter
- ❑ GPIO adapter
- ❑ Two Brackets for wall/table mounting
- ❑ Bracket for cabinet mounting
- ❑ DIN rail mounting clip

6.1. Type Label and Product Identification

The type label (product name, serial number) and the inspection status label of your KBox A-101 system are located on the bottom side of the device (refer to Fig. 19, pos. 6).

Fig. 1: Front view (with wall/table mounting brackets)

Fig. 2: Rear view (with wall/table mounting brackets)

7. Product Description

The KBox A-101 expands the Kontron line of computers - KBox series. The KBox A-101 is equipped with a SBC (Single Board Computer) with Intel® Atom™ Dual Core D2550, 1.86 GHz processor. The hardware system configuration and the robust construction with excellent mechanical stability of the KBox A-101 offer the superior qualities of a computer designed for operation in harsh industrial environment.
The KBox A-101 is a fanless system with a compact aluminum chassis with cooling fins.
The rated voltage of the mains can be found on the type label. The type label is located at the bottom side of the device.
The KBox A-101 may be optionally factory-equipped with a Mini PCIe WLAN card for two antennas.
For the configuration of your KBox A-101 please follow the ordering options specified in "Configuration Guides – KBox Series" on our web site www.kontron.com.

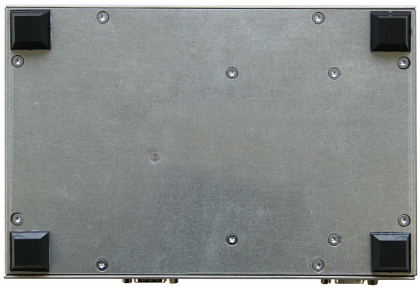


Fig. 3: Bottom side view

Fig. 4: Right side view

Fig. 5: Front side view

Fig. 6: Left side view

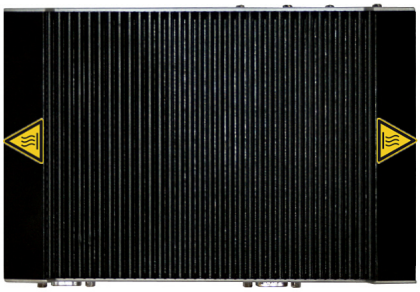


Fig. 7: Top side view

Fig. 8: Rear side view

☞ The device may be operated in all positions except with the top side facing down. When switching on the KBox A-101, make sure that the air openings on the front side (Fig. 9, pos. 3) and the rear side (Fig. 14, pos. 2) and the cooling fins of the chassis are not obstructed (covered) by any objects.
To provide sufficient heat dissipation for the cooling of the device, do not cover the cooling fins of the KBox A-101. Do not place any objects on the device. When installing the platform, please note the clearance recommendation in the section 11.2 "Mechanical Specifications".

7.1. Front Side

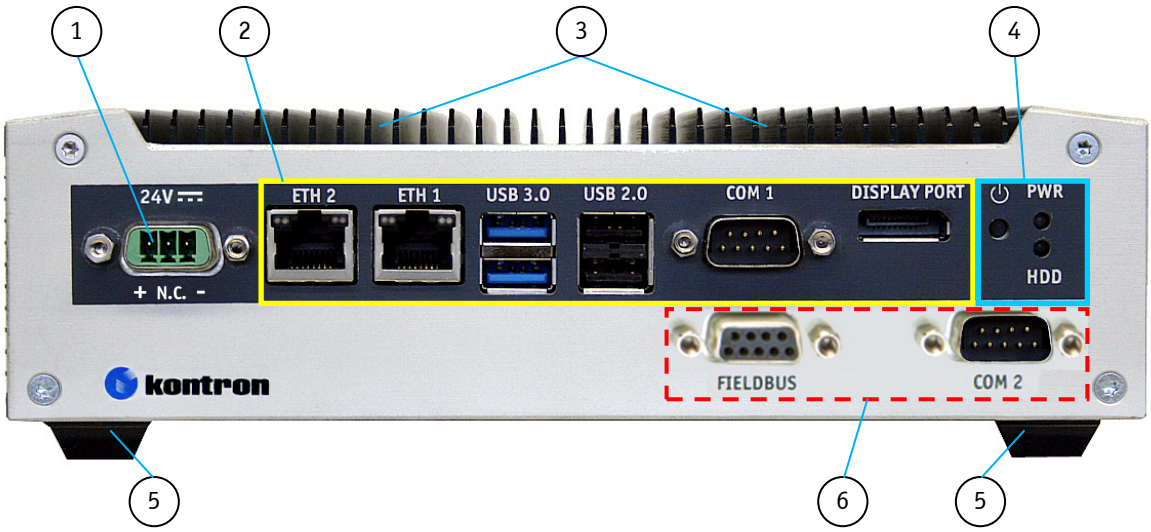


Fig. 9: KBox A-101 - front view

1 DC IN power connector
2 External connectors of the installed SBC
3 Cooling fins
4 Controls and indicators
5 Rubber feet
6 External interface connectors (optionally routed from the on board interfaces)

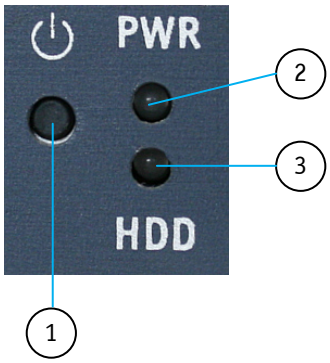
7.1.1. DC IN – Direct Current Connector

The 3-pin connector (Fig. 9, pos. 1) provides the power connection of the KBox A-101 to the appropriate main power supply:

❑ **DC power supply:** using a corresponding power cord (only the Phoenix connector is included).

Please observe the section 8.1 "Connecting to DC Main Power Supply".

7.1.2. Controls and Indicators



1 Power button
2 Power LED
3 HDD LED

Fig. 10: KBox A-101 - Controls and indicators

7.1.2.1. Power Button

Press this button (Fig. 10, pos. 1) to switch the system on or off.

Prerequisite:
The KBox A-101 has to be connected to an appropriate main power supply (DC).

Even when the system is turned off via the power button there is still a standby voltage of 5 VSb on the SBC.

The unit is only completely disconnected from the DC mains, when the power cord is disconnected either from the mains or the unit. Therefore, the power cord and its connectors must always remain easily accessible.

7.1.2.2. Power and HDD LED

The power LED (Fig. 10, pos. 2) and the HDD LED (Fig. 10, pos. 3) are located on the front side of the KBox A-101 and indicate the system status. If an error occurs, the system will be turned off and the power LED will be blinking red.

Power LED	System Status
Off	Power off or failure of the Embedded Controller (EC)
Red	System held off (i.e. over-temperature, etc.)
Orange	System in S4/S5
Orange (blinking)	System in S3
Green	System in S0

An over-temperature condition has the highest of all priorities.
As long as the temperature is too high, the power LED blinks red and the power button is deactivated.

The HDD LED blinks when there is activity of the SATA HDD / SSD or SATA drive

HDD LED	Storage Device Status
Off	Without SATA/mSATA activity
Orange	SATA/mSATA activity

7.1.3. External Interfaces of the SBC at the Front Side

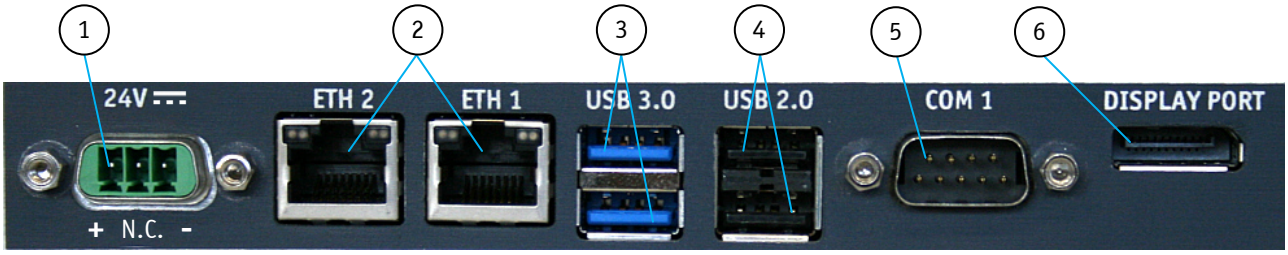


Fig. 11: External interfaces of the integrated SBC

1 DC Power Connector
2 2x LAN port (RJ45) (10/100/1000Mbps)
3 2x USB 3.0 port
4 2x USB 2.0 port
5 Serial port (COM 1) configured as RS232
6 Display Port Connector

7.1.3.1. LAN Ports (ETH1, ETH2)

These ports (Fig. 11, pos. 2) consist of RJ45 connectors with integrated LEDs and support a transfer rate of 10/100/1000Mbps.

Left LED Color	Link Status
Off	No Link
Yellow	Link is established
Yellow (blinking)	Link is established

Right LED Color	Link speed
Off	10 Base-T
Green	100 Base-T
Green (blinking)	1000 Base-T

7.1.3.2. USB Ports

The system is equipped with two USB 2.0 and two USB 3.0 interfaces (Fig. 9, pos. 2 and Fig. 11, pos. 3 and 4). Various USB devices can be connected to these USB interface connectors.

7.1.3.3. Serial Port (COM 1)

The serial port COM 1 (Fig. 11, pos. 5) consists of a 9-pin, RS-232 configured D-SUB connector that allows the connection of a serial peripheral.

7.1.3.4. DisplayPort

An external (digital) display can be connected to the DisplayPort connector (Fig. 11, pos. 6).

7.1.4. Optional Interfaces on the Front Side

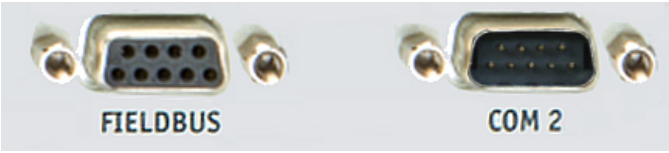


Fig. 12:Optional external interfaces routed from the onboard ports (on the front side)

The optional interfaces (Fieldbus and COM 2) on the front side of the KBox A-101 must be ordered separately. The following interfaces are available:

- Fieldbus interface: LPCtoCAN or PROFIBUS **(Please note: With PROFIBUS, optional WLAN is not available!)**
- COM 2-interface: RS232 or RS422/485 (non-isolated)

7.1.4.1. RS422/RS485 Serial Interface

The optional serial RS422/485 interface (Fig. 9, pos. 6; Fig. 12) consists of a 9-pin D-SUB connector. The interface can be configured via an on-board DIP switch (SW1) for RS422 or RS485 serial communication.

The optional settings (SW1) for RS485 mode communication allow the system's operation either in full duplex mode or in half duplex mode (see tables on the next page). While running in RS485 half duplex mode the system stays permanently in a receiver mode. The switch to transmission mode will be done automatically. The user can determine if the automatic mode switch to transmission mode should be triggered by the RTS-line or should be triggered by the last sent message using the TxD line.

If triggered by RTS has been selected, then the RTS-signal must be activated by the application software before transmission of the data packets starts; and RTS signal has to be disabled again after termination of data transmission.

If TxD line will be used for the mode transceiver switch process, the receiver device has to follow a timeout before starting to send any data.

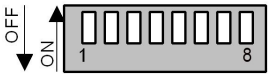


Fig. 13: Onboard DIP switch (SW1) with DP1 up to DP8 for RS422/RS485serial communication settings

In order to configure this interface for serial communication (as RS422 or RS485) corresponding to your requirements, set the switches of the DIP switch (SW1) to "ON" or "OFF" (factory settings are marked grey). For accessing the DIP switch refer to the procedure described in the subsection 9.3.1 "Opening and Closing the KBox A-101".

Serial Communication Type	Transmitting<->receiving	SW1 Settings		
		DIP1	DIP2	DIP3
RS422 4-Channel Mode	-	OFF	OFF	OFF
RS485 4-Wire Mode (Bus-Master)	-	ON	OFF	ON
RS485 2-Wire Mode	RTS	ON	ON	ON
RS485 2-Wire Mode	Timeout	ON	ON	OFF

Termination Resistor for RS422 and RS485	SW1 Settings
	DIP4
Deactivated	OFF
Activated	ON

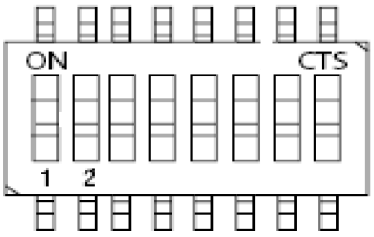
DIP4 setting in order to activate or deactivate the termination resistor for RS422 and RS485

Timeout	Min. Baud Rate	SW1 Settings			
		DIP5	**DIP6**	**DIP7**	**DIP8**
10.2ms	1200	OFF	OFF	OFF	OFF
9.6ms		OFF	OFF	OFF	ON
9.0ms		OFF	OFF	ON	OFF
8.4ms		OFF	OFF	ON	ON
7.8ms		OFF	ON	OFF	OFF
7.2ms		OFF	ON	OFF	ON
6.5ms		OFF	ON	ON	OFF
5.9ms		OFF	ON	ON	ON
4.8ms	2400	ON	OFF	OFF	OFF
4.3ms		ON	OFF	OFF	ON
3.7ms		ON	OFF	ON	OFF
3.1ms		ON	OFF	ON	ON
2.5ms	4800	ON	ON	OFF	OFF
1.9ms		ON	ON	OFF	ON
1.2ms	9600	ON	ON	ON	OFF
0.6ms	19200	ON	ON	ON	ON

DIP5, DIP6, DIP7 and DIP8 settings in order to set the needed timeout and min. baud rate

7.1.4.2. DIP-Switch Settings (SW1) for LPCtoCAN Adapter

The DIP-switch is for setting the SJA1000-base address, the SJA-interrupt, and the NVRAM operation mode.



	Default setting

Color marking: Default setting for KBox A-101 in the following tables

SJA Base Address (SW1: 1-3)

Switch			Address Range
3	2	1	
OFF	OFF	OFF	0x340 to 0x35F*
OFF	OFF	ON	0x320 to 0x33F*
OFF	ON	OFF	0x300 to 0x31F
OFF	ON	ON	0x220 to 0x23F*
ON	OFF	OFF	0x200 to 0x21F*
ON	OFF	ON	0x140 to 0x15F*
ON	ON	OFF	0x120 to 0x13F*
ON	ON	ON	0x100 to 0x11F*

*Not useable for KBox A-101!

SJA-Interrupt (SW1: 4-6)

Switch			IRQ
6	5	4	
OFF	OFF	OFF	disabled*
OFF	OFF	ON	15*
OFF	ON	OFF	11*
OFF	ON	ON	10
ON	OFF	OFF	7*
ON	OFF	ON	5*
ON	ON	OFF	4*
ON	ON	ON	3*

*Not useable for KBox A-101!

NVRAM-Operation Mode (SW1: 7-8)

Switch		Mode
8	7	
OFF	OFF	disabled
OFF	ON	IO-mode
ON	OFF	Memory at C0000
ON	ON	Memory at D0000

7.2. Rear View

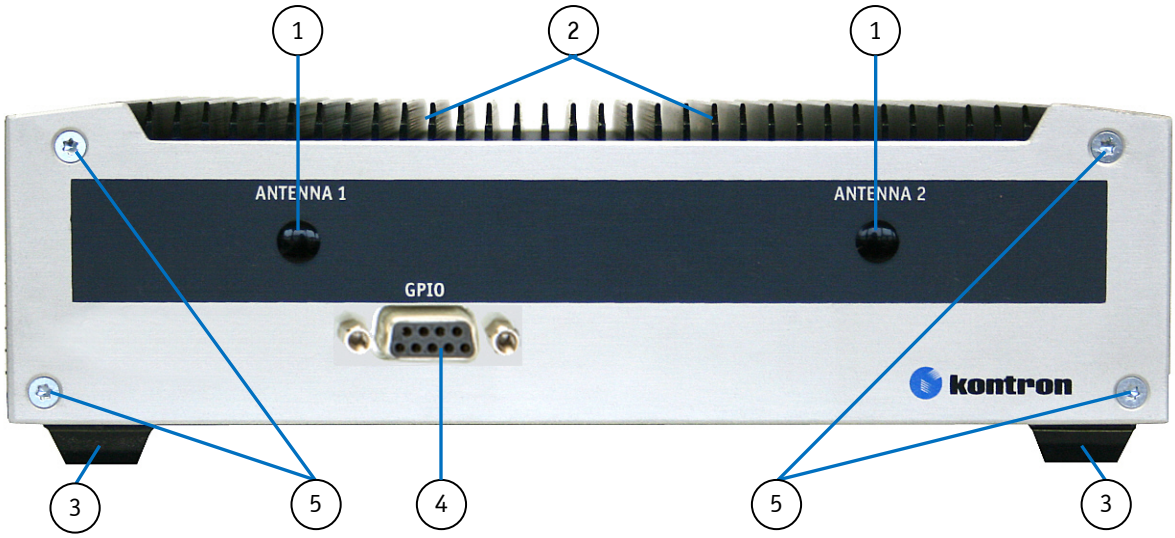


Fig. 14: KBox A-101 rear view with optional GPIO interface

1 Covered cutout for Reverse (RP) SMA connector for optional WLAN antenna (Mini PCIe WLAN card and 2 antennas are optional)

2 Cooling fins on the top side of the chassis

3 Rubber feet

4 Optional GPIO interface (routed from the on board connector)

5 Countersunk screws M3x8 ISO14581 torx for mounting the rear cover and the bracket for cabinet mounting

7.2.1. GPIO Interface (Option)

Optionally, the KBox A-101 can be equipped with a GPIO (General Purpose Input/Output) interface. Peripheral devices can be controlled freely programmable via this interface (Fig. 14, pos. 4), which consists of a 9-pin D-SUB connector.

7.2.2. WLAN (Option)

Depending on the ordered system configuration, the KBox A-101 an be equipped with WLAN (WiFi) hardware expansion (with two antennas). If you have ordered a system configuration including WLAN, at the rear side two Reverse (RP) SMA-connectors are installed (Fig. 14, pos. 1) for screwing on the provided WLAN antenna.

During the installation of the KBox A-101 the antennas (Fig. 15) will be screwed on to the RP SMA connector (Fig. 14, pos. 1). The antenna can be tilt and rotated in the appropriate position to get the optimal transmission and reception quality.

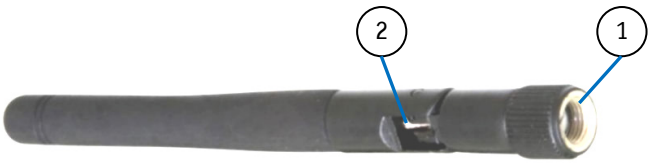


Fig. 15: WLAN (WiFi) antenna

1 Reverse (RP) SMA antenna connector
2 Hinge for positioning the antenna

7.3. Chassis with Cooling Fins

Three sides of the aluminum chassis (left, upper and right side) are covered with cooling fins. The cooling fins provide heat dissipation during operation.

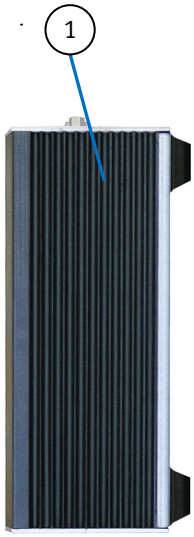


Fig. 16: Linke Seite des Chassis

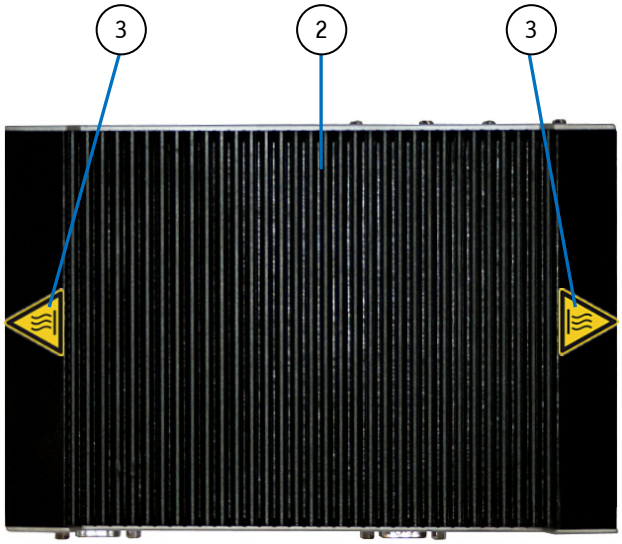


Fig. 17: Obere Seite des Chassis

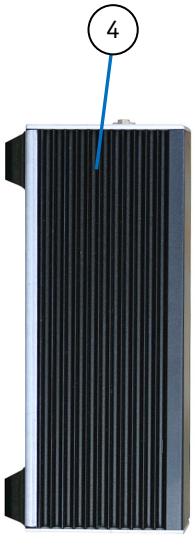


Fig. 18: Rechte Seite des Chassis

1 Cooling fins of the chassis on the left side

2 Cooling fins of the chassis on the top side

3 Warning sticker "Hot Surface"

4 Cooling fins of the chassis on the right side

☞ To provide sufficient heat dissipation for the cooling of the KBox A-101 platform, never cover the cooling fins of the chassis. Do not place any objects onto the device.

Please observe the warning label "Hot Surface" (see Fig. 7 and Fig. 17, pos. 3) in the area of the cooling fins of the chassis. The KBox A-101 chassis may be hot during operation and should not be touched without taking care. There is a risk of burns.

The material on bottom surface of the enclosure interior where the KBox A-101 is to be mounted, shall keep at least flammability class UL 94-5VB. Don't put flammable materials under the device!

7.4. Bottom Side

At the bottom side are located: the type label, the inspection status label and if applicable, the license sticker.

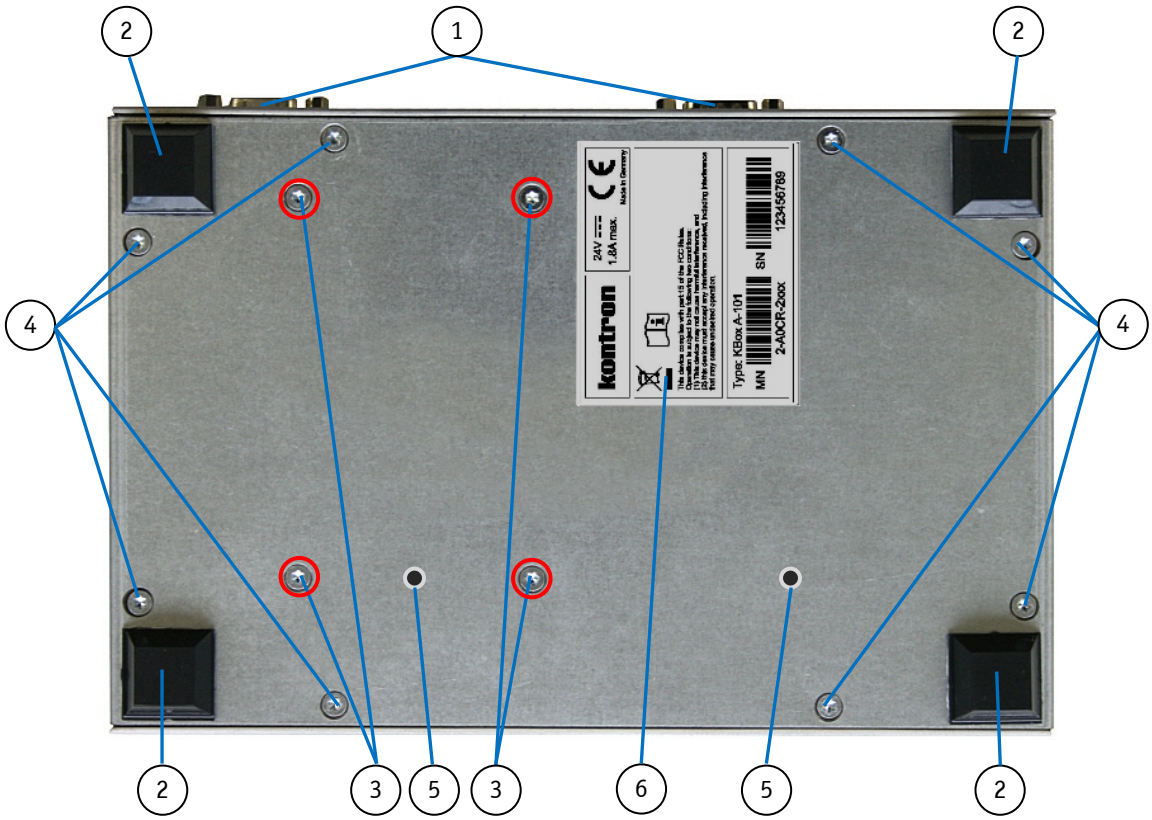


Fig. 19: Bottom side (shown as desktop version)

1 Front side with external interfaces of the SBC

2 Rubber feet of the desktop version

3 Countersunk screws M3x8 ISO14581 torx for the mounting of the internal HDD/SSD drive

4 Countersunk screws M3x8 ISO14581 torx for the mounting of the bottom part of the chassis and the brackets for wall/table mounting

5 Threaded holes for mounting the DIN rail mounting clip

6 Type label

☞ Do not loosen or remove the torx screws of the internal HDD/SSD drive (Fig. 19, pos. 3).

If you intend to convert your device from the desktop version to a wall/table mount version, see also chapter 9 "Setting Up the KBox A-101".

7.5. DC Power Connection (via Phoenix Connector)

The KBox A-101 can be connected to a DC power source via a DC power cable (only the Phoenix power plug terminal is included).

7.5.1. DC Power Connector

The KBox A-101 is delivered with a DC power plug terminal (3-pin Phoenix connector). For DC connection prepare the connecting wires using the supplied Phoenix plug terminal.

☞ The length of the DC connecting wires may not exceed 10.

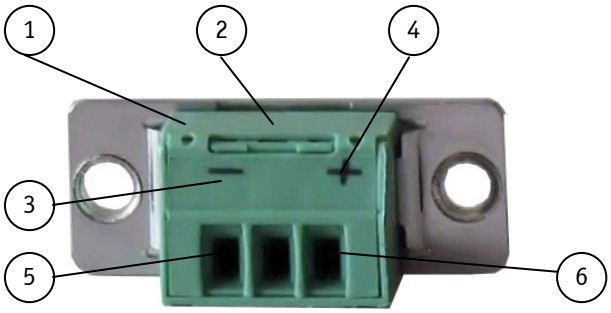


Fig. 20: Phoenix power plug terminal with "plus" and "minus" marking

1	3-pin Phoenix plug terminal	4	Marking "plus"
2	Cover over the slotted pan head screws	5	Location for inserting the "minus" wire
3	Marking "minus"	6	Location for inserting the "plus" wire

1. Cut the required length two isolated wires [AWG18 (∅ up to 1 mm^2)] and strip each end 5 –7 mm.
2. Twist the striped wire-ends and tin it with solder.
3. Open the cover to have access to the slotted pan head screws.
4. Loosen the two slotted pan head screws (that correspond to the marked location "+" and "-" of the DC plug terminal) far enough so that you can insert the end of the prepared wires.
5. Insert the wires into the corresponding clamp of the Phoenix plug terminal. Make sure that you have the right polarity of the connection (refer to Fig. 20).
6. Fasten the screws to secure the wires into the clamps of the plug terminal.
7. Close the cover.

☞ The second end of each wire will be prepared as required for the connection to the DC power supply.

8. Starting Up

☞ The rated voltage of the power supply must agree with the voltage value on the type label.

8.1. Connecting to DC Main Power Supply

The DC input connector (Fig. 9, pos. 1) is located on the front side of the KBox A-101.

☞	The KBox A-101 can be connected to a DC main power supply (see Fig. 21) via a DC power cable and the supplied Phoenix power plug terminal (see Fig. 20).
⚠	Even when the system is turned off via the power button (Fig. 10, pos. 1) there is still a standby-voltage of 5 VSb on the SBC. The DC main power supply must be able to be switched off and on via a 2-pole disconnecting device which must always remain easily accessible. The DC-input must fulfill SELV (Safety Extra Low Voltage) requirements of EN60950-1 standard.

8.1.1. Connecting the KBox A-101 to a DC Main Power Supply

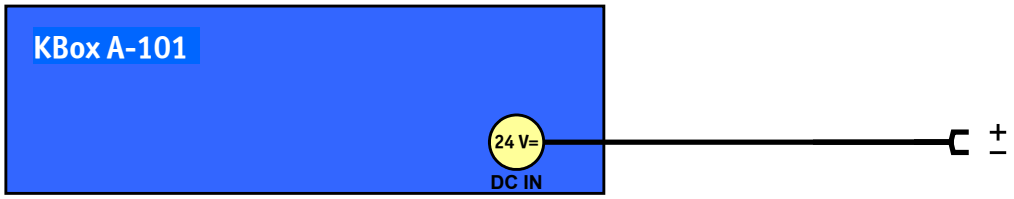


Fig. 21: Connecting the KBox A-101 to a DC main power supply via DC power cable

To connect the KBox A-101 to a corresponding DC main power supply, please perform the following steps:

1. Connect the DC power cord with the Phoenix power plug installed to the DC input connector (Fig. 9, pos. 1, Fig. 11, pos. 2) of the KBox A-101. The DC input connector is located on the front side and is marked "24V ⎓".
2. The DC main power supply must be switched off via a 2-pole disconnecting device to make sure that no voltage is present at the terminals during the connecting procedure.
3. Connect the other end of the DC power cord to the connections of the DC main power supply. Pay attention to the polarity of the connections.
4. Switch on the DC main power supply via the disconnecting device.

⚠ It must be ensured that the system can be powered ON and OFF via a readily accessible two-pole disconnecting device that shall be incorporated in the building installation wiring (e.g. overload protection switch).

8.2. Operating System and Hardware Component Drivers

Your system can be supplied optionally with a pre-installed operating system.

If you have ordered your KBox A-101 with a pre-installed operating system, all drivers are installed in accordance with the system configuration ordered (optional hardware components). Your system is fully operational when you switch it on for the first time. Please pay attention to the following note.

Important information on the use of the pre-installed "WINDOWS 7 ULTIMATE FOR EMBEDDED SYSTEMS" or "WINDOWS 7 PROFESSIONAL FOR EMBEDDED SYSTEMS" operating systems:

The terms and conditions for the use of the pre-installed operating systems are specified in the document "MICROSOFT SOFTWARE LICENSE TERMS".

You can download this document from our web site www.kontron.com by selecting Product/ Downloads tab/Windows.

If you have ordered The KBox A-101 without a pre-installed operating system, you will need to install the operating system and the appropriate drivers for the system configuration you have ordered (optional hardware components) yourself.

You can download the relevant drivers for the installed hardware from our web site at www.kontron.com by selecting the product.

Pay attention to the manufacturer specifications of the operating system and the integrated hardware components.

9. Setting Up the KBox A-101

In order to prevent personal injury and damage by direct or indirect contact with the hot surfaces of the chassis, following requirements have to be implemented:

- ❑ The KBox A-101 system should be mounted and installed into a SERVICE ACCESS AREA or into a RESTRICTED ACCESS LOCATION].
- ❑ Users which are admitted to the SERVICE ACCESS AREA or to the RESTRICTED ACCESS LOCATION must be suitably instructed and sufficiently informed about the associated dangers.

Important Instructions!

In order to setting-up, installing / removing the KBox A-101 platform, please observe the instructions described in this manual.

The device may be operated in all positions except with the upper side facing down.

Please observe all specified dimensions required for mounting included in the drawing with outline dimensions for the KBox A-101 platform. The corresponding drawing can be downloaded from our web site www.kontron.com by selecting the product name.

When installing the KBox A-101, there must be at least 50 mm (approximately 1.97") free space around the cooling fins to prevent the system overheating.

Leave at least 100 mm (approximately 3.937") free space to the front and rear of the unit in order to have access to the interfaces to connect the peripherals and to operate the power button.

When mounted into a cabinet: the cabinet must have adequate space for the KBox A-101 platform, and corresponding spaces for air circulation and cable connections (see also section 11.2 "Mechanical Specifications"). Furthermore, the cabinet must have a sufficient, optionally active ventilation to prevent overheating.

The cooling fins of the chassis are not obstructed (covered) by any objects.

For mounting to a table, to a wall or DIN Rail: Use for mounting the system only the optional brackets (not included) and the countersunk M3x8 (Torx ISO14581) screws. Longer screws can damage the device!

The platform must be firmly attached to a clean flat and solid mounting surface. Use proper fastening materials suitable for the mounting surface. Ensure that the mounting surface type and the used mounting solution safely support the load of the KBox A-101 platform and the attached components. It is recommended to use screws with a diameter of 5 mm (0.197"). The screw type and length as well as accessories like anchors depend on the type and the consistence of the mounting surface (table, wall, cabinet etc.).

Please follow the local/national regulations for grounding.

The voltage feeds must not be overloaded.
Adjust the cabling and the external overcharge protection to correspond with the electrical data indicated on the type label.

The type label is located on bottom side of the unit (refer to Fig. 19, pos. 6).

9.1. KBox A-101 – Desktop Version

The KBox A-101 can also be ordered as a desktop version. The self-adhesive rubber feet (included) have to be attached to the bottom side of the device. When setting up the device, pay attention to the range of restriction areas around the KBox A-101 (refer to the subsection 11.2.1 "KBox A-101 Desktop Dimensions").

Fig. 22: KBox A-101 as Desktop unit with rubber feet

9.2. Wall or Table or Cabinet Mount using the Brackets

In order to mount the KBox A-101 to a wall (vertical, upright or longitudinal), on a table (horizontal) or into a cabinet, you may order the corresponding mounting brackets with keyhole-shaped mounting slots or a DIN Rail mounting clip. You can adapt your desktop KBox A-101 to a wall mount system by attaching the mounting brackets to the left and the right side of the KBox A-101 bottom side.

When setting up the device, pay attention to the range of restriction areas around the KBox A-101. Refer to the subsection 11.2 "Mechanical Specifications").

Please observe the "General Safety Instructions for IT Equipment" (included) and the installation instructions (refer to the chapters 4 and 9).

9.2.1. Brackets for Wall / Table Mount

These brackets (Fig. 23) are used to mount the KBox A-101 in a vertical, a longitudinal or an upright orientation to a wall or horizontally to a table corresponding to the desired orientation.

The wall mounting of the KBox a-101 is possible in the horizontal as well as in vertical orientation. You may choose the mounting orientation witch side is facing up or facing down (four operating positions). The two brackets are symmetrical and can be mounted on either the left or right (see Fig. 24 and Fig. 25).

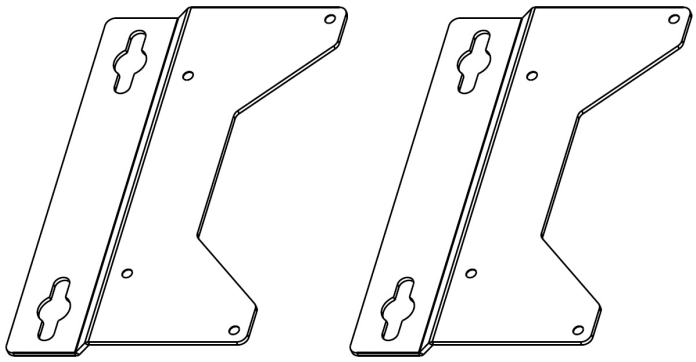


Fig. 23: Left/right mounting bracket for wall / table mounting

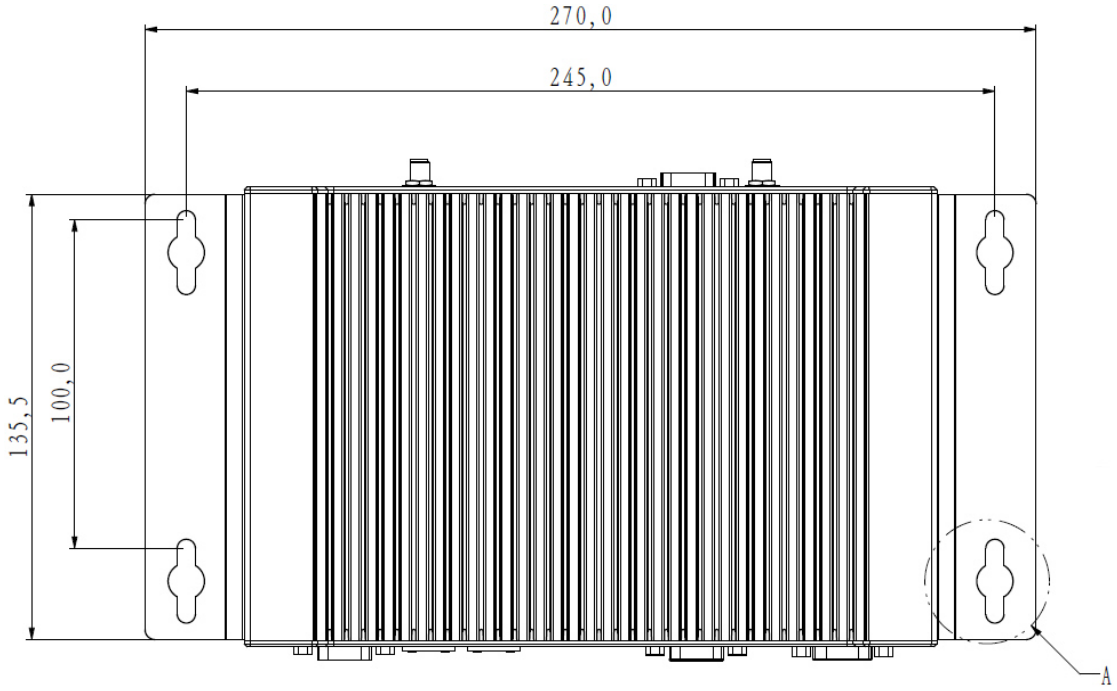


Fig. 24: KBox A-101 with mounted wall mounting brackets

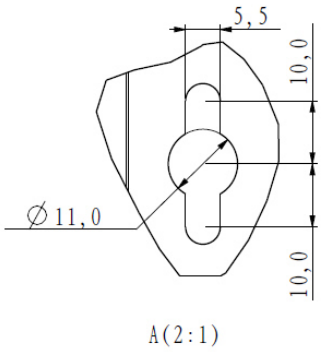


Fig. 25: Detail of the keyhole mounting slots

9.2.2. Bracket for Cabinet Mounting

This bracket (Fig. 26) allow you to mount the KBox A-101 in a vertical orientation in a cabinet (e.g. industrial cabinet) corresponding to the desired orientation.

The mounting of the KBox A-101 into a cabinet is permitted only in a vertical orientation. You may choose which side should be facing up or down (two operating positions). The bracket must be mounted on the rear of the KBox A-101, according to the desired operating position, so that the keyhole mounting slots of the bracket should be located above the unit (see Fig. 27 and Fig. 28). Please observe that by using of this kind of bracket the interfaces (WLAN and GPIO) on the rear side of the KBox A-101 are not available!

Before mounting the cabinet bracket (Fig. 26) to the KBox A-101, you have to disassemble:

- the WLAN and GPIO modules and interface connectors if you have ordered the KBox A-101 equipped for WLAN and GPIO functionality
- the cover protection plates of the WLAN and GPIO interface slots, if you have ordered a KBox A-101 without WLAN and GPIO function.

Please refer to the subsection 9.3.1 "Opening and Closing the KBox A-101".

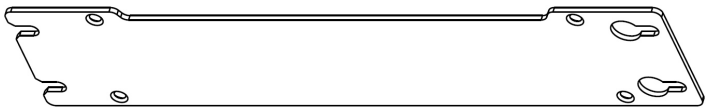


Fig. 26: Bracket for cabinet mounting

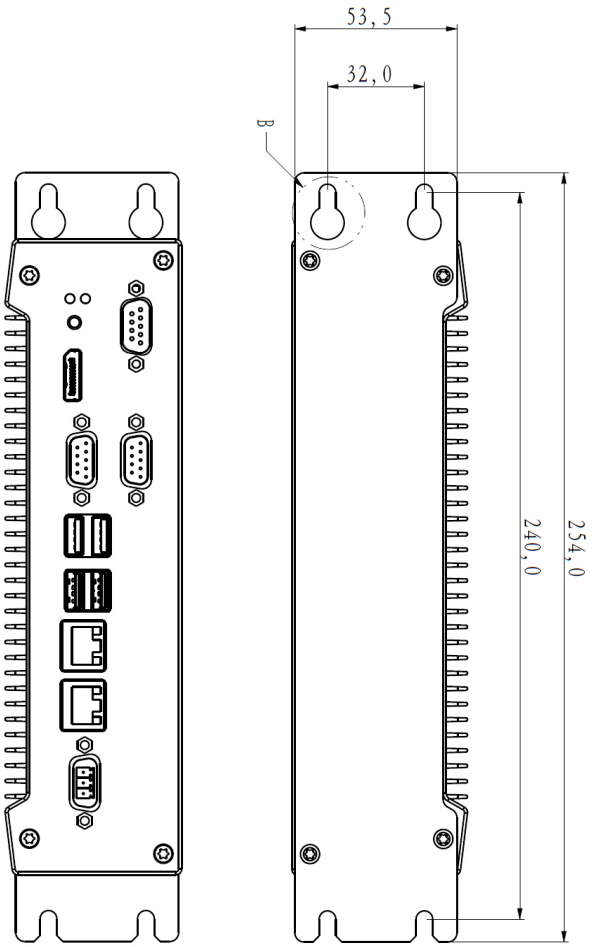


Fig. 27: KBox A-101 with assembled bracket for cabinet mounting

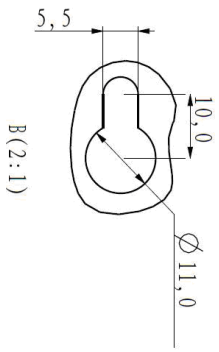


Fig. 28: Keyhole slot dimensions

9.2.3. DIN Rail Mounting Clip

The DIN Rail mounting clip (Fig. 29) allows you to mount the KBox A-101 to a DIN Rail.

The DIN Rail mounting clip make possible to operate the KBox in two operating positions. You may choose the mounting orientation witch side is facing up or facing down. The DIN Rail mounting clip has to be mounted to the bottom side of the KBox A-101 corresponding to the desired orientation (refer to Fig. 30 and Fig. 31).

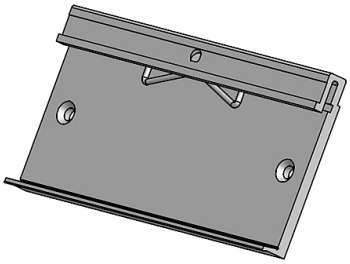


Fig. 29: DIN Rail mounting clip

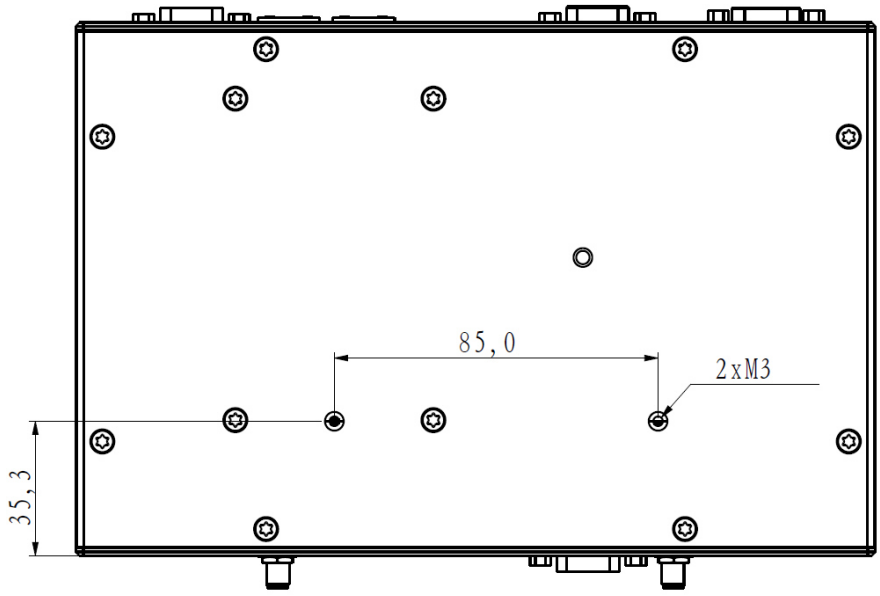


Fig. 30: Tapped holes at the bottom of the KBox for fixing the DIN Rail mounting clip

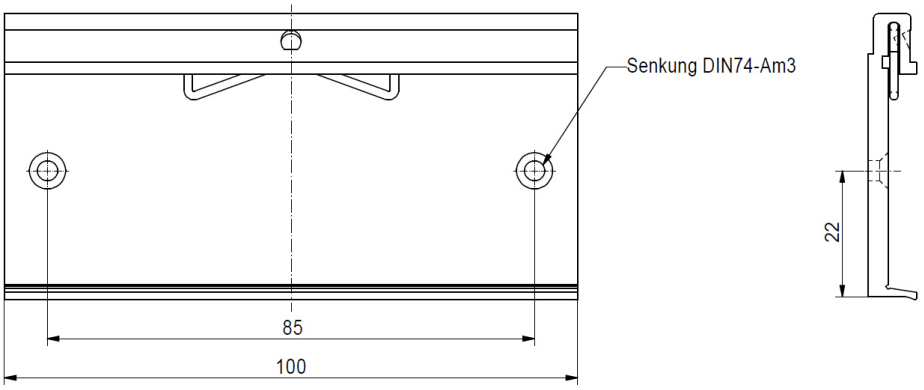


Fig. 31: Details of the DIN Rail mounting clip

9.3. Handling internal Components

This section contains important information that you must read before accessing the internal components. You must follow these procedures properly when handling any board components of the KBox A-101.

Before installing/removing an add-on card, please pay attention to the following information:

Please observe the "General Safety Instructions for IT-Equipment" provided with the system and the installation instructions in this manual (see also chapter 4 and 9).

The installation/removal of add-on cards may only be performed by a qualified person, according to the description in this manual.

Before removing the cover of the device, make sure that the device is switched off and disconnected from the power supply.

Before you upgrade the KBox A-101 with add-on cards, pay attention to the power specifications in chapter 11 "Technical Data" and make sure that the power consumption of the add-on cards does not exceed 5 W per card.

Please follow the safety instructions for components that are sensitive to electrostatic discharge (ESD). Failure to observe this warning notice may result in damage to the device or the latter's components.

Please observe the warning label "Hot Surface" (see Fig. 7 and Fig. 17, pos. 3) in the area of the cooling fins of the chassis. The KBox A-101 chassis may be hot during operation and should not be touched without taking care. There is a risk of burns.

Please pay attention to the manufacturer's instructions before installing/removing an add-on card.

9.3.1. Opening and Closing the KBox A-101

In order to install or to remove optional hardware or to change the DIP switch settings, the KBox A-101 needs to be opened. For opening and closing the KBox A-101, please perform the following steps:

Before opening the KBox A-101, the system must be switched off and disconnected from the main power supply. Also disconnect peripheral devices from the KBox A-101. Before you begin, ensure that you have a clean, flat and ESD-safe surface to work on.

1. Close all applications. Shut down the system properly and disconnect the power cord from the power source. Disconnect all peripherals.
2. The KBox A-101should lay on a flat, clean surface with the top side (cooling fins) facing downwards.
3. Unscrew the 8x countersunk screws M3x8 ISO14581 torx (see Fig. 19, pos. 4) that secure the cover. Put the screws aside for later use. Lift the cover (with the mounted HDD/SSD) carefully.
4. Remove the HDD/SSD data cable und power cable from the SBC and put the cover (with mounted HDD/SSD) aside. Now all internal components inside the chassis and on the cover can be accessed.
5. For closing the KBox A-101, proceed in reverse order: Reconnect the data cable and the power cable of the HDD/SSD (mounted on the cover) to the SBC, place the cover on the cassis and secure the cover with the countersunk screws removed in step 3 (see Fig. 19, pos. 4).

9.3.2. Configuration of the optional RS422/RS485 Port

In order to change the factory configuration of the RS422/RS485 port (see also subsection 7.1.4.1 "RS422/RS485 Serial Interface), proceed as follows:

The new port configuration has to be set before the KBox A-101 is installed on a panel or into an industrial cabinet. The system must be disconnected from the power source. Disconnect all peripherals. Before you begin, ensure that you have a clean, flat and ESD-safe surface to work on.

1. Open the chassis of the KBox A-101as described in subsection 9.3.1 "Opening and Closing the KBox A-101".
2. The DIP switches for setting the SJA1000 base address, SJA interrupt and NVRAM operation mode are located on the LPCtoCAN adapter (see Fig. 32).
3. By use of an insulated thin tool (e. g. screwdriver or a stylus) set the DIP switches to the up (for ON) or down (for OFF) position corresponding the needed port configuration.

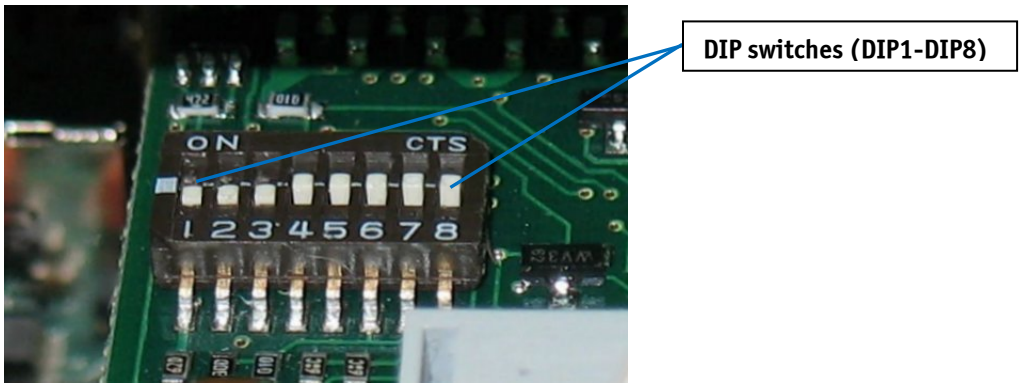


Fig. 32: DIP1-DIP8 switches (shown with factory settings)

4. Close the chassis of the KBox A-101 as described in subsection 9.3.1 "Opening and Closing the KBox A-101".

10. Maintenance and Prevention

Equipment from Kontron Europe requires only minimum servicing and maintenance for problem-free operation.

- For light soiling, clean the KBox A-101 with a dry cloth.
  Carefully remove dust from the surface of the cooling fins of the chassis using a clean, soft brush.
- Stubborn dirt should be removed using a mild detergent and a soft cloth.

11. Technical Data

KBox A-101		
Installed SBC	SBC with Intel® Atom™ Dual Core processor	
Processor	Intel® Atom™ Dual Core D2550 1.86 GHz	
RAM	2 GB or 4 GB	
Storage Media	1x HDD or SSD and/or 1x mSATA drive	
BIOS	AMI	
Interfaces	Interfaces at the front side: 1x DisplayPort 1x COM 1(RS232) 4x USB: 2x USB 2.0; 2x USB 3.0 2x LAN (10/100/1000Mbps) **Optional:** 1x Fieldbus (PROFIBUS or CAN bus) 1x COM 2 (RS232 or RS422/485)	Interfaces at the rear side: **Optional:** 1x WLAN (with 2x antenna connector) 1x GPIO interface
Internal Onboard Slots	1x full-Size mini PCIe x1 for optional WLAN card; mSATA port	
Controls (at the front side)	Power button	
Indicators (at the front side)	Power LED HDD LED	
DC IN Connector (at the front side)	3-pin DC input connector	
Power consumption per Slot (Mini PCIexpress)	Max. 5 W	
Weight	approx. 2.5 kg	
Rated Voltage Range	See type label	24 VDC (+/- 20%) via Phoenix connector

The corresponding document "Configuration Guide" and the manual of the installed SBC can be downloaded from our web site: www.kontron.com by selecting the product.

11.1. Electrical Specifications

The corresponding electrical specifications for your KBox A-101 can be found on the type label of the system.

11.2. Mechanical Specifications

11.2.1. KBox A-101 Desktop Dimensions

For a sufficient air circulation around the device, we recommend not to place (mount) or operate any other devices within the red marked restriction area (all around the cooling fins of the chassis) (see Fig. 33).

The restriction areas marked with "100 mm" (at the front and rear side of the platform) are reserved for cable connections (see Fig. 34).

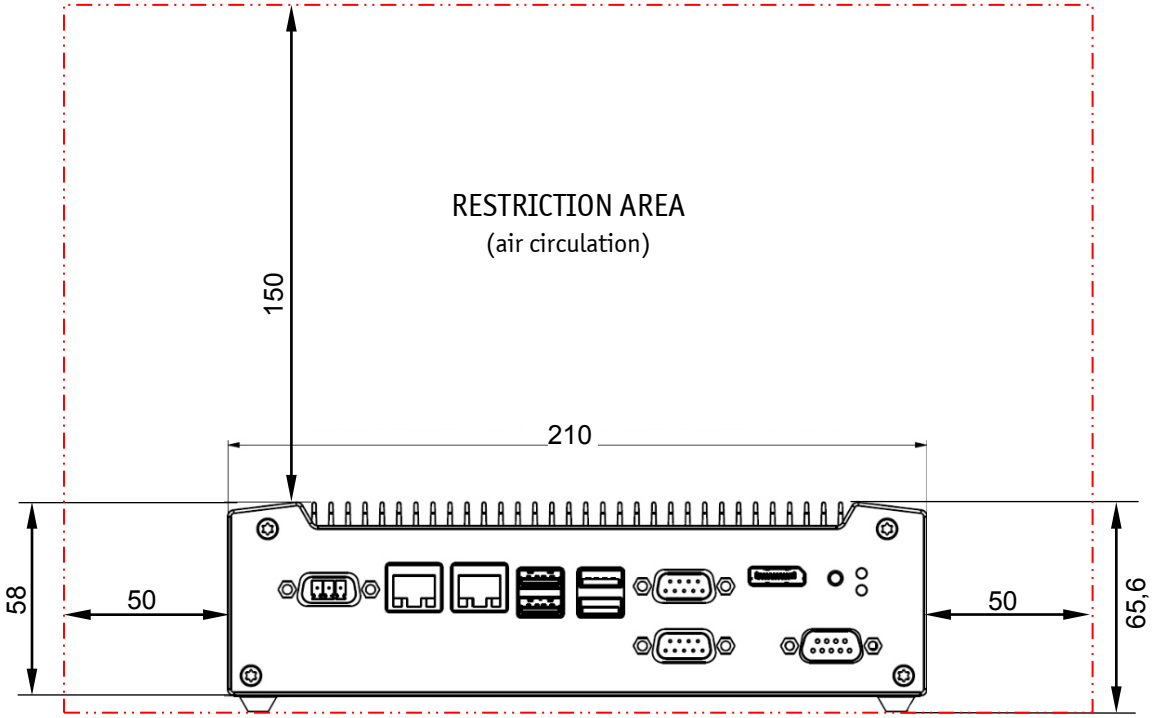


Fig. 33: Dimensions in the front view (desktop)

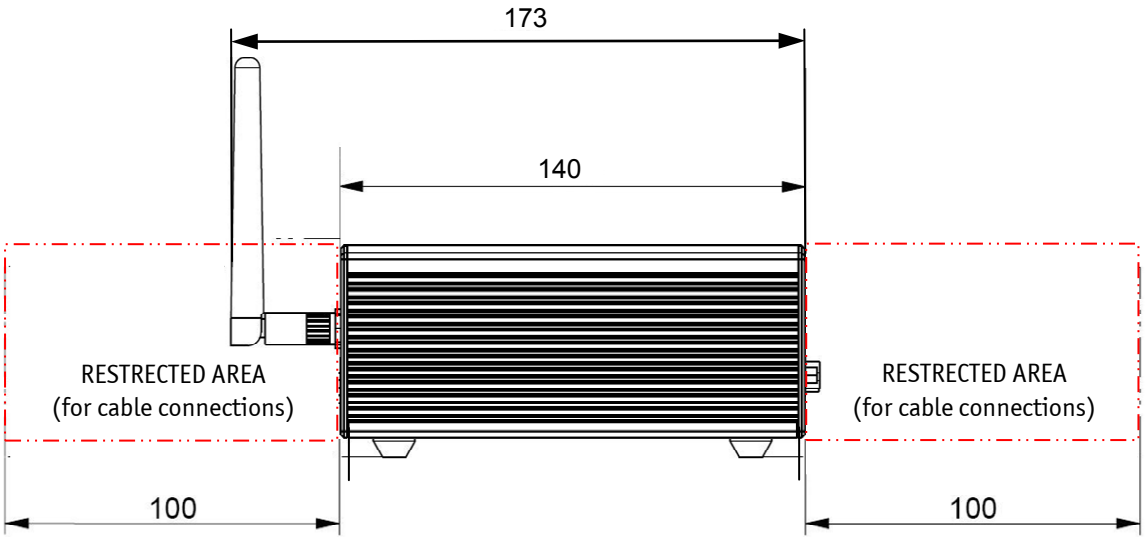


Fig. 34: Dimensions in the side view (desktop with optional antenna)

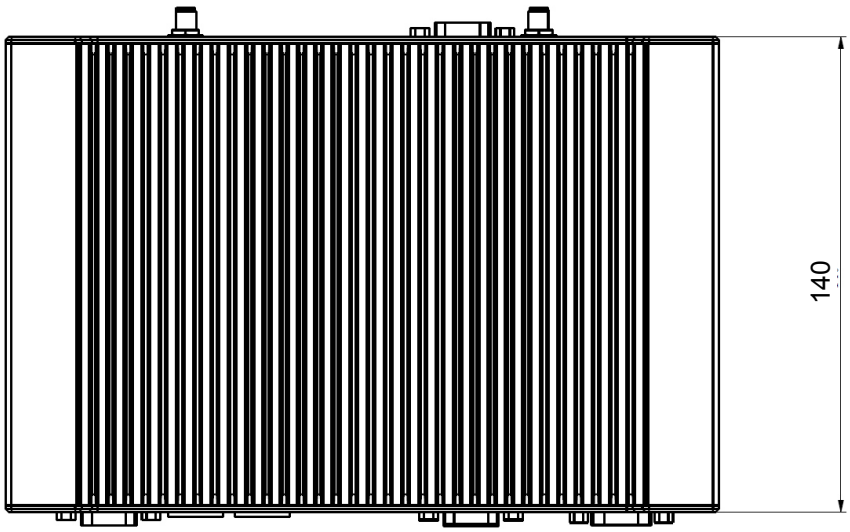


Fig. 35: Dimensions in the top side view (desktop)

11.2.2. Dimension for Wall and Table Mounting

For a sufficient air circulation around the device, we recommend not to place (mount) or operate any other devices within the red marked restriction area (all around the cooling fins of the chassis) (see Fig. 36).

The restriction areas marked with "100 mm" (at the front and rear side of the platform) are reserved for cable connections (see Fig. 37).

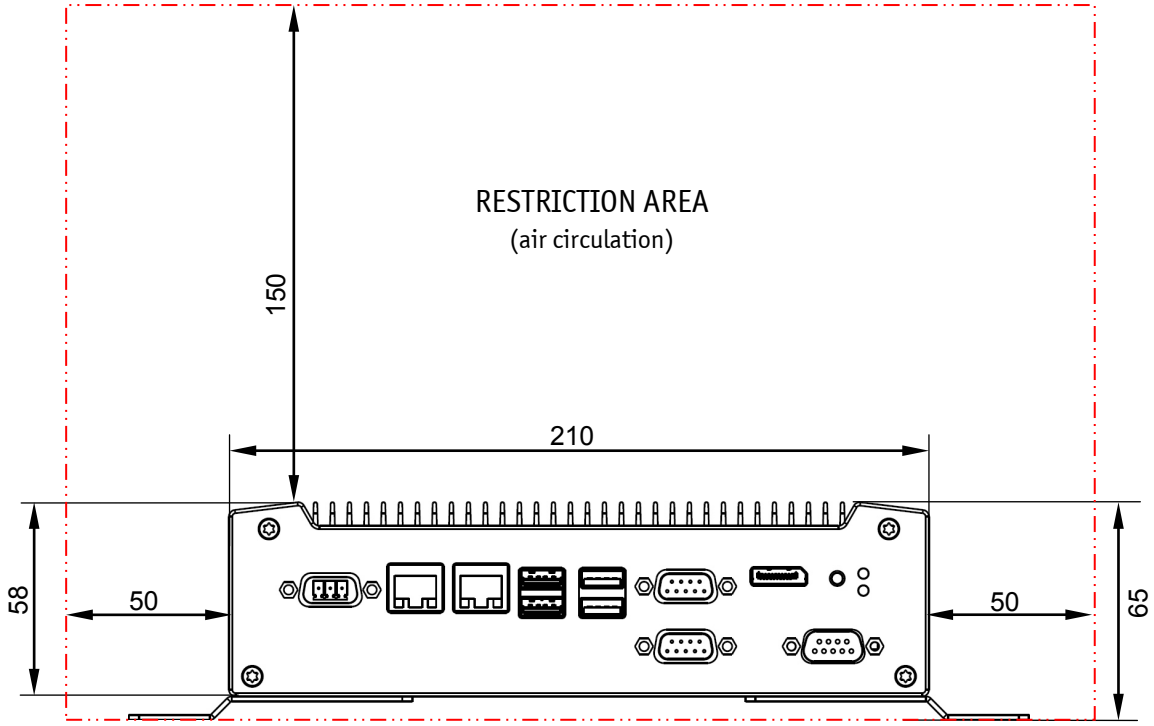


Fig. 36: Dimensions in the front view (wall or table mounting)

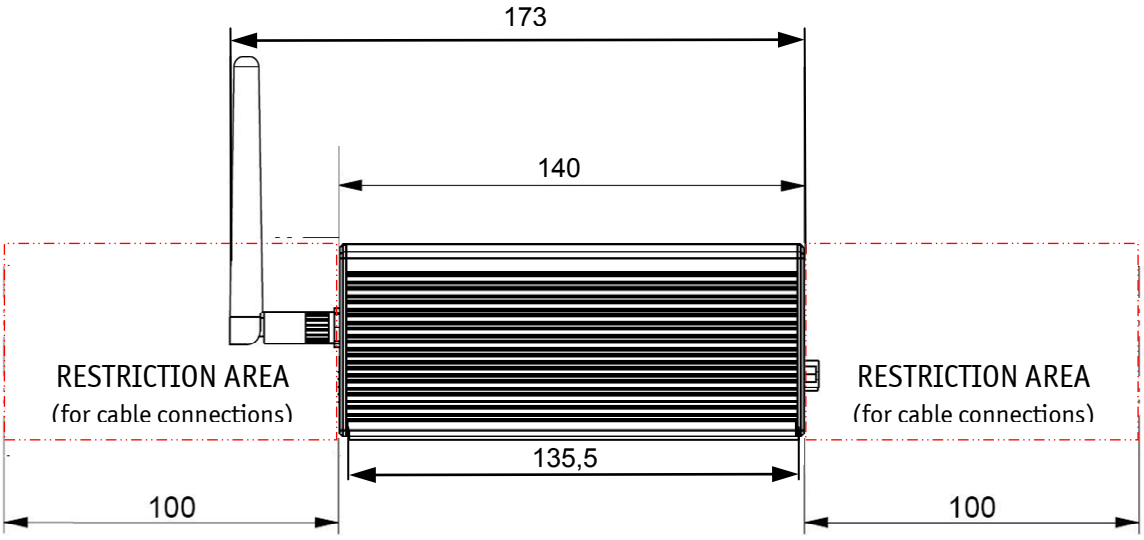


Fig. 37: Dimensions in the side view (wall or table mounting)

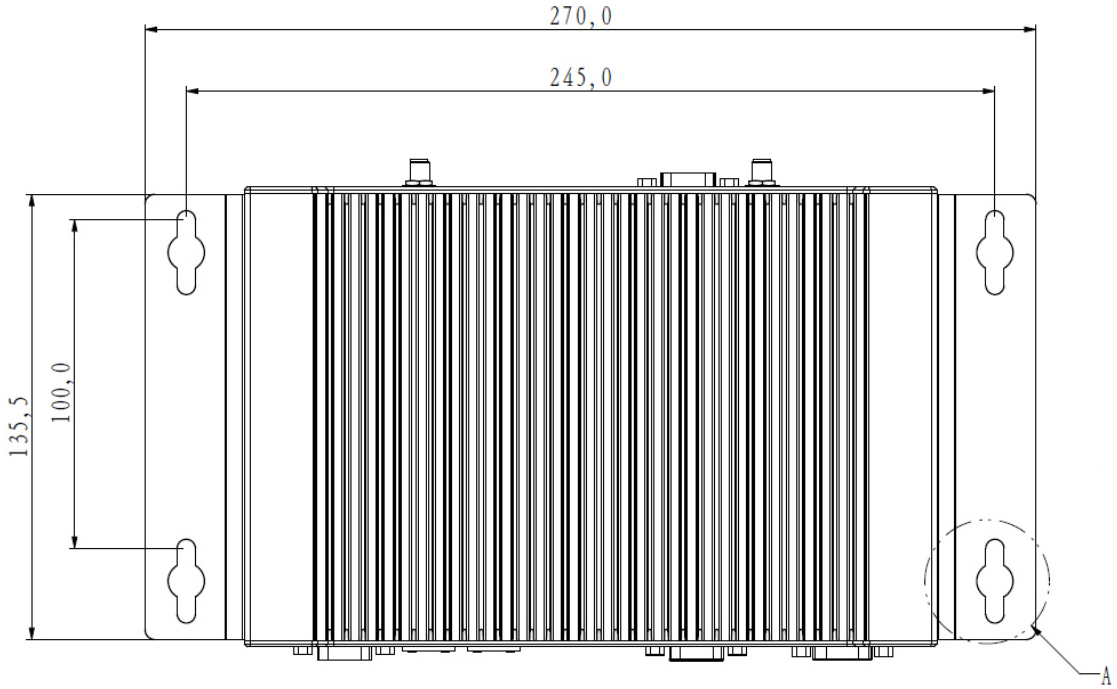


Fig. 38: Dimensions in the top view (wall or table mounting)

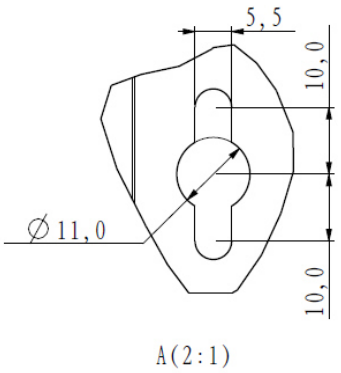


Fig. 39: Detail for keyhole (wall or table mounting)

11.2.3. Dimensions for using the Bracket for Cabinet Mounting

For a sufficient air circulation around the device, we recommend not to place (mount) or operate any other devices within the red marked restriction area (all around the cooling fins of the chassis) (see Fig. 40).

The restriction areas marked with "100 mm" (at the front and rear side of the platform) are reserved for cable connections (see Fig. 41).

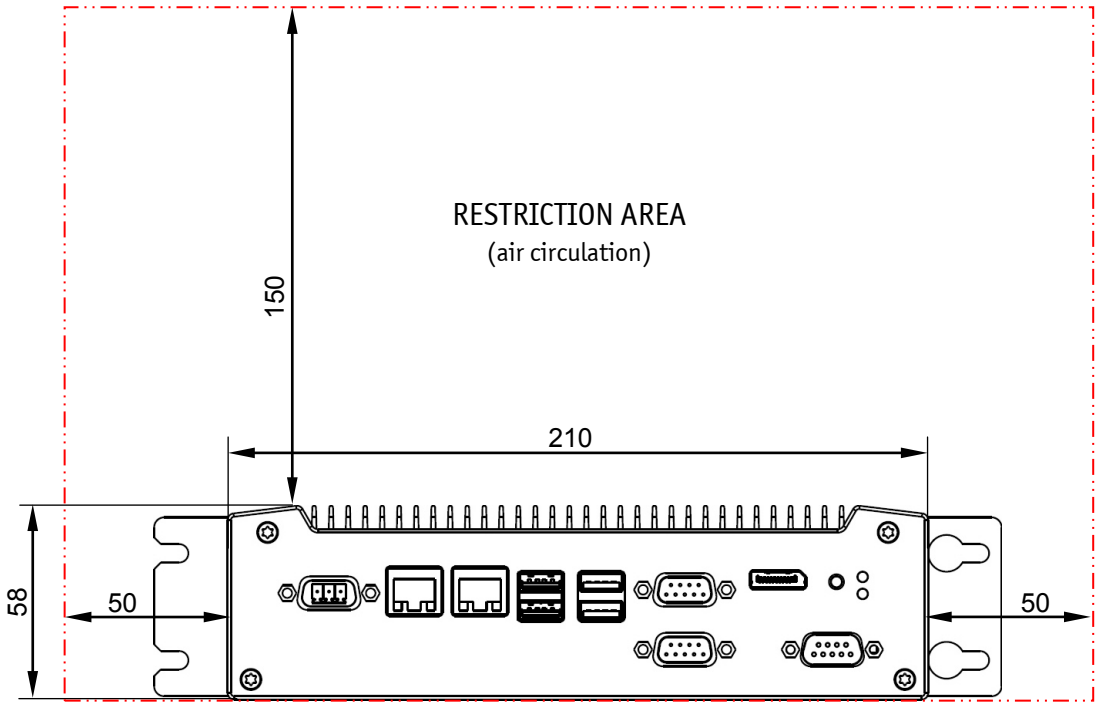


Fig. 40: Dimensions in front view for KBox A-101 with bracket for cabinet mounting

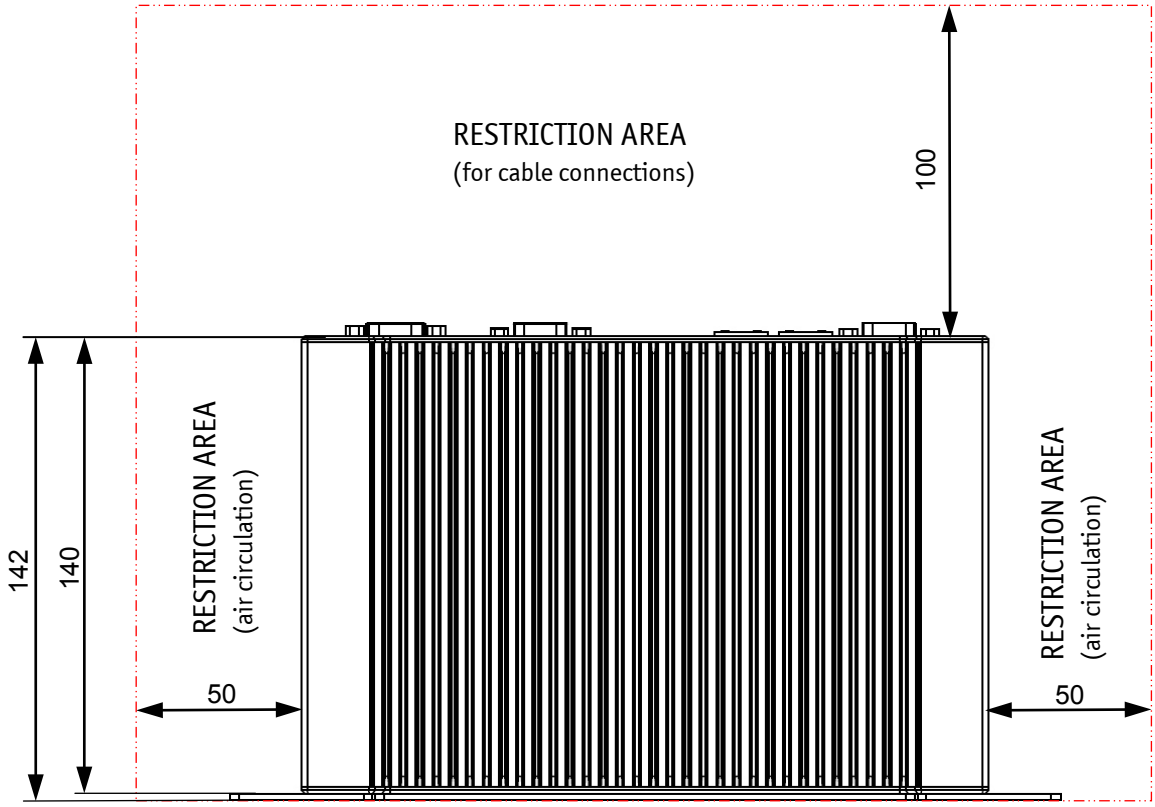


Fig. 41: Dimensions in side view when using the bracket for cabinet mounting (side with cooling fins)

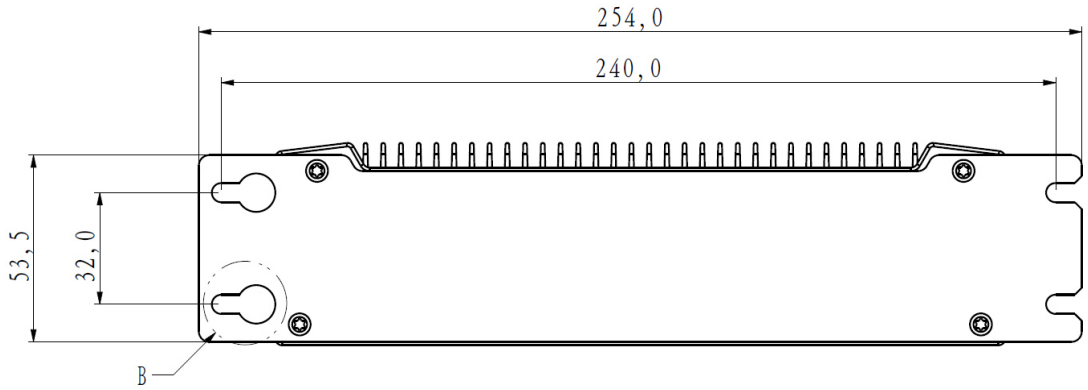


Fig. 42: Dimensions in rear side view when using the bracket for cabinet mounting

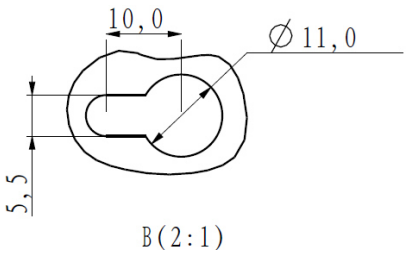


Fig. 43: Detail for keyhole (bracket for cabinet mounting)

11.2.4. Dimension for KBox A-101 by using the DIN Rail Clip

For a sufficient air circulation around the device, we recommend not to place (mount) or operate any other devices within the red marked restriction area (all around the cooling fins of the chassis) (see Fig. 44).

The restriction areas marked with "100 mm" (at the front and rear side of the platform) are reserved for cable connections (see Fig. 45).

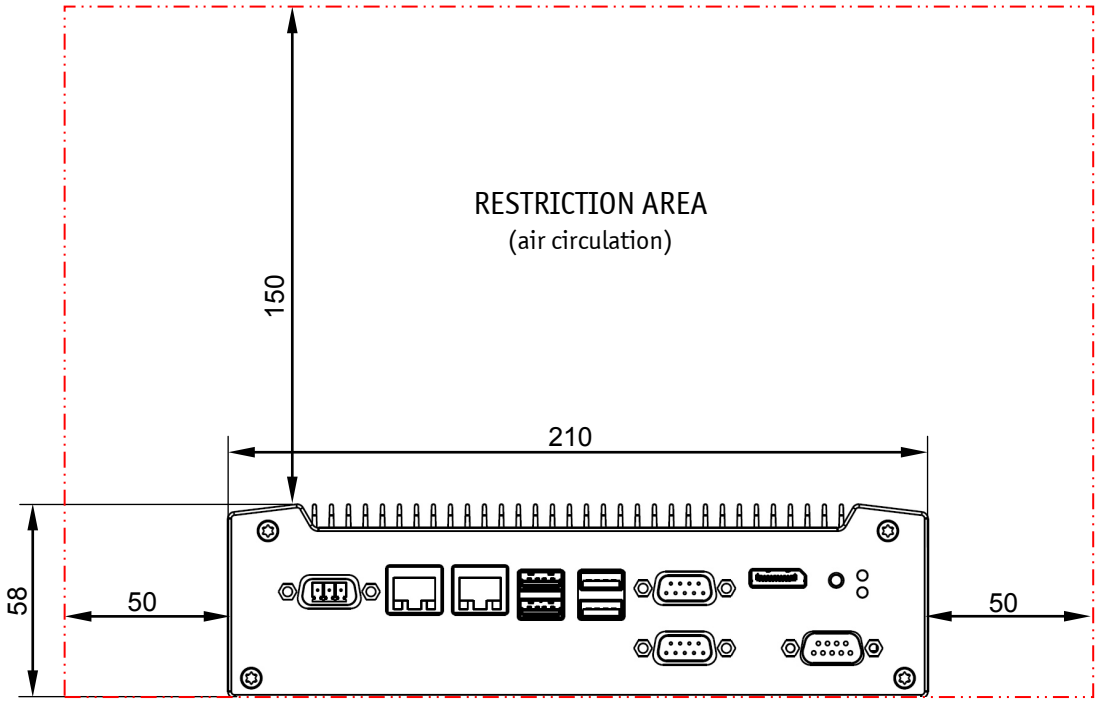


Fig. 44: Dimensions in front view (by use of the DIN Rail clip)

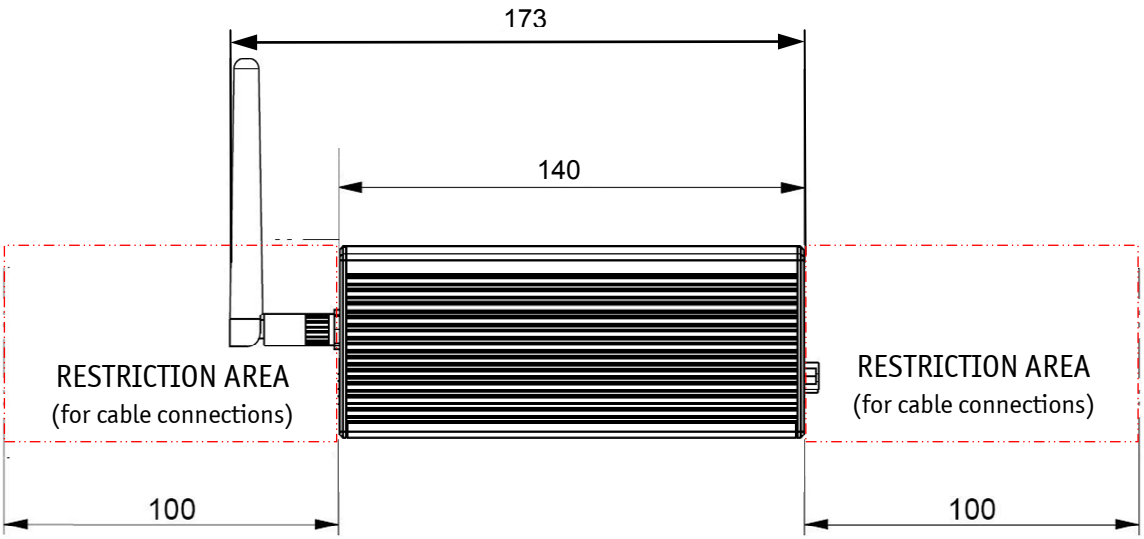


Fig. 45: Dimensions in side view (by use of the DIN Rail clip))

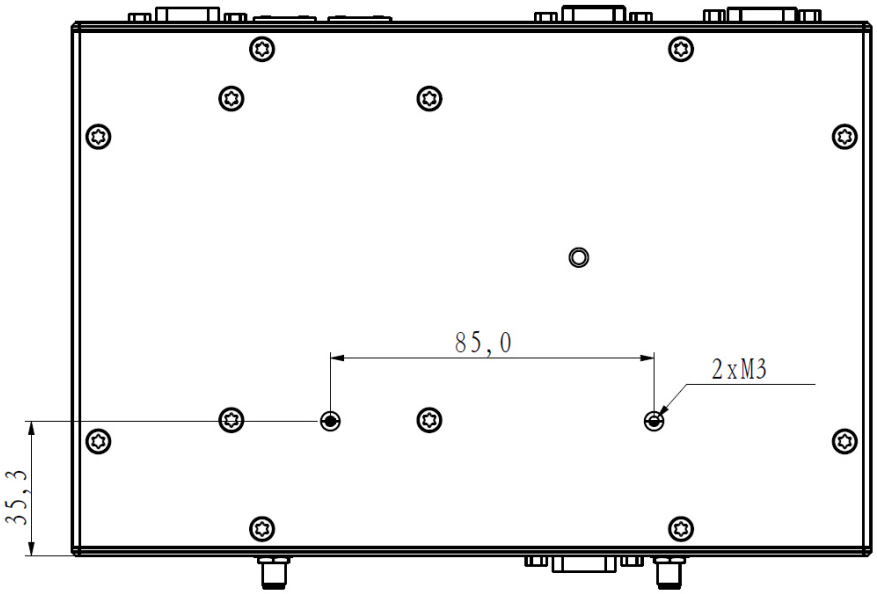


Fig. 46: Dimensions in bottom view (by use of the DIN Rail clip)

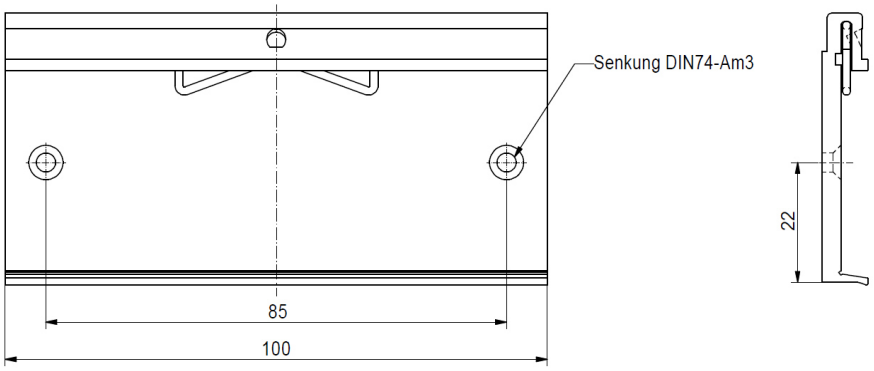


Fig. 47: Ditails with dimensions of the DIN Rail mounting clip

11.3. Environmental Specifications

Operating Temperature	0 ... +50 °C (32 ... 122 °F) with HDD and a sufficient air circulation -10 ... +60 °C (14 ... 140 °F) with peripherals for extended temperature range
Storage / Transit Temperature	-40 ... +85 °C (-40 ... +185 °F)
Relative Humidity (Operating)	95% @ 40 °C (non condensing)
Max. Operation Altitude	3,048 m (10,000 ft)
Max. Storage / Transit Altitude	10,000 m (32,800 ft)
Operating Shock	15 G, 11 ms, half sine
Storage / Transit Shock	30 G, 11 ms, half sine
Operating Vibration	10 - 500 Hz, 2 G
Storage / Transit Vibration	10 – 500 Hz, 2 G

11.4. CE-Directives and Standards

CE Directive	
Elektrical Safety	General Product Safety Directive (GPSD) 2001/95/EC Low Voltage Directive (LVD) 2006/95/EC
Electromagnetic Compatibility (EMC)	EMC Directive 2004/108/EC
CE Marking	CE Directive 93/68/EEC
RoHS II Directives	2011/65/EU

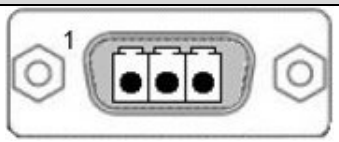
Elektrical Safety	Harmonized Standards
CB Scheme	CB Certification
EUROPE	Information technology equipment - Safety - Part 1: General requirements EN 60950-1+ A11
U.S.A. / CANADA	To meet UL60950-1 / CSA C22.2- No. 60950-1-7

EMC	Harmonized Standards
EU	Generic emission standard for industrial environments (Emission): EN 61000-6-4 Generic standards - Immunity for industrial environments (Immunity): EN 61000-6-2
U.S.A.	FCC 47 CFR Part 15, Class A
CANADA	ICES-003, Class A

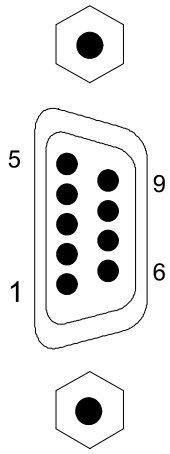
12. Standard Interfaces – Pin Assignments

Low-active signals are indicated by a minus sign.

12.1.1. Power Input Connector

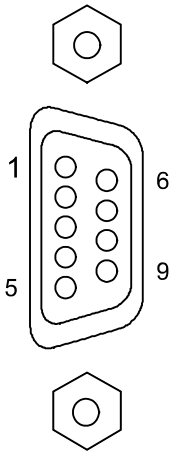
Pin	Signal Name	3-pin POWER SUBCON (male)
1	0V (input)	
2	NC	
3	+24 VDC (input)	

12.1.2. Serial Interfaces COM1 and COM2 (RS232)

Pin	Signal Name		9-pin D-SUB Connector
1	DCD	(Data Carrier Detect)	
2	RXD	(Receive Data)	
3	TXD	(Transmit Data)	
4	DTR	(Data Terminal Ready)	
5	GND	(Signal Ground)	
6	DSR	(Data Set Ready)	
7	RTS	(Request to Send)	
8	CTS	(Clear to Send)	
9	RI	(Ring Indicator)	

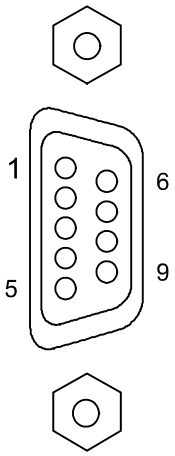
12.1.3. Serial Port (RS422/RS485) configured as RS422 (4-Channel Mode)

Refer to subsection 7.1.4.1 "RS422/RS485 Serial Interface"

Pin	Signal Name		9-pin D-SUB Connector (female)
1	TxD-	(Transmit Data-)	
2	RxD+	(Receive Data+)	
3	TxD+	(Transmit Data+)	
4	RxD-	(Receive Data-)	
5	GND	(Signal Ground)	
6	RTS-	(Request to Send-)	
7	RTS+	(Request to Send+)	
8	CTS+	(Clear to Send+)	
9	CTS-	(Clear to Send-)	

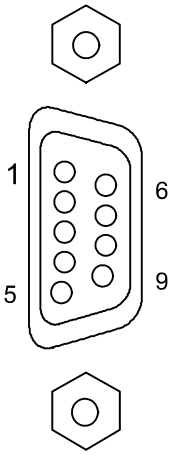
12.1.4. Serial Port (RS422/RS485) configured as RS485 (4-Wire Mode), Full Duplex, (Bus-Master)

Refer to subsection 7.1.4.1 "RS422/RS485 Serial Interface"

Pin	Signal Name		9-pin D-SUB Connector (female)
1	TxD-	(Transmit Data-)	
2	RxD	(Receive Data+)	
3	TxD+	(Transmit Data+)	
4	RxD-	(Receive Data-)	
5	GND	(Signal Ground)	
6	NC		
7	NC		
8	NC		
9	NC		

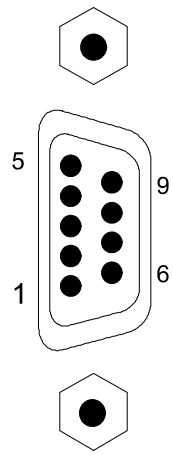
12.1.5. Serial Port (RS422/RS485) configured as RS485 (2-Wire Mode), Half Duplex

Refer to subsection 7.1.4.1 "RS422/RS485 Serial Interface".

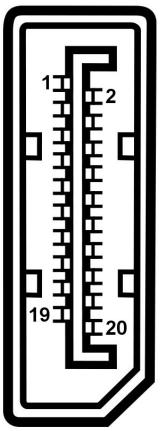
Pin	Signalname	9-pin D-SUB Connector (female)
1	Data-	
2	NC	
3	Data+	
4	NC	
5	GND (Signal Ground)	
6	NC	
7	NC	
8	NC	
9	NC	

12.1.6. CAN Connector

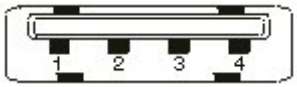
Refer to subsection 7.1.4.2 "DIP-Switch Settings (SW1) for LPCtoCAN Adapter ".

Pin	Signalname	9-pin D-SUB Connector (male)
1	NC	
2	CANL (galvanisch getrennt)	
3	CANOV (galvanisch getrennt)	
4	NC	
5	NC	
6	NC	
7	CANH (galvanisch getrennt)	
8	NC	
9	NC	
Case	GND	

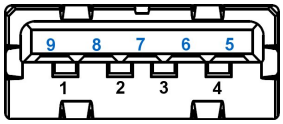
12.1.7. DP Connector (DisplayPort)

Pin#	Signal Name	DisplayPort	Signal Name	Pin#
1	ML Lane 0 (p)		GND (ML Lane 0)	2
3	ML Lane 0 (n)		Lane 1 (p)	4
5	GND (ML Lane 1)		Lane 1 (n)	6
7	Lane 2 (p)		GND (ML Lane 2)	8
9	Lane 2 (n)		Lane 3 (p)	10
11	GND (ML Lane 3)		Lane 3 (n)	12
13	AUX SEL#		Pull-down to GND	14
15	AUX CH (p)		GND (AUX CH)	16
17	AUX CH (n)		Hot Plug	18
19	GND (GND_DDC)		3.3V (DDC EEPROM power 500 mA fused	20

12.1.8. USB 2.0 Port

Pin	Signal Name	4-pin USB Connector Typ A Version 2.0
1	VCC	
2	Data-	
3	Data+	
4	GND	

12.1.9. USB3.0 Port

Pin Signal Name				9-pin USB Connector Type A Version 3.0/2.0
USB 2.0 contact pins		USB 3.0 contact pins		
1	VCC, fused (900 mA max.)	5	StdA_SSRX-	
2	Data-	6	StdA_SSRX+	
3	Data+	7	GND_DRAIN	
4	GND	8	StdA_SSTX-	
		9	StdA_SSTX+	

13. Technical Support

For technical support, please contact our Technical Support department:

e-mail: support-keu@kontron.com
Web: http://www.kontron.com/support

Make sure you have the following information on hand when you call:

- the unit part id number (PN),
- the serial number (SN) of the unit; the serial number can be found on the type label, placed on the right side of the system.

Be ready to explain the nature of your problem to the service technician.

If you have questions about Kontron Europe or our products and services, you can reach us by the above-mentioned telephone number and on e-mail address or at: www.kontron.com .

13.1. Returning Defective Merchandise

Please follow these steps before you return any merchandise to Kontron Europe:

1. Download the corresponding form for returning a device with an RMA No. [RMA (**R**eturn of **M**aterial **A**uthorization)] from our website www.kontron.com / Support /.RMA Information; contact our Customer Service department to obtain an RMA No.
   e-mail: service@kontron.com
2. Ensure that you have received an RMA number from Kontron Customer Services before returning any device. Write this number clearly on the outside of the package.
3. Describe the fault that has occurred.
4. Please provide the name and telephone number of a person we can contact to obtain more information, where necessary. Where possible, please enclose all the necessary customs documents and invoices.
5. When returning a device:
   - Pack it securely in its original box.
   - Enclose a copy of the RMA form with the consignment.

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