



Fault annunciator systems

Interface description

→ Interface description IEC 60870-5-101/104 for USM and WAP

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1 Validity

This description is valid for the IEC 60870-5-101/104 interface of the following devices


Window facia annunciators (WAP-K)	from Software Packet version 002.004.002
Annunciators with protocol interface (USM)	from Software Packet version 003.000.000.

2 General notes

2.1 Additional instructions

Note!

This manual provides the safe and efficient use with the protocol interface of the annunciator series USM and WAP (in the following called „ 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 are trained especially for the working environment and are 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.



Note!
This symbol warns of a situation which can lead to malfunction or dangerous situations if not noted.



ENVIRONMENTAL PROTECTION!

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

Important passage



This symbol accentuates especially important passages.

Tips and recommendations



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

Cross reference



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


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)

2.5 Safety instructions

The interface of the fault annunciators 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.

	<p>WARNING! Hazard of incorrect use! Incorrect use of the annunciator can lead to hazardous situations.</p>
	<ul style="list-style-type: none"> • 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.

2.6 Customer service

For further technical information please contact our customer service:

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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.

2.7 Copyrights, trademark rights, GNU licenses

Copyright

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3 Introduction

This document comprises the description of the IEC 60870-5-101 / 104 interface of the annunciator series USM and WAP. For information on the basic characteristics of the annunciators and the parameterisation of the annunciator functions, please refer to the separate documentation of the devices. In this manual only the interface and its parameterisation are explained.

In this manual only the possible settings of the annunciator will be explained (→ interoperability list of the respective device).



For basic information about the IEC interface, please refer to the standard „Tele control units and systems Part 5: transmission protocols“. In the following sections, we will refer to the respective parts of the standard, where further information can be found to the respective topic.

For communication with superior or inferior third party systems in the control or process level the annunciators provide one or two interface cards. Through these interfaces the annunciators can be linked to third party systems via the following protocols:

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



The fault annunciator can establish connections to a maximum number of 4 Clients (Multilink) when working as 104-Server. In 104-Client mode, up to 32 Servers can be connected. The combination of multiple of the above mentioned protocols within one annunciator is possible.

In the application example stated below, the WAP-K 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.

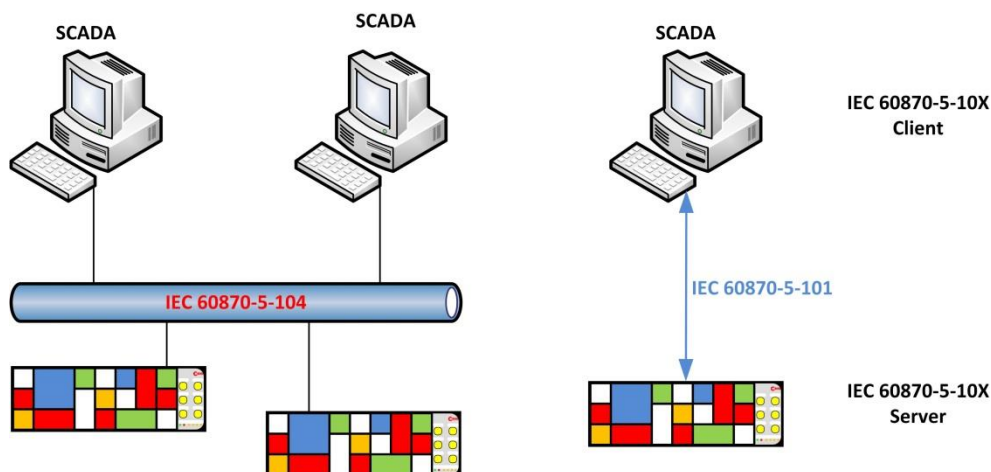


Fig. 3.1: Application example for communication of annunciators as acquisition devices

In the following example, the WAP-K signals alarms, which are gathered from the IEC interface. A galvanic delivery of the signals is not required, thus the wiring of the single alarm signals is obsolete.

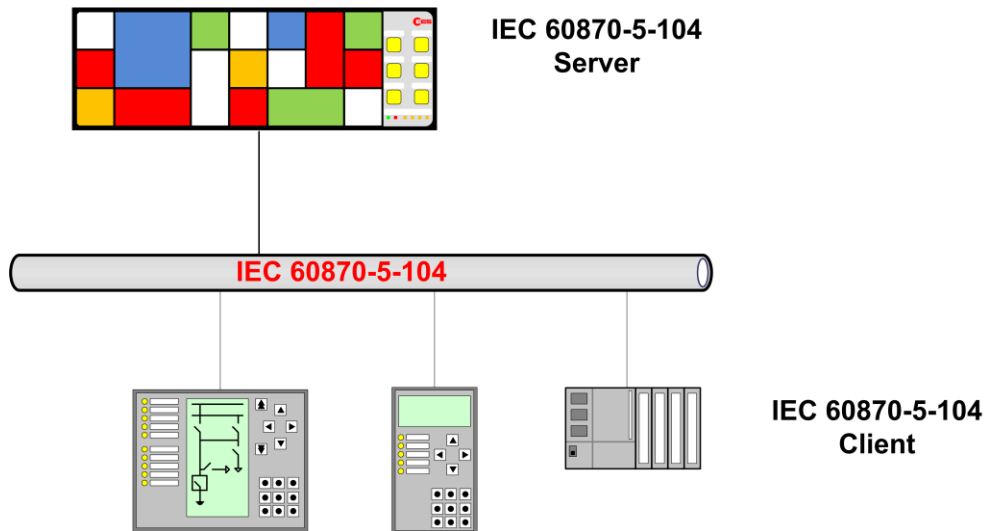


Fig. 3.2: Application example for an annunciator used as indication device for alarms which are retrieved from the IEC interface.



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.

4 Parameterisation

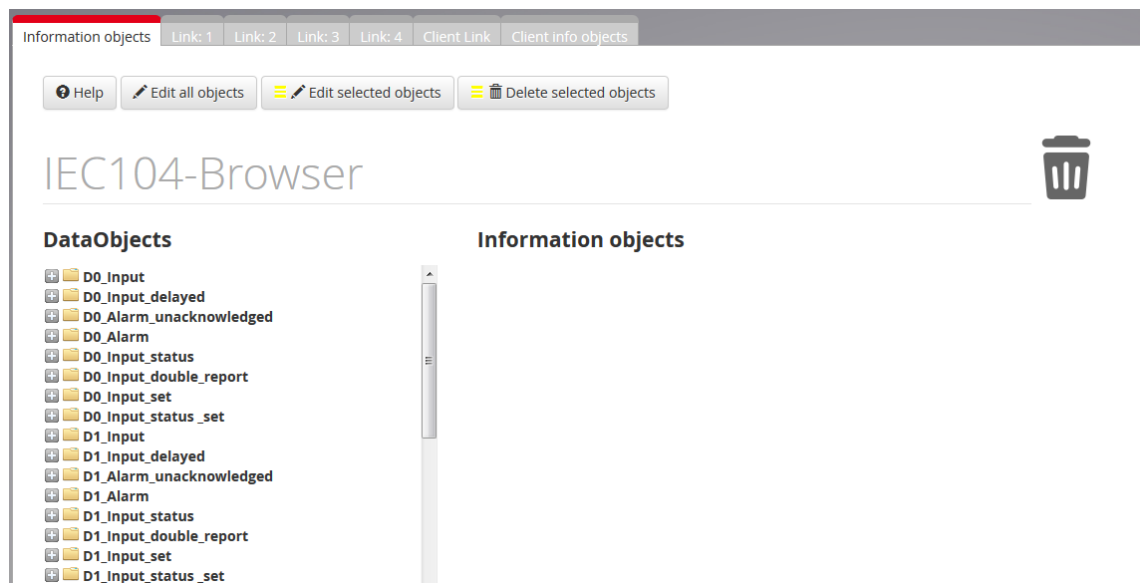


Fig. 4.1: Menu IEC 60870-5-101/104

In this menu the settings for the protocol interface IEC 60870-5-101/104 can be defined. The annunciator can communicate with up to 4 clients (Multilink) as IEC server and can act as IEC client for up to 32 servers at the same time.

The page is structured in 7 submenus by tabs. The first 5 tabs define the settings for the IEC server functionality of the annunciator and the last 2 tabs define the IEC client functionality.

- Server Information objects (Data browser)
- Server Link1 ... 4
- Client Link
- Client info objects (Editing of the information objects)

4.1 Submenu for parameterisation of the 4 links for the server functionality

The IEC 60870-5-101/104 interface of the annunciator is capable of multilink-communication. This means that one device can communicate to a maximum number of 4 IEC clients. For each of these possible 4 links, a separate submenu is available.

In the upper part of the page the interface which should be used for the respective link can be chosen.

60870-5-101 symmetric: 60870-5-101 unsymmetric: 60870-5-104: inactiv:

For links 1 and 2 all 4 options can be chosen. Links 3 and 4 can only be set to IEC 60870-5-104 or to inactive.

If the serial interface IEC 60870-5-101 symmetric or asymmetric is used, an automatic assignment to one of the two possible serial interfaces takes place.

Link 1 – X6

Link 2 – X96 (optional interface card)

Parameter	Value	Default setting
Baud rate	110, 300, 600, 2400, 4800, 9600, 38400, 57600 or 115200	38400
Parity	none , even, odd	even (IEC-standard)
Link address length in Byte	0, 1, 2	2 Byte
Link address	1...65534 (structured or unstructured *)	1
ASDU address length in Byte	1, 2	2 Byte
ASDU address	1...65534 (structured or unstructured *)	2
ASDU valid per link	In the submenu „Edit objects“ an individual ASDU can be assigned to each IEC object. When this checkbox is activated, this assignment is invalid. For all objects the here defined ASDU is valid for the whole link.	active
IOA address length	2 Byte (resulting address space 1 ... 65534) 3 Byte (resulting address space 1 ... 16777215)	3 Byte
Originator address	The entered originator address is valid for the whole link.	1
Originator address length	deactivated – address not used activated – originator address is used	active
Single character acknowledgement	IEC 60870-5-101/104 offers the possibility for telegram acknowledgement with a single character <E5> instead of a telegram. This checkbox defines if single character acknowledgement of the IEC request telegrams is permitted.	active
Link-normation	The following actions for normation can be activated: <ul style="list-style-type: none"> • Link • Link condition request • User process reset Multiple activations are possible.	Link User process

Table 4.1: Parameters for the 60870-5-101 interface symmetric or asymmetric

Furthermore the following parameters can be set depending on the communication partner:

- Testing packet interval
- Acknowledgement timeout T1
- Link timeout
- Total link timeout
- Number of follow-up objects

* The shifting between structured and unstructured address format can be done by click on the button

„structured/unstructured address“

*** Structured/unstructured address

Parameter	Value	Default setting
ASDU address	Address length 2 Byte 1...65534	2
ASDU valid per link	In the submenu „Edit objects“ an individual ASDU can be assigned to each IEC object. When this checkbox is activated, this assignment is invalid. For all objects the here defined ASDU is valid for the whole link.	active
Originator address	The entered originator address is valid for the whole link.	1
IEC Client IP-address	IP address of the IEC client (e.g. SCADA) which is allowed to subscribe to this link. For the IP address 0.0.0.0 any client can subscribe.	0.0.0.0
IP-Port	Port number for the communication (IEC-Standard is Port 2404)	2404

Table 4.2: Parameters for the 60870-5-104 interface

Furthermore the following parameters can be set depending on the communication partner:

- Testing packet interval
- Acknowledgement timeout T1
- Total link timeout
- Number of follow-up objects
- Assignment to a redundancy group

The IEC connections of the server functionality of the annunciator can be run in parallel and/or redundant to each other.

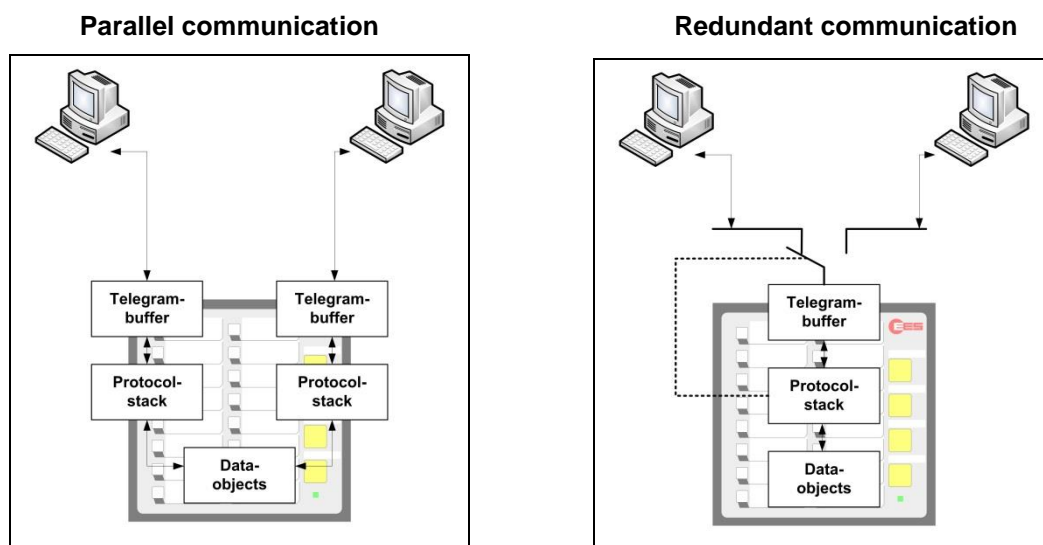


Fig. 4.2: Example for parallel and redundant communication between two servers/clients

In parallel communication mode the information is sent simultaneously to all parameterised servers or clients. Parallel communication is possible for IEC 60870-5-101 and -104 connections.

In redundant communication mode the connections act as alternative for each other. If one client within a redundancy group fails, the data will be sent to another client.

The determination which client is currently active is done by the clients themselves through the interface. Redundant communication is possible only for IEC 60870-5-104 connections.

4.2 Information objects of the IEC server functionality

In this dialog the available data objects provided by the annunciator can be defined as information objects by drag and drop. For this, please select an object with the left mouse button and drag it into the information object list. The new element will be inserted after the element it was dropped on. The available data objects cannot be edited or deleted and are dependent from the type of the annunciator and possibly connected slave devices in a cascaded annunciator system.

In the following summary of the available data objects, „X“ stands as place marker and can have the following values:

- 0 Data objects of the master device
- 1 Data objects of the slave device 1 (only available in cascaded annunciator systems)
- 2 Data objects of the slave device 2 (only available in cascaded annunciator systems)
- 3 Data objects of the slave device 3 (only available in cascaded annunciator systems)

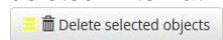
For each annunciator the following data objects are available:

DX_Input	- physical input (not stored) without alarm delay (input-parallel signal)
DX_Input_delayed	- status of the input after expiration of the alarm delay (input-parallel signal delayed)
DX_Alarm_unacknowledged	- the stored signal (alarm) is at issue or receded but not yet acknowledged (stored alarm)
DX_Alarm	- alarm is at issue and stored for 2-frequency – not reset (output-parallel alarm)
DX_Input_status	- status of the respective alarm channel (Status 1 ... 4 as explained above (Input / Input delayed / Alarm unacknowledged / Alarm))
DX_Input_double_report	- undelayed output of 2 inputs as alarm double report Always 2 inputs (odd channel and even channel) are embraced to a double alarm. The resulting data object is designated with the number of the odd channel. e.g. X16.1 and X16.2 → D0_InDouble1_Alarm/Meldung_X16.1.
DX_Input_set	- Triggering of an alarm (channel defined as output)
DX_Function_output	- Status of the function relays 1 ... 4 (not triggered / triggered)
DX_Function_out_set	- Triggering of the function relays 1 ... 4
DX_Output	- Status of the repeat relays
DX_Output_set	- Triggering of the repeat relays
DX_Output_double_command	- triggering of repeat relays as double command Always 2 relays (odd relay and even relay) are embraced to a double command. The resulting data object is designated with the number of the odd relay. e.g. X30.1 and X30.2 → D0_output double command_1
DX_Button	- The respective button (1...6) is operated and the assigned function has been triggered.

Parameterisation

- DX_Function_inputs - Function input 1 or 2 is activated and the assigned function has been triggered.
- Error - Device error detected (Error type → section error codes)
- Special channels - Collective report 1, 2 or 3 triggered
- Horn triggered
- Lamp test triggered and still active
- Commands - Acknowledgement of collective report groups 1 .. 3
- Reset of collective report groups 1 .. 3
- Acknowledgement horn
- Triggering of the function test
- Triggering of the lamp test

Information objects that are not required anymore can be dragged to the paper bin and thus be deleted. Alternatively, selected information objects can be deleted with the button



In the next step, IEC addresses and object types have to be assigned to the defined information objects. Three possibilities are available for this:

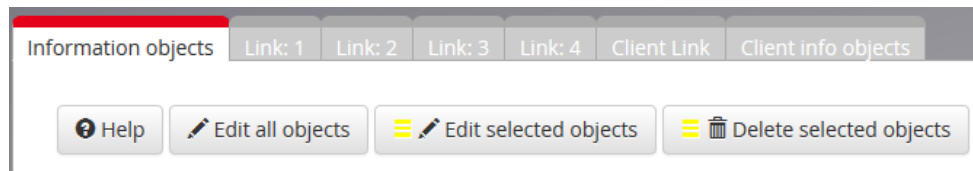


Fig. 4.3: Menu IEC 60870-5-101/104 / Information objects

1. Assignment for a single object by double click on the respective object.
2. Assignment for selected objects (marked in yellow) by click on the button „Edit selected objects“. Objects can be selected and de-selected by single-click on the respective object.
3. Assignment for all objects by click on the button „Edit all objects“.

For all three possibilities a separate sub-menu „Edit objects“ is opened.

4.3 Assignment of object addresses and types

I	Signal Name	Channel Type	ASDU	IOA	IEC Type	Link	blo
0	D0_In3_Alarm Meldung\X14.3	undelayed	1	3	30 single report long time	1	<input type="checkbox"/>
1	D0_In2_Alarm Meldung\X14.2	undelayed	1	2	30 single report long time	1	<input type="checkbox"/>
2	D0_In1_Alarm Meldung\X14.1	undelayed	1	1	30 single report long time	1	<input type="checkbox"/>

Fig.4.4: Menu IEC 60870-5-101/104 / Edit objects

This menu contains the following information and parameters, respectively:

Signal name

Designation of the channel, corresponding to the text entered in the Menu „Master-Device“. This field cannot be changed in this menu.

Channel type

Type of the object corresponding to the submenu „Information objects“. This field cannot be changed.

ASDU / IOA

ASDU (2 Byte) and IOA (3 Byte) can be entered structured or unstructured. Switching between the address formats can be done by click on the button „***Structured/unstructured address“.



When the checkbox „ASDU valid per link“ is activated in the submenus „Link 1...4“, the ASDU assigned in this submenu „Edit objects“ is invalid. For the respective link only the ASDU as per link parameterisation is valid.

IEC-Type

In this field the IEC-type for the respective object can be chosen. The following types are available:

Type Meaning

1	- Single report without timestamp	M_SP_NA_1
2	- Single report with short timestamp	M_SP_TA_1
3	- Double report without timestamp	M_DP_NA_1
4	- Double report with short timestamp	M_DP_TA_1
5	- Step position without timestamp	M_ST_NA_1
6	- Step position with short timestamp	M_ST_TA_1
7	- Bit report 32 Bit without timestamp	M_BO_NA_1
8	- Bit report 32 Bit with short timestamp	M_BO_TA_1
30	- Single report with timestamp CP56Time 2a	M_SP_TB_1
31	- Single report with timestamp CP56Time 2a	M_DP_TB_1
32	- Step position with timestamp CP56Time 2a	M_ST_TB_1
33	- Bit report 32 Bit with short timestamp CP56Time 2a	M_BO_TB_1

If the respective object is a command, e.g. „Output set“ or an acknowledgement command, the following types are available additionally:

45	- Single command without timestamp	C_SC_NA_1
46	- Double command without timestamp	C_DC_NA_1
58	- Single command with timestamp CP56Time 2a	C_SC_TA_1
59	- Double command with timestamp CP56Time 2a	C_DC_TA_1
60	- Step position command with timestamp CP56Time 2a	C_RC_TA_1

Link

By activation of the respective checkbox the object will be forwarded on the corresponding link. Multiple assignments are possible.

blo

If this checkbox is activated, the object is blocked for IEC communication and will not be transmitted spontaneously. It will, however, be transmitted when answering a general interrogation to ensure that the interrogation is complete.

4.4 Links of the client functionality

The annunciator can communicate as IEC 60870-5-104 client with up to 32 servers. For each server a link needs to be parameterised. In the upper half of the menu, the parameters are set which apply for all links.

Parameter	Value
IOA length	2 Byte (resulting address space 1 ... 65534) 3 Byte (resulting address space 1 ... 16777215)
Originator address	The originator address is valid for the whole link. The originator address length can be 0 or 1, for 0 the originator address will not be used.
Testing packet interval	The testing packet interval defines the time interval between testing telegrams. 0 means no testing telegrams will be sent. Value range 0 .. 65500
Quitting-Timeout T1	If no response is received to a sent packet after expiration of the Quitting-Timeout, an error will be released. Value range 0 .. 255
Link-Timeout	If no link request telegram is received within the link timeout interval, an error will be released. Value range 0 .. 255
Total Link-Timeout	If no link request telegram is received within the link timeout interval, an error will be released. Value range 0 .. 65500
Number of follow-up objects	The number of follow-up objects defines how many follow-up objects may be copied to one IEC telegram as a maximum. Value range 1 .. 50

Table 4.3: Parameters valid for all client links

Additionally, for each used link the following parameters have to be set:

IP-Address

IP-address of the server which shall be connected to the annunciator.

IP-Port

IP-port through which the annunciator addresses the server.

Link activation

Activation or deactivation of the respective client link.

4.5 Information objects of the IEC client functionality

The information objects of the client functionality are identical to the information objects of the server functionality, selection and administration are identically, as well.

Edit objects

This window is activated as soon as values of the information objects are to be changed. Either the selected or all defined information objects will be displayed and can be changed.

Input

Channel number of the respective alarm (display only).

Signal name

Designation of the respective channel (display only).

Channel type

The type of the information object as per definition (display only).

DX_Input	- physical input (not stored) without alarm delay (input-parallel signal)
DX_Input_delayed	- status of the input after expiration of the alarm delay (input-parallel signal delayed)
DX_Alarm_unacknowledged	- the stored signal (alarm) is at issue or receded but not yet acknowledged (stored alarm)
DX_Alarm	- alarm is at issue and stored for 2-frequency – not reset (output-parallel alarm)
DX_Input_status	- status of the respective alarm channel (Status 1 ... 4 as explained above (Input / Input delayed / Alarm unacknowledged / Alarm))
DX_Input_double_report	- undelayed output of 2 inputs as alarm double report Always 2 inputs (odd channel and even channel) are embraced to a double alarm. The resulting data object is designated with the number of the odd channel. e.g. X16.1 and X16.2 → D0_InDouble1_Alarm/Meldung_X16.1.
DX_Input_set	- Triggering of an alarm (channel defined as output)
DX_Function_output	- Status of the function relays 1 ... 4 (not triggered / triggered)
DX_Function_out_set	- Triggering of the function relays 1 ... 4
DX_Output	- Status of the repeat relays
DX_Output_set	- Triggering of the repeat relays
DX_Output_double_command	- triggering of repeat relays as double command Always 2 relays (odd relay and even relay) are embraced to a double command. The resulting data object is designated with the number of the odd relay. e.g. X30.1 and X30.2 → D0_output double command_1
DX_Button	- The respective button (1...6) is operated and the assigned function has been triggered.

Parameterisation

DX_Function_inputs	- Function input 1 or 2 is activated and the assigned function has been triggered.
Error	- Device error detected (Error type → section error codes)
Special channels	- Collective report 1, 2 or 3 triggered - Horn triggered - Lamp test triggered and still active
Commands	- Acknowledgement of collective report groups 1 .. 3 - Reset of collective report groups 1 .. 3 - Acknowledgement horn - Triggering of the function test - Triggering of the lamp test

ASDU

ASDU address (2 Bytes) of the respective information object.

IOA

Information object address (3 Bytes) of the respective information object.

IEC Type

Type Meaning

1	- Single report without timestamp	M_SP_NA_1
2	- Single report with short timestamp	M_SP_TA_1
3	- Double report without timestamp	M_DP_NA_1
4	- Double report with short timestamp	M_DP_TA_1
5	- Step position without timestamp	M_ST_NA_1
6	- Step position with short timestamp	M_ST_TA_1
7	- Bit report 32 Bit without timestamp	M_BO_NA_1
8	- Bit report 32 Bit with short timestamp	M_BO_TA_1
30	- Single report with timestamp CP56Time 2a	M_SP_TB_1
31	- Single report with timestamp CP56Time 2a	M_DP_TB_1
32	- Step position with timestamp CP56Time 2a	M_ST_TB_1
33	- Bit report 32 Bit with short timestamp CP56Time 2a	M_BO_TB_1

If the respective object is a command, e.g. „Output set“ or an acknowledgement command, the following types are available additionally:

45	- Single command without timestamp	C_SC_NA_1
46	- Double command without timestamp	C_DC_NA_1
58	- Single command with timestamp CP56Time 2a	C_SC_TA_1
59	- Double command with timestamp CP56Time 2a	C_DC_TA_1
60	- Step position command with timestamp CP56Time 2a	C_RC_TA_1

Link

By activating the respective checkbox the object will be transmitted on this link.

For telegrams that shall be received through the IEC interface, only one link should be chosen to avoid false alarms due to inconsistent information received on the interface.

For commands and alarms that shall be sent to all devices from the IEC client – e.g. acknowledge commands or lamp test – up to 32 links can be activated in parallel.

blo

If this checkbox is activated, the respective object is blocked for IEC communication.

Address format

The shifting between structured and unstructured address format can be done by click on the button

„structured/unstructured address“

4.6 Communication between multiple USM/WAP-K

Through the IEC 60870-5-104 interface not only third party devices can be connected. The communication between two or more annunciators of the types USM or WAP-K is possible as well. In this case, one of the devices works as IEC Server and the other one as IEC Client.

4.6.1 Exchanging of alarms and commands

All information objects of an annunciator can be transmitted to other annunciators and can be used for triggering of alarms or commands (e.g. acknowledgement) there. The „sending“ device works as IEC Server and the „receiving“ device works as IEC Client.

When parameterising the information objects to be exchanged between the annunciators, please note that for the objects on the Server- and on the Client-Link the same information object type is selected. For this purpose, so-called „alarms in control direction“ are supported by the IEC Client.

If alarms are to be triggered from the IEC interface (instead of the galvanic signal input), the option „Interface“ has to be selected for the signal source of the respective alarm in the menu „Master-device (Slave-device 1..3) → Reporting channel“:

I	Signal Name	OI	NC	DT	RD	DF	CR1	CR2	CR3	HT	signal source	A				
X14.1	Alarm\Meldung\X14.1	<input type="checkbox"/>	<input type="checkbox"/>	5	ms	0.100	<input checked="" type="checkbox"/>	5	/1000	ms	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Horn is not locked	Interface	<input type="checkbox"/>
X14.2	Alarm\Meldung\X14.2	<input type="checkbox"/>	<input type="checkbox"/>	5	ms	0.100	<input checked="" type="checkbox"/>	5	/1000	ms	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Horn is not locked	Physical input	<input checked="" type="checkbox"/>

If two or more annunciators are connected to each other through the IEC 60870-5-104 interface, a distinct IP address has to be defined for the client in the definition of each Server Link.

4.6.2 Function „Display“ – Mirroring of an alarm status

Through IEC-communication between two annunciators, the alarm status of a dedicated alarm can be mirrored on another annunciator.

The annunciator which provides the alarm to be mirrored is called “acquisition device“ and the annunciator on which the mirrored alarm is displayed is called “indication device“ in the following. When mirroring an alarm, the indication devices exactly displays the status of the corresponding LED (off, flashing (for 2-frequ.: fast and slow flashing), steady light) on the acquisition device. Acknowledgement or reset on the indication device has no effect on the status of the mirrored alarm.

To mirror an alarm on another annunciator, the following information objects have to be parameterised on Server- and Client-side, respectively:

IEC 60870-5-104 Server (Acquisition device):

DX_Input_status

The information object of the respective alarm channel has to be defined as 32 Bit report without timestamp (IEC type 7) with arbitrary ASDU and IOA.

I	Signal Name	Channel Type	ASDU	IOA	IEC Type	Link	blo
1	D0_In1_Alarm Meldung\X14.1	status	0 1	3 7 15	7 32 Bit report no time	1 2 3 4	<input type="checkbox"/>

IEC 60870-5-104 Client (Indication device):

DX_Input_status_set

The information object of the alarm channel which displays the Mirrored alarm has to be defined as 32 Bit report without timestamp (IEC type 7). ASDU and IOA have to match the corresponding object of the acquisition device.

I	Signal Name	Channel Type	ASDU	IOA	IEC Type	Link	blo
0	D0_In1_status_Alarm MeldungX14.1	set	0 1	3 7 15	7 32 Bit report no time	1✓✓✓✓4	<input type="checkbox"/>


For the channel that displays the mirrored alarm on the indication device, the option „Display“ has to be selected for the signal source of the respective alarm in the menu „Master-device (Slave-device 1..3) → Reporting channel“:

I	Signal Name	OI	NC	DT	RD	DF	CR1	CR2	CR3	HT	signal source	A
X14.1	Alarm\MeldungX14.1	<input type="checkbox"/>	<input type="checkbox"/>	5 ms	0.100 <input type="checkbox"/>	5 / 1000 ms <input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Horn is not locked	Display	<input checked="" type="checkbox"/>
X14.2	Alarm\MeldungX14.2	<input type="checkbox"/>	<input type="checkbox"/>	5 ms	0.100 <input type="checkbox"/>	5 / 1000 ms <input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Horn is not locked	Physical input	<input checked="" type="checkbox"/>

5 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 given structure of the Excel file must not be changed. This applies especially for the designations in the first two rows. For a better overview, columns which are not required can be deleted from the table. Empty columns will not be processed during the import.

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 edited in the parameterisation of the master annunciator before.



The Excel-file has to be of the type .xls, other Excel formats cannot be processed by the annunciator.

5.1 Alarm channels and IEC objects



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

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

5.1.1 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.

5.1.2 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).

Parameterisation

„IOA“ - integer value 0 – 16777215 or structured xx-xx-xx (z.B. 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.

5.2 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.

5.2.1 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.

5.2.2 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.