Original User Manual

Series Touch Hygienic PC

Christ Electronic Systems GmbH

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Instruction Manual: Touch Hygienic PC

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1 Identification

Target group

This document is not intended for end customers! Necessary safety instructions for the end customer must be passed on by the machine builder or system provider and adopted in the respective national language.

Intended use

The devices described in this documentation are intended to enale the user to control, operate, observe, drive and viualise certain processes.

Technical changes

Christ Electronic Systems GmbH reserves the right to change the information, designs and technical data contained in this documentation without prior notice.

History

The following editions of the manual have already been published:

Version	Comment
06/2023 Rev. 00	First edition
06/2023 Rev. 01	Chapter 3.1 External Interfaces: External Power Button: inserted electrical parameter Chapter 3.2 Add-On: removed Chapter 4.1 Torque: updated Chapter 4.3 Mounting: inserted notice that the device must not be opened Chapter 9.9 Touch Specifications: inserted

Table 1: History

Design of safety instructions

The general structure of the safety instructions is shown below:

NOTICE	
	Type of hazard and source of hazard Consequences in the event of non-compliance with the guideline ➢ Measures to avoid hazards

The meaning of the colours of the safety instructions is shown below:

⚠ DANGER	
	Indicates an imminent danger Failure to follow the instructions may result in death or serious injury.

⚠ WARNING	
	Indicates a dangerous situation Failure to follow the instructions may result in serious injury.

⚠ CAUTION	
	Indicates a possible dangerous situation Failure to follow the instruction may result in injury.

NOTICE	
	Indicates user tips and useful information Important information to avoid malfunctions.

2 Product description

Every industry has its own requirements for machine and system operation. To meet all of them, there are different housing variants with industry-specific features.

All touch panels are equipped with multitouch technology in various inch sizes as standard. This means that gesture control, as used on tablets or smart phones, is no problem. This makes machine operation particularly user-friendly.

Christ also offers the greatest possible flexibility in terms of operating systems with Windows 10 or Linux distributions. The sophisticated device design enables use in large temperature ranges completely without fans. This enables versatile use without any maintenance effort.

The hygienic version of the touch panel has a stainless steel housing and is completely IP69 protected. It is particularly suitable for use in hygienically demanding environments such as the pharmaceutical or food industry. Glove operation is also possible here with the help of an adapted touch.

Another aspect is the scalability of performance. A distinction is made here between different configuration levels: monitor, distance monitor (for use over long distances), web panel and particularly powerful panel PCs with Intel® Celeron® or Core™ i3, i5, or i7 processors.

2.1 System Overview

Titanium

CPU	Intel® Celeron™ 3965U 2.2 GHz	Intel® Core™ i3-7100U 2.4 GHz	Intel® Core™ i5-7300U 2.6 GHz	Intel® Core™ i7-7600U 2.8 GHz
Graphic	Intel® HD Graphics 610	Intel® HD Graphics 620		
Memory	2 x DDR4 slot, in summary max. 32 GB			
BIOS	AMI Optio 5 BIOS			
Interfaces	4 x USB: 2 x USB 2.0 Port (Type A); 2 x USB 3.0 Port (Type A) 2 x 1 GBit Ethernet (RJ45) 1 x RS-232 / RS-422 / RS-485 (Bios setting) (Sub-D) 1 x Display Port 1.1			

Table 2: System overview Titanium

2.2 Housing and Components

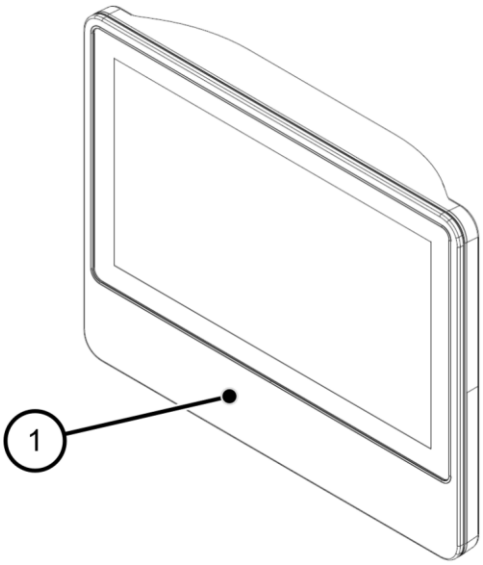

Illustration 1: Hygienic Front View

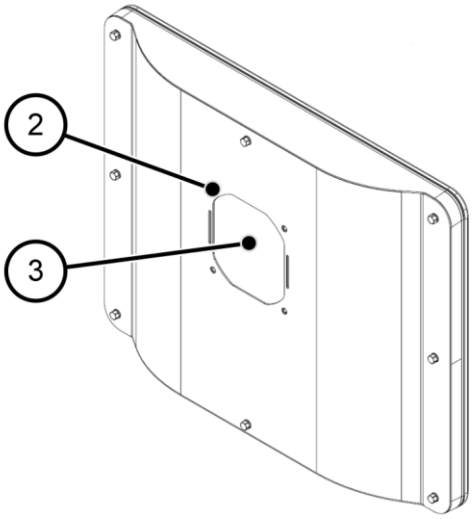

Illustration 2: Hygienic Rear View

1	Control Element Area
2	VESA MIS-D, 100
3	Interface Area

Table 3: Hygienic Front View and Hygienic Rear View

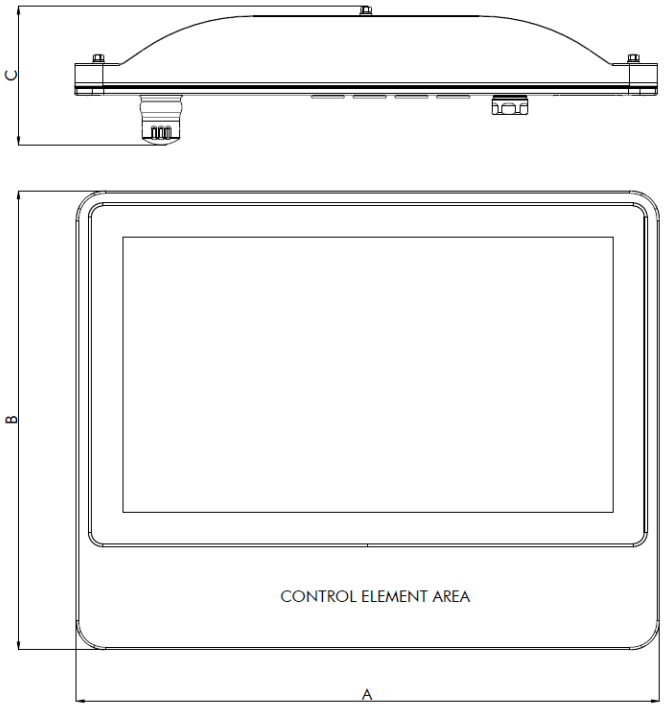

Illustration 3: Dimensions Hygienic

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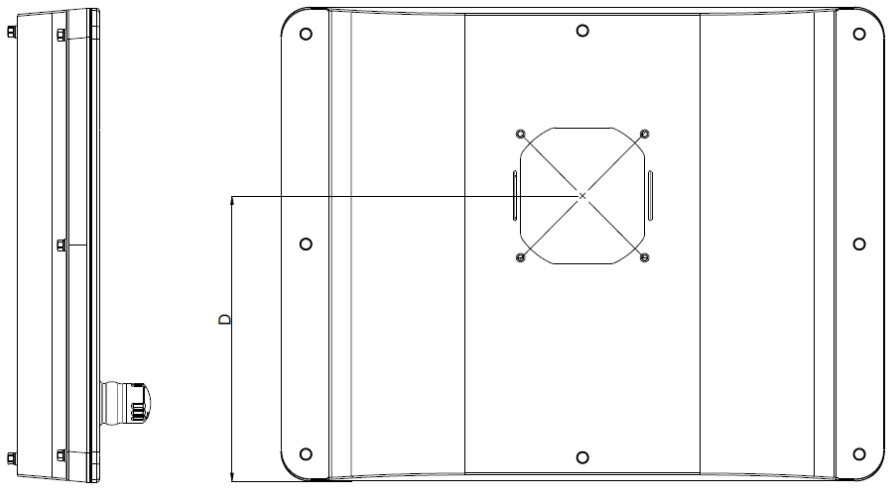

Illustration 4: Dimensions Hygienic Rear

Size	A	B	C	D
18.5"	486	383	115	230

Table 4: Dimensions Hygienic

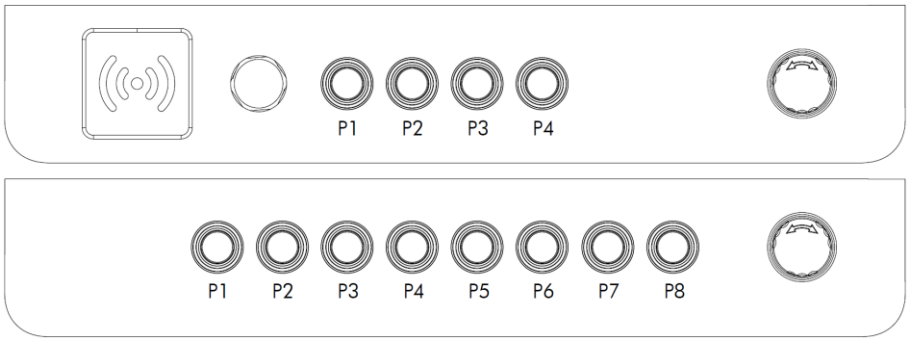

Illustration 5: Positions Control Element Area

Pushbuttons

Series	SHORTRON® base-plate mounting
Degree of protection	IP69
Travel	2.3 mm
Illumination	Yes, white LED
Labeling Option	Yes[1]
Front Bezel	Stainless steel
Operating Temperature	-25 °C ... 70 °C
Contact Elements	Changeover Contact
Front ring	Blue, Green, Red, Black

[1] Possible designation plates are provided by your contact person

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Emergency Stop

Series	QUARTRON®
Type	RXUVP
Degree of protection	IP66 / IP69K
Illumination	No
Labelling Option	No
Front Bezel	Yellow
Mushroom Head	Red
Operating Temperature	-30°C ... 70°C
Contact Elements	max. 2 x normally closed / 1 x normally closed + 1 x normally open
Switching Position Indicator	No
Release	Twist right or left
Anti-lock Collar	Yes

USB

Degree of protection	IP67
USB	USB 2.0
Illumination	No
Labelling Option	No
Material	V2A Stainless Steel

Electrical Parameter

Note! The switching elements must be operated with 24 V ± 20 %.

	Contact 24 VDC + 20 %	Floating contact
Operating current P1 - P8	per contact 1 A maximum total current of the contacts used 2 A	per contact 1 A
Operating current Emergency Stop	---	per contact 0.5 A

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RFID

Manufacturer	ELATEC GmbH
Type	TWN4 MULTITECH NANO M
Degree of protection	IP65
Frequencies	125 kHz / 13.56 MHz
Operating temperature	-25°C ... 80°C
Transponder	**125 KHz:** AWID, Cardax[1], CASI-RUSCO, Deister[1], EM4100, 4102, 4200[2], EM4050, 4150, 4450, 4550, EM4305[3], FDX-B[4], EM4105[4], UltraProx[4], HITAG 1[5], HITAG 2[5], HITAG S[5], ICT[6], IDTECK, Isonas, Keri, Miro, Nedap[1], PAC[6], Pyramid, Q5, T5557, T5567, T5577, TIRIS/HDX[4], TITAN (EM4050), UNIQUE, ZODIAC **13.56 MHz / ISO14443A:** LEGIC Advant[7], MIFARE Classic EV1[8], MIFARE Classic, MIFARE Mini, MIFARE DESFire EV1, MIFARE DESFire EV2[9], MIFARE DESFire Light[6], MIFARE Plus S, X, MIFARE Pro X[10], MIFARE Smart MX[10], MIFARE Ultralight, MIFARE Ultralight C, MIFARE Ultralight EV1[8], NTAG2xx, SLE44R35[10], SLE66Rxx (my-d move)[10], Topaz **13.56 MHz / ISO18092 ECMA-340:** NFC Forum Tag 1-5, NFC Peer-to-Peer, Sony FeliCa[11], NFC Active and passive communication mode **13.56 MHz / ISO14443B:** Calypso[10], Calypso Innovatron protocol[10], CEPAS[10], HID iCLASS[7], Moneo[10], Pico Pass[12], SRI4K, SRIX4K, SRI512, SRT512 **13.56 MHz / ISO15693:** EM4x33[10], EM4x35[10], HID iCLASS[7], HID iCLASS SE/SR[7], ICODE SLI, LEGIC Advant[7], M24LR16/64, MB89R118/119, SRF55Vxx (my-d vicinity)[10], Tag-it, PicoPass[12]

[1] hash value only
[2] only emulation of 4100, 4102
[3] from FW V4.05
[4] 134.2 kHz only
[5] without encryption
[6] on request
[7] UID only
[8] read/write enhanced security features on request
[9] EV2/EV3 supported as part of the EV1 downward compatibility
[10] read/write in direct chip command mode
[11] UID + read/write public area
[12] UID only, read/write on request

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Manufacturer	ELATEC GmbH
Type	TWN4 MULTITECH NANO LEGIC 42 M
Degree of protection	IP65
Frequencies	125 kHz / 13.56 MHz
Operating temperature	-25°C ... 80°C
Transponder	**125 KHz:** AWID, Cardax[1], CASI-RUSCO, Deister[1], EM4100, EM4102, EM4200[2], EM4050, EM4150, EM4450, EM4550, EM4305, HITAG 1[3], HITAG 2[3], HITAG S[3], ICT[4], IDTECK, ISONAS, Keri, Miro, Nedap[1], Pyramid, Q5, T5557, T5567, T5577, TITAN (EM4050), UNIQUE, ZODIAC **13.56 MHz / ISO14443A:** LEGIC Advant, MIFARE Classic EV1[5], MIFARE Classic, MIFARE Mini, MIFARE DESFire EV1, MIFARE DESFire EV2[6], MIFARE DESFire EV3[6], MIFARE DESFire Light[4], MIFARE Plus S/X, MIFARE Smart MX[7], MIFARE Ultralight, MIFARE Ultralight C, MIFARE Ultralight EV1[5], NTAG2xx, SLE44R35[7], SLE66Rxx (my-d move)[7], HID iCLASS DESFire[8], HID iCLASS MIFARE Classic[8], HID iCLASS SEOS[8] **13.56 MHz / ISO18092 ECMA-340:** NFC Forum Tag 1-5[9], Sony FeliCa[10] **13.56 MHz / ISO14443B:** Calypso[7], CEPAS[7], HID iCLASS[8], Pico Pass[8] **13.56 MHz / ISO15693:** EM4x33[7], EM4x35[7], HID iCLASS[8], HID iCLASS SE/SR/Elite[8], ICODE SLI, LEGIC Advant, M24LR16/64, SRF55Vxx (my-d vicinity)[7], Tag-it, PicoPass[8] **LEGIC Prime:** LEGIC Prime

[1] hash value only
[2] only emulation of 4100, 4102
[3] without encryption
[4] on request
[5] read/write enhanced security features on request
[6] supported as part of the EV1 downward compatibility
[7] read/write in direct chip command mode
[8] UID only
[9] NFC Forum Tag 1 not supported
[10] UID + read/write public area

3 Description Hardware

The description of the hardware refers to the device interfaces and the possible extensions for the device.

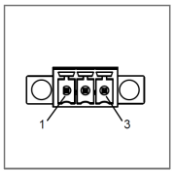
3.1 External Interfaces

NOTICE	
	External cable for Power Supply Malfunction occur ➢ Prepare a proper earth connection on the power supply

NOTICE	
	Signal and data cables Malfunction occur ➢ Signal and data cables must be shielded and of high quality.

NOTICE	
	Operating the interfaces outside their intended specification Malfunctions occur and the electronics of the device can be damaged or completely broken ➢ All interfaces must be operated within their specification. Only cables and components that meet the requirements for the intended use of the interfaces may be connected.

Supply Connector screwable



Mating Connector	Phoenix Connector MC 1,5 / 3-STF-3.5 (screwable)	
PIN	**Function**	**Description**
1	GND	Ground
2	FE	Functional Earth
3	+24 VDC	Supply

Table 5: Pinout Supply Connector screwable

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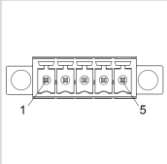
External Power Button



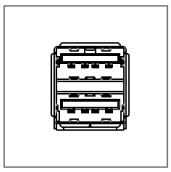
Mating Connector	Phoenix Connector MC 1,5 / 5-STF-3.5 (screwable)	
PIN	Function	Description
1	Power Button 1	Connection 1
2	Power Button 2	Connection 2
3	--	--
4	--	--
5	--	--

Table 6: Pinout External Power Button

Switching Voltage	3.0 VDC
Switching Current	0.6 mA

Table 7: Electrical Parameter External Power Button

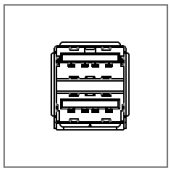
USB Host 2.0 (Type A)



PIN	Function	Description
1	VBUS	USB VCC
2	D-	USB Data-
3	D+	USB Data+
4	GND	USB Ground

Table 8: Pinout USB 2.0

USB Host 3.0 (Type A)



PIN	Function	Description
1	VBUS	USB VCC
2	D-	USB Data-
3	D+	USB Data+
4	GND	USB Ground
5	StdA_SSRX-	SuperSpeed transmitter differential pair
6	StdA_SSRX+	SuperSpeed transmitter differential pair
7	GND_DRAIN	Ground for signal return
8	StdA_SSTX-	SuperSpeed receiver differential pair
9	StdA_SSTX+	SuperSpeed receiver differential pair

Table 9: Pinout USB 3.0

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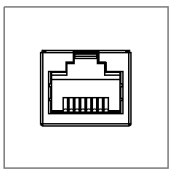
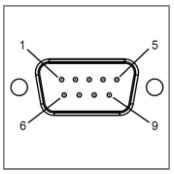
Ethernet Gigabit



PIN	Function	Description
1	D1+	Transmit Data +
2	D1-	Transmit Data -
3	D2+	Receive Data+
4	D3+	Bidirectional +
5	D3-	Bidirectional -
6	D2-	Receive Data -
7	D4+	Bidirectional +
8	D4-	Bidirectional -

Table 10: Pinout Ethernet Gigabit

Serial Connector (Titanium)



	RS-232		RS-422		RS-485	
PIN	Function	Description	Function	Description	Function	Description
1	DCD	Data Carrier Detect	TX-	Transmitter Differential Pair -	DATA-	Data Differential Pair A
2	RX	Receive Data	TX+	Transmitter Differential Pair +	DATA+	Data Differential Pair B
3	TX	Transmit Data	RX+	Receiver Differential Pair +	--	--
4	DTR	Data Transmit Ready	RX-	Receiver Differential Pair -	--	--
5	GND	Ground	GND	Ground	GND	Ground
6	DSR	Data Set Ready	--	--	--	--
7	RTS	Ready To Send	--	--	--	--
8	CTS	Clear To Send	--	--	--	--
9	RI	Ring Indicator	--	--	--	--

Table 11: Pinout Serial Connector Titanium

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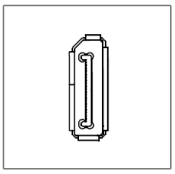
Display Port



PIN	Function	Description
1	DP data 0+	DP data 0+
2	GND	Ground
3	DP data0-	DP data0-
4	DP data1+	DP data1+
5	GND	Ground
6	DP data1-	DP data1-
7	DP data2+	DP data2+
8	GND	Ground
9	DP data2-	DP data2-
10	DP data3+	DP data3+
11	GND	Ground
12	DP data3-	DP data3-
13	CONFIG1 CAD	Cable adapter recognized
14	CONFIG2	Ground (Pull-Down)
15	AUX_CH+	Additional device +
16	GND	Ground
17	AUX_CH-	Additional device -
18	HPD	Hot Plug recognized
19	GND	Ground
20	DP_PWR 3,3V	Power Supply DP

Table 12: Pinout Display Port

With the DP1.0 it is not possible to display an image on DVI / HDMI devices. An active adapter with properties of DP++ is required for this.[1]

Display Port 1.1 is also known as "Dual-Mode Display Port" and "Display Port++". This allows compatibility with DVI and HDMI.

[1] The Argon board uses DP1.0

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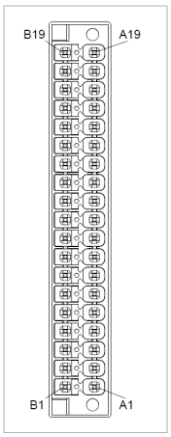
Phoenix DMCV 1,5/19-G1F-3,5-P20THR



PIN	Function	Description	PIN	Function	Description
A1	E_C1	Emergency Stop Contact C1	B10	P3_C3	Position P3 Contact C3
B1	E_C2	Emergency Stop Contact C2	A11	P3_C2	Position P3 Contact C2
A2	E_C3	Emergency Stop Contact C3	B11	P3_LED	Position P3 Contact LED
B2	E_C4	Emergency Stop Contact C4	A12	--	
A3	E_C5	Emergency Stop Contact C5	B12	P6_C2	Position P6 Contact C2
B3	E_C6	Emergency Stop Contact C6	A13	P6_C3	Position P6 Contact C3
A4	--	--	B13	P6_LED	Position P6 Contact LED
B4	P2_C2	Position P2 Contact C2	A14	--	--
A5	P2_C3	Position P2 Contact C3	B14	P5_C3	Position P5 Contact C3
B5	P2_LED	Position P2 Contact LED	A15	P5_C2	Position P5 Contact C2
A6	--	--	B15	P5_LED	Position P5 Contact LED
B6	P1_C3	Position P1 Contact C3	A16	P8_C2	Position P8 Contact C2
A7	P1_C2	Position P1 Contact C2	B16	P8_LED	Position P8 Contact LED
B7	P1_LED	Position P1 Contact LED	A17	P7_C3	Position P7 Contact C3
A8	--	--	B17	P7_LED	Position P7 Contact LED
B8	P4_C2	Position P4 Contact C2	A18	GND	Ground
A9	P4_C3	Position P4 Contact C3	B18	24 VDC	24 VDC
B9	P4_LED	Position P4 Contact LED	A19	GND	Ground
A10	--	--	B19	24 VDC	24 VDC

Table 13: Pinout Phoenix DMCV 1,5/19-G1F-3,5-P20THR

The pinout can vary. This can be seen in the device specific datasheet.

EtherCAT® / Profinet®

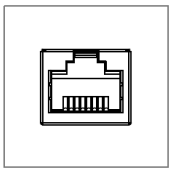
	The pinout corresponds to the EtherCAT® and Profinet® standards.

Table 14: Pinout EtherCAT® / Profinet®

4 Mounting

This chapter describes all the steps for assembly. The following warnings are safety instructions that must be applied throughout the assembly chapter and in every other life cycle of the device.

NOTICE	
	Power Supply Disturbance of the proper operation ➢ The device must be operated with protective low voltage (< 28.8 VDC).

⚠ WARNING	
	Dropping a device Injuries and bruises to the legs and / or feet ➢ Wear safety shoes

Note for the installation site

This device is not designed for outdoor use.

Make sure that the ambient temperature and humidity are within the ranges which are specified under Environmental Conditions.

Do not install the device directly in the sunlight.

Make sure that the device is installed so that is accessible for the operator.

Installation instructions

Check the package contents for any visible damage and for completeness.

In case of damage, do not install the device and contact the Christ Service.

4.1 Torque

All screws must be tightended with the following torques.

Size	Torque
M5	4.5 Nm

All screws with blue seal must be tightened with the following torques.

Size	Torque
M8	20 Nm

4.2 Connection of the power supply

NOTICE	
	Short circuit Power Supply / device may be damaged ➢ The power supply connetion must be mounted in a voltage-free state.

Use conductors with a cross-section of 0.75 mm² to 1.5 mm². Use the MC 1,5/ 3-STF-3,5 BKBDWH:GND Q PCB connector from Phoenix.

Strip the insulation from the individual wires of the conductor (1). Insert these into the connection contacts (3) of the PCB connector and tighten the screw contacts (2) with a screwdriver and a maximum torque of 0.3 Nm.

The rear view (4) of the connector is shown for clarification.

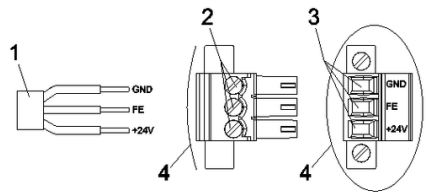


Illustration 6: Connection of the power supply

4.3 Mounting

There are four mounting threads with the measurement of M5 x 8. The fixing screws are not included in the delivery attachment of the device because of the different installation situation.

In the assembly drawing, the threads for attachment are marked in blue.

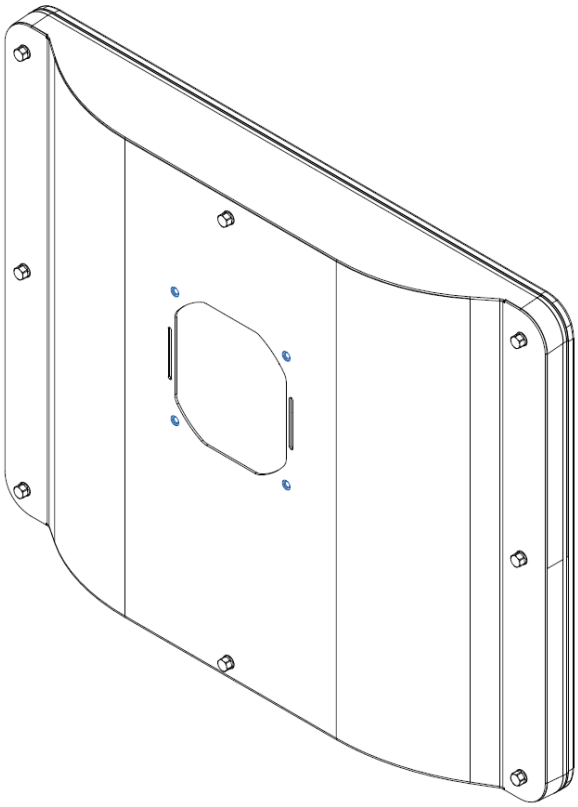


Illustration 7: Mounting

NOTICE	
	The device must not be opened. ➢ The eight screws on the back of the device must not be loosened.

5 Commissioning

To put the device into operation, connect the power supply to the unit.

The device starts.

Further steps for commissioning are not necessary.

5.1 Function of the power button

If the device has a power button, it behaves according to the following standard.

When the device is plugged into the power supply, the device boots up without having to press the power button.

If the power button is pressed while the device is running, the device shuts down.

If the power button is pressed while the device is not running, the device starts up. The power supply must be present at the device.

Notice:

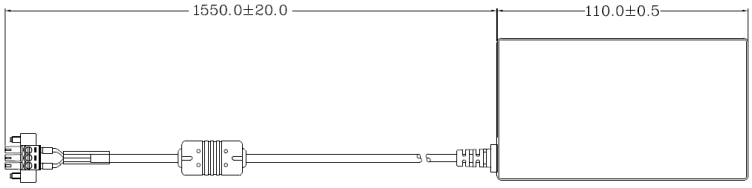
A different behaviour may occur if the device does not have the standard configuration.

The electrical parameters of the power button to be used are described here: Electrical Parameter External Power Button.

6 Accessories and Spare Parts

The accessories listed here have been checked by Christ and are compatible with the products. The following accessories are available:

6.1 Power supply



Input Voltage	90 - 264 VAC
Input Current	max. 1 A
Input Frequency	47 - 63 Hz
Consumption with unloaded output	max. 0.075 W
Output Voltage	24 VDC
Output Current	max. 2.5 A
Temperature Range Operation	0 - 70°C
Humidity Operation	20 - 80% RH non condensing

Table 15: Power supply

7 Software

The Software chapter describes settings and functions that may be required to use the device.

The x86 architecture has a BIOS (Basic Input Output System) for the basic settings of the system. This is not present in the ARM architectures. Here, updates are performed with CURT (Christ Update and Recovery Tool).

7.1 BIOS Basic Settings

AMI BIOS ROM has built-in settings program that allows users to make basic settings. This information is stored in a battery supported CMOS RAM, so it remains stored even when there is no power supply.

Accessing the BIOS works by pressing the "Del" key several times while the device is booting.

The following tabs in the BIOS enable various settings.

Main	Set date
Advanced	Make advanced BIOS settings like: COM, ACPI, etc.
Chipset	Enter host bridge parameters
Security	Set administrator password
Boot	Set Boot Option
Save & Exit	Save the settings made and initiate a restart. (Also possible with the F4 key on the keyboard)

Table 16: BIOS

Pressing F3 and confirming the query "Load Optimized Defaults?" with "Yes" restores the delivery state.

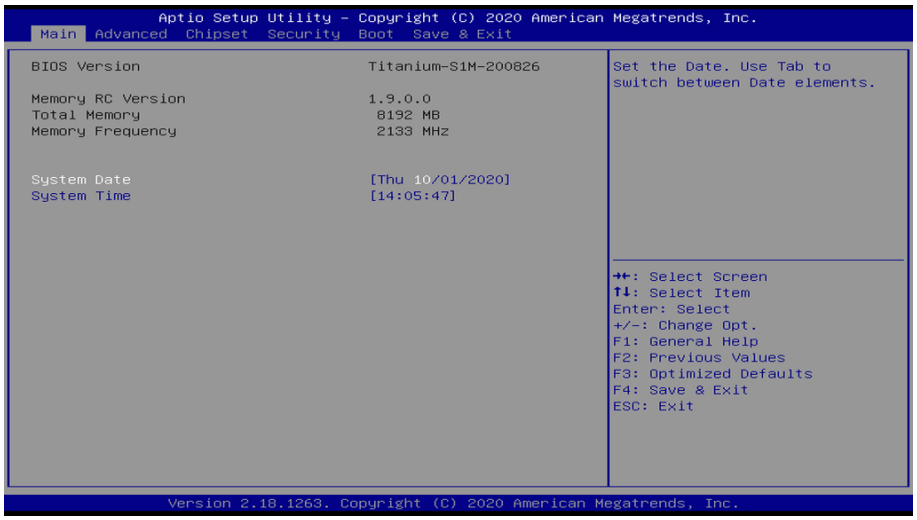


Illustration 8: BIOS

7.1.1 Set display resolution

Set Display Chanel and Resolution

Argon / Titanium

The following settings can be made in the BIOS:

1. Select "Advanced" tab
2. Select "LVDS Configuration"
3. Select "LVDS Chanel Type" (Set "Dual" for Full HD displays)
4. Select "LCD Panel Type"
5. Set resolution
6. Save with keystroke "F4" (confirmation with "Yes")

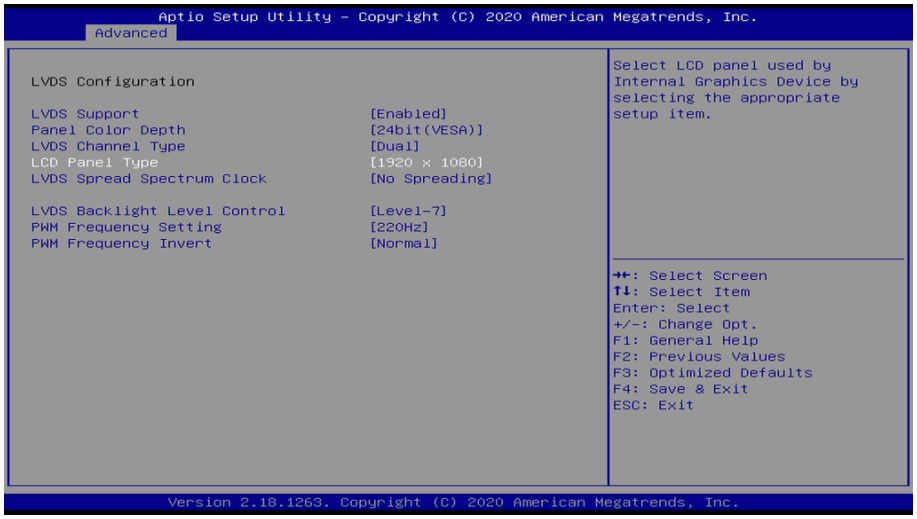


Illustration 9: BIOS Display Resolution

7.1.2 COM Port configuration

COM Port configuration

Titanium

In order for RS-232, RS-422 and RS-485 to be recognized on the COM port, the following settings must be made in the BIOS:

1. Select "Advanced" tab
2. Select "F81804 Super IO Configuration"
3. Select "Serial Port1 Configuration"
4. Under "F81846 SERIAL PORT1 MODE SELECT" select the mode (RS232, RS422, RS485)
5. If RS422 or RS485 mode has been selected, settings can be made for "RS422/RS485 Termination" or "RTS Auto Flow Control
6. Save with keystroke "F4" (confirmation with "Yes")

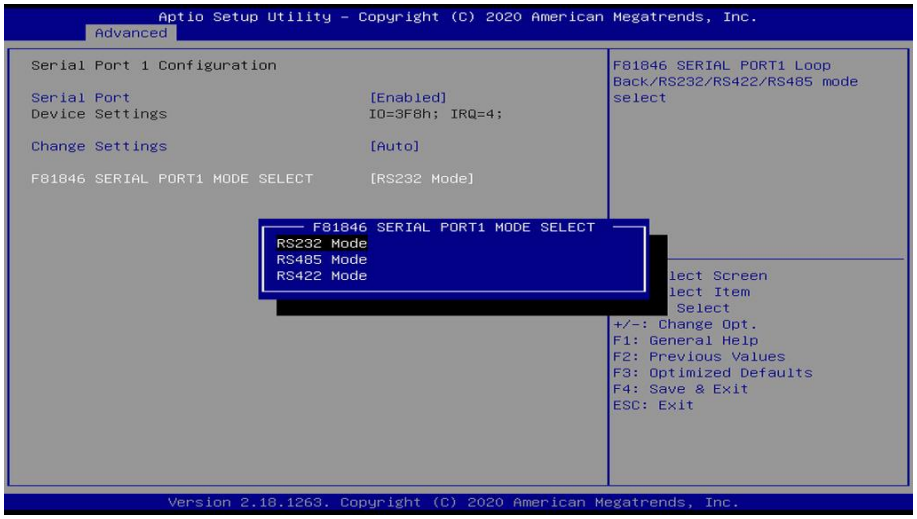


Illustration 10: BIOS COM Port Titanium

7.1.3 Set Boot Priority

Set Boot Priority

Argon / Titanium

If you want to boot from a USB device, the following settings must be made in the BIOS:

1. Select "Boot" tab
2. Select "Boot mode select" "UEFI"
3. Open the "Boot Option #1" by pressing the "Enter" key
4. Select USB device with "Enter"
5. Save with keystroke "F4" (confirmation with "Yes")

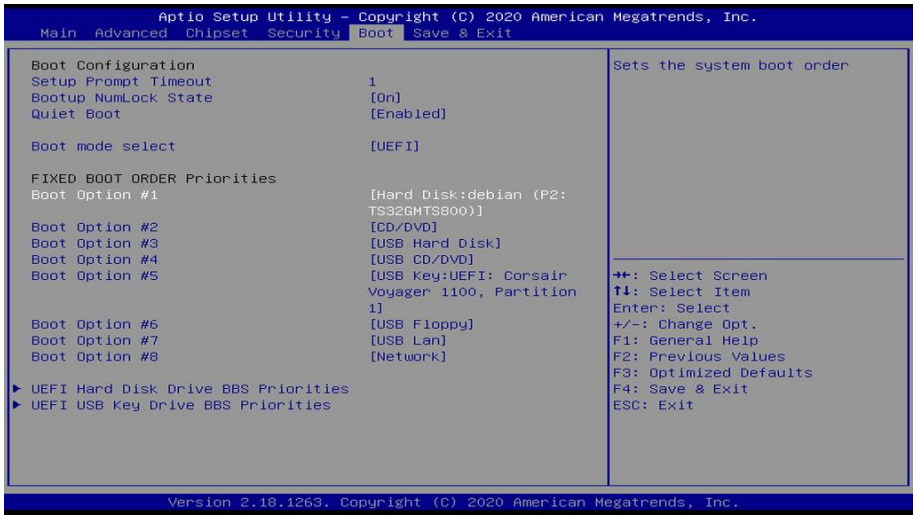


Illustration 11: BIOS Boot Priority

7.2 BIOS Update

7.2.1 Preparation

Copy the AMI BIOS update files to a USB stick

You can obtain the required files from Christ Electronic Systems. These are the same for Argon and Titanium.

- efi
- flash.nsh
- fparts.txt
- Fpt.efi
- Titanium-200826a-S1M.bin (This .bin is only an example, the file can also be named differently)

7.2.2 Perform Update

Insert the bootable USB stick with the required files into the device.

Set the USB stick to Hard Disk Boot Priority in the BIOS. You can read about the procedure under Boot Priority.

The EFI Update Script is automatically detected on the USB stick and starts the update process.

Further procedure Argon

- Confirm the question: "Enter 'q' to quit, any other key to continue:" with Enter.

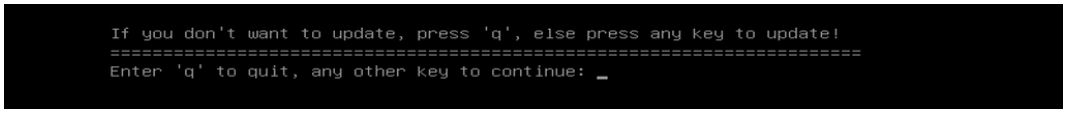


Illustration 12: Argon BIOS Update

- Confirm the question "Do you want to continue? Y/<N> or q to quit:" with "y"
- The update is executed
- The message "FPT Operation Successful" indicates successful completion

Illustration 13: Argon BIOS Update successful

- Disconnect the power supply
- Restore the power supply and enter the BIOS again (do not reboot)
- Press the F3 key to confirm the question "Load Optimized Defaults" with "Yes"
- Press the F4 key to save and exit

Further procedure Titanium

Confirm the question: "Enter 'q' to quit, any other key to continue:" with Enter.

```
If you don't want to update, press 'q', else press any key to update!
=====================================================================
Enter 'q' to quit, any other key to continue: _
```

Illustration 14: Titanium BIOS Update

- The update is executed
- The message "FPT Operation Successful" indicates successful completion

```
FPT Operation Successful.

Done! Please turn off the system
```

Illustration 15: Titanium BIOS Update successful

- Disconnect the power supply
- Restore the power supply and enter the BIOS again (do not reboot)
- Press the F3 key to confirm the question "Load Optimized Defaults" with "Yes"
- Press the F4 key to save and exit

7.3 OBS Client

7.3.1 Activating the OBS Client

The OBS client is disabled by default.

To enable the OBS client, perform the following steps:

1. Launch Task Manager
2. Open "Startup" tab
3. Select "Hardware Monitor Utility for IBASE" and activate it by clicking on "Enable"

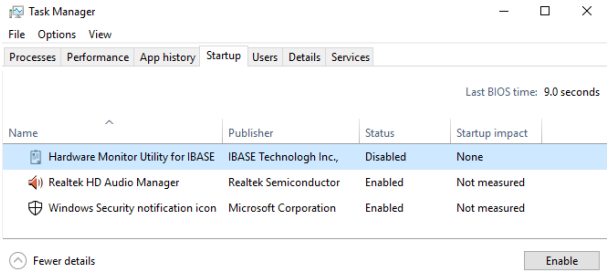


Illustration 16: Task Manager - enable OBS Client

4. Perform a restart of the device

7.3.2 Functions of the OBS Client

To start the OBS client, expand the taskbar and click on the key icon.

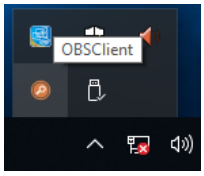


Illustration 17: Start OBS Client

These functions are provided by the OBS Client:

System Information

The System Information provides information about the processor and the operating system.

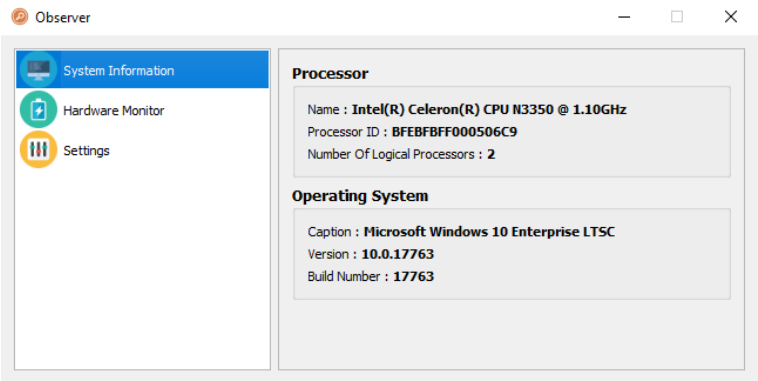


Illustration 18: OBS Client System Information

Hardware Monitor

The Hardware Monitor category indicates the approximate temperatures of the processor and peripherals.

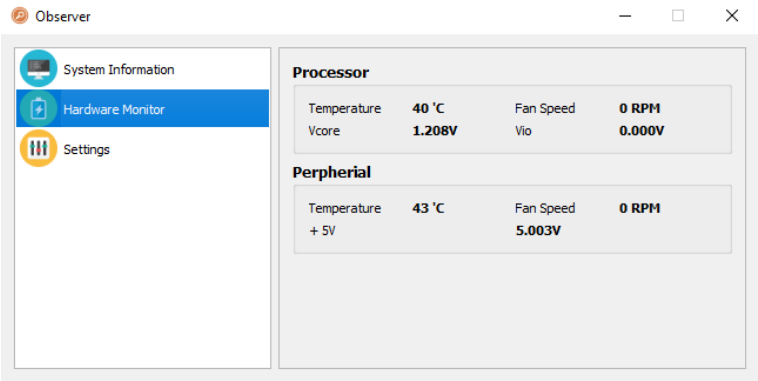


Illustration 19: OBS Client Hardware Monitor

Settings

Various settings can be made in the Settings area.

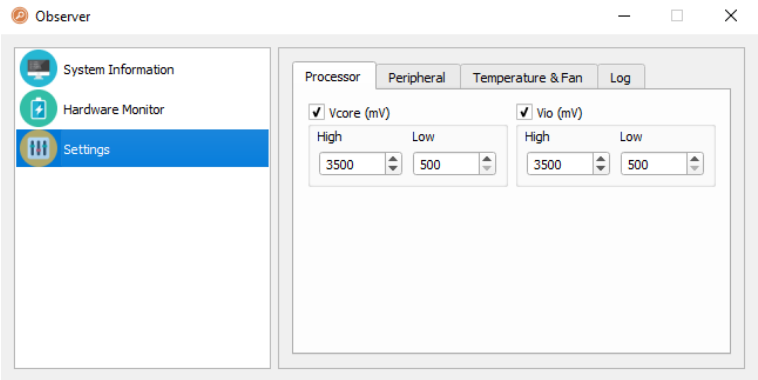


Illustration 20: OBS Client Settings

7.4 Redo Backup and Recovery

The instructions for Christ Redo Backup and Recovery can be found in the Download section of the Christ website: Downloads

7.5 Enhanced Write Filter EWF

Instructions on how to set EWF and UWF filters can be found in the download section of the Christ website: Downloads

8 Maintenance

The following chapter describes maintenance measures that can be performed by a qualified end user.

NOTICE	
	Seals attacked, damage to the housing Loss of IP protection class ➢ There must be no permanent exposure to substances containing large amounts of oils or fats.

8.1 Cleaning

⚠ DANGER	
	Triggering unintended functions Loss of control of the plant / machine / device ➢ The unit may only be cleaned when it is switched off or unplugged.

The cleaning agent may only be applied to the device in diluted form.

The device can be cleaned with alcoholic, slightly acidic or slightly alkaline cleaning agents without any problems.

Under no circumstances should highly aggressive solvents, chemicals or scouring agents, or cleaning agents containing chlorine, strong acids or bases be used.

When properly mounted, the device may be cleaned with high pressure / steam jet cleaning within IP69 specification.

8.2 Maintenance

It does not require any maintenance on the part of the user.

9 Technical Data

This chapter summarizes the technical data.

9.1 Mechanical Specifications

Enclosure Front	Glass
Enclosure	Stainless steel
Weight	max. 10 kg
Dimensions	490 x 385 x 115 [mm]
Mounting	VESA 100
Cooling	Passive

Table 17: Dimensions

9.2 Electrical Specifications

Supply Voltage	9,6 VDC ... 28,8 VDC
Power Consumption	see table Power Consumption
Inrush Current (load-independent)	max. 70A for 80 µs (Used power supply: FSP060-DAAN3)
External Power Supply	SELV
Earthing	Functional Earthing (Cable cross-section has to be identical to the supply lines)
Battery Lifetime	4 years (constantly turned off)

Table 18: Electrical Specifications

9.3 Power Consumption

Display size	Power Consumption
18.5"	bis 80 W

Table 19: Power Consumption

NOTICE

Specifications are maximum values

Peripheral devices are considered (e.g. 1 x USB 2.0 equals 2,5 W)

➢ Provide sufficient power

9.4 Electromagnetic Compatibility

Emitted Interference	EN55032 Class A
Immunity of supply line DC	±2 kV according to IEC 61000-4-4; EFT ± 0,5 kV according to IEC 61000-4-5; Surge asymmetrical
Immunity of signal lines	±1 kV according to IEC 61000-4-4; EFT
ESD	± 4 kV Contact discharge according to EN61000-4-2 ± 8 kV Air discharge according to EN 61000-4-2
Immunity of conducted emission	3 V 150 kHz – 80 MHz, 80% AM nach IEC 61000-4-6
Immunity of high-frequency radiation	3 V/m 80 MHz – 1 GHz, 80% AM nach IEC 61000-4-3 3 V/m 1 GHz – 6 GHz, 80% AM nach IEC 61000-4-3

Table 20: Electromagnetic Compatibility

9.5 Environmental Conditions

Operating Temperature	0 ~ 40 °C
Storage Temperature	-10 ~ 70 °C
Humidity	5 ~ 80 % (non condensing)
Protection Class	IP69
Cooling	Natural Air Convection

Table 21: Environmental Conditions

NOTICE

Insufficient air supply to the device

Overheating

➢ Never cover the device completely or operate it in a small, unventilated housing

9.6 Temperature test

The values for ambient temperature and humidity were determined under worst-case conditions. The maximum workload of the system was achieved by the BurnInTest from PassMark Software Pty Ltd.

The test ran under 100 % utilisation of:

- CPU
- RAM
- 2D and 3D Graphic (x86 only)
- Brightness of the display

9.7 IP Protection Class

The protection class only can be guaranteed under the following conditions:

- The device is installed correctly
- All components and covers of the interfaces are assembled
- Compliance with all environmental conditions

9.8 Display Specifications

Color Depth	8 bit
Lifetime	min. 50,000 h
Viewing Angle (right/left/up/down)	min. 85°/85°/85°/85°
Backlight	LED

Table 22: Display Specifications

NOTICE

Pixel Errors

Due to the manufacturing process, displays may contain faulty pixels (pixel errors), which do not constitute a claim or warranty within the limits described below.

The international standard ISO 9241-307:2009 defines, on an international level, the maximum permissible pixel errors in an LC-display. This standard discribes different error types, in consideration of different pixel error classes.

There are the following pixel error classes, each with three differnet error types:

Maximum acceptable errors per 1 Mio. pixels according to ISO 9241-307:2009				
error class	error type 1 pixel constantly illuminatied	error type 2 pixel constantly dark	error type 3 subpixel constantly illuminatied	error type 4 subpixel constantly dark
0	0	0	0	0
I	1	1	n = 0 to 2 2 - n	2 x n + 1
II	2	2	n = 0 to 5 5 - n	2 x n
III	5	15	max. 50	max. 50
IV	50	150	max. 150	max. 150

Why this classification of errors?

Each pixel of a display contains three subpixels which have the basic colors red, green and blue. The combination makes it possible to show a wide spectrum of colors.

Considering for example the display solution of 1280 x 800 pixels, thereof a total of 1,024000 pixels or 3,072000 subpixels are embedded in the display area. This means , the display holds 3,072000 single transistors at an area of 261.1 mm by 163.2 mm.

These figures make it clear that it is not possible to specifically produce defect-free displays even by today's manufacturing standards.

Christ Electronic Systems GmbH therefore adapts to the corresponding requirements of most international manufacturers. The displays must always comply with error class II. If the permissible number of errors of the pixel error class II is not exceeded, there is also no complaintable "failure" of the display.

Refering to the calculation, the following errors can occur in the display:

- Max. 2 constantly illuminated and 2 constantly dark pixels
- Max. 5 constantly illuminated or 10 constantly dark subpixel

Avoid burn-in on displays

NOTICE	
	Images that do not change "Image shadows", "ghost images" arise ➢ Changing displayed images, screen saver, energy-saving mode

With LC displays, so-called "ghost images" or "image shadows" can occur under certain circumstances. These are images that remain from the previous image and are felt to be "burnt into" the display. These do not remain forever. If "image shadows" occur, the device should be switched off for a longer period of time so that the burnt-in image disappears.

To avoid "ghost images" or "image shadows", the following behaviour is recommended:

- Do not display still images over an extended period of time
- Change standing images at short intervals
- Switch off the unit or use the energy-saving mode when not in use
- Use the screen saver function

9.9 Touch Specifications

Touch technology	PCAP
Touch shatterproof film	Yes

Table 23: Touch Specifications

10 Standards and Approvals

The device meets the following requirements.

10.1 CE Marking

The device has been tested in accordance with the applicable EU directives and the associated harmonized standards.

10.2 RoHS

The device complies with the requirement of the EU Directive RoHS 2011/65/EU.

10.3 Electromagnetic Compatibility

The device complies with the requirements of the EU Electromagnetic Compatibility Directive 2014/30/EU with the harmonized standards listed below:

EN 55032: 2015 Class A	Electromagnetic compatibility of multimedia equipment - Emission Requirements
EN 55035: 2017	Electromagnetic compatibility of multimedia equipment - Immunity requirements

10.4 Environmentally Appropriate Disposal

The device must not be disposed of with domestic waste.

The appliance complies with the requirement of the EU Directive WEEE 2012/19/EU, which is symbolised by the symbol with the crossed-out dustbin.

In order to enable environmentally friendly recycling, the various materials must be separated from one another.

Disposal must be carried out in accordance with the applicable legal regulations.

Component parts	Disposal
Enclosure	Metal Recycling
Electronic	Electronics Recycling
Paper / cardboard packaging	Paper / Cardboard boxes Recycling
Plastic packing materials	Plastics Recycling

11 Technical Support

Despite the highest quality standards and detailed function tests of all our products, damage or failure can always occur in the daily handling of our equipment. The failure of a ma-chine in production costs a lot of money. That is why the Christ company processes complaints as quickly as possible.

You can send the device to us without prior notice. All you need to do is fill out the repair cover letter and enclose it with the touch panel or IPC so that the service department can start the repair quickly.When the device arrives, it goes through a defined process that clearly documents all processes and makes the respective status traceable. As soon as your panel or IPC is registered in our system, you will receive a confirmation of receipt so that you can also get a precise overview.

Technical Support can be contacted as follows:

Service, Repair and Technical Support
Phone: +49 8331 8371-500
Fax: +49 8331 8371-497
E-Mail: service@christ-es.de

Or directly via the Homepage.
Christ Service

11.1 Device Seal

A device seal is affixed to every Christ device in order to prove whether the device has been opened by a third party. In case of a defect, please do not open the device, but contact our service department. They will discuss the further procedure with you.
Opening the device will void the warranty.

Index of Illustration

Index of Tables