

ETT 775

Build-in Touch Terminal

Instruction Manual

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Translation from German

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Build-in Touch Terminal

ETT 775

The build-in touch terminal is an intelligent panel for visualizing, operating and monitoring automated processes.

A resistive touch screen serves as the input medium for process data and parameters. The output is shown on a 7" WVGA TFT color display.

With the LSE visualization tool, graphics can be created on the PC, then stored and displayed on the build-in touch terminal.

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



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1 Introduction

1.1 Target Group/Purpose of this Operating Manual

This operating manual contains all information required for the operation of the product.

This operating manual is intended for:

- Project planners
- Technicians
- Commissioning engineers
- Machine operators
- Maintenance/test technicians

General knowledge of automation technology is required.

Further help and training information, as well as the appropriate accessories can be found on our website www.sigmatek-automation.com.

Our support team is happily available to answer your questions.
Please see our website for our hotline number and business hours.

1.2 Important Reference Documentation

This and additional documents can be downloaded from our website or obtained through support.

1.3 Contents of Delivery

1x ETT 775

1.4 Accessories (optional)

TFS 0xx Series: CAN FlowControl Circuit Board
TG 2xx Series: Temperature Control Unit I/O Electronics

2 Basic Safety Guidelines

2.1 Symbols Used

The following symbols are used in the operator documentation for warning and danger messages, as well as informational notes:

DANGER



Danger indicates that death or serious injury **will occur**, if the specified measures are not taken.

⇒ To avoid death or serious injuries, observe all guidelines.

Danger indique une situation dangereuse qui, faute de prendre les mesures adéquates, **entraînera** des blessures graves, voire mortelles.

⇒ Respectez toutes les consignes pour éviter des blessures graves, voire mortelles.

WARNING



Warning indicates that death or serious injury **can** occur, if the specified measures are not taken.

⇒ To avoid death or serious injuries, observe all guidelines.

Avertissement d'une situation dangereuse qui, faute de prendre les mesures adéquates, **entraînera** des blessures graves, voire mortelles.

⇒ Respectez toutes les consignes pour éviter des blessures graves, voire mortelles.

CAUTION



Caution indicates that moderate to slight injury **can** occur, if the specified measures are not taken.

⇒ To avoid moderate to slight injuries, observe all guidelines.

Attention indique une situation dangereuse qui, faute de prendre les mesures adéquates, **peut** entraîner des blessures assez graves ou légères.

⇒ Respectez toutes les consignes pour éviter des blessures graves, voire mortelles.

INFORMATION**Information**

- ⇒ Provides important information on the product, handling or relevant sections of the documentation, which require attention.

2.2 Disclaimer

The contents of this operating manual were prepared with the greatest care. However, deviations cannot be ruled out. This operating manual is regularly checked and required corrections are included in the subsequent versions. The machine manufacturer is responsible for the proper assembly, as well as device configuration. The machine operator is responsible for safe handling, as well as proper operation.

The current operating manual can be found on our website. If necessary, contact our support.

Subject to technical changes, which improve the performance of the devices. The following operating manual is purely a product description. It does not guarantee properties under the warranty.

Please thoroughly read the corresponding documents and this operating manual before handling a product.

SIGMATEK GmbH & Co KG is not liable for damages caused through, non-compliance with these instructions or applicable regulations.

2.3 General Safety Directives

The Safety Directives in the other sections of this operating manual must be observed. These instructions are visually emphasized by symbols.

According to EU Directives, the operating manual is a component of a product. This operating manual must therefore be accessible in the vicinity of the machine since it contains important instructions. This operating manual should be included in the sale, rental or transfer of the product, or its online availability indicated.

Regarding the requirements for Safety and health connected to the use of machines, the manufacturer must perform a risk assessment in accordance with machine directives 2006/42/EG before introducing a machine to the market.

INFORMATION



Operate the unit with devices and accessories approved by SIG-MATEK only.

CAUTION



Handle the device with care and do not drop or let fall. Prevent foreign bodies and fluids from entering the device. The device must not be opened!

Manipulez l'appareil avec précaution et ne le laissez pas tomber. Empêchez les corps étrangers et les liquides de pénétrer dans l'appareil. L'appareil ne doit pas être ouvert !

If the device does not function as intended or has damage that could pose a danger, it must be replaced!

En cas de fonctionnement non conforme ou de dommages pouvant entraîner des risques, l'appareil doit être remplacé !

For your own safety and that of others, compliance with the environmental conditions is essential.

Pour votre propre sécurité et celle des autres, le respect des conditions environnementales est essentiel.

2.4 Software/Training

The application is created with the software LASAL CLASS 2 and LASAL SCREEN Editor.

Training for the LASAL development environment, with which the product can be configured, is provided. Information on our training schedule can be found on our website.

3 Technical Data

3.1 Performance Data

Processor	EDGE2 Technology
Processor cores	1
Internal cache	32-kbyte L1 Instruction Cache 32-kbyte L1 Data Cache 512-Kbyte L2 Cache
Internal program and data memory (DDR3 RAM)	256 Mbytes
Internal remnant data memory	256-kByte SRAM (battery buffered)
Internal storage device	4 GB microSD card (3D-TLC pSLC technology) ¹⁾
Internal I/O	no
Interfaces	1x USB 2.0 Type A (front) 1x USB device 1.1, Type Mini-B (back) 1x Ethernet 10/100 (RJ45) 1x CAN bus (6-pin Weidmüller) 1x RS485/Modbus (6-pin Weidmüller) 1x RS232 (9-pin D-Sub) 1x TTY for a max. of 6 participants (6-pin Phoenix Contact)
Internal interface connections and devices	1x TFT-LCD color display 1x touch screen
Display	7" TFT color display
Resolution	800 x 480 Pixels
Operating panel	4-wire touch screen (analog resistive)
Signal generator	no
Status LEDs	1x front LED bi-color RED/GREEN (controllable through the application)
Real-time clock	yes
Cooling	passive (fanless)

¹⁾ 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.

3.2 TTY Specifications

Number of interfaces	1		
Adjustable data transfer rate	2400 Baud, 4800 Baud, 9600 Baud		
Over voltage protection	TTY	pin 20 mA	70 V
Voltage drop	Rx < 3 V	Tx < 2 V	
Maximum number of TTY participants	depends on the voltage drop on the participants, cables and connectors (maximum of 6)		
Short-circuit proof	yes		

3.3 Electrical Requirements

Supply voltage	typically +24 V DC UL: NEC Class 2	
	minimum +18 V DC	maximum +30 V DC
Current consumption of power supply at +24 V	typically 260 mA (without externally connected devices)	maximum 390 mA (with external devices connected)
Current consumption of standby voltage at +24 V	typically 160 mA (without externally connected devices)	maximum 265 mA (with external devices connected)
Inrush current	maximum 16.9 A for 50 µs	

3.4 Terminal

Dimensions	180 x 135 x 50 mm (W x H x D)
Material	front plate: 3 mm aluminum, natural
Weight	circa 591 g

3.5 Environmental Conditions

Storage temperature	-10 ... +80°C	
Environmental temperature	0 ... +60°C	
Humidity	10-95 %, non-condensing	
Installation altitude above sea level	0-2000 m without derating, > 2000 m with derating of the maximum environmental temperature by 0.5 °C per 100 m	
EMC resistance	in accordance with EN 61000-6-2:2007 (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 protection through housing	Front: IP54 Cover IP20 (not evaluated by UL)

3.6 Display 7" WVGA incl. Touch

Type	7" TFT LCD color display
Resolution	WVGA 800 x 480 pixels
Color depth	16 Bit RGB (65K colors)
LCD mode	normal white ⁽¹⁾
LCD Polarizer	transmissive ⁽²⁾
Pixel size	0.1926 x 0.1790 mm
Number of pixels	800*3 (RGB) x 480
Active surface	154.08 x 85.92 mm
Backlighting	LED
Contrast	500:1
Brightness	typically 280 cd/m ²
Visible field	left, right, below 70°, above 50°

⁽¹⁾ If there is no display data, the display is white (LED backlight visible)

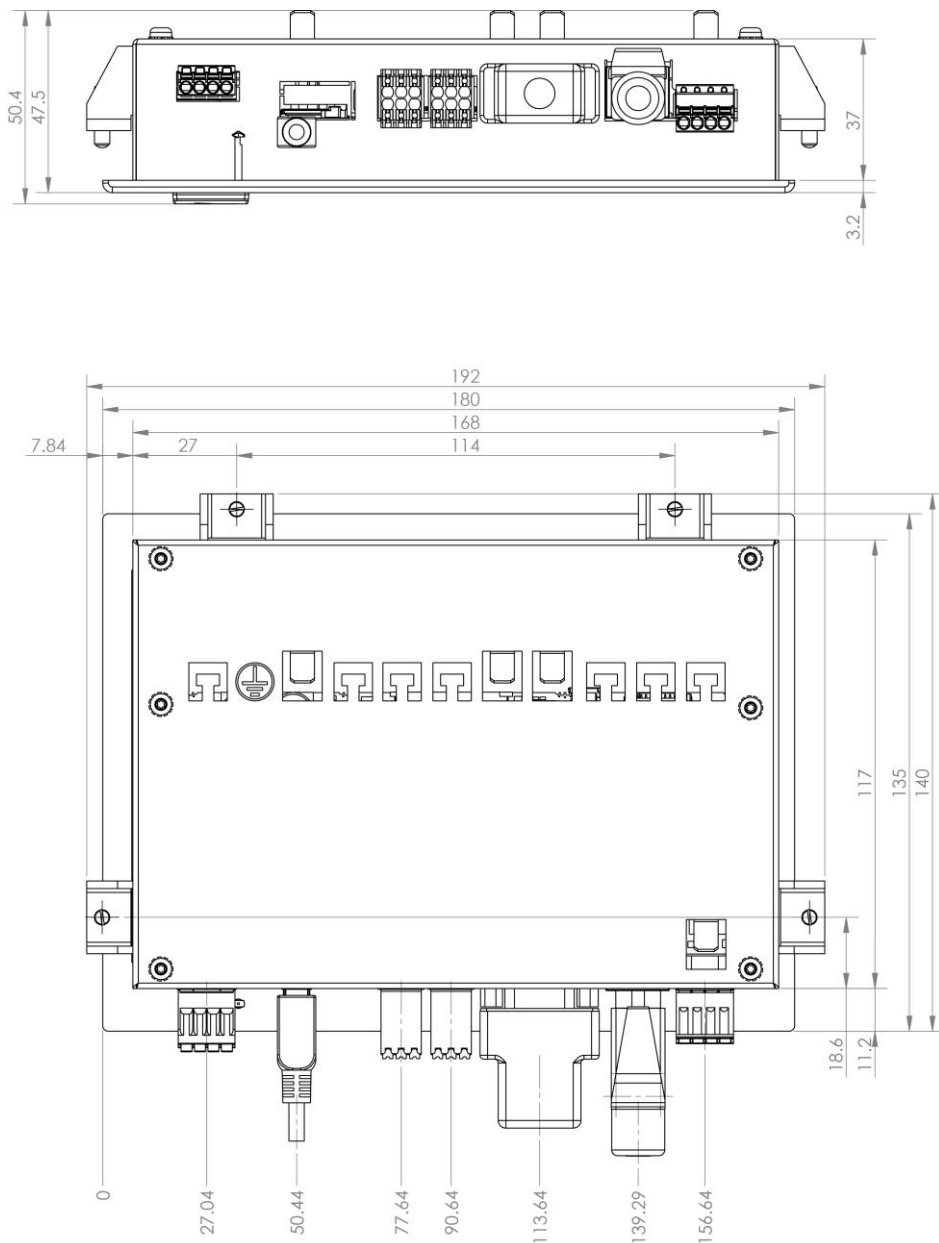
⁽²⁾ Display technology, with which display backlighting is used.

3.7 Miscellaneous

Article number	01-230-775
Standard	cULus (E247993)
Approvals	CE

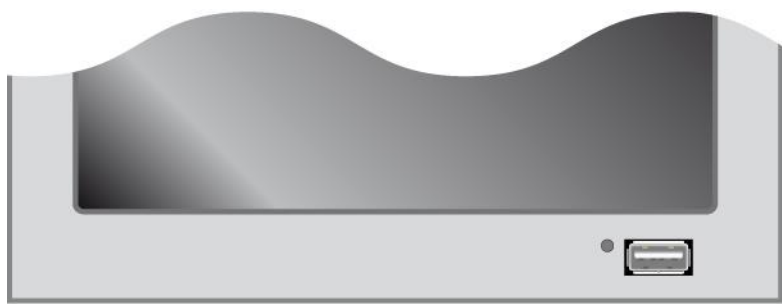
	Warning for electrician
	Temperature classification of the cable connected to the terminal
	The temperature resistance of the cable insulation must be higher than 65 °C

4 Mechanical Dimensions

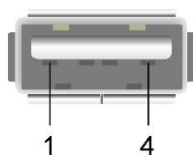


5 Connector Layout

5.1 Front



X9 USB Host 2.0 (Type A)



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

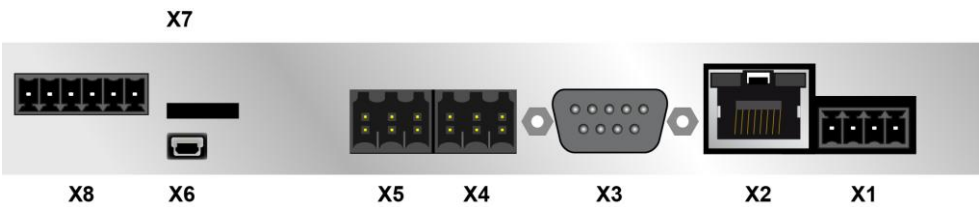
It should be noted that many of the USB devices on the market do not comply with USB specifications; this can lead to device malfunctions. This may cause the device to malfunction. It is also possible that these devices will not be detected at the USB port or function correctly. Therefore, it is recommended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

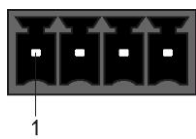
5.1.1 Status LEDs

Run	green	ON	from activation of the voltage supply until processing of the auto-exec.lsl when the application is running (except when controlled through application differently)
		BLINKS	In the CLI, while processing the autoexec.lsl until the application is running
		OFF	when an error or reset occurs
	can be set from the application (ON, BLINKING, OFF)		
Error	red	BLINKS	when an error or reset occurs
		OFF	during start process during RUN status (application running)
	can be set from the application (ON, BLINKING, OFF)		

5.2 Rear

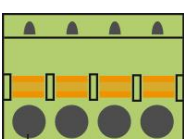


X1: Power supply (4-pin Phoenix Contact)



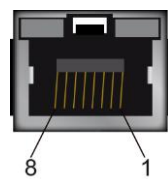
1

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



1

X2: Ethernet 10/100 (RJ45)



8 1

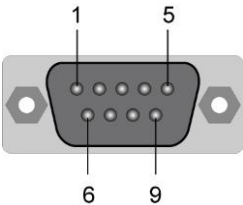
Pin	Function
1	Tx+
2	Tx-
3	Rx +
4	n.c.
5	n.c.
6	Rx -
7	n.c.
8	n.c.

n.c. = do not use

Problems can arise if a control is connected to an IP network, which contains modules that are not running with 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 problems mentioned above.

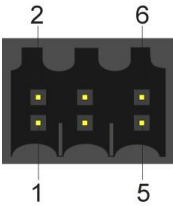
Des problèmes peuvent survenir si un automate est connecté à un réseau IP contenant des modules qui ne fonctionnent pas sous un système d'exploitation SIGMATEK. Avec de tels dispositifs, les paquets Ethernet peuvent être envoyés à l'automate avec une fréquence tellement élevée (càd. diffusion), que les 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

X3: COM 1 (D-Sub)

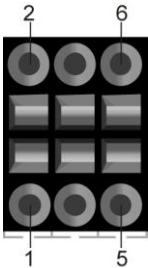


Pin	Function: RS232
1	DCD
2	Rx
3	Tx
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

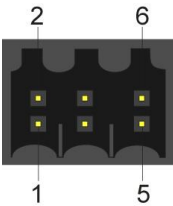
X4 CAN 1 (6-pin Weidmüller)



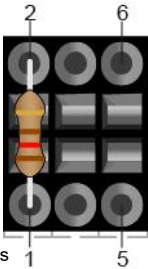
Pin	Function
1	CAN A (CAN LOW)
2	CAN B (HIGH)
3	CAN A (CAN LOW)
4	CAN B (HIGH)
5	CAN GND
6	n.c.



X5: COM 3 (6-pin Weidmüller)



Pin	RS485/ModBus Function
1	RS485/Modbus-A
2	RS485/Modbus-B
3	RS485/Modbus-A
4	RS485/Modbus-B
5	RS485/Modbus GND
6	n.c.



The RS485/Modbus interface is protected against external voltages of ± 30 V DC, there is no function for an error voltage!

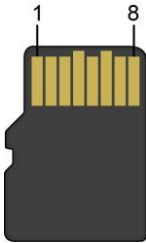
The termination is made by a 120R resistor mounted on the X5 connector between the RS485/Modbus-A and RS485/Modbus-B lines.

X6: USB-Device 1.1 (Type Mini-B)



Pin	Function
1	+5 V
2	D
3	D+
4	n.c.
5	GND

X7: 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 microSD card: 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 number of read and write actions have a significant influence on the lifespan of the storage media.

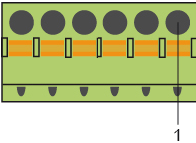
Le nombre de cycles de lecture et d'écriture a l'influence notable sur la durée de vie des supports de stockage

The microSD card is not intended as an exchangeable medium and should therefore be removed from the card holder for maintenance purposes only.

X8: TTY (6-pin Phoenix Contact)



Pin	Function
1	TTY Tx+
2	TTY Tx-
3	TTY 20 mA
4	TTY Rx+
5	TTY Rx-
6	TTY GND



5.2.1 Applicable Connectors

- X1:** 4-pin Phoenix Contact plug with spring terminals FK-MCP 1.5/4-ST-3.5
(Included with delivery)
- X2:** 8-pin RJ45 (not included in delivery)
- X3:** 9-pin D-Sub (not included in delivery)
- X4, X5:** 6-pin Weidmüller plug B2L/B2CF 3.5/6 (included in delivery)
- X6:** USB 1.1 (Mini-B) (not included in delivery)
- X7:** microSD card
- X8:** 6-pin Phoenix Contact plug with spring terminal FK-MCP 1.5/6-ST-3.5
(Included with delivery)
- X9:** USB 2.0 (Type A) (not included in delivery)

Wiring Requirements

Use only copper conductors with a minimum temperature rating of 65 °C and a recommended wire size range of AWG 26 to AWG 16.

6 Cooling

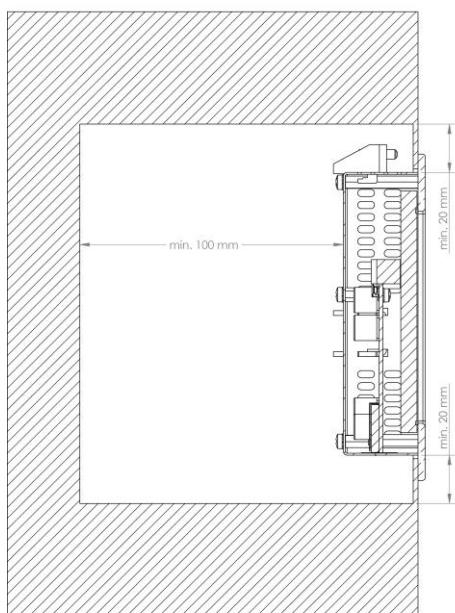
The terminal's power loss can reach up to 8.5 Watts. To ensure the necessary air circulation for cooling, the following mounting instructions must be followed!

7 Mounting Instructions

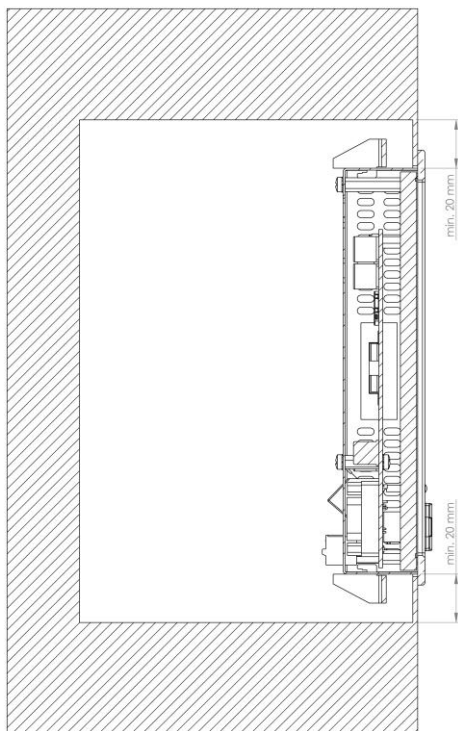
The following distance from the housing should be maintained:

- Left, right, below, above 2 cm
- In the rear, 10 cm

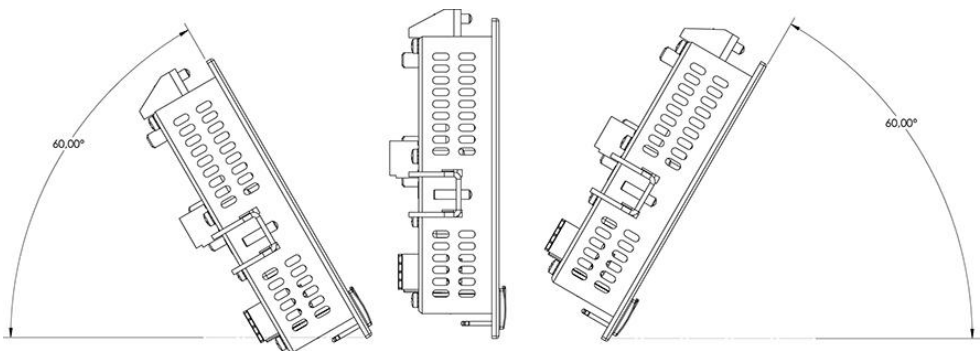
Side View:



Top view:



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



8 Buffer Battery

The exchangeable buffer battery ensures that the clock time (RTC) and SRAM data of the ETT 775 is preserved in the absence of a supply voltage. A lithium battery is installed at the manufacturer.

After delivery of the ETT 775 and storage of one year, the lifespan of the battery reaches 10 years, if the device is in operation (supply connected) most of the time.

We recommend however, that the battery be replaced every 8 years to ensure optimal performance.

CAUTION: If the module is not powered for a period of 2 years, the battery is emptied.

Battery order number: 01-690-028

	Company	Data
Lithium battery	RENATA	3.0 V/225 mAh

Use batteries from RENATA with the label CR2032 only!

WARNING! Incorrect use of the batteries could result in fire or explosion! Do not recharge, disassemble or throw batteries into fire!

N'utilisez que des piles RENATA CR2032!

Attention! L'utilisation incorrecte des piles peut entraîner un incendie ou d'explosion! Ne pas recharger, démonter ou jeter les piles dans le feu!

If the battery voltage is located between both thresholds of the monitoring switch, the battery can be detected as good during operation, but as low after turning off and on. If this is the case, it is recommended that the battery be replaced.

8.1 Exchanging the Battery: 1. Option

1. Connect power supply
2. Using the correct cross-tip screw driver, loosen and remove the battery cover.



When exchanging the battery, caution must be taken to avoid a short circuit since it could cause a defect in the terminal!

3. Using the strap, remove the battery from the holder.



4. Insert the new battery with the correct polarity (plus side facing the back of the terminal) and remount the battery cover.

8.2 Exchanging the Battery: 2. Option

1. The SRAM data are saved in the flash or the microSD card using the CLI command "sramsave FILENAME".

Example: sramsave C:\sram_backup

The commands can be executed via the Remote CLI of LASAL Class 2 or via direct input on the device.

CAUTION: If the data is not previously saved, the settings in the ETT are lost.

ATTENTION : Si les données ne sont pas sauvegardées auparavant, les réglages du ETT sont perdus.

2. Disconnect the ETT 775 supply

3. Using the correct cross-tip screw driver, loosen and remove the battery cover.



4. Using the strap, remove the battery from the holder.



5. Insert the new battery with the correct polarity (plus side facing the back of the terminal) and remount the battery cover.

6. Load the SRAM data from the flash using the CLI command "sramload FILENAME" and set the time. The time and date can be set through set Time and set Date.

Example: sramload C:\sram_backup

9 Wiring Guidelines

9.1 Ground

The terminal must be connected to ground via the assembly on the control cabinet or over the connection 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.

9.2 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.

9.3 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.

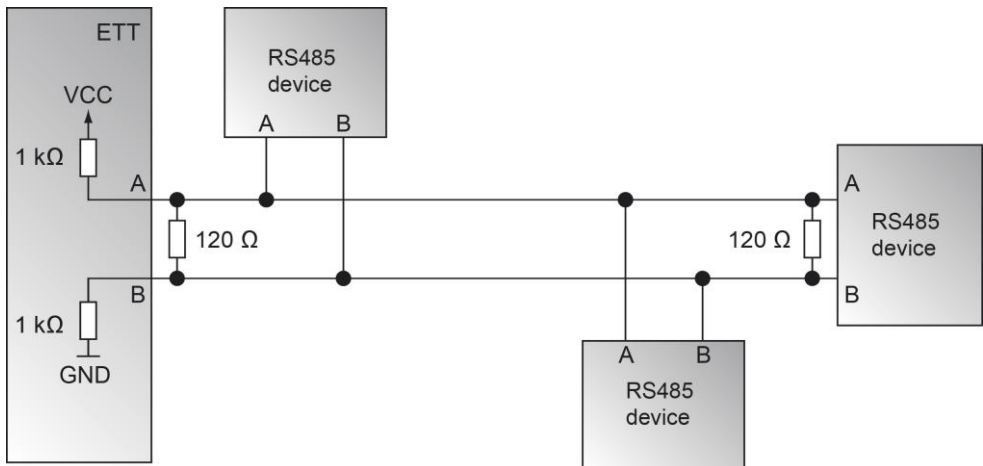
Before any device is connected to, or disconnected from the terminal, the potential should be equalized (by touching the control cabinet or ground terminal). Electrostatic loads (through clothing and shoes) can thereby be dissipated.

9.4 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.

9.5 RS485

- Because the RS485 requires a defined quiescent point, a pull-up and pull-down resistor is required in addition to the termination resistor. The resistors are already implemented in the device.
- The 120 Ω terminating resistors must be placed at each bus end.
- Star wiring should be avoided.



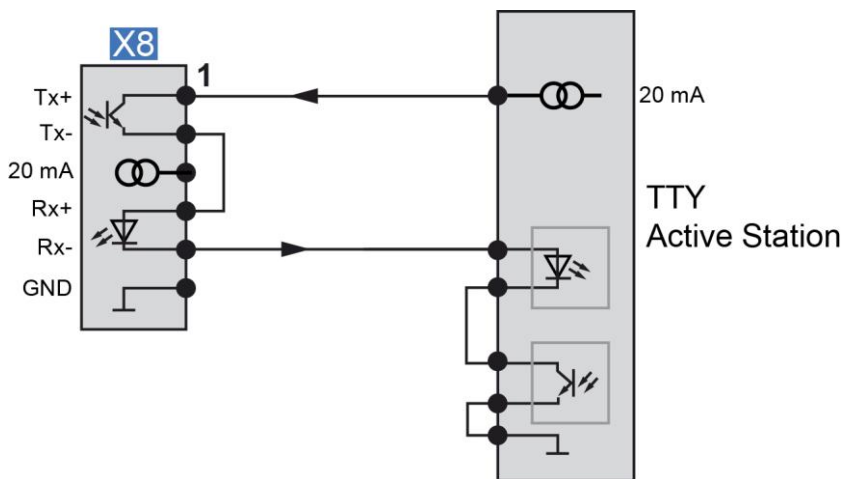
9.6 TTY

9.6.1 General Data/Specifications

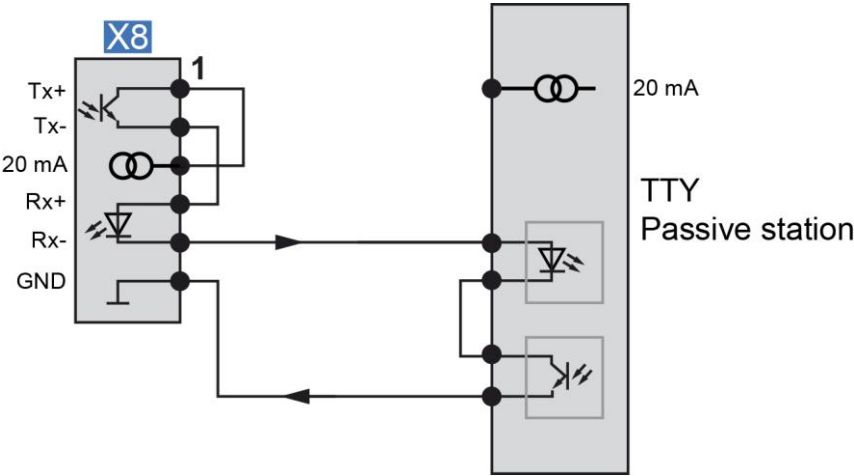
- For wiring data cables, twisted pair cables with shielding must be used!
- Maximum bus participants during active operation: The sum of the voltage drop of all participants (Rx, Tx) including on cables and connectors should not exceed 30 V (this corresponds in practice to 3-6 participants).
- Maximum cable length: 300 m
- Sender / receiver IC: Optic coupler

9.6.2 Wiring and Configuration

9.6.2.1 ACTIVE



9.6.2.2 PASSIVE



10 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.

10.1 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!

10.2 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 120 Ω, at least 100 participants are possible.

10.3 CAN Bus Data Transfer Rate

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

Value	Baud rate	maximum length
0	615 kbit/s*	60 m
1	500 Kbits/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 Mbits/s	30 m

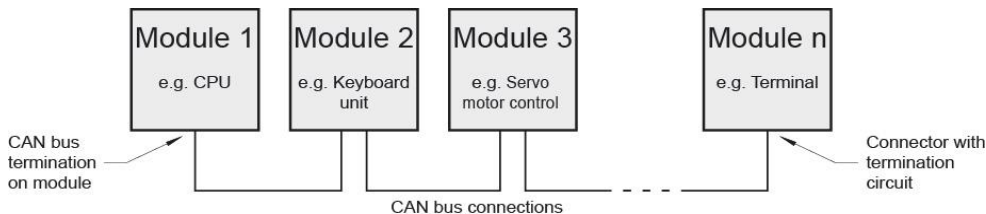
*only between devices with EDGE2 technology

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

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

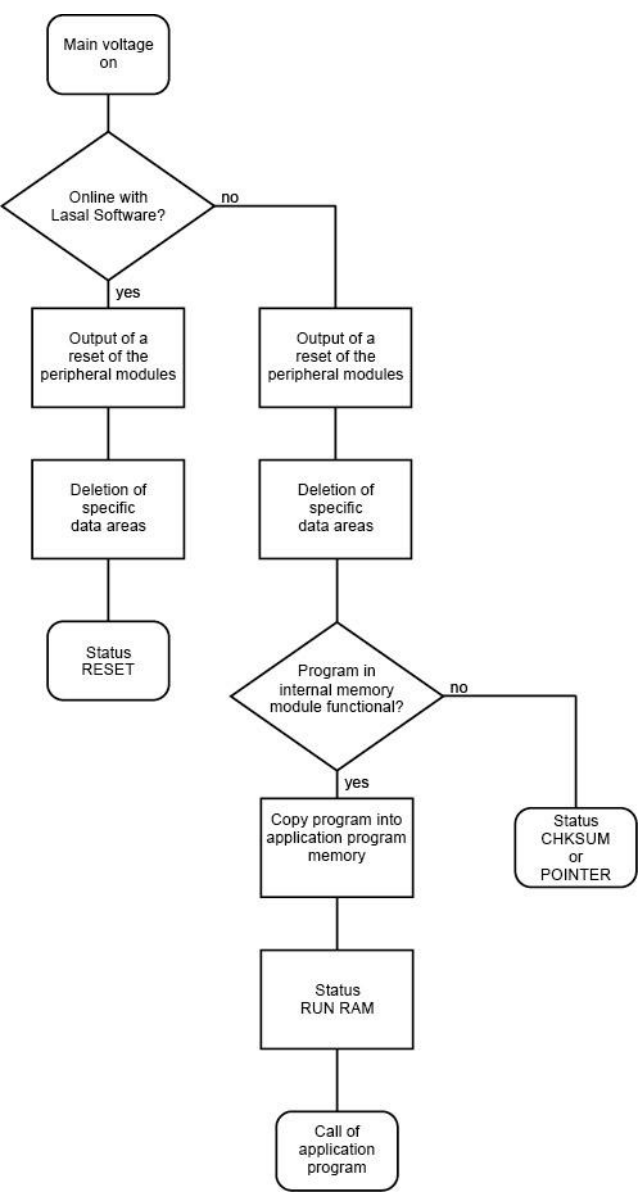
11 CAN Bus Termination

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



The termination is made by an internal 120-Ohm resistor between CAN A (LOW) and CAN B (HIGH).

12 Process Diagram



13 Status and Error Messages

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

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 was loaded into the RAM and is currently running. The display is not affected.	Info
02	RUNTIME	The total time for all cyclic objects exceeds the maximum time; the time can be configured using 2 system variables: - Runtime: Remaining time - SWRuntime: Preset value for 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 defective. - The program in the user program memory (RAM) is not executable. - The buffer 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 defective. Solution: - Correct programming error. - Exchange CPU
06	GENERAL ERROR	General error An error has occurred while stopping the application via the online interface.	This error occurs only during the development of the operating system.
07	PROM DEFECT	An error has occurred while programming the memory module.	Causes: - The program memory module is defective. - 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 DEFECT	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.	Causes: - A nonexistent operating system was used. - Stack error (uneven number of PUSH and POP instructions). - The user program was interrupted by a software error. Solution: - Correct programming error.
18	SINGLE STEP	The CPU is in single step mode and is waiting for further instructions.	Info
19	READY:	A module or project has been sent to the CPU and it is 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	INVALID 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 function or an interface function is called from the application.	Causes: - 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 programming 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.	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 a 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 while accessing arrays. The memory area was overwritten by 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 DIAS Master.	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 duration of all real-time objects exceeds the maximum time; 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 exceeds the maximum time; the time can be configured using 2 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 an S-DIAS module has occurred.	Possible Causes: - Real network does not match the project - S-DIAS client is defective Solution: - Analyze log file
75	SRAM ERROR	An error occurred while initializing, reading or writing SRAM data.	Possible Causes: - SRAM configured incorrectly - Battery for powering the internal program memory is empty Solution: - Analyze log file (Event00.log, Event19.log) - Check configuration - Exchange battery for powering the internal program memory
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	Non-specific error. Recompile and download all project sections.	
113	C_NO_FILE_OPEN	An attempt was made to open an unknown table.	
114	C_OUTOF_NEAR	Memory allocation failed	
115	C_OUT_OF_FAR	Memory allocation failed	
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 exists but must be updated.	
224	LINKING	The application is currently linking.	
225	LINKING ERROR	An error has occurred while linking.	
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		

14 Display „Burn-In“ Effect

The “Burn-In” effect describes a pattern burned into the display after displaying the same contents over a longer period of time (e.g. a single screen).

This effect is also described mostly as “image sticking”, “memory effect/sticking” or “ghost image”. Here, a distinction is made between a temporary and permanent effect. While the temporary effect fades after the screen has been turned off for some time or when dynamic content is displayed, damage from the permanent effect is irreversible.

This effect can have the following causes:

- Operation without a screen saver
- The same contents displayed over a longer time period (e.g. a single screen)
- Operation at high ambient temperatures
- Operation above specifications

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

- Use of a screen saver with continuous content change (e.g. video)
- ATTENTION: Switching off the backlight does not prevent this effect but only increases the life of the backlight

15 Cleaning the Touch Screen

CAUTION!

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

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

The terminal's touch screen can only be cleaned with a soft, damp cloth. A screen cleaning solution such as an anti-static foam, water with a mild detergent or alcohol should be used to dampen the cloth. The cleaning solution should be sprayed onto the cloth and not directly onto the terminal. The cleaning solution should not be allowed to reach the terminal electronics, for example, through the ventilation slots.

No erosive cleaning solutions, chemicals, abrasive cleansers or hard objects that can scratch or damage the touch screen may be used.

If the terminal comes into contact with toxic or erosive chemicals, carefully clean the terminal immediately to prevent corrosion!

To ensure the terminal functions optimally, it should be cleaned regularly!

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

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

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

Documentation Changes

Change date	Affected page(s)	Chapter	Note
05.12.2019		12 Display "Burn-In" Effect	Corrected
11.02.2020	9	3.1 Front	Changed from X8 to X9
	14	3.2 Rear	Changed from X9 to X8
	15	3.2.1 Applicable Connectors	X8 and X9 exchanged
	23 + 24	7.6.2 Wiring and Configuration	Graphics exchanged
15.07.2020		6.2 Exchanging the Battery: Option 2	Chapter adjusted
14.12.2023	15	3.2.1 Applicable Connectors	B2CF added
13.03.2024	4	1.1 Performance Data	microSD card updated
	9	3 Connector Layout	
04.11.2024	18	6 Buffer Battery	Battery data changed
04.08.2025	4-10	1 Introduction	New Chapter added
		2 Basic Safety Guidelines	New Chapter added
	11	3.3 Electrical Requirements	Text added
	12	3.5 Environmental Conditions	Text added
	21	5.2.1 Applicable Connectors	Text added