FusionClient

Fusion Client – User Guide (Rev. 1.3)

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FusionClient - USER GUIDE

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Revision History

Revision	Brief Description of Changes	Date of Issue	Author
1.0	Release version	2016-September-29	mk
1.1	Power consumption table corrected; SDXC cards removed; legal and service information updated.	2017-January-25	mk
1.2	GoldCap information updated; FCC radiation exposure statement added; information about mounting clamps corrected.	2017-July-13	mk
1.3	corrected grounding information	2018-May-09	hjs

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Customer Comments

If you have any difficulties using this user guide, discover an error, or just want to provide some feedback, contact Kontron support. Detail any errors you find. We will correct the errors or problems as soon as possible and post the revised user guide on our website.

Symbols

The following symbols may be used in this user guide

⚠DANGER	DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.
⚠WARNING	WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.
NOTICE	NOTICE indicates a property damage message.
⚠CAUTION	CAUTION indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.
	Electric Shock! This symbol and title warn of hazards due to electrical shocks (> 60 V) when touching products or parts of products. Failure to observe the precautions indicated and/or prescribed by the law may endanger your life/health and/or result in damage to your material.
	ESD Sensitive Device! This symbol and title inform that the electronic boards and their components are sensitive to static electricity. Care must therefore be taken during all handling operations and inspections of this product in order to ensure product integrity at all times.
	HOT Surface! Do NOT touch! Allow to cool before servicing.
	Laser! This symbol inform of the risk of exposure to laser beam and light emitting devices (LEDs) from an electrical device. Eye protection per manufacturer notice shall review before servicing.
	This symbol indicates general information about the product and the user guide. This symbol also indicates detail information about the specific product configuration.
	This symbol precedes helpful hints and tips for daily use.

For Your Safety

Your new Kontron product was developed and tested carefully to provide all features necessary to ensure its compliance with electrical safety requirements. It was also designed for a long fault-free life. However, the life expectancy of your product can be drastically reduced by improper treatment during unpacking and installation. Therefore, in the interest of your own safety and of the correct operation of your new Kontron product, you are requested to conform with the following guidelines.

High Voltage Safety Instructions

As a precaution and in case of danger, the power connector must be easily accessible. The power connector is the product's main disconnect device.

⚠CAUTION

Warning

All operations on this product must be carried out by sufficiently skilled personnel only.

⚠CAUTION

Electric Shock!

Before installing a non hot-swappable Kontron product into a system always ensure that your mains power is switched off. This also applies to the installation of piggybacks. Serious electrical shock hazards can exist during all installation, repair, and maintenance operations on this product. Therefore, always unplug the power cable and any other cables which provide external voltages before performing any work on this product.

Earth ground connection to vehicle's chassis or a central grounding point shall remain connected. The earth ground cable shall be the last cable to be disconnected or the first cable to be connected when performing installation or removal procedures on this product.

Special Handling and Unpacking Instruction

NOTICE

ESD Sensitive Device!

Electronic boards and their components are sensitive to static electricity. Therefore, care must be taken during all handling operations and inspections of this product, in order to ensure product integrity at all times.

Do not handle this product out of its protective enclosure while it is not used for operational purposes unless it is otherwise protected.

Whenever possible, unpack or pack this product only at EOS/ESD safe work stations. Where a safe work station is not guaranteed, it is important for the user to be electrically discharged before touching the product with his/her hands or tools. This is most easily done by touching a metal part of your system housing.

It is particularly important to observe standard anti-static precautions when changing piggybacks, ROM devices, jumper settings etc. If the product contains batteries for RTC or memory backup, ensure that the

product is not placed on conductive surfaces, including anti-static plastics or sponges. They can cause short circuits and damage the batteries or conductive circuits on the product.

Lithium Battery Precautions

If your product is equipped with a lithium battery, take the following precautions when replacing the battery.

⚠CAUTION	**Danger of explosion if the battery is replaced incorrectly.** **Replace only with same or equivalent battery type recommended by the manufacturer.** **Dispose of used batteries according to the manufacturer's instructions.**

General Instructions on Usage

In order to maintain Kontron's product warranty, this product must not be altered or modified in any way. Changes or modifications to the product, that are not explicitly approved by Kontron and described in this user guide or received from Kontron Support as a special handling instruction, will void your warranty.

This product should only be installed in or connected to systems that fulfill all necessary technical and specific environmental requirements. This also applies to the operational temperature range of the specific board version that must not be exceeded. If batteries are present, their temperature restrictions must be taken into account.

In performing all necessary installation and application operations, only follow the instructions supplied by the present user guide.

Keep all the original packaging material for future storage or warranty shipments. If it is necessary to store or ship the product then re-pack it in the same manner as it was delivered.

Special care is necessary when handling or unpacking the product. See Special Handling and Unpacking Instruction.

Quality and Environmental Management

Kontron aims to deliver reliable high-end products designed and built for quality, and aims to complying with environmental laws, regulations, and other environmentally oriented requirements. For more information regarding Kontron's quality and environmental responsibilities, visit http://www.kontron.com/about-kontron/corporate-responsibility/quality-management.

Disposal and Recycling

Kontron's products are manufactured to satisfy environmental protection requirements where possible. Many of the components used are capable of being recycled. Final disposal of this product after its service life must be accomplished in accordance with applicable country, state, or local laws or regulations.

WEEE Compliance

The Waste Electrical and Electronic Equipment (WEEE) Directive aims to:

- Reduce waste arising from electrical and electronic equipment (EEE)
- Make producers of EEE responsible for the environmental impact of their products, especially when the product become waste
- Encourage separate collection and subsequent treatment, reuse, recovery, recycling and sound environmental disposal of EEE
- Improve the environmental performance of all those involved during the lifecycle of EEE

Environmental protection is a high priority with Kontron.
Kontron follows the WEEE directive
You are encouraged to return our products for proper disposal.

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1/ General Safety Instructions for IT Equipment

⚠WARNING **Please read this chapter carefully and take careful note of the instructions, which have been compiled for your safety and to ensure to apply in accordance with intended regulations. If the following general safety instructions are not observed, it could lead to injuries to the operator and/or damage of the product; in cases of nonobservance of the instructions Kontron is exempt from accident liability, this also applies during the warranty period.**

The product has been built and tested according to the basic safety requirements for low voltage (LVD) applications and has left the manufacturer in safety-related, flawless condition. To maintain this condition and also to ensure safe operation, the operator must not only observe the correct operating conditions for the product but also the following general safety instructions:

- The product must be used as specified in the product documentation, in which the instructions for safety for the product and for the operator are described. These contain guidelines for setting up, installation and assembly, maintenance, transport or storage.
- The on-site electrical installation must meet the requirements of the country's specific local regulations.
- If a power cable comes with the product, only this cable should be used. Do not use an extension cable to connect the product.
- To guarantee that sufficient air circulation is available to cool the product, please ensure that the ventilation openings are not covered or blocked. If an air filter is provided, this should be cleaned regularly. Do not place the system close to heat sources or damp places. Make sure the system is well ventilated.
- Only devices or parts which fulfill the requirements of SELV circuits (Safety Extra Low Voltage) as stipulated by
  IEC 60950-1 may be connected to the available interfaces.
- Before opening the device, make sure that the device is disconnected from the mains.
- Switching off the device by its power button does not disconnect it from the mains. Complete disconnection is only possible if the power cable is removed from the wall plug or from the device. Ensure that there is free and easy access to enable disconnection.
- The device may only be opened for the insertion or removal of add-on cards (depending on the configuration of the system). This may only be carried out by qualified operators.
- If extensions are being carried out, the following must be observed:
  - All effective legal regulations and all technical data are adhered to.
  - The power consumption of any add-on card does not exceed the specified limitations.
  - The current consumption of the system does not exceed the value stated on the product label.
- Only original accessories that have been approved by Kontron can be used.
- Please note: safe operation is no longer possible when any of the following applies:
  - The device has visible damages.
  - The device is no longer functioning.

  In this case the device must be switched off and it must be ensured that the device can no longer be operated.

Additional Safety Instructions for DC Power Supply Circuits

- To guarantee safe operation of devices with DC power supply voltages larger than 60 volts DC or a power consumption larger than 240 VA, please observe that:
  - The device is set up, installed and operated in a room or enclosure marked with "RESTRICTED ACCESS", if there are no safety messages on product as safety signs and labels on the device itself.
  - No cables or parts without insulation in electrical circuits with dangerous voltage or power should be touched directly or indirectly.
  - A reliable protective earthing connection is provided.
  - A suitable, easily accessible disconnecting device is used in the application (e.g. overcurrent protective device), if the device itself is not disconnectable.
  - A disconnect device, if provided in or as part of the equipment, shall disconnect both poles simultaneously.
  - Interconnecting power circuits of different devices cause no electrical hazards.
- A sufficient dimensioning of the power cable wires must be selected – according to the maximum electrical specifications on the product label – as stipulated by EN60950-1 or VDE0100 or EN60204 or UL508 regulations.
- The devices do not generally fulfill the requirements for "centralized DC power systems" (UL 60950-1, Annex NAB; D2) and therefore may not be connected to such devices!

1.1. Electrostatic Discharge (ESD)

A sudden discharge of electrostatic electricity can destroy static-sensitive devices or micro-circuitry.

Therefore proper packaging and grounding techniques are necessary precautions to prevent damage. Always take the following precautions:

1. Transport boards in ESD-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.

1.1.1. Grounding Methods

By adhering to the guidelines below, electrostatic damage to the device can be avoided:

1. Cover workstations with approved antistatic material. Always wear a wrist strap connected to workplace. Always use properly grounded tools and equipment.
2. Use antistatic mats, heel straps, or air ionizers for more protection.
3. Always handle electrostatically sensitive components by their edge or by their casing.
4. Avoid contact with pins, leads, or circuitry.
5. Turn off power and input signals before inserting and removing connectors or connecting test equipment.

6. Keep work area free of non-conductive materials such as ordinary plastic assembly aids and Styrofoam.
7. Use only field service tools which are conductive, such as cutters, screwdrivers, and vacuum cleaners.
8. Always place drives and boards PCB-assembly-side down on the foam.

1.2. Hot Surface Warning

⚠CAUTION

Please observe the warning label “Hot Surface” shown in Figure 22 on the rear side of the system. The chassis may be hot during operation and should not be touched without taking care.

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

1.3. Instructions for the optional Lithium Battery

If ordered, your FusionClient is equipped with an optional lithium battery. For the replacement of this battery please observe the instructions described in section 7.2 “Replacing the Lithium Battery”.

⚠WARNING

Danger of explosion when replacing with wrong type of battery. Replace only with the same or equivalent type recommended by the manufacturer. The lithium battery type must be UL recognized.

Do not dispose of lithium batteries in general trash collection. Dispose of the battery according to the local regulations dealing with the disposal of these special materials, (e.g. to the collecting points for dispose of batteries).

2/ Electromagnetic Compatibility (Class B Device)

For detailed information refer to section 8.4 “CE-Directives, Standards and Approvals”.

2.1. Electromagnetic Compatibility EU

This product has been designed for low level of radiated emission for residential, commercial and light-industrial environments and high immunity level for industrial environmental. This product complies with the European Council Directive on the approximation of the laws of the member states relating to electromagnetic compatibility (EMC Directive 2014/30/EU) and Radio Equipment Directive (RED Directive 2014/53/EU).

2.2. FCC Statement (U.S.A.)

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

The following statement applies to the products covered in this manual, unless otherwise specified herein. The statement for other products will appear in the accompanying documentation.

Kontron Europe GmbH is not responsible for any radio television interference caused by unauthorized modifications of this equipment or the substitution or attachment of connecting cables and equipment other than those specified by Kontron Europe GmbH. The correction of interference caused by such unauthorized modification, substitution or attachment will be the responsibility of the user.

The use of shielded I/O cables is required when connecting this equipment to any and all optional peripheral or host devices. Failure to do so may violate FCC and ICES rules.

Contains TX FCC ID: 2AATH-WUBM273ACN

FCC Radiation Exposure Statement:
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.
FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

2.3. EMC-Compliance Canada

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

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

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

3/ Scope of Delivery

Please check that your package is complete, and contains the items below (according to the ordered unit configuration). If you discover damaged or missing items, please contact your dealer.

Table 1: FusionClient - Scope of delivery

	FusionClient system in the configuration ordered: ▶ FC 121 (with 12.1" display) ▶ FC 156 (with 15.6" display) ▶ FC 185 (with 18.5" display) ▶ FC 215 (with 21.5" display)
	DC power terminal
	Mounting clamps with Allen screws for front panel of system (Number of mounting clamps depends on the model ordered)
	General safety instructions for IT equipment

3.1. System Configuration

Depending on the configuration ordered, your FusionClient system may include one or more of the following components.

Table 2: FusionClient – System Configuration Option

CPU Options	Intel® Atom™ E3845, E3826 or E3815 (optional: E3827, E3825)
Memory	Up to two DDR3-1333/1600 max up to 8/16 GB (204-pin SODIMM single /dual channel) depending on the ordered COM Express® module
	1x 2.5" SATA SSD drive (internal)
	1x mSATA SSD, full/half size
eMMC Flash Drive	2-64GB (only with E3845 installed, depending on the ordered COM Express® module)
mPCIe Card	1x mPCIe card (full/half size)

3.1.1. Optional System Configuration

Table 3: FusionClient - System configuration options

	**I/O extension module (must be ordered and pre-installed)** ▶ GbE Intel i210IT ▶ RS-232 (DSUB) ▶ RS-485/422 isolated 1.5 kV (DSUB9) **With selectable mode:** o RS-422 4-channel mode o RS-485 4-wire mode (Bus master mode) o RS-485 2-wire mode (RTS mode) o RS-485 2-wire mode (Adjustable Timeout mode) o Enable/Disable Bus Termination
RFID	**Must be ordered and pre-installed.**
WiFi	**Must be ordered and pre-installed.**
RTC lithium battery	**Must be ordered and pre-installed.**

3.1.2. Accessory Parts

Table 4: FusionClient – Optional Accessories

		External AC/DC adapter (90-264 V AC/24 V DC), including power cable for EU and US. Mating connector (DC power terminal for DC power supply) is supplied with the system.
 EU	 USA	

4/ Product Description

Before working with your FusionClient, you should take a few minutes to learn about the variants, various ports, drives, connectors and controls that are part of your FusionClient system.

The FusionClient system expands the Kontron line of Human Machine Interface (HMI). The FusionClient is a system designed for demanding industrial applications. It integrates a workstation system with an integrated touch screen display. The FusionClient can be configured to meet the requirements of many demanding applications. The rugged design offers excellent mechanical stability suitable for operation in harsh industrial environments.

Two non-detachable components comprise an FusionClient:

- The computer base designed around carrier board with a COM Express® module. It is common for all system variants.
- The touch display unit offering 12.1", 15.6", 18.5" and 21.5" display sizes.

The system accommodates a new processor platform based on COMe-cBT6 (COM Express® module. Depending on the implemented COM Express® module, up to two DDR3 SO-DIMM sockets are available for up to 16 GB memory size (2, 4, 8GB, dual channel DDR3 ECC memory modules are supported).

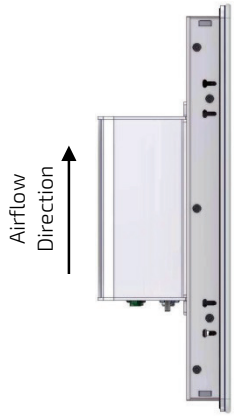
Depending on the system configuration ordered, the Fusion client can be equipped optionally with one external accessible SD card and following from outside not accessible drives:

- 1x 2.5" SATA SSD
- 1x mSATA SSD
- 1x eMMC flash drive

The power button, the LED control indicators and user interfaces such as USB (2.0), USB (3.0), DisplayPort (DP),
LAN ports (10/100/1000 Mbps) and serial ports (RS232/RS422/RS485) are accessible on the bottom (rear) side of the system. The functionality of the system can be extended with an optional extension port (e.g. Fieldbus). The W-LAN and LED alarm bar options enable tracking and indicating machine issues and their severity.

The computer base of the FusionClient is fanless with a compact aluminum chassis with cooling fins. The air openings located on the sides of the touch display unit, and the cooling fins of the computer base and provide air circulation for the system interior cooling, in order to prevent overheating.

Figure 1: Airflow direction



NOTICE

- When powering the FusionClient system, make sure that the air intake and exhaust openings and the cooling fins of the cover are not obstructed/covered by any objects.
- In order to prevent the systems overheating and to ensure the access to the I/Os for cable connections, leave at least 5 cm (approx. 2") of free space on the rear top and bottom side of the computer base.

FusionClient is designed to be connected to a 24 V DC (15 V to 30 V DC operating range) mains power supply (limited power supply) using the DC power terminal (included). An optional external AC/DC adapter can be ordered in order to connect the FusionClient to the main power source.

FusionClient provides a self-protection turn off function if the temperature sensors will measure an internal temperature level out of the limits (85°C). Refer to the section 6.4 "System Self Protection against Ambient Overheating".

FusionClient is designed to comply with IP65 protection class at the front side (when installed to a wall/panel only).

The mounting and operation of the FusionClient is allowed in horizontal (with the interfaces downwards) and vertical position. Vertical operating position (with the interfaces to the left or to the right) is only possible when supported by the OS used.

All versions are suitable for installation in an instrument panel or other cabinet.

The system is designed to be mounted in the user's application by either of the following methods:

- Installation in an instrument panel or other cabinets (preferred mounting method) using the corresponding supplied mounting clamps.
- Installation by a heavy duty VESA 75/100 compliant mounting system.

NOTICE **Installation by using of a VESA 75/100 compliant mounting system must be properly designed to support the heavy load of the FusionClient system.**

⚠WARNING **No user-serviceable parts inside. Do not open the FusionClient system.**

The following sections detail each of these components and their function in the FusionClient.

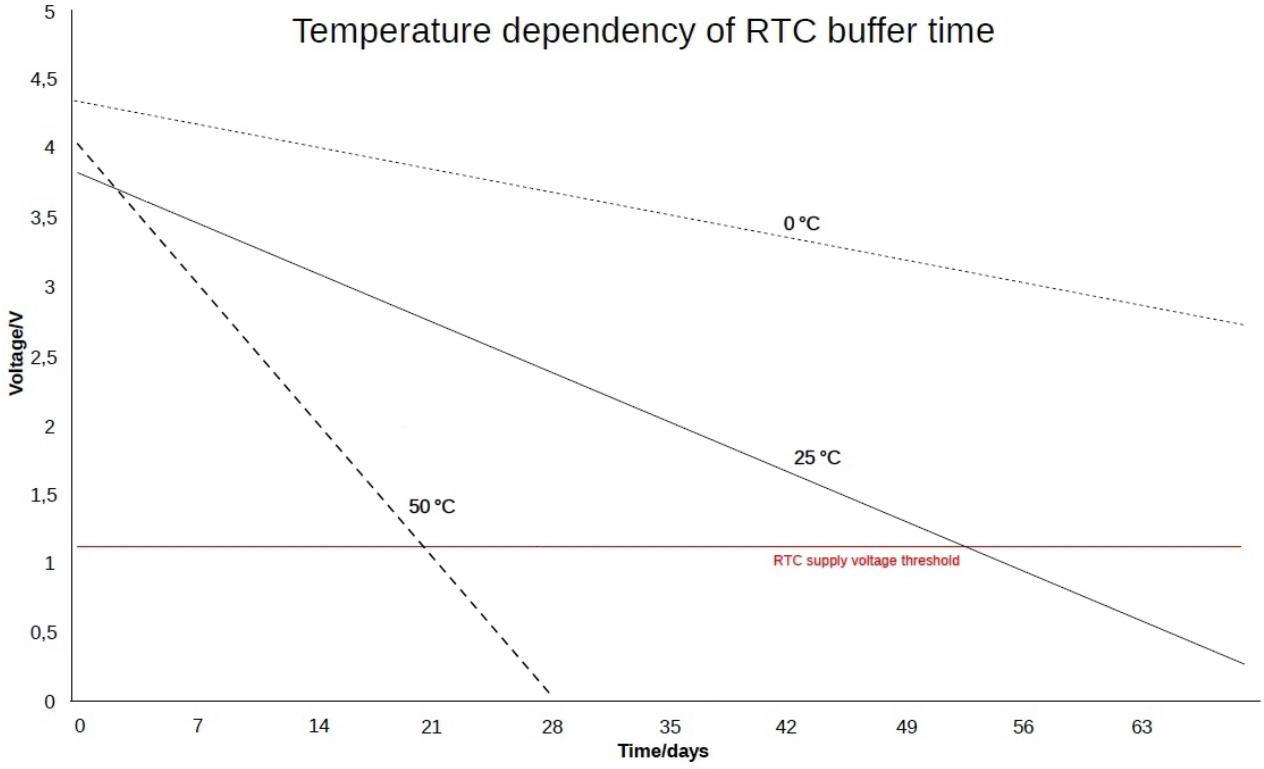
4.1. RTC (GoldCap)

The baseboard of the FusionClient provides an "external RTC" module connected via the I2C Bus. An RTC module of type RV-8564 or compatible is used. To provide a valid date and time when no power is connected to the system, the RTC module is equipped with a GoldCap buffer.

4.1.1. RTC Buffer Time

The RTC buffer time is depending of the ambient temperature. For a better understanding of the differing behavior of the GoldCap buffer integrated in your system, refer to the diagram below:

Figure 2: RTC buffer time depending on temperature



If the time is not valid this is indicated by a status bit in the RTC registers. For details see the RV-8564 application manual.

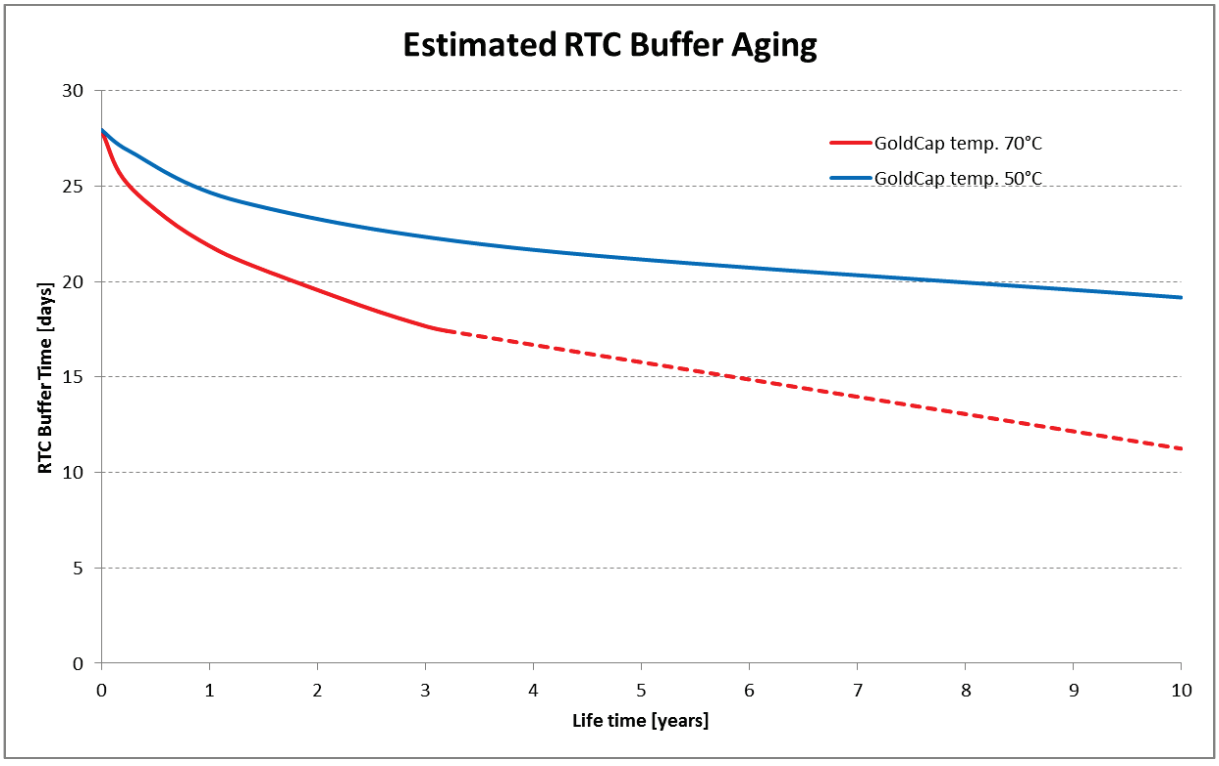
To get the maximum buffer time, it is necessary to have the system for at least 1 day powered on. This ensures that the buffer capacitors are fully loaded.

The buffer time depends on the ambient temperature and on how long the system is connected to the power supply.

4.1.2. RTC Buffer Aging

The RTC Buffer aging is depending of the temperature over the device life time. For a better understanding of the differing behavior of the GoldCap buffer integrated in your system, refer to the diagram below:

Figure 3: RTC buffer aging depending on temperature over the device life time



The solid line is estimated aging by reliability data and dashed line is assumption extension (GoldCap 100% of time at specified temperature, data provided by GoldCap manufacturer).

4.1.3. Optional Lithium Battery

In addition to the GoldCap, an optional lithium battery can be installed. The lithium battery must be ordered separately and will be factory-installed.

4.2. Product Images of FusionClient (shown as 15.6", other units similar)

Figure 4: Bottom view

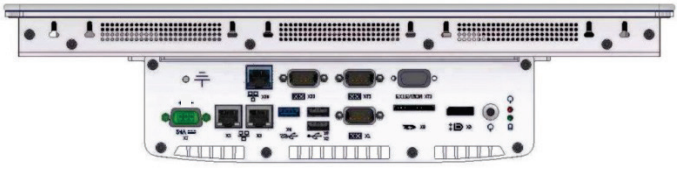


Figure 5: Right view

Figure 6: Front view

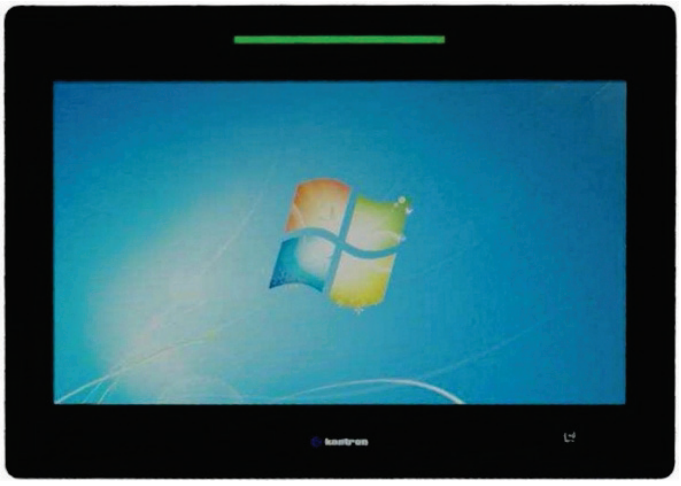


Figure 7: Left view

Figure 8: Top view

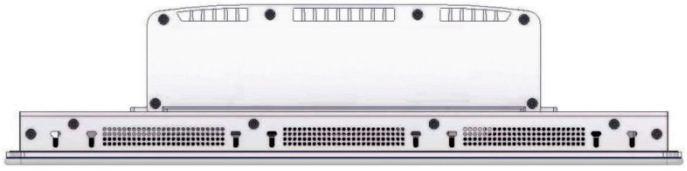
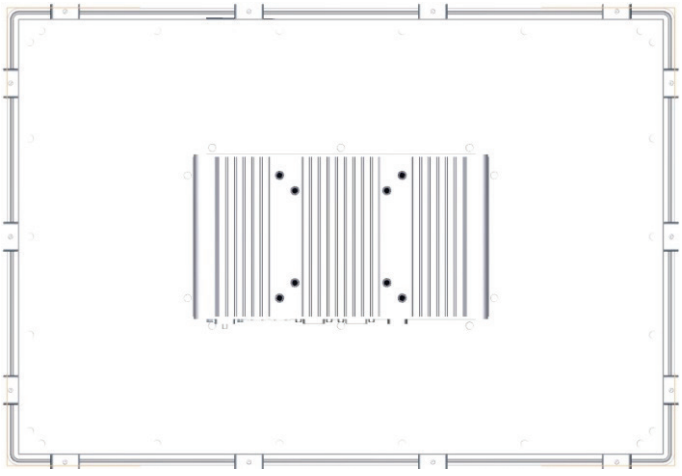
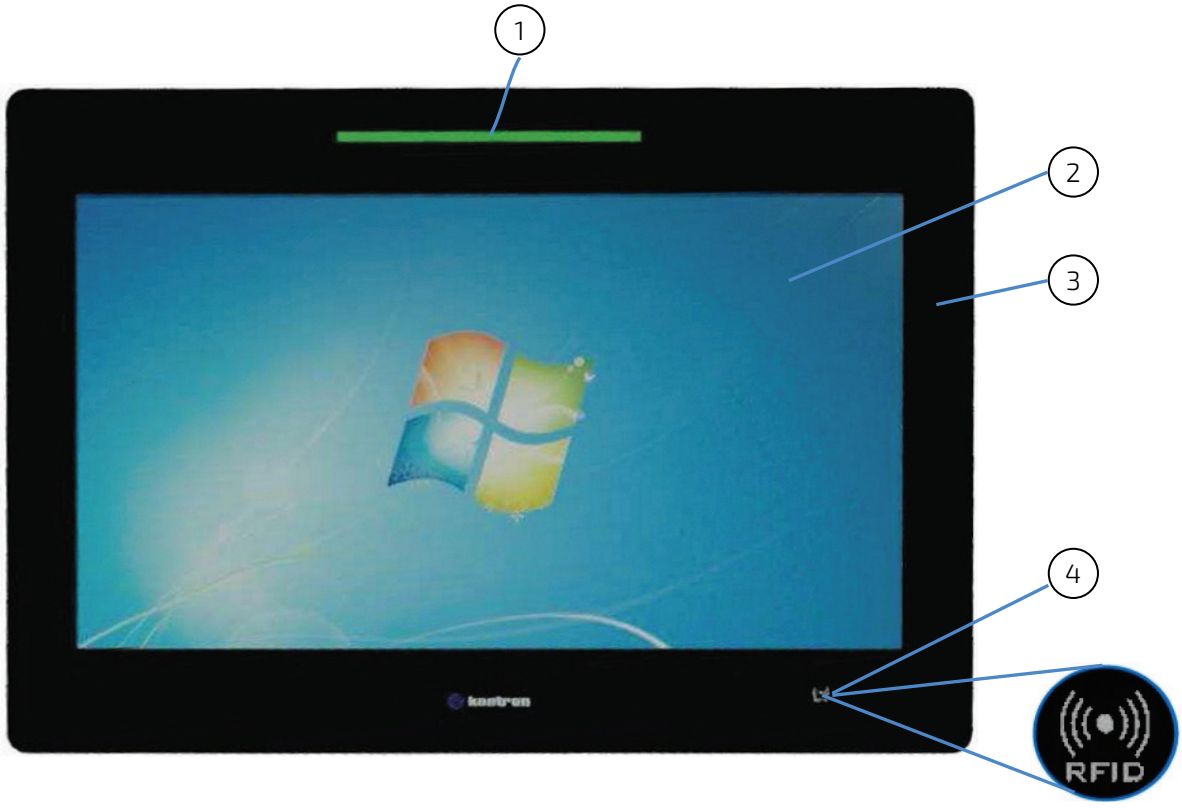


Figure 9: Rear view



4.3. Front View

Figure 10: Front view



1 Light bar

2 TFT display with touch screen and full glass front

3 Front bezel (border) with glass

4 RFID reader location (optional)
Detail: enlarged RFID logo

4.3.1. Front Side

The front side of the FusionClient system consists of a continuous glass front (Figure 10, pos.3), the display with the integrated projected capacitive touch screen and the anti-glare glass plate (Figure 10, pos.2).
For the outline dimensions refer to 8.2 “Mechanical Specifications”.

4.3.2. Display with Touch Screen

Depending on the FusionClient system ordered, the built-in display is a 12.1", 15.6", 18.5" or 21.5" size TFT display with corresponding **P**rojected **C**apacitive (PCAP) touch screen. The touch screen is USB connected. The surface of each display size is also mechanical protected through an appropriate anti-glare glass plate.

The glass plate provides physical and chemical properties to protect against accidental damage to the display during field applications such as accidental drops or scratches with tools.

The integrated touch screen registers contacts of fingers and allows the user to operate the system without a keyboard or a pointing device. The implemented touch technology allows 10-touch operations

with fingers or thin gloves. For information about the required touch screen driver refer to section 6.3 “Operating System and Hardware Component Drivers”.

For technical specification of the built-in display and touch screen refer to chapter 8/ “Technical Data”.

⚠CAUTION

Do not use a hard or a pointed object (like screw driver) to operate the touch screen, since it can damage the touch screen surface and can disturb the touch screen functionality. If any stylus is used make sure it is proper for PCAP sensitive surface.
The touch screen is covered with an anti-glare glass panel and care should be taken when cleaning it (see section "Touch Screen Care and Cleaning"

4.3.2.1. Projected Capacitive Touch Screen

Advantages of the PCAP:

- offers superior optical clarity,
- provides much higher positional accuracy and
- may detect multiple touches simultaneously.

The capacitive touch screen is factory-calibrated.

4.3.3. RFID Card Reader (Option)

Your FusionClient can optionally be equipped with a contactless RFID card reader. It is designed for reading chip data from electronic cards and documents (contactless reading of RFID data). The data between the HF-mPCIe RFID reader and a host system are transmitted via a USB comport emulation.

The transponder is readable over the whole operation distance between reader antenna and the specified maximum read distance. For technical specifications, refer to section 8.6.

Depending on your application installed the RFID card reader allows reading of chip cards for authentication functions or for services that requires user-specific authorizations (for access rights control).

4.3.4. Integrated WiFi Module (Option)

If ordered there is manufacturer pre-installed an 802.11 ac/b/g/n Wi-Fi USB module, which is backward compatible with 802.11a/b/g standard. With advanced 2T2R MIMO technology the WiFi module delivers ultimate wireless data rate for up to 300 Mbps.

The WiFi antennas are integrated behind the PCAP touch glass, so no external antenna is needed.

For technical specifications, refer to section 8.5.

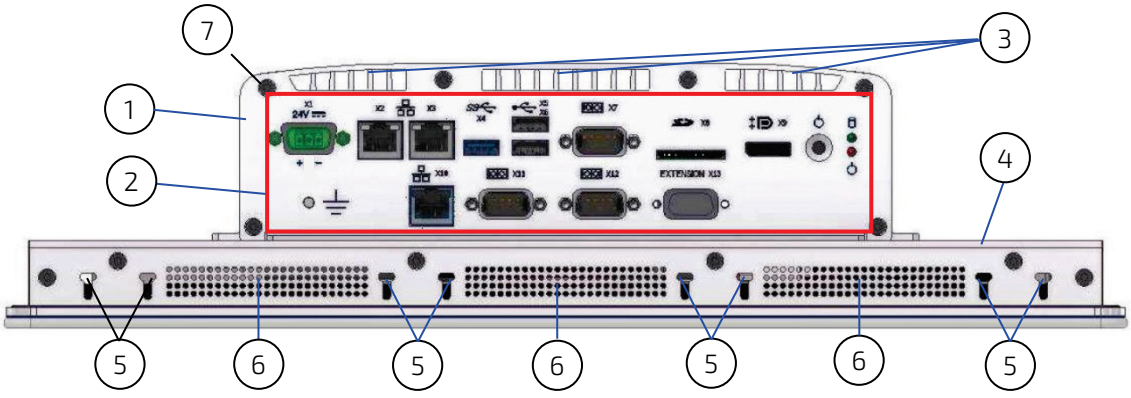
4.3.5. Light Bar

The light bar is equipped with multi-color LEDs and provides the following features:

- RGB color spectrum
- Permanent lighting and blinking modes configurable
- Blinking frequency and pulse duty factor configurable

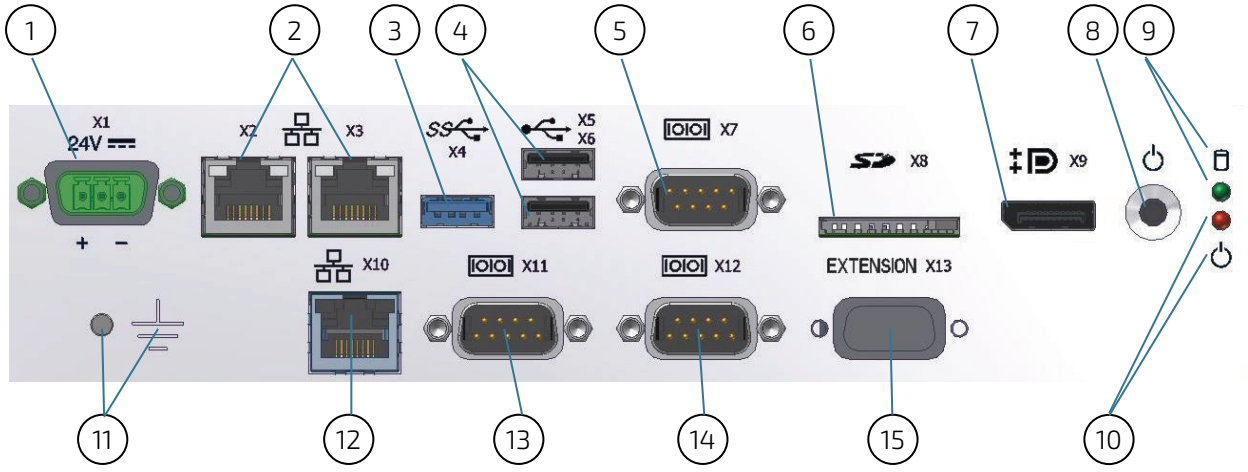
4.4. Bottom Side (with Interfaces)

Figure 11: Bottom side of the FusionClient (interface side; shown as a system with a 15.6" display



1 Computer base
2 Interfaces on the bottom side
3 Air openings at the bottom side of the computer base (cover with cooling fins)
4 Touch display unit
5 Mounting slots (without installed mounting clamps and screws)
6 Air openings on the bottom side of the touch display unit
7 6x screws that secure the front panel to the cover with cooling fins of the computer base

Figure 12: Power, control indicators, interfaces

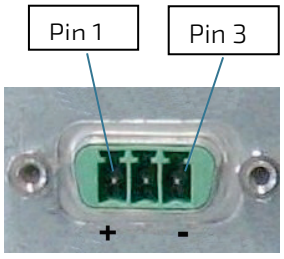


1 DC power input connector (X1)
2 2x Ethernet connector(X2, X3)
3 1x USB 3.0 (X4)
4 2x USB 2.0 (X5, X6)
5 1x serial port COM1, RS232 (X7)
6 1x SD card slot (X8)
7 1x DisplayPort (X9)
8 Power button
9 Storage activity LED
10 Power LED
11 Grounding stud and symbol
12 1x Ethernet connector (X10) (option)
13 1x serial port COM2, RS232, RS422 (X11) (option)
14 1x serial port COM3, RS485 (X12) (option)
15 Optional interface (X13)

4.4.1. (X1) - DC Power Input Connector

The 3-pin connector (X1, Figure 12, pos. 1 and Figure 13) provides the power connection of the FusionClient system to an appropriate DC main power supply (15-30 V DC) via a power cable connection (refer to section 6.1. and 6.1.1.). For pin assignments, refer to subsection 9.1.1.

Figure 13: Detail of the DC Power connector shown without Phoenix terminal



Pin	Signal Name
1	15-30 V DC (input)
2	Shield
3	0 V (input)

The external cable connector is a Phoenix PSC 1,5/ 3-M, 3-pin plug with an SCT-D-SUB 9-KG housing. This power plug is delivered with the Fusion Client. The mating connector is a Phoenix PSC 1,5/ 3-F connector.

The system is equipped with a reverse voltage protection (30 V max).

For connection to a DC power supply, refer to subsection 6.2.2.

For connection to an AC power supply by use of the optional AC/DC adapter refer to subsection 6.2.3.

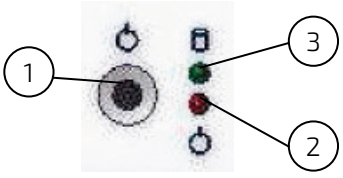
4.4.2. Grounding Stud

There is an M4 grounding stud (Figure 12, pos. 11). Please observe the requirements for grounding and connect this terminal as required.

⚠WARNING **Each FusionClient system is equipped with the stud marked with a grounding symbol (Figure 12, pos. 11) has to be grounded to an appropriate “common earth” connection point (refer to 6.2.2 “DC Power Connection”.**

4.4.3. Controls and Indicators

Figure 14: FusionClient - Controls and Indicators



1 Power Button
2 Power LED
3 Storage activity LED

4.4.3.1. Power Button and Power LED

The power button (Figure 12, pos. 8 and Figure 14, pos. 1) allows to power ON/OFF the system. It is located on the rear side of the device. By pressing the power button for longer than four seconds, a forced shutdown of the system will be initialized.

⚠CAUTION	Performing a forced shut down can lead to loss of data or other undesirable effects!

⚠CAUTION	Please note the BIOS setup settings (BIOS Setup/Advanced/South Cluster Configuration/Miscellaneous Configuration/State after G3 –S0 State). “Power On” is the default setting. Please also note the description in section 6.4 “System Self Protection against Ambient Overheating”.

The power LED (Figure 12, pos. 10 and Figure 14, pos. 3) is on green steady when power is applied to the system.

Prerequisite:
The FusionClient system has to be connected to an appropriate main power supply (DC).

⚠CAUTION

Even when the system is turned off via the power button, there are parts of the system still energized.

The unit is completely disconnected from the DC mains only when the power is removed.

The DC main power supply should be able to be switched off and on via a 2-pole isolating switch. The unit is only completely disconnected from the DC main power supply, when the DC power cord is disconnected either from the DC main or the unit. Therefore, the DC power cord and its connectors must always remain easily accessible.

As soon as external power is applied to the main input power connector, (X1, Figure 12, pos. 1), the FusionClient boots up and then starts the operating system and application where available.

To perform an orderly shutdown of the system, press the power button, and the system shuts down under the control of the operating system.

Once the system has been shut down, it can restarted by pressing power button (assuming that power is still applied to the main input power connector X1 (Figure 12, pos. 1).

4.4.3.2. Power LED and Storage Activity LED

The power LED (Figure 12, pos. 10) and the storage activity LED (Figure 12, pos. 9) which are located on the front side of the system indicate the system status.

The power LED (Figure 12, pos. 10) indicates the current system power state (S0, S3, S4, or S5) as shown in Table 5. The power LED will blink red if an error condition was detected (the system is held off). The color red is reserved for error state only.

Table 5: Colors of the power LED indicate the system status

System	System Status	Color of the Power LED
Fusion Client	Power off or PC failure	off
	System held off (i.e. temperature over 85 C, etc.)	red
	System at high temp (temperature over 80 C)	red*
	System in S4/S5	orange
	System in S3	orange*
	System in S0	green

*) The system power LED blinks with 1Hz (75% duty cycle).

Depending on the system configuration and storage drives activities, the storage activity LED (Figure 12, pos. 9 and
Figure 14, pos. 3) may be blinking as shown in Table 6.

Table 6: Storage activity LED colors indicate the storage media activity

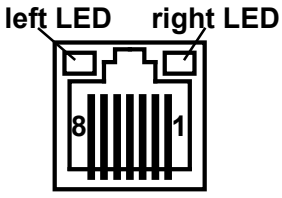
System	Activity of the installed Storage Media	Color of the storage activity LED

FusionClient	No activity on SATA / mSATA / SD-card	off
	SATA / mSATA activity	orange
	SD-card activity	green

NOTICE Activity on SD-card has a higher priority than SATA / mSATA.

4.4.4. X2/X3 - Ethernet Connectors

These connectors (X2/X3, Figure 12, pos. 2) are Gigabit Ethernet 10/100/1000 Mb/s, IEEE 1588 capable interfaces. The connectors are standard 8-pin RJ45 type connectors with status LEDs. These LEDs indicate the status of the LAN.

Pin#	Signal Name	J5, J6: LAN1, LAN2 [RJ45 (female)]
1	MDI0+	
2	MDI0-	
3	MDI1+	
4	MDI2+	
5	MDI2-	
6	MDI1-	
7	MDI3+	
8	MDI3-	

Left LED States	Link Activity State
Off	Link not active
Green (constant on)	Link active
Green (flashing)	Link active plus activity

Right LED State	Link Speed
Off	10 Base-T
Yellow (constant on)	1000 Base-T
Green (constant on)	100 Base-T

For pin assignment refer to subsection 9.1.6.

4.4.5. X4 - USB 3.0

The FusionClient provides one USB 3.0/2.0 interface. This connector (X4, Figure 12, pos. 3) allows connection of USB 3.0 or USB 2.0 compatible devices to the system.

For pin assignment, refer to subsection 9.1.5.

4.4.6. X5/X6 - USB 2.0

The FusionClient provides two USB 2.0/1.1 interfaces. These connectors (X5/X6, Figure 12, pos. 4) allow connection of USB 2.0 or USB 1.1 compatible devices to the system.

For pin assignment, refer to subsection 9.1.4.

4.4.7. X7 - RS232 Serial Port (COM1)

The RS232 interface (X7, Figure 12, pos. 5) provided as a 9-pin D-SUB connector, allows you to connect a serial device to the system.

For pin assignment, refer to subsection 9.1.2.

4.4.8. X8 – SD CARD Slot

This slot, (X8, Figure 12, pos. 6) provided as an SD/SDHC compliant interface is realized using a standard SD card connector. It is accessible at the bottom side of the FusionClient and is located between the serial interface (X7, RS232) and DisplayPort (X9). The SD card slot should only be used for service purposes.

- This SD card reader supports SD, and SDHC cards.
- SD card activity is indicated by the storage activity LED (Figure 12, pos. 9) of the FusionClient.
- This interface permits hot-plugging of the SD card. The system can also be booted from this interface.

Figure 15: FusionClient – SD card slot

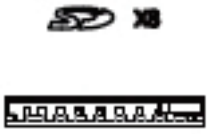


Figure 16: FusionClient – SD card (not included)

⚠CAUTION **To prevent data loss when removing the SD/SDHC card, it may not be removed during a read or write access [while the Power LED is "on"; refer to Notice of the Table 6)].**

To install an SD card please perform following steps:

1. Insert the SD/SDHC card into the SDCARD slot (see Figure 12, pos. 6) on the bottom side of the FusionClient.
2. Gently push the card into the slot until it snaps into place. When the card was inserted correctly, the storage activity LED (Figure 12, pos. 9) lights up.

Do not act with force when inserting the memory card. If the card is not inserted properly in the guide rails, remove the card from the slot and re-insert it with care.

3. The card is ready for use.

To remove a card, proceed as described below:

1. Gently push the SD/SDHC card until it clicks.
2. Release the card and it will be partially ejected.
3. Pull the card out from the slot.

4.4.9. X9 - DisplayPort

The DisplayPort (X9, Figure 12, pos. 7) provided as a compliant interface using a standard DisplayPort connector, allows to connect an external (digital) display to the system. For pin assignment, refer to subsection 9.1.3.

4.4.10. X10 – Optional Ethernet Connector

This optional connectors (X10, Figure 12, pos. 12) is a Gigabit Ethernet 10/100/1000 Mb/s, IEEE 1588 capable interface. The connectors is a standard, 8-pin RJ45 type connector.

For pin assignment, refer to subsection 9.1.6.

4.4.11. X 11 – Optional serial Port COM2 (RS232)

The RS232 interface (X 11, Figure 12, pos. 13), if ordered, is provided as a 9-pin D-SUB connector. It allows you to connect a serial device to the system. For pin assignment, refer to subsection 9.2.1.

4.4.12. X 12 – Optional serial Port COM3 (RS422/RS485)

The interface (X 12, Figure 12, pos. 14), if ordered can be provided on your FusionClient as an RS422 or RS485 serial port, 9-pin D-SUB connector (female). This port can be configured corresponding to your requirements at factory only. For RS422 pin assignment, refer to subsection 9.2.2 and for RS485 refer to 9.2.3 and 9.2.4.

The customized settings for RS485 mode communication allow the system's operation either in full duplex mode or in half duplex mode.

4.4.13. X13 - Optional Extension Port (D-Sub Type Connector)

Figure 17: Extension Port for optional interface

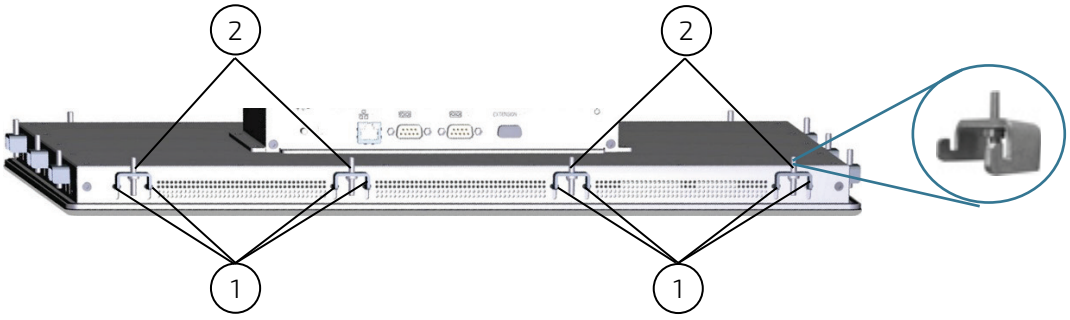
The optional interface on the bottom side of the FusionClient must be ordered separately. To add an optional interface to the system, the second mPCIe socket of the baseboard), will be used. This connection can be implemented at factory only.

If ordered, this D-Sub type extension port (X13, Figure 12, pos. 15) can be configured corresponding to your requirements at factory only.

4.4.14. Mounting Slots on the bottom Side of the Touch Display Unit 9.2.1

On the bottom side of the touch display unit are available two pairs of mounting slots (Figure 12, pos. 5 and Figure 18, pos. 1) for the installation of the provided mounting clamps with screws (Figure 18, pos. 2).

Figure 18: Bottom side of the touch display unit with installed mounting clamps (enlarged)



1 Pairs of mounting slots

2 Mounting clamp with screw

Note for mounting clamps:

The FC 215 and FC 185 system will be secured into a wall/panel by use of:

- four mounting clamps at the top and bottom side
- three mounting clamps at the left and right side

The FC 156 system will be secured into a wall/panel by use of:

- four mounting clamps at the top and bottom side
- two mounting clamps at the left and right side

The FC 121 system will be secured into a wall/panel by use of:

- two mounting clamps at the top and bottom side
- two mounting clamps at the left and right side

4.4.15. Air Openings on the bottom Side of the Touch Display Unit

The air intake openings (Figure 11, pos. 6) are situated on the bottom side of the touch display unit.

⚠CAUTION

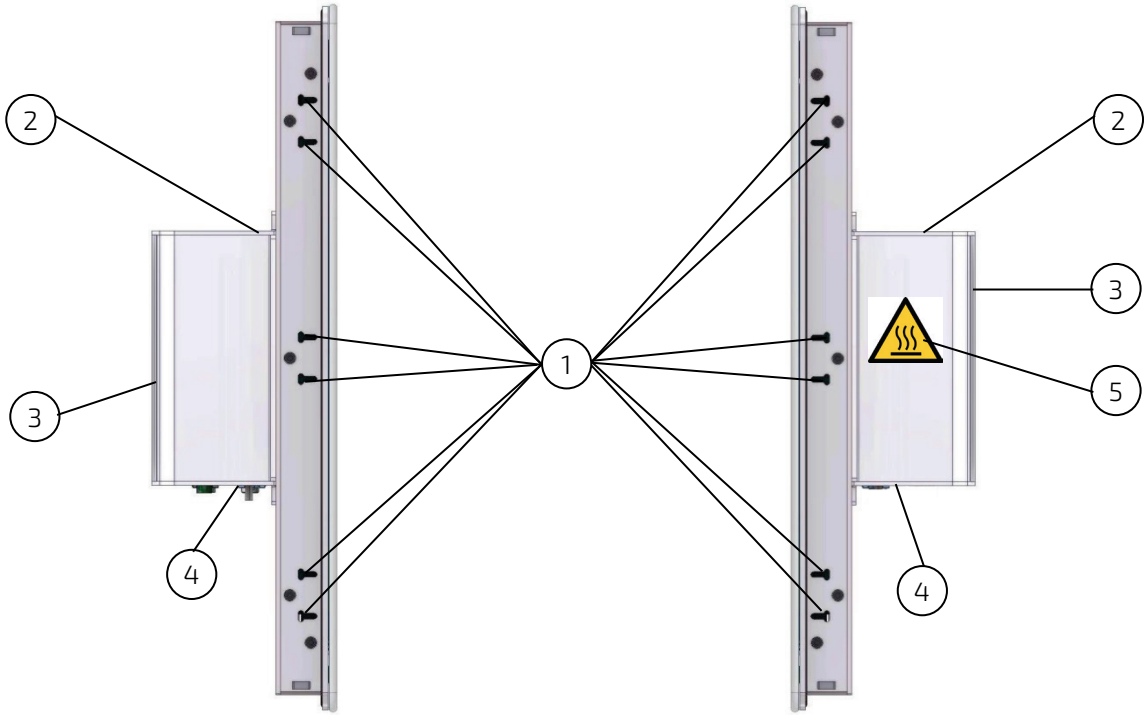
When powering on the FusionClient, make sure that the air intake and exhaust openings are not obstructed.

4.5. Left and Right Side View

On the left and right side of the system are situated mounting slot for installation of the mounting clamps with screws.

Figure 19: Left side of the FusionClient shown as FC 215

Figure 20: Right side of the FusionClient shown as FC 215



Legend for Figure 19 **and** Figure 20**:**

1 Mounting slots for installing the mounting clamps with screws

2 Top side of the computer base

3 Cooling fins of the computer base

4 Interface side (bottom)

5 Warning Label "Hot Surface"

Note for mounting clamps:

The FC 215 and FC 185 system will be secured into a wall/panel by use of:

- four mounting clamps at the top and bottom side
- three mounting clamps at the left and right side

The FC 156 system will be secured into a wall/panel by use of:

- four mounting clamps at the top and bottom side
- two mounting clamps at the left and right side

The FC 121 system will be secured into a wall/panel by use of:

- two mounting clamps at the top and bottom side
- two mounting clamps at the left and right side

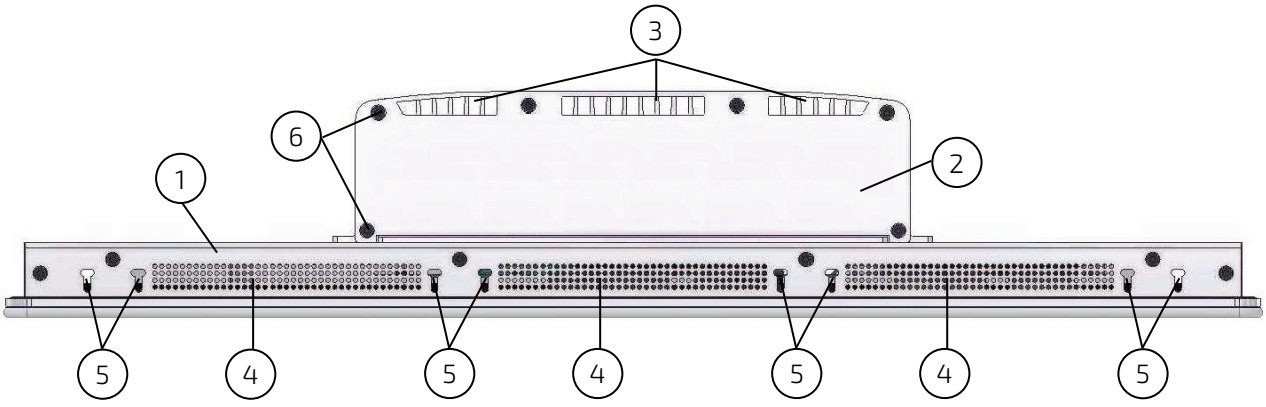
⚠CAUTION

Please observe the warning label "Hot Surface" shown in Figure 20 on the rear left side of the system. The chassis may be hot during operation and should not be touched without taking care.

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

4.6. Top Side

Figure 21: Top side of the FusionClient shown as FC 215



1 Touch display unit

2 Computer base

3 Air openings on the top side of the computer base

4 Air exhaust openings on the top side pf the touch display unit

5 Two pairs of mounting slots without installed mounting clamps and screws

6 6x screws that secures the top panel to the computer base (cover with cooling fins)

⚠CAUTION

When powering on the FusionClient, make sure that the air intake and exhaust openings are not obstructed and the cooling fins not covered by objects.

Note for mounting clamps:

The FC 215 and FC 185 system will be secured into a wall/panel by use of:

- four mounting clamps at the top and bottom side
- three mounting clamps at the left and right side

The FC 156 system will be secured into a wall/panel by use of:

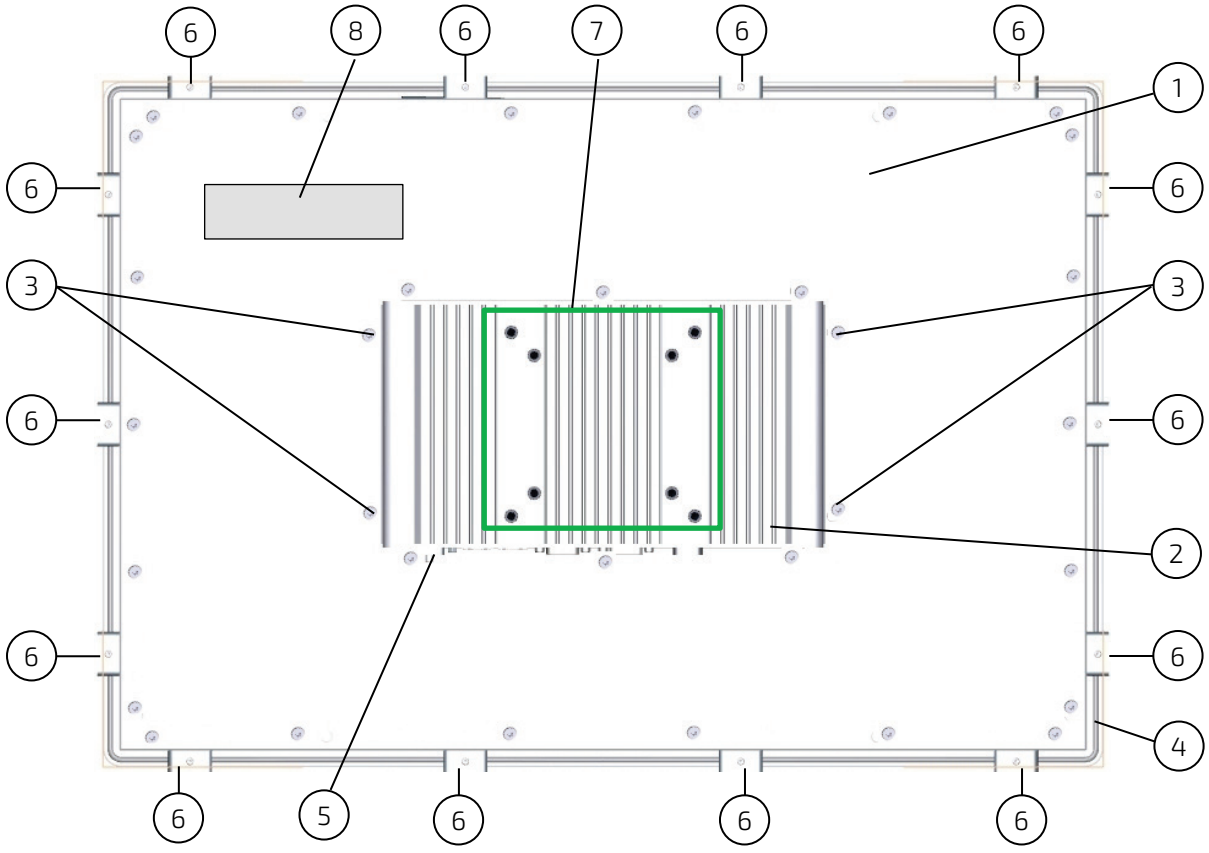
- four mounting clamps at the top and bottom side
- two mounting clamps at the left and right side

The FC 121 system will be secured into a wall/panel by use of:

- two mounting clamps at the top and bottom side
- two mounting clamps at the left and right side

4.7. Rear Side

Figure 22: Rear side of the FusionClient shown as FC 215



1 Rear side of the touch display unit
2 Cover of the computer base with cooling fins
3 Screws that secures the cover with cooling fins to the display unit
4 Gasket location (around the rear side of the touch display unit)
5 Interface side of the computer base
6 14 x mounting clamps with screws
7 4x M4 threaded blind holes (8mm max) for mounting of the optional VESA® 75/100 compliant mounting adapter
8 Type label

⚠CAUTION

When powering on the FusionClient, make sure that the air intake and exhaust openings are not obstructed and the cooling fins not covered by objects.

NOTICE

Please do not remove the screws marked with red in the picture (Figure 22 pos. 8).
Refer to the note for mounting clamps in section 4.5 “Left and Right Side View”.

⚠CAUTION

Please observe the warning label “Hot Surface” shown in Figure 22 on the rear side of the system. The chassis may be hot during operation and should not be touched without taking care.
The material on bottom surface of the enclosure interior where the FusionClient is to be mounted, shall keep at least flammability class UL 94-5VB. Don’t put

flammable materials under the device.

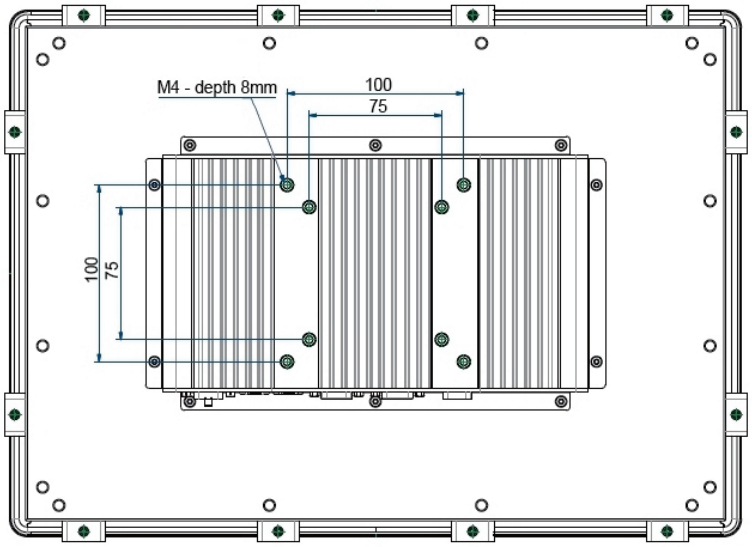
4.7.1. Gasket on the Rear Side

The gasket (Figure 22, pos. 4).at the rear of the touch display unit has to be present and in proper condition.

4.7.2. VESA 75/100 Mounting Holes

The FusionClient can be mounted to a VESA 75/100 compliant mounting system (in vertical position with the interfaces downwards). The FusionClient mounted to a VESA 75/100 compliant mounting system may be rotated to left or right in order to view landscape or portrait images if the installed operating system supports this feature. Ensure that the length of the cable connections to power and peripherals are sufficient for this operating position.

Figure 23: Detail with holes (M4 - depth 8 mm) for VESA 75/100 mounting



4.8. External AC/DC Adapter (Option)

The external AC/DC power adapter is delivered with two main power cords (1x for Europe and 1x for USA) and a and a custom designed wall mount kit.

Figure 24: Optional AC/DC adapter

For connecting the FusionClient to AC power mains refer to subsection 6.2.3 “AC Power Connection”.

5/ Installation Instructions

The FusionClient is designed to be mounted in the user's application by either of the following methods:

- Installation in an instrument panel or other cabinets by use of mounting clamps (preferred mounting method)
- Installation by a heavy duty VESA 75/100 compliant mounting system

⚠CAUTION

The FusionClient has to be installed and operated only by trained and qualified personnel.

We recommend that the mounting procedure is to be carried-out by two persons.

The mounting and operation of the FusionClient is allowed in horizontal (with the interfaces downwards) and vertical position. Vertical operating position (with the interfaces to the left or to the right) is only possible when supported by the OS used.

The unit must be placed such that there is sufficient space for connecting the cables to the I/O interface connectors.

Leave at least 5 cm (approx. 2") of free space around the unit to prevent the device from possibly overheating! Do not obstruct the air intake and exhaust openings.

The voltage feeds must not be overloaded. Adjust the cabling and the external overload protection to correspond with the rated voltage range indicated on the type label.

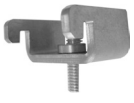
The type label is located on the rear left side of the system.

During the system operation, the cover of the computer base must be proper installed and secured by the corresponding screws.

5.1. Installation by use of the Mounting Clamps

The mounting clamps with screws (supplied), allow the easy and fast mounting of the FusionClient FC 121/FC 156/
FC 185/FC 215. The outline and mounting drawing can be found on our web site www.kontron.com.

Table 7: FusionClient - Specification for mounting

Dimensions for:	FC 121	FC 156	FC 185	FC 215
Cut-out for mounting to a wall/panel (W x H) [mm]	312 x 250 [mm] (12.28" x 9.84")	398 x 282 [mm] (15.67" x 11.02")	464 x 321 [mm] (18.27" x 12.64")	529 x 357 [mm] (20.83" x 14.06")
Thickness of the mounting wall/panel for proper mounting [mm]	1.5 - 6			
Clamp with screws for mounting the FusionClient to a wall/panel	8x	12x	14x	
				
Required Tool	Allen Wrench 2 mm			
Proper Torque	Tighten the screws with a torque of 0.7 Nm (start with 0.4 Nm and increase to 0.7			

	Nm)
Mounting position	Ensure the vertical and horizontal alignment of the system/display unit.

NOTICE

Refer to the note for mounting clamps in section 4.5 “Left and Right Side View”.

NOTICE

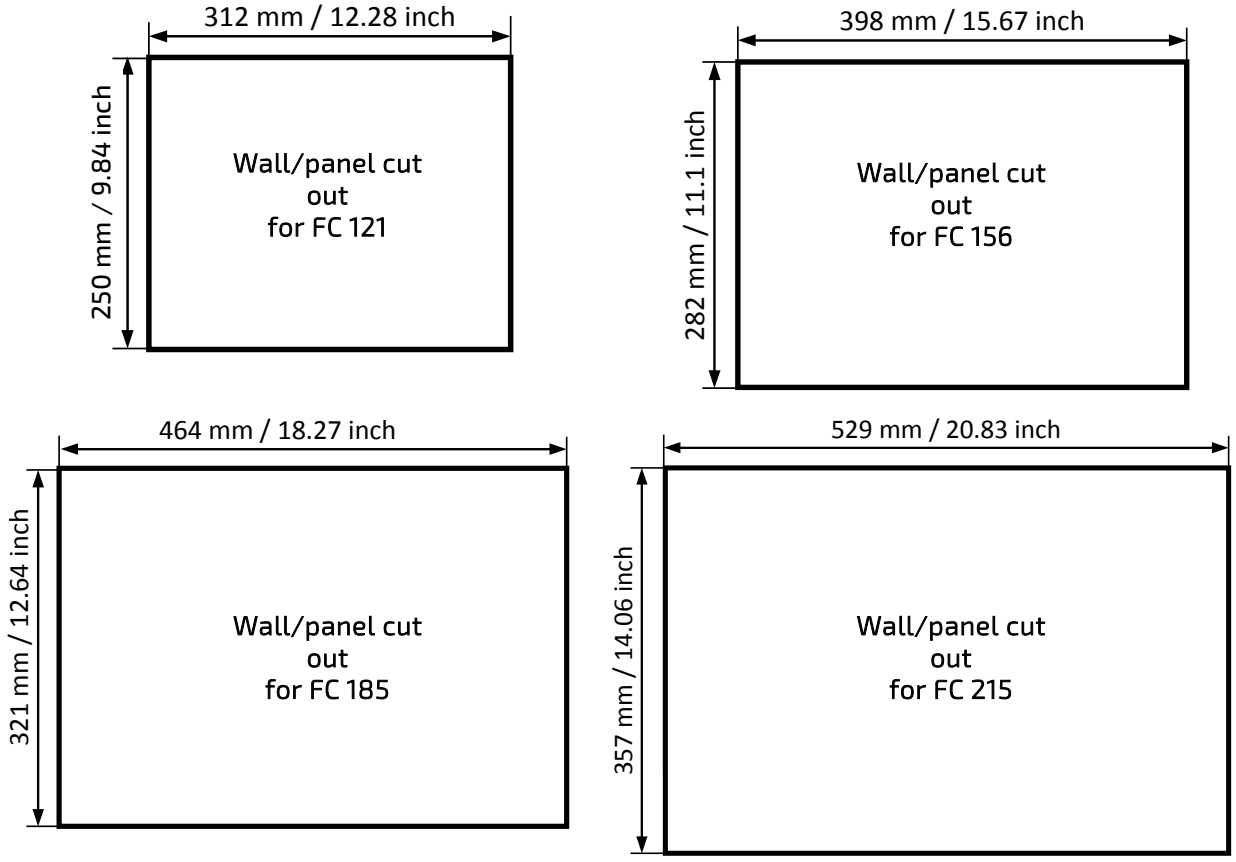
In order to ensure IP65 front sealing against dust and water, *mount the system on a non-textured surface.*

Before you install the FusionClient system into a panel or a wall, verify the perfect condition of the gasket at the rear of the front bezel.

The gasket has to be in place without surface imperfections/defects and dirt.

Ensure the vertical and horizontal alignment of the system/display unit.

Figure 25: Wall/panel cutout dimensions for FusionClient systems

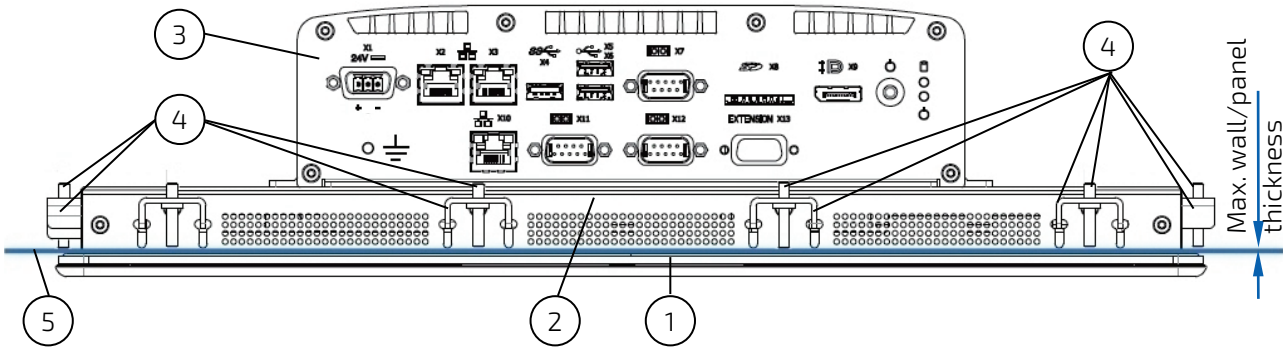


⚠WARNING

The glass front of the FusionClient is fragile. Handle with care to prevent personal injury or material damage. Never place the FusionClient on the edges or corners of the glass front. Always use two hands when carrying the device.

The glass front of the FusionClient is provided with edge protection and a protective foil. Only remove this protective material after the installation of the FusionClient.

Figure 26: Wall/panel mounting of the FusionClient by use of the mounting clamps



1 Front panel of the FusionClient with gasket
2 Touch display unit
3 Bottom side of the computer base
4 Mounting clamps with screws for system installation into a wall/panel
5 Example of wall for system installation (with specified max. wall thickness)

To mount the system to a wall or to a panel, follow these steps:

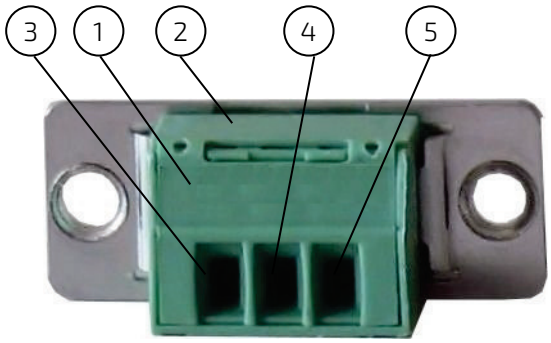
1. Depending on the dimension of the display enclosure of your FusionClient, prepare a cutout in the wall/panel. The maximum thickness of the wall/panel is 6 mm. Refer to Table 7 and Figure 25 for the wall/panel cutout dimensions or to the corresponding mechanical drawings for your FusionClient on our web site www.kontron.com.
2. The system must be properly powered down and disconnected from the power source and peripherals.
3. The wall/panel where you intend to install the system must be accessible from both sides (front as well as rear). The material strength and stiffness must be sufficient to hold the fusion client unit.
4. Insert the system into the wall/panel cutout from the front.
5. In order to ensure the protection class IP65 on the front side in the installed condition, the contact surface with the gasket must be clean and flush.
6. Hook the mounting clamps with screws (Table 7) from the rear side of the panel into the corresponding pairs of slots as shown in Figure 18. Refer also to Figure 19 and Figure 20 pos. 1, and Figure 21, pos. 4) of the touch display unit enclosure.
7. The system must be attached firmly by tightening the screws (refer to Figure 26, pos. 4 and Figure 18, pos. 2). Refer also to the mounting requirements included in Table 7. Always tighten screws in pairs on opposite sides of the front panel. Repeat the tightening sequence two times and increase the torque from 0.4 to 0.7 Nm.

6/ Starting Up

6.1. DC Power Terminal

The FusionClient 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: PSC 1,5/ 3-F.

Figure 27: Phoenix power plug terminal



1 3-pin Phoenix plug terminal
2 Cover over the slotted pan head screws
3 Location for inserting the "15-30 V DC input" wire
4 Location for inserting the "shield" wire
5 Location for inserting the "0 V (input)" wire

6.1.1. Cabling

For the pin assignment Phoenix power plug terminal refer to subsection 9.1.1 "(X1) Power Input Connector".

1. Cut the required length three isolated wires (1 mm^2) AWG18 and strip each end 5 –7 mm.
2. Twist the striped wire-ends and provide them with ferrules.
3. Open the cover (Figure 27, pos. 2) to have access to the slotted pan head screws.
4. Loosen the slotted pan head screws 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 Figure 27, Figure 13 or subsection 9.1.1 "(X1) Power Input Connector"].
6. Fasten the screws to secure the wires into the clamps of the plug terminal.
7. Close the cover (Figure 27, pos. 2).

6.2. Connecting to Power

Before using your system, you should first become familiar with the system components and check that everything is properly connected. Following a proper cabling procedure will prevent a false power-on condition, which could result in unit operational failure.

⚠WARNING The rated voltage range of the mains supply must correspond to the value on the type label.

The FusionClient systems can be connected to a DC power source or optionally via an AC /DC powe adapter to an AC main power. The DC power connector (Figure 12, pos. 1) is located on the bottom side of the system.

6.2.1. Behavior of the System when Connecting to Power

As soon as external power is applied to the input power connector (refer to Figure 12, pos. 1 and Figure 13) the FusionClient boots up and the operating system and applications, where available, start immediately. Refer to 4.4.3.1 “Power Button and Power LED”.

6.2.2. DC Power Connection

Please observe the safety requirements given in chapter 1/ “General Safety Instructions for IT Equipment”.

⚠WARNING

The system must be connected only to a LPS (Limited Power Supply) DC mains power supply complying with the requirements of EN 60950-1.
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. It must be UL-listed and correspond to the required current and voltage for the FusionClient (refer to the type label).

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

Ensure that a short-circuit (overcurrent) protection, is provided as part of the building installation. Install only in accordance with national and local wiring regulations.

When you install or replace the system the ground connection must always be made first and disconnected last.

We recommend that the power cable should be the last cable attached to the system.

To connect the FusionClient to a corresponding DC main power supply, please perform the following steps:

1. The wires used for power connections must be clearly marked (+/-/grounding) to ensure that they will be proper connected to the DC connector of the FusionClient and to the main power source, corresponding the signals marked (refer to Figure 13).

2. Ensure that the DC power source is switched off via a disconnecting device (circuit breaker), in order to ensure that no power is flowing from the external DC power source during the connection procedure.
3. Connect at first the wire for the grounding stud" (Figure 12, pos. 11) to an appropriate “common earth" connection point.
4. Connect the Phoenix power terminal prepared as described in subsection 6.1.1 "Cabling" to the DC input connector (Figure 12, pos. 1, marked X1) of the FusionClient. The DC input connector is located on the front side and is marked “24 VDC”.
5. Connect the other ends of the DC power wires to the connections of the DC main power supply. Pay attention to the polarity of the connections.
6. Switch on the disconnecting device (circuit breaker) in order to apply voltage to the terminals of the power wires.

6.2.3. AC Power Connection

Please observe the safety requirements given in chapter 1/ "General Safety Instructions for IT Equipment".

⚠WARNING

Use only a LPS (Limited Power Supply) power supply complying with the requirements of EN-60950-1 to connect the system to an AC power source.

The AC power cable must correspond to the requirements of the country where the system is used.

Make sure that the mains power supply (power outlet) is properly grounded and that the power cord is in perfect condition without any visible damage. An ungrounded power supply is not permissible.

The AC power cable of the AC/DC adapter is the disconnecting device. For this reason the socket for the power supply must always be mounted close to the device and be easily accessible.

The FusionClient system will be connected to an AC power source via the optional AC/DC adapter (refer to Figure 24).

1. Connect the 3-pin DC connector of the AC/DC adapter to the appropriate DC power connector (Figure 12, pos. 1) of the FusionClient. The DC power connector of the system is located on the bottom side and is labeled "15-30V DC". Make sure the connector is securely locked in place.
2. Connect the AC power cord to the AC/DC adapter.
3. Plug the AC connector of the adapter into an AC wall outlet of the AC power source.

6.3. Operating System and Hardware Component Drivers

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

If you have ordered your FusionClient 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 power it on for the first time.

If you have ordered the FusionClient 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.

6.4. System Self Protection against Ambient Overheating

The FusionClient system is designed to be protected against ambient overheating.

During operation the system will initialize automatic shutdown (emulation of short press of the power botton, if the internal temperature reaches the limit of 83°C (measured on the internal temperature sensor). This could happen if the ambient temperature around the system exceeds (e.g. because of external reasons) the maximum specified ambient temperature of 50°C. In case that the internal temperature reaches limit of 85°C (measured on the internal temperature sensor), the system will perform an emergency turn off. In case of emergency turn off the running applications will not be closed properly (because of the device's turn off).

What happens after such automatic shutdown or emergency turn off?

The system should cool down until the internal temperature decrease below: 80°C.
The FusionClient system turns on automatically and performs a system start as soon as the internal temperature decreases to 80 °C.

Please observe that as long as the internal temperature is too high:

- the color of the power LED (Figure 12, pos. 10 and Figure 14, pos. 2) on the bottom side of the system indicates the current power state and signalizes the emergency state of the system (refer to subsection 4.4.3.2 "Table 5").

Please observe that as long as the internal temperature is too high, the color of this LED stays permanently red.

- the function of the power buttons is deactivated.
- the settings in BIOS Setup/Advanced/South Cluster Configuration/Miscellaneous Configuration/State after G3 –S0 State with option settings: Power on (default)/ Power off) will also be ignored.

When the system is turned off via the self protection against ambient overheating function, any unsaved data will be lost. [The system is powered off immediately (like a "forced off" via power button) and enter into 5-volt standby mode as long as the internal temperature is too high.]

7/ Maintenance and Cleaning

Kontron systems require minimal maintenance and care to keep them operating correctly.

- Occasionally wipe the FusionClient with a soft dry microfiber cloth.
- You should only remove persistent dirt by use of a soft, slightly damp cloth and mild detergent.

7.1. Touch Screen Care and Cleaning

NOTICE

The touch screen is covered by an anti-glare glass plate and care should be taken when cleaning it. The front side of the touch display unit is sealed against dust and liquids.

The touch screen is protected by an anti-glare glass surface. Care should be taken to avoid using sharp objects such as knife, pen or pencil tips. Sharp objects may permanently damage the surface of the anti-glare glass plate.

Mild detergent and water is recommended for cleaning the touch screen. Use of strong solvents must be avoided. Wet the glass plate with a microfiber cloth lightly moistened with warm water and mild glass cleaner.

7.2. Replacing the Lithium Battery

NOTICE

The lithium battery is located on the installed carrier board and is not a serviceable part. Please contact Kontron support if the lithium battery needs to be replaced.

8/ Technical Data

System		FC 121	FC 156	FC185	FC215
TFT LCD Display	Size (diagonal)	12.1"	15.6"	18.5"	21.5"
	Active area (H x V) [mm]	261.1 x 163.2	344.2 x 193.5	409.8 x 230.4	476.6 x 268.1
	Resolution (H x V) [pixel]	1280 x 800	1366 x 768 (HD)	1366 x 768 (HD)	1920 x 1080 (Full HD)
	Pixel Pitch (H x V) [µm]	204 x204	252 x 252	300 x 300	248 x 248
	Colour Depth	16.7M colors	16.7 M colors	16.7 M colors	16.7 M colors
	Backlight	LED	LED	LED	LED
	Brightness [cd/m2]	400	400	450	300
	Control Signal	24 bit/s LVDS	24 bit LVDS	24 bit LVDS	24bit LVDS
	Viewing Angle [°] (r / l / u / d)	88/88/88/88	85/85/80/80	85/85/80/80	89/89/89/89
	Contrast ratio	1000:1	500:1	1000:1	5000:1
	Response Time [msec]	10	8	5	25
Touch Screen		Projected Capacitive	Projected Capacitive	Projected Capacitive	Projected Capacitive
Installed COM Express Module and Baseboard		Baseboard with COM Express®-cBTi6 module			
Processor		Intel® Atom E3815/E3825/E3826/E3827/E3845			
Memory		Depending on the installed CPU: Up to 2x 204-pin SODIMM dual-channel DDR3L-1600 max. up to 16 GB			
BIOS		Phoenix uEFI			
External Interfaces (bottom side accessible)		2x USB (2.0)			
		1x USB (3.0)			
		2x LAN (10/100/1000 Mbps)			
		1x DisplayPort			
		1x SD card slot			
		1x serial port (RS232)			
Optional interfaces (bottom side accessible)		1x LAN (10/100/1000 Mbps) 1x serial port (RS232) 1x serial port (RS422/RS485 (galvanic isolated)			
Operating element (on the bottom side)		Power button			
LED Indicators (on the bottom side)		Power LED Storage activity LED			
DC IN Power Plug (on the bottom side)		3 pin Phoenix connector On the bottom side			
Power		DC: external 15-30 V power source (limited power source)			

	AC: via the optional external AC/DC adapter (limited power source) not included
Lithium Battery (option)	Type: CR2032; 3.0 V; 0.22Ah;
VESA 75/100	On the rear
Protection Class	IP20 rear IP65 front (only mounted to a wall/panel)

The table is continued on the next page.

Options	
Internal Drives	1x 2.5" SATA SSD 1x mSATA SSD (full size, half size
RFID	IDS-R13MP HF/13.56MHz ISO15693
WiFi	802.11a, 802.11b, 802.11g, 802.11n
Serial interfaces	2x DB punch out for1x RS232 and 1x galvanic isolated RS422/RS485
FieldBus	Via internal mPCIe card (full size, half size)

8.1. Electrical Specifications

⚠CAUTION

Hint for DC power connection:
The FusionClient must be connected only to a LPS (Limited Power Supply) DC mains power supply complying with the requirements of EN 60950-1.

Hint for AC power connection:
Use only a LPS (Limited Power Supply) power supply complying with the requirements of EN 60950-1 to connect the FusionClient to an AC power source.

FusionClient	FC 121	FC 156	FC 185	FC 215
Power	15-30 V DC			
Power consumption	3.0 A max.	3.0 A max.	3.5 A max.	3.5 A max.

8.2. Mechanical Specifications

For detailed mechanical dimensions, please see the outline dimensions drawings on the web site www.kontron.com.

FusionClient	FC 121	FC 156	FC 185	FC 215
Height	266 mm (10.47")	298 mm (11.73")	337 mm (13.27")	373 mm (14.69")
Width	328 mm (12.91")	414 mm (16.3")	480 mm (18.9")	545 mm (21.46")
Depth (total)	97.1 mm (3.82")	97.1 mm (3.82")	97.1 mm (3.82")	97.1 mm (3.82")
Depth (without front plate)	89.5 mm (3.52")	89.5 mm (3.52")	89.5 mm (3.52")	89.5 mm (3.52")
Weight	5.0 kg (11.02 lbs)	5.9 kg (13.00 lbs)	8.3 kg (18.29 lbs)	9.5 kg (20.94 lbs)
Display unit	Aluminum plate			
Chassis (computer base cover)	Aluminum with fins and holes for VESA75/100 mounting			

Dimension of the touch display unit

FusionClient	FC 121	FC 156	FC 185	FC 215
Aluminum front bezel (W x H)	328 x 266 [mm] (12.91" x 10.47")	414 x 298 [mm] (16.3" x 11.73")	480 x 337 [mm] (18.9" x 13.27")	545 x 373 [mm] (21.46" x 14.69")
Frontal cut out for display (W x H)	261.1 x 163.2 [mm] (10.28" x 6.43")	344.2 x 193.5 [mm] (13.55" x 7.62")	409.8 x 230.4 mm] (16.13" x 9.07")	476.6 x 268.1 [mm] (18.76" x 10.56")
Wall/panel mounting cut out (W x H)	312 x 250 [mm] (12.28" x 9.84")	398 x 282 [mm] (15.67" x 11.02")	464 x 321 [mm] (18.27" x 12.64")	529 x 357 [mm] (20.83" x 14.06")

Figure 28: Mechanical specification - Front view of the FC 121

Figure 29: Mechanical specification - Rear view of the FC 121

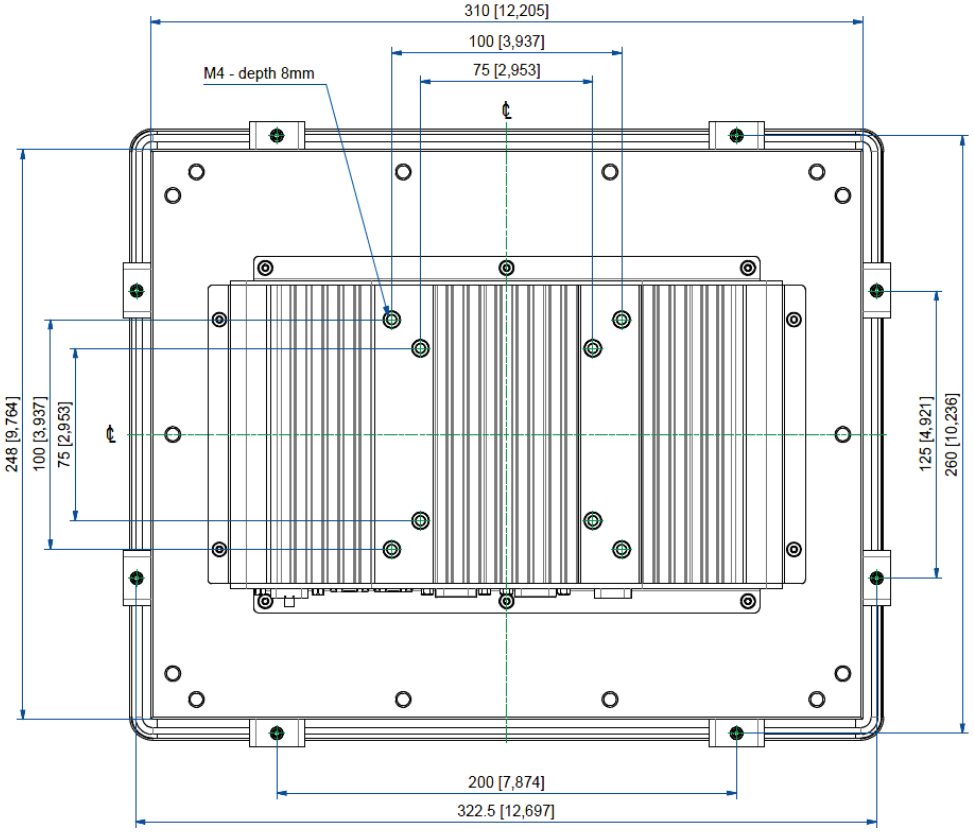


Figure 30: Mechanical specification - Side view of the FC 121

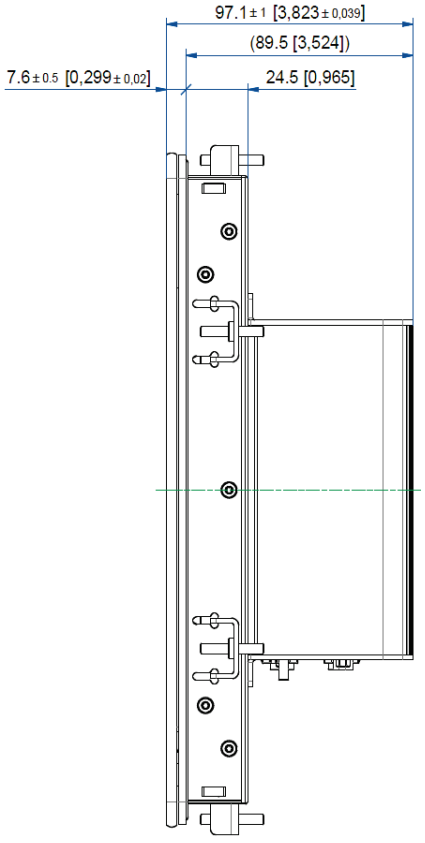


Figure 31: Mechanical specification - Front view of the FC 156

Figure 32: Mechanical specification - Rear view of the FC 156

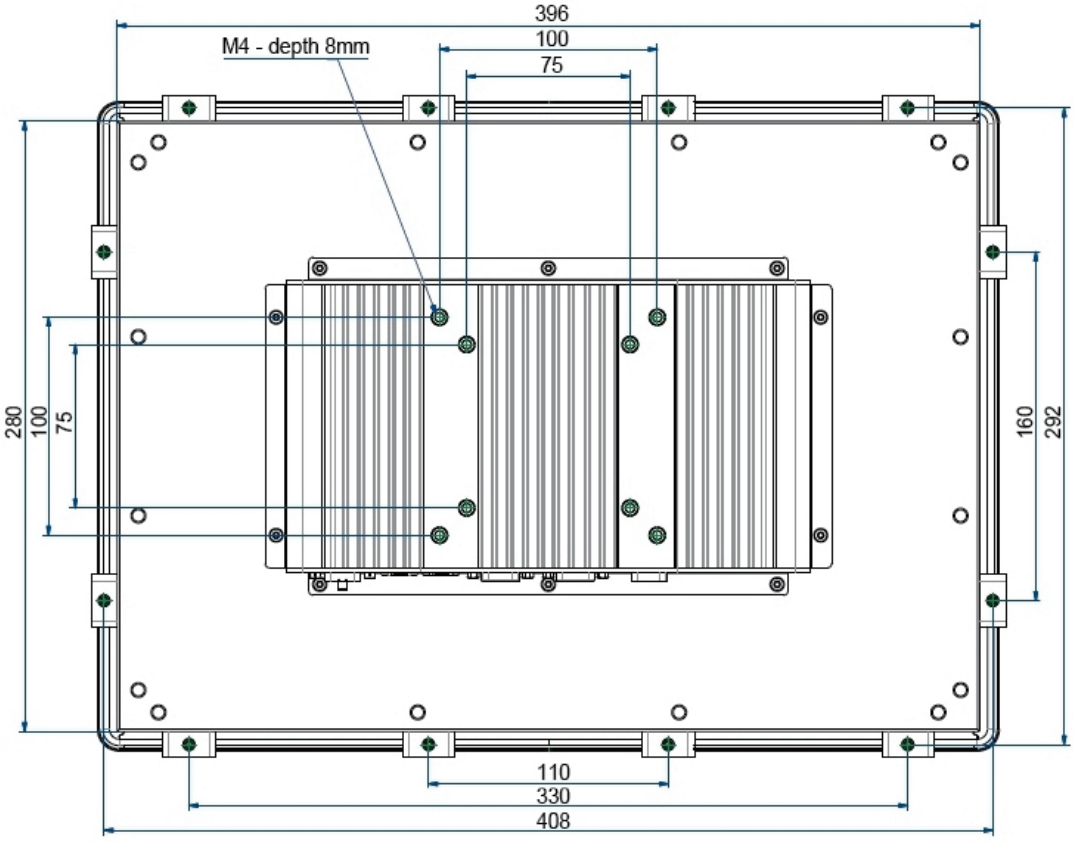


Figure 33: Mechanical specification - Side view of the FC 156

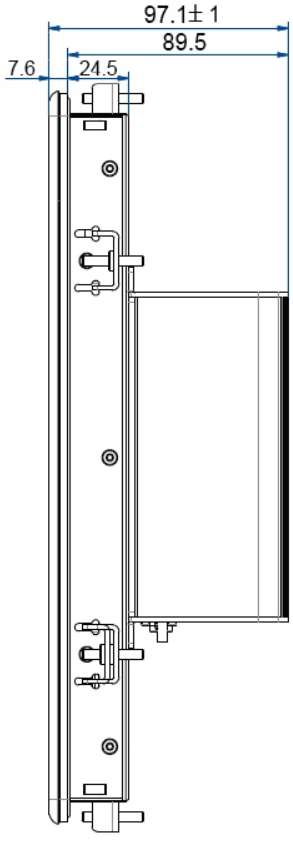


Figure 34: Mechanical specification - Front view of the FC 185

Figure 35: Mechanical specification - Rear view of the FC 185

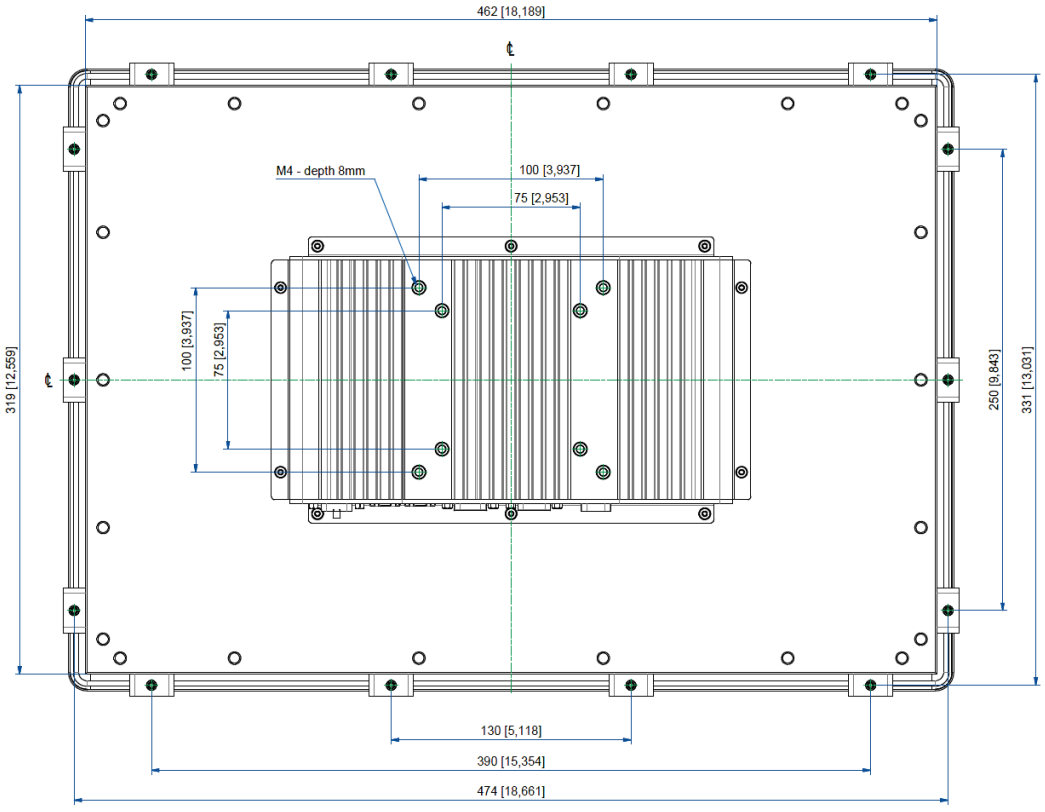


Figure 36: Mechanical specification - Side view of the FC 185

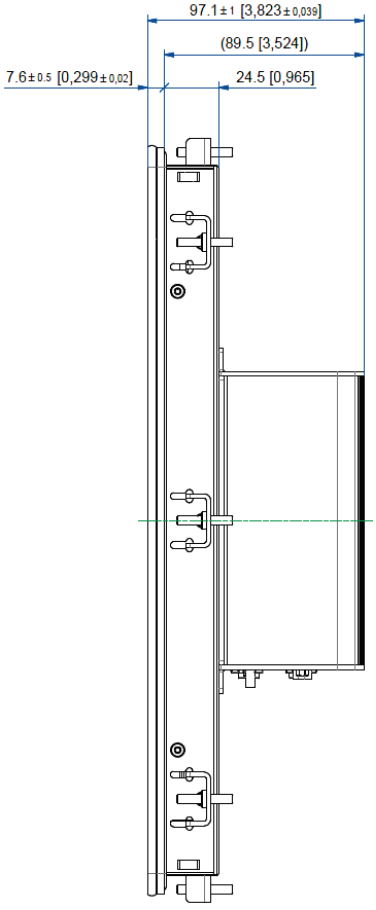

97.1 ± 1 [3,823 ± 0,039]
(89.5 [3,524])
7.6 ± 0.5 [0,299 ± 0,02]
24.5 [0,965]

Figure 37: Mechanical specification - Front view of the FC 215

Figure 38: Mechanical specification - Rear view of the FC 215

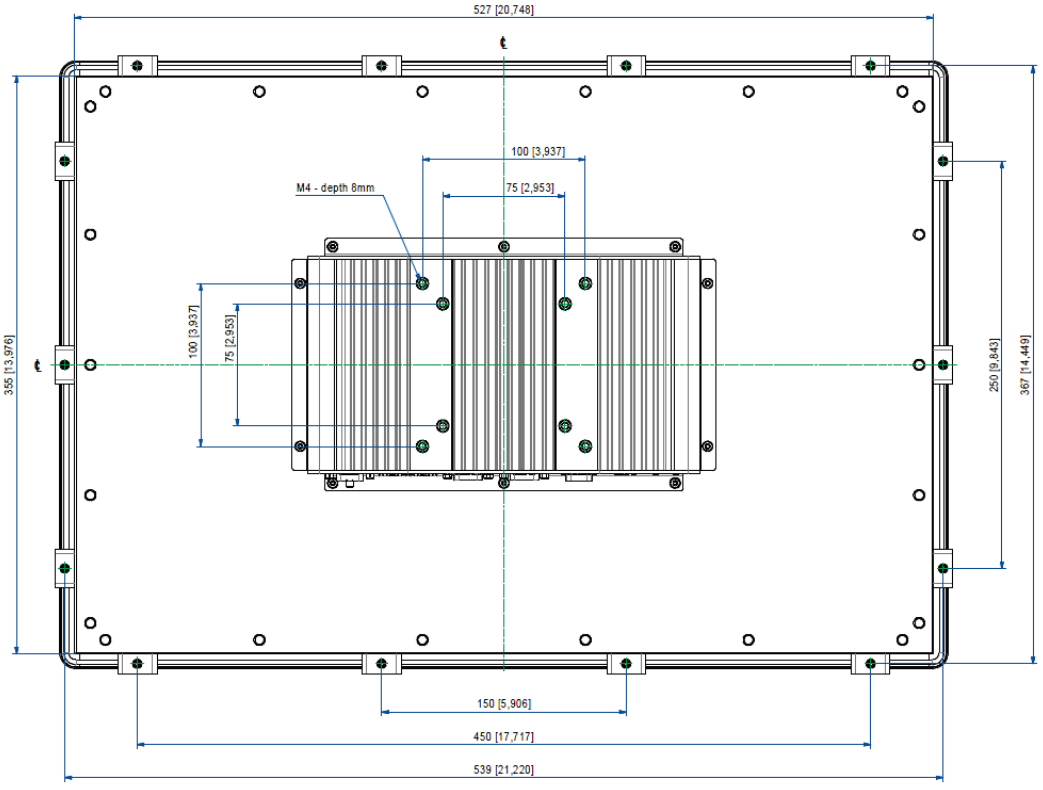
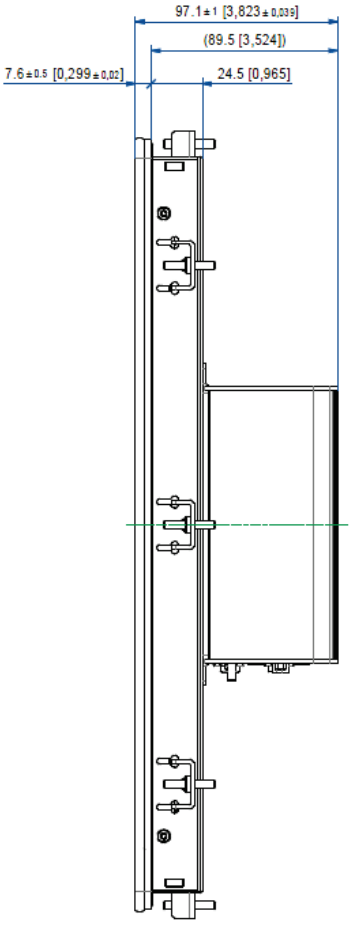


Figure 39: Mechanical specification - Side view of the FC 215



8.3. Environmental Specifications

Environmental Specifications	FusionClient
Thermal management	Convection cooling (fanless)
Temperature (operating)	0 °C to +50 °C (32 °F to 122 °F)
Temperature (storage/transit)	-20 °C to +70 °C (-4 °F to 158 °F)
Relative humidity (non operating)	93 % @ 40 °C (non condensing) acc. to IEC 60068-2-78
Shock (operating)	15 G, 11 ms, half sine, acc. to IEC 60068-2-27:2010-2
Shock (non operating)	30 G, 11 ms, half sine, acc. to IEC 60068-2-27:2010-2
Vibration (operating)	10 Hz to 500 Hz, 1G/3axes acc. to IEC 60068-2-6:2008-10
Vibration (non operating)	10 Hz to 500 Hz, 2G/3axes acc. to IEC 60068-2-6:2008-10
Max. operation altitude	3,000 m (9842,52 ft.)
Max. storage/transit altitude	4 , 572 m (15,000 ft.)

8.4. CE-Directives, Standards and Approvals

CE Directive	
Elektrical Safety	General Product Safety Directive (GPSD) 2001/95/EC Low Voltage Directive (LVD) 2014/35/EU
Electromagnetic Compatibility (EMC)	EMC Directive 2014/30/EU RED Directive 2014/53/EU
CE Marking	CE Directive 93/68/EEC
RoHS II Directives	2011/65/EU

Elektrical Safety	Harmonized Standards
EUROPE	Information technology equipment - Safety - Part 1: General requirements EN 60950-1
U.S.A. / Canada	Certified to IEC/UL 60950-1 + CAN/CSA C22.2 No. 60950-1
CB Report	IEC 60950-1(ed.2);am1, am2

EMC	Harmonised Standards
EU	Generic standards - Emission standard for residential, commercial and light-industrial environments (Emission): EN 61000-6-3; EN 301 489-17; EN 301 489-1 EN 55011, EN 55022: Class B (Radiated and Conducted Emissions) Generic standards - Immunity for industrial environments (Immunity): EN 61000-6-2; EN 301 489-17; EN 301 489-1
U.S.A. / Canada	FCC (CFR) 47 Part 15 Subpart B Class B

8.5. WiFi Specification (Option)

WiFi	Specification
IEEE WLAN Standard	802.11a, 802.11b, 802.11g, 802.11n
Interface	USB 2.0
Antenna	2T2R

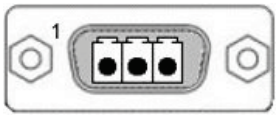
8.6. RFID Specification (Option)

RFID	Specification
RFID Reader	IDS-R13MP HF/13.56MHz ISO15693
Internal antenna	Internal connected
Read distance (d Peak)	0-20 mm

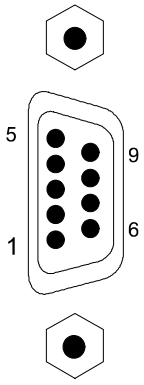
9/ Standard Interfaces – Pin Assignments

Low-active signals are indicated by a minus sign.

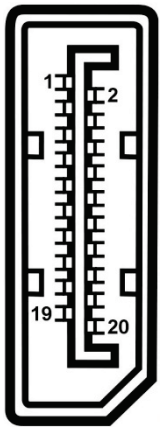
9.1.1. (X1) Power Input Connector

Pin	Signal Name	3-pin POWER SUBCON (male)
1	15-30 V DC (input)	
2	Shield	
3	0 V (input)	

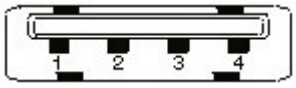
9.1.2. (X7) COM1 Serial Interface RS232

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)	

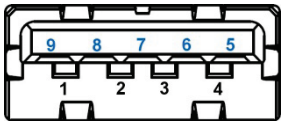
9.1.3. (X8) DisplayPort

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

9.1.4. USB 2.0 Port (X5, X6)

Pin	Signal Name	4-pin USB Connector Typ A Version 2.0
1	VCC used (900 mA max.)	
2	Data-	
3	Data+	
4	GND (ground for power return)	

9.1.5. USB3.0 Port (X3)

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 (ground for power return)	8	StdA_SSTX-	
		9	StdA_SSTX+	

9.1.6. Ethernet Connectors (X2, X3, X10)

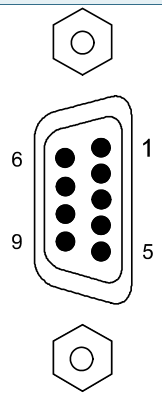
Pin#	Signal Name	X2, X3, X10LAN1, LAN2,LAN3 (RJ45)
1	MDI0+	
2	MDI0-	
3	MDI1+	
4	MDI2+	
5	MDI2-	
6	MDI1-	
7	MDI3+	
8	MDI3-	

9.2. Optional Interfaces

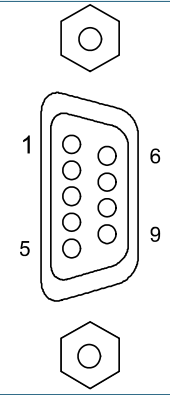
These ports (X12 and X13) must be only factory installed and configured.
When you order the FusionClient with this extended interface via RS485/RS422adapter module, you have to specify in your ordering:

- the needed configuration of this port as RS485 or RS422 and
- for RS422/RS485 configuration: if the onboard termination resistor (120 Ω) should be enabled or disabled.

9.2.1. (X 11) Serial Port RS232

Pin	Signal Name	9-pin D-SUB Plug (male)
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)	

9.2.2. (X12) Serial Port (RS422/RS485) configured as RS422 (4-Channel Mode)

Pin	Signal Name	9-pin D-SUB Plug (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-)	

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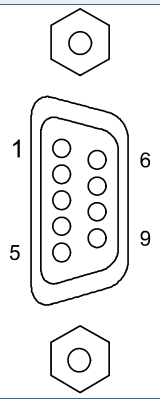
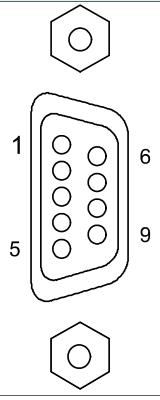
9.2.3. (X12) Serial Port (RS422/RS485) configured as RS485 (4-Wire Mode), full duplex, (Bus-Master)

Pin	Signal Name	9-pin D-SUB Plug (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	

9.2.4. (X12) Serial Port (RS422/RS485) configured as RS485 (2-Wire Mode), half duplex

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

10/ Technical Support

For technical assistance, please contact our Technical Support department via:

e-mail: support@kontron.com or
web: http://www.kontron.com/support-and-services

Ensure that your request contains the following information:

- unit part number (PN),
- serial number (SN), which can be found on the type label,
- a short description of the faulty behaviour of your system.

For information about Kontron products and services, please visit www.kontron.com

10.1. Returning Defective Merchandise

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

1. Download the corresponding form for returning a device with an RMA No. [RMA (Return of Material Authorization)] from our website http://www.kontron.com/support-and-services/support/RMA-information contact our customer 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 packaging.
- Enclose a copy of the RMA form with the consignment.

About Kontron

Kontron is a global leader in embedded computing technology (ECT). As a part of technology group S&T Kontron offers a combined portfolio of secure hardware, middleware and services for Internet of Thing (IoT) and Industry 4.0 applications. With its standard products and tailor-made solutions based on highl reliable state-of-the-art embedded technologies, Kontron provides secure and innovative applications fo a variety of industries. As a result, customers benefit from accelerated time-to-market, reduced total cos of ownership, product longevity and the best fully integrated applications overall. For more informatior please visit: www.kontron.com

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