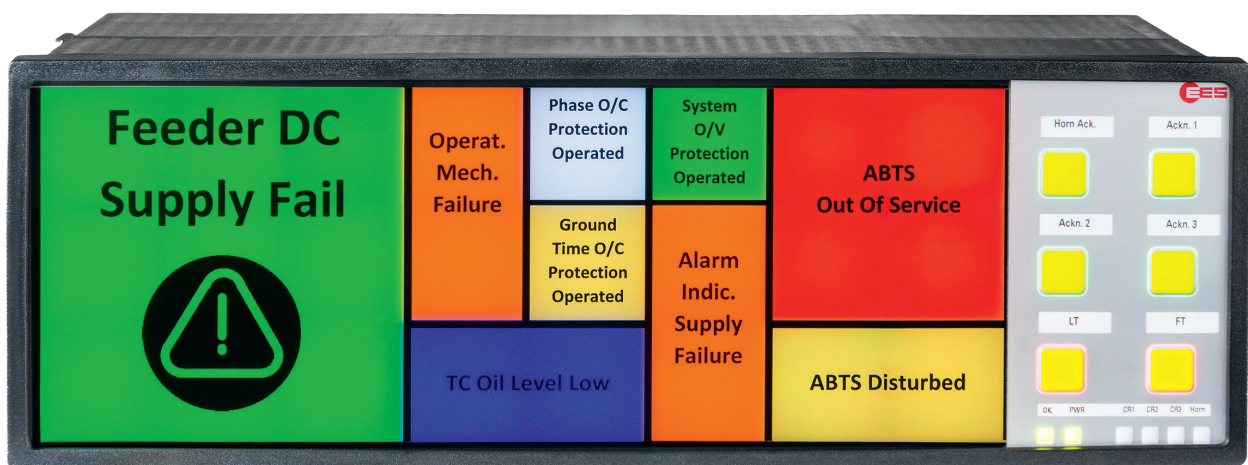




Window facia fault annunciators



➔ WAP – Window Annunciator Panel

- › Annunciators for panel mounting with 24 signal inputs
- › Storage of the last state of inputs and sequence in the case of power failure
- › Cascading of multiple devices to an annunciating system with up to 96 alarms possible
- › Sealed front panel, protection class IP 54
- › Integrated push buttons, function inputs, function relays, self-monitoring and internal horn
- › All established reporting sequences implemented, parameterisable by Software or integrated Web-Server
- › Optional communication interfaces acc. to IEC 60870-5-101/-104 or IEC 61850
- › Optional integrated repeat-relays for multiplication and forwarding of single alarms
- › Supply and signal voltages from 24 V ... 250 V AC/DC
- › Redundant power supply in two voltage ranges available as option
- › Two bright RGB-LEDs with parameterisable colour per each window
- › Slide-in pockets for individual labelling of windows and push buttons
- › Labelled plug-in screw terminals

➔ General system description - annunciator variants

The fault annunciator is available in three different categories:

- WAP-P: Software-parameterisable version
- WAP-K: Annunciator with protocol interface
- WAP-C: Slave device for cascaded systems only

The annunciators provide 24 signal inputs and signal inputs are arranged in groups of 8 alarms each. The sealed front contains 6 push buttons, and slide-in pockets for labelling foil and strips. The size of the windows can be parameterised individually by software or web-server. The default window size is 28x28 mm. Every window is lit by two RGB-LEDs with parameterisable colour. The functions of the buttons can be parameterised individually.

The push buttons are backlit; the light is triggered according to the function of the buttons and the respective alarm status and thus allows for a guided operation of the annunciator.

The two function inputs are used according to the chosen alarm sequence (e.g. external acknowledgement). The integrated function relays are realized as change-over contacts. They are used for alarm specific functions (e.g. collective report or triggering of an external horn) as well as for signaling of malfunctions through an alive-contact.

➔ WAP-P: Parameterisable version

For the parameterisable version, basic configuration of the annunciator can be done by DIP-switches. The following settings are available:

- Alarm sequence (first-up, no-first-up or operation indication)
- NO- or NC-principle of the inputs cardwise (8 inputs)
- Horn triggerering by subsequent alarms
- Master/slave configuration and assignment of address for cascaded annunciator system

The function inputs, push buttons and function relays have the following fixed functions:

- Function input 1 - external horn acknowledgement
- Function input 2 - external acknowledgement
- Button 1 - horn acknowledgement
- Button 2 - acknowledgement
- Button 3 - lamp test
- Button 4 - function test
- Button 5 - no function assigned
- Button 6 - no function assigned
- Relay 1 - collective report 1
- Relay 2 - no function assigned
- Relay 3 - external horn
- Relay 4 - watchdog-contact

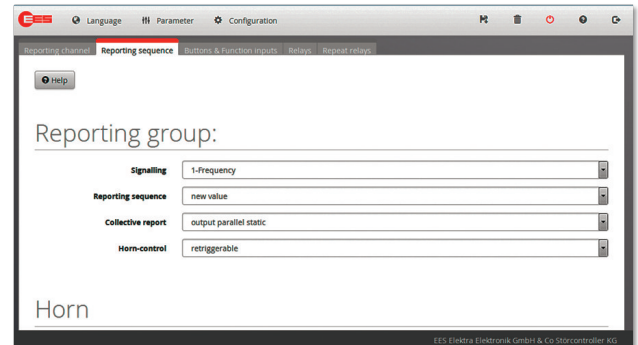
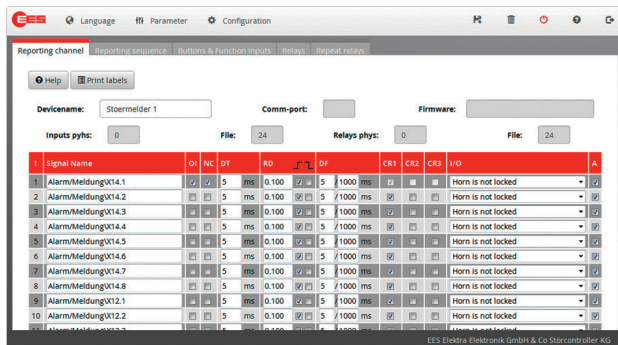
Default Settings

- Collective report - static / parallel to output
- Horn - retriggerable by subsequent alarm and manual acknowledgement
- Horn lock - none

Additional parameterisation can be carried out through an USB-interface.

Parameterisation

To allow for further application specific settings, every annunciator of the variant WAP-P can be parameterised by PC-software (Browser). In addition to the settings by DIP-switch numerous additional settings are available:



For each single alarm channel the following parameters can be set:

- Signal name (labelling)
- Operation indication or fault annunciation
- NO- or NC-principle for each signal input
- Debouncing delay
- Alarm delay
- Defluttering (for forwarding signal information on the IEC protocol)
- Assignment to collective reports 1, 2 or 3
- Horn triggering

The alarm sequence can be compiled from the following components:

- First-up or no-first-up alarm
- 1- or 2-frequency-flashing or status indication

The following settings can be done for the horn triggering:

Function	Option	Description
Internal horn	Active	Internal horn is activated.
	Inactive	Internal horn is deactivated.
Horn triggering	Retriggerable	Horn is triggered by subsequent alarm, even if there are already alarms at issue.
	Not retriggerable	Horn is triggered by subsequent alarms only if no alarms are at issue.
Horn lock	Inactive	Horn can always be acknowledged.
	Active	Alarm can only be acknowledged once the horn has been acknowledged.
Horn acknowledge	Manual (continuous tone)	Horn is acknowledged manually by button or function input.
	Automatic (pulse tone)	Horn is acknowledged automatically according to the set time.
Horn mute	Horn not triggered	Horn is not triggered as long as horn mute is activated.
	Automatic (pulse tone)	Horn is acknowledged automatically after the set time as long as horn mute is activated.

The different alarm sequences use different options for forming **collective reports**. In principle, the following variants may be used:

Function	Procedure
static / input-parallel	The collective report is set with the first incoming alarm and resets with the last receding alarm.
static / output-parallel	The collective report is set with the first incoming alarm. Once all alarms have receded <u>and</u> been acknowledged the collective report is reset.
static / dynamic / input-parallel	The collective report is set with the first incoming alarm. For each subsequent alarm, the collective report is reset for approx. 0.8 s and then set again. Once all alarms have receded the collective report is reset permanently.
static / dynamic / output-parallel	The collective report is set with the first incoming alarm. For each subsequent alarm, the collective report is reset for approx. 0.8 s and then set again. Once all alarms have receded <u>and</u> been acknowledged the collective report is reset permanently.
dynamic	The collective report is activated for approx. 0.8 s with each incoming alarm.
static / input-parallel / resettable	The collective report is set with the first incoming alarm and resets with the last receding alarm <u>or when acknowledged</u> .
static / output-parallel / resettable	The collective report is set with the first incoming alarm and reset independently from the state of the alarms by acknowledgement.

The following functionalities are assignable for the 6 buttons and 2 function inputs:

Multiple assignments are possible:

- Acknowledgement lamps Group^{*)} 1, 2 or 3
- Reset Group^{*)} 1, 2 or 3
- Acknowledgement Horn
- Lamptest
- Function test
- Mute horn

3 of the in total 4 function relays can be assigned with functions. The 4th relay is fixed designed as a live relay.

Multiple assignments are possible:

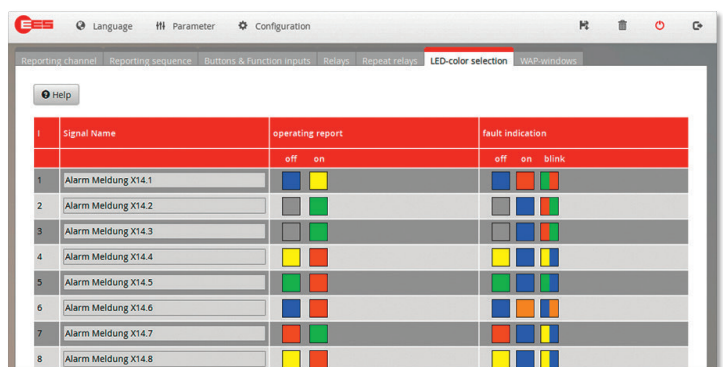
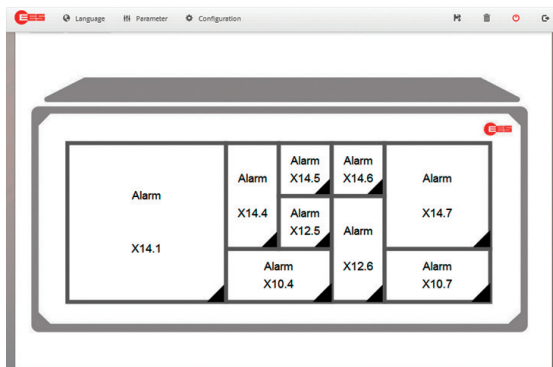
- Collective report 1, 2 or 3
- Triggering of an external horn
- Control of relays by a function input (1 or 2)
- Triggering through one of the buttons 1...6
(statically, as long as button is pressed or as a bistabile relay, toggles on each operation of the button)
- Inversion of the relay function is possible

^{*)} A group is formed from all alarms that are triggering the same collective report.

Parameterisation of window size and colour

The number and size of the windows of the annunciator is individually parameterisable. By default, each of the 24 windows is of the size 28 x 28 mm. The window size can be enlarged by covering the adjacent windows. The relevant signal input for the new created window is the alarm that has been enlarged, therefore the assigned signal inputs of the covered alarms are not processed.

The colour of the displayed alarms can individually be defined for each alarm window. For each of the states "Off", "On" and "Flashing", a colour can be chosen. Available colours are OFF (no LED triggered), RED, GREEN, YELLOW, BLUE, AMBER and WHITE.



Parameter Import from Excel

In addition to the manual parameterisation as described in the last sections, the alarm specific settings and even communication parameters for the WAP-K can also be imported from Excel. EES provides a template that can be filled in and processed with common procedures in order to save time and reduce causes of failure during the parameterisation process.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
	Geräte-				Betriebs-	Ruhe-		Anspruch-	Melde-		Flatter-	Flatter-					
1	Index	nummer	Eingang	Beschriftung1	Beschriftung2	meldung	strom	verzögerung	verzögerung	kommend	gehend	anzahl	zeit	Sammel1	Sammel2	Sammel3	Hupe
2	idx	device	input	signal	signal	operation	normally	debounce	response	edge	edge	deflutter	deflutter	collective	collective	collective	horn
		number		name1	name2	closed	closed	time	delay	rising	falling	number	time	report1	report2	report3	not active
3	1	0	1	Alarm/Meldung	X20.8	x		5	0.100	x		5	1000	x			
4	2	0	2	Alarm/Meldung	X20.7		x	5	30	x	x	5	1000	x			
5	3	0	3	Alarm/Meldung	X20.6	x		5	0.100	x		5	1000	x			
6	4	0	4	Alarm/Meldung	X20.5			5	0.100	x		5	1000	x			
7	5	0	5	Alarm/Meldung	X20.4	x		5	0.100	x		5	1000	x			
8	6	0	6	Alarm/Meldung	X20.3			5	0.100	x		5	1000	x			
9	7	0	7	Alarm/Meldung	X20.2	x		5	0.100	x		5	1000	x			
10	8	0	8	Alarm/Meldung	X20.1			5	0.100	x		5	1000	x			
11	9	0	9	Alarm/Meldung	X18.8	x		5	30	x	x	5	1000	x			
12	10	0	10	Alarm/Meldung	X18.7			5	0.100	x		5	1000	x			
13	11	0	11	Alarm/Meldung	X18.6	x		5	0.100	x		5	1000	x			
14	12	0	12	Alarm/Meldung	X18.5			5	0.100	x		5	1000	x			
15	13	0	13	Alarm/Meldung	X18.4	x		5	0.100	x		5	1000	x			
16	14	0	14	Alarm/Meldung	X18.3		x	5	0.100	x		5	1000	x			
17	15	0	15	Alarm/Meldung	X18.2		x	5	0.100	x		5	1000	x			
18	16	0	16	Alarm/Meldung	X18.1		x	5	0.100	x		5	1000	x			
19	17	0	17	Alarm/Meldung	X16.8		x	5	0.100	x		5	1000	x			
20	18	0	18	Alarm/Meldung	X16.7			5	0.100	x		5	1000	x			
21	19	0	19	Alarm/Meldung	X16.6			5	0.100	x		5	1000	x			
22	20	0	20	Alarm/Meldung	X16.5			5	0.100	x		5	1000	x			
23	21	0	21	Alarm/Meldung	X16.4			5	0.100	x		5	1000	x			
24	22	0	22	Alarm/Meldung	X16.3			5	0.100	x		5	1000	x			
25	23	0	23	Alarm/Meldung	X16.2			5	0.100	x		5	1000	x			
26	24	0	24	Alarm/Meldung	X16.1			5	0.100	x		5	1000	x			
27	25	0	25	Alarm/Meldung	X14.8			5	0.100	x		5	1000	x			
28	26	0	26	Alarm/Meldung	X14.7			5	0.100	x		5	1000	x			
29	27	0	27	Alarm/Meldung	X14.6			5	0.100	x		5	1000	x			
30	28	0	28	Alarm/Meldung	X14.5			5	0.100	x		5	1000	x			
31	29	0	29	Alarm/Meldung	X14.4			5	0.100	x		5	1000	x			

Cascading (Function in preparation)

With the cascading functionality up to four devices can be grouped to an annunciating system by connecting the devices via CAN-Bus interface. One device works as “master” and the connected devices work as “slave”. Thus systems with up to 96 signal inputs (4*24) can be realized. Annunciators of the types WAP-P or WAP-K can be used as master device in a cascaded annunciator system. As slave devices, annunciators of the type WAP-C and WAP-P can be used.

The connected devices will be processed as a virtual compound annunciator with common signaling (alarm sequence, forming of collective reports and horn triggering). Acknowledgement as well as output of the collective reports and horn triggering can arbitrarily be assigned to any of the buttons or relays respectively of the compound system.

Annunciators of the type WAP-K can only be used as master device in a cascaded annunciator system, which saves time while parameterisation and reduces budget costs

General design of a cascaded fault annunciator system:



The parameterisation is done at once via the browser-based software. Only the master device has to be connected, the parameterisation will automatically be distributed to the slave devices.

→ WAP-K: Annunciator with protocol interfaces

The WAP-K resembles the WAP-P in general functionality. For communication with superior or inferior systems (e.g. SCADA or control systems) the WAP-K is equipped with one or two communication cards. The communication cards provide the following interfaces:

Card 1 (equipped as standard)

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

Card 2 (optionally equipped)

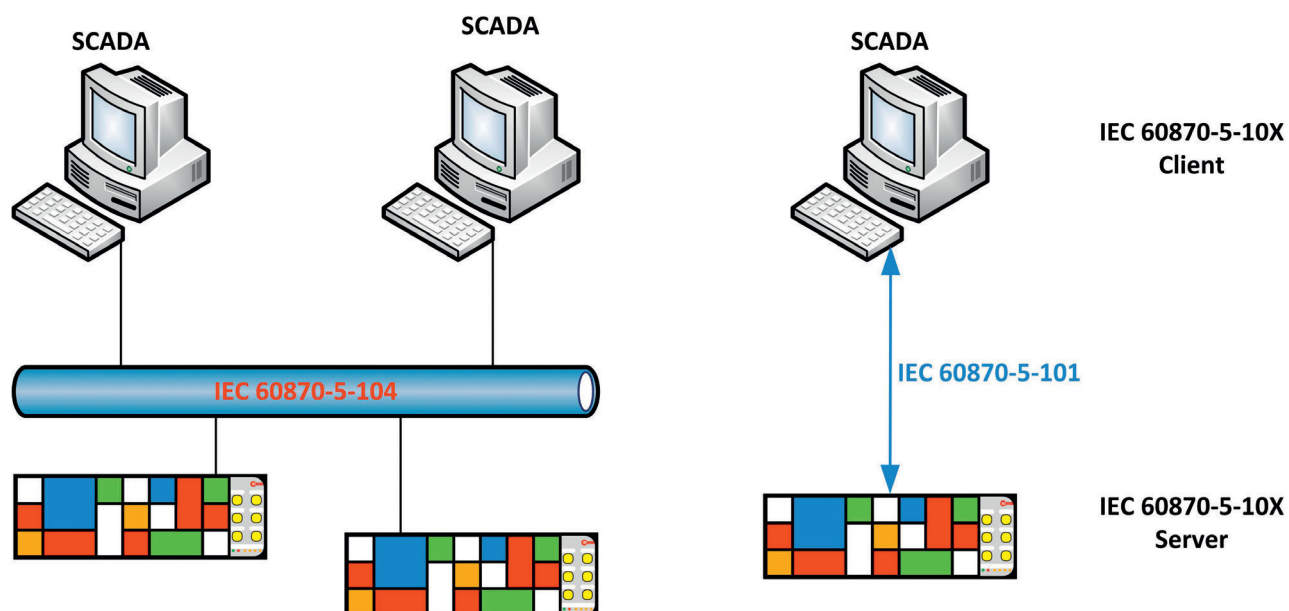
- 1 x Ethernet / RJ45
(alternatively available as optic interface of SC-type)
- 1 x RS232 / pluggable terminal

Through these interfaces the annunciators can be connected to third party systems by use of the following protocols:

- IEC 60870-5-101 (annunciator is IEC-slave)
- IEC 60870-5-104 (annunciator is IEC-server)
- IEC 61850 (annunciator is IEC-server)

- ▶ The annunciator can establish connections to a maximum number of 4 clients (multilink).
The combination of different of the above mentioned protocols within one annunciator is possible.

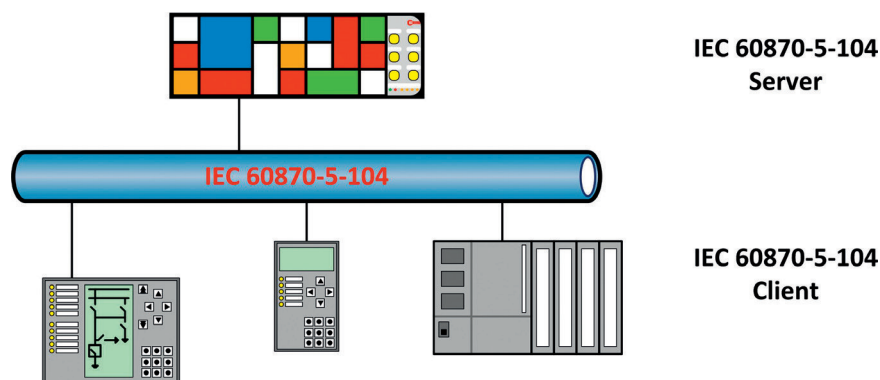
1. WAP-K as acquisition device



In the application example above, the WAP-K annunciators work 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.

- ▶ The alarm channels can either be triggered from the galvanic signal input or from the IEC interface. Which of these options is used, can be parameterised individually for each channel. Acknowledgement through the IEC interface is possible as well.

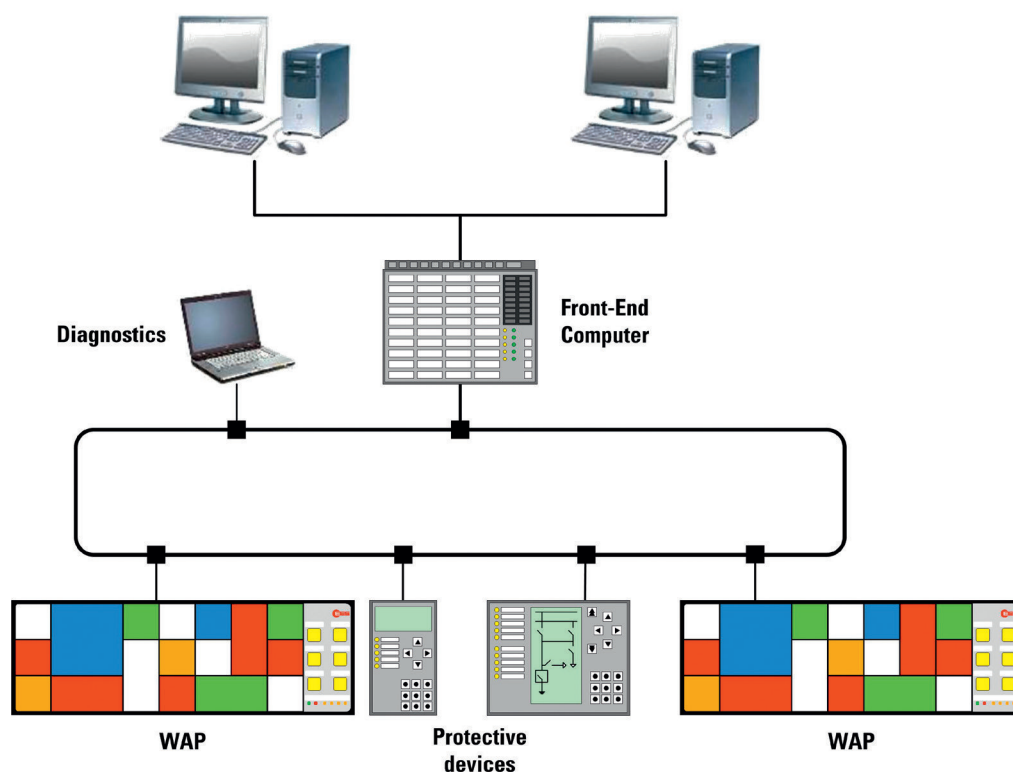
2. WAP-K as indication device



In this application example the WAP-K processes and displays alarms that are retrieved from the IEC interface. Thus, a secondary wiring of the alarms is not necessary.

3. WAP-K in IEC 61850 structures

In automated substations information from field- and protection devices are transmitted through the protocol IEC 61850. In addition, various specific single point alarms are available which – depending on the type of information – need to be transmitted to the SCADA system or to other devices on field or station level. The annunciators of the series WAP-K adopt this „rag-man“ functionality and provide these single point information on the integrated IEC 61850 server. Individual reports and datasets can be configured easily which contain all relevant information about the alarm and device status. In addition to the monitoring direction via single or double point information objects, even control commands can be carried out via the IEC61850 as single or double commands

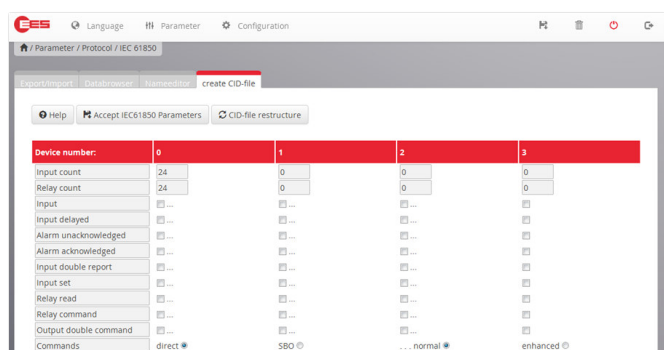


With the optionally available software license IEC 61850 the WAP-K can be integrated into IEC 61850 structures.

CID-Creator

Every annunciator of the series WAP-K provides numerous information about the status of the in- and outputs as well as the device status on the communication interface by default.

Some applications require only a subset of the available information, e.g. on the IEC 61850 Bus. The CID-creator offers the possibility to select the information which is of interest in advance. Thus, the CID-file of the annunciator only contains the required and relevant information for the respective application.



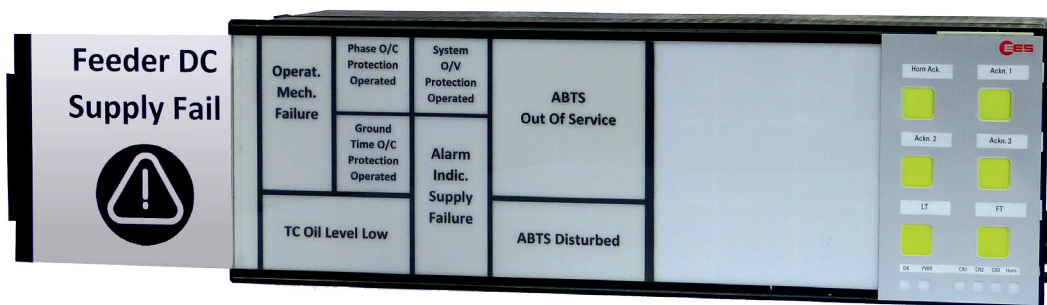
The WAP-K provides an integrated Web-Server. Thus the parameterisation can be done via network with all current web browsers. All annunciator and interface parameters are available on the web-server and can be parameterised through it. No additional software or special cables are required!

Service-access and online-monitoring are additional functions that are provided by the integrated web-server.

→ Labelling

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

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



→ Available Options

The annunciators can be equipped with the following available options:

1. Internal relay-cards

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

1. In- or output-parallel multiplication and forwarding of single alarms.
2. Output of the collective report or external horn triggering.
3. Triggering of the relays from the IEC-interface (only available for WAP-K).

The assignment of the relays depends from the version of the respective annunciator:

- WAP-P - assignment of repeat relays to signal inputs individually parameterisable *)
- WAP-K - individual parameterisation which input triggers the relay or if the relay is triggered from the IEC-interface

The eight relay contacts on a relay card have one common root. The triggering and function of the repeat relays can be configured individually by means of the parameterisation software or web-server, respectively. An individual definition, which signal input triggers the respective relay, is possible. The assignment of repeat relays and signal inputs can either be 1:1 (one relay follows one signal input) or n:1 (multiple relays are following one signal input). Additionally, special functions like the output of a collective report or external horn triggering can be assigned to the repeat relays. Furthermore, additional parameters like e.g. inversion of the relay status or wipe duration for pulse outputs are available.

*) In a cascaded system the functionality of the WAP-P and WAP-K is also available for the WAP-C

2. Redundant power-supply

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

- 24 – 60 V AC/DC
- 110 – 220 V AC/DC

The voltage level of the redundant power supply can be chosen independently from the voltage level of the primary power supply. Both primary and redundant power supplies are included in the self-monitoring of the annunciator and any malfunctions are signalized on the watchdog-contact and the Status-LEDs on the annunciator front. Additionally the application of the supply voltage for both power supplies are indicated by a LED each on the rear side of the device. For the annunciators of the series WAP-K the breakdown of a power supply is also transmitted on the communication interface.

→ 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 95...264 V AC

Signal voltage U_{M}

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
E	60	42	54	75	1,6
4	110	35	50	150	1,6
H	125	35	50	150	1,8
5	220	100	140	260	1,2

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

Power consumption

Number of channels	Power consumption [W]			
	WAP-P	WAP-P with integrated repeat relays	WAP-K	WAP-K with integrated repeat relays
24	< 5	< 13	< 10	< 17

General data

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

Mechanical Data

Type	Front frame H x W x D [mm]	Front panel [mm]	Depth with front frame and terminals [mm]	Weight [kg]
24 24-...-R*	96 x 287 x 135	92 x 282	135	approx. 1.50

* WAP-...-R are variants with integrated repeat relays.

Mounting

	panel mounting
Required installation depth	155 mm
Minimum horizontal gap	
Between 2 devices	15 mm
Connection terminals	pluggable
Wire cross section rigid or flexible	
Without wire sleeves	0,2 ... 2,5 mm ²
With wire sleeves	0,25 ... 2,5 mm ²

Ambient environment

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

Dielectric strength

Voltage dielectric strength	
RS232/RS485 interface against	
Digital inputs	4 kV AC / 50 Hz 1 min
Relay contacts	4 kV AC / 50 Hz 1 min
Supply (110 / 230V AC/DC)	3,0 kV AC / 50 Hz 1 min
Supply (12 / 24 / 48 V AC/DC)	1,0 kV AC / 50 Hz 1 min
Relay contacts against each other	500 V / 50 Hz 1 min
Impulse withstand strength	
RS232/RS485 against	
Digital inputs	2,5 kV ; 1,2 / 50 µs; 0,5 J; acc. to IEC60255-5:2000
Relay contacts	2,5 kV ; 1,2 / 50 µs; 0,5 J; acc. to IEC60255-5:2000
Supply	2,5 kV ; 1,2 / 50 µs; 0,5 J; acc. to IEC60255-5:2000
Relay contacts against each other	500 V ; 1,2 / 50 µs; 0,5 J; acc. to IEC60255-5:2000

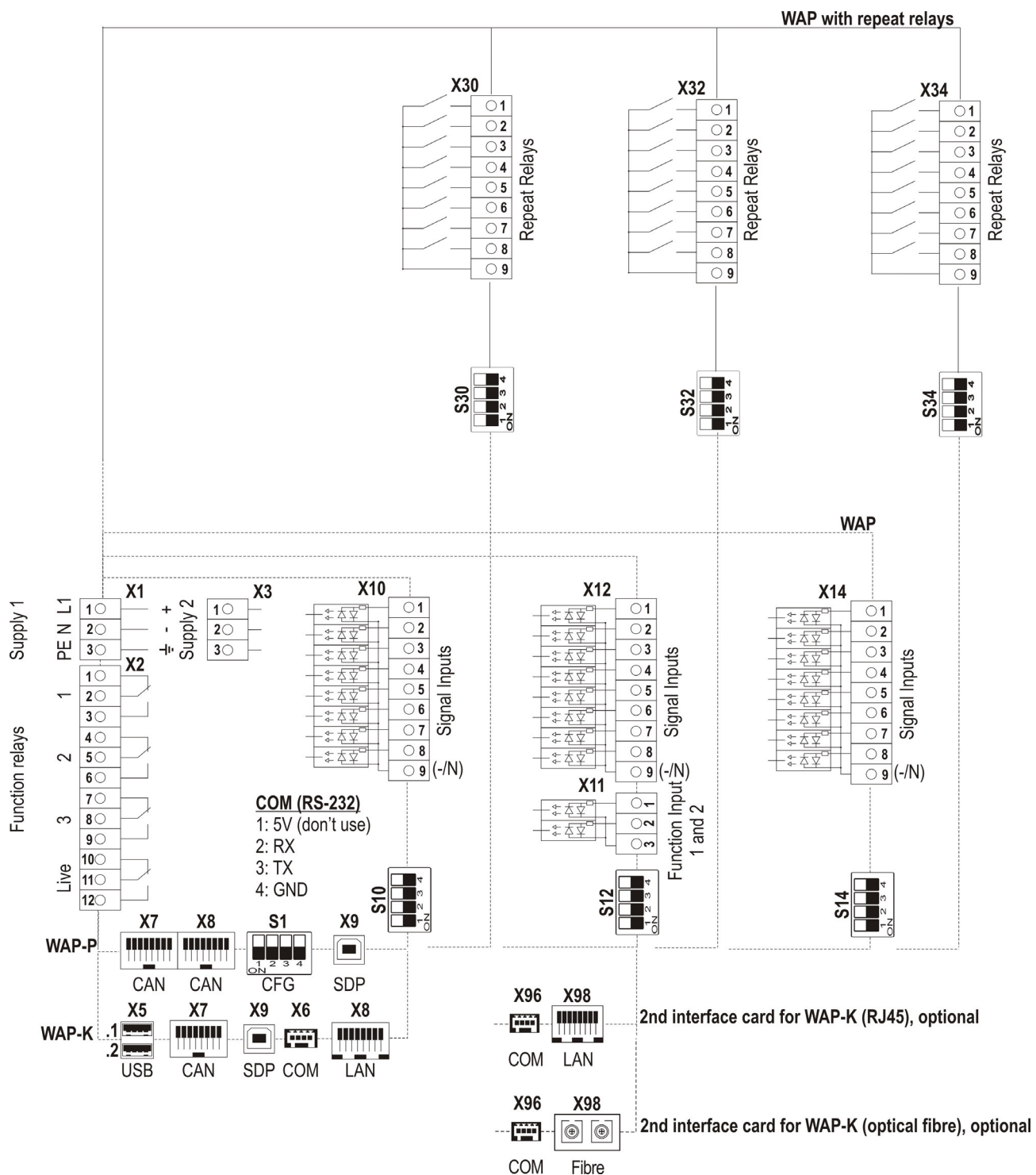
Electromagnetic Compatibility

Noise immunity acc. to	DIN EN 61000-4-2:2009
	DIN EN 61000-4-3:2011
	DIN EN 61000-4-4:2013
	DIN EN 61000-4-5:2007
	DIN EN 61000-4-6:2009
	DIN EN 61000-4-8:2010
	DIN EN 61000-4-11:2005
	DIN EN 61000-4-12:2007
Noise irradiation acc. to	DIN EN 61000-3-2:2011
	DIN EN 61000-3-3:2012
	DIN EN 55011:2011
	DIN EN 55022:2011



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

→ Terminal assignment



Subject to technical changes without prior notice.

→ Ordering Code

59	W	x	x	x	x	x	x	x	x	x	
											Number of Signal Inputs
		C									24 Signal Inputs
											Supply Voltage
			1								24 V AC/DC
			2								48 - 60 V AC/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
											Security options
					0						Standard- configuration for WAP-P and WAP-C
					E						Basic version WAP-K, no IT security functionality
					S						Security configuration, security functionality included
					P						Port Security, enhanced security configuration incl. option S
											Interfaces
					P						Parameterisation interface (USB-B)
					W						Communication interface IEC 60870-5-101/-104
					F						Communication interface IEC 60870-5-101/-104 + IEC 61850
											Protocol Interface Card 2 (only WAP-K)
						0					Not equipped
						W					IEC 60870-5-101/-104
						F					Communication interface IEC 60870-5-101/-104 + IEC 61850
						L					IEC 60870-5-101/-104, fibre optic interface Type SC
						G					IEC 60870-5-101/-104 + IEC 61850, fibre optic interface Type SC
											LED Colour
								R			RGB-LED, colour parameterisable
											Integrated Repeat Relays
									0		No repeat relays
									1		8 repeat relays
									2		16 repeat relays
									R		24 repeat relays
											Redundant Power Supply
										0	No redundant power supply
										1	24 - 60 V AC/DC
										5	110 - 220 V AC/DC

59 W

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Example for ordering

59WC550W0RR1

WAP-K with 24 signal inputs and communication interface card

Supply voltage 220 V / Signal voltage 220 V

No 2nd interface card equipped

RGB-LEDs

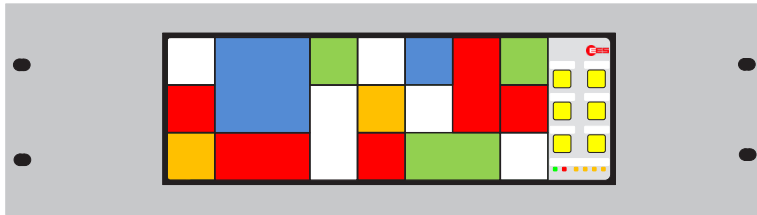
Integrated repeat relays

Redundant power supply 24 – 60 V

Art. Nr. 59ZLCP61850 - License for communication through IEC 61850

→ Accessories

Frontplates for 19"-rack-mounting



In order to use the WAP annunciators in 19" rack mounted systems, EES provides a frontplate with a defined cut-out for the WAP. The plate material is aluminum with anodized treatment.

Ordering code: 58ZFP1948-2

Transparent film for window labelling

Transparent foils for slide-in labelling of the alarm windows. Laser-printable.

Ordering code: 58ZFPWAP-01

Parameterisation cable

Cable for connection of parameterisable annunciators WAP-P to PC. Connection type USB-A to USB-B.

Ordering code: 59ZUSB20A-B

Parameterisation software

When ordering annunciators of the type WAP-P, the parameterisation software is part of the scope of delivery. Upon request we will be happy to provide our software-DVD separately. Alternatively, the parameterisation software can be downloaded from our website (www.ees-online.de).

Ordering code: 97ZPSOFTPARA

Patch-cables for cascading

For connecting multiple annunciators to a cascaded alarm system, connection cables in different lengths can be supplied. In case of deviant lengths required, kindly contact our service-team.

Ordering code:	K118-0.5 (0.5 m)
	K118-1 (1 m)
	K118-3 (3 m)
	K118-5 (5 m)



Do you need flexible annunciators with LED-indication?

Series BSM



- Annunciators with 8...48 signal inputs
- Cascading functionality - up to 192 alarms can be processed in one system
- parameterisation by DIP-switch and/or parameterisation software
- optionally integrated repeat relays
- optionally integrated redundant power supply

Series USM



- Based on BSM with the same options
- Annunciators with communication interfaces acc. to IEC 60870-5-104 and/or IEC 61850
- Fully parameterisable by integrated Web-Server
- Multiple interfaces for parallel and redundant communication
- Integrated logic functionality

→ Contact

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