ETT 771

Build-in Touch Terminal

Operating Manual

Build-in Touch Terminal   ETT 771

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 mask editor, 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.

Contents

1   Technical Data

1.1   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-Mbyte
Internal remnant data memory	256-kbyte SRAM (battery buffered)
Internal storage device	512-Mbyte microSD card
Internal I/O	no
Interfaces	1x USB-OTG (Host/Device) (for service purposes only)
	1x Ethernet 10/100 (RJ45)
	1x CAN bus (6-pin Weidmüller)
	1x RS485/Modbus (6-pin Weidmüller)
	1x RS232 (9-pin D-Sub)
Internal interface connections and devices	1x TFT LCD color display
	1x touch
Display	7" TFT color display
Resolution	800 x 480 Pixel
Control 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)

1.2   Electrical Requirements

Supply voltage	typically +24 V DC (+18-30 V DC)	
Current consumption of power supply at +24 V	typically 180 mA (without externally connected devices)	maximum 290 mA (with external devices connected)
Current consumption of standby voltage at +24 V	typically 110 mA (without externally connected devices)	maximum 180 mA (with externally connected devices)
Inrush current	600 mA (1 ms)	
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	180 x 135 x 50 mm (W x H x D)
Material	front plate: until HW 2.x: 3 mm plastic, RAL 9006 since HW 3.0: 3 mm aluminum, unadulterated
Weight	until HW 2.x: circa 550 g since HW 3.0: circa 591 g

1.4   Environmental Conditions

Storage temperature	-10 ... +80 °C	
Environmental temperature	0 … +60 °C	
Humidity	10-90 %, non-condensing	
Operating conditions	Pollution degree 2 Indoor use altitude up to 2000 m	
EMC stability	according to product standard EN 60730-1	
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 protection through housing	front: IP54 (no UL-rating) cover: IP20 (no UL-rating)

1.5   Display 7" WVGA incl. Touch

Type	7" TFT 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/m²
Visible field	left and right 70°, 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.

1.6   Miscellaneous

Article number	01-230-771
Hardware version	1.x-4.x
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 65 ° C

2 Mechanical Dimensions

2.1 Up to Hardware 3.0
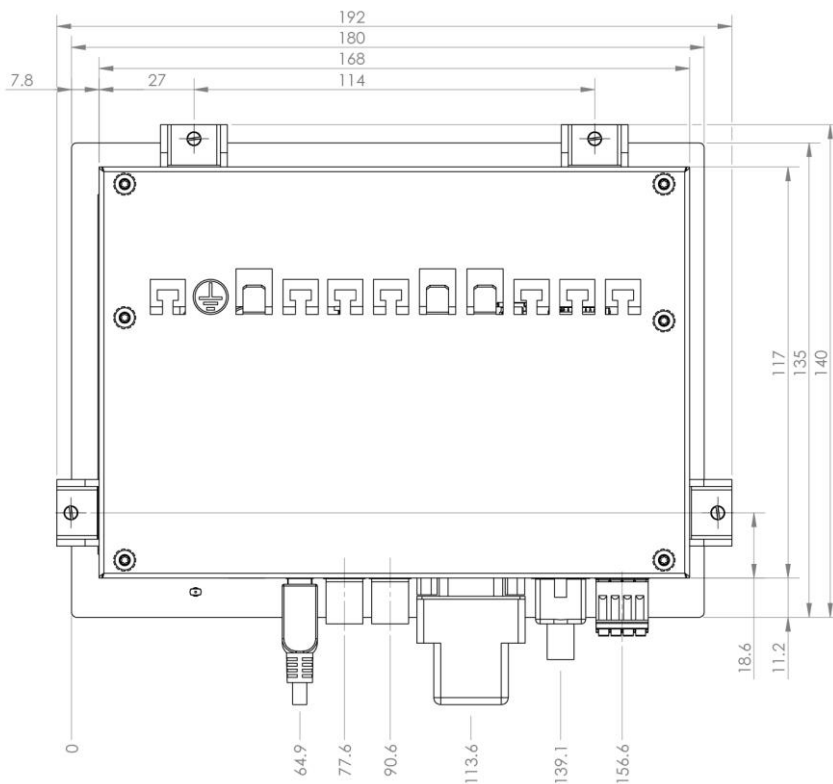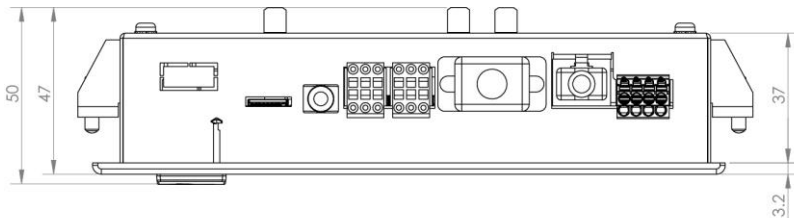
2.2   Starting with Hardware 4.0
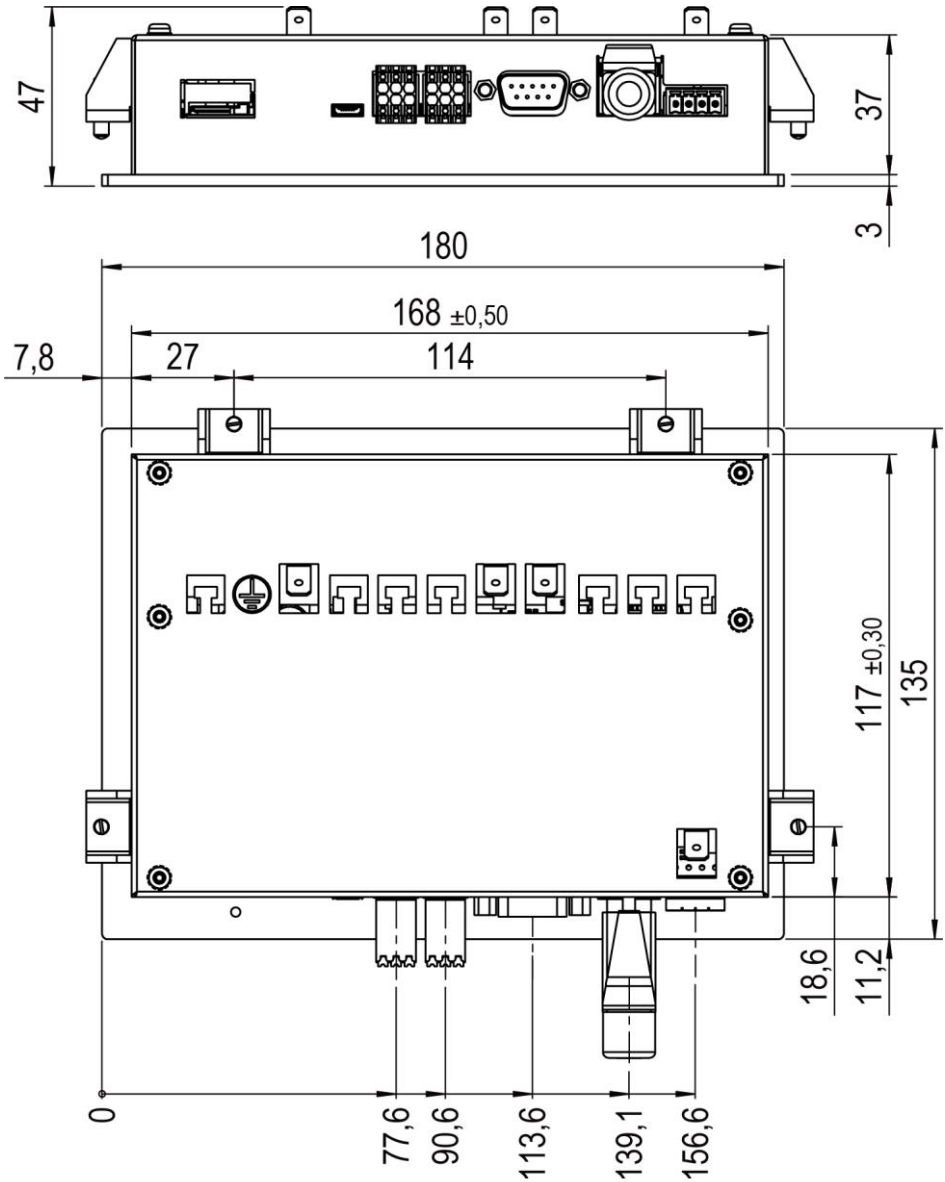
3 Connector Layout

3.1 Front
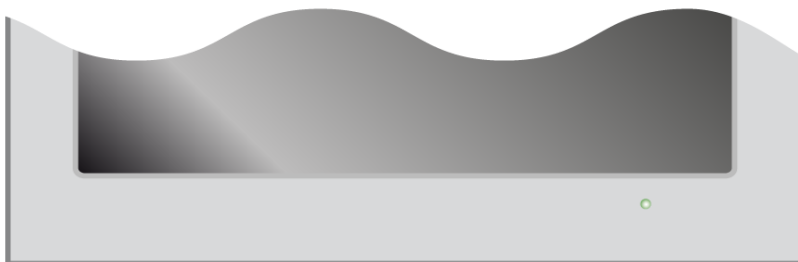
3.1.1 Status LEDs

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 error occurs or reset
	can be set from the application (ON, BLINKING, OFF)		
Error	red	BLINKS	when error occurs or reset
		OFF	during start process
			during RUN status (application running)
	can be set from the application (ON, BLINKING, OFF)		

3.2   Backside

Up to hardware 3.0
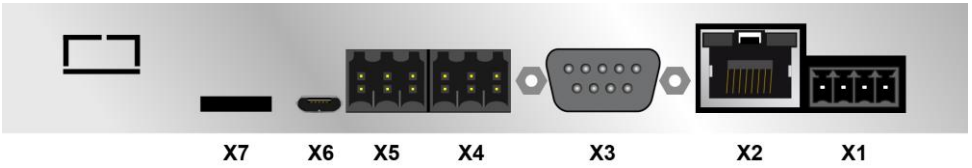
Starting with hardware 4.0
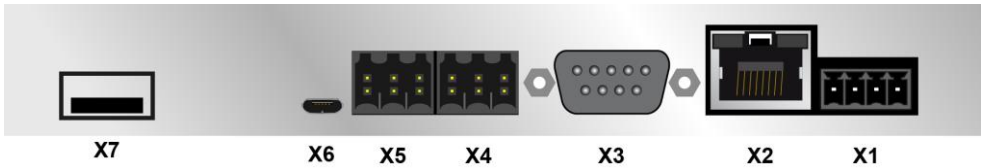
X1: Power supply (4-pin Phoenix Contact)
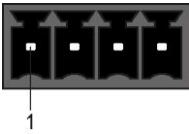
Pin	Function
1	+24 V DC
2	+24 V DC
3	GND
4	GND
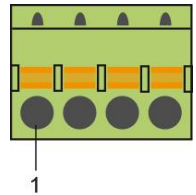
X2: Ethernet 10/100 (RJ45)
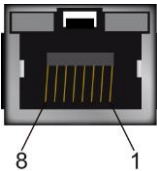
Pin	Function
1	Tx +
2	Tx -
3	Rx +
4	n.c.
5	n.c.
6	Rx-
7	n.c.
8	n.c.

n.c. = do not use

Problems can arise if a control is connected to an IP network, which contains modules that 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.

X3: COM 1 (D-Sub)
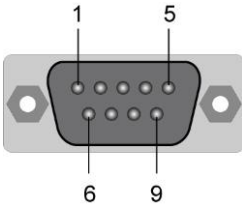
Pin	Function RS232
1	DCD
2	Rx
3	Tx
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

X4: CAN 1 (6-pin Weidmüller)
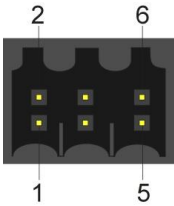
Pin	Function
1	CAN A (LOW)
2	CAN B (High)
3	CAN A (LOW)
4	CAN B (High)
5	CAN GND
6	n.c.
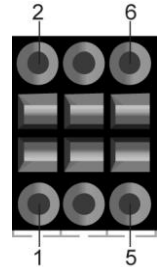
X5: COM 3 (6-pin Weidmüller)
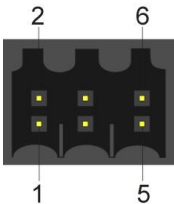
Pin	Function RS485/ModBus
1	RS485/Modbus-A
2	RS485/Modbus-B
3	RS485/Modbus-A
4	RS485/Modbus-B
5	RS485/Modbus-GND
6	n.c.

The RS485 / Modbus interface is protected against external voltages of ±30 V DC, there is no function for an error voltage!
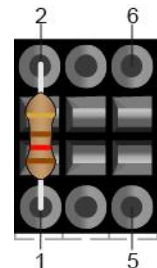
The termination since HW version 1.10 is made with a 120 Ω resistor on connector X5 between RS485/Modbus-A and RS485/Modbus-B.

X6: USB Device 2.0 (Type Micro-B) (can be used with OTG cable as USB host, otherwise USB Device for service purposes)
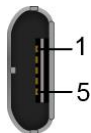
Pin	Function
1	+5 V
2	D-
3	D+
4	ID
5	GND

X7: microSD Card
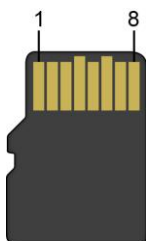
Pin	Function
1	DAT2
2	CD/DAT3
3	CMD
4	+3V3
5	CLK
6	GND
7	DAT0
8	DAT1

**It is recommended that only storage media provided by SIGMATEK (CompactFlash cards, microSD cards etc.) be used.
Order number for 512 MByte EDGE2: 12-630-055**

**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 512 Mo EDGE2 est le: 12-630-055**

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.

3.2.1   Applicable Connectors

X1:   1x 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 and X5: 6-pin Weidmüller plug B2L3.5/6 (included in delivery)
X6:   USB 2.0 (Micro-B) (not included in delivery)
X7:   microSD card

4   Cooling

The terminal's power loss can reach up to 7.5 Watts. To ensure the necessary air circulation for cooling, the following mounting instructions must be followed!

5   Mounting Instructions

The following distance from the housing should be maintained:

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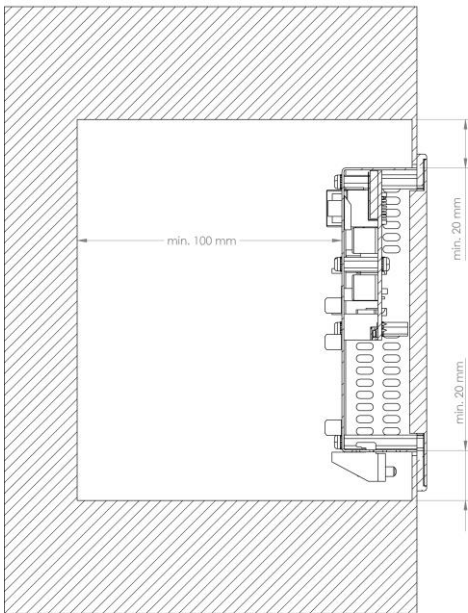
Top View:

Side View:
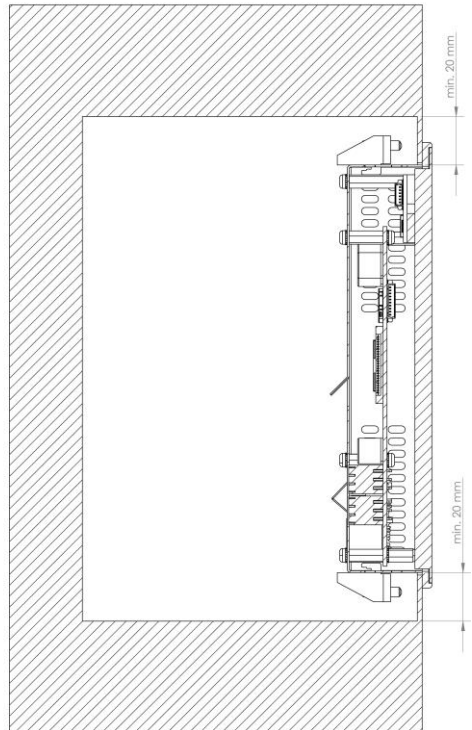
A mounting position of 60-120° is also required.
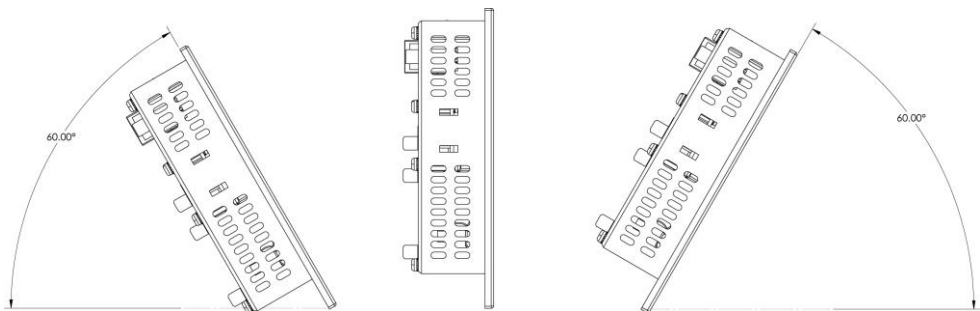
6   Buffer Battery

The exchangeable buffer battery ensures that the clock time (RTC) and SRAM data of the ETT 771 are preserved in the absence of a supply voltage. A lithium battery is installed at the manufacturer.

After delivery of the ETT 771 and storage of one year, the lifespan of the battery reaches 10 years. Assuming that 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 device is not powerd for 2 years, the battery discharges completely.

Battery order number: 01-690-055

	Company	Data
Lithium battery	RENATA	3.0 V/235 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, dis-assemble 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.

6.1   Exchanging the Battery: 1. Option

1. Keep supply plugged in

2. Loosen the battery cover screws with a cross-head screw driver and remove cover.

When exchanging the battery, caution must be taken to avoid a short circuit. Otherwise, a defect can be caused 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 fix battery cover.

6.2　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 a direct input on the device.

CAUTION: If data are not first before, the terminal settings are lost.

2. Disconnect the ETT 771 supply.

3. Loosen the battery cover screws with a cross-head screw driver and remove 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 fix battery cover.

6. Restore power to the device.

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

Example: sramload C:\sram_backup

7 Wiring Guidelines

7.1 Ground

The terminal must be connected to ground through 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 should have a maximum cross section and the largest (electrical) surface 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.

7.5   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.
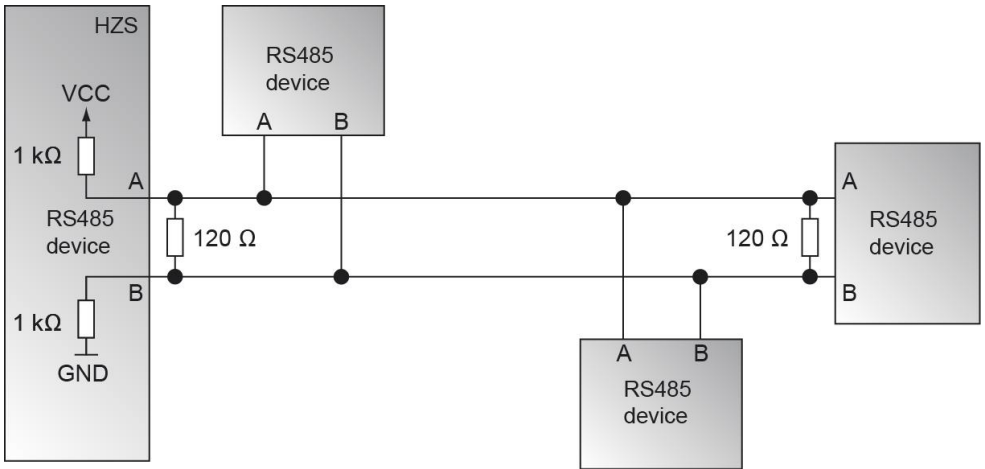
8   CAN Bus Setup

This section explains how to correctly configure the CAN bus. 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 120 Ω, at least 100 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 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

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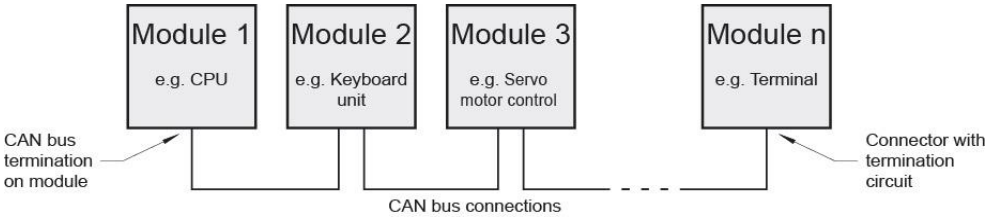
The termination is made by an internal 120 Ω resistor between CAN A (LOW) and CAN B (HIGH).

10 Process Diagram
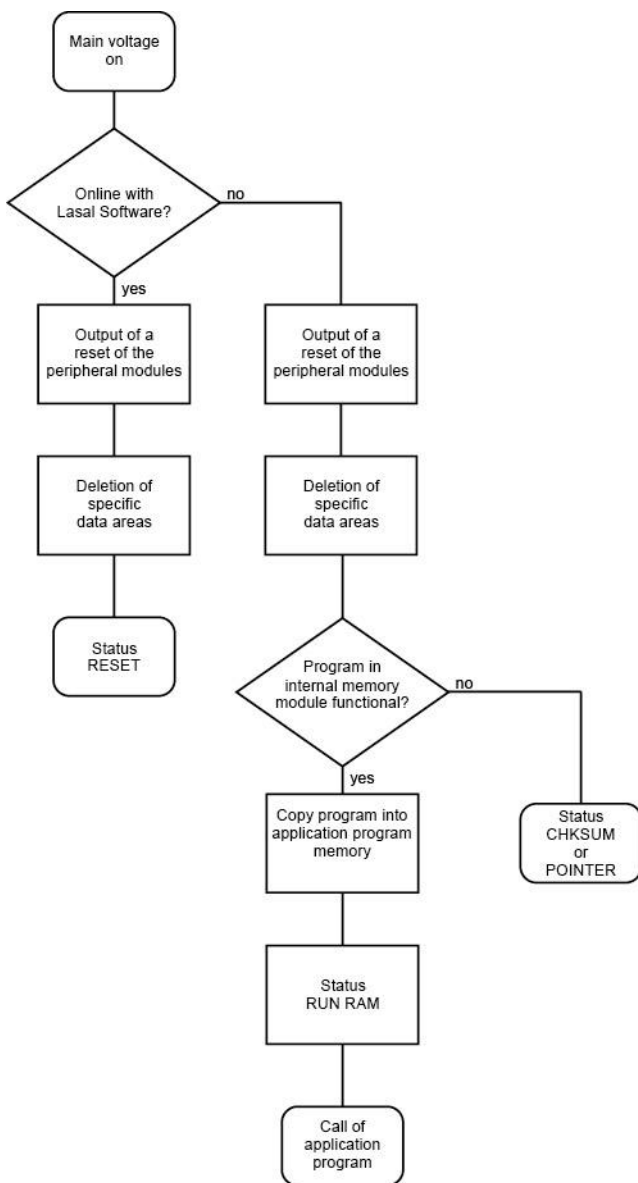
11 Status and Error Messages

Status and error messages are displayed in the LASAL CLASS software status test. POINTER or CHKSUM messages can also be 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 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 program-ming 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 interrupt-ed 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 bun 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 rein-stalled.	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 FAIL-URE	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 ac-cess 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 discon-nected 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	`PRIVILEDGED 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 fort he 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 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

13 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 déclanchement 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 on 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 in contact with toxic or erosive chemicals, carefully clean the terminal immediately to prevent corrosion!

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

Pour garantir le fonctionnement optimal du terminal, l'écran tactile doit être nettoyé régulièrement!

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

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

Documentation Changes

Change date	Affected page(s)	Chapter	Note
19.04.2016	4	1.1 Performance Data	Table updated
15.11.2016	27	11 Status and Error Messages	Error code 75 added
28.11.2016	6	1.5 WVGA Display	Pixel size updated
06.12.2016	14	6 Buffer Battery	Added battery surveillance
23.01.2017	5	1.2 Electrical Requirements 1.4 Environmental Conditions	Table content changed
	6	1.6 Miscellaneous	
06.02.2017	6	1.6 Miscellaneous	Added cable insulation temperature resistance
15.03.2018	10	3.2 Backside	X3, X5 updated
09.05.2019	30	12 Display "Burn-In" Effect	Chapter appended
16.07.2019	5	1.3 Terminal	Aluminum front instead of plastic
05.12.2019		12 Display "Burn-In" Effect	Corrected
15.06.2020	8 11 18	2.2 Starting with Hardware 4.0 3.2 Backside 6.2 Exchanging the Battery: 2. Option	Chapter added New HW added Extended
15.07.2020	1		New image