Panel mounting fault annunciator

BSM - Panel-mounting fault annunciator (2nd generation)

28.06.2021

Manual

Table of content

1 Validity

The description applies to BSM modules with the following options:

59	**B**	x	x	x	x	**C**	R	x	x	**0**	
											Number of reporting channels
		0	8								8 alarm inputs
		1	6								16 alarm inputs
		1	W								16 alarm inputs in wide housing (96 x 192 mm)
		2	4								24 alarm inputs
		3	2								32 alarm inputs
		4	0								40 alarm inputs
		4	8								48 alarm inputs
											Operating voltage
				1							24 V AC/DC
				2							48 V AC/DC or 60 V DC
				5							110 - 220 V AC/DC
											Signal voltage
					1						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
					W						Wide range 50 - 250 V AC/DC
											LED color adjustable (red, green, yellow, orange, blue, white)
											Additional cards
								0			none
								R			8 relay outputs (only for 8 way annunciator)
								R			16 relay outputs (only for 16 way annunciator)*
								R			24 relay outputs (only for 24 way fault annunciator)
								R			40 relay outputs (only for 40 way fault annunciator)
											Redundant operating voltage
									0		No additional power supply
									1		24 - 60 V AC/DC
									5		110 - 220 V AC/DC

Table 1.1: Device variants of the BSM-C

* 16s fault annunciator with integrated relay outputs only in wide housing (96 x 192 mm)

59	B	x	x	x	x	P	R	x	x	x	
											Number of reporting channels
		0	8								8 alarm inputs
		1	6								16 alarm inputs
		1	W								16 alarm inputs in wide housing (96 x 192 mm)
		2	4								24 alarm inputs
		3	2								32 alarm inputs
		4	0								40 alarm inputs
		4	8								48 alarm inputs
											Operating voltage
				1							24 V AC/DC
				2							48 V AC/DC or 60 V DC
				5							110 - 220 V AC/DC
											Signal voltage
					1						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
					W						50 - 250 V AC/DC (wide range)
											LED color adjustable (red, green, yellow, orange, blue, white)
											Additional cards
								0			none
								R			8 relay outputs (only for 8 way annunciator)
								R			16 relay outputs (only for 16 way annunciator)
								R			24 relay outputs (only for 24 way annunciator)
								R			40 relay outputs (only for 40 way annunciator)
								1			8 relay outputs (independent of the size of the annunciator) *
								2			16 relay outputs (independent of the size of the annunciator) * / **
											Redundant operating voltage
									0		No additional power supply
									1		24 - 60 V AC/DC
									5		110 - 220 V AC/DC
											Interface Modbus RTU
										0	none
										M	Interface Modbus RTU switchable RS232 or RS485 **

Table 1.2: Device variants of the BSM-P

* 16 way fault annunciator with integrated relay outputs only in wide housing (96 x 192 mm)
** Option is only available for BSM with 16 signal inputs in wide housing as well as with 24 – 48 alarms

All explanations on the parameterization software refer to version Parasoft-EES-SMT V 3.1.3.

2 General notes

2.1 Supplementary instructions

Note!
These instructions enable the safe and efficient handling of the fault indicators (hereinafter referred to as "BSM, fault indicator or device"). The instructions are an integral part of the device and must be kept in the immediate vicinity of the device and accessible to personnel at all times.

The personnel must have carefully read and understood these instructions before starting any work. The basic prerequisite for safe working is the observance of all safety instructions and handling instructions given in these instructions. In addition, the local accident prevention regulations and general safety regulations for the area of application of the device apply.

Illustrations in these instructions are for basic understanding and may deviate from the actual design.

2.2 Usage

These instructions are a prerequisite for the safe installation as well as the safe operation of the product and must be read and understood before installation.

2.3 Target group

These instructions are written for qualified personnel (electricians) who, due to their technical training, knowledge and experience as well as knowledge of the relevant standards and regulations, are able to carry out work on electrical systems and independently recognize and avoid possible dangers.

The electrician is specially trained for the work environment in which he works and knows the relevant standards and regulations.

2.4 Explanation of symbols

Safety instructions

Safety instructions are identified in these instructions by symbols. The safety instructions are introduced by signal words which express the extent of the danger.

Warning!
This combination of symbol and signal word indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

Note!
This combination of symbol and signal word indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

ENVIRONMENTAL PROTECTION!
This combination of symbol and signal word indicates possible dangers for the environment.

Tips and recommendations

This symbol highlights useful tips and recommendations as well as information for efficient and trouble-free operation.

Further markings

The following labels are used in this manual to highlight instructions for action, results, listings, references, and other items:

Marking	Explanation
	Step-by-step instructions for action
	Results of action steps
	References to sections of this manual and to other applicable documents
	Listings without specified order
[Button]	Operating elements (e.g. buttons, switches), Display elements (e.g. signal lamps)
„Display“	Screen elements (e.g. buttons, Assignment of function buttons)

Important passage

This symbol indicates particularly important information.

Cross reference

This symbol refers to illustrations and other places in this documentation or to further literature.

2.5 Safety instructions

2.5.1 Intended use

The fault indicators are intended exclusively for the applications described in these instructions and may only be used under the conditions described in the chapter Technical data. Any use beyond the intended use or any other use is considered misuse.

WARNING!
Danger in case of misuse!
Incorrect use of the fault annunciator can lead to dangerous situations.

- Never use the devices in EX areas.
- Never use equipment in areas where there is a risk of interference without observing the special regulations for this.
- The devices must not be opened or improperly modified.

2.5.2 Storage of the manual

The instructions must be deposited within easy reach of the device and be accessible to personnel.

2.6 Customer service

For technical information please contact our customer service:

Address	Elektra Elektronik GmbH & Co Störcontroller KG Hummelbühl 7-7/1 71522 Backnang
Phone	+ 49 (0) 7191/182-0
Fax	+49 (0) 7191/182-200
Email	info@ees-online.de
Internet	www.ees-online.de

In addition, we are always interested in information and experiences that result from the application and can be valuable for the improvement of our products.

2.7 Copyright, trademarks, GNU licenses

Copyright

This manual is protected by copyright.

The transfer of this manual to third parties, duplications of any kind and in any form - including excerpts - as well as the utilization and/or communication of the contents are not permitted without the written consent of Elektra Elektronik GmbH & Co. Störcontroller KG (hereinafter referred to as the "manufacturer") except for internal purposes. Violations will result in liability for damages.

The manufacturer reserves the right to assert additional claims.

The copyright is held by the manufacturer.

Usage of open source software

Our firmware contains partial source code produced under the GNU Public License (GPL) by third parties and published for use by anyone. This software is under special open source software licenses and third party copyright. In principle, each customer may freely use the open source software in accordance with the license terms of the respective manufacturers. The rights of the customer to use this software beyond the purpose of our product are regulated in detail by the respective open source software licenses concerned. The customer may freely use the open source software, as provided for in the respective valid license, beyond the purpose for which the software serves in our product.

The use of the open source software used is free of charge. We do not charge a usage fee or other comparable fees for the use of the open source software contained in our products.

The GPL code used in our product is published without warranty and is subject to the copyright of the corresponding author. If programs contained in our products are subject to the GNU General Public License (GPL), GNU Lesser General Public License (LGPL), the Clarified Artistic License or any other open source software license that stipulates that the source code must be made available and the software has not already been supplied with our product on a data carrier in the source code, we will send this at any time on request. If the sending on a data carrier is requested, the sending takes place against payment of an expense lump sum at a value of 10,00 €. Requests are to be directed to our customer service, stating the article and serial number.

Email: info@ees-online.de
Phone: + 49 (0) 7191/182-0
Fax: +49 (0) 7191/182-200

3 Functional description

3.1 Basic structure of the BSM

The annunciators are manufactured in 2 performance classes.

- BSM-C: Basic version configurable via DIP switch
- BSM-P: Software parameterizable version

The fault indicators are used to record and display alarms that are provided via galvanic inputs. The alarms are processed and displayed according to the parameterized fault alarm sequence. In addition, the alarms can be forwarded to higher-level systems via the optionally available Modbus interface.

The fault indicators are offered with 8, 16, 24, 32, 40 or 48 signal inputs. The signal inputs are combined in groups of 8 alarms each. The closed front surface contains 4 buttons, 3 status LEDs, one RGB LED for each alarm with which the 6 color variants (red, green, yellow, blue, orange and white) can be parameterized and insertion pockets for the labeling strips.

The BSM-P has an internal horn. With both versions of the BSM (BSM-C and BSM-P), an external horn can be controlled via a function relay.

The two function inputs are used according to the selected signal sequence (e.g. external acknowledgement). The integrated function relays are designed as changeover contacts. They realize alarm-specific functions (e.g. collective alarm and control of an external horn) as well as the signaling of a malfunction by a live contact.

All fault indicators of the BSM series have a **status memory in case of power failure**. If the supply voltage fails, all visual and acoustic signals are switched off and the relays drop out. During the power failure, no new alarms are registered and acknowledgements are not possible. After voltage recovery, all states are immediately resumed and the fault annunciator is wide for operating actions and new alarms.

The fault indicators have a hardware watchdog and software monitoring. The fault-free function is signaled by LED and relay contact (live contact).

The BSM-P can be parameterized via a parameterization program and the USB parameterization interface. The most common fault alarm sequences, input processing, collective alarm formations and horn controls can be set, and the mode of operation of the buttons, function inputs and relay outputs can be defined. A detailed description of the parameterization can be found in the chapter "Parameterization". Customer-specific fault reporting sequences can be implemented ex works if required.

The fault annunciator has USB and CAN bus, and optionally an RS232/485 interface, whose function and use are described in the following sections.

Many energy plants operate unmanned at times and only in the event of maintenance or a fault is someone on site. For this purpose, two special functions have been integrated in the fault indicators, which are signaled as an additional operating mode by green flashing of the alive LED.

- **Mute function**
  In the "Silent" operating mode, the horn is not triggered or is automatically acknowledged after a parameterizable time. The function is switched on or off with a button parameterized for this purpose. The operating mode can also be activated via a parameterizable function input. In this case, the "Silent" mode is only active as long as a voltage is present at the input.

- **Unmanned**
  The fault indicators can be switched between the operating modes "manned station" and "unmanned station". In the "unmanned station" state, there is no visual or audible output of pending alarms. The internal alarm processing and, if necessary, the control of relays or the output via an interface remain active. Alarm acknowledgement at the fault annunciator is deactivated.

In order to not only display the individual fault alarms via LED, but also to forward them via relay contact in input or output parallel (1:1 relay), two methods can be used:

1. Integration of additional relay cards (8 NO contacts each) for use as 1:1 outputs. These relays can be freely assigned in the parameterizable fault indicators. The relay cards are optional and must be taken into account when ordering.
2. Connection of external relay modules to the CAN bus socket. For further information on the expansion modules, please refer to the separate data sheet MSM-EM-DB-UK.

→ For further information on the integrated fault reporting sequences, please refer to the separate documentation "Reporting sequences of the EES fault indicators".

3.2 Internal Relay cards (optional)

The optionally integrable relay cards (8 NO contacts each) are independent of the 4 function relays of the fault annunciator and can be used for the following functions:

1. Single or output-parallel multiplication and forwarding of individual alarms directly in the fault annunciator without connection of external relay modules
2. Output of collective alarms and horn control

Each of the 8 relays on a plug-in card has a common root. With the BSM-P, control and mode of operation can be individually adapted with the aid of the parameterization program, e.g. inversion of the signals. With the BSM-C, these functions are fixed at the factory (see section Configuration).

3.3 Redundant power supply (optional)

Independent of the primary supply voltage, a second, redundant power supply unit can be integrated into the fault annunciator. Two voltage variants are available for this purpose:

- 24 – 60 V AC/DC
- 110 – 220 V AC/DC

The voltage level of the redundant power supply can be selected independently of the voltage level of the primary power supply. Both the primary and the redundant power supply unit are included in the self-monitoring of the fault annunciator and faults are output via the alive relay. In addition, the presence of the supply voltage on both power supply units is signaled via an LED on the front and rear of the fault annunciator.

3.4 Cascading of several fault indicators

With the cascading function, one BSM or one USM (universal fault monitor) and up to 3 BSMs (BSM-C or BSM-P) can be combined to form a fault monitoring system. In this case, the devices are connected via the system bus provided at the CAN bus sockets using network cables (patch cables). A fault annunciator operates as a "master" and the connected BSMs as "slaves". Thus, systems with a maximum of 192 signal inputs (4*48) can be realized. Systems formed in this way behave like a (virtual) fault annunciator with common annunciation processing (annunciation sequence, collective annunciation formation, horn control). The alarms of the entire system can be accessed via the optional Modbus interface of the master annunciator.

External MSM relay expansion modules cannot be connected when using fault annunciator cascades.

The parameterization of fault alarm cascades takes place completely in the master fault annunciator and is then automatically distributed to the slave fault annunciators. For information on the USM, please refer to the separate operating instructions MSM-USM2G-BA-UK.

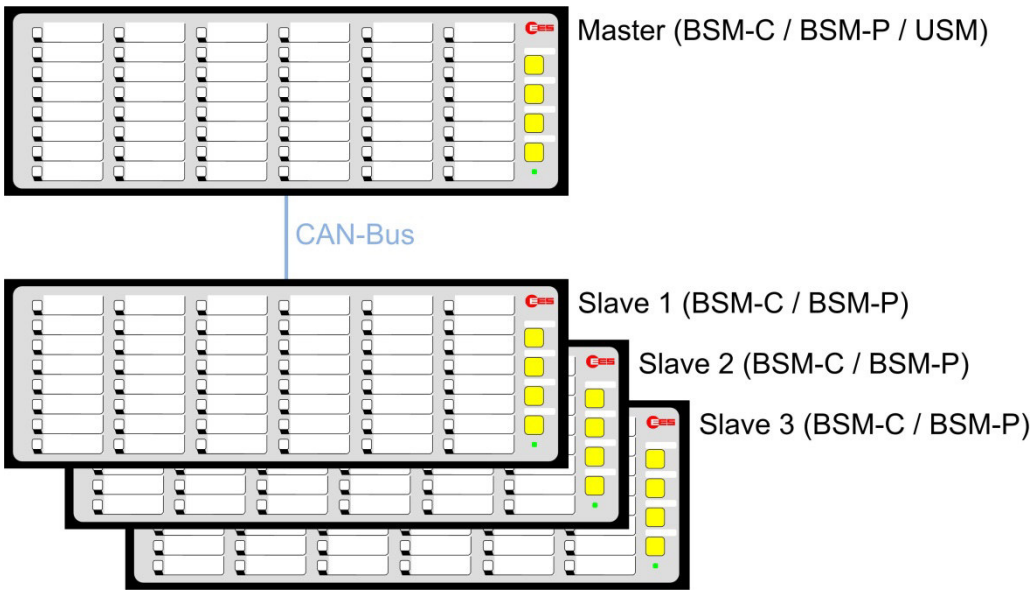


Fig. 3.1: Basic structure of a cascaded annunciator system

3.5 Interfaces

The BSM has the following interfaces:

- 2 x CAN-Bus (System bus for connecting expansion modules or setting up fault alarm cascades - see also section Cascading)
- 1 x USB-B (factory interface) Parameterization interface (only BSM-P)
- 1 x COM - RS232/485 / pluggable terminal as Modbus RTU interface (optionally only BSM-P)

3.6 Labeling

The BSM is labeled using labeling strips that are slid under the cover foil after the front frame has been removed. To do this, use both thumbs to lift the frame out of the clamp from behind at one corner, then lift it out further along the edges and remove it carefully.

Fig. 3.2: Removing the cover frame

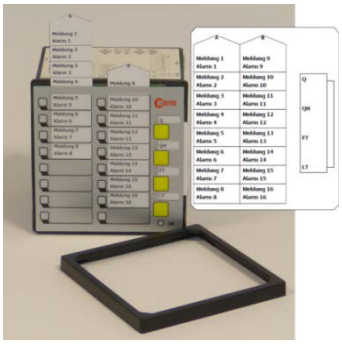


Fig. 3.3: Inserting the labeling strips under the cover foil

The labeling strips with the alarm texts and button designations can be printed directly from the parameterization interface for the BSM-P. Templates in Word format are available for manual creation of the labeling strips for BSM-C and BSM-P.

3.7 Control lights, buttons and connectors

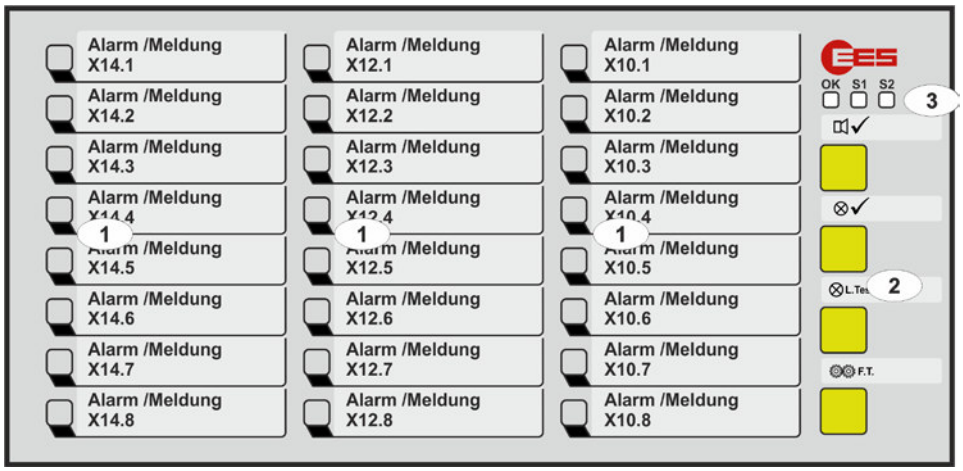


Fig. 3.4: Front view of the BSM24

[1] Alarm lights (Function depends on the parameterized reporting sequence)
[2] Buttons 1 … 4 (Function depends on parameterization)
[3] Control lights

OK - control light „operating state“
- Steady light green - No error, no alternative operating state
- Off - No supply voltage or device defective
- Red flashing - Error (see section Diagnostic functions)
- Green flashing - Signaling of an alternative operating state (see table below)

S1 – Control light supply voltage 1
- Off - No supply voltage 1 and 2
- Steady light red - Error supply voltage 1
- Steady light green - Supply voltage 1 error-free

S2 – Control light supply voltage 2 (redundant supply)
- Off - Option redundant supply voltage not integrated
- Steady light red - Error supply voltage 2
- Steady light green - Supply voltage 2 error-free

Flashing sequence	Alternative operating state	Note
long – short	Mute function activated	As long as the operating mode is activated, the horn is not triggered or automatically acknowledged after the parameterized time.
long – long – short	Unmanned mode activated	As long as the operating mode is active, there is no visual or audible output of pending alarms. The internal alarm processing and, if necessary, the control of relays or the output of alarms via an interface remain active. Alarm acknowledgement at the fault annunciator is deactivated.

Table 3.1: Alternative operating states of the BSM are indicated by the green flashing of the "OK" control light.

During the initialization process of the fault annunciator after the restart, the three control lights "OK", "S1" and "S2" light up green several times in a row.

The illustration of the BSM with 24 signal channels is given here only as an example to clarify the principle. The number of signal channels and the LED colors of the signal lamps may vary depending on the configuration and size of the annunciator.

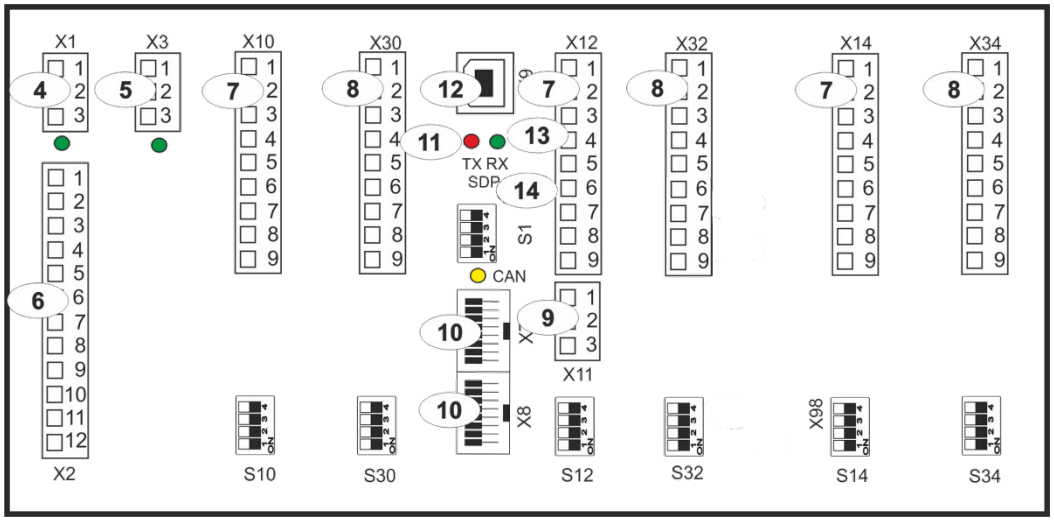


Fig. 3.5: Back view of the BSM24-P with Modbus

[4] Terminals Supply voltage 1 (green LED indicates voltage present)
[5] Terminals Supply voltage 2 (redundant supply voltage optional) (green LED indicates voltage present)
[6] Terminals Function relay 1 - 4
[7] Terminals alarm inputs
[8] Terminals relay cards (optional)
[9] Terminals function inputs 1 and 2
[10] CAN-Bus inputs (System bus / RJ45)
[11] Control lights „communication“
red - Tx serial interface
green - Rx serial interface
yellow - Can-Bus

[12] USB-B (factory interface), Service, diagnostics and parameterization interface
[13] Terminals Modbus-RTU interface (RS232/485) (only optional with BSM-P)

On the BSM 08, terminal X11 (function inputs) is not located under terminal X12, but under terminal X10.

The DIP switches S30, S32 and S34 are only present when the optional relay cards are inserted.

3.8 Diagnostic functions

Diagnostic information is available for monitoring and assessing system functions by signaling errors via LED and relay contacts.

3.8.1 Control light „Operating mode“ and Alive Relay

The "Operating status" indicator light provides information on the current status of the station or system:

- Steady light green - No error
- Green flashing - Initialization process or alternative operating mode (see section Control lights, buttons, connections)
- Red flashing - Error (see section „Error list“)
- Off - No power supply

An error code can be derived from the blink sequence and the associated error can be inferred. A flashing sequence consists of:

- Number of long flashes → 1st digit of the error code
- Number of short flashed → 2nd digit of the error code
- Pause

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

If several errors occur simultaneously, the one with the highest priority is always displayed.

In addition to the "Operating mode" indicator lamp, the live relay with changeover contact signals the status of the fault annunciator.

Terminal X2
Contact 11 / 10 closed - Power failure or error (→ Error codes)
Contact 11 / 12 closed - No error

3.8.2 Error codes

The error codes listed in the following table correspond to the flashing sequence of the "Operating status" indicator lamp of the BSM.

Example:

Error 15 - Communication in the fault annunciating cascade disturbed
Blinking sequence of the indicator lamp - long, short, short, short, short, short, Pause

The following table lists the error codes of the BSM:

Error code	Error	Note
11	Internal error	If the error occurs again after restarting the device, send the device to EES for inspection.
12	Internal error	
13	Overflow alarm buffer	After the occurrence of an alarm surge, intermediate states of alarms may have been lost. The final states are valid.
14	Relay cards	If the error occurs again after restarting the device, send the device to EES for inspection.
15	Communication in the fault annunciating cascade disturbed	This error can occur with fault annunciating cascades. It is displayed when the connection between the master (BSM or USM) and at least one configured slave BSM is interrupted. Please check the configuration of the slave addresses on the BSM (DIP switch combination S1) and the connection cables.
17	Operating voltage 1	Fault of a power supply unit - only for fault indicators with redundant power supply
18	Operating voltage 2	
19	Configuration inconsistent	The configuration entered does not match the device (e.g. BSM 08 and BSM 16).
33	Parameter file missing	Restore factory setting via parameterization program, then perform parameterization again or import. Contact customer service if the error persists.
34	Imported configuration is faulty	Import correct file or restore factory setting via parameterization program.

Table 3.2: Error codes of the BSM

3.9 Terminal assignments

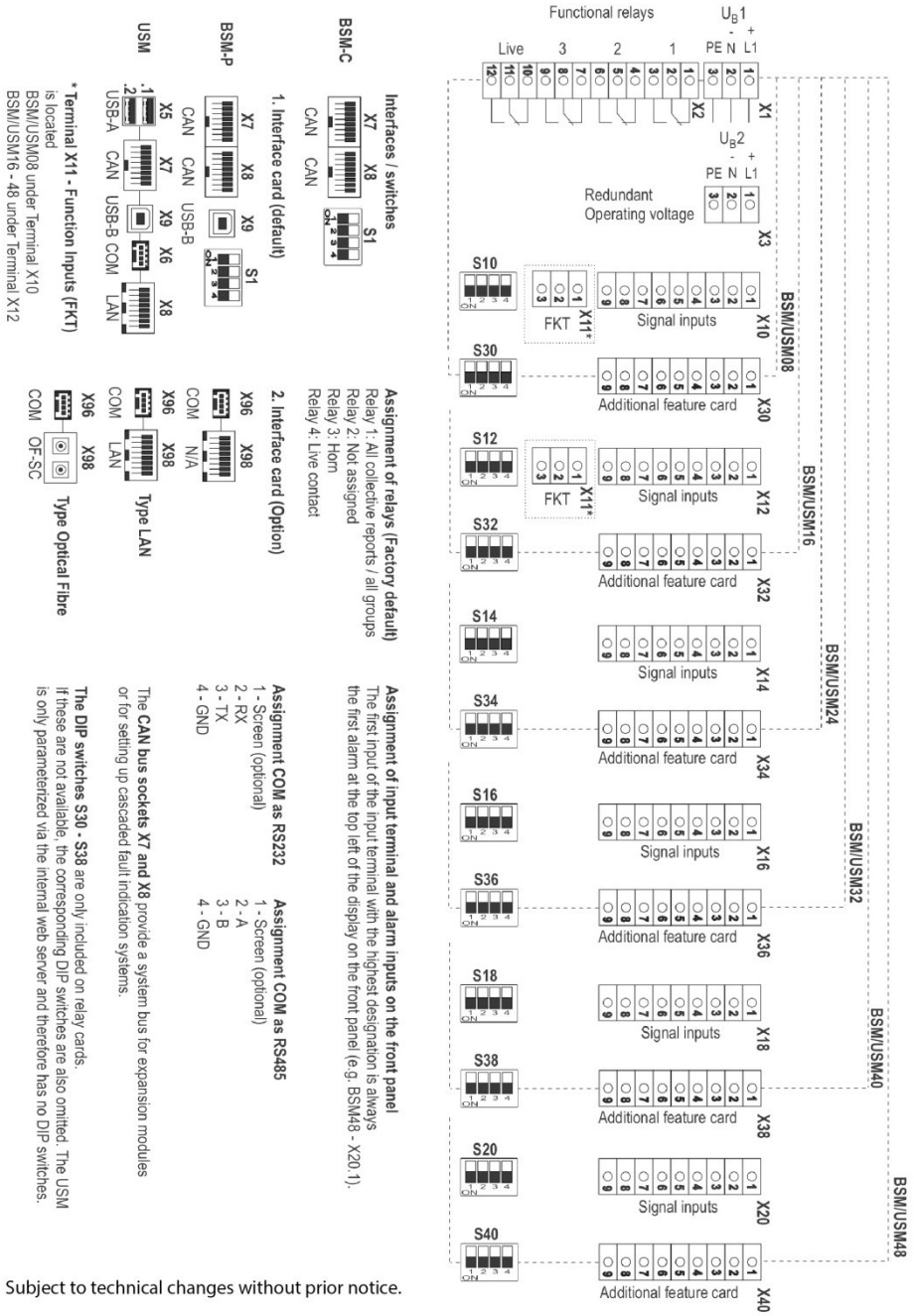


Fig. 3.6: Terminal assignment BSM

Detailed terminal assignment

Alarm inputs
(X10, X12, X14, X16, X18, X20)

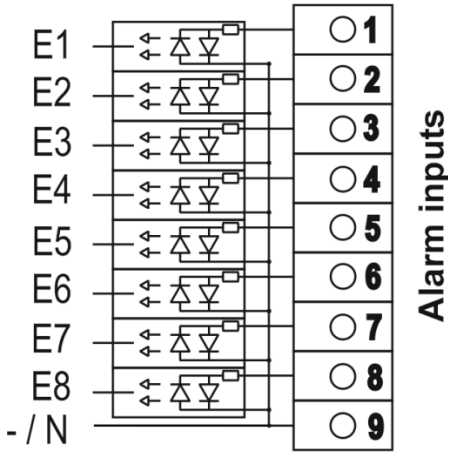


Fig. 3.7: Terminal assignment of the alarm inputs

Output relays
(X30, X32, X34, X36, X38, X40)

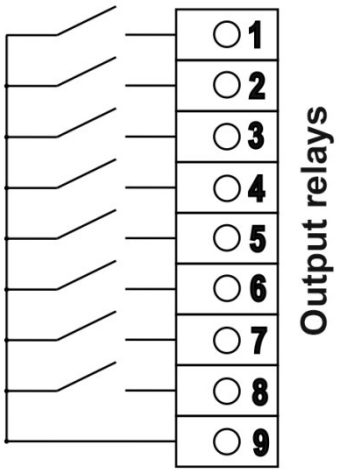


Fig. 3.8: Terminal assignment of the output relays

Functional inputs (X11)

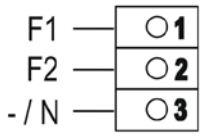


Fig. 3.9: Terminal assignment of the functional inputs

3.10 Front and back view of the BSM

The following pages show the front and rear views of the fault indicators. Please note the arrangement of the terminals of the signal inputs and their assignment to the displays in the front. The devices are shown in each case with the maximum configuration, i.e. all options. For devices that do not have these options, the corresponding terminals are omitted.

3.10.1 BSM 08

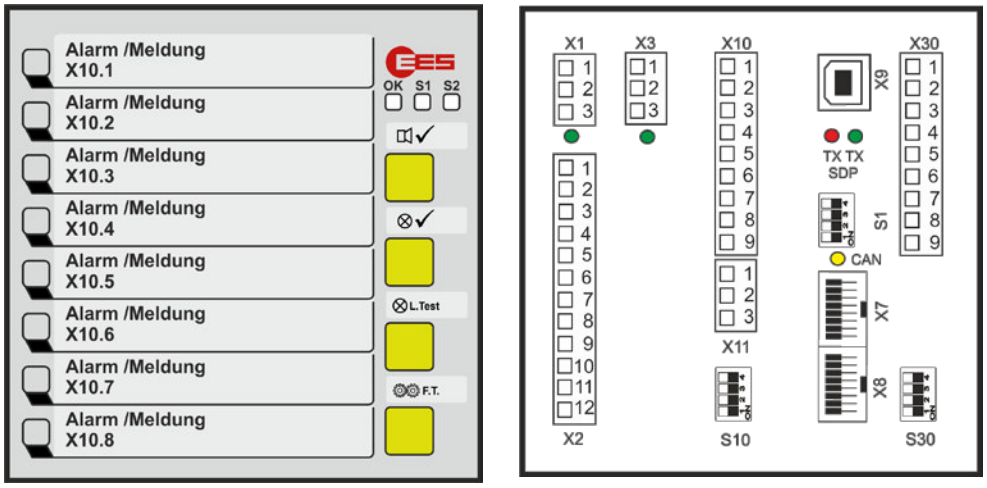


Fig. 3.10: Front and back view of the BSM 08

3.10.2 BSM 16

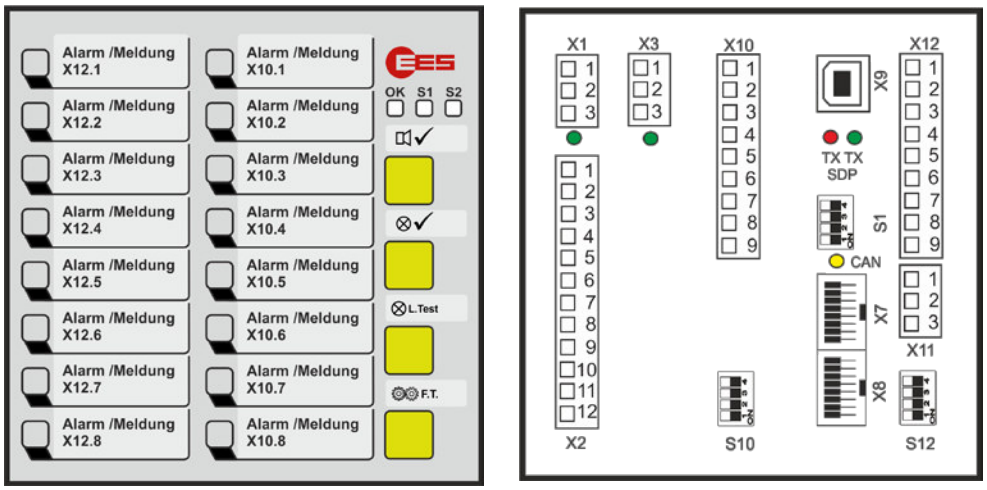


Fig. 3.11: Front and back view of the BSM 16 in housing 96 x 96

3.10.3 BSM 16 in wide housing

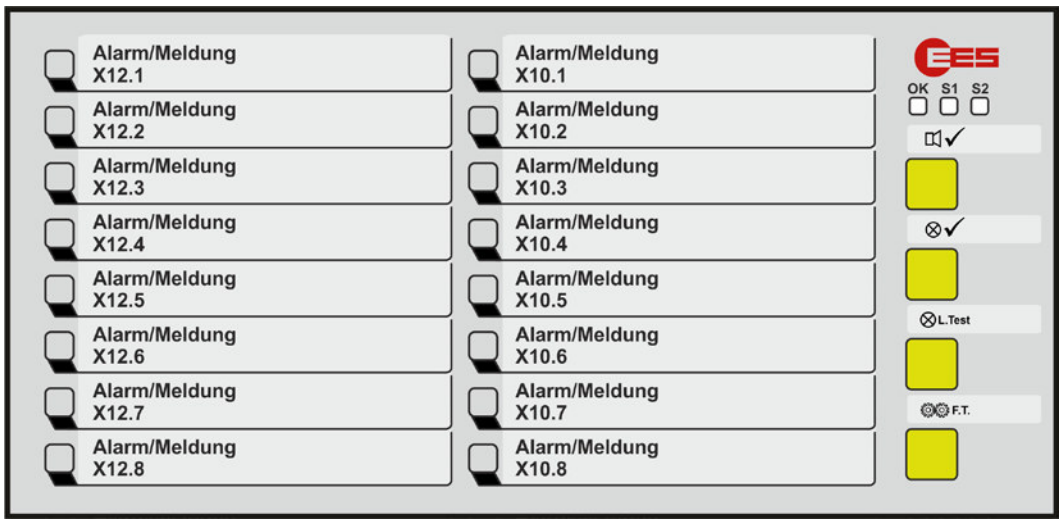


Fig. 3.12: Front view of the BSM 16W in wide housing 96 x 192

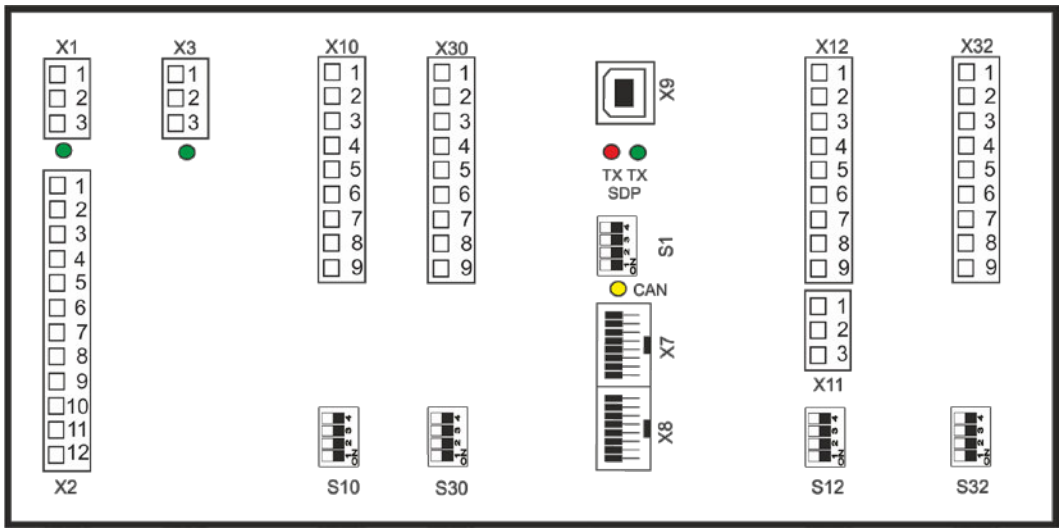


Fig. 3.13: Back view of the BSM 16W in wide housing 96 x 192

3.10.4 BSM 24

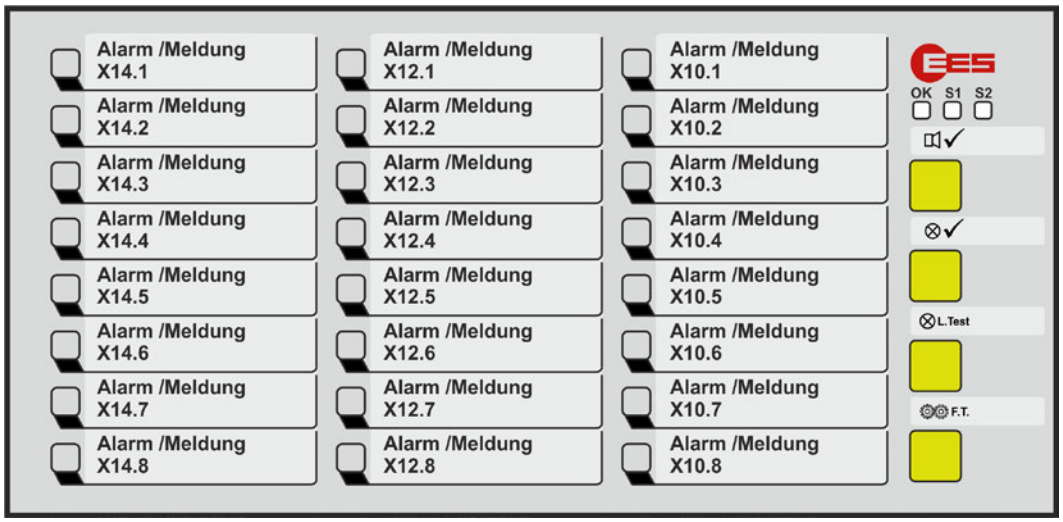


Fig. 3.14: Front view of the BSM 24

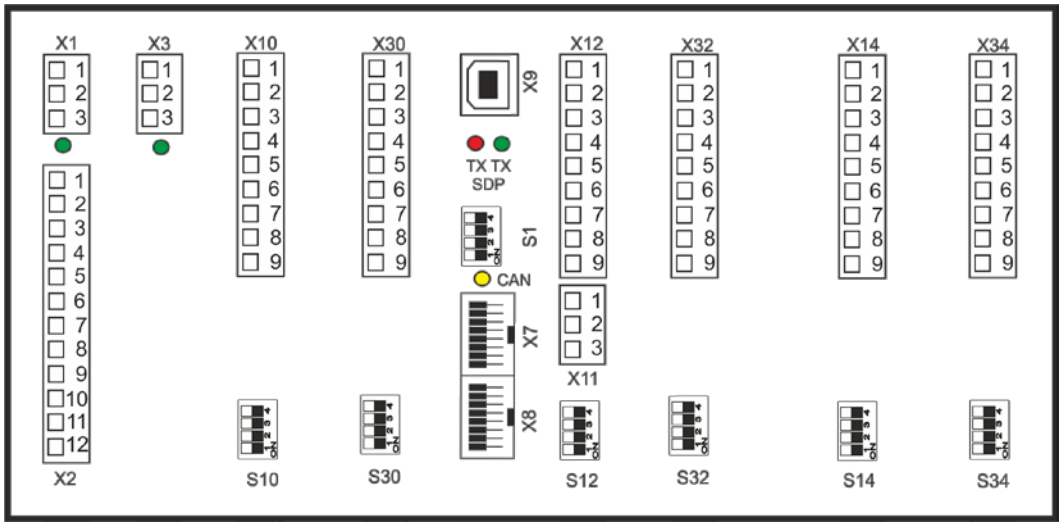


Fig. 3.15: Back view of the BSM 24

3.10.5 BSM 32

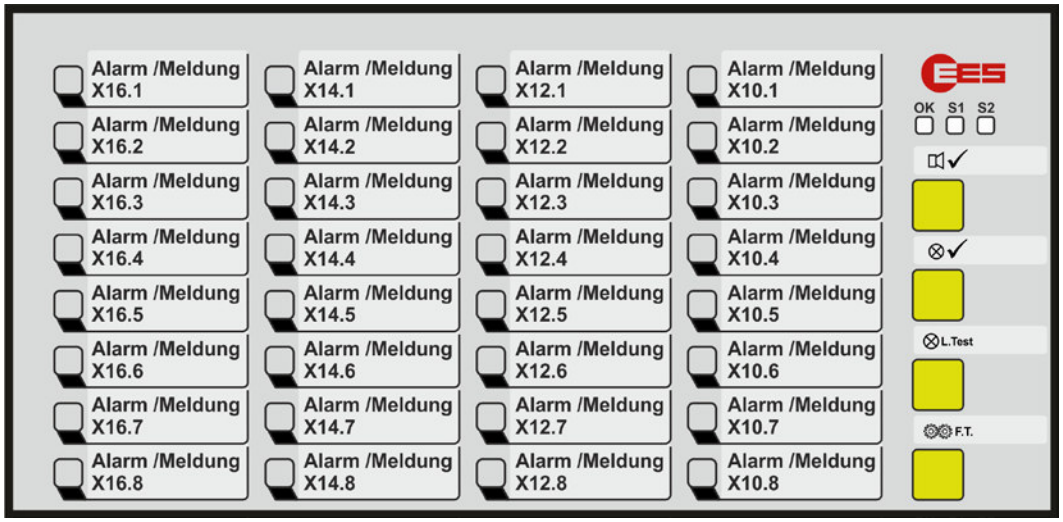


Fig. 3.16: Front view of the BSM 32

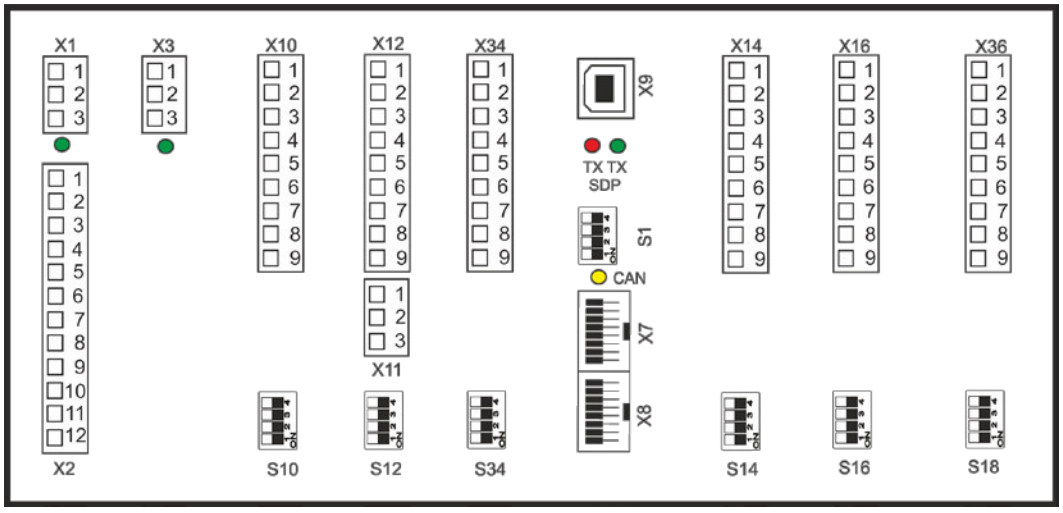


Fig. 3.17: Back view of the BSM 32

3.10.6 BSM 40

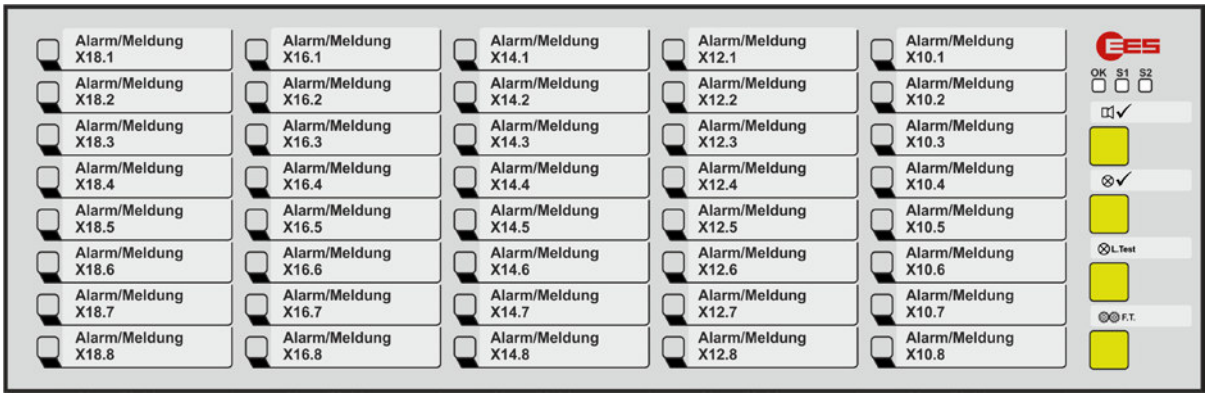


Fig. 3.18: Front view of the BSM 40

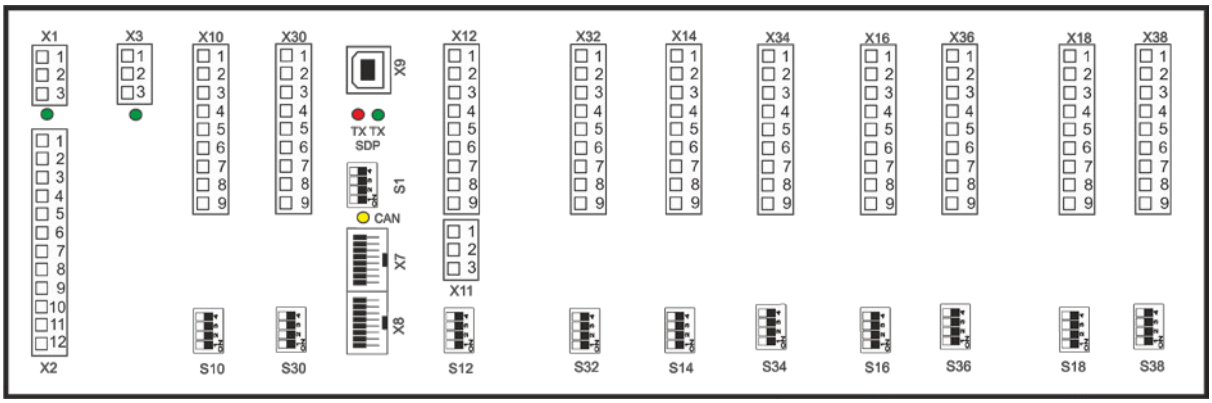


Fig. 3.19: Back view of the BSM 40

3.10.7 BSM 48

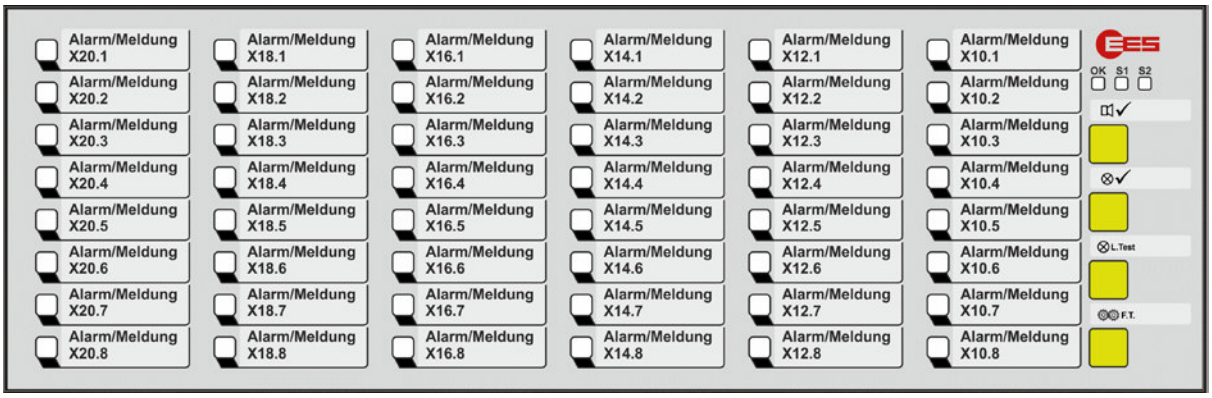


Fig. 3.20: Front view of the BSM 48

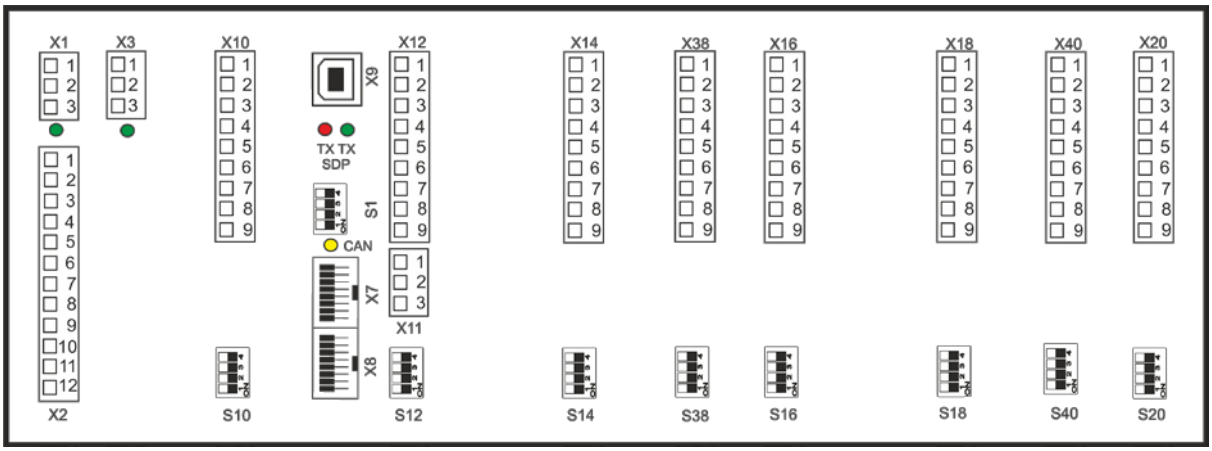


Fig. 3.21: Back view of the BSM 48

3.11 Input and signal light assignment

The first input of the input terminal with the highest designation is always the first alarm at the top left of the front panel display. In the following example, this is X14.1. The other assignments of the input terminals are as shown in the individual alarm texts on the front panel in the drawing below.

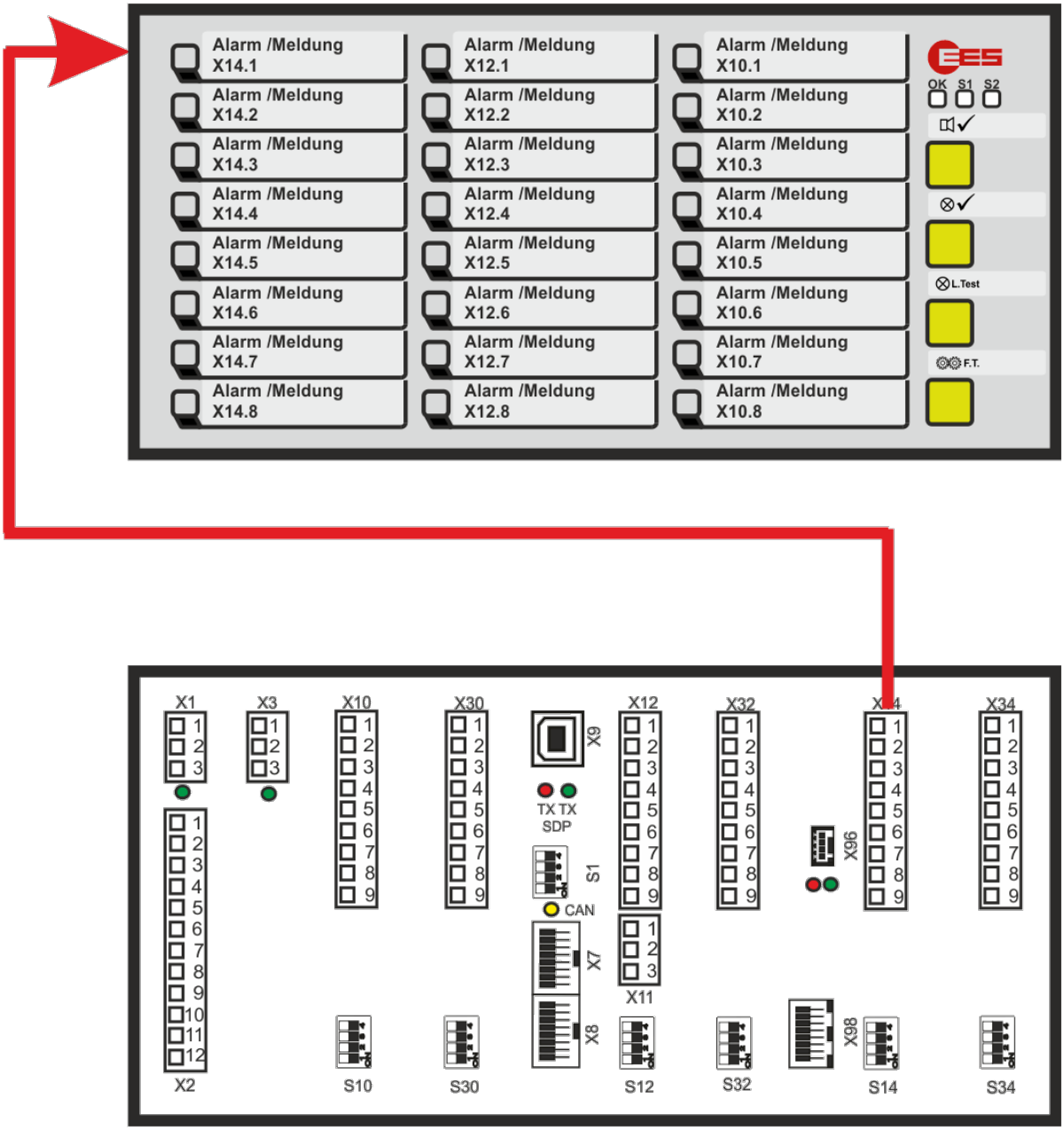


Fig. 3.22: Assignment between signal input and LED display using the example of a BSM 24

3.12 Technical data

Supply voltage U_{Sup}

Key	Rated voltage	Voltage range
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 – BSM

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]		
1	24	11	15	50	2,3
3	48	17	25	75	2,1
	60	17	25	75	2,7
4	110	35	50	150	1,6
H	125	35	50	150	1,8
5	220	100	140	260	1,2
W	50 - 250	25	45	250	1,6

Table 3.4: Signal voltage keys – BSM

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	< 4	< 6
16	< 5	< 9
24	< 5	< 13
32	< 6	< 11*
40	< 7	< 19
48	< 8	< 13*

Table 3.5: Power consumption – BSM

* The power consumtion 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
BSM-C	
Response delay (Flutter suppression)	5 ms
Alarm delay	100 ms
BSM-P	
Response delay (Flutter suppression)	adjustable (0 … 1000 ms), Factory setting 5 ms
Alarm delay	adjustable (5 ms … 9 h), Factory setting 100 ms
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

Mechanical data

Type BSM/USM	Front frame H x B x T [mm]	Panel cut-out [mm]	Depth with front frame and terminals [mm]	Weight [kg]
08	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 in wide housing 24 32	96 x 192 x 8	92 x 186	100	approx. 0,70
40 48	96 x 287 x 8	92 x 282	100	approx. 1,00

Table 3.6: Dimensions – BSM

Mounting	panel mounting
Required installation depth	120 mm
Minimum horizontal gap	
Between 2 devices	15 mm
Connection terminal	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]

Electrical data

AC voltage resistance

CAN-Bus and USB	500 V / 50 Hz 1 min
Digital inputs	4 kV AC / 50 Hz 1 min
Relay outputs	4 kV AC / 50 Hz 1 min
Supply (110 / 230V AC/DC)	3,0 kV AC / 50 Hz 1 min
Supply (24 / 48 V AC/DC)	1,0 kV AC / 50 Hz 1 min
Relay outputs against each other	500 V / 50 Hz 1 min

Surge voltage resistance

RS232/RS485 against	
Digital inputs	2,5 kV ; 1,2 / 50 µs; 0,5 J; acc. to IEC60255-27
Relay outputs	2,5 kV ; 1,2 / 50 µs; 0,5 J; acc. to IEC60255-27
Supply	2,5 kV ; 1,2 / 50 µs; 0,5 J; acc. to IEC60255-27
Relay outputs against each other	500 V ; 1,2 / 50 µs; 0,5 J; acc. to IEC60255-27

Dielectric strength

Electromagnetic compatibility

Noise immunity acc. to	DIN EN 61000-4-2
	DIN EN 61000-4-3
	DIN EN 61000-4-4
	DIN EN 61000-4-5
	DIN EN 61000-4-6
	DIN EN 61000-4-12
Noise irradiation acc. to	DIN EN 61000-3-3
	DIN EN 55011

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

Note!
Incorrect use (e.g. deviations of temperature, supply voltage or signal voltage from the specified values) can cause damage to the devices.

Subject to technical changes without prior notice

4 Mounting and installation

Warning!
The devices may only be installed by qualified personnel (electricians) with the operating voltage switched off.

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 input and output lines.

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

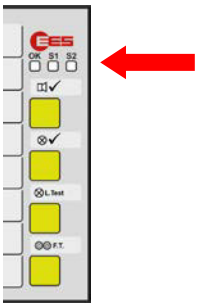
4. For a cascaded annunciator system, connect slaves according to steps 2 and 3 and connect the cascaded annunciators to each other by means of a patch cable through the CAN-Bus-interfaces (terminals X7 / X8 at the BSM and terminal X7 at the USM).

5. Connect the power supply and activate power supply.

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

6. Configure the fault annunciator (see section Configuration.)

   If a BSM-P is used, apply parameterization.
   (see section Parameterization)



7. After switching on, the fault annunciator requires about 30 s for the system test and initialization, which is completed with alternate green flashing of the "OK", "S1" and "S2" watchdog-LEDs.

   Watchdog-LED “Self-monitoring” is in steady light – the fault annunciator is operational.
   Watchdog-LED is flashing (see section Diagnosis.)

5 Configuration

For both BSM-C and BSM-P some main settings of the annunciator can be defined by configuration through DIP-switches. If further settings are required additional parameterization by software is possible for the BSM-P (see section Parameterization).

To apply the DIP-switch settings to the annunciator, DIP-switch S1/4 has to be set to ON. If the additional options of the software parameterization are to be used for the BSM-P, the DIP-switch S1/4 has to be set to OFF (default setting).

5.1 Cascading functionality (DIP-switch combination S1)

<table>
<tr><th>Switch</th><th>Function</th><th>Setting</th><th>Default setting</th></tr>
<tr><td>S1/4</td><td>Definition of the functionality as per DIP-switch (configuration) or parameterization (this definition is valid for all settings of the annunciator)</td><td>OFF – Parameterization (software)
ON – Configuration (DIP-switch)</td><td>OFF - Parameterization</td></tr>
<tr><td>S1/3 and S1/2</td><td>S1/1 = OFF (device is Master)
- Number of connected slaves
or
S1/1 = ON (device is Slave)
- Slave-address</td><td><table><tr><th>S1/3</th><th>S1/2</th><th>Slave</th></tr><tr><td>OFF</td><td>OFF</td><td>none</td></tr><tr><td>OFF</td><td>ON</td><td>1</td></tr><tr><td>ON</td><td>OFF</td><td>2</td></tr><tr><td>ON</td><td>ON</td><td>3</td></tr></table></td><td>OFF, OFF
No connected slaves or no slave address</td></tr>
<tr><td>S1/1</td><td>Master or Slave</td><td>OFF - Master
ON - Slave</td><td>OFF - Master</td></tr>
</table>

Table 5.1: Assignment of DIP-switch combination S1

If the BSM is not part of a cascaded annunciator system, DIP-switches S1/1 – S1/3 are to be set to OFF (default setting).

5.2 Alarm group related DIP-switch combinations (S10 – S20)

The DIP-switches 1 and 2 of these DIP-switch combinations always affect the respective alarm group (8 channels) which is assigned to the respective terminals.

Dip-switch	Terminal
S10	X10
S12	X12
S14	X14
S16	X16
S18	X18
S20	X20

The functions of the switches 3 and 4 are set on one DIP-switch combination for the whole device.
For the BSM08 this is the combination S10 and for all other BSM it is the combination S12.

Table 5.2: Assignment of the DIP-switch combinations to the reporting channels (input terminals)

Switch	Function	Meaning	Factory setting
S./4	Reporting sequence with setting of switch S./2 OFF (fault alarm)	OFF - New value sequence* ON - First-Up sequence*	OFF – New value sequence
S./3	Horn control for follow-up alarm	OFF - Horn is activated again ON - Horn is not recontrollable	OFF Horn is activated again
S./2	Signaling of the signaling group (8 channels)	OFF – Fault alarm (red flashing light) ON - Operating alarm (green steady light)	OFF – Fault alarm
S./1	Normally open / Normally closed principle of the group (8 channels)	OFF - Normally open ON - Normally closed	OFF – Normally open

Table 5.3: Assignment DIP switch combination S10 – S20

* The detailed designations of the signal sequences are as follows
  - New value with 1-frequency flashing light and single acknowledgement or
  - First-Up with 1-frequency flashing light and single acknowledgement.

For more detailed information on the fault reporting sequences, please refer to the separate document describing the SM-MA-FB-DE fault reporting sequences.

5.3 Configuration of the relay groups

The DIP-switches of the relay groups (S30 – S38) if available, have no function in these annunciator variants.

The relay groups are factory set as follows:

- Relays are assigned 1:1 to the respective inputs.
- If only 1 or 2 relay groups (8 relays each) are integrated (e.g. BSM48), these are assigned to the first or the first two alarm groups (8 inputs each).
- The relays are triggered input parallel.
- The relays are not inverted.

5.4 Color configuration of the alarm lights through key combinations

The display of the alarms of the BSM is done via one RGB LED per channel. These RGB LEDs can be used to set the 6 color variants (red, green, yellow, blue, orange or white). The setting of the color variants of each LED can be done via key combinations. With the BSM-P, parameterization with the PC program (see section Parameterization) is more convenient.

The setting of the LED colors via key combination is only available from firmware version 10.0.0.

Depending on the alarm sequence and the status of the alarm of the respective channel, the above-mentioned 6 colors or the LED state "Off" can be set:

Reporting procedure	Signalling state of the channel	Factory setting of the LED colors
Fault signal	Alarm pending (flashing state LED "On")	Red
	Alarm pending (flashing state LED "Off")	LED „Off“
	Alarm is pending and has been acknowledged (steady light)	Red
	Alarm gone and acknowledged (corresponds to LED off)	LED „Off“
Operating signal	Alarm is on (steady light)	„Green“
	Alarm has gone (corresponds to LED off)	LED „Off“

Table 5.4: Setting options of the color configuration

In the standard fault alarm sequence, the LED flashes e.g. with red color "On" and "Off". For special sequences, a different color can be set for the "Off" state of the LED. The color of the LED then changes e.g. between red and green.

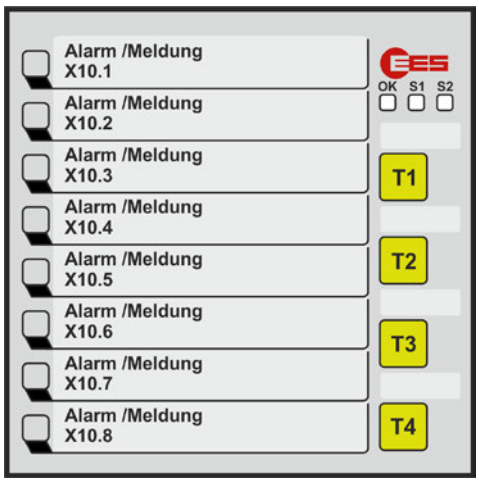


Fig. 5.1: Buttons as an example on the BSM 08

The 4 buttons in the front of the BSM-C are used for configuration. The following settings can be made for each channel and thus each LED:

Parameter	Selection option	Example
Reporting status	State 1 Alarm active flashing on	Fault alarm with 2-frequency flashing light new unacknowledged alarm state "On" of the flashing LED
	State 2 Alarm active flashing off	Fault alarm with 2-frequency flashing light new unacknowledged alarm State "Off" of the flashing LED (normally off, i.e. black)
	State 3 Alarm active, acknowledged	Fault alarm with 2-frequency flashing light acknowledged alarm, which is still active color of the steady light
	State 4 Alarm off, acknowledged	Fault alarm with 2-frequency flashing light acknowledged alarm, which is no longer active color of the state off (normally off, so black)
	State 5 Operating alarm on	Steady light green
	State 6 Operating alarm off	LED off (also black)
Color setting	Red, green, yellow, blue, orange, white, black (off)	Flashing fault alarm red or operating alarm steady light green
Channel	1 … 48	Selection of 1 or more channels to which these settings should apply.

Table 5.5: LED color setting parameters

Configuration

1. **Switch on the device** and wait until normal fault indication mode is reached (OK LED lights up in green continuous light).

2. **Activate configuration mode**
   Keep buttons T1 and T4 – or else, up from firmware 10.3, T2, T3 and T4 together – pressed for approx. 2 seconds! An acoustic signal sounds, the OK LED flashes red/green. The first LED at the top left flashes in the currently set color. The BSM is in configuration mode.

   If the BSM is operated as a slave in a cascaded annunciator system (see also section Cascading), the configuration mode cannot be switched on. In this case, set switch "S1/1" to "Off" - master during configuration of the LED colors.

3. **Select state of alarm**
   Select the desired signal state (see table above) by pressing the "T1" key several times! To confirm, depending on the set status, the LEDs 1 to 6 light up briefly in white (e.g. status 5 - the LEDs 1 to 5 light up briefly).

4. **Selection of the desired channel**
   By pressing the "T3" or "T4" key several times, the channel (1 ... 48) can be selected to which a color is to be assigned in the next step for the alarm state selected in step 3. Key "T3" decreases and "T4" increases the channel number.

   By holding down "T3" or "T4" while pressing the other key, several channels can be selected simultaneously.

   The selected LEDs light up permanently in the currently set colors.

5. **Select color**
   Select a color by pressing the "T2" key several times. The LEDs of the selected channels light up in the selected color.

   The color black (LED off) is displayed flashing gray.

6. **Make further settings**
   If desired, make further settings in this order alarm state, channel setting and color setting.

7. **Finish configuration**
   Keep keys T1 and T4 pressed for 3 s. The configuration is saved, all LEDs go out and the fault annunciator performs a restart.

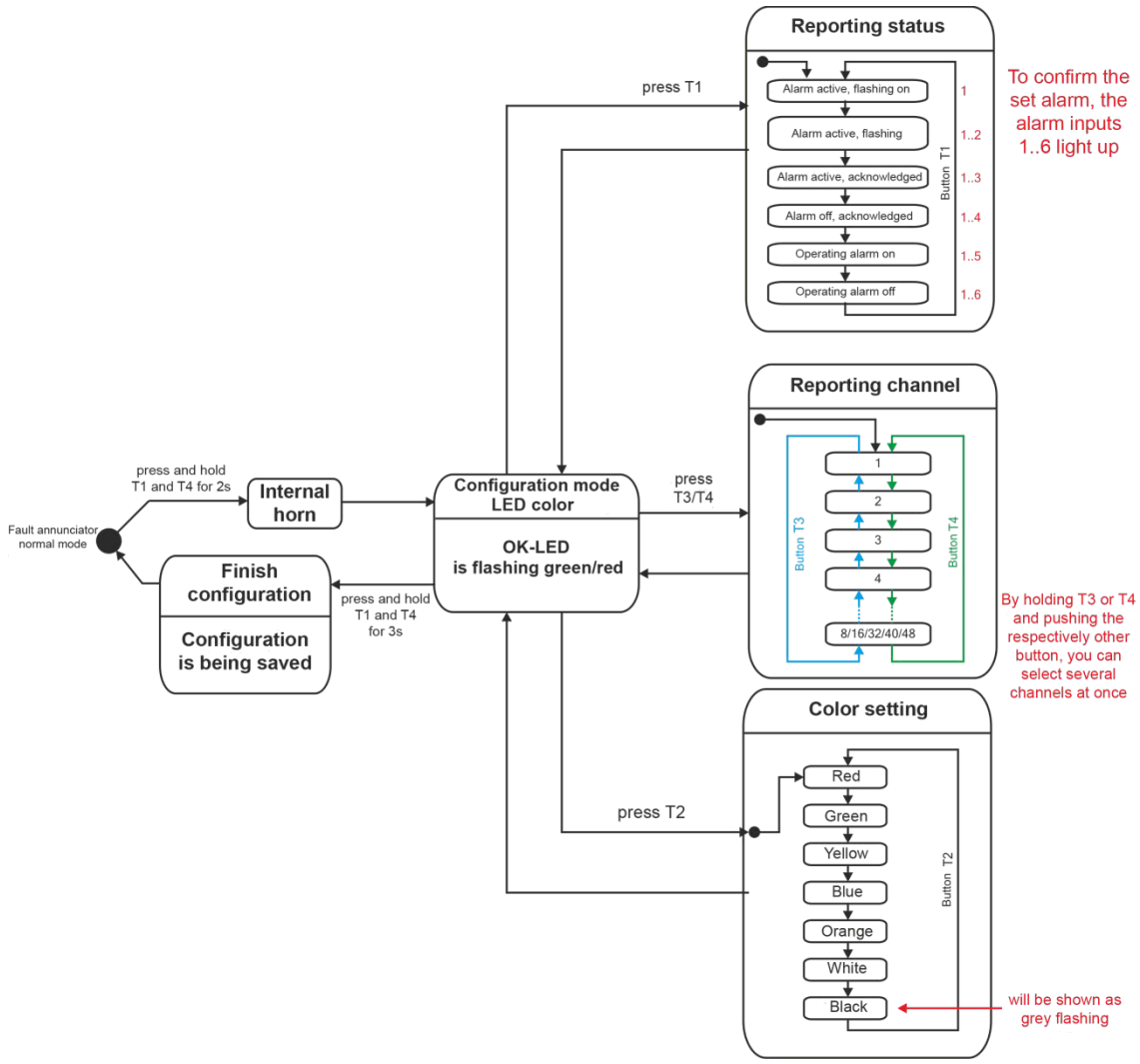


Fig. 5.2: Schematic representation of LED color setting by key combination

5.5 Default settings

- LED-colour - red for fault signalling and green for operation indication
- Function input 1 - horn acknowledgement
- Function input 2 - acknowledgement
- Button 1 - horn acknowledgement
- Button 2 - acknowledgement
- Button 3 - lamp test
- Button 4 - not assigned
- Function relay 1 - collective report 1
- Function relay 2 - not assigned
- Function relay 3 - external horn
- Function relay 4 - live-contact
- Collective report - static / output parallel
- Horn - retriggerable by subsequent alarm, manual acknowledgement
- Horn lock - none

6 Parameterization

Alternatively to configuration by DIP-switches the BSM-P can be parameterised by software. To parameterise the device the service and diagnosis interface USB-B (terminal X9) of the BSM-P has to be connected to the PC.

System requirements

- Windows 7 or Windows 10
- Internet browser with **activated Javascript**
  We recommend to use Mozilla Firefox from version 40 or Internet Explorer from version 11. When using other internet browsers the functionality of the parameterization software might be limited.
- Recommended monitor resolution from 1280 x 800

Installation

The installation starts with the execution of the file „EES-SMT-Parasoft V3.X.X.exe“. X.X in this case are replacement markers for the respectively current software version. During installation, 2 Visual C++ packets are installed additionally, in case they are not yet available on the PC. This may require a restart of the PC.

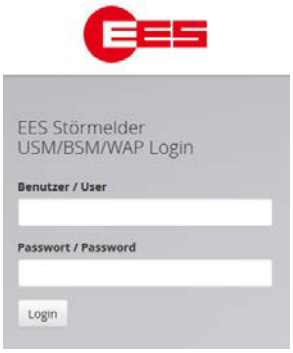
A total of 6 programs are installed:

CDM v2.12.28 WHQL Certified	- Driver installation program for the FTDI USB serial adapter used in the BSM, is normally executed (if not deselected) during the installation of the parameterization software
EES-SMP-Parasoft v3.1.3	- Parameterization software
Change-Default-Port-8080	- Allows to change the default port of the Windows web server from (80) to 8080 if another program on your PC occupies it
EES-SMP-Parasoft v3.1.3 Port 8080	- Calls the parameterization software after execution of Change-Default-Port-8080 via port 8080
Reset-IIS-Server	- Restarts the web server (necessary if a logon is login is no longer possible due to an error).
Uninstall EES-SMT-Parasoft v3.1.3	- Uninstalling all program components installed with the EES-SMP program components

Start of the software EES-SMT-Parasoft

Please launch the program „EES SMT-Parasoft V3.X.X“ in the start menu or from the icon on the Desktop.

The login screen will automatically be opened in the default browser of the PC.



For the first login please use the following login data:

User: admin
Password: admin

Fig. 6.1 Login

The passwords can be changed on the "System" dialog page.

If you have not yet connected a fault annunciator, you will be prompted after correct login either to connect a device and to identify and select it using the "Identify device" button or, if you do not yet have the device available, to select a device type manually (see also section New / adapt submenu).

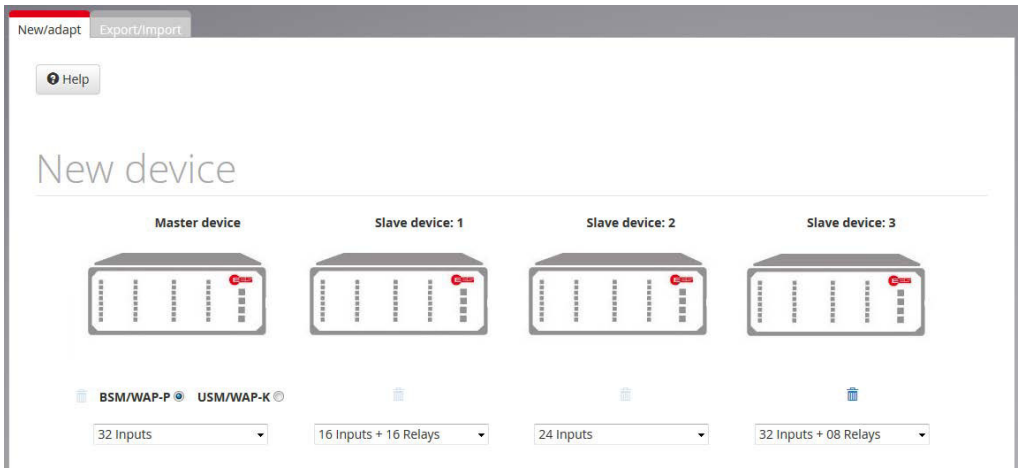


Fig. 6.2 New/Customize submenu in the menu "Device administration"

Aside from the EES logo, you can navigate among the 5 main menus

- **Language**
- **Information**
- **Parameter**
- **Configuration**
- **Monitor**

and the symbol bar consisting of 5 buttons 

The buttons have the following meaning:

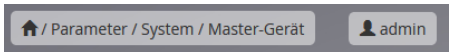
- **Adopt configuration**
  Saving the changed parameters of the currently edited device in the working memory of the PC.
- **Adopt all 4 configurations**
  With this button the parameters of all devices (Master device and the possibly connected extensions (slave device 1 ... 3) are stored in the working memory of the PC.

> Please note that the parameterization needs to be saved either
> - with the menu command "Write configuration/parameters to device" in the device
> - or with „Parameter/System/Export/Import" in a file on the computer.
>
> Otherwise, the current changes will be discarded once you log out.

- **Dismiss configuration**
  Discard all changes made in the session (since the last "Accept configuration").
- **Version**
  Display of the version number of the parameterization program
- **Sign out**
  Sign out of the program

Please always end the parameterization with the "Logout" function and not by closing the browser window. Otherwise, the current user will only be logged out automatically after a few minutes. Since only one "admin" can be logged in at a time, access is only possible again after the automatic logout or the restart of the PC. When logging off without first accepting the configuration, the currently entered parameters are discarded.

Below the main menu bar, the current menu path and the user name are visible.



In this tutorial we will explain the individual menus in the order in which they appear in the menu bar.

Some dialog pages are structured in the form of tabs and contain additional buttons. The function of these elements is explained in the description of the respective pages.

Fig. 6.3: Card tab on the Master Device dialog page

When switching between the individual menus or tabs, the changes are temporarily saved but not yet adopted in the current configuration of the fault annunciator. This is only done with the "Accept configuration" action.

6.1 Main menu “Language”

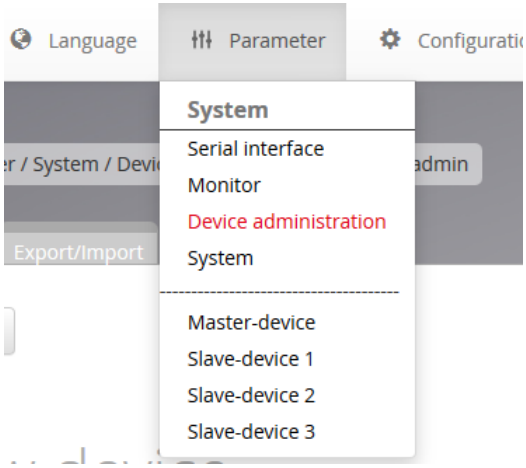
In this menu, the web interface of the parameterization can be switched between the two languages German and English.

6.2 Main menu „Information“

Fig. 6.4: Main menu „Information“

The dialog page contains version information of the parameterization software and the connected devices as well as information about the options of the fault indicators.

6.3 Main menu „Parameter“



The Parameter main menu has several submenus and one menu for each registered fault annunciator. In cascades, this can be 1 master device and a maximum of 3 slave devices.

Fig. 6.5: Open main menu „Parameter“

6.3.1 Serial interface

Serial interface

COM-Ports

The parameterization interface on the PC is selected in the "Serial interface" main menu. The selection is only available if a BSM is already connected.

When a BSM is connected to the PC for the first time, the associated driver is automatically loaded by Windows. If no interface can be selected afterwards, it may be necessary to restart the PC. If the selection of the interface is still not available, the driver was not loaded correctly. In this case, please contact our service team. We will be happy to provide you with this driver separately.

6.3.2 Menu “Device administration”

After clicking on the "Device administration" menu in the "Parameters" main menu, a new dialog box opens with which a fault indicator can be added or removed or the parameterization of the devices can be exported or imported.

6.3.2.1 Submenu “New/adapt”

With the cascading function, a fault alarm system can be formed from one BSM or USM and up to 3 BSM-C or BSM-P, which has a common alarm processing (reporting sequence, collective alarm formation and horn control).

The individual devices communicate with each other via the integrated system bus, which is provided via the CAN bus interfaces. For this purpose, the devices are connected with network cables (patch cables). One annunciator works as a "master" and the other connected annunciators as "slaves". Thus systems with up to 192 alarm inputs (4*48) can be realized. External MSM relay expansion modules cannot be connected when using fault annunciator cascades.

The parameterization of fault alarm cascades takes place completely in the master fault annunciator and is then automatically distributed to the slave fault annunciators.

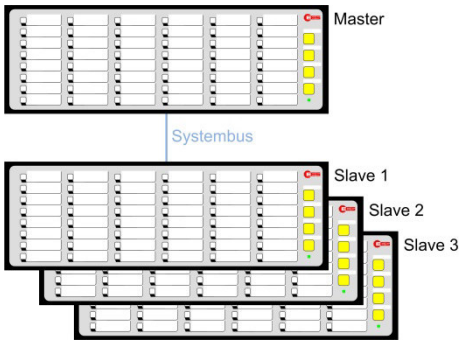


Fig. 6.6: Example of a fault alarm cascade

Please note that the slave devices must be configured as slave via DIP switch and the corresponding slave addresses (1 - 3) must be set.

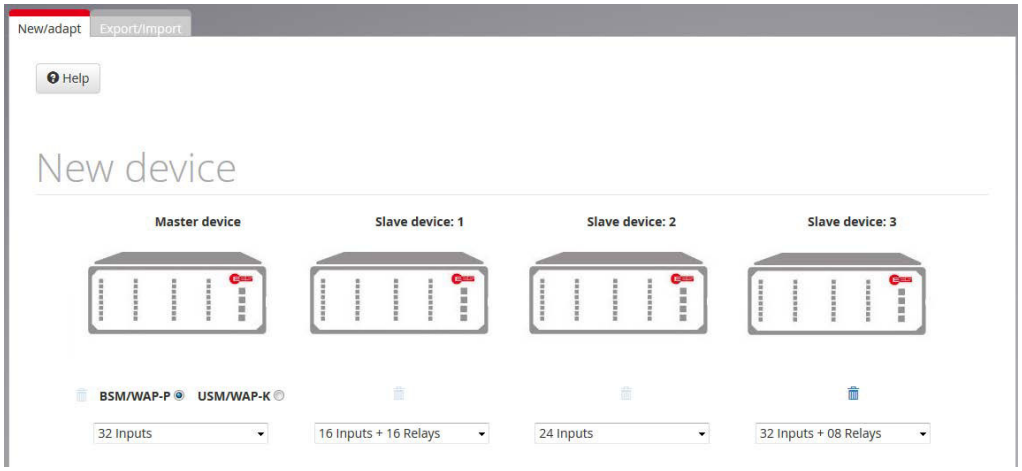
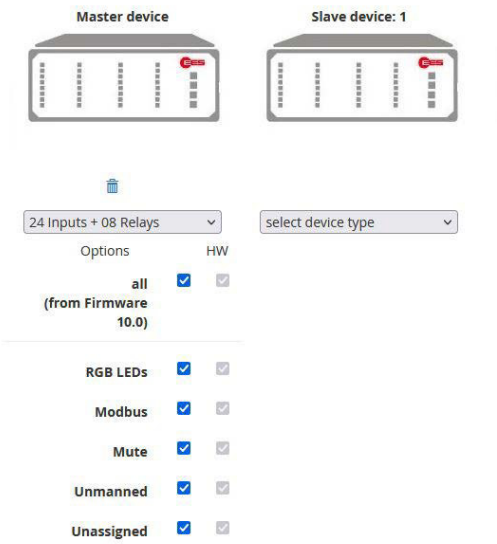


Fig. 6.7: Submenu „New/adapt“

You have the option of having a connected device identified or manually selecting the device type.



If the device is created manually, you will be asked to specify the options of the annunciator. If the device has been identified, the supported options are represented by checkmarks in the HW column.

Fig. 6.8: Display of device options in the "Parameters/Device administration" menu

After the fault annunciator has been created, it appears under the name Master device or Slave device 1 to Slave device 3 in the "Parameters" main menu. The menu of a newly created slave annunciator corresponds to the menu of the master device. However, the "Reporting sequence" tab is missing, since the alarm sequences of the slave annunciators are identical to those of the master annunciator.

In this way, 1 master and a maximum of 3 slave devices can be created. The slave annunciators are displayed independently of the parameterized device name in the main menu Parameterization under the name Slave device (1 ... 3). By clicking on the recycle bin symbol, the last device in the cascade can be deleted again.

6.3.2.2 Submenu “Export/Import”

In this dialog, the parameterization of the fault annunciator can be exported or imported. The following functions are possible:

Export total parameterization
The parameters of the entire system (incl. possibly connected slave devices in cascaded systems) are compressed to a file and saved. Depending on the setting of your internet browser, this is saved as file EESsystem.pcf (protected configuration file) in the default download folder of the browser or name and location can be freely selected. The file is password protected and cannot be read. Parameters currently changed on the web interface must first be saved using the **"Accept configuration"** function before they are exported as well.

Import total parameterization
A system parameter file is selected via the "Browse" button and loaded and processed in the device with the "Import" button. The parameters are immediately taken over and activated. The file suffix "pcf" is necessary to recognize the file as a protected configuration file.

Export device parameterization
With the "export" button, the parameter file of a device (0 .. 3) selected via the option fields is stored as a password-protected zip file under the name to be selected, in the directory to be selected (default "USMDeviceX.pcf" with X as device number). The parameters that are stored on the device are exported. Changes currently made to these parameters on the web interface must first be saved in the device by "Apply configuration" before they can be exported.
The "Export HTML" button exports the selected parameter file (0 .. 3) in HTML format and displays it formatted in plain text.

Import device parameterization
The parameter file of a device is selected via the "Browse" button and imported into the device and processed with the "Import" button. The parameters are immediately taken over and activated. The type .pcf is necessary to recognize the file as a protected zip file.

It is also possible to import exported parameter files from older device versions (xml format instead of zip file), these must have the file type .ucf.

6.3.3 System

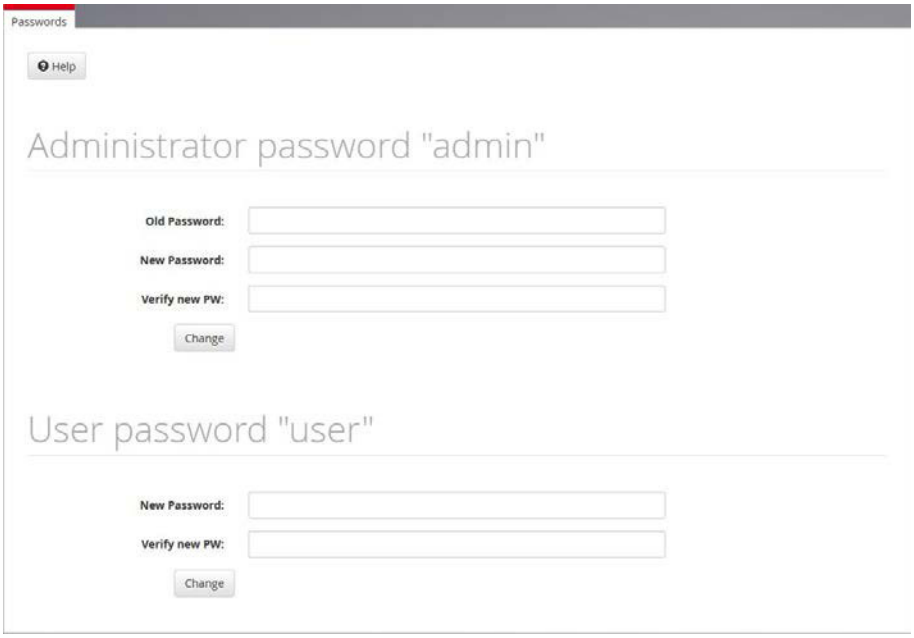


Fig. 6.9: Submenu „Passwords“ in the menu „System“

In the submenu "System" the passwords for the two users administrator and user can be changed.

Administrator (read and write rights) - admin

User with limited rights (read only) - user

A password can consist of ASCII characters and has a length limit of 40 characters.

6.3.4 Menu “Fault annunciator” (Master device / Slave device 1 … 3)

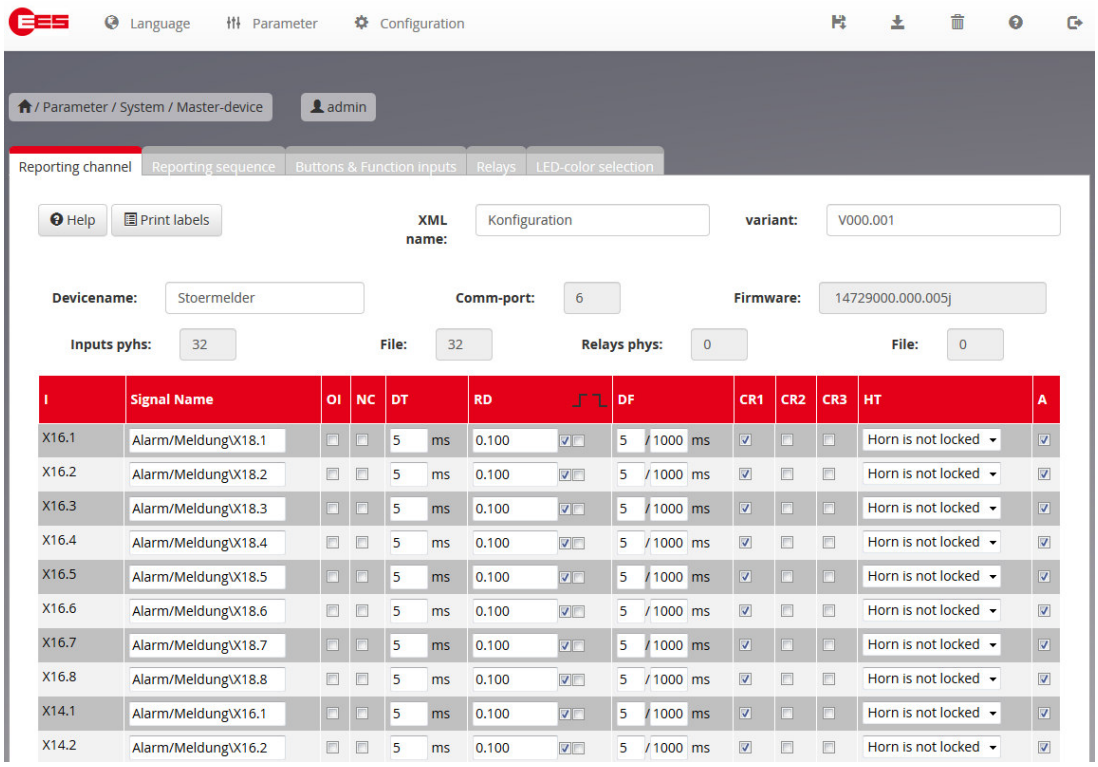


Fig. 6.10: Menu „Master device“

The actual function of the fault annunciator is parameterized in the "System" menu. This includes the submenus:

- Reporting channels
- Reporting sequence
- Buttons and function inputs
- Relays
- Repeat relay
- LED color selection

6.3.4.1 Submenu “Reporting channels”

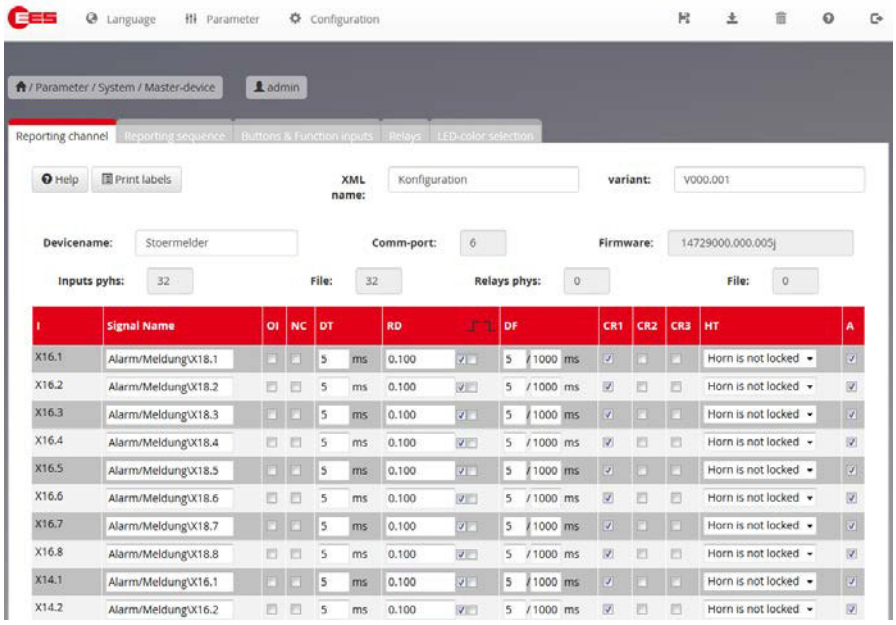


Fig. 6.11: Submenu „Reporting channels“

XML name, variant
Name and variant of the parameterization of the fault annunciator, which appears in the header lines when printing out the device parameters via the "Parameters/Device administration/Export/Import" menu. The content can be defined by the user.

Device name
Here you have the option of assigning a designation consisting of 40 ASCII characters for the fault annunciator. This is used to identify the device and is transferred to the BSM during parameterization, stored there and inserted for identification when the labeling strip is printed.

COM-Port:
This field displays the parameterization port of the PC set in the "Serial interface" main menu.

Labeling strips
Clicking on the "Labeling strips" button opens a window with the labeling strips. Strips with 8 channels each and a strip for the key labeling are displayed. The alarm texts are executed according to the labels of the channels. The labeling of the keys is done according to the information on the “Buttons and function inputs” dialog page. If a label is too long, the corresponding line is displayed in red and should be corrected, otherwise only the visible text is printed. Clicking on a text in the labeling strip opens a dialog for editing the text. The paper format DIN A4 landscape must be selected at the printer.

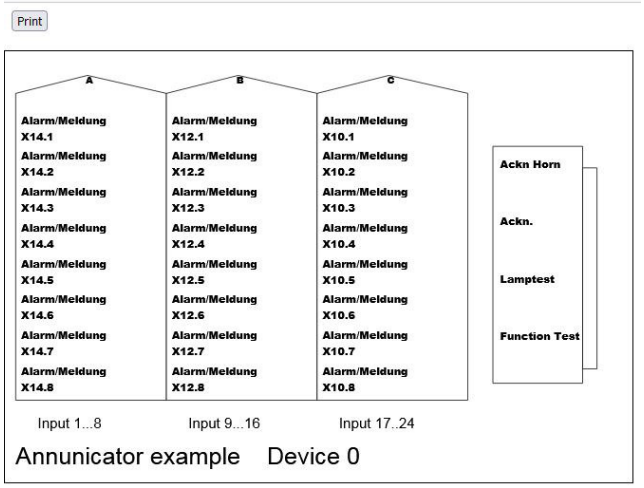


Fig 6.12: Print version of a labeling strip

The following parameters can be set in the table for each individual signal channel.

Field	Explanation
I	**Input = 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. Trf.\Circuit breaker switch).
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 (see 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 alarm delay delays a permanently pending alarm (debounced and monitored for flutter) before it is processed. This is intended to suppress error alarms that would occur, for example, if a value is only briefly exceeded or underrun. The time span is significantly greater than the response delay (debouncing time). The time span goes from 0...32400 s (9 h) and is definable in two grids (value < 30 s in a 1 ms grid and for values > 30 s in a 1 s grid). The value can be entered in three formats: 1. pure numerical value e.g. 100 interpretation in seconds → 100 s 2. .xxx e.g. .100 interpretation in ms → 100 ms 3. mmm:ss.xxx interpretation in minutes, seconds and milliseconds e.g. 111:22.0 → 111 minutes and 22 seconds 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 **flutter suppression** is to prevent that (e.g. due to a loose contact) an input is always switched on and off and thus the alarm changes constantly. The flutter suppression acts after the response delay (debounce time). If an input changes more often than the defined number of edges within the defined flutter time, the flutter suppression takes effect and marks the signal channel as faulty. Fluttering time: 0 ms … 65535 ms, ~1 min., grid 1 ms Number of edges: 0 … 255 Default setting: 5/1000
CR1, CR2, CR3	**Assignment to collective reports** If one of these check boxes is activated, the alarm triggers the corresponding collective alarm. Multiple assignments are possible. All alarms assigned to a collective alarm form a group. This assignment is also important for alarm acknowledgement and RESET.

Table 6.1a: Parameters of reporting channel

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
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 6.1b: Parameters of the reporting channels

Explanation of the delay times
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 (see section Repeat relays).

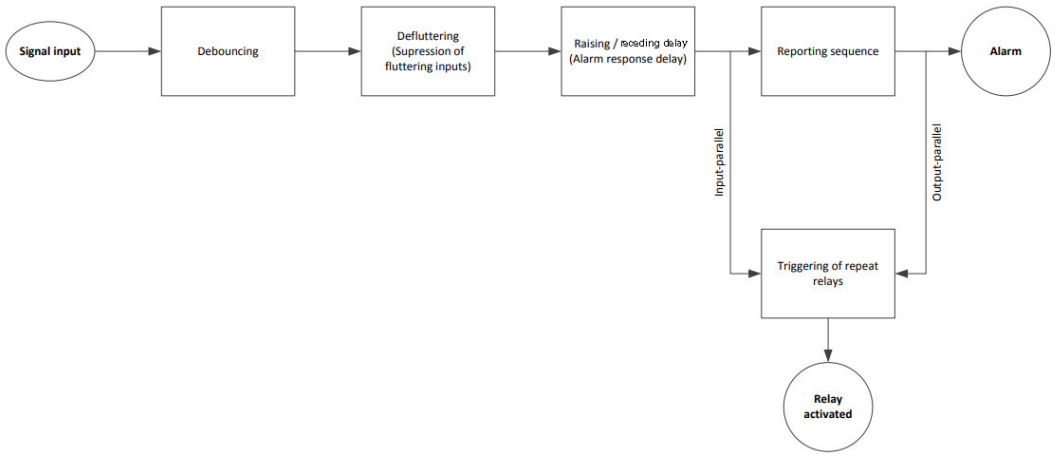


Fig. 6.13 Schematic illustration of the alarm processing in the BSM

Debounce time
Closing a contact may cause several edge changes before the contact is permanently closed. Due to the short response time when detecting alarms, several alarms could therefore be generated during the closing of the contact. To prevent this, the debouncing time can be set in 1 ms steps up to a time of 1000 ms. The signal is not recognized as valid until it is permanently present beyond this time period. However, the time stamp is still set with the first edge of the signal and not only at the time of the validity of the signal.

Response delay (alarm delay)
The response delay delays a permanently pending alarm (debounced and monitored for flutter) before it is displayed, forwarded or deleted. This is to suppress error alarms that would occur, for example, if a value is only briefly exceeded or underrun.

Example:
The monitoring contact of a thermostat triggers briefly before the corresponding temperature is reached by the conditional control loop time. Because this short overtemperature should not be reported as an malfunction, the alarm can be suppressed with the alarm delay. Only alarms that are present for longer than the alarm delay are processed in the alarm sequence or output at the output-parallel repeat relays.

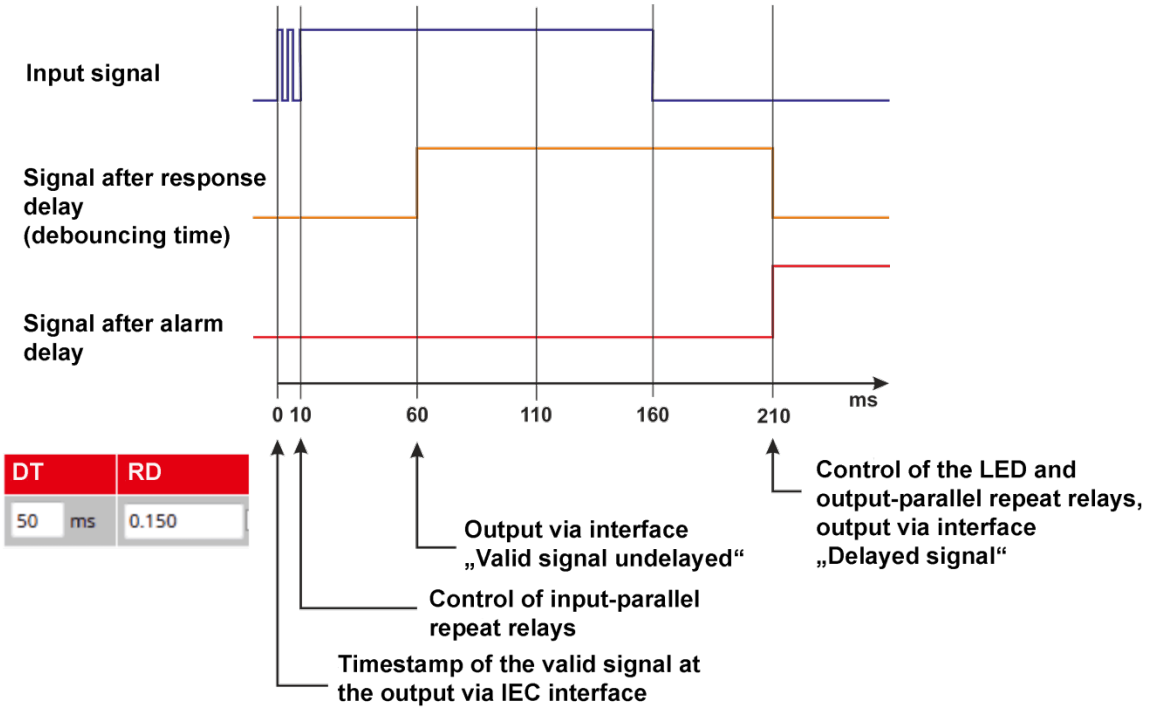


Fig. 6.14: Time diagram with a response delay of 50 ms and a alarm delay of 150 ms

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.

6.3.4.2 Submenu “Reporting sequence” (only master device)

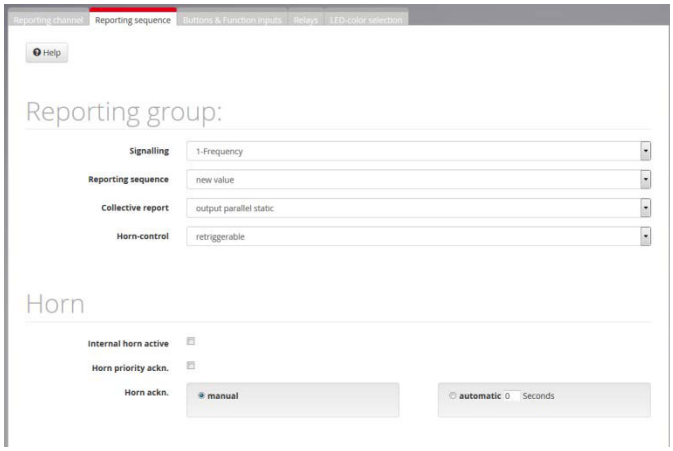


Fig. 6.15: Submenu “Reporting sequence”

In this submenu, the reporting sequence and the horn control are parameterized. In cascaded systems, the same reporting sequence applies to all devices, which is why this submenu is only available on the master device. In order to be able to adapt the sequences as flexibly as possible to the respective requirements, these are composed of individual components.

Reporting sequence

Designation	Selection options	Note
Signaling	1-Frequency	1- Frequency flashing light
	2-Frequency	2- Frequency flashing light
	State display	Self-clearing alarm: Alarm is immediately displayed as an acknowledged alarm and goes when the associated input is no longer present.
Reporting sequence	New value	New value alarm
	First-up value	First-up value alarm
	Steady light	Only selectable in conjunction with 2-frequency
Collective alarm	Input parallel static	The collective alarm is set with the first coming alarm and goes, regardless of the acknowledgement, with the last going alarm.
	Input parallel static dynamic	The collective alarm is set with the first incoming alarm. With each further alarm, the collective alarm is deleted for approx. 0.8 s and then set again. When all alarms have gone, the collective alarm is permanently deleted.
	Output parallel static	The collective alarm is set with the first incoming alarm. The collective alarm is only deleted when all alarms have been sent **and** acknowledged.
	Output parallel static dynamic	The collective alarm is set with the first coming alarm. With each further alarm, the collective alarm is deleted for approx. 0.8 s, then set again. When all alarms have gone **and** have been acknowledged, the collective alarm is permanently deleted.
	Dynamic	The collective alarm is activated for approx. 0.8 s with each incoming alarm.
	Input parallel statically acknowledgeable	The collective alarm is set with the first coming alarm and goes with the last going alarm or when all alarms have been acknowledged.
	Output parallel statically acknowledgeable	The collective alarm is set with an upcoming alarm. When the alarm is acknowledged, the collective alarm is deleted, even if alarms are still pending.
Horn control	Horn can be triggered again	The horn is activated again with the next alarm, even if alarms are already pending.
	Horn cannot be retriggered again	The horn is only activated again for subsequent alarms if no alarms are pending.

Table 6.2: Parameters of the reporting sequence

More detailed information on the reporting procedures and their designation can be found in the separate document "Description of the reporting procedures" with the document designation "SM-MA-ZI-UK".

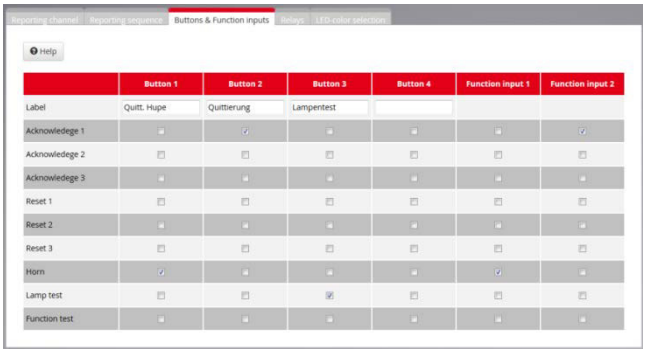
Horn

Designation	Selection options	Note
Internal horn active	Activated	The internal and external horns are controlled in parallel.
	Deactivated	The internal horn is switched off, the horn contact for connecting the external horn is still active.
Horn priority acknowledgement	Inactive	The alarm can be acknowledged according to the Horn activation setting of the "Reporting channels" submenu.
	Active	The alarm can only be acknowledged when the horn has already been acknowledged.
Horn acknowledgement	Manual	Horn is acknowledged manually by pushbutton or via a function input.
	Automatic	Horn is automatically acknowledged after the set time.
Horn mute	No triggering when button is pressed	The horn is not triggered or automatically acknowledged after a parameterizable time if a key parameterized for this purpose or a parameterized function input is pressed or activated. (see section Buttons and function inputs)
	Automatic acknowledgement	Horn is automatically acknowledged after the set time. This time can be selected differently from the time for automatic horn acknowledgement in normal operating mode.

Table 6.3: Parameter of the horn function

Please note the connection between the "Horn priority acknowledgement" parameter and the "Horn activation" parameter of the "Reporting channels" submenu, which can be set individually for each channel. The "Horn priority acknowledgement" parameter applies to all signal channels and has the higher priority. If it is set to "active", the alarm can only be acknowledged after the horn has been acknowledged.

6.3.4.3 Buttons and function inputs



On this dialog page, the functions of the fault annunciator listed below are assigned to the buttons T1 ... T4 and the function inputs 1 and 2. Multiple assignments are possible.

The texts entered in the "Labeling" line are printed out together with the labels of the reporting channels by pressing the "Labeling strips" button in the "Reporting channels" submenu.

Fig. 6.16: Submenu „Buttons and function inputs"

Function	Meaning
Acknowledgement 1, 2, 3, unassigned	Acknowledgement optical for alarms of groups 1, 2 ,3 or unassigned alarms
Reset 1, 2, 3, unassigned	Reset for alarms of the collective alarm groups 1, 2 or 3 or unassigned alarms
Horn	Acknowledgement acoustic (horn)
Lamp test	Lamp test
Test function	Simulation of the excitation of all inputs
Mute function	As long as this operating mode is activated, the horn is not triggered or automatically acknowledged after the parameterized time.
Unmanned function	As long as this operating mode is active, there is no visual or audible output of pending alarms. The internal alarm processing and, if necessary, the control of relays or the output of alarms via interface remain active. Alarm acknowledgement at the fault annunciator is deactivated.

Table 6.4: Parameters of the assignment of buttons and function inputs

A group is formed by all alarms that are included in the same collective alarm.
Unassigned alarms are alarms that are not assigned to a collective alarm.

6.3.4.4 Submenu “Relays” (function relays)

In this submenu, the assignment of the 4 function relays to the individual fault alarm functions, buttons or function inputs takes place. Several events can be defined for a relay, e.g. the grouping of collective reports. As soon as one of these events occurs, the relay switches. When the last triggering event has gone, the relay drops out again. For each relay, a check mark in the "Inverted" field can be used to specify whether the switching function or its negation is executed. For example, the relay then drops out when the collective report occurs.

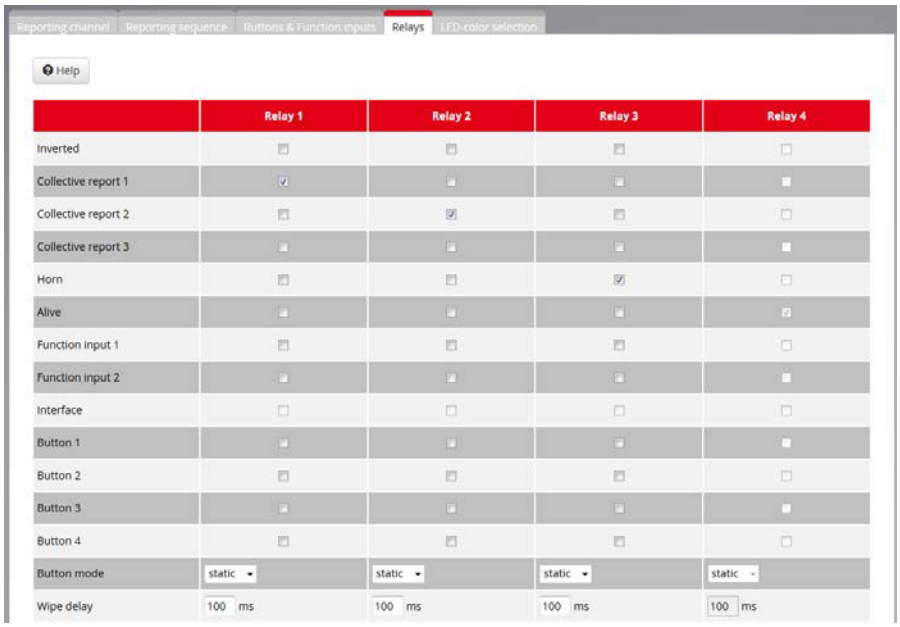


Fig. 6.17: Submenu „Relays“

The assignment is made via matrix whose rows represent the triggering events (e.g. keystroke) and whose columns represent the relays. Realized links are marked by check marks.

Function	Meaning
Inverted	If the box is checked, the negation of the switching function is executed.
Collective alarm 1, 2, 3	The relay is activated by collective alarm 1,2 or 3.
Horn	Horn control
Alive	Live contact of the self-monitoring (permanently assigned to relay 4)
Function input 1, 2	Function input controls relay output
Interface	Control via interface (e.g. IEC 60870-5-101/104 or IEC 61850). Pulse output with set wipe duration is possible.
Button 1 … 4	Button controls relay output
Button mode	Relay function when controlled via a button or the interface Static – The relay is energized as long as the button remains pressed. Toggle – The bistable relay changes its state with each excitation (flip-flop function) Wipe – Relay switches with each excitation and drops out again after the wipe duration (10 ms ... 10 000 ms).

Table 6.5: Function assignment of the relays

6.3.4.5 Repeat Relays

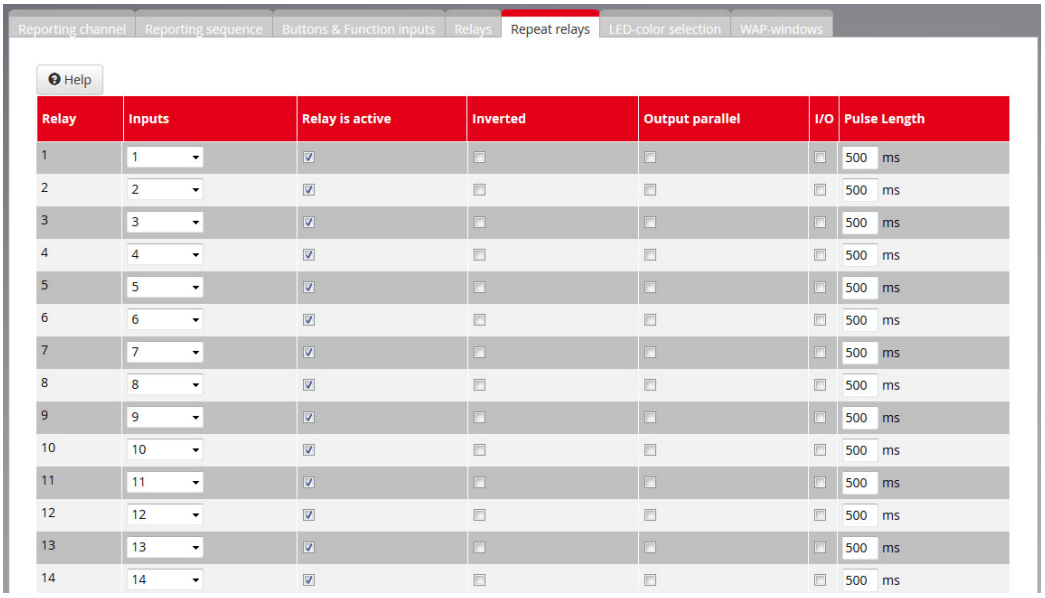


Fig. 6.18: Submenu „Repeat Relay“

The optionally available relay cards (with 8 NO contacts each) are independent of the 4 function relays described in the previous section. During parameterization, only the relay groups available in each case are displayed. For each relay (channel) it can be defined whether it is controlled via a device input, a device function or the interface. The following specifications can be made.

Inputs

Here you can define how the relay is controlled. The following options are available:

- Function collective alarm 1, 2 or 3
- Function horn control
- Available galvanic alarm inputs

Relay is activated
By removing the check mark, the control of the relay by the above functions and inputs can be deactivated.

Inverted
If this check mark is set, the negation of the respective function is executed. For example, the relay then drops out when the collective alarm occurs and picks up when no collective alarm is present.

Output parallel
If the relay is activated by an alarm input, it can be defined whether it follows this input directly (tick not set) or remains activated until the alarm has been acknowledged (tick set) - signaling of the stored alarm.

6.3.4.6 Submenu „LED color settings“

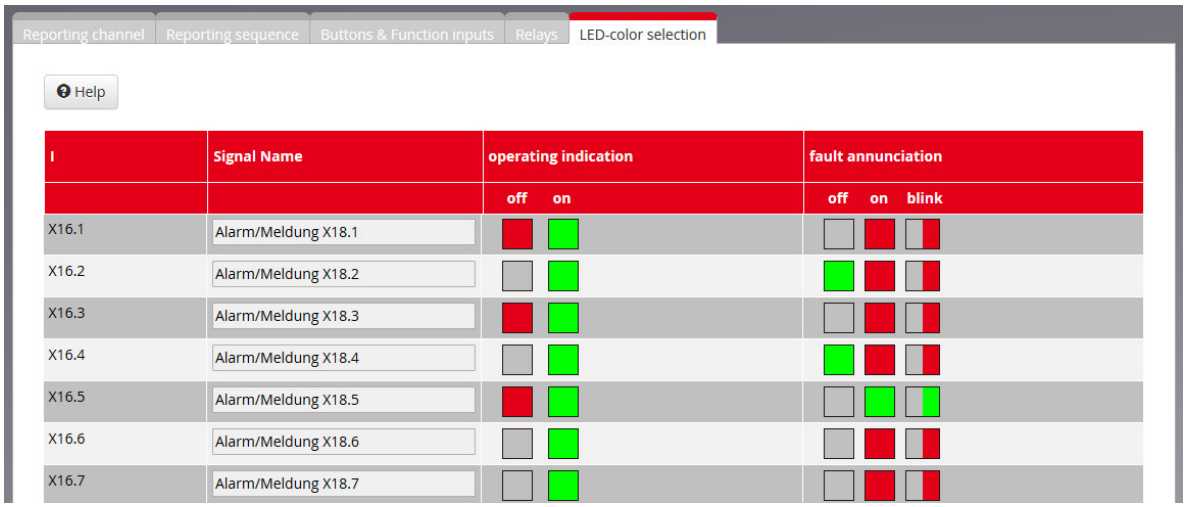


Fig. 6.19: Submenu „LED color settings“

On this dialog page, the LED colors for operating and fault alarms can be set for each channel. The BSM is delivered with RGB-LED.

RGB-LED - LED off (grey box)) or the colors red, green, yellow, blue, orange, white

The selection "LED off" is only available for the "Off" state.

Operating alarm
For operating alarms, the colors can be set for two states.

Fault alarm
For the fault alarm, one of the above colors is set for each of the states "Off", "On" and "Flashing".

Please note that different color settings are always required for the "Off" or "On" state of an LED.

6.3.5 Menu „Modbus“

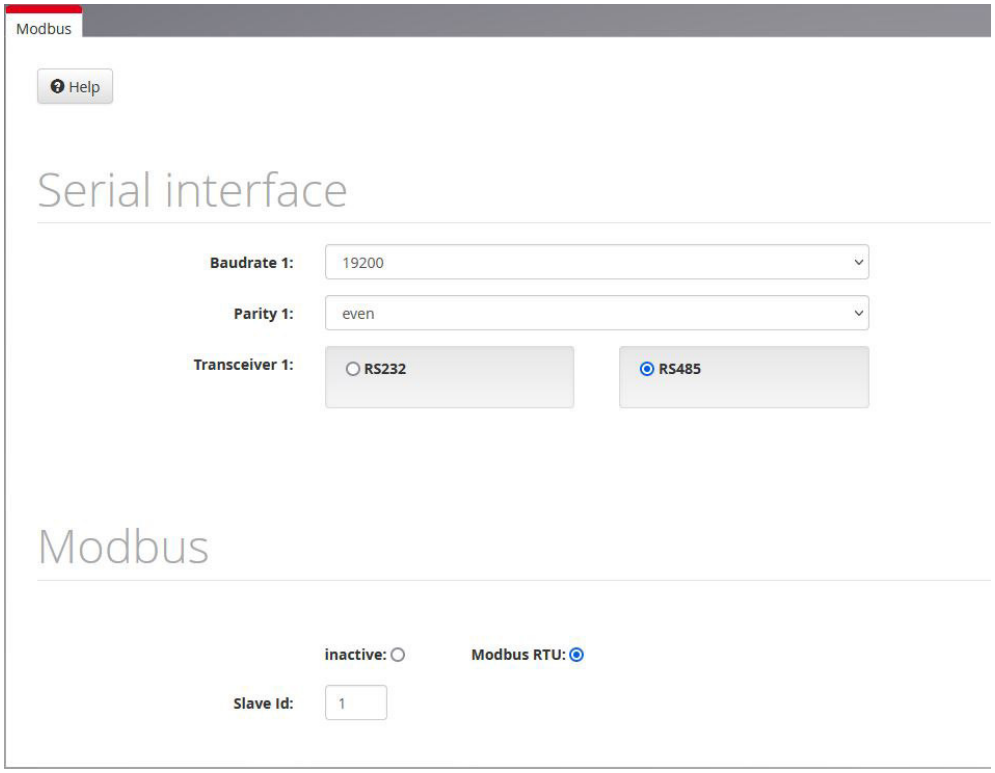


Fig. 6.20: Menu „Modbus“

This menu is used to set the serial interface (terminal X6) on the optional interface card. This interface is used for Modbus communication.

The following parameters can be set:

Baud rate - 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 Baud
Parity - none, even, odd

The interface can be switched between RS232 and RS485.

If the Modbus is activated by selecting the "Modbus RTU" radio button, an additional input field opens for defining the Modbus slave address of the fault annunciator.

For further information about the Modbus interface please refer to the separate documentation MSM-SMODB-BA-UK.

6.4 Main menu „Configuration“

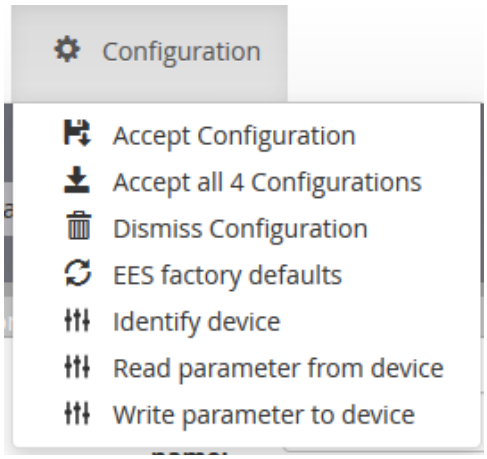


Fig. 6.21: Open main menu „Configuration”

Apply configuration
Saving the changed parameters of the currently edited device in the RAM of the PC.

Apply all 4 configurations
With this button, the parameters of all devices (basic device and the possibly connected extensions (slave device 1 ... 3) are stored in the RAM of the PC.

Dismiss configuration
Discard all changes made in the session (since the last "Apply configuration").

Please note that the parameterization needs to be saved either

- with the menu command "Write parameters to device" in the device
- or with „Parameter/System/Device administration/Export/Import“ in a file on the computer.

Otherwise, the current changes will be discarded once you log out.

Factory defaults
Resetting all parameters to the factory setting

Identify device
Identifying and creating the device (for fault alarm cascades of all connected devices)

Read parameters from device
Read out the parameters stored in the device. After the readout, the data in the PC must be updated using the "Accept configuration" or "Accept all 4 configurations" action.

Write parameter to device
With this function, the configuration created on the PC is written to the device. The fault annunciator is then restarted automatically.

6.5 Main menu „Monitor“

The monitor is a diagnostic tool for the fault annunciator and any slave devices connected in the cascade. In this display, the LEDs of the fault annunciator are shown with their states (flashing, on and off).

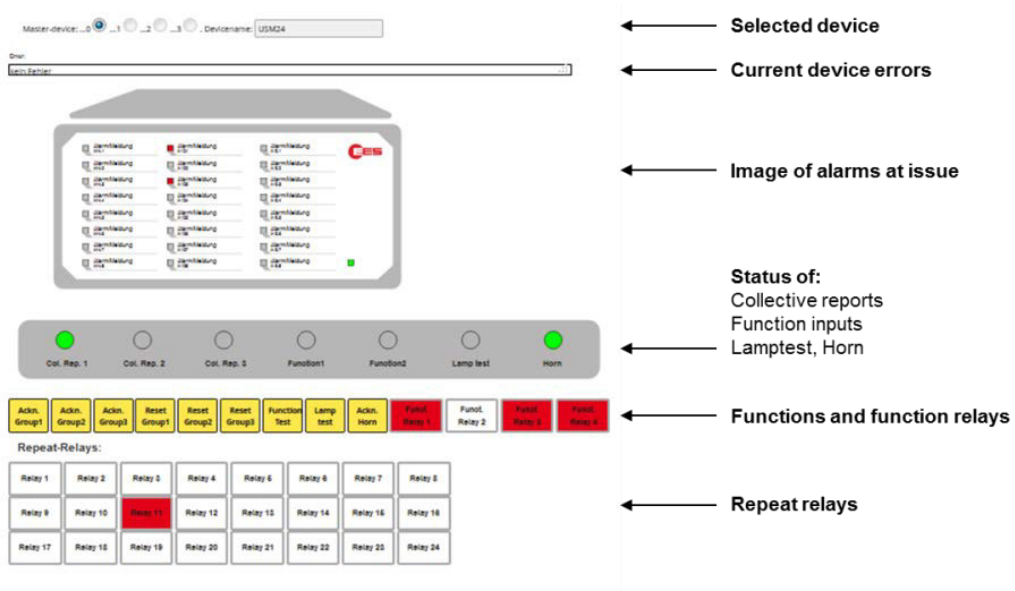


Fig. 6.22: Monitor - a diagnostic tool

For each device (master or slave 1...3) created in "Parameters / Device administration", a separate monitor screen can be called up via the associated tabs.

The 13 yellow buttons symbolize functions and can be "actuated" by mouse click, if logged in as an admin, thus triggering the corresponding action (acknowledgement, function test ...).

The states of the 4 function relays and, if available, the 1:1 relays are also displayed (red - excited, white - idle state).

7 Usage and product life cycle

7.1 Maintenance

To ensure a high life expectancy of the product, regular maintenance activities are required, which are limited exclusively to cleaning and care activities for the devices used. These may also only be carried out by trained specialist personnel. Improperly performed maintenance work can lead to partial or complete failure of the product.

Warning!
All maintenance work may only be carried out when the device is disconnected from the power supply!

7.2 Repair

In the event of partial or complete failure of the product, repair work may be necessary which, due to the complexity of the device, may only be carried out by the manufacturer. Improperly performed repair work will void any warranty or guarantee claims. Please contact our customer service.

Technical service:
Elektra Elektronik GmbH & Co Störcontroller KG
Hummelbühl 7-7/1
71522 Backnang
Tel.: + 49 (0) 7191/182-0
Fax: +49 (0) 7191/182-200
E-Mail: info@ees-online.de

7.3 Decommissioning

In the event of temporary or permanent decommissioning of the product, proceed according to the instructions below. These may only be carried out by trained specialist personnel. Improperly performed activities can lead to partial or complete failure of the product.

Warning!
All decommissioning work must only be carried out when the device is de-energized!

Decomissioning:

- Switch off the power supply to the device
- Disconnect wiring
- Release the retaining clips and remove the unit from the front panel or door by pulling it forwards.

Proper storage until recommissioning or shipment to the manufacturer's customer service department requires suitable premises in accordance with the storage conditions in the Technical data section.

In case of complete decommissioning, proceed as described in section 7.6 Disposal.

In case of recommissioning, proceed as described in section 4 Mounting and installation.

7.4 Packaging and transport

If it is necessary to transport the product for repair purposes or relocation, appropriate packaging and transport conditions must be ensured so that the device is not impaired in any way during transport.

Packing instructions:
Please ensure suitable shipping packaging (original packaging if possible).
Please observe country-specific regulations for shipping electronic products.

7.5 Spare parts

The partial or complete failure of the product can, if necessary, be prevented by appropriate repair activities using suitable spare parts, which, due to the complexity of the device, may only be carried out by the manufacturer. Please contact our customer service.

Technical service:
Elektra Elektronik GmbH & Co Störcontroller KG
Hummelbühl 7-7/1
71522 Backnang
Tel.: + 49 (0) 7191/182-0
Fax: +49 (0) 7191/182-200
E-Mail: info@ees-online.de

7.6 Disposal

The disposal of defective products or old devices can potentially have negative effects on health and the environment, therefore they must be disposed of in a harmless and environmentally friendly manner in accordance with the regional legal disposal regulations. Alternatively, a return shipment to the manufacturer should be considered.

Disposal instructions:
Returning the packaging to the material cycle reduces the volume of waste and saves raw materials. Dispose of packaging materials that are no longer required at the regional collection points for the dual recycling system. If possible, save the packaging during the warranty period so that the device can be properly packaged in the event of a warranty claim.

The disposal of the device itself falls under the scope of electronic waste. If necessary, contact your local waste disposal company for information on suitable disposal methods. Do not dispose of electrical devices in household waste, but use the regional collection points. If electrical devices are disposed of in an uncontrolled manner, hazardous substances may enter the groundwater during weathering and thus enter the food chain or poison the flora and fauna for years.