Universal fault annunciator for panel mounting

USM – Universal fault annunciator for panel mounting (2nd Generation)

16.03.2018

Operating manual

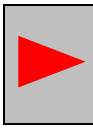
Table of content

1 Validity

The description covers the USM devices with the following options:

59 U x x x x W x x x x	
A	**Number of reporting inputs** 08 Reporting inputs
B	16 Reporting inputs
C	24 Reporting inputs
D	32 Reporting inputs
E	40 Reporting inputs
F	48 Reporting inputs
1	**Operating voltage** 24 V AC/DC
2	48 - 60 V AC/DC
5	110 - 220 V AC/DC
1	**Signal voltage** 24 V AC/DC
3	48 - 60 V AC/DC
4	110 V AC/DC
H	125 V AC/DC
5	220 V AC/DC
E	**Device type** Basic version, no IT security functionality
S	Security configuration, security functionality included
P	Port Security, enhanced security configuration incl. option S
W	**Protocol interface 1 (Processlayer)** IEC60870-5-101/-104
F	IEC60870-5-101/-104 + IEC 61850
0	**Protocol interface 2 (Superior level)** not equipped
W	IEC60870-5-101/-104
F	IEC60870-5-101/-104 + IEC 61850
L	IEC60870-5-101/-104, fibre optic interface Type SC
G	IEC60870-5-101/-104 + IEC 61850, fibre optic interface SC
D	**LED-Colour** DUO-LED, colour parameterisable (red, green)
0	**Repeat relays** no internal repeat relays
R	8 Relay outputs (for 8 way fault annunciator)
R	16 Relay outputs (for 16 way fault annunciator)
R	24 Relay outputs (for 24 way fault annunciator)
R	40 Relay outputs (for 40 way fault annunciator)
1	8 Relay outputs (independent from no. of inputs)
2	16 Relay outputs (independent from no. of inputs)
0	**Redundant operating voltage** no additional power supply
1	24 - 60 V AC/DC
5	110 - 220 V AC/DC

Table 1: Matrix of USM devices



Please note that – independent from the total number of Ethernet interfaces of the annunciator – the IEC 61850 communication can only be carried out on one of the interfaces.

2 General notes

2.1 Additional instructions

This manual provides the safe and efficient use with the devices of the universal fault annunciating system (in the following called „USM, fault annunciator or device) The manual is part of the device and must be stored always accessible for the personnel in direct proximity of the device.

The personnel are supposed to thoroughly read and fully understand this manual prior to starting any works. The major condition for secure handling is to obey to all security and usage procedures described in this manual.
Furthermore the local prevention advices and general security preventions in the installation site are obligatory.

The illustrations included in this manual serve for essential comprehension and are subject to modifications matching the application.

2.2 Usage

This manual is a prerequisite for secure mounting and safe operation of the product and must be read and understood before mounting.

2.3 Target group

This manual was written for qualified personnel which – based on their specific education and knowledge and experience as well as their knowledge of the relevant norms and regulations – are subject to deal with electrical sites and able to recognize and prevent possible hazards.

The qualified personnel is trained especially for the working environment and is familiar with the norms and regulations.

2.4 Symbol definition

Security advice

Security advices are indicated with symbols in this manual. The security advices are expressed through signal words that characterize the extent of the hazard.

DANGER!
This combination of symbol and signal word warns of a hazardous situation which can lead to death or severe injuries if not avoided.

WARNING!
This combination of symbol and signal word warns of a possibly hazardous situation which can lead to death or severe injuries if not avoided.

CAUTION!
This combination of symbol and signal word warns of a possibly hazardous situation which can lead to minor injuries if not avoided.

NOTE!
This combination of symbol and signal word warns of a possibly hazardous situation which can lead to material damages if not avoided.

ENVIRONMENTAL PROTECTION!
This combination of symbol and signal word warns of possible hazards for the environment.

Tipps and recommendations

This symbol accentuates useful tips and recommendations for an efficient and failure-free operation.

Further markings

To accentuate operation instructions, results, listings, cross references and other elements, the following markings are used in this manual:

Marking	Description
	Step-by-step operation instructions
	Results of operation steps
	Cross reference to sections of this manual and to further applicable documents
	Listings without fixed sequence
[Button]	Control elements (e.g. buttons, switches), Indication elements (e.g. signal lamps)
„Display“	Display elements (e.g. push buttons, assignment of function buttons)

Important passage

This symbol accentuates especially important passages.

Cross reference

This symbol refers to figures and other passages in this document or to further reading.

2.5 Safety instructions

2.5.1 Appropriate use

The universal fault annunciator USM is intended for use according to the applications described in this manual only and may only be used according to the conditions as described in the section “Technical Data”. Every use that exceeds the appropriate use or unauthorized use is considered as incorrect use.

WARNING!
Hazard of incorrect use!
Incorrect use of the annunciator can lead to hazardous situations.

- Do never use the annunciator in EX-areas.
- Do never use the annunciator within the range of irradiation sensitive devices without considering the special precautions therefor.
- The annunciators may not be opened or improperly modified.

2.5.2 Storage of the manual

The manual must be stored nearby the annunciator and must be accessible for the personnel.

2.6 Customer service

For further technical information please contact our customer service:

Address	Elektra Elektronik GmbH & Co Störcontroller KG Hummelbühl 7-7/1 71522 Backnang Germany
Telephone	+ 49 (0) 7191/182-0
Telefax	+49 (0) 7191/182-200
E-Mail	info@ees-online.de
Internet	www.ees-online.de

Further we are looking forward to receiving feedback and experiences which result from the application and are useful for improvement of our products.

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3 Functional description

3.1 Basic set-up of the USM

The series of universal fault annunciators USM is designed for systems networked by Ethernet.

The USM serves for acquisition and indication of alarms that are provided on the galvanic inputs or through the Ethernet interface from a communication partner (e.g. SCADA system). The alarms are processed and displayed according to the parameterized reporting sequence.

The fault annunciators are available with 8, 16, 24, 32, 40 or 48 signal inputs. The alarms are aligned to groups of 8 inputs each on the device front. The closed front panel contains 4 push buttons, bi-colour LED displays (red / green) and slide-in pockets for the labelling strips. Each fault annunciator features an internal horn. Additionally, an external horn can be triggered through a function relay.

The annunciator features four change-over relays as integrated function relays. Alarm specific functions (e.g. collective report or external horn triggering) as well as signalization of any malfunction through a live-contact can be realized with the function relays.

Two function inputs are available and can be used according to the chosen reporting sequence (e.g. for external acknowledgement).

The functions that are assigned to the push buttons, function inputs and function relays can be parameterized individually.

All USM fault annunciators provide a hardware-watchdog and software-monitoring. The fault-free operation is indicated by an OK-LED and through a relay contact (live-contact).

The parameterisation of the annunciator is done through the integrated web-server with a web-browser and by uploading of parameterization files. By these means the reporting sequence, input processing, assignment to collective reports and horn triggering can be defined and protocol parameters, IP-address and information object addresses can be parameterized. A detailed descripition of the parameterization can be found in the section “Parameterisation”. Customised special reporting sequences can be realized ex-factory upon request.

The fault annunciator USM provides different interfaces (USB, CAN, SDP, COM and LAN), which will be described regarding functionality and usage in the following sections.

Additional explanations to the integrated alarm sequeces can be found in the separate document „Alarm sequences of EES-Fault annunciators“ (SM-MA-ZI-UK).

3.2 Internal Relays cards (optional)

The optionally integrated relay cards (8 NO contacts each) are independent from the 4 function relays of the annunciator and can be assigned the following functions:

1. In- or output parallel multiplication and forwarding of single alarms within the annunciator and without the requirement for connection of external relay modules MSM-RM.
2. Issue of collective reports and triggering of external horn
3. Triggering of the relay from the IEC interface

The 8 relays of one board have one common root. Triggering and functionality can be adapted individually by means of the parameterization interface on the web-server, e.g. inversion of the signal or wipe duration for pulse commands.

3.3 Dual power supply (optional)

Independent from the primary power supply, a second, redundant power supply can be integrated into the fault annunciator. Two different voltage variants are available:

- 24 – 60 V AC/DC
- 110 – 220 V AC/DC

The voltage level of the redundant power supply can be chosen independently from the voltage level of the primary power supply. Both primary and secundary power supply are integrated into the self-monitoring of the annunciator and any malfunction is indicated on the live-contact. Additionally, presence of the supply voltage is indicated for both power supplies by an LED on the rear of the device. Failure of one of the power supplies is communicated on the protocol interface.

3.4 Cascading of several fault annunciators

With the cascading functionality one USM and up to three BSM (BSM-C or BSM-P) can be grouped to an annunciating system which is processed as a virtual compound annunciator with common signalling (reporting sequence, forming of collective reports and horn triggering). Through the communication interface of the USM, signals and alarms of the whole annunciating system can be addressed.

The communication within the annunciating system is done through the integrated CAN-Bus interface. The devices are connected to each other by means of a patch-cable. The USM works as “master” and the connected BSM-C or BSM-P act as “slave”. Thus a system with up to 192 (4*48) signals can be realized. When creating an annunciating system, please note that the number of channels of the USM has to be bigger or equal to the number of channels of the connected BSM devices.
External MSM relay modules cannot be connected to cascaded annunciators.

> The parameterization is done in the master fault annunciator by means of the web-server and is distributed automatically to the slave devices.
> Information to the BSM annunciators can be found in the separate BSM manual.

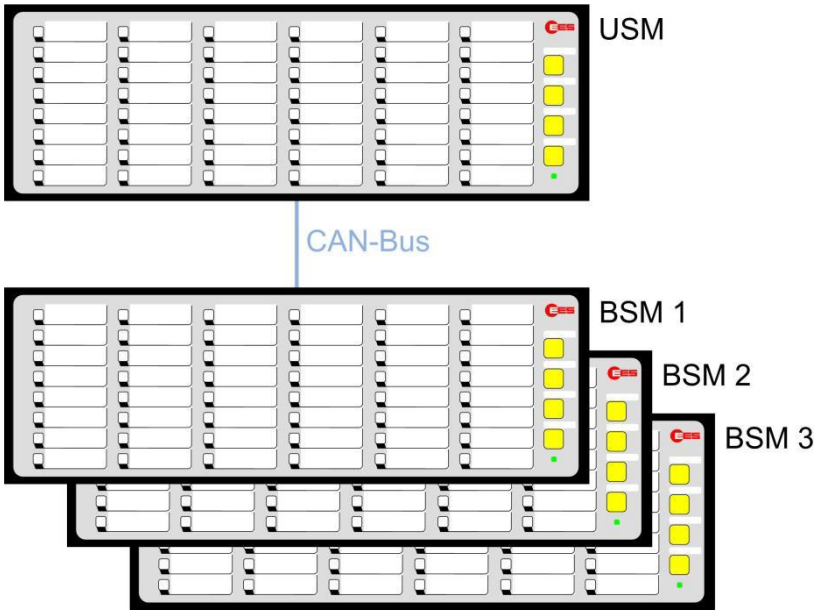


Fig. 3.1: General design of a cascaded fault annunciator system

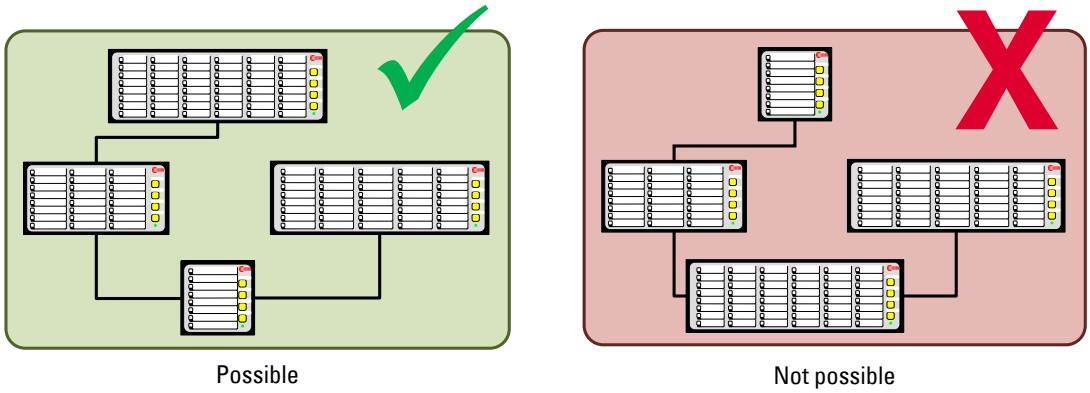


Fig. 3.2: Examples of cascaded annunciator systems

3.5 Protocol interfaces

For communication to superior or inferior systems (e.g. SCADA or PLC) the USM provides one or two interface cards. These contain the following interfaces:

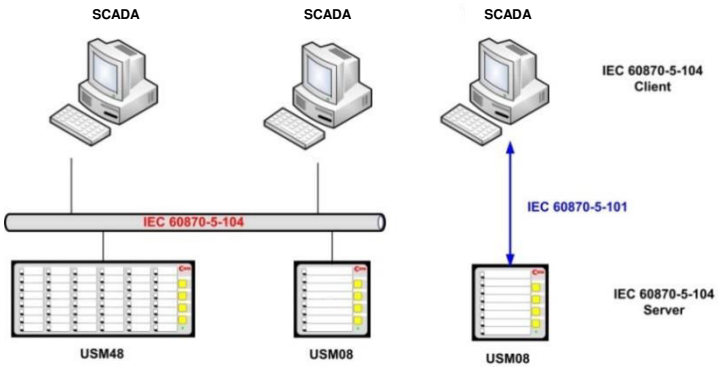
Card 1 (always equipped)
- 1 x Ethernet / RJ45
- 1 x RS232 / pluggable terminal
- 2 x USB-A
- 1 x CAN-Bus / RJ45
- 1 x USB-B (factory interface)

Card 2 (optionally equipped)
- 1 x Ethernet / RJ45 or LWL SC-Type
- 1 x RS232 / pluggable terminal

Through these interfaces the fault annunciators can communicate to third party systems via the following protocols:

- IEC 60870-5-101 (USM is IEC-Slave)
- IEC 60870-5-104 (USM is IEC-Server or Client)
- IEC 61850 (USM is IEC-Server)

As IEC-Server or Slave, the fault annunciator can establish connections to a maximum number 4 Clients (Multilink). The combination of multiple of the above mentioned protocols within one annunciator is possible.
As IEC-Client, the annunciator can establish IEC 104 connections to a maximum number of 32 servers.



In this application example, the USM annunciators act as acquisition devices which process and display alarms locally. In addition, the alarms are forwarded to the SCADA level through IEC 60870-5-101 or -104.

Fig. 3.3: Application example for communication of USM acquisition devices (IEC-Server/Slave) with an IEC-Client/Master.

The single alarm channels can alternatively be triggered from the galvanic input or from the IEC interface. These options can be chosen individually for each channel. Acknowledgement through the IEC interface is possible as well.

3.6 Protocol IEC 61850 (optional)

In automated substations information from field- and protection devices are transmitted through the protocol IEC 61850.
In addition, various specific single point alarms are available which – depending on the type of information – need to be transmitted to the SCADA system or to other devices on field or station level. The annunciators adopt this “rag-man“ functionality and provide these single point information on the integrated IEC 61850 server.
Individual reports and datasets can be configured easily which contain all relevant information about the alarm and device status.
The IEC 61850 communication can be enabled in every USM by means of a license key.

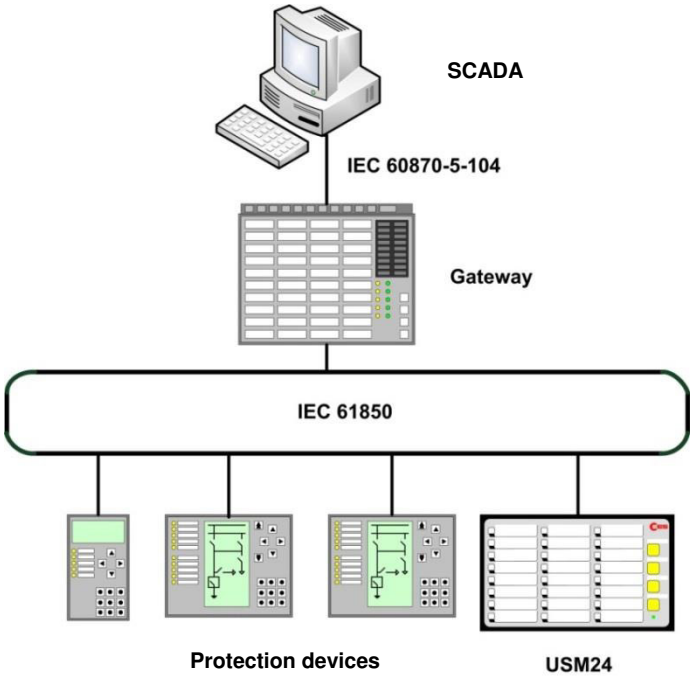
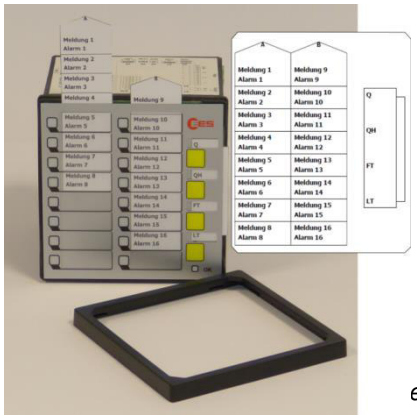


Fig. 3.4: With the optionally available software license IEC 61850 the USM can be integrated into IEC 61850 structures

3.7 IT security functionalities (optional)

For companies in the energy business a whitepaper with fundamental security measures for control and telecommunication systems has been released. Goal of these measures is to provide an appropriate protection against security threats in daily operation.
The security measures defined in this whitepaper are recommended for all new control or telecommunication systems.
The strategic goal of the whitepaper is a positive impact on the product development for the aforementioned systems with regard to IT security and to provide a common understanding for protection of these systems.
Software options are available for annunciators of the series USM, which ensure that the devices can be included into critical infrastructures under consideration of the recommendations of the aforementioned whitepaper.
For detailed information on the IT security functionalities, please refer to the separate documentation **→ MSM-SEC-BA-UK**.

3.8 Labelling



Labelling of the annunciators is done by means of designation strips that can be inserted beneath the cover foil after removing the front frame.

The designation strips with signal names can be created and printed directly from the parameterization interface on the web-server or generated manually from labelling strips in Word-format.

er removing the front frame

3.9 Monitoring LEDs, buttons and connections

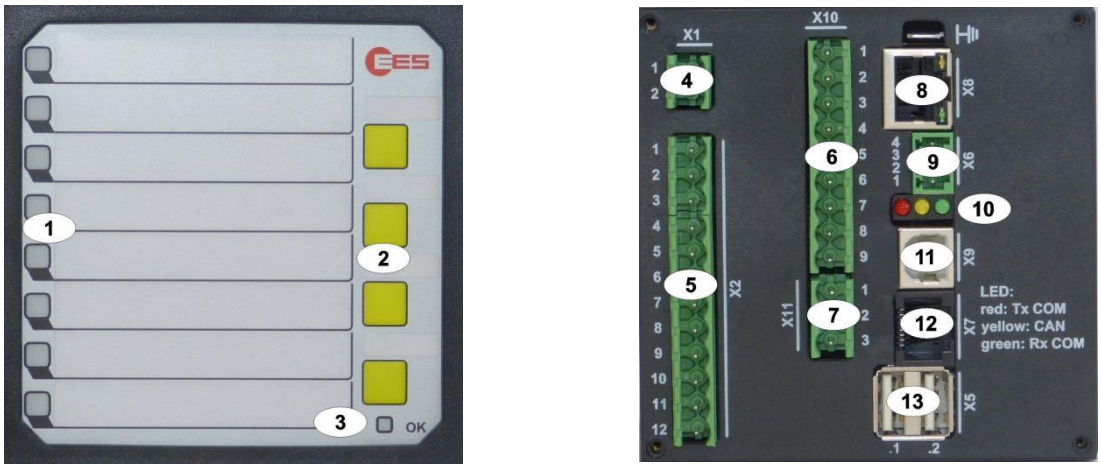


Fig. 3.6: Front- and rear view of the USM08

[1] Alarm LEDs (function depending on reporting sequence)
[2] Buttons 1 … 4, (function depending on reporting sequence and parameterisation)
[3] Watchdog-LED „Self-monitoring“
Steady light green - no error
Off - no power supply or device defective

Flashing red - error (→ section „Diagnosis“)
Flashing green - initialisation of the annunciator

[4] Terminals power supply
[5] Terminals function relays
[6] Terminals signal inputs
[7] Terminals function inputs
[8] LAN-connector (Ethernet / RJ45)
[9] Terminal serial interface (RS232 optionally RS 485)
[10] Watchdog-LEDs „Communication“
red - Tx serial interface
green - Rx serial interface
yellow - CAN-Bus
[11] Service- and diagnosis interface USB-B (factory interface)
[12] CAN-Bus interface (RJ45)
[13] 2 x USB-A interface

In this section, the USM with 8 alarm channels is used to illustrate the general setup of a USM. The number of signal inputs and the colours of the alarm LEDs can deviate depending on the configuration and size of the respective USM.

3.10 Diagnosis

For monitoring and evaluation of the system functions different diagnosis information are available. These are e.g. the signalling of errors on watchdog LEDs or relay contacts or the provision of error information on the protocol interface by means of the data object “error”.

3.10.1 Watchdog-LED „Self-monitoring“

The watchdog-LED „self-monitoring“ gives information about the current status of the annunciator device or system:

- Steady light green = no error
- Flashing green (no flashing sequence) = initialisation of the annunciator
- Flashing green (with flashing sequence) = annunciator in dedicated operation mode
- Flashing red = error
- Off = no power supply

From the flashing sequence, an error code can be read which defines the error. A flashing sequence consists of:

- Number of long flashing pulses → 1st digit of the error code
- Number of short flashing pulses → 2nd digit of the error code
- Pause

Example: long, short, short, pause = error code 12

If multiple errors are at issue, the LED displays the error with the highest priority.

3.10.2 Error codes

The hexadecimal error codes which are listed in the following table resemble the flashing sequence of the OK-LED of the USM. If the error code is transmitted through the protocol interface, it might – dependent from the superior system – be interpreted as decimal number.

Example:

Error 68 - *Connection to NTP Server disturbed*
Flashing sequence of OK-LED - *long, long, long, long, long, long short, short, short, short, short, short, short, short, pause*
Interpretation on the protocol-interface
hexadecimal - *0x68*
binary - *0110.1000*
decimal - *104*

In the following table the error codes of the USM are enlisted.

Error code		Error	Remark
hex	decimal		
11	17	Internal error	If the error still is at issue after restart of the device, the device needs to be returned to EES for inspection.
12	18	Internal error	
13	19	Overflow alarm buffer	After a surge of alarms, interstages of alarms can be lost. The final stages of the alarms are valid.
14	20	Relay cards	If the error still is at issue after restart of the device, the device needs to be returned to EES for inspection.
15	21	Communication within cascaded annunciator system disturbed	This error can occur in cascaded systems. It will be issued when the connection between the USM and at least one of the slaves (BSM) is disrupted. Please verify the configuration of the slave addresses and the connection cables.
17	23	Operating voltage 1	This error can occur in annunciators with dual power supply.
18	24	Operating voltage 2	
19	25	Configuration inconsistent	The downloaded configuration does not match the hardware of the device (e.g. USM08 and USM16).
31	49	License error	The IEC 61850 license does not match the device. Has the right license file been downloaded to the device? Please contact customer service.
32	50	CID-file missing	Please download CID-file to the device.
33	51	Parameter file missing	Download manufacturer file. Please contact customer service.
34	52	Imported configuration is faulty	Download correct file to the device or restore default setting by means of the web-server.
35	53	Faulty CID-file	The downloaded CID-file is incorrect. Please download the correct CID-file to the device.
63	99	IEC 104 Client connection	The connection to a IEC 104 Server is disturbed or no valid status can be received for defined information objects. If this error is still at issue after restart of the device, please check parameterisation of the IEC 104 Client links.
68	104	NTP-connection	Connection to NTP-Server disturbed.

Table 3.1: Error codes of the USM

3.10.3 Operation modes

By means of a push button or function input, the annunciator can be set to different operation modes. A currently activated operation mode is indicated by green flashing of the OK-LED with dedicated flashing sequences as follows:

Flashing sequence	Operation mode	Comment
long – short	Horn muted	The horn will be triggered according to parameterisation in „Horn mute“, as long as this operation mode is activated.
long – short – short	Unmanned mode	As long as this operation mode is activated, no optical or acoustical output of alarms at issue is triggered. The internal alarm processing as well as triggering of relays and IEC communication stays active though.

Table 3.2: Operation modes of the USM

3.11 Terminal assignments

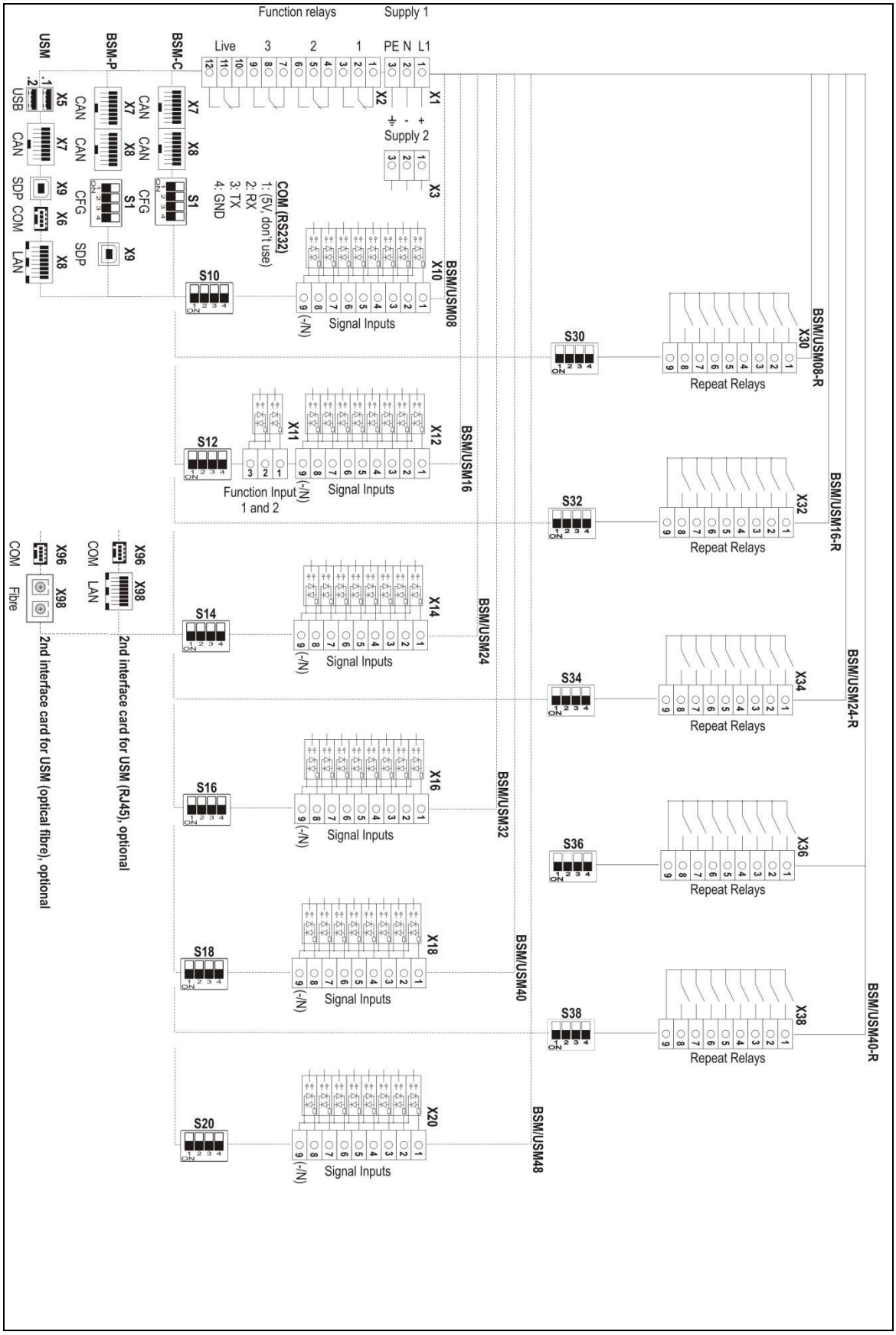


Fig. 3.7: Terminal assignment USM

3.12 Technical data

Supply voltage U_{Sup}

Key	Rated voltage	Voltage range
0	12 V AC/DC	10…19 V DC or 8…13 V AC
1	24 V AC/DC	19…37 V DC or 14…26 V AC
2	48 V AC/DC or 60 V DC	37…73 V DC or 26…51 V AC
5	110 V AC/DC or 220 V AC/DC	100…370 V DC or 85…264 V AC

Table 3.3: Supply voltage keys - USM

Signal voltage U_{Sig}

Key	Rated voltage [V AC/DC]	Threshold for alarm		Maximum permitted voltage [V AC/DC]	Input current per input @ rated voltage [mA]
		Inactive [V AC/DC]	Active [V AC/DC]		
0	12	3	9	35	2,3
1	24	11	15	50	2,3
3	48	17	25	75	2,1
	60	17	25	75	2,7
E	60	42	54	75	1,6
4	110	35	50	150	1,6
H	125	35	50	150	1,8
5	220	100	140	260	1,2

Table 3.4: Signal voltage keys - USM

The voltage U_{Sig} is valid for signal inputs and function inputs.

If not otherwise specified the given information for alternating voltage are effective values and refer to a sinusoidal alternating voltage with a frequency of 50/60 Hz.

Power consumption

Number of channels	Power consumption [W]	
	Without integrated repeat relays	With integrated repeat relays
8	< 8	< 10
16	< 9	< 13
24	< 10	< 17
32	< 10	< 15*
40	< 11	< 24
48	< 12	< 17*

Table 3.5: Power consumption - USM

* The power consumption of 32- and 48-way annunciators with integrated repeat relays refers to a maximum number of 2 relay cards (16 relays).

General data

Buffer time in the event of failure / short circuit	100 ms*
response delay	adjustable (5 ms … 9 h)
Flashing frequency	
Single frequency flashing	2 Hz
Slow flashing	0,5 Hz
Load capacity of relay contacts	24 ... 250 V AC 2 A; 110 V DC 0,5 A; 220 V DC 0,3 A
Ethernet interface	100 Base-T / RJ45

* Storage of the last state of inputs and sequence in the event of power failure.

Mechanical Data

Type BSM/USM	Front frame H x W x D [mm]	Panel cut-out [mm]	Depth with front frame and terminals [mm]	Weight [kg]
08 08-…-R*	96 x 96 x 8	92 x 92	100	approx. 0,40
16	96 x 96 x 8	92 x 92	100	approx. 0,45
16-…-R** 24 24-…-R* 32	96 x 192 x 8	92 x 186	100	approx. 0,70
40 40-…-R* 48	96 x 287 x 8	92 x 282	100	approx. 1,00

Table 3.6: Dimensions - USM

* USM-…-R are variants with integrated repeat relays.
** An 16-way annunciator with 16 integrated repeat relays and/or 2nd interface card can only be realised in the variant 16 wide (housing 96 x 192 mm).

Mounting	panel mounting
Required installation depth	120 mm
Minimum horizontal gap	
Between 2 devices	15 mm
Connection terminals	pluggable
Wire cross section rigid or flexible	
Without wire sleeves	0,2 ... 2,5 mm^2
With wire sleeves	0,25 ... 2,5 mm^2

Ambient environment

Operating ambient temperature	-20°C .... +60°C
Storage temperature	-20°C .... +70°C
Duty cycle	100 %
Protection class at the front	IP 54
Protection class at the rear	IP 20
Humidity	75% r.h. max. on average over the year; up to 93% r.h. during 56 days; condensation during operation not permitted [Test:40°C, 93% r.h. > 4 days]

Dielectric strength
Electromagnetic compatibility

Noise immunity acc. to	DIN EN 61000-3-2 / CLASS A
	DIN EN 61000-3-3
	DIN EN 61000-4-2 / 4/8 kV / Criterion A
	DIN EN 61000-4-3 / Imm. Test Level 3 / Criterion A
	DIN EN 61000-4-4 / Imm. Test Level 3 / Criterion A
	DIN EN 61000-4-5 / Imm. Test Level 3 / Criterion A
	DIN EN 61000-4-6 / Imm. Test Level 3 / Criterion B
	DIN EN 61000-4-11 / Imm. Test Level 3 / Criterion B
Noise irradiation acc. to	DIN EN 55011
	DIN EN 55022

The devices are designed and manufactured for industrial applications according to EMC-standard.

Subject to technical changes without prior notice

4 Mounting and installation

1. Unpack all modules of the delivery and check for possible transport damages. Report any transport damages to the responsible forwarding agent immediately. Please verify the integrity of the delivery according to the shipping documents.

2. Insert the annunciator into the prepared panel cut-out and fix it with the fasteners at the side of the device.

3. Connect the in- and outputs of the annunciator.

   The length of the wires of the in- and outputs should not exceed 3 m.

4. Connect the fault annunciator to the network / LAN by patch cable.

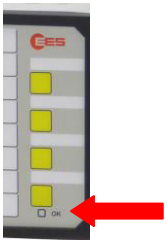
5. For a cascaded annunciator system, connect slave devices according to steps 2 and 3 and connect the cascaded annunciator to each other by means of a patch cable through the CAN-Bus-interfaces (terminal X7 at the USM and terminals X7/X8 at the BSM).

6. Connect the power supply and activate power supply.

   The length of the power supply wires should not exceed 10 m.

7. Parameterise the fault annunciator (refer to section “Parameterisation”).

8. Watchdog-LED „Self-monitoring” is in steady light – the fault annunciator is operational. Watchdog-LED is flashing → section “Diagnosis”.



5 Parameterisation by Web-Server

The parameterisation of the USM is done through the integrated web-server by means of a web-browser. For access to the web-server, the network interface (terminal X8) of the USM has to be connected to the PC.

System requirements

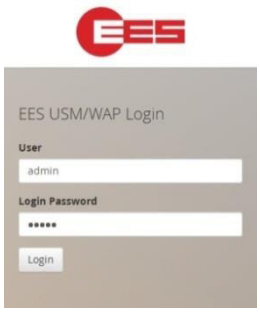
- Internet browser with **activated Javascript**
  We recommend to use Mozilla Firefox from version 40 or Internet Explorer from version 11.
  Usage of other browser tools can lead to limitations in functionality.
- Recommended monitor resolution from 1280 x 800

The configuration interface can be accessed from the browser http://<IP-Address>.

The default IP-address of the USM is as follows:

192.168.1.99

Please consider the network settings at your PC and the configuration of the network.



For the first login please use the following login data:

User: admin
Password: admin

Fig. 5.1 Login

The passwords can be changed in the menu „Parameter / System / Security“.

The identification of the user is done by a random 32 byte session ID. No cookies are used. Up to 8 sessions (subscribed users) can be handled at a time. The number of “admin” sessions is limited to one at a time. Sessions are monitored by a time-out and closed automatically upon exceeding the time.

After login the first page is opened.

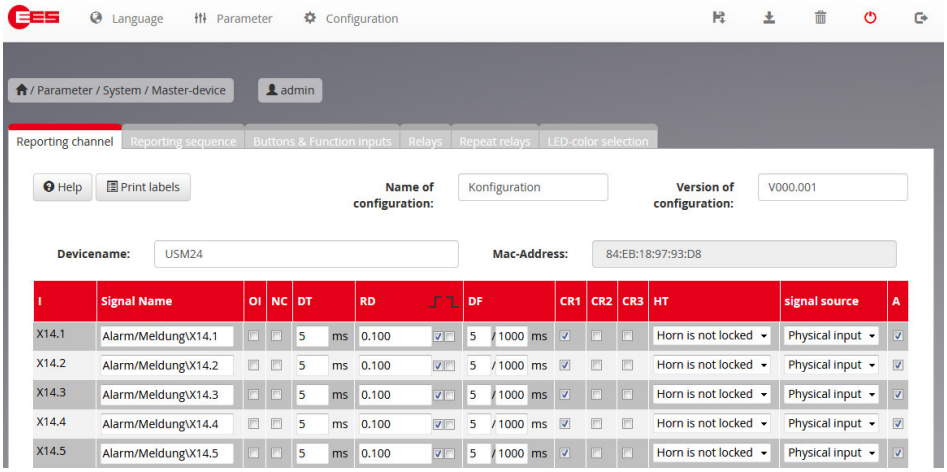


Fig. 5.2: Start page of the USM Web-server, tab reporting channel

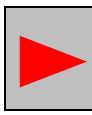
Next to the EES logo the menu bar contains the three main menus:

- **Language**
- **Parameter**
- **Configuration**

and the symbol bar consisting of five buttons:

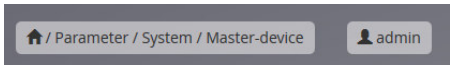
The buttons have the following functions:

- **Accept configuration**
  Storage and activation of the changed parameters in the fault annunciators. **After finishing the parameterisation, the new parameters have to be accepted and thus stored into the device.**
- **Accept all 4 configurations**
  With this button the parameters of all devices (base device and optionally defined slave devices (annunciator 1 …3)) will be accepted and stored.
- **Dismiss configuration**
  Dismissal of all changes done in the session (since last “accept configuration”).
- **Restart**
  Restart of the USM
- **Logoff**
  Logoff from the web-server of the fault annunciator



Upon logoff without accepting the configuration all new entered parameters will be dismissed.

Below the main menu bar the menu path and the user are displayed.



In the main window the menu “Parameter / Master-device” is already opened. The parameterisation could be started straight away. In this manual though, the single menus will be explained first in the order of their appearance in the menu bar.

Some parameterisation pages are structured by different tabs and contain additional buttons. The function of these elements is described in the explanation of the respective pages.

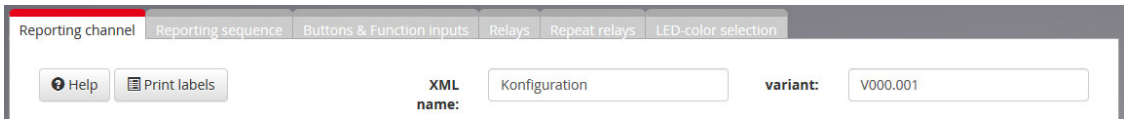


Fig. 5.3: Tabs and buttons on the page „Master-device“

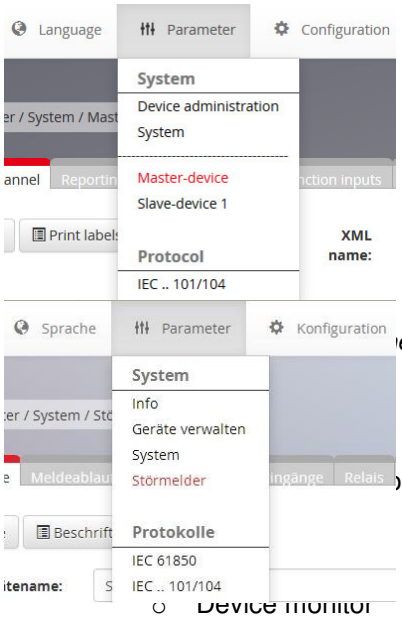
When switching between different menus or tabs, the changes will be buffered but not stored to the current configuration of the annunciator.

5.1 Main Menu Language

The parameterisation interface can be changed between German and English here.

5.2 Main Menu Parameter

This main menu is separated into two groups „System“ and „Protocol“.



eter“

on

- Device monitor
- Device administration
  - Edification and extinction of devices in a cascaded annunciator system
  - Ex- and Import of parameterisation files
- System
  - Time
  - Network settings
  - Security / Passwords
  - Activation / Deactivation of error messages
  - Firmware Update
  - Licence administration (IEC 61850)

- Master-device / Slave-device 1..3 (Annunciator functionalities)
  - Reporting channel
  - Reporting sequence
  - Push buttons & function inputs
  - Function relays
  - Repeat relays
  - LED-colour settings

Group protocols

- IEC 61850
- IEC 60870-5-101/104

In this manual only the parameterisation settings in the group „System“ are described. For explanation of the settings in the group „Protocol“, please refer to the separate interface descriptions IEC 60870-5-101/104 and/or IEC 61850.

5.2.1 Menu Info

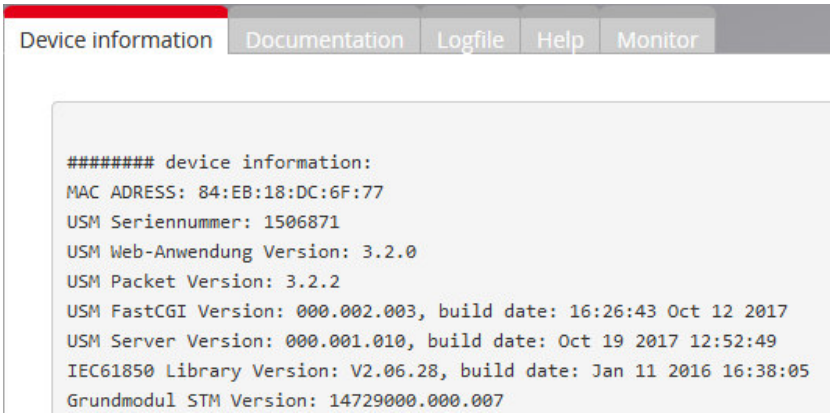


Fig. 5.5: The page „Info“ structured with tabs

The menu is structured into sub-menus by 5 tabs:

Sub-menu Device information
On this page information about the release version of the software of the single program parts is displayed.

Sub-menu Documentation
Here the device documentation in PDF-format can be found.

Sub-menu Logfile
On this page the system-logfile can be opened or exported. To open this file, any text program e.g. WordPad can be used. The logfile contains a protocol of events like system start, login and logoff as well as parameter changes.

Sub-menu Help
Here all help-files are concentrated which can be accessed by the help-buttons in the respective menus.

Sub-menu Monitor
The page monitor offers diagnostics for the WAP. On this page the LEDs of the annunciator are displayed with their current status (flashing, steady light, off).

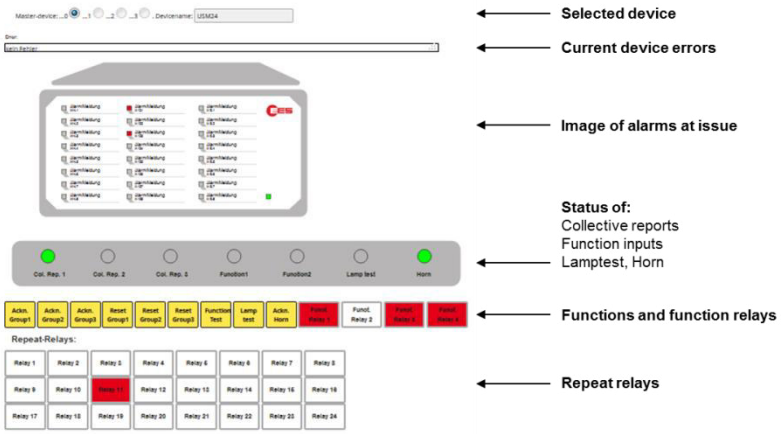


Fig. 5.6: Monitor – a diagnosis tool

If the annunciator is used within a cascaded annunciator system, each of the devices can be displayed in the monitor by click on the respective radio button „Annunciator 0…3“.
A slave device can only be chosen here, if it has been defined in the menu „System/Device administration“ before.

The symbolically depicted yellow push buttons can be “activated” by mouse click and the corresponding function is issued (acknowledgement, function test, …).

The 4 function relays and – if available – the integrated repeat relays are depicted as well (red = activated, white = non-operated state). Relays which can be operated through the monitor or from the IEC interface are displayed with a thin black lining. The status of these relays can be toggled by left-click on the respective relay. Relays with a thick grey lining cannot be operated by mouse-click.

5.2.2 Menu Device administration

In the menu „Device administration“ slave devices can be added or edited and the parameterisation of the annunciator(s) can be exported or imported.

5.2.2.1 Submenu New/adapt

From a USM or BSM-P (Master) and up to 3 slaves (BSM-C or BSM-P) a cascaded annunciator system can be formed which disposes of one common alarm processing (Reporting sequence, forming of collective reports and horn triggering). Through the protocol interface of the USM all alarms of the complete system can be accessed.

The communication between the master and slave devices is realized through the integrated CAN-Bus interface. The USM or BSM-P acts as “master” and the connected WAP-C or WAP-P act as “slave”. Thus systems with up to 192 signal inputs (4*48) can be realized.
MSM-relay-modules cannot be connected to cascaded annunciators.

The parameterisation of cascaded annunciator systems is carried out in the Master device (USM or BSM-P) and will be distributed automatically to the slave devices.

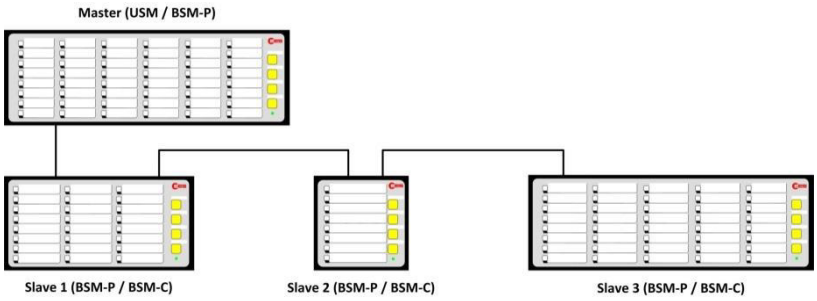


Fig. 5.7: Example of a cascaded annunciator system

Please note that the slave devices have to be set to slave-mode by DIP-Switch and the respective slave addresses (1…3) have to be defined.

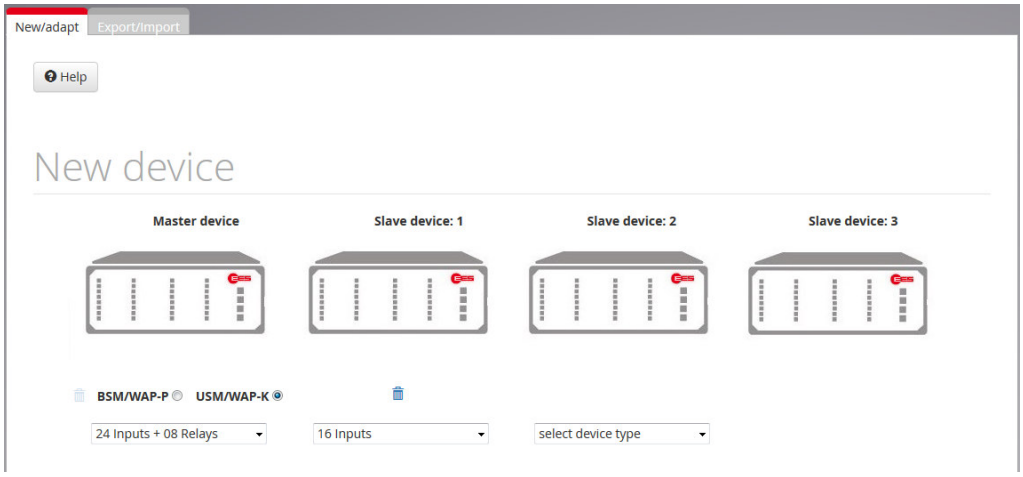
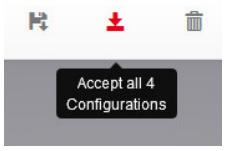


Fig. 5.8: Submenu New/adapt

After selection of the required annunciator type from the respective drop down menu, the device will automatically be added to the parameterisation. After all required devices have been edified, please confirm the system configuration with the button „Accept all 4 configurations“.



The added slave devices now can be found in the menu „Parameter“ as items „Slave-device 1…3“. The menu of each of the slave devices resembles the menu „Master-device“. The tab „reporting sequence“ is not available for the slave devices since the sequence is identical with the master device.

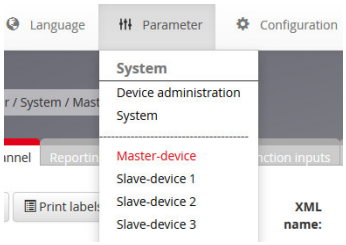


Fig. 5.9: Menu „Parameter“, complemented with the entries „Slave-device 1…3“

By this means, up to three slave devices can be added. Each slave will be displayed under the name Slave-device 1…3 in the menu „Parameter“ – independent from the defined devicename.
By click on the paper bin symbol the respective last slave device in the cascaded system can be deleted.

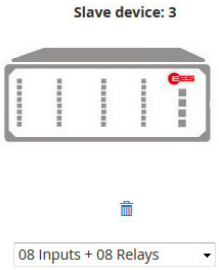


Fig. 5.10: Paper bin - symbol of the last annunciator in the cascaded system

5.2.2.2 Submenu Export/Import

On this page the configuration of the fault annunciator(s) can be stored or a parameter file can be loaded. The following options are available:

Store complete parameterisation
The parameters of the whole annunciator system (incl. optionally connected slave devices in a cascaded system) are packed to one file and saved. Depending on the settings of the internet browser used, this file will be saved under the default name „EESsystem.pcf“ in the download folder, or the filename and folder can be chosen individually.
Any changes done to the parameterisation on the web-interface have to be saved first by **„Accept configuration“** or **„Accept all 4 configurations“**, respectively, before they can be exported.

Load complete parameterisation
Import of a parameter file (e.g. EESsystem.pcf) from an arbitrary folder.

Store device parameterisation
Button „Store“

The parameter file of the chosen device (Master (0) or Slave 1…3) is stored as a packed file. Depending on the settings of the internet browser used, this file will be saved under the default name „USMDeviceX.pcf“ (X indicates the device number 0…3) in the download folder, or the filename and folder can be chosen individually.
Any changes done to the parameterisation on the web-interface have to be saved first by **„Accept configuration“** before they can be exported.

Button „HTML export“

The parameters of the chosen device (Master (0) or Slave 1…3) are displayed in HTML format in a separate window of the browser and can be printed, e.g. for documentation purposes.

Only parameters of devices, which have been edified in the sub-menu „New/adapt“ before, can be exported.

Load device parameterisation

Import of a parameter file from an arbitrary folder into the chosen device.
Only parameters of devices, which have been edified in the sub-menu „New/adapt“ before, can be imported.

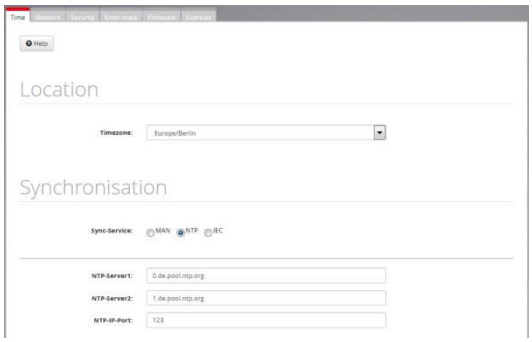
Import Excel Parameterisation

In certain applications, parameters need to be imported from an Excel-file into the devices. → Please refer to section 6 „Parameterisation by Excel-file“.

5.2.3 Menu System

In this menu different system functions can be defined for the annunciator.

5.2.3.1 Submenu Time



On the page „time“ the time zone and way of time synchronization can be defined. The internal real time clock of the annunciator can be set manually or synchronized cyclically by a NTP-server or the IEC interface.

Fig. 5.11: Submenu Time

Manual time synchronisation

With click on the button “set time” the manually entered time is sent to the USM.
With click on the button “set actual time” the PC time is sent to the USM.

Synchronisation by NTP

For time synchronisation two alternative NTP-server can be used. For this the server name or IP address as well as port number of the service need to be defined. If a Universal Annunciation Server (USS) from EES is used within the network, this can provide a time-server. To use the USS’ time server, please enter the USS IP address instead of the server name.

Synchronisation by IEC

Alternatively, the time can be synchronised with the SCADA system connected through the IEC interface.

5.2.3.2 Submenu Network

The USM provides an Ethernet interface on the terminal X8 (Network 0). Optionally the annunciator can provide an additional Ethernet interface on the terminal X98 (Network 1). Both interfaces are completely separated and need to be operated in two independent networks.
The two Ethernet interfaces are equivalent and can be used e.g. for communication with a SCADA system or for parameterisation. For both Ethernet interfaces IP-address, subnet mask and gateway address can be parameterised.

If the USM provides two network interfaces, the two IP addresses have to be in separate networks. Otherwise the annunciator might not be addressable through network anymore.

IP-Address

IP-Adress of the fault annunciator in the local network. This address is used for communication to a client (SCADA system or USS) and for parameterisation.

The IP address entered here must be outside of a possibly existing DHCP-range of the router or DHCP server.

Please note that activation of a new IP address with „accept configuration“ will interrupt the connection to the fault annunciator. The connection has to be established again with the new IP address.

Subnetmask

Please enter the subnet mask for the network used.

Gateway IP-Address

If the network communication is realised through more complex structures (e.g. if the NTP server is available through a gateway only), please enter the gateway IP address here.

DNS-Server

Two alternative DNS-server can be entered here.

5.2.3.3 Submenu Security / Passwords

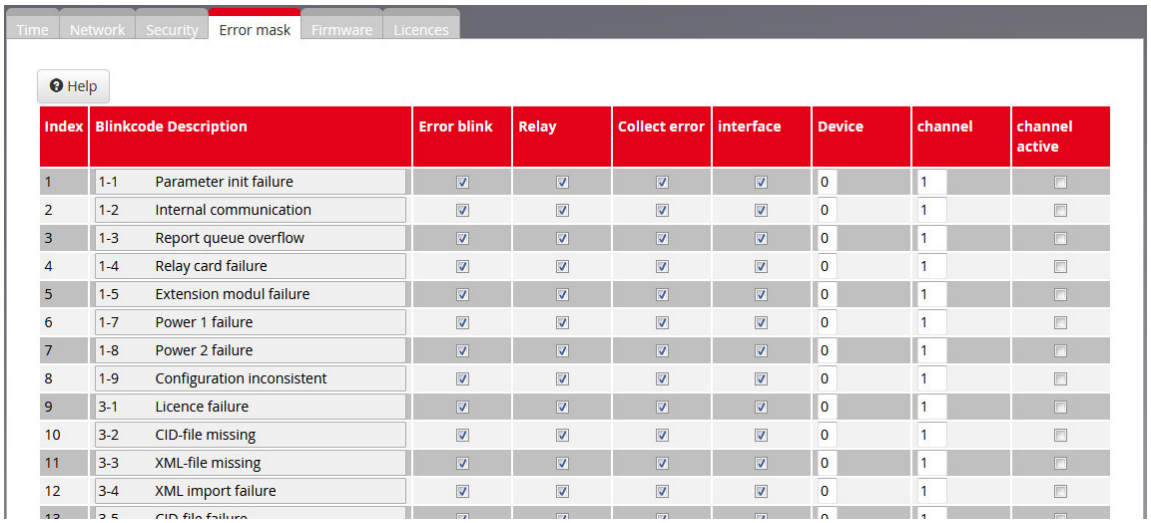
The passwords for the two users admin (with authentication) and user can be changed here.

admin - administrator (rights for reading and writing)

user - user with limited rights (rights for reading only)

The password may consist of ASCII characters and is limited to a maximum length of 40 characters.

5.2.3.4 Submenu Error mask



Index	Blinkcode	Description	Error blink	Relay	Collect error	interface	Device	channel	channel active
1	1-1	Parameter init failure	☑	☑	☑	☑	0	1	☐
2	1-2	Internal communication	☑	☑	☑	☑	0	1	☐
3	1-3	Report queue overflow	☑	☑	☑	☑	0	1	☐
4	1-4	Relay card failure	☑	☑	☑	☑	0	1	☐
5	1-5	Extension modul failure	☑	☑	☑	☑	0	1	☐
6	1-7	Power 1 failure	☑	☑	☑	☑	0	1	☐
7	1-8	Power 2 failure	☑	☑	☑	☑	0	1	☐
8	1-9	Configuration inconsistent	☑	☑	☑	☑	0	1	☐
9	3-1	Licence failure	☑	☑	☑	☑	0	1	☐
10	3-2	CID-file missing	☑	☑	☑	☑	0	1	☐
11	3-3	XML-file missing	☑	☑	☑	☑	0	1	☐
12	3-4	XML import failure	☑	☑	☑	☑	0	1	☐

Fig. 5.12: Submenu Error mask

In this menu the handling of device errors can be defined.

Blinkcode and Description
The entries in this field cannot be edited and show the blinkcode and the corresponding error in clear text.
The first 20 entries are device errors and can be displayed with blinkcode by the Watchdog-LED „Self-monitoring“. For example error „1-4 Relay card failure“ will be displayed with one long and four short flashing pulses (→ section 3.9 „Diagnosis“).
The additional 32 error entries (160…191) signalise a faulty connection to an IEC104 client each and can only be forwarded to the IEC interface or be displayed on a signal channel.

Error blink
If this checkbox is activated the corresponding error will be displayed by flashing on the Watchdog-LED.

Relay
The Alive-Relay is triggered by this error. (→section 3.9 „Diagnosis“).

Collect error
This error is assigned to the collective device error which can be transmitted through the IEC interface.

Interface
If this checkbox is activated the corresponding error can be forwarded through the IEC interface.

Device and Output
With the columns „Device“ and „Output“ a signal channel on one of the annunciators (Master device (0) or Slave device 1…3) can be defined, which will be triggered by this error.

Output active
With this checkbox the specified display (Device/Output) can be activated / deactivated.

5.2.3.5 Submenu Firmware

If a firmware-update is required for the USM, the respective firmware-file can be uploaded into the device on this page.

5.2.3.6 Submenu Licences

The USM provides communication through the protocol IEC 60870-5-101/104 by default. Optionally the annunciator can provide communication through IEC 61850. For this communication a software licence is required. If the licence has not been installed by EES, the license file can be installed from this page after being provided by EES.

5.2.4 Menu Master-device / Slave-device1..3

In the menu “Master-device” or “Slave-device1..3”, respectively, the fault annunciation functionalities of the device can be parameterised. This menu contains the following sub-menus:

- Reporting channel
- Reporting sequence (only available for Master-device)
- Buttons & function inputs
- Relays
- Repeat relays
- LED-colour selection

5.2.4.1 Submenu reporting channel

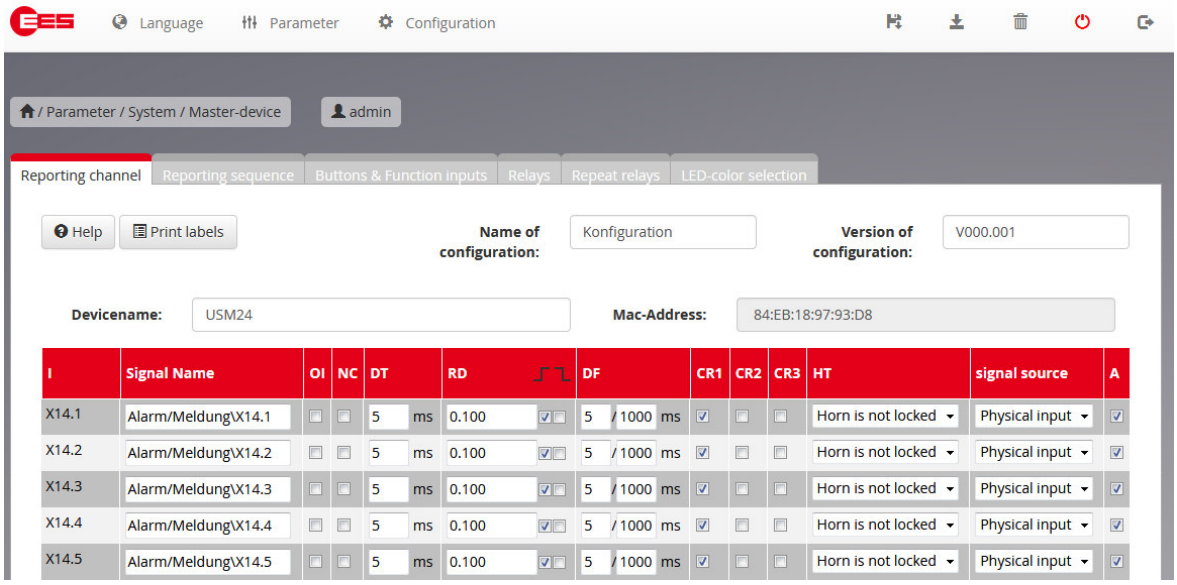


Fig. 5.13: Page Reporting channel

Devicename
A device designation with a maximum length of 40 ASCII characters can be entered here. This designation serves for identification of the device, is transmitted to the WAP when parameterised and stored there.

XML name / variant
In these fields declarations for name and version of the respective device parameterisation can be entered. This information is stored in the parameterisation file and on the device and will be read and displayed when loading a parameterisation file or when a device is connected.

MAC-address
In this field the MAC-address of the USM is displayed.

Labelling strips
With click on the button “Print labels” a new window with the labelling strips will be opened. The signal texts resemble the labelling of the channels, the button texts follow the declaration on the page “buttons & function inputs”. If a text is too long, it will be displayed in red characters and should be changed – otherwise only the visible part of the text will be printed. By click on a text within the labelling foil a new dialog for editing of the text will be opened. Please choose DIN A4 landscape format as paper settings for your printer.

In the table the following parameters can be defined for each signal channel:

Field	Explanation
I	**Channelnumber** (fixed assigned)
Signal name	**Designation of the respective channel** This designation will be used when printing the labelling strips. A 2-line labelling can be realised by separating the second line by “\” (backslash) from the first line (e.g. “Bucholtz\Alarm”).
OI	**Operation indication** If this checkbox is ticked, the signal will be treated as operation indication. If this box is unchecked (default setting), the signal will be processed according to the chosen reporting sequence (→ page reporting sequence). By defining the signal to be operation indication or fault annunciation, the LED-colour will automatically be set according to the settings on the page “LED-colour”. Default settings: operation indication = green, fault annunciation = red.
NC	**Normally closed principle of the inputs** (when checkbox is ticked) Normally open principle: application of a voltage at the input triggers an alarm. Normally closed principle: voltage drop at the input triggers an alarm. Default setting: Checkbox not ticked – normally open principle.
DT	**Debouncing time** The debouncing time defines the timespan for which a signal must continuously be applied before an alarm is issued. This prevents multiple alarms in the case of a bouncing switch. Time 0 ms … 1000 ms, settable in steps of 1 ms.
RD _|‾ ‾|_	**Response delay** The response delay delays a debounced and defluttered alarm before it is displayed, forwarded or deleted. This time span is considerably longer than the debouncing time and can be set from 0 ms … 9h in steps of 1 ms. The checkboxes _|‾ and ‾|_ for rising and falling edge define for which signal edge the alarm delay is active. _|‾ checked: delay is active for coming alarm ‾|_ checked: delay is active for receding alarm
DF	The **defluttering** prevents alarms from being triggered and reset permanently e.g. by a loose contact. The defluttering acts after the response delay (debouncing). If an input changes more often than the defined number of edges within the fluttering time, the defluttering comes into effect and the alarm channel is marked as faulty. **→ This information is only relevant for IEC communication and does not affect the local display of the annunciator!** Number of edges: 0 … 255 Fluttering time: 0 ms … 65535 ms, ~1 min., in steps of 1 ms Default settings: 5/100
CR1, CR2, CR3	**Assignment to collective reports** The alarm triggers the collective report which is checked here. Multiple allocations are possible. All alarms that are assigned to one collective report from a group. This assignment takes effect for acknowledgement and reset.

Field	Explanation
HT	**Horn triggering** None: Alarm does not trigger horn With horn lock: Horn acknowledgement only possible after lamp acknowledge No horn lock: Horn acknowledgement always possible
Signal Source	**Triggering of the alarm channel** The source of the signal for each channel can be defined with this checkbox. Physical input: corresponding galvanic signal input Interface: IEC Client (SCADA or USS) through interface Display: IEC Server (signal status from another annunciator) through interface Logic: Alarm channel is triggered from logic functionality Device error: Alarm channel is triggered by a device error as defined in the menu "System" → "Error mask" Default setting: Physical input
A	**Activation of the alarm channel** If this checkbox is unticked, the channel will not be processed. The alarm will be ignored within the complete system. Default setting: channel activated

Table 5.1: Parameters of reporting channel

The following drawing illustrates the mode of operation of the two delay times and the defluttering. The options for triggering of the optionally integrated repeat relays is displayed as well (→ section "repeat relays").

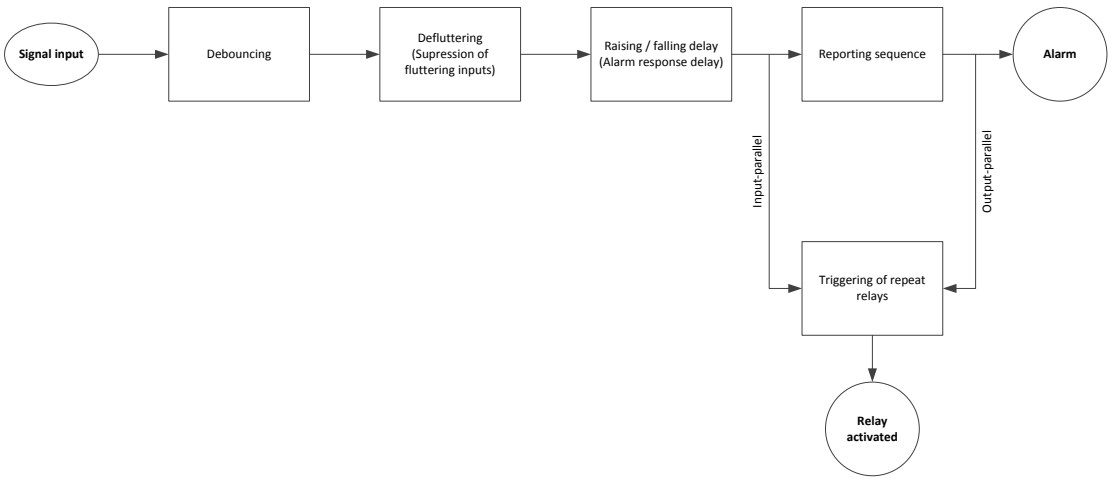


Fig. 5.14 Schematic illustration of the alarm processing in the annunciator

To use the settings in one line for one or all other lines, line contents can be copied to the desired line(s). By right-click on the marked line a context menu with the following options opens:

Copy
Paste
Paste to all

The latter option fills all lines with the respective contents.

For device and channel designation, all characters from A…Z and 0…9 are allowed. The special characters „ { } | $ & # ; “ are not allowed. For channel designations, „\“ (backslash) is used as separation mark to start a new line.

5.2.4.2 Submenu reporting sequence

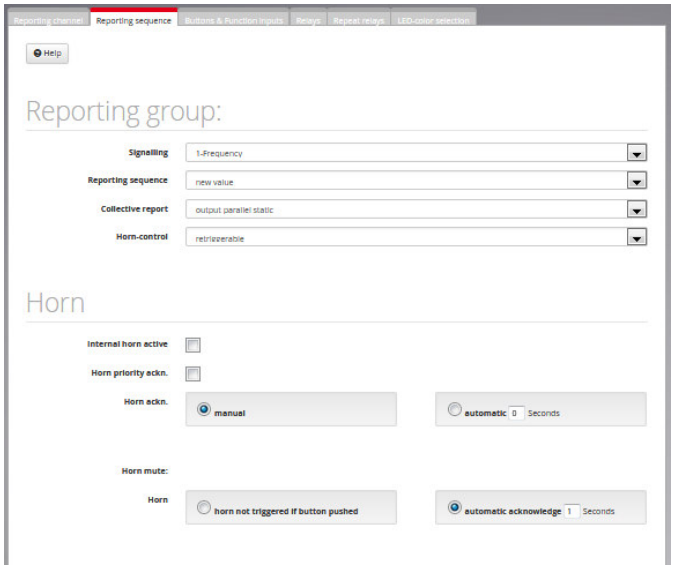


Fig. 5.15: Page reporting sequence

In this sub-menu the reporting sequence and the horn triggering can be parameterised. To ensure a flexible adaption of the sequence to the requirements, the reporting sequence is composed from different components, which are explained in the following.

Reporting sequence

Title	Options	Note
Signalling	1-Frequency	1-frequency flashing
	2-Frequency	2-frequency flashing
	Status indication	Self-acknowledging alarm: alarm is displayed as acknowledged alarm and recedes, when the corresponding input drops.
Reporting sequence	New value	New value reporting (no-first-up)
	First up	First-up reporting
	Steady-steady-light	Can only be chosen for 2-frequency flashing
Collective report	Input parallel static	The collective report is set with the first incoming alarm and resets with the last receding alarm.
	Input parallel static-dynamic	The collective report is set with the first incoming alarm. For each subsequent alarm, the collective report is reset for approx. 0.8 s and then set again. Once all alarms have receded the collective report is reset permanently.
	Output parallel static	The collective report is set with the first incoming alarm. Once all alarms have receded and been acknowledged the collective report is reset.

	Output parallel static-dynamic	The collective report is set with the first incoming alarm. For each subsequent alarm, the collective report is reset for approx. 0.8 s and then set again. Once all alarms have receded and been acknowledged the collective report is reset permanently.
	dynamic	The collective report is activated for approx. 0.8 s with each incoming alarm.
	Input parallel static acknowledgeable	The collective report is set with the first incoming alarm and resets with the last receding alarm or when acknowledged.
	Output parallel static acknowledgeable	The collective report is set with the first incoming alarm and reset independently from the state of the alarms by acknowledgement.
Horn control	retriggerable	Horn is triggered by subsequent alarm, even if there are already alarms at issue.
	not retriggerable	Horn is triggered by subsequent alarms only if no alarms are at issue.

Table 5.2: Options reporting group

For further details on the different reporting sequences, please refer to the separate documentation „Alarm sequences of EES – fault annunciators“ with the document name „SM-MA-ZI-UK“.

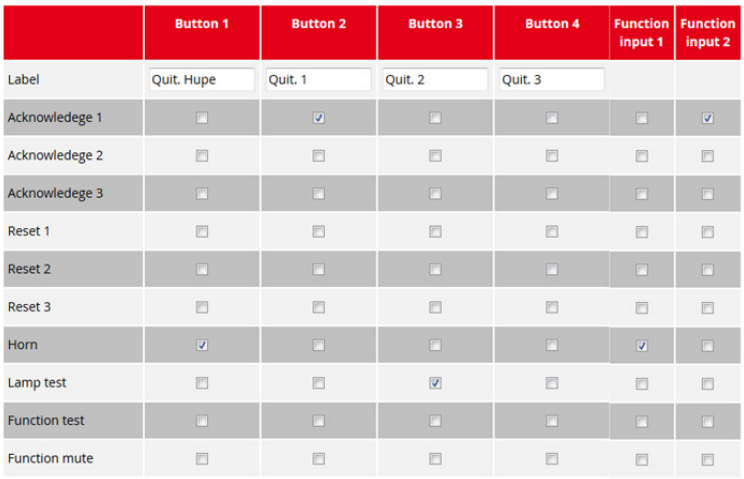
Horn

Title	Options	Note
Internal horn active	Active	Internal and external horn will be triggered in parallel.
	Inactive	Internal horn is deactivated, relay contact for triggering of external horn stays active.
Horn priority acknowledgement	Inactive	Horn can always be acknowledged.
	Active	Alarm can only be acknowledged once the horn has been acknowledged.
Horn acknowledge	Manual (continuous tone)	Horn is acknowledged manually by button or function input.
	Automatic (pulse tone)	Horn is acknowledged automatically according to the set time.
Horn mute	Horn off	Horn is not triggered as long as function horn mute is activated.
	Automatic (pulse tone)	Horn is acknowledged automatically according to the set time as long as function horn mute is activated. This time can be defined independently from the time for automatic horn acknowledgement in normal operation mode.

Table 5.3: Options horn

Please note that the parameters „horn priority acknowledgement“ and „Horn triggering“ (HT, page „Reporting channel“) are dependent from each other. If horn priority acknowledgement is activated, the alarm can generally only be acknowledged after the horn has been acknowledged.

5.2.4.3 Submenu Buttons & Function inputs



	Button 1	Button 2	Button 3	Button 4	Function input 1	Function input 2
Label	Quit. Hupe	Quit. 1	Quit. 2	Quit. 3		
Acknowledege 1	☐	☑	☐	☐	☐	☑
Acknowledege 2	☐	☐	☐	☐	☐	☐
Acknowledege 3	☐	☐	☐	☐	☐	☐
Reset 1	☐	☐	☐	☐	☐	☐
Reset 2	☐	☐	☐	☐	☐	☐
Reset 3	☐	☐	☐	☐	☐	☐
Horn	☑	☐	☐	☐	☑	☐
Lamp test	☐	☐	☑	☐	☐	☐
Function test	☐	☐	☐	☐	☐	☐
Function mute	☐	☐	☐	☐	☐	☐

On this page, the specified functions can be assigned to the push buttons 1…6 and the function inputs 1&2. Multiple allocations are possible.

The designations of the buttons in the line „Label“ will automatically be adopted in the labelling strips and can be printed from the page „reporting channels“.

Fig. 5.16: Submenu assignment of buttons and function inputs

Function	Note
Lamp acknowledgement 1, 2, 3	Optical acknowledgement: Acknowledgement of the alarms in the collective report groups 1, 2 or 3
Reset 1, 2, 3	Reset of the alarms in the collective report groups 1, 2 or 3
Horn	Acknowledgement audible alarm
Lamp test	Lamp test
Function test	Simulation of alarms at all inputs
Function mute	Horn triggering acc. to the settings in „Horn mute“

Table 5.4: Assignment of buttons and function inputs

The assignment is done in a matrix – the lines are representing the functions and the columns are representing the buttons and function inputs. Implemented assignments are displayed by a tick in the respective checkbox.

5.2.4.4 Submenu Relay (function relays)

On this page the assignment of the 4 function relays to different annunciation functions, buttons or function inputs can be defined.

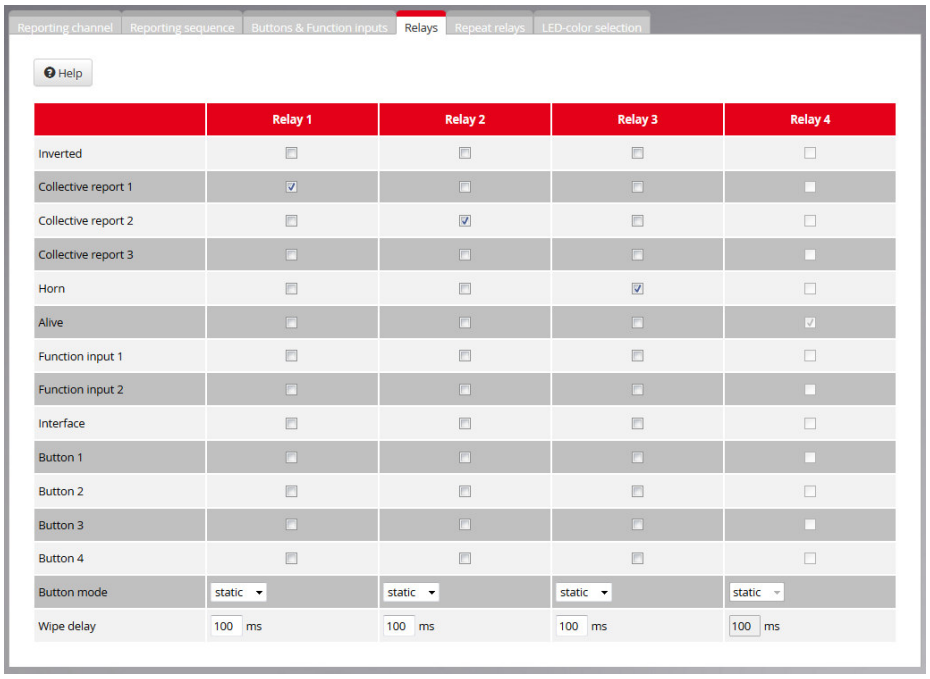


Fig. 5.17: Page Relay

The assignment is done in a matrix – the lines are representing the triggering events (e.g. pushing a button) and the columns are representing the relays. Implemented assignments are displayed by a tick in the respective checkbox.

Function	Note
Inverted	When activated the switching function is negated
Collective report 1, 2, 3	Activated by collective report 1,2 or 3
Horn	Relay contact for connection and triggering of an external horn
Alive	Alive-contact of the internal self-monitoring (fixed assigned to relay 4)
Function input 1, 2	Relay follows function input
Interface	Triggering from IEC interface (pulse commands with below defined wipe duration possible)
Button 1 … 6	Relay follows button
Button mode	Function of the relay when triggered from button or IEC interface Static – relay is activated as long as the button is pushed Toggle – flip-flop function, relay converts with each excitation Wipe – relay is activated with each excitation and drops after the defined wipe duration (10…10000ms)

Table 5.5: Function assignment of the relays

Multiple allocations, e.g. aggregation of collective reports, are possible. For each relay the switching function can be negated – in this case the relay drops e.g. when a collective report is activated.

5.2.4.5 Submenu Repeat relays

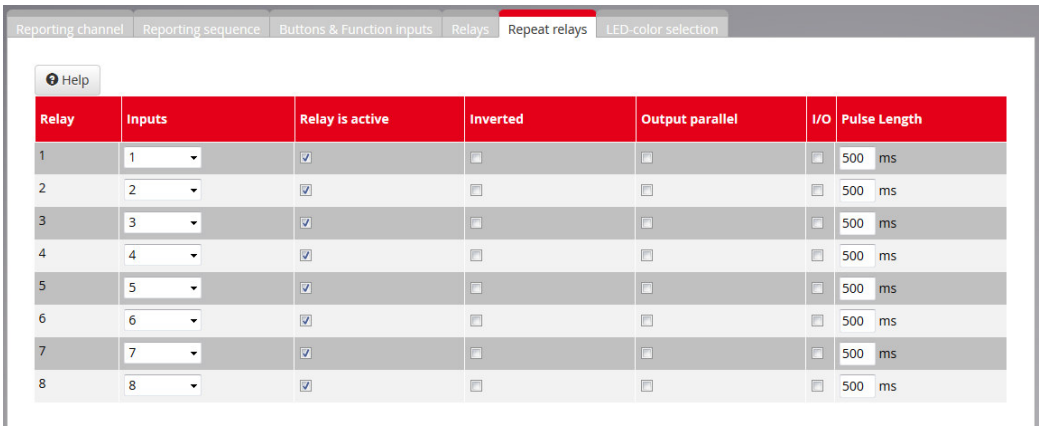


Fig. 5.18: Page repeat relays

The optionally integrated repeat relay cards (8 NO contacts each) are independent from the 4 function relays described in the previous section.
Only the relays as available in the hardware to be parameterised will be displayed.
For each relay the following definitions can be made:

Inputs
Here the trigger for the relay can be defined. The following options are available:

- Function collective report 1,2 or 3
- Function horn triggering
- Available galvanic signal inputs

Relay is active
By unchecking the checkbox the relay is deactivated.

Inverted
When this checkbox is ticked, the respective function is negated. In this case e.g. the relay drops when a collective report is at issue and is energized when no collective report is at issue.

Output parallel
If the relay is triggered from a signal input, it can be defined if the relay directly follows the input (input parallel) or if it is activated until the corresponding alarm is acknowledged (stored alarm = output parallel).
Checkbox checked (default setting) – Relay follows the stored alarm (= output parallel)

I/O
If the relay is to be triggered from the IEC interface instead of a galvanic signal input or a function, this box needs to be checked. Please note that in this case a respective IEC-object needs to be defined for the relay in the protocol settings.

Pulse length
If a relay is triggered from the IEC interface, the pulse width can be defined here in the range from 10…10000 ms.

5.2.4.6 Submenu LED-colour selection

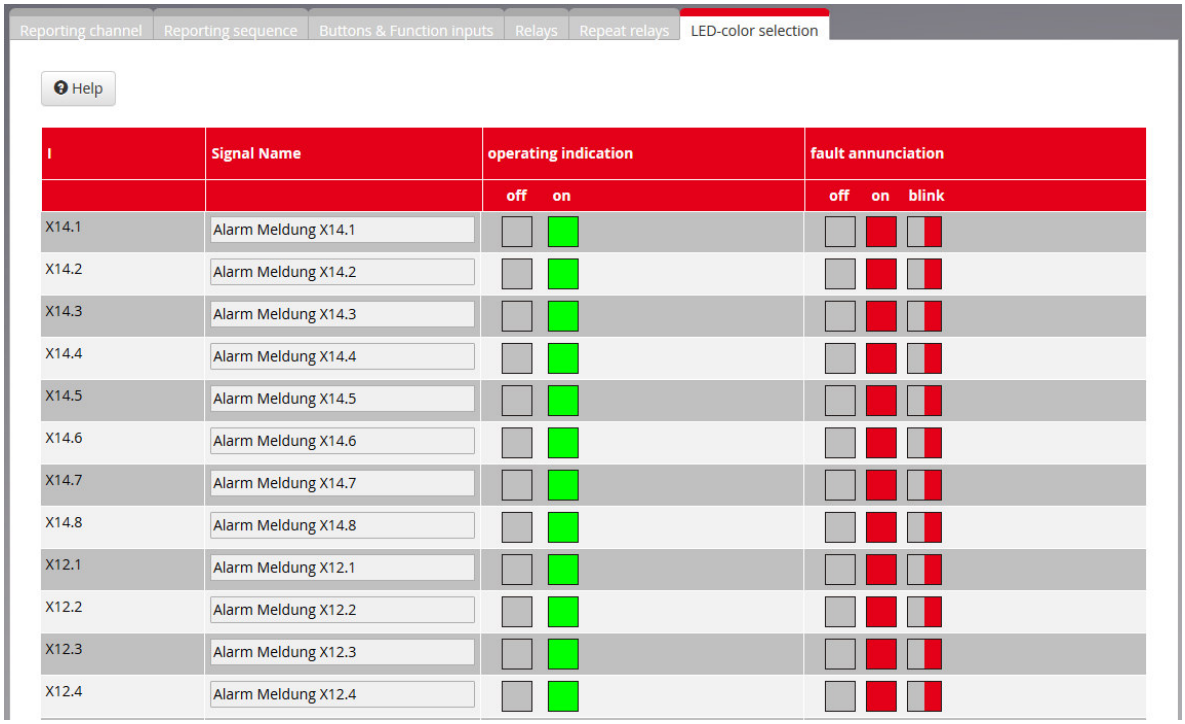


Fig. 5.19: Page LED-colour

On this page the LED colours for the operation modes “operation indication” and “fault annunciation” of each channel can be defined.

Operation indication
For both states OFF and ON the LED can be triggered as follows:
LED OFF or colour: RED, GREEN.

Fault annunciation
For fault annunciation signals the colour for the signal conditions OFF and ON can be defined as follows:
LED OFF or colour: RED, GREEN.
For the state flashing the colour of the state ON is selected automatically.

Please note that for the states OFF and ON of one channel different colours need to be defined.

5.2.5 Menu IEC 61850

In this menu settings can be done that affect the IEC 61850 interface of the annunciator.
For detailed information please refer to the separate interface description → **MSM-S850-BA-UK**.

5.2.6 Menu IEC .. 101/104

In this menu settings can be done that affect the IEC 60870-5-101/104 interfaces of the annunciator.
For detailed information please refer to the separate interface description → **MSM-S850-BA-UK**.

5.3 Main menu Configuration

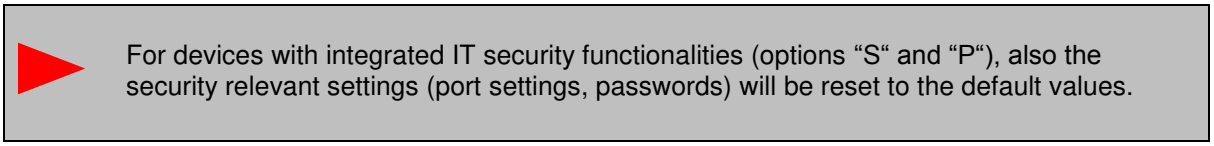
This menu contains buttons with the following functionalities:

- **Accept configuration**
  Storage and activation of the changed parameters in the fault annunciators. **After finishing the parameterisation, the new parameters have to be accepted and thus stored into the device.**
- **Accept all 4 configurations**
  With this button the parameters of all devices (base device and optionally defined slave devices (annunciator 1 …3)) will be accepted and stored.
- **Dismiss configuration**
  Dismissal of all changes done in the session (since last “accept configuration”).
- **EES factory defaults**
  Restoring of the default values for all parameters. (Note: also the IP-address of the annunciator will be set to the default value!)

5.4 Parameterisation by push buttons

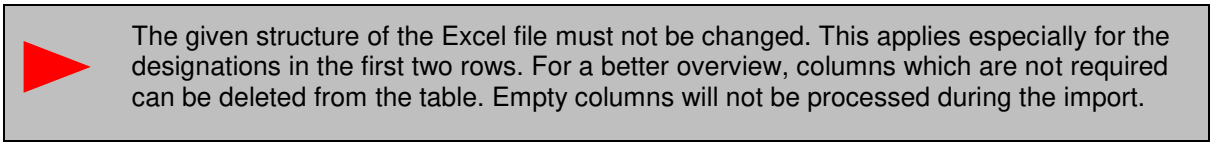
The annunciators of the series USM can temporarily be reset to the default settings by means of the push buttons on the device front. This allows to reset all parameters of the device, e.g. to enable communication to the annunciator for maintenance access.
The default parameters can be restored as follows:

1. Press button 1 and 4 (the topmost button (=1) and the lowermost button (=4)) at the same time for approx. 2 seconds.
2. The top-left LED shows orange light, the LED underneath it shows red light, the horn sounds for a moment and the OK-LED starts flashing in red and green. This indicates that the annunciator now is in parameterization mode.
3. Now press button 3 (3rd button from the top) one or two times (dpeneding on the currently activated parameter set: press once if parameters deviate from the default parameters, press twice if the default parameters are active) until the second LED in the left column of LEDs shows green light. This indicates that all parameters of the annunciator will now be set to default.
4. In the next step please confirm this by pressing the lowermost button (button 4).
5. Now the indication of the annunciator goes back to the normal operation state (you have left the parameterization mode) and you can log on to the web-server under the default IP address (192.168.1.99).



6 Parameterisation by Excel-file

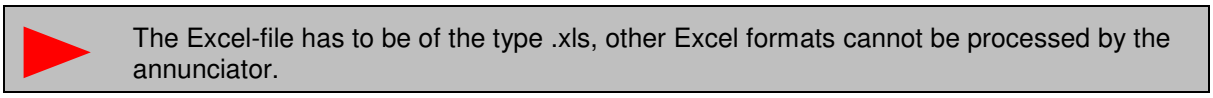
In many applications, a part of the required information for parameterisation is already available in Excel-files (e.g data point lists). In this case it is useful to transfer this information to a template and import it into the annunciator. EES provides a template that can be filled in and processed with common procedures. With the Excel file the parameters for the alarm channels, repeat relays and IEC objects can be imported into the WAP.
All other parameters can then separately be adjusted on the Web-interface.



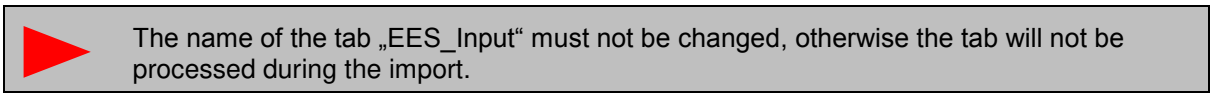
The file consists of three different tabs which allow for parameterisation of the following features:

EES_Input - Alarm channels and IEC objects
EES_Relay - Repeat relays
EES_Collective - Logic disjunctions for 16 „collective alarms“

If the Excel-file contains parameters for additional slave-devices (within a cascaded annunciator system), these can only be imported if the respective annunciators have been edified in the parameterisation of the master annunciator before.



6.1 Alarm channels and IEC objects



Further information on the parameters can be found in the section → 5.2.4.1 Submenu Reporting channel.

6.1.1 Alarms

Index (idx)
The index is a consecutive number which ensures that the original sequence is reproducible when sorting the table according to certain contents.

Device number and input
The column **device number** (0…3) indicates the device that is addressed (master annunciator (0) or one of the up to three slaves (1…3)).
The column **input** addresses the alarm channel on the respective device.
The values entered in these columns have to be consistent.

Signal name 1 and 2
The content of these two fields is used for the parameter „Signal name“ of the reporting channels in the parameterisation interface. To gain a 3-lined labelling , a third line can be generated in the field „signal name 2“ by inserting a „\“ as separation between lines 2 and 3.

Operation / Normally closed
The respective function (operation indication or processing of the input in normally closed principle) can be activated with „x“ or „X“. If the field is empty, the respective function is not activated.

Delay times / Defluttering

„debounce time“	0 – 1000 ms
„response delay“	delay time from 0ms .. 32400s (9h), up to 30s in pattern of 1ms, any longer times in pattern of 1s. Format: mmm:ss.xxx (xxx indicates the value of the milliseconds). If no delimiters are used, the entered value will be interpreted in seconds.
„deflutter number“	0 – 255
„deflutter time“	0 – 65535 ms

These fields must not be empty.

Selective functions

For additional parameters, which can be activated or deactivated, the respective function can be activated by entering “x” or “X” in the corresponding column:

Alarm edges	- „rising“, „falling“ (multiple assignment possible)
Collective reports	- „collective report1 – collective report3“ (multiple assignment possible)
Horn triggering:	- „not active“, „not locked“, „locked“ (only one assignment possible)
Signal source :	- „input physical“, „interface“, “display“, „logic“ (only one assignment possible)

For empty fields the respective function is not activated.

6.1.2 IEC-objects of the reporting channels

For each alarm channel and IEC type an IEC object is generated. All objects are formed identically and have the same parameters.

Discrete object parameters

„ASDU“	- integer value 0 – 65535 or structured xx-xx (e.g. 11-22).
„IOA“	- integer value 0 – 16777215 or structured xx-xx-xx (e.g. 11-22-33).
„IEC-Typ“	- integer value indicating the respective IEC object type according to standard:

1	single report without timestamp
2	single report with short timestamp
3	double report without timestamp
4	double report with short timestamp
5	step position without timestamp
6	step position with short timestamp
7	32 bit report without timestamp
8	32 bit report with short timestamp
30	single report with long timestamp
31	double report with long timestamp
32	step position with long timestamp
33	32 bit report with long timestamp
45	single command without timestamp
46	double command without timestamp
47	step command without timestamp
58	single command with long timestamp
59	double command with long timestamp
60	step command with long timestamp

For empty fields the value will be set to 0 (no type).

Object parameters selective functions

The respective function can be activated by entering “x” or “X” in the corresponding column.

„Link1 –Link4“	- defines on which link the respective object will be forwarded
„blocked“	- the respective object is blocked, no forwarding on the IEC interface
„double“	- the respective object will be addressed as double command

For empty fields the respective function is not activated.

Object types
Two object groups are available for communication as IEC server (station) and IEC client (Master).

Object types server communication:

Input (undelayed)	- physical activation of the signal input
Delayed Input	- signal input after expiration of the response delay
Unacknowledged Alarm	- alarm at issue/receded (stored, but not acknowledged)
Stored Alarm	- alarm stored and at issue (output-parallel)
Status	- status of the alarm (Status 1 .. 4)
Status set	- status of the alarm is set (Status 1 .. 4)
Input set	- input is set

For empty fields the value will be set to 0.

Object types client communication:
The available information objects of the IEC client are identical to the information objects of the IEC server.

6.2 Repeat relays and IEC objects

The name of the tab „EES_Relay“ must not be changed, otherwise the tab will not be processed during the import.

6.2.1 Relays

Index (idx)
The index is a consecutive number which ensures that the original sequence is reproducible when sorting the table according to certain contents.

Device number and relay
The column **device number** (0…3) indicates the device that is addressed (master annunciator (0) or one of the up to three slaves (1…3)).
The column **relay** addresses the respective repeat relay on the respective device.
The values entered in these columns have to be consistent.

Input
Input indicates the signal input which triggers the relay. The inputs 1…24 can be assigned to a repeat relay. Additionally, the triggering of an external horn (“h”, “H”) or the output of the collective reports 1 – 3 (“s1…s3”, “S1…S3”) can be assigned to a repeat relay. Triggering input and repeat relay have to be on the same device.
These fields must not be empty.

Pulse length
The pulse length is an integer value between 10 and 10000 in ms.
These fields must not be empty.

Selective functions
In the columns “active”, “inverted”, “output parallel” and “IEC-interface”, the respective function can be activated by entering “x” or “X”.
For empty fields the respective function is not activated.

6.2.2 IEC-objects of the repeat relays

For each repeat relay and IEC type an IEC object is generated. All objects are formed identically and have the same parameters.

Discrete object parameters

„ASDU“ - integer value 0 – 65535 or structured xx-xx (e.g. 11-22).
„IOA“ - integer value 0 – 16777215 or structured xx-xx-xx (e.g. 11-22-33).
„IEC-Typ“ - integer value indicating the respective IEC object type according to standard:

1	single report without timestamp
2	single report with short timestamp
3	double report without timestamp
4	double report with short timestamp
5	step position without timestamp
6	step position with short timestamp
7	32 bit report without timestamp
8	32 bit report with short timestamp
30	single report with long timestamp
31	double report with long timestamp
32	step position with long timestamp
33	32 bit report with long timestamp
45	single command without timestamp
46	double command without timestamp
47	step command without timestamp
58	single command with long timestamp
59	double command with long timestamp
60	step command with long timestamp

For empty fields the value will be set to 0 (no type).

Object parameters selective functions

The respective function can be activated by entering “x” or “X” in the corresponding column.

„Link1 –Link4“ - defines on which link the respective object will be forwarded
„blocked“ - the respective object is blocked, no forwarding on the IEC interface
„double“ - the respective object will be addressed as double command

For empty fields the respective function is not activated.

Object types

Two object groups are available for communication as IEC server (station) and IEC client (Master).

Object types server communication:
relay - read relay status
relay set - set relay status

Object types client communication:
The available information objects of the IEC client are identical to the information objects of the IEC server.

6.3 Simple logic function

With the tab EES_Collective a simple logic disjunction for up to 16 alarms, which are formed out of OR-disjunctions of multiple inputs, can be parameterised. The designations in line 2 are mandatory for correct import of the Excel file.

Index (idx)
Index of the collective report or disjunction, respectively, 1 – 16.

Output device (device)
This value defines the device which holds the alarm channel which is to be triggered when the disjunction is fulfilled. Device 0…3.

Output channel (alarm)
This value defines the alarm channel which is triggered on the respective device when the disjunction is fulfilled. Alarm 1…48.

Triggering alarms (E1 – E192)
An „x“, „X“ in the respective column indicates that this alarm is used as input for the logic disjunction.

Logic inputs
In the parameterisation interface, menu “Annunciator -> Reporting channels -> Signal source” the inputs which are triggered from the logic disjunction, are set to “Logic”.