Control Panel ETV 0851-I

The control panel is an intelligent terminal for programming and visualization of automated processes. Process diagnostics as well as operating and monitoring automated procedures are simplified using this terminal.

A touch screen serves as the input medium for process data and parameters. The output is shown on an 8.4" SVGA TFT color display.

With the LSE mask editor, graphics can be created on the PC, then stored and displayed on the terminal.

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

The integrated, high-performance VARAN bus can be used to control I/O modules directly.

Contents

Technical Data

Performance Data

Processor	EDGE-Technology X86 compatible
Internal cache	32-kbyte L1 Cache 256-Kbyte L2 Cache
BIOS	AMI
Internal program and data memory (DDR2 RAM)	64 Mbytes
Internal remnant data memory	512-kbyte (1)
Internal storage device	512 MByte microSD
Internal I/O	Yes
Interfaces	1 x USB 2.0, Type A (Full Speed 12 Mbits/s) 1 x USB 1.1, Type Mini B 1 x Ethernet 1 x VARAN bus (maximum length: 100 m) 1 x CAN bus
Internal interface connections and devices	1 x TFT LCD color display 1 x Touch
Display Resolution	8.4" TFT color display 800 x 600 Pixel
Control panel	4-wire touch screen (analog resistive)
Data buffer	yes
Signal generator	No
Status LEDs	No
Real-time clock	Yes (battery buffered)
Cooling	passive (fanless)

(1) See chapter “Note on SRAM Behavior”

Electrical Requirements

Supply voltage	typically+24 V DC	
	minimum +18 V DC	maximum +30 V DC
Current consumption Power supply +24 V	Typically 400 mA (without externally connected devices)	Maximum 450 mA (with external devices connected)
Inrush current	Maximum 27 A for 9 µs	

The Unit must be powered by a galvanically isolated source, which contains a UL-certified secondary fuse with a maximum rated current of

a) 5 A at voltages from 0..20 Vrms (0..28.3 Vp) or
b 100VA/Vp at voltages from 20..30 Vrms (28.3..42.4 Vp).

Terminal

Dimensions	240 mm / 200 mm / 40.5 mm (W / H / D)
Material	front plate: 3.5 mm anodized aluminum
Weight	Typically 1.5 kg

Environmental Conditions

Storage temperature	-10 ... +85 °C	
Operating temperature	0 – 50 °C	
Humidity	10 – 90 %, non-condensing	
EMC stability	EN 61000-6-2: Noise immunity EN 61000-6-4: noise emission	
Vibration resistance	EN 60068-2-6	2 – 9 Hz: amplitude 3.5 mm 9 – 200 Hz: 1 g (10 m/s²)
Shock resistance	EN 60068-2-27	150 m/s²
Protection type	EN 60529 protected through the housing	front: IP65 cover: IP20

8.4" SVGA display

Type	8.4” TFT LCD color display
Resolution	SVGA 800 x 600 Pixel
Color depth	18-bit RGB (262K colors)
LCD mode	TN / normal white
LCD Polarizer	Transmissive
Pixel size	0.213 mm x 0.213 mm
Active surface	170.40 x 127.80 mm
Backlighting	LED
Contrast	Typically 600
Brightness	typically 250 cd/m²
Angle CR >= 10	Left and right 75°, above 60° , below 70°

Control Unit

Touch panel	Optic adhesive analog resistive film glass touch
Resolution	12-bit (4096 x 4096)
Connection technology	4-wire

Digital Outputs

Number	8
Short-circuit proof	yes
Maximum continuous current load allowed per channel	2 A
Maximum total current (all 8-channels)	6 A (100 % of on time)
Voltage drop over power supply (output active)	≤ 1 V
Residual current (off)	≤ 12 µA
Turn-on delay	< 400 µs
Turn-off delay	< 400 µs
Max. braking energy of inductive loads	1 channel 0.12 [Joules]

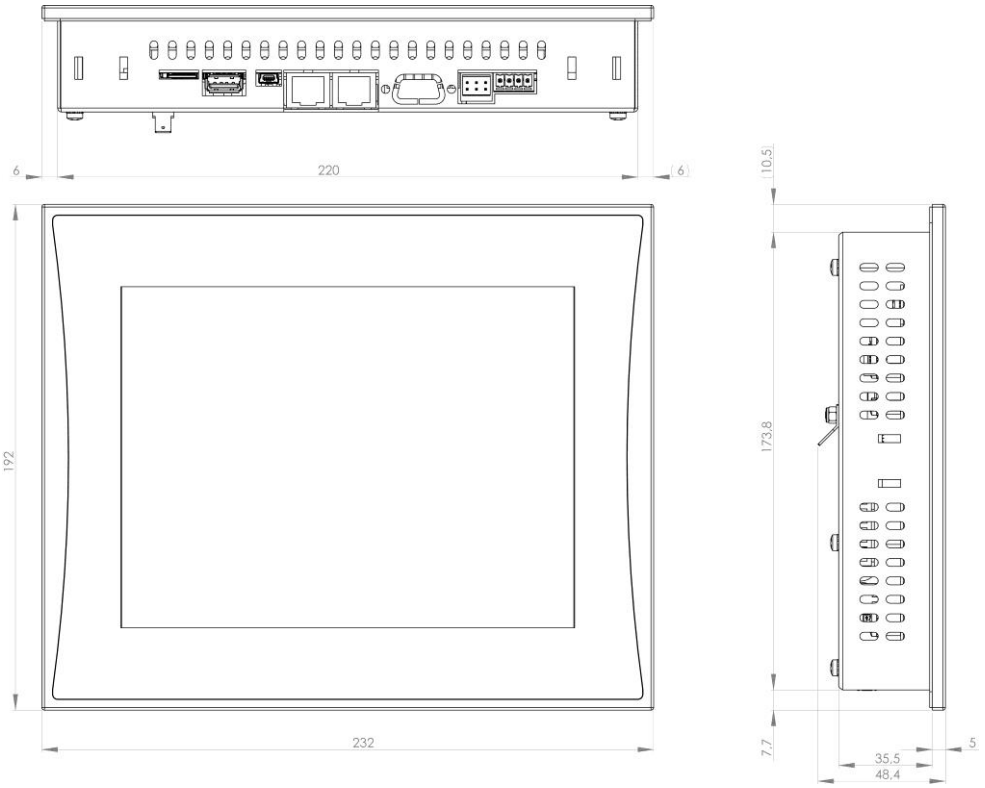
Digital Inputs

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

Miscellaneous

Article number	12-230-0851-I
Hardware version	2.x
Standard	UL 508 (E247993)

Mechanical Dimensions



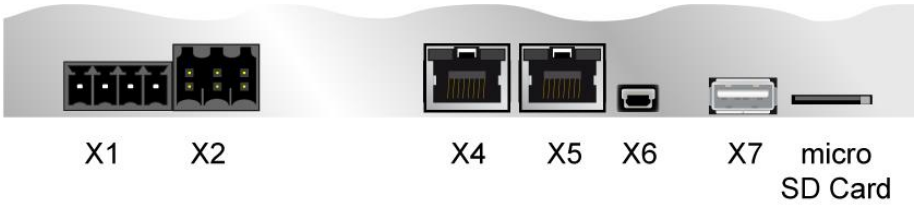
Chemical Resistance

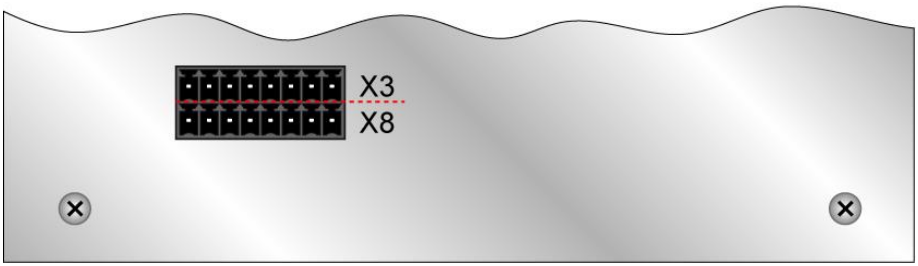
Decorative foil

Solution	Effect over time	
	1 hour	24 hours
Methyl, ethyl, ketone	None	None
Cyklothexanol	None	None
Acetone	None	None
Ethanol	None	None
Benzyl alcohol	Yes	Yes
1.1.1.Trichlorethan (Genklene)	None	None
Perchloroethylene (Perklone)	None	None
Trichloroethylene	None	None
Methylene chloride	Yes	Yes
Diethyl ether	None	None
Toluene	None	None
Xylene	None	None
Benzine	None	None
Diesel oil	None	None
Nitric acid <10 %	None	None
Sodium hydroxide <10 %	None	None
Turpentine	None	None
Ethyl acetate	None	None

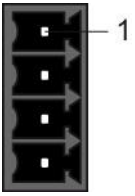
Connector Layout

Connections on Rear and Bottom



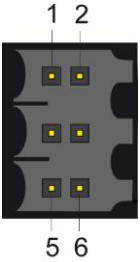


X1: Power Supply



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

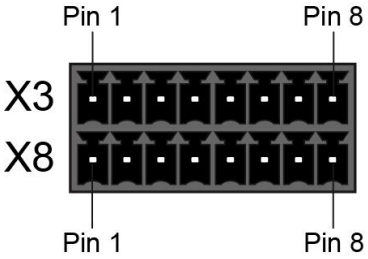
X2: CAN



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

n.c. = do not use

X3 and X8: 8 digital inputs, 8 digital outputs

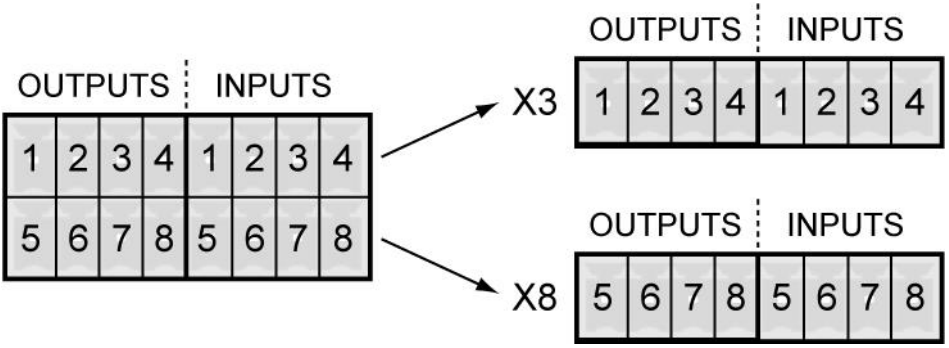


X3: Pin Assign-

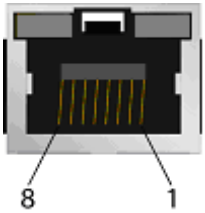
Pin	Function
1	OUTPUT 1
2	OUTPUT 2
3	OUTPUT 3
4	OUTPUT 4
5	Input 1
6	Input 2
7	Input 3
8	Input 4

X8 Pin Assign-

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



X4: Ethernet



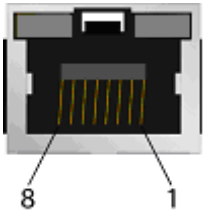
Pin	Function
1	RX +
2	RX -
3	TX +
4	n.c.
5	n.c.
6	TX -
7	n.c.
8	n.c.

n.c. = do not use

Problems can arise if a control is connected to an IP network, which contains modules that do not contain 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.

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

X5: VARAN Out



Pin	Function
1	TX+ / RX+
2	TX- / RX-
3	RX+ / TX+
4	n.c.
5	n.c.
6	RX- / TX-
7	n.c.
8	n.c.

More information on the VARAN bus can be found in the VARAN bus specifications!

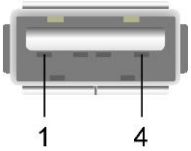
c

X6: USB 1.1 (Type Mini B)

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

n.c. = do not use

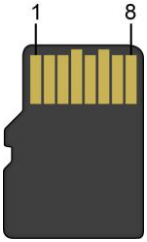
X7: X3: USB 2.0 (Type A, full speed 12 Mbits/s)



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.

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 EDGE microSD card: 12-630-051

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

Applicable Connectors

CAN bus:	6-pin Weidmüller plug, B2L3, 5/6
USB:	4-pin, Type A (downstream connector)
Ethernet:	8-pin, RJ45
VARAN:	8-pin, RJ45
Supply:	4-pin Phoenix plug with screw terminal technology MC1, 5/4-ST-3.5 4-pin Phoenix plug with spring terminal FK-MCP 1.5/4-ST-3.5
Digital IOs:	2 x 8-pin Phoenix plug with spring terminal FMC1, 5/8-ST-3.5

The complete CKL 213 connector set is available from SIGMATEK under the article number 12-600-213.

Buffer Battery

The exchangeable buffer battery ensures that the clock time (RTC) 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 7 years.

Battery order number: 01-690-055

	MANUFACTURER	DATA
Lithium battery	RENATA	3.0 V / 235 mAh

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

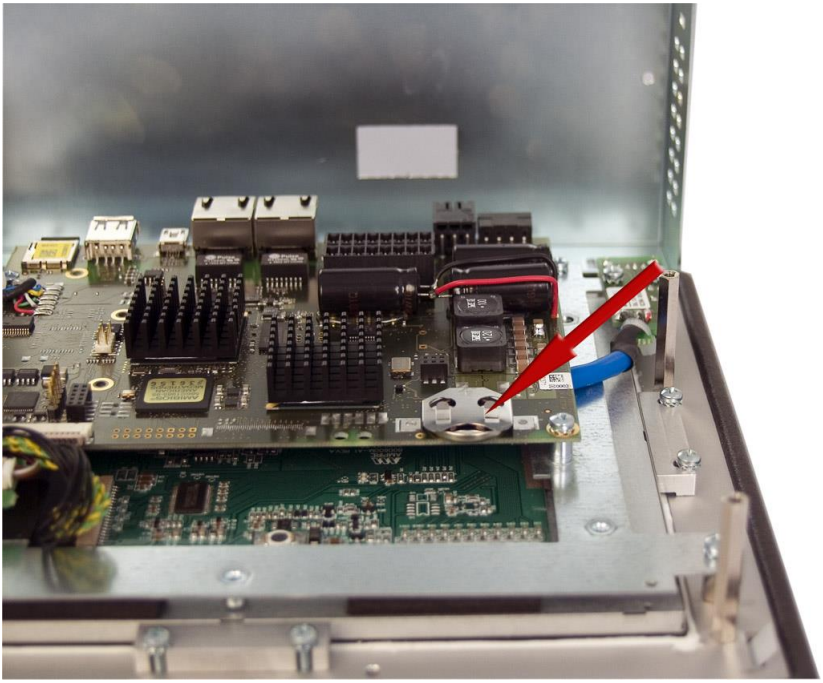
Exchanging the Battery

1. Disconnect the power to the ETV.

2. Open the locking screws on the back of the terminal with a PH-1 screwdriver:

3. Lift rear panel of the terminal:

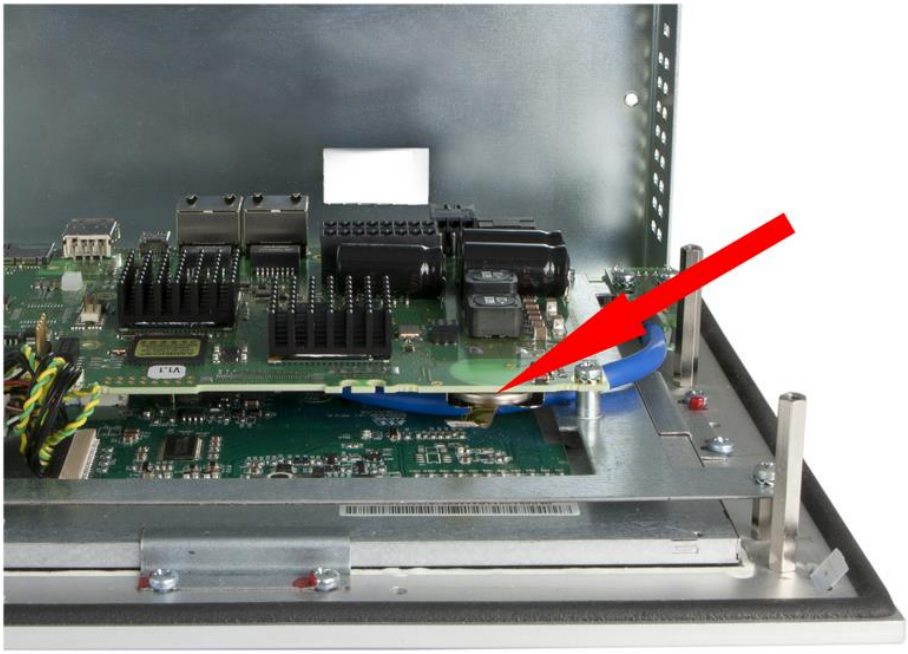
For HW version 1.x:



4. Using the strap, remove the battery the holder (see arrow).

5. Place the new battery in the holder with the correct polarity and replace the cover.
(+ Pole toward the backside)

Starting from HW version 2.x:



4. Using the strap, remove the battery the holder (see arrow).

5. Place the new battery in the holder with the correct polarity (+ pole facing front) and close the cover.

BIOS

The BIOS is configured so that the LASAL operating system is booted from the SD card.

Cooling

The terminal's power loss can reach up to 10 Watts. To ensure the necessary air circulation for cooling, the following mounting instructions must be followed!

Mounting Instructions

The following distance from the housing should be maintained:

- Rear side, left and right 5 cm
- Above and below 10 cm

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

Wiring Guidelines

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.

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.

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).

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.

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.

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. Up to 31 stations can be installed in a CAN bus system. In a CAN bus system however, each station number can only be assigned once!

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.

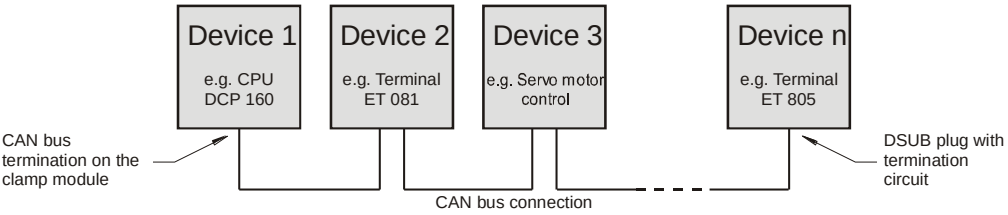
Value	Baud Rate	Maximum Length
0	615 kbits / s	60 m
1	500 kbits / s	80 m
2	250 kbits / s	160 m
3	125 kbits / s	320 m
4	100 kbits / s	400 m
5	50 kbits / s	800 m
6	20 kbits / s	1200 m
7	1 Mbit / s	30 m

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

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

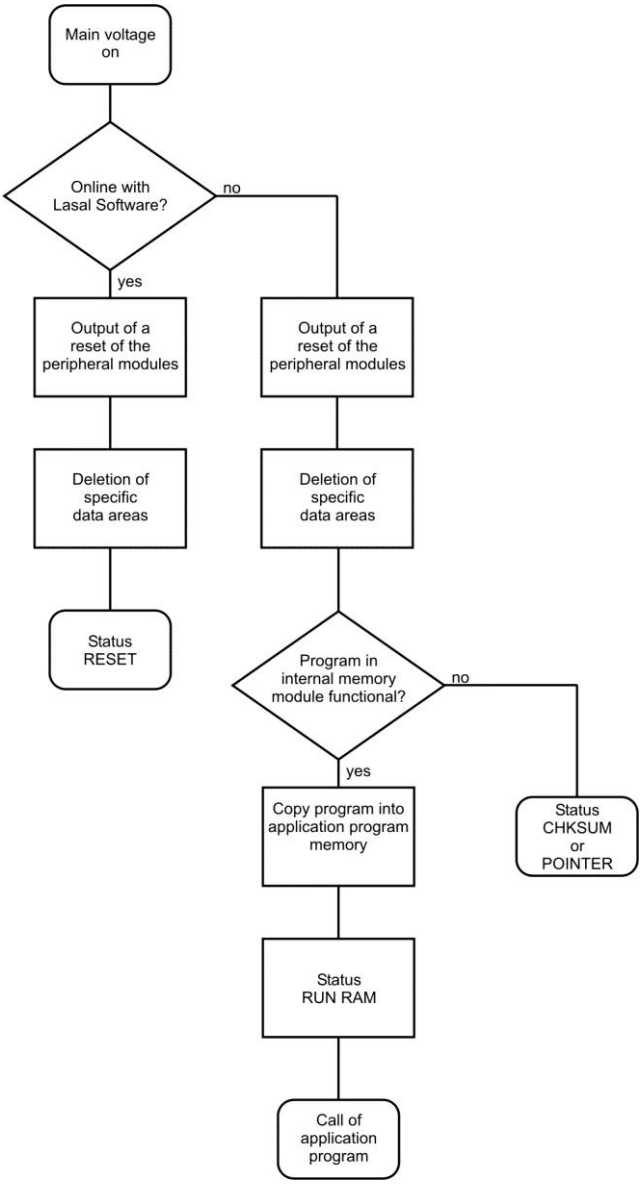
CAN Bus Termination

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



If the terminal is an end module, it can be terminated by placing a 150-Ohm resistor between CAN-A (Low) and CAN-B (High).

Process Diagram



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 exceeds the maximum time; the time can be configured using two system variables: - - Runtime: Remaining time - SWRuntime: Preset value for runtime counter	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 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 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.	- 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 log file
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	**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 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 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 exceeds the maximum time; the time can be configured using two system variables: -BTRuntime: Remaining time -SWBTRuntime: Preset value for 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 log file
75	**SRAM error**	Only EDGE CPUs An error occurred while initializing, reading or writing SRAM data.	Possible causes: SRAM configured incorrectly SD card formated incorrectly SD card removed Solution: evaluate log file (Event00.log) check configuration format SD card as EDGE medium with Lasal Class 2 check SD card
95	**USER DEFINED 0**	User-definable code.	
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**		

Application Exceptions

SRAM and IRQ routines

Writing remnant data during interrupt routines is not allowed and leads to a system crash.

SRAM and consistency of changed data

If more than 32 different sectors are changed (512 bytes each) shortly before shutting down the voltage supply while the user program is writing to the microSD card, a partial loss of remnant data could occur.

The file system does not support safe writing through SRAM

If files are stored, modified or written on the microSD card from the user program, these files must always be stored with a fixed maximum size. Since changes in size and the simultaneous shutdown of the voltage supply can corrupt the file system, a later change in the file size is not allowed.

Data Breakpoint

This CPU does not support the data breakpoint feature.

Note on SRAM Behavior

Because the SRAM (remnant memory) is emulated via the microSD card, there are two different mechanisms for saving SRAM data to the microSD card:

1. Cyclic writing when data is changed (default)

2. Writing only in the event of PowerFail with a backup time buffered through the hardware (starting with version 01.02.195)

The advantage of cyclic writing is that in the event of a severe system crash, it's possible to reference an image of the SRAM data that with the standard settings, is a maximum of 1 minute older than the last change. With extensive use, the amount and frequency of SRAM data changes from the user program can have a massive effect on the microSD card lifespan.

Detailed information regarding the SRAM behavior and the corresponding settings can be found in the LASAL OS documentation, in the chapter “SRAM”.

In the LASAL CLASS project, seldom changed value settings in retentive servers as well as RamEx and StringRam objects, can be converted to file storage. Should existing objects be converted from SRAM to File, the loader version 02.02.140 or higher and the RamEx and StringRam classes of the Tools library version 01.02.033 or higher must be used.

If the user program runs cyclic writing processes in files, the tool “Flash Media Lifetime Calculation” included in LASAL CLASS can be used to determine the effects of the operations mentioned above on the flash media. This allows the lifespan of the media to be calculated for different, configurable writing scenarios.

Recommended Shielding for VARAN

The VARAN real-time Ethernet bus system exhibits a very robust quality in harsh industrial environments. Through the use of IEEE 802.3 standard Ethernet physics, the potentials between an Ethernet line and sending/receiving components are separated. In the event of an error, the VARAN Manager resends messages to a bus participant immediately. The shielding described below is mainly recommended.

For applications in which the bus is operated outside the control cabinet, the correct shielding is required. This is especially important, if due to physical requirements, the bus cables must be placed next to sources of strong electromagnetic noise. It is recommended to avoid placing VARAN bus lines parallel to power cables whenever possible.

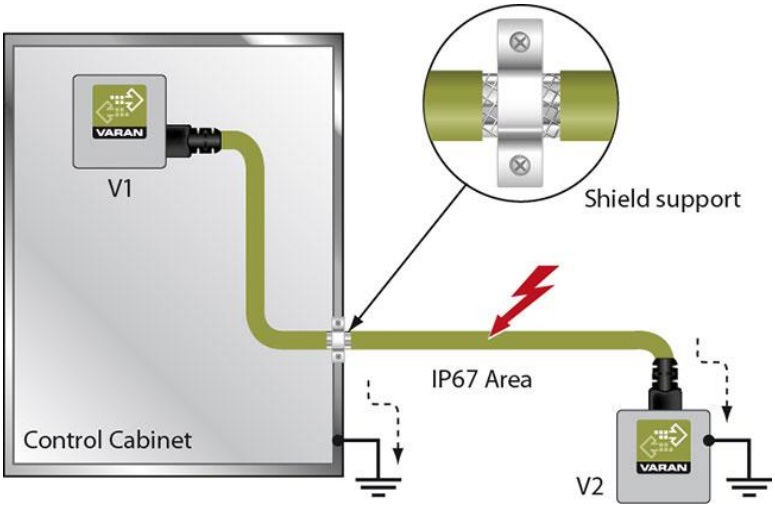
SIGMATEK recommends the use of CAT5e industrial Ethernet bus cables.

An S-FTP cable should be used for the shielding.
An S-FTP bus is a symmetric, multi-wire cable with unshielded pairs. For the entire shielding, a combination of foil and braiding is used. A non-laminated variant is recommended.

The VARAN cable must be secured at a distance of 20 cm from the connector for protection against vibration!

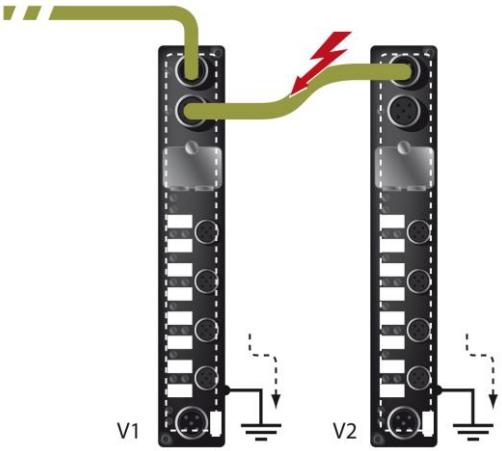
1. Wiring from the Control Cabinet to an External VARAN component

If the Ethernet lines are connected from a VARAN component to a VARAN node located outside the control cabinet, the shielding should be placed at the entry point to the control cabinet housing. All noise can then be deflected from the electronic components before reaching the module.



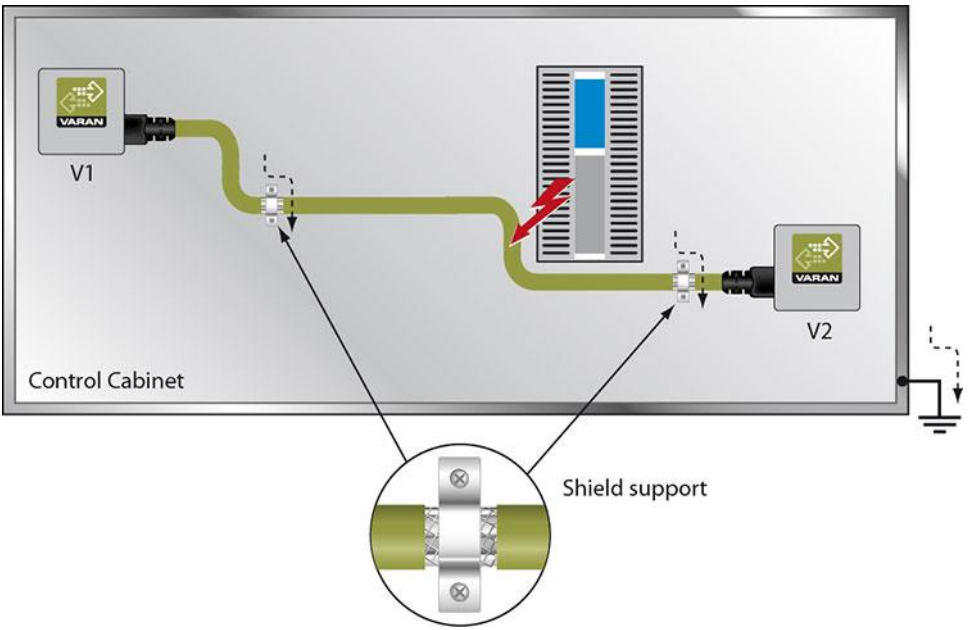
2. Wiring Outside of the Control Cabinet

If a VARAN bus line must be connected outside of the control cabinet only, no additional shield support is required. A requirement therefore, is that only IP67 modules and connectors can be used outside the control cabinet. These components are very robust and noise resistant. The shielding for all sockets in IP67 modules are electrically connected internally or over the housing, whereby voltage spikes are not dissipated through the electronics.



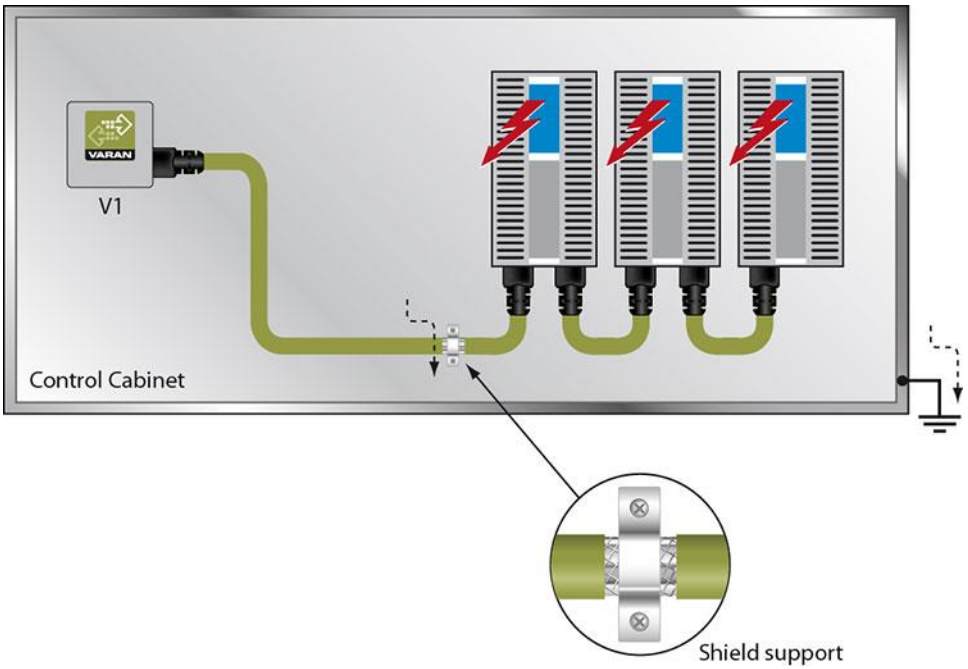
3. Shielding for Wiring Within the Control Cabinet

Sources of strong electromagnetic noise located within the control cabinet (drives, Transformers, etc.) can induce interference in a VARAN bus line. Spike voltages are dissipated over the metallic housing of a RJ45 connector. Noise is conducted through the control cabinet housing without further action from the electronic components. To eliminate sources of noise during data exchange, it is recommended that the shielding for all electronic components be connected within the control cabinet.



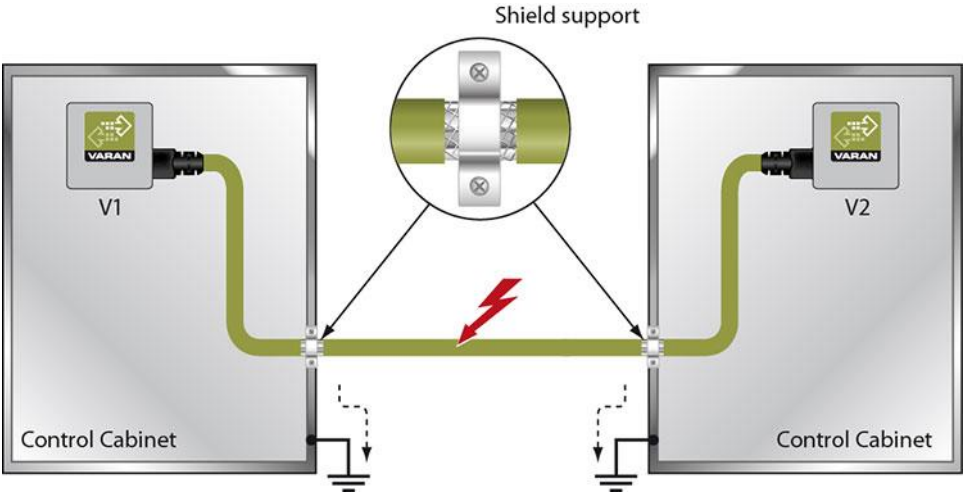
4. Connecting Noise-Generating Components

With the connection of power components, which generate strong electromagnetic interference, it is also critical to ensure correct shielding. The shielding should be placed before a power element (or group of power elements).



5. Shielding Between Two Control Cabinets

If two control cabinets must be connected over a VARAN bus, it is recommended that the shielding be located at the entry points of both cabinets. Noise can be thereby prevented from reaching the electronics within the control cabinet.



Cleaning the Touch Screen

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

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, 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.