SIGMATEK

PC 444-W

Control Cabinet PC

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Translation from German

Control Cabinet PC PC 444-W

The PC 444-W is a control cabinet PC with an Intel® Celeron G3900 Skylake processor that is entirely PC-compatible and operates with a standard PC BIOS.

Using the HMI-Link G2 Expansion, HMI-Link (G2) terminals can be connected to the PC 444-W. This allows the transmission of USB and display signals up to 100 m.

Contents

1 Technical Data

1.1 Performance Data

Processor	Intel® Celeron G3900 Skylake
Hard drive	128-Gbyte Solid State Disk
Main memory (DDR-RAM)	4-Gbyte DDR4 RAM (SODIMM)
Graphics	Intel® HD-Graphics 510
Interfaces	2x Ethernet 10/100/1000 Mbit 3x USB 2.0 2x USB 3.0 1x RS232 1x Audio (Line In, Line Out) 1x PS/2 Mouse 1x PS/2 Keyboard 1x DVI-D interface (max. 1920x1200 px @ 60 Hz) 1x Display port V1.2 (max. 1920x1200 px @ 60 Hz) 1x HMI local OUT (HMI-Link G2)
Real-time clock	yes

In order to use the HMI interface, a second-generation SIGMATEK HMI (G2) is required on the remote station.

1.2 Electrical Requirements

Supply voltage	+18-30 V DC (Class 2 or SELV and limited energy) (connection: 4-pin Phoenix)
IDLE power consumption without HMI-Link	24 W
IDLE power consumption with HMI-Link	26 W
Max. Power consumption with HMI-Link	43 W
Inrush current	2.5 A Peak – 15 ms

Caution: The +24 V supply voltage is buffered for 5 ms!

Mise en garde! La tension d'alimentation 24 V est tamponnée pour 5 ms!

1.3 Environmental Conditions

Storage temperature	-20 ... +60 °C	
Environmental temperature	0 ... +50 °C	
Humidity	10-90 %, non-condensing	
Operating conditions	Indoor use pollution degree 2 Altitude up to 2000 m	
EMC tolerance	EN 61000-6-2 (industrial area): EMC resistance EN 61000-6-4: noise emission	
Vibration resistance	EN 60068-2-6	2-9 Hz: amplitude 3.5 mm 9-200 Hz: 1 g (10 m/s²)
Shock resistance	EN 60068-2-27	15 g (150 m/s²) duration 11 ms, 18 shocks
Protection type	EN 60529: protected through the housing	IP20

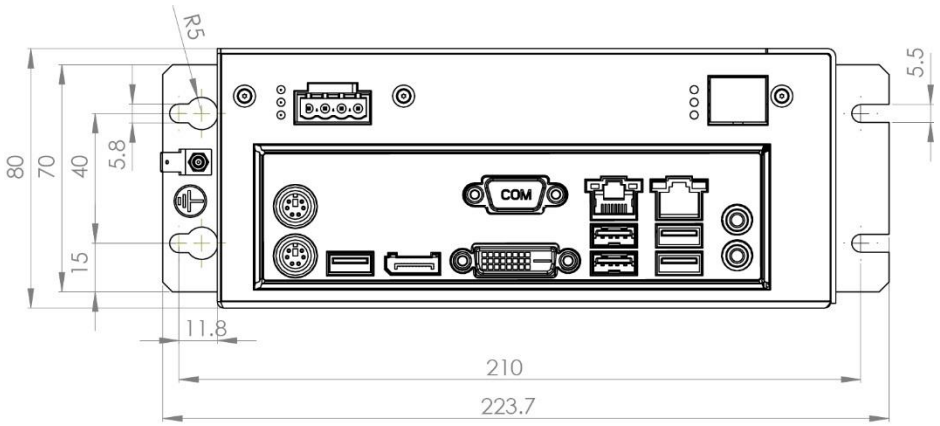
1.4 Miscellaneous

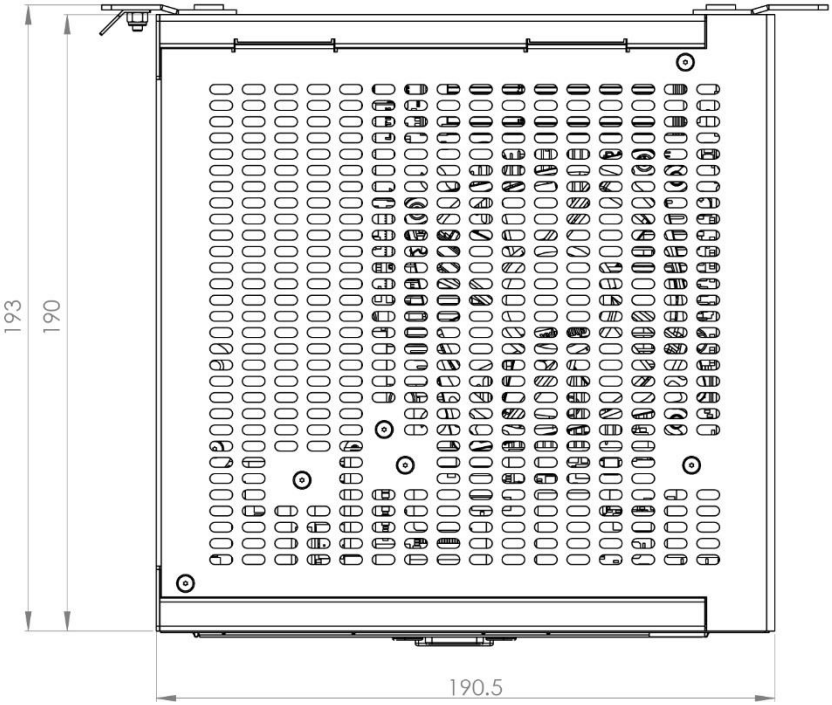
Article number	01-310-444-W
Hardware version	1.x
Dimensions	80 x 223.7 x 193 mm (W x H x D)
Standard	CE, $_{c}UL_{US}$ in preparation

In order to use the HMI interface, a SIGMATEK HMI-Link of the second generation (G2) is required on the remote station.

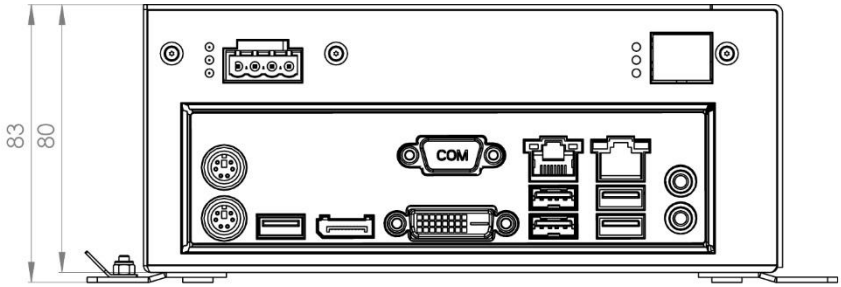
2 Mechanical Dimensions

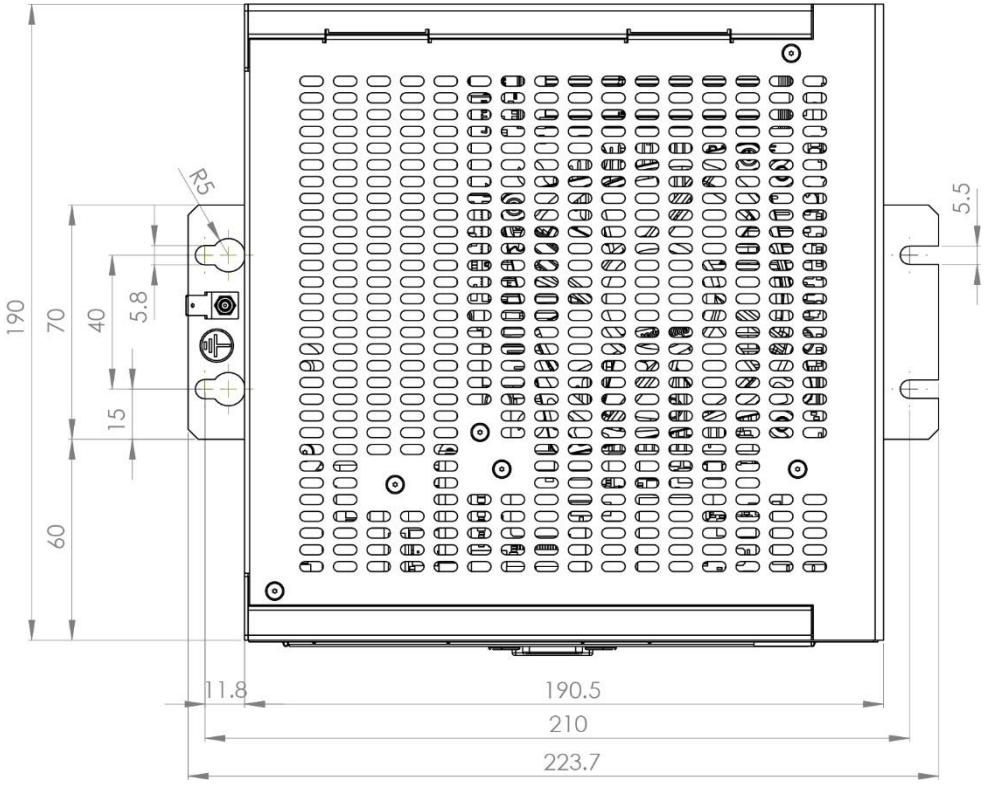
2.1 Horizontal



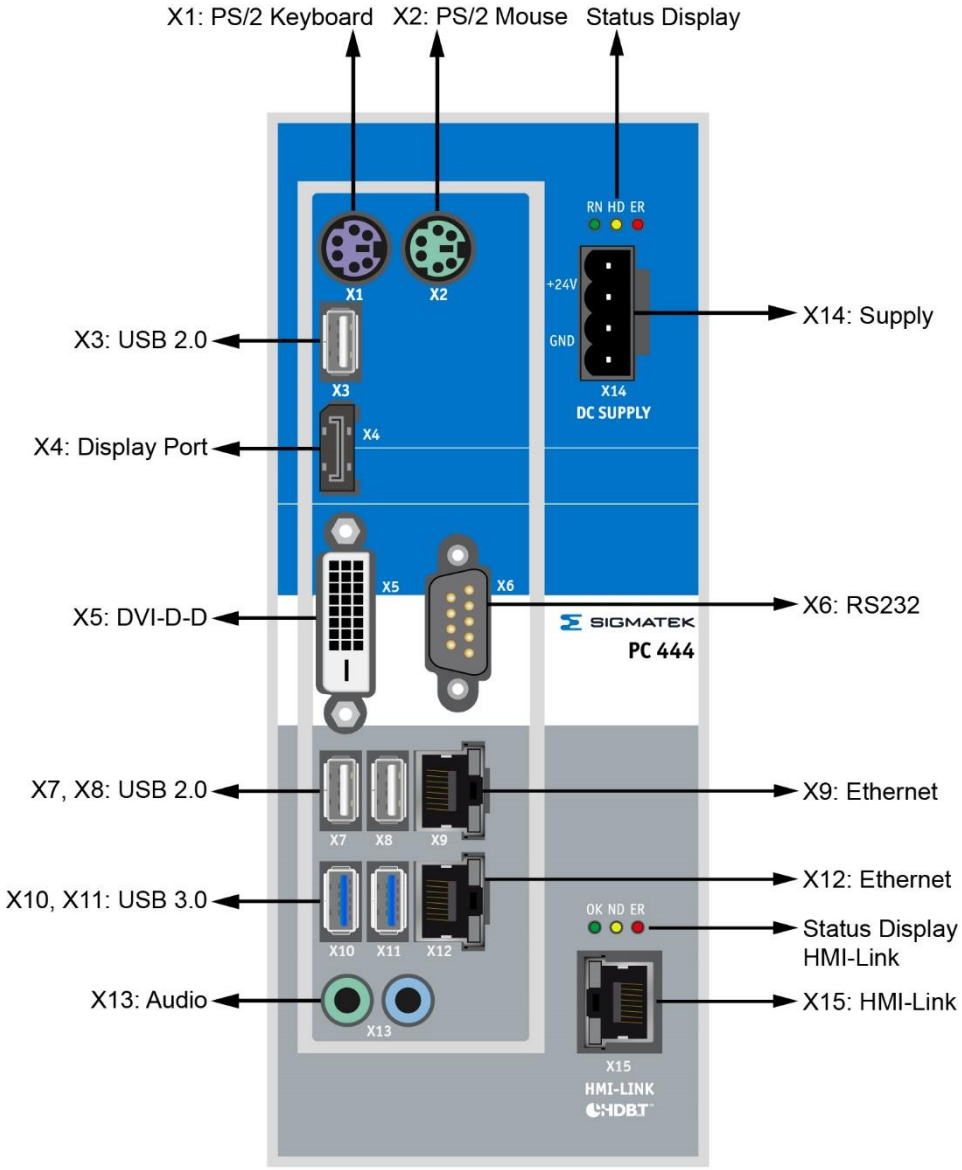


2.2 Vertical





3 Connector Layout



X1: PS2 keyboard

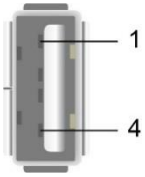
Pin	Function
1	KEYBOARD DATA
2	MOUSE DATA
3	GND
4	+5 V
5	KEYBOARD CLOCK
6	MOUSE CLOCK

X2: PS2 mouse

Pin	Function
1	MOUSE DATA
2, 6	n.c.
3	GND
4	+5 V
5	MOUSE CLOCK

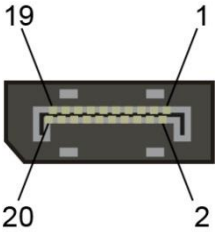
n.c. = do not use

X3: USB 2.0 (Type A)



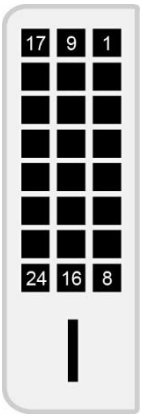
Pin	Function
1	+5 V
2	D0-
3	D0+
4	GND

X4: Display port



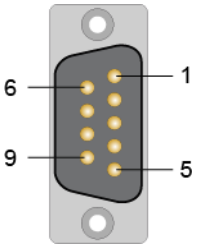
Pin	Function
1	Lane 0 (p)
2	GND
3	Lane 0 (n)
4	Lane 1 (p)
5	GND
6	Lane 1 (n)
7	Lane 2 (p)
8	GND
9	Lane 2 (n)
10	Lane 3 (p)
11	GND
12	Lane 3 (n)
13	Config1
14	Config2
15	AUX CH (p)
16	GND
17	AUX CH (n)
18	Hot Plug
19	Return
20	DP_VCC_3V3

X5: DVI-D (24-pin DVI)



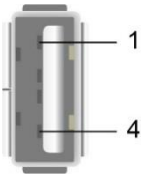
Pin	Function	Pin	Function
1	DVI2-	13	DVI3+
2	DVI2+	14	+5 V
3	GND	15	GND
4	DVI4-	16	Hot Plug detec-tion
5	DVI4+	17	DVI0-
6	DDC-CLOCK	18	DVI0+
7	DDC-DATA	19	GND
8	V-Sync	20	DVI5-
9	DVI1-	21	DVI5+
10	DVI1+	22	GND
11	GND	23	DVI-CLOCK+
12	DVI3-	24	DVI-CLOCK-

X6: RS232 (9-pin D-Sub plug)



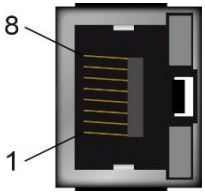
Pin	Function
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

X7, X8: USB 2.0 (Type A)



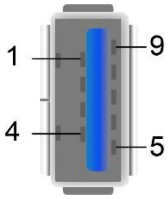
Pin	Function
1	+5 V
2	D0-
3	D0+
4	GND

X9: Ethernet 10/100/1000



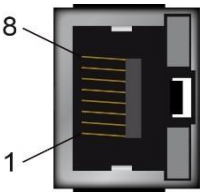
Pin	Function
1	DA+
2	DA-
3	DB+
4	DC+
5	DC-
6	DB-
7	DD+
8	DD-

X10, X11: USB 3.0 (Type A)



Pin	Function
1	+5 V
2	D0-
3	D0+
4	GND
5	USB3 Rx-
6	USB3 Rx+
7	GND
8	USB3 Tx-
9	USB3 Tx+

X12: Ethernet 10/100/1000



Pin	Function
1	DA+
2	DA-
3	DB+
4	DC+
5	DC-
6	DB-
7	DD+
8	DD-

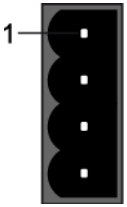
X13: Audio

Socket	Function
Green	Line Out
Blue	Line In

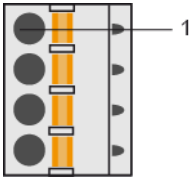
Line IN, Line OUT

Pin	Function
L	Stereo left
R	Stereo right
GND	GND

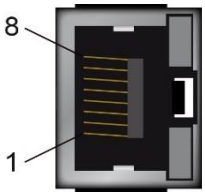
X14: Power supply (4-pin Phoenix)



Pin	Function
1	+24 V DC supply
2	+24 V DC supply
3	GND
4	GND



X15: HMI Local OUT (HMI-Link G2, RJ45)



Pin	Function
1	HMI_P0
2	HMI_N0
3	HMI_P1
4	HMI_P2
5	HMI_N2
6	HMI_N1
7	HMI_P3
8	HMI_N3

Before the PC is switched on, the terminal or manual control unit must be powered and the HMI cable connected, since otherwise a correct initialization of the terminal or the manual control unit cannot be guaranteed.

If a terminal or manual control unit connected to the PC with a HMI-Link cable is exchanged with a device with a different resolution during operation, the PC must be restarted so the new device with the different resolution is correctly identified and initialized.

Avant l'allumage du PC, le terminal ou l'unité de commande manuelle doit être alimenté et le câble HMI doit être connecté, car sinon une correcte initialisation du terminal ou de l'unité de commande manuelle ne peut pas être garantie.

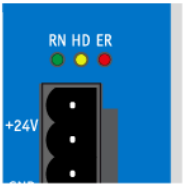
Si le terminal ou l'unité de commande manuelle connectée au PC avec un câble HMI-Link est échangé pendant le fonctionnement pour un dispositif avec une résolution différente, le PC doit être redémarré. Ainsi, le nouveau dispositif avec la résolution différente est correctement identifié et initialisé.

3.1 Applicable Connectors

USB: Type A
PS/2: 6-pin PS/2 connector
DVI: 24-pin DVI connector
Display port: 20-pin display port connector
RS232: 9-pin D-Sub socket
Ethernet: 8-pin RJ45 CAT5e / CAT6
Audio: jack connector
Power supply: 4-pin Phoenix Contact FKC 2.5/ 4-ST-5.08
HMI-Link: 8-pin RJ45 CAT5e / CAT6

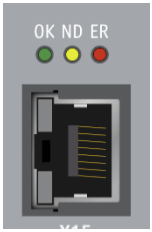
4 Status Displays

4.1 PC Status Display



Power	Green	Power supply
HD	Yellow	access to the SSD
Error	Red	alarm signal (e.g. exceeding the maximum temperature)

4.2 HMI-Link Status Display



ER	red	ON	**No HMI-Link connection between PC and terminal**
ND	yellow	OFF	Check HMI-Link cable
OK	green	OFF	

ER	red	OFF	HMI-Link connection between PC and terminal available
ND	yellow	ON	**No video signal available**
OK	green	OFF	Check display port cable

ER	red	ON	HMI-Link connection between PC and terminal available
ND	yellow	OFF	Video signal available
OK	green	ON	**No USB signal**
			Check USB cable

ER	red	OFF	HMI-Link connection between PC and terminal available
ND	yellow	ON	Video signal available
OK	green	ON	**No valid EDID data**
			Restart PC and terminal

ER	red	OFF	**System ready**
ND	yellow	OFF	
OK	green	ON	

5 SSD (Solid State Disk) Exchange

Disconnect, the PC 444-W from the supply.

To exchange the SSD, the locking screw must be removed with a Tx 8 screwdriver.

Carefully lift the plug-in slot.

Carefully lift the hard drive plug-in slot upwards. Disconnect the two cables. Loosen the 4 mounting screws using a Tx 10 screw driver and remove the hard drive from the hard drive plug in slot. Connect the new hard drive and secure the hard drive plug-in slot using a thread lock fluid (Loctite 270 or similar) on the screws.

Caution: Place spacer sleeves in between!

Photo of hard drive

4 Tx 10 locking screws

A solid-state disk cannot be exchanged while voltage is applied!
(Disconnect 24 V DC supply!)

Un disque à semi-conducteurs ne peut pas être échangé sous la tension!
(Débranchez l'alimentation 24 V DC!)

6 Exchanging the BIOS Battery

The exchangeable buffer battery ensures that the clock time is preserved in the absence of a supply voltage. A lithium battery is installed at the manufacturer.

The battery has enough capacity to preserve data in the absence of a supply voltage for up to 5 years.

Battery order number: **01-690-055**

	Company	Data
Lithium battery	RENATA	3.0 V / 235 mAh

Use batteries from RENATA with the number CR2032 only!
WARNING! Incorrect use of the batteries could result in fire or explosion! Do not re-charge, disassemble or throw batteries in fire!

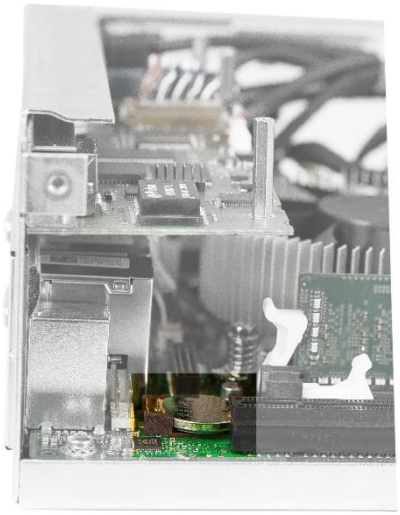
N'utilisez que des piles RENATA CR2032!
ATTENTION! La pile peut exploser en cas d'un usage non-conforme. Ne pas recharger, démonter ou jeter au feu.

The BIOS battery cannot be exchanged while voltage is applied!
(Disconnect 24 V DC supply!)

La pile BIOS ne peut pas être échangée sous la tension!
(Débranchez l'alimentation 24 V DC!)

To exchange the BIOS battery, the 8 screws must be loosened with a Tx 8 screwdriver and the cover removed. If necessary, when hand tools are insufficient, the screw can be heated locally to approx. 250 °C. Dismantle while warm.

The remaining 3 screws are located on this side!



With a screwdriver, carefully push the metal battery holder back. The battery can now be removed and replaced. Replace the cover and using a locking fluid – Loctite 221 or similar – tighten the locking screws.

The clock time must then be reset.

7 Mounting Instructions

The PC 444-W has 4 mounting holes to allow mounting onto the back wall of the control cabinet. This is the preferred mounting position, since the cool air can flow from the bottom to the top of the module and ensure optimal cooling.

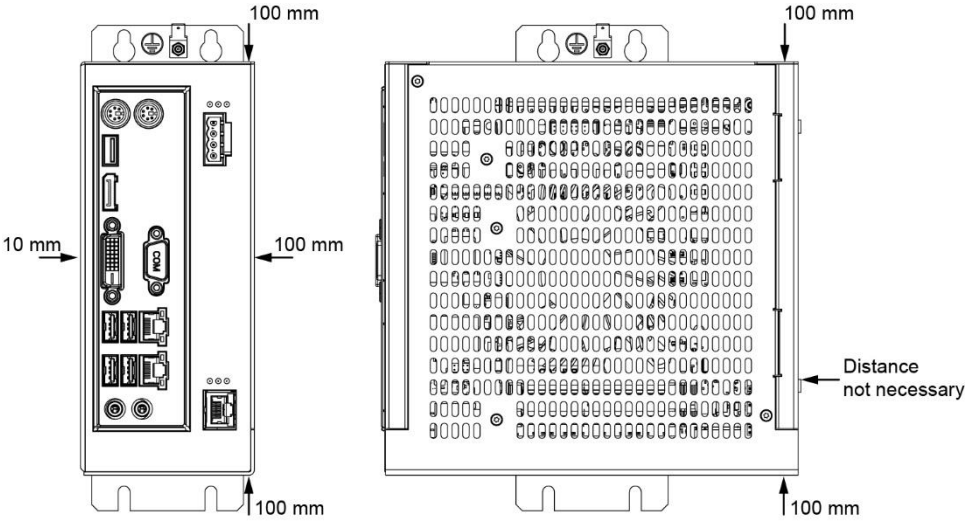
- With a change in the mount position, the 4-cylinder screws with internal hex socket and an extremely low head (Bossard BN1206 M5 with a maximum length of 6 mm) must be used. The tightening torque is 1.6 Nm

7.1 Mounting Material

- Disks EN ISO 7089-5-200HV
- Lock washer DIN 7980, galvanized spring steel, size 5
- Screws M5x10-8.8 (10 mm minimum length)
- Torque 6 Nm

A different mounting position is not recommended, as the specified environmental temperature cannot be guaranteed. In addition, a clearance of 10 cm between the nearest components (control cabinet wall) must be ensured.

7.2 Minimum Clearance to the Nearest Components

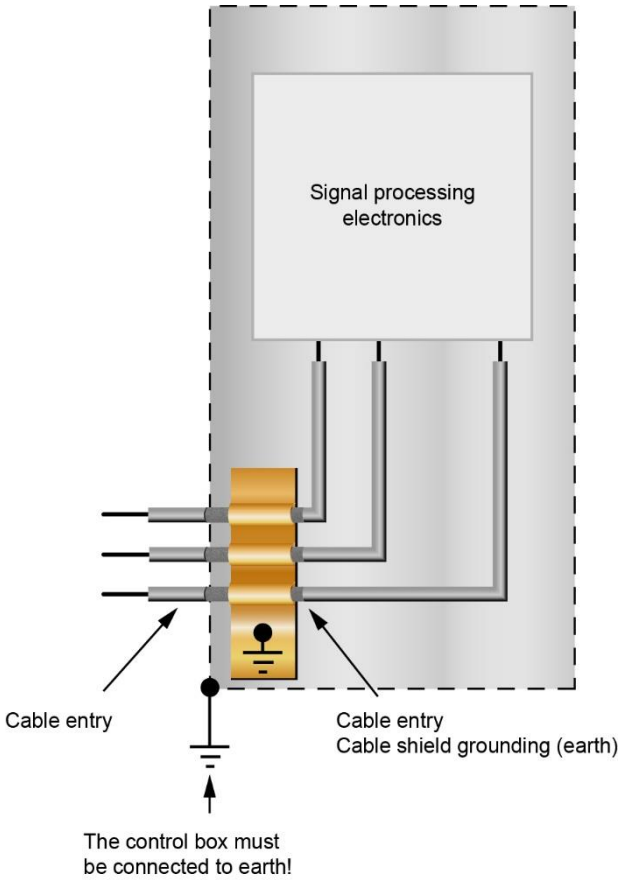


8 Wiring Guidelines

8.1 Ground

The signal-processing electronics must be connected to ground via the mounting on control cabinet or over the ground terminal provided. It is important to create a low-ohm ground connection, only then can error-free operation be guaranteed. The ground connection must be made with the maximum cross section and largest (electrical) surface possible.

Any noise signals that reach the signal-processing electronics over external cables must be filtered through the ground connection. High frequency noise can also be dissipated over a large (electrical) surface (skin effect).



8.2 Shielding

The wiring for the COM1, display port, Ethernet, VGA, and DVI must be shielded. The low-ohm shielding is either connected at the entry to the control cabinet or directly before the PC 444-W over a large, low-ohm surface (cable grommets, grounding clamps)!

Noise signals can therefore be prevented from reaching the electronics and affecting the function.

8.3 ESD Protection

Typically, the PS/2 devices (keyboard, mouse) are not equipped with shielded cables. The same applies to the USB keyboard and mouse. These devices are disrupted by ESD and in some instances, no longer function.

Before any device is connected to or disconnected from the PC 444-W, the potential should be equalized (by touching control cabinet or ground terminal). Electrostatic loads (through clothing and shoes) can thereby be dissipated.

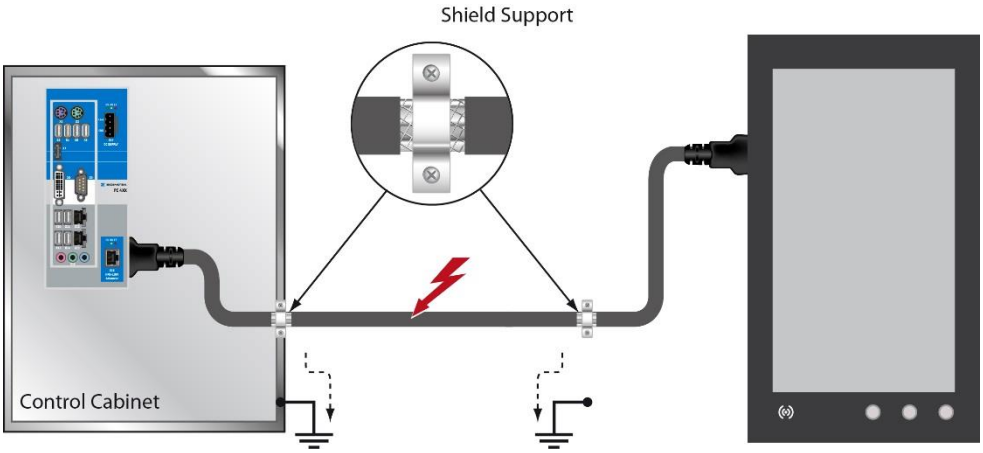
9 HMI-Link G2 Wiring

9.1 Ground

For the HMI-Link G2 line, CAT5e or CAT6 cables with shielded RJ45 connectors must be used.

The cable shielding must be connected to ground on both sides to prevent noise signals from reaching the electronics and affecting the function.

For CAT5e cables, the total allowable length is limited to 90 m. To utilize the maximum 100 m length of the Link system, a CAT6 cable must be used.



9.2 HMI-Link G2 Cable Specification

The RJ45 cable must be wired 1:1 in accordance with the EIA568A standard.

Self-fabricated cables must be tested for compliance with the limit values corresponding to the cable class (CAT5e/CAT6...).

EIA 568A Pin Assignment		
Pin	**Wire Color**	**Signal**
1	White/green	HMI_P0
2	green	HMI_N0
3	White/orange	HMI_P1
4	blue	HMI_P2
5	White/blue	HMI_N2
6	orange	HMI_N1
7	White/brown	HMI_P3
8	Brown	HMI_N3

9.3 HMI-Link G2 Wires in the Cable Strand

To guarantee correct function, it is important to ensure that in the cable strand, the wires do not run parallel over long distances. This especially applies to fast data lines such as Ethernet, VARAN, as well as the HMI-Link. Here, it is recommended to use a cable that is equal to or better than the CAT6A standard.

When multiple HMI-Link cables run in parallel, the following limit values for the maximum length of the parallel wiring apply:

Cable type	**30 m**	**50 m**	**70 m**	**100 m**
CAT5e/CAT6	6	4	2	1
CAT6a/CAT7	6	6	6	6

Crosstalk between the data lines and the resulting interference coupled between the wires should be monitored. The highest number of cables allowed in a cable strand with multiple HMI-Link cables, which are run over a defined distance, is specified.

10 Disposal

To dispose of the product, the applicable local guidelines must be met and followed.

Documentation Changes

Change date	Affected page(s)	Chapter	Note
09.01.2019	12	3 Connector Layout	Pin tables USB correctly allocated
01.04.2019	4	1.1 Performance Data	Table extended
06.05.2019	4	1.1 Performance Data	Table: Graphic line extended
17.06.2020	20	6 Exchanging the BIOS Battery	Image corrected to page 20 and text blocks changed