

ETT 1533

Multi-Touch Operating Panel

Publisher: SIGMATEK GmbH & Co KG
A-5112 Lamprechtshausen
Tel.: +43/6274/4321
Fax: +43/6274/4321-18
Email: office@sigmatek.at
WWW.SIGMATEK-AUTOMATION.COM

Copyright © 2015
SIGMATEK GmbH & Co KG

Translation from German

All rights reserved. No part of this work may be reproduced, edited using an electronic system, duplicated or distributed in any form (print, photocopy, microfilm or in any other process) without the express permission.

We reserve the right to make changes in the content without notice. The SIGMATEK GmbH & Co KG is not responsible for technical or printing errors in the handbook and assumes no responsibility for damages that occur through use of this handbook.

Multi-Touch Operating Panel

ETT 1533

The Multi-Touch Operating Panel is an intelligent panel for visualizing, operating and monitoring automated processes.

A capacitive touch screen serves as the input medium for process data and parameters. The output is shown on a 15" XGA TFT color display.

With the LSE mask editor, graphics can be created on the PC, then stored and displayed on the Multi-Touch Operating Panel.

The available interfaces can be used to exchange process data or configure the multi touch terminal. A microSD card serves as the storage medium for the operating system, application and application data.



Contents

1 **Technical Data 4**

 1.1 Performance Data 4

 1.2 Electrical Requirements 5

 1.3 Terminal 5

 1.4 Environmental Conditions 5

 1.5 15" XGA Display 6

 1.6 Control Unit 7

 1.7 Digital Outputs 9

 1.8 Digital Inputs 9

 1.9 Miscellaneous 10

2 **Mechanical Dimensions 11**

 2.1 Up to HW Version X.XX 11

 2.2 Starting from HW Version X.XX 12

3 **Connector Layout 13**

 3.1 Applicable Connectors 17

4 **Buffer Battery 18**

 4.1 Exchanging the Battery 19

5 **Cooling 20**

6 **Mounting Instructions 20**

7 **Wiring Guidelines 22**

7.1	Ground	22
7.2	Shielding	22
7.3	ESD Protection	22
7.4	USB Interface Connections	22
8	CAN Bus Setup	23
8.1	CAN Bus Station Number	23
8.2	Number of CAN Bus Participants	23
8.3	CAN Bus Data Transfer Rate	23
9	CAN Bus Termination	24
10	Process Diagram	25
11	Status and Error Messages	26
12	Logo Backlighting (optional)	34
13	Display „Burn-In“ Effect	34
14	Cleaning the Touch Screen	35
15	Disposal	36

1 Technical Data

1.1 Performance Data

Processor	EDGE2 Technology
Processor cores	2 ¹⁾
Internal cache	32-kbyte L1 Instruction Cache 32-kbyte L1 Data Cache 512-kbyte L2 Cache
Internal program and data memory (DDR3 RAM)	512-Mbyte
Internal remnant data memory	512-kbyte SRAM (battery buffered)
Internal storage device	4 GB microSD card (3D-TLC pSLC technology) ²⁾
Internal I/O	yes
Interfaces	2x USB 2.0 type A 1x USB-OTG (host/device), type Mini B 2x Ethernet 1x CAN bus (not galvanically separated)
Internal interface connections and devices	1x TFT color display 1x USB (touch connection)
Display	15" TFT color display
Resolution	1024 x 768 Pixels
Control panel	Touch screen (projective capacitive)
Signal generator	no
Status LEDs	no
Logo backlighting	if existing: RGB
Real-time clock	yes (battery buffered)
Cooling	passive (fanless)

¹⁾ Attention: When programming (with LASAL) on multicore CPUs, particular focus must be placed on thread security!

²⁾ The 4 GByte microSD card is formatted to 1 GByte in order to achieve the lifetime of a standard SLC card. A format change to the full 4 GByte is not allowed and will result in a massive reduction of the microSD card's lifetime.

1.2 Electrical Requirements

Supply voltage	typically +24 V DC (+18-30 V DC)	
Current consumption of power supply at +24 V	typically 730 mA (without externally connected devices)	maximum 890 mA (with externally connected devices)
Inrush current	maximum 2 A for 10 μ s	
UL standard	for UL ¹⁾ : must be supplied with SELV / PELV and Limited Energy Digital output also is SELV / Limited Energy.	

¹⁾ In US according to Class 2 UL 1310 or UL 61010-1, 3rd edition, chapter 9.4 or LPS (limited power supply) UL 60950-1 or Limited Energy UL 1585

1.3 Terminal

Dimensions	376.1 x 310.1 x 47.9 mm (W x H x D)
Material	front plate: 4 mm glass on 1.5 mm aluminium frame
Weight	typically 4.7 kg

Because of the glass surface, you should care that it is not damaged during mounting with strong shocks on the edges or corners!

Les chocs sur les bords ou sur les coins du terminal survenus lors d'un montage peuvent endommager la surface en verre!

1.4 Environmental Conditions

Storage temperature	-10 ... +75 °C	
Environmental temperature	0 ... +55 °C	
Humidity	10-95 %, non-condensing	
Operating conditions	Pollution degree 2 Indoor use altitude up to 2000 m	
EMV resistance	in accordance with EN 61000-6-2 (industrial area)	
EMC - noise generation	in accordance with EN 61000-6-4 (industrial area)	
Vibration resistance	EN 60068-2-6	2-9 Hz: amplitude 3.5 mm 9-200 Hz: 1 g (10 m/s ²)
Shock resistance	EN 60068-2-27	15 g (150 m/s ²) duration 11 ms, 18 shocks
Protection type	EN 60529 protected through the housing	front: IP65 (no UL-rating) cover: IP20 (no UL-rating)

1.5 15" XGA Display

Type	15" TFT color display
Resolution	XGA, 1024 x 768 Pixels
Color depth	24 Bit RGB
LCD mode	normally black ¹⁾
LCD polarizer	transmissive ²⁾
Pixel size	0.297 x 0.297 mm
Active surface	304.1 x 228.1 mm
Backlighting	LED
Contrast	typically 1500:
Brightness	typically 400 cd/m ²
Angle CR ≥ 10	left, right, below, above 85°
Lifespan	by compliance with the ambient conditions, the brightness of the display sinks after 50,000 operating hours to 50 % of the original brightness

¹⁾ If there is no display data, the display is black (LED backlight on).

²⁾ Display technology, with which display backlighting is used.

Due to the production process of displays defective pixels cannot be excluded completely.

1.6 Control Unit

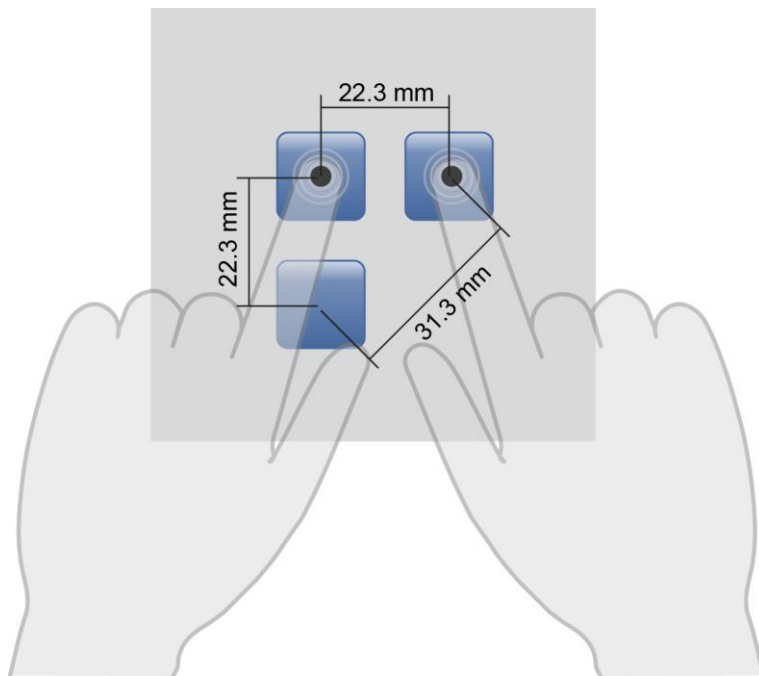
Touch panel	projective capacitive touch panel
Surface	4 mm front glass with black frame
Cleaning	see chapter: Cleaning the Touch Screen

The ETT 1533 has a projective capacitive touch screen is built in, with which 10-finger input, Zoom and gesture functions can be implemented. Data can be input using fingers, a projective capacitive touch pen and while wearing thin gloves. The device must always have a good ground connection so that the function of the touch screen is stable. In addition, it could be that the touch screen must be calibrated for the respective environmental conditions.

L'ETT 1533 dispose d'un écran tactile capacitif projectif avec lequel de gestes avec 10 doigts, multi gestes et fonctions zoom peuvent être réalisées. Les données peuvent être saisies en utilisant les doigts, y compris en portant des gants minces, ou bien un stylo tactile capacitif projectif. Le dispositif doit toujours être correctement mis à la terre afin d'assurer le fonctionnement stable de l'écran tactile. En outre, il se pourrait que l'écran tactile doive être calibré pour les conditions environnementales respectives.

Needed distance of operating elements for multitouch applications:

In order to guarantee smooth operation in multitouch applications, buttons and control elements, which should be operated at the same time, must have the minimum distance shown below (depending on the estimated touch point).



The size of the buttons and control elements directly affects the usability of the application. So small control elements should be avoided.

1.7 Digital Outputs

Number	8
Short-circuit proof	yes
Maximum permitted continuous load current / channel	0,5 A
Maximum total current (all 8-channels)	2 A (100 % of on time)
Voltage drop over power supply (output active)	$\leq 1 \text{ V}$
Residual current (off)	$\leq 12 \text{ }\mu\text{A}$
Turn-on delay	$< 400 \text{ }\mu\text{s}$
Turn-off delay	$< 400 \text{ }\mu\text{s}$
Max. braking energy of inductive loads	1 channel 0.12 [Joules]

1.8 Digital Inputs

Number	8	
Input voltage	typically +24 V	maximum +30 V
Signal level	low: $< +4.5 \text{ V}$	high: $> +14 \text{ V}$
Switching threshold	typically +11 V	
Input current	typically 5 mA at + 24 V	
Input delay	typically 5 ms	

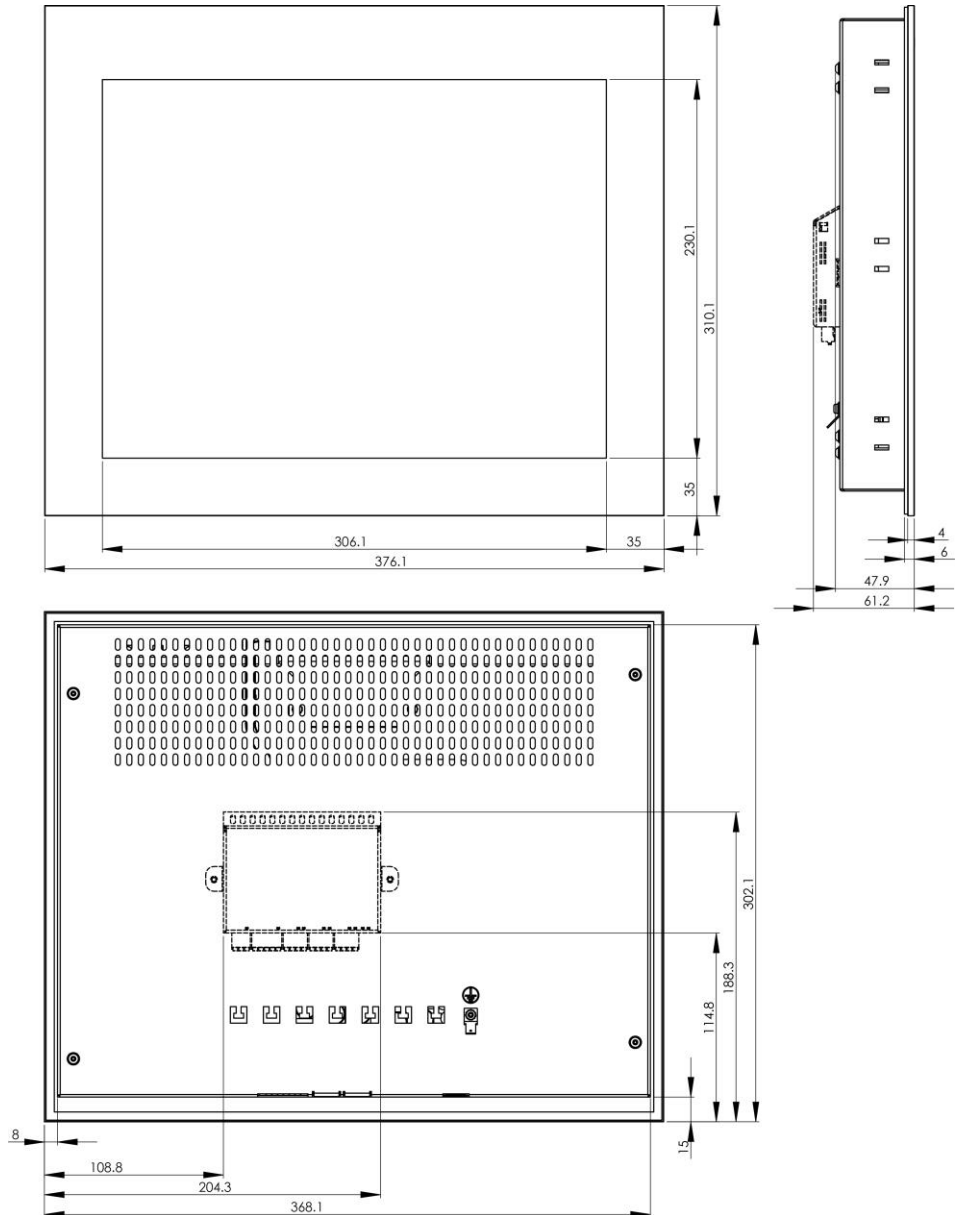
1.9 Miscellaneous

Article number	01-230-1533
Hardware version	3.x
Operating system	Salamander
Standard IP address	10.10.150.1
Standard	UL 61010-2-201
Approbations	UL, cUL, CE

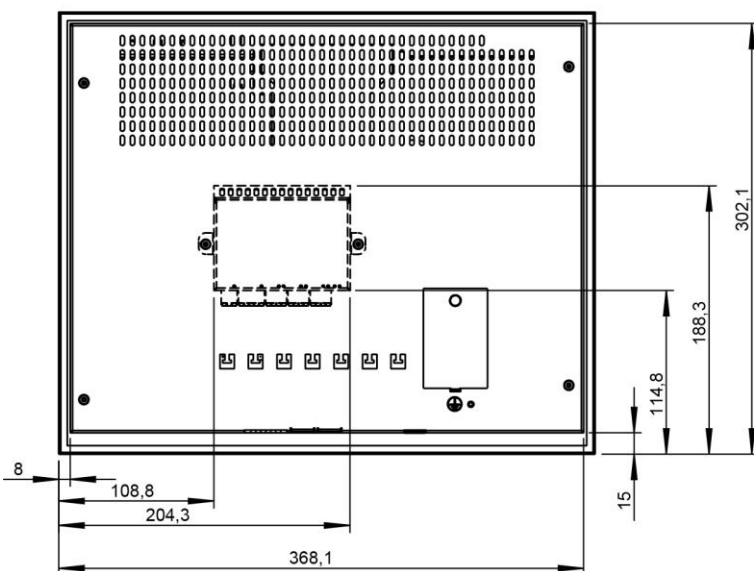
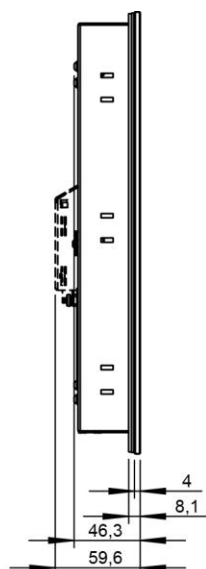
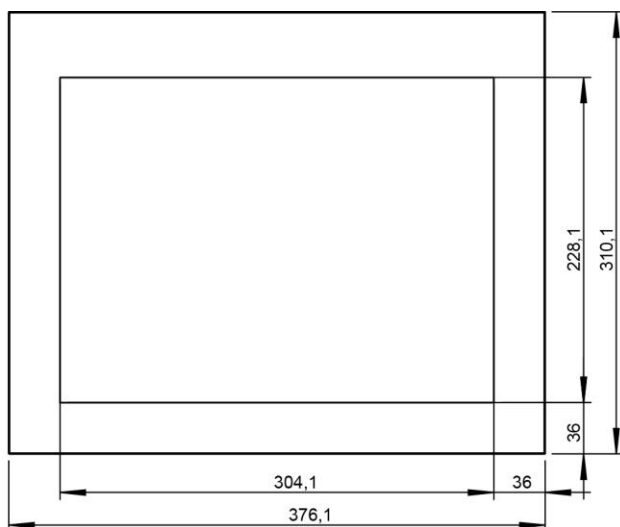
	Warning to the installer
	Temperature rating of the cable to be connected to the terminals
	Temperature resistance of the cable insulation must be above 70 °C

2 Mechanical Dimensions

2.1 Up to HW Version 2.60

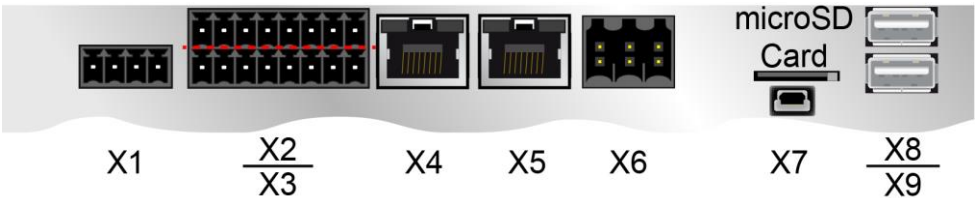


2.2 Starting from HW Version 2.70

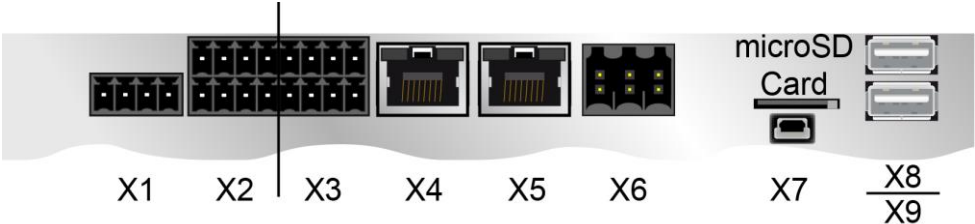


3 Connector Layout

Backside starting with HW 2.40



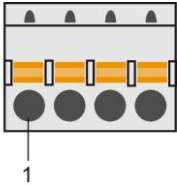
Backside up to HW 2.30



X1: Supply (4-pin Phoenix RM 3.5)

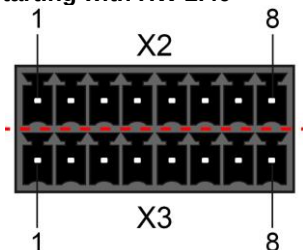


Pin	Function
1	+24 V DC DIG IOs
2	+24 V DC
3	GND
4	GND



X2 and X3: 8 Digital Outputs, 8 Digital Inputs (8-pin Phoenix RM 3.5)

Starting with HW 2.40



X2: Pin Assignment

Pin	Function
1	Output 1
2	Output 2
3	Output 3
4	Output 4
5	Input 1
6	Input 2
7	Input 3
8	Input 4

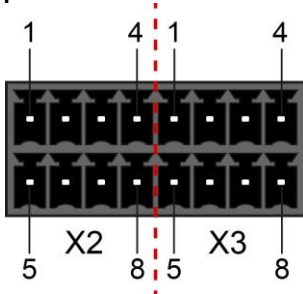
OUTPUTS : INPUTS

1	2	3	4	1	2	3	4
5	6	7	8	5	6	7	8

X3: Pin Assignment

Pin	Function
1	Output 5
2	Output 6
3	Output 7
4	Output 8
5	Input 5
6	Input 6
7	Input 7
8	Input 8

Up to HW 2.30



X2: Pin Assignment

Pin	Function
1	Output 1
2	Output 2
3	Output 3
4	Output 4
5	Output 5
6	Output 6
7	Output 7
8	Output 8

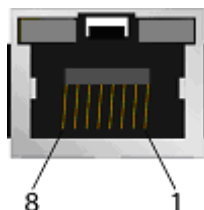
OUTPUTS : INPUTS

1	2	3	4	1	2	3	4
5	6	7	8	5	6	7	8

X3: Pin Assignment

Pin	Function
1	Input 1
2	Input 2
3	Input 3
4	Input 4
5	Input 5
6	Input 6
7	Input 7
8	Input 8

X4, X5: Ethernet 10/100 (RJ45)



Pin	Function
1	Rx+
2	Rx-
3	Tx+
4	n.c.
5	n.c.
6	Tx-
7	n.c.
8	n.c.

n.c. = do not use

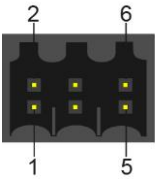
Problems can arise if a control is connected to an IP network, which contains modules that do not have a SIGMATEK operating system. With such devices, Ethernet packets could be sent to the control with such a high frequency (i.e. broadcasts), that the high interrupt load could cause a real-time runtime error or runtime error. By configuring the packet filter (Firewall or Router) accordingly however, it is possible to connect a network with SIGMATEK hardware to a third party network without triggering the error mentioned above.

Des problèmes peuvent survenir si un automate est connecté à un réseau IP contenant des modules qui ne fonctionnent pas sous un système d'exploitation SIGMATEK. Avec de tels dispositifs, les paquets Ethernet peuvent être envoyés à l'automate avec une fréquence tellement élevée (càd. diffusion), que les interruptions ainsi générées peuvent provoquer une erreur d'exécution. En configurant d'une façon appropriée le filtre de paquets (pare-feu ou un routeur) il est toutefois possible de connecter un réseau avec le matériel SIGMATEK à un réseau tiers sans déclencher l'erreur mentionnée ci-dessus.

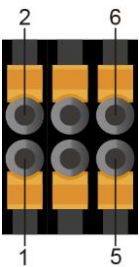
For use in local networks only, not in telecommunication circuits.

Pour une utilisation dans les réseaux locaux uniquement, et non pas dans de circuits de télécommunications.

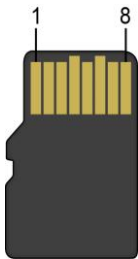
X6: CAN (6-pin Weidmüller RM 3.5 not galvanically separated)



Pin	Function
1	CAN A (LOW)
2	CAN B (HIGH)
3	CAN A (LOW)
4	CAN B (HIGH)
5	GND
6	GND



microSD Card



Pin	Function
1	DAT2
2	CD/DAT3
3	CMD
4	+3V3
5	CLK
6	GND
7	DAT0
8	DAT1

**It is recommended that only storage media provided by SIGMATEK (CompactFlash cards, microSD cards etc.) be used.
Order number for 4 Gbyte EDGE2: 12-630-105**

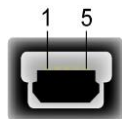
**Il est recommandé de n'utiliser que les supports de stockage approuvés par SIGMATEK (compact flash, microSD, etc.).
Numéro de commande pour la carte microSD 4 Go EDGE2 est le: 12-630-105**

The microSD card is not meant to be used as a removable media and thus only should be removed from the card holder for maintenance purposes.

The number of read and write actions have a significant influence on the lifespan of the storage media.

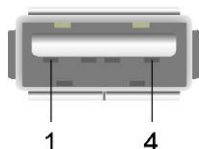
Le nombre de cycles de lecture et d'écriture a l'influence notable sur la durée de vie des supports de stockage.

X7: USB 2.0 (Type Mini B)



Pin	Function
1	+5 V
2	D-
3	D+
4	ID
5	GND

X8, X9: USB 2.0 (Type A)



Pin	Function
1	+5 V_USB
2	D-
3	D+
4	GND

It should be noted that many of the USB devices on the market do not comply with USB specifications; this can lead to device malfunctions. This can lead to malfunction of the device. It is also possible that these devices will not be detected at the USB port or function correctly. Therefore, it is recommended that every USB stick be tested before actual use.

Il faut souligner que la plupart des périphériques USB sur le marché ne sont pas conformes aux spécifications USB, ce qui peut entraîner des dysfonctionnements de l'appareil. Il est également possible que ces dispositifs ne seront pas détectés par le port USB ou qu'ils ne fonctionnent pas correctement. Par conséquent, il est recommandé que chaque clé USB soit testée avant l'utilisation sur l'automate.

3.1 Applicable Connectors

- X1:** 4-pin Phoenix plug with spring terminal FK-MCP 1.5/ 4-ST-3.5 (included with delivery)
- X2:** 2x 8-pin Phoenix plug with spring terminal FMC 1.5/ 8-ST-3.5 (included with delivery)
- X4, X5:** 8-pin RJ45
- X6:** 6-pin Weidmüller plug B2L/B2CF 3,5/6 (included in delivery)
- X7:** USB Type Mini B OTG cable (host) or USB Type Mini B to USB Type A cable (device) (no included with delivery)
- X8, X9:** USB 4-pin, Type A (downstream connector) (no included with delivery)

4 Buffer Battery

The exchangeable buffer battery ensures that the clock time (RTC) and zero voltage safe data 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: 01-690-028

Numéro de commande de la pile: 01-690-028

	COMPANY	DATA
Lithium battery	RENATA	3.0 V/225 mAh

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

Utilisez seulement des piles de RENATA CR2032!
ATTENTION! La pile peut exploser si elle n'est pas manipulée correctement! Ne pas recharger, démonter ou jeter au feu!

When the battery voltage is in between the supervisor circuit thresholds it may happen that the battery is detected "good" during operation but "low" after a power cycle. If this happens it is recommended to replace the battery.

4.1 Exchanging the Battery



1. Switch off the ETT's power supply. From this moment on you have three minutes to exchange the battery.

2. Open the screws of the battery cover.



3. Take out the battery with the help of the strap.

4. Insert new battery with the correct polarity (+ pole at the back, see graphics).

5. Close battery cover.

5 Cooling

The terminal's power loss can reach up to 20 Watts. To ensure the necessary air circulation for cooling, the following mounting instructions must be followed!

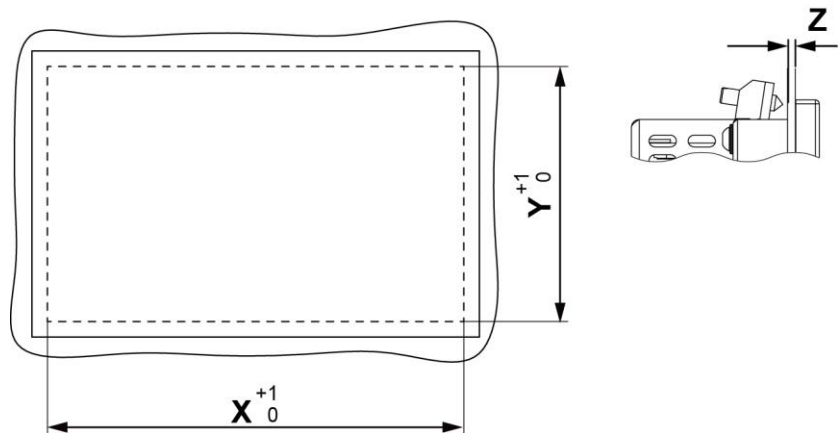
6 Mounting Instructions

Because of the glass surface, you should care that it is not damaged during mounting with strong shocks on the edges or corners!
Les chocs sur les bords ou sur les coins du terminal survenus lors d'un montage peuvent endommager la surface en verre!

The following hints should be cares for when mounting the terminal:

- For mounting with the spring clips included in delivery a material thickness of the wall between min. 1 mm and max. 6 mm is recommended. The spring clips may be fixed with a maximum torque of 0.15-0.20 Nm. For this a slotted screwdriver 3x0.5 must be used.
- To avoid damages of the glass care for cleanliness (dirt, bumps) of the contact area of the wall during mounting. Bumps can lead to tensions in the glass or intrusion of dust and water.

Required Cutout for Mounting the Terminal:

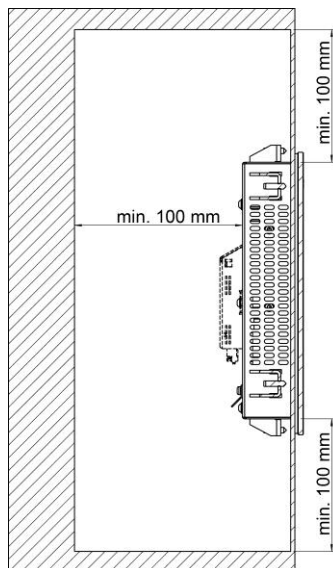


Control cabinet cutout width X	360.9 mm
Control cabinet cutout height Y	287.6 mm
Maximum thickness of control cabinet wall Z	6 mm

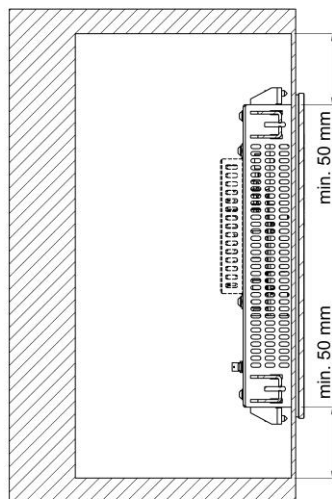
The following distance from the housing should be maintained:

- Left and right 5 cm
- Back side, above and below 10 cm

Section side view:

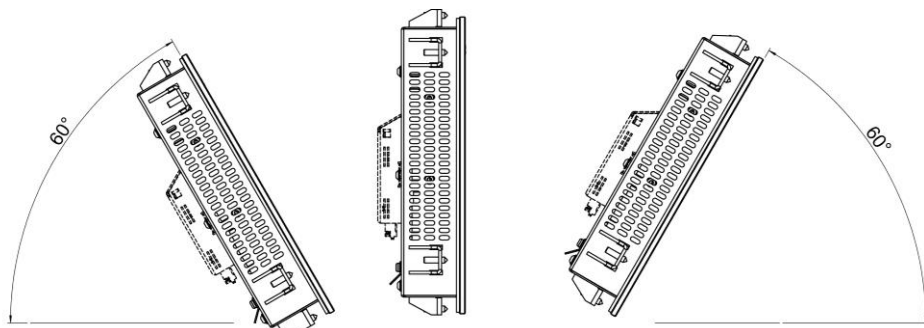


section top view



The specified mounting distances can be reduced under some circumstances, if appropriate action and technical precautions are taken to drain the resulting loss.

A mounting position of 60-120° is also required.



7 Wiring Guidelines

7.1 Ground

The device must be grounded to protective earth (PE) via the blade terminal provided. In addition, ensure that when installing into the control cabinet, a large grounding surface is provided. It is important to establish a low-Ohm connection to ground to ensure error-free function. The ground connection must be made with the maximum wire cross-section and largest (electrical) surface possible. The cable length of the ground connection must also be kept as short as possible.

7.2 Shielding

For the Ethernet, CAT5 cables with shielded RJ45 connectors must be used. The shielding on the CAT5 cable is connected to ground over the RJ45 plug connector. Noise signals can therefore be prevented from reaching the electronics and affecting the function.

7.3 ESD Protection

Typically, USB devices (keyboard, mouse) are not equipped with shielded cables. These devices are disrupted by ESD and in some instances, no longer function.

Before any device is connected to, or disconnected from the terminal, the potential should be equalized (by touching the control cabinet or ground terminal). This will allow the dissipation of electrostatic loads (caused by clothing/shoes).

7.4 USB Interface Connections

The terminal has a USB interface. In LASAL, this interface can be used for various USB devices (keyboard, mouse, storage media, hubs, etc.). Using a hub, several USB devices can be connected that are then fully functional in LASAL.

8 CAN Bus Setup

This section explains how to configure a CAN bus correctly. The following parameters must first be set: Station number and data transfer rate.

8.1 CAN Bus Station Number

Each CAN bus station is assigned its own station number. With this station number, data can be exchanged with other stations connected to the bus. In a CAN bus system however, each station number can only be assigned once!

8.2 Number of CAN Bus Participants

The maximum number of participants on the CAN bus depends on the cable length, termination resistance, data transfer rate and the drivers used in the participants.

With a termination resistance of $2 \times 120 \, \Omega$, at least 100 bus participants are possible.

8.3 CAN Bus Data Transfer Rate

Various data transfer rates (baud rates) can be set on the CAN bus. The longer the bus line is, the lower the data transfer rate that must be selected.

Value	Baud Rate	Maximum Length
0	615 Kbits/s ¹⁾	60 m
1	500 kbit/s	80 m
2	250 Kbits/s	160 m
3	125 Kbits/s	320 m
4	100 Kbits/s	400 m
5	50 Kbits/s	800 m
6	20 kbits/s	1200 m
7	1 Mbit/s	30 m

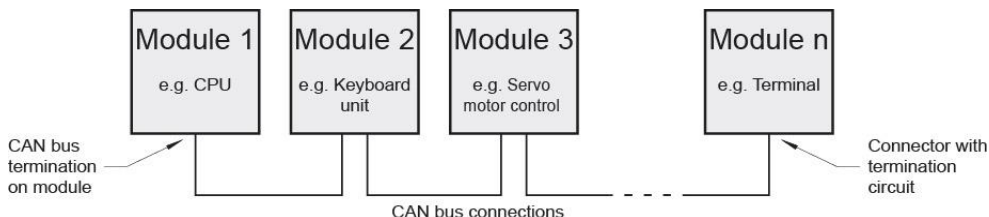
¹⁾ only between devices with EDGE2 technology

These values apply to the following cable: 120 Ω Twisted Pair.

Note: For the CAN bus protocol: 1 kbit/s = 1 kBaud.

9 CAN Bus Termination

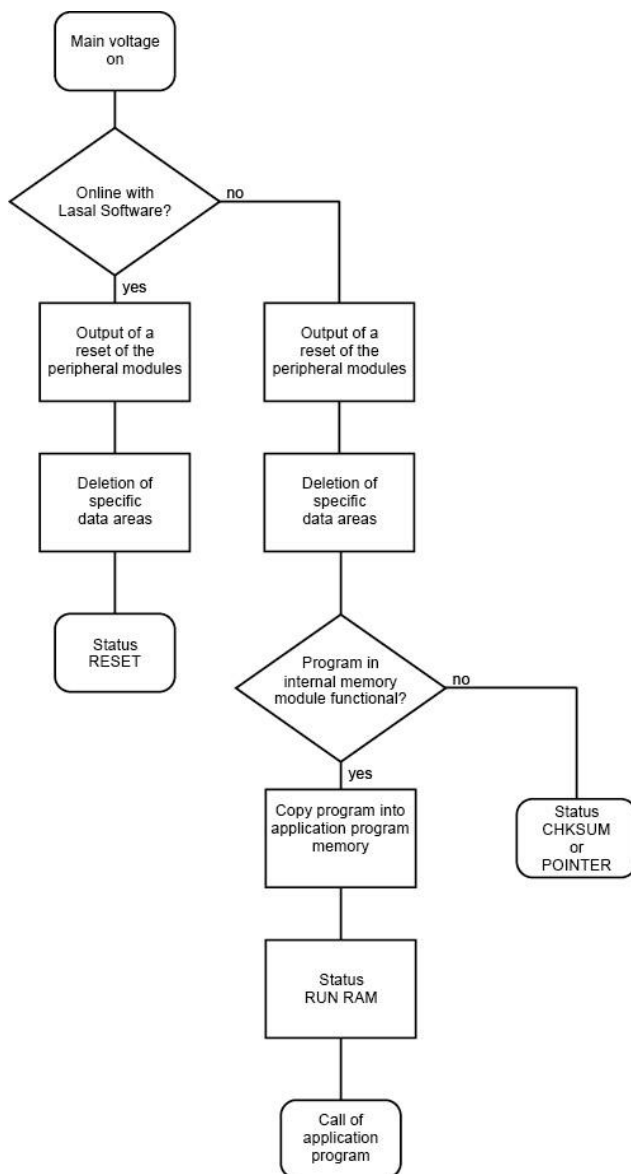
In a CAN bus system, both end modules must be terminated. This is necessary to avoid transmission errors caused by reflections in the line.



For the CAN interfaces, the terminal has a $120\ \Omega$ switchable termination resistor that can be turned on and off through the application.

The termination is made by an internal switchable $120\ \Omega$ resistor between CAN A (LOW) and CAN B (HIGH).

10 Process Diagram



11 Status and Error Messages

Status and error messages are shown in the status test of the LASAL CLASS software. POINTER or CHKSUM messages can also be shown on the terminal screen.

With missing microSD card or a microSD card with a defective operating system version the terminal will not boot and the logo is not lighted!

Number	Message	Definition	Cause/Solution
00	RUN RAM	The user program is currently running in RAM. The display is not affected.	Info
01	RUN ROM	The user program stored in the program memory module loaded into the RAM is currently running. The display is not affected.	Info
02	RUNTIME	The total time for all cyclic objects exceed the maximum time; the time can be configured using two system variables: - Runtime: time remaining - SWRuntime: pre-selected value for the runtime counter	Solution: - Optimize the application's cyclic task. - Use higher capacity CPU - Configure preset value
03	POINTER	Incorrect program pointers were detected before running the user program	Possible Causes: - The program memory module is missing, not programmed or defect. - The program in the user program memory (RAM) is not executable. - The buffering battery has failed. - The user program has overwritten a software error. Solution: - Reprogram the memory module, if the error reoccurs exchange the module. - Exchange the buffering battery - Correct programming error
04	CHKSUM	An invalid checksum was detected before running the user program.	Cause/solution: s. POINTER

05	WATCHDOG	The program was interrupted via the watchdog logic.	Possible Causes: - User program interrupts blocked over a longer period of time (STI command forgotten) - Programming error in a hardware interrupt. - INB, OUTB, INW, OUTW instructions used incorrectly. - The processor is defect. Solution: - Correct programming error. - Exchange CPU.
06	GENERAL ERROR	General error An error has occurred while stopping the application over the online interface.	The error occurs only during the development of the operating system.
07	PROM DEFECT	An error has occurred while programming the memory module.	Cause: - The program memory module is defect. - The user program is too large. - The program memory module is missing. Solution: - Exchange the program memory module
08	RESET	The CPU has received the reset signal and is waiting for further instructions. The user program is not processed.	Info
09	WD DEFEKT	The hardware monitoring circuit (watchdog logic) is defective. After power-up, the CPU checks the watchdog logic function. If an error occurs during this test, the CPU deliberately enters an infinite loop from which no further instructions are accepted.	Solution: - Exchange CPU.
10	STOP	The program was stopped by the programming system.	
11	PROG BUSY	Reserved	
12	PROGRAM LENGTH	Reserved	
13	PROG END	A memory module was successfully programmed.	Info
14	PROG MEMO	The CPU is currently programming the memory module.	Info

15	STOP BRKPT	The CPU was stopped by a breakpoint in the program.	Info
16	CPU STOP	The CPU was stopped by the programming software.	Info
17	INT ERROR	The CPU has triggered a false interrupt and stopped the user program or has encountered an unknown instruction while running the program.	Cause: - A non-existent operating system was used. - Stack error (uneven number of PUSH and POP instructions). - The user program was interrupted through a software error. Solution: - Correct program error
18	SINGLE STEP	The CPU is in single step mode and is waiting for further instructions.	Info
19	READY	A module or project was sent to CPU and it is now ready to run the program.	Info
20	LOAD	The program is stopped and the CPU is currently receiving a new module or project.	Info
21	UNZUL. MODULE	The CPU has received a module that does not belong to the project.	Solution: - Recompile and download the entire project
22	MEMORY FULL	The operating system memory /heap) is too small. No memory could be reserved while calling an internal or interface function from the application.	Cause: - Memory is only allocated but not released. Solution: - Clear memory
23	NOT LINKED	When starting the CPU, a missing module or a module that does not belong to the project was detected.	Solution: - Recompile and download the entire project
24	DIV BY 0	A division error has occurred.	Possible Causes: - Division by 0. - The result of a division does not fit in the result register. Solution: - Correct program error
25	DIAS ERROR	While accessing a DIAS module, an error has occurred.	Hardware problem
26	WAIT	The CPU is busy.	Info

27	OP PROG	The operating system is currently being reprogrammed.	Info
28	OP INSTALLED	The operating system has been reinstalled.	Info
29	OS TOO LONG	The operating system cannot be loaded; too little memory.	Restart; report error to SIGMATEK.
30	NO OPERATING SYSTEM	Boot loader message. No operating system found in RAM.	Restart; report error to SIGMATEK.
31	SEARCH FOR OS	The boot loader is searching for the operating system in RAM.	Restart; report error to SIGMATEK.
32	NO DEVICE	Reserved	
33	UNUSED CODE	Reserved	
34	MEM ERROR	The operating system loaded does not match the hardware configuration.	Solution: - Use the correct operating system version
35	MAX IO	Reserved	
36	MODULE LOAD ERROR	The LASAL Module or project cannot be loaded.	Solution: - Recompile and download the entire project
37	BOOTIMAGE FAILURE	A general error has occurred while loading the operating system.	Solution: - Contact SIGMATEK
38	APPLMEM ERROR	An error has occurred in the application memory (user heap).	Solution: - Correct allocated memory access error
39	OFFLINE	This error does not occur in the control.	This error code is used in the programming system to show that there is no connection to the control.
40	APPL LOAD	Reserved	
41	APPL SAVE	Reserved	
44	VARAN MANAGER ERROR	An error number was entered in the VARAN manager and stopped the program.	Solution: - Read logfile
45	VARAN ERROR	A required VARAN client was disconnected or communication error has occurred.	Solution: - Read logfile - Error Tree

46	APPL-LOAD-ERROR	An error has occurred while loading the application.	Cause: - Application was deleted. Solution: - Reload the application into the control.
47	APPL-SAVE-ERROR	An error has occurred while attempting to save the application.	
50	ACCESS-EXCEPTION-ERROR	Read or write access of a restricted memory area. (I.e. writing to the NULL pointer).	Solution: - Correct application errors
51	BOUND EXCEEDED	An exception error has occurred when accessing arrays. The memory area was overwritten through accessing an invalid element.	Solution: - Correct application errors
52	PRIVILEGED INSTRUCTION	An unauthorized instruction for the current CPU level was given. For example, setting the segment register.	Cause: - The application has overwritten the application program code. Solution: - Correct application errors
53	FLOATING POINT ERROR	An error has occurred during a floating-point operation.	
60	DIAS-RISC-ERROR	Error from the Intelligent DIASMaster.	Restart; report error to SIGMATEK.
64	INTERNAL ERROR	An internal error has occurred, all applications are stopped.	Restart; report error to SIGMATEK.
65	FILE ERROR	An error has occurred during a file operation.	
66	DEBUG ASSERTION FAILED	Internal error.	Restart; report error to SIGMATEK.
67	REALTIME RUNTIME	The total time for all real time objects exceeds the maximum time allowed. The time cannot be configured. 2 ms for 386 CPUs 1 ms for all other CPUs	Solution: - Optimize the application's real-time task (RtWork). - Reduce the clock time for the real-time task of all objects. - Correct application errors - CPU is overloaded in real-time => use a higher capacity CPU.
68	BACKGROUND RUNTIME	The total time for all background objects exceed the maximum time; the time can be configured using two system variables: -BTRuntime: time remaining SWBTRuntime: pre-selected value for the runtime counter	Solution: - Optimize the application's background task (background) - Use higher capacity CPU - Set SWBTRuntime correctly

70	C-DIAS ERROR	A connection error with a C-DIAS module has occurred.	Cause: - The cause of the error is documented in the log file Solution: - This depends on the cause
72	S-DIAS ERROR	A connection error with a S-DIAS module has occurred.	Possible causes: - real network does not match the project - S-DIAS client is defective Solution: - analyze logfile
75	SRAM ERROR	An error occurred while initializing, reading or writing SRam data.	Possible Causes: - SRam configured incorrectly - Battery for the internal program memory supply is empty Solution: - Analyze log file (Event00.log, Event19.log) - Check configuration - Change internal program memory supply battery
96	USER DEFINED 1	User-definable code.	
97	USER DEFINED 2	User-definable code.	
98	USER DEFINED 3	User-definable code.	
99	USER DEFINED 4	User-definable code.	
100	C_INIT	Initialization start; the configuration is run.	
101	C_RUNRAM	The LASAL project was successfully started from RAM.	
102	C_RUNROM	The LASAL project was successfully started from ROM.	
103	C_RUNTIME		
104	C_READY	The CPU is ready for operation.	
105	C_OK	The CPU is ready for operation.	

106	C_UNKNOWN_CID	An unknown object from a stand-alone or embedded object, or an unknown base class was detected.	
107	C_UNKNOWN_CONSTR	The operating system class cannot be created; the operating system is probably wrong.	
108	C_UNKNOWN_OBJECT	Indicates an unknown object in an interpreter program; more the one DCC080 object.	
109	C_UNKNOWN_CHNL	The hardware module number is greater than 60.	
110	C_WRONG_CONNECT	No connection to the required channels.	
111	C_WRONG_ATTR	Wrong server attributes.	
112	C_SYNTAX_ERROR	No specific error, recompile all project components and reload the project.	
113	C_NO_FILE_OPEN	An attempt was made to open an unknown table.	
114	C_OUTOF_NEAR	Memory allocation error	
115	C_OUT OF_FAR	Memory allocation error	
116	C_INCOMAPTIBLE	An object with the same name already exists but has a different class.	
117	C_COMPATIBLE	An object with the same name and class already exists but must be updated.	
224	LINKING	The application is currently linking.	
225	LINKING ERROR	An error has occurred while linking. An error messaged is generated in the LASAL status window.	
226	LINKING DONE	Linking is complete.	
230	OP BURN	The operating system is currently being burned into the Flash memory.	
231	OP BURN FAIL	An error has occurred while burning the operating system.	
232	OP INSTALL	The operating system is currently being installed.	
240	USV-WAIT	The power supply was disconnected; the UPS is active. The system is shutdown.	
241	REBOOT	The operating system is restarted.	
242	LSL SAVE		

243	LSL LOAD		
252	CONTINUE		
253	PRERUN	The application is started.	
254	PRERESET	The application is ended.	
255	CONNECTION BREAK		

12 Logo Backlighting (optional)

The application can control the color and intensity of the logo backlighting. This is realized with the three primary colors (red, green, blue) in a value range between 0 and 100.

Activation of the until processing of the autoexec.lsl	Logo lights (white)
In the CLI, while processing the autoexec.lsl until the application is running	Logo blinks (white)
During execution of the application	Logo lights (white) (except differently controlled by the application)

13 Display „Burn-In“ Effect

The “Burn-In” effect means the burning in of a pattern in the display after a longer display of the same contents (e.g. one screen).

This effect often is also called “image sticking”, “memory effect/sticking” or “ghost image”.

A temporary and a permanent effect is distinguished here. The temporary effect disappears after a longer switching off of the display or when dynamic contents is displayed. The permanent effect can lead to permanent damage of the display.

This effect can occur because of the following reasons:

- Operation without screen saver
- Longer display of the same contents (e.g. one screen)
- Operation with high ambient temperatures
- Operation outside the specifications

The effect can be avoided/reduced by the following actions:

- Using a screen saver
- Deactivating the display when not using it
- Continuous change of contents (e.g. video)

14 Cleaning the Touch Screen

CAUTION!

Before cleaning the touch screen, the terminal must first be turned off to avoid unintentionally triggering functions or commands!

ATTENTION!

Avant de nettoyer l'écran tactile, le terminal doit d'abord être éteint afin d'éviter un déclenchement involontaire des commandes!

Never clean the glass surface punctually, but always extensively and possibly moist. This avoids, that the wiping during the cleaning procedure causes scratches due to the dust, sand, etc. on the glass surface.

When removing fat (finger prints, etc.) apply a commercially available glass cleanser extensively. Foam cleanser proved of value for this cleaning procedure. Wipe the applied cleanser with a soft, clean, colorless (white) cotton cloth. When cleaning, do not apply pressure to the glass surface. Continue the wiping, until the cleanser dries even. If necessary repeat the procedure, until the staining is removed.

The cleaning solution or water should not be allowed to reach the terminal electronics, for example, through the ventilation slots.

No alkaline cleansers or hard objects that can scratch or damage the touch screen may be used.

If the terminal comes in contact with toxic or erosive chemicals, clean the terminal immediately and with caution to prevent acid damage.

To ensure the optimal function of the terminal, the touch screen should be cleaned at regular intervals!

To extend the lifespan of the touch screen as much as possible, using the fingers to operate the terminal is recommended.

Pour garantir le fonctionnement optimal du terminal, le terminal doit être nettoyé régulièrement!

Pour prolonger la durée de vie de l'écran tactile on recommande d'utiliser les doigts pour l'opérer.

15 Disposal

To dispose of the product, the respective, possibly country-dependent, guidelines must be met and followed.

Documentation Changes

Change date	Affected page(s)	Chapter	Note
24.08.2015			Label
12.10.2015	13	3.1 Backside	Pin 4 changed
06.11.2015	14	4 Buffer Battery	Zero voltage safe data
23.11.2015	7	1.6 Control Unit	Multitouch distance added
11.12.2015	21	8.3 CAN Bus Termination	120 Ω instead of 150 Ω
22.11.2015	6	1.6 Control Unit	Note for touch pen
23.12.2015	20	8 CAN Bus Setup	Updated
26.01.2016	6	1.6 Control Unit	Note for touch pen removed
22.02.2016	4	1.5 Display	Pixel error note added
	16	4. Exchanging the Battery	Battery cover
	17	6 Mounting Instructions	Note added
	31	13 Display "Burn-In" Effect	Chapter added
19.04.2016	4	1.1 Performance Data	Table updated
20.06.2016	1		Photo
	4	1.1 Performance Data	Logo backlighting
	7	1.6 Control Unit	Size of control elements
	9	2 Mechanical Dimensions	Graphics
	32	12 Logo Backlighting	Optional
23.09.2016	5	1.4 Environmental Conditions	Shock resistance specifications
	6	1.5 Display	Lifespan added, Note LCD
	13	3.1 Backside	Note microSD
	14		X7 USB 2.0
	14		X8, X9 speed
	33	15 Disposal	Chapter added

24.11.2016	28	11 Status and Error Messages	Error code 75 added
01.12.2016	4	1.1 Performance data	Changed description to "Multi-Touch Operating Panel" Processor cores added
	8	1.7 Digital Outputs	Changed values of Maximum continuous current load and Maximum total current
	15	4 Buffer Battery	Battery surveillance added
23.01.2017	5	1.2 Electrical Requirements 1.4 Environmental Conditions	Table content changed
	8	1.9 Miscellaneous	
06.02.2017	10	1.9 Miscellaneous	Added cable insulation temperature resistance
21.06.2017	20	6 Mounting Instructions	Note mounting distances added
07.01.2019	10	1.9 Miscellaneous	Standard IP address appended to the schedule
19.06.2019	12	3 Connector Layout	HW versions added
21.10.2020	5	1.3 Terminal	For Material on 1.5 mm aluminum frame inserted
	12	2 Mechanical Dimensions	2.2 Starting from HW Version 2.70 added
24.11.2020	4	1.1 Performance Data	Footnote cores (programming) added
08.04.2021	10	1.9 Miscellaneous	Hardware version changed to 3.x
	20	6 Mounting Instructions	Torque of spring clips changed to 0.15-0.20 Nm Graphic + table inserted
	22	7.1 Ground	Text block reworded
20.11.2023	13	3 Connector Layout	B2CF added
13.03.2024	4	1.1 Performance Data	microSD card updated
	13	3 Connector Layout	
04.11.2024	18	4 Buffer Battery	Battery data changed