Window facia fault annunciators

WAP – Window Annunciator Panel

- Annunciators for panel mounting with 4, 6, 8 or 24 signal inputs
- Combination of multiple devices to an annunciating system possible
- Very bright RGB LEDs with parameterizable color (red, green, yellow, blue, orange and white)
- Pockets for individual labelling of windows and buttons
- Integrated buttons, function inputs, function relays, self-monitoring and internal horn
- State storage in the event of power failure
- WAP-K 24 optional with internal generating of the signaling voltage
- WAP-K with
  - Integrated user management and event recorder
  - Communication interfaces according to Modbus RTU/TCP, IEC 60870-5-101/104, IEC 61850, SNMP or Syslog
  - IT-Security according to BDEW guidelines
  - Parameterization of all functions via the integrated web server, parameter import possible via Excel template
- Optional:
  - Integrated 1:1 relays for multiplication and forwarding of individual alarms
  - Redundant power supply in two voltage ranges available as option
  - Analog inputs with threshold monitoring and transmission of the values via interface

Datasheet

09.04.2024

General system description - annunciator variants

This documentation describes the two categories of the WAP

- WAP-P: Software-parameterisable version (starting from version 3.4)
- WAP-K: Annunciator with communication interface (version 4.4 and up, delivery starting from January 2024)

This description corresponds to the specified version. Earlier versions may contain different or fewer functions.

There are variants of this fault annunciator for 4,6,8, or 24 alarms

Type	Signal Inputs and window size	Housing size incl. terminals (H x W x D) [mm]
WAP 4 	4 Signal Inputs window size (H x W) [mm] 35,5 x 31	96 x 96 x 132
WAP 6 	6 Signal Inputs window size (H x W) [mm] 23,0 x 31	
WAP 8 	8 Signal Inputs window size (H x W) [mm] 16,75 x 31	
WAP 24 	24 Signal Inputs window size (H x W) [mm] 35,5 x 31	96 x 267 x135

The sealed front contains buttons and pockets for labelling alarms and buttons. The alarm windows are backlit by RGB light emitting diodes with parameterizable color. With the WAP 24 the size of the individual window can be individually parameterized via PC software or the integrated web server.

The function of the buttons and function inputs can be parameterized individually. The integrated function relays are designed as changeover contacts. They signalize alarm-specific functions (e.g. collective alarm and activation of an external horn) as well as the signaling of a malfunction by a live contact.

The annunciator has a **status memory in the event of a power failure**. If the supply voltage fails, all visual and acoustic signals are switched off and the relays de-energise. During the power failure, no new messages are registered and acknowledgements are not possible. After the power supply returns all previous states are immediately restored and the annunciator is ready for operating actions and new alarms.

Many energy plants work unmanned at times and only in case of maintenance or faults someone comes to the side. For this purpose, two special functions have been integrated into the fault annunciator, which are indicated as an additional operating mode by flashing of the Alive-LED.

- **Mute function**
  The horn is not triggered or is automatically acknowledged after a parameterizable time if a button parameterized for this purpose or a parameterized function input is pressed or activated.

- **Unmanned**
  The fault indicators can be switched between the operating modes "manned station" and "unmanned station".
  In the "unmanned station" status, the LEDs for displaying the alarms are switched off and the alarm acknowledgement on the fault indicator is deactivated.

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

1. Integration of additional relay cards (8 NO contacts each) for use as 1:1 outputs. In the parameterizable fault indicators, these relays can be freely assigned. 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 MSM-EM-DB-UK data sheet.

Further details on the integrated fault alarm sequences of the devices can be found in the separate documentation alarm sequences for EES fault annunciators" (document name SM-MA-ZI-UK).

Software parameterisable version WAP-P

In the software-parameterisable version, the fault annunciator has the following interfaces:

- 1 x USB-B (factory interface) - for parameter adjustment via PC software or
- 2 x CAN bus / RJ45 (system bus for the connection of expansion modules or the creation of alarm cascades - see also section Cascading)
- 1 x RS 232/485 Modbus RTU (optional)

Basic settings can be made via DIP switches.

- Alarm sequence (first-up, new value or operating indication)
- Open-circuit (NO) or closed-circuit (NC) current version of the inputs per signalling group (8 inputs)
- Master/slave functionality and address in cascaded fault alarm system
- Horn control for follow-up subsequent alarm

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

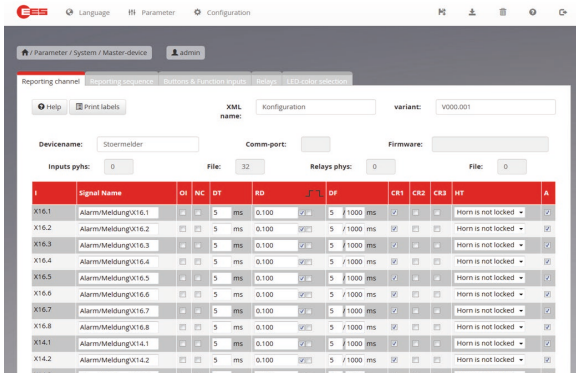
- Function input 1 - external horn acknowledgement
- Function input 2 - external acknowledgement
- Function input 3 (only WAP24) - external lamp test
- Function input 4 (only WAP24) - mute function
- Button 1 - horn acknowledgement
- Button 2 - acknowledgement
- Button 3 - lamp test
- Button 4 - function test
- Button 5 - no function assigned (Button only available on 24 WAP)
- Button 6 - no function assigned (Button only available on 24 WAP)
- Relay 1 - collective report 1
- Relay 2 - no function assigned
- Relay 3 - external horn
- Relay 4 - watchdog-contact

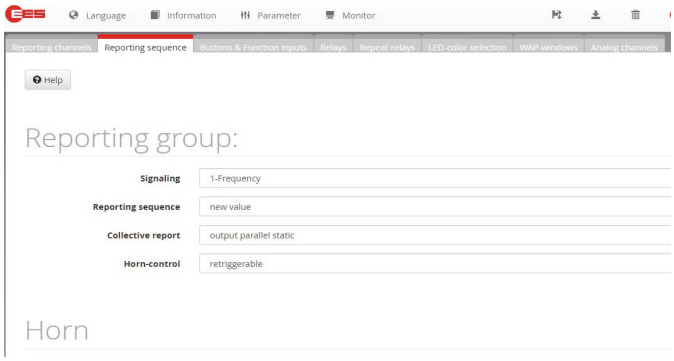
Additional default settings

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

Parameterisation

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





1. Channel specific parameters (separate settings possible for each alarm channel)

- Signal name (labelling)
- Operation indication or fault annunciation
- Debouncing delay (debouncing time)
- Normally closed or normally open contact
- Alarm delay
- Defluttering
- Assignment to collective reports 1, 2 or 3
- Horn triggering (none, with interlock or without interlock, see section horn control)

2. Alarm sequence (can be compiled from the following components)

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

3. Unmanned

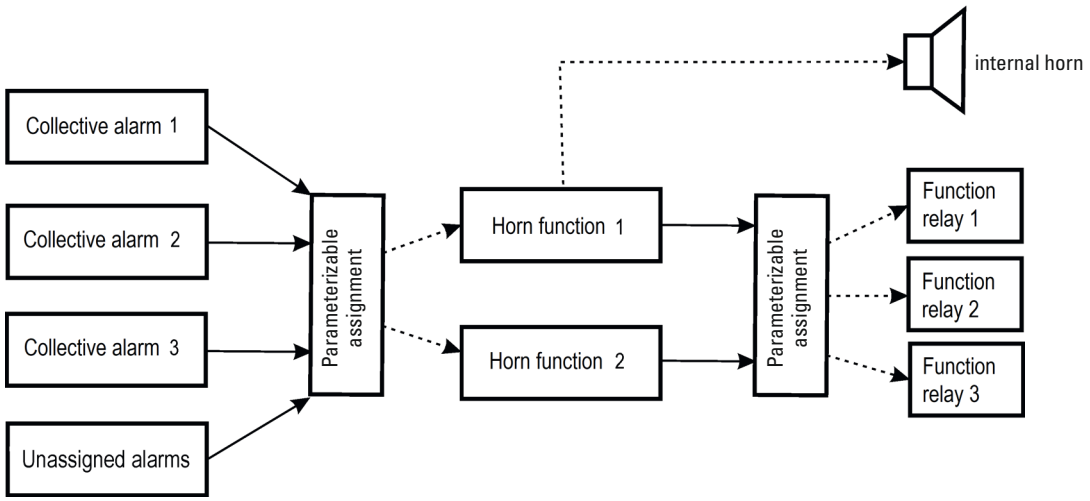
Function	Effects
Mute function (Mute)	The horn is not triggered or automatically acknowledged after a parameterizable time if a button or a parameterized functional input is pressed or to set the function active.
Unmanned operation (Unmanned)	The fault annunciators can be switched between manned and unmanned station operating modes. In unmanned station mode, LEDs for displaying the alarms are switched off and the alarm acknowledgement on the fault annunciator is deactivated at all.

4. Collective alarm

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 and 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 and 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 or when acknowledged.
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.

5. Horn assignment

The fault indicators have 2 horn functions. In the parameterization, you can specify which collective alarms or non-grouped alarms control the respective horn functions. In a second step, you can again specify which relay is controlled by a horn function. You can also parameterize whether horn function 1 activates the internal horn or not.



The following parameters are adjustable for the horn function.

Function	Option	Description
Horn triggering (valid for both horn functions)	Retriggerable	The horn is activated again with the next alarm, even if even if alarms are already pending.
	Not retriggerable	The horn is only activated again for subsequent alarms, if no alarms are pending.
Internal horn	Active	Internal horn activated for horn function 1.
	Inactive	Internal horn is deactivated.
Horn priority acknowledgement (for both horn functions separately adjustable)	Inactive	Alarm can always be acknowledged.
	Active	Alarm can only be acknowledged once the horn has been acknowledged.
Horn acknowledgement (can be set separately for each horn function)	Manual	Horn is acknowledged manually by button or function input.
	Automatic	Horn is acknowledged automatically according to the set time.
Horn mute (can be set separately for each alarm)	Horn not triggered when muted	Horn is not triggered as long as horn mute is activated.
	Automatic acknowledgement	Horn is acknowledged automatically after the set time as long as horn mute is activated.
Horn activation (can be set separately for each alarm)	No horn triggering	Alarm is not triggering horn.
	Horn without lock	The horn is activated for every alarm and can always be acknowledged.
	Horn with lock	The horn is activated for every alarm and can only be acknowledged after the alarm acknowledgement.

In the event of conflicts between the settings for horn activation and horn priority acknowledgement, the setting for horn priority acknowledgement valid for all alarms always prevails.

Additionally, the mute function can also be used. After activation of this function by a button parameterized for this purpose or a parameterized function input, the horn is not triggered or is automatically acknowledged after a parameterizable time. Furthermore, the horn control is deactivated in the "Unmanned operation" state.

6. Buttons and function inputs

The following functions can be assigned to the **buttons and function inputs**.
Multiple assignments are possible:

- Acknowledgement lamp group 1, 2, 3 or unassigned alarms
- Reset group 1, 2, 3 or unassigned alarms
- Horn acknowledgement
- Lamp test
- Function test
- Mute
- Unmanned operation

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

7. Function relays

Three of the total of **4 function relays** can be assigned to functions. The 4th relay is fixed as live relay configured. Multiple assignments are possible:

- Collective report 1, 2 or 3
- Triggering of an external horn
- Control of relays by one of the function inputs (1 ... 4)
- 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

8. Modbus-RTU interface

The WAP-P can optionally be equipped with a Modbus RTU interface (parameterizable RS232 or RS485) with pluggable terminals. As a Modbus slave, the fault annunciator can use this interface to transmit states to higher-level systems as well as to display and process alarms from other devices. The communication partners must be designed as Modbus masters.

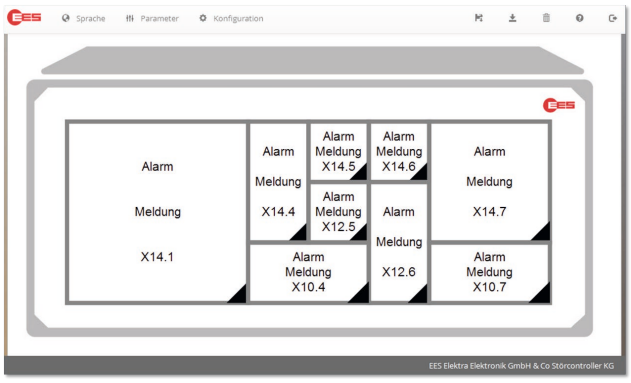
9. Windows

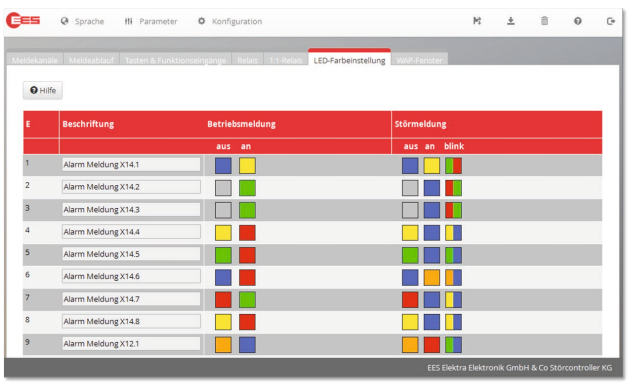
Window size (24 inputs WAP only)

The number and size of the windows of the WAP 24 can be individually parameterised. On delivery, the size of each of the 24 windows is 28 x 28 mm. A window can be enlarged by covering adjacent windows. The relevant alarm input to the newly created window is the window that was enlarged. The alarms of the windows that were covered by the newly created window are not processed.

Window colour

The color of the displayed alarms can be defined individually for each window. The color can be defined for each of the three alarm states "Off", "On" and "Flashing". In addition to the "off" state (no LED controlled), the following colours are available: red, green, yellow, blue, orange and white.





Cascading

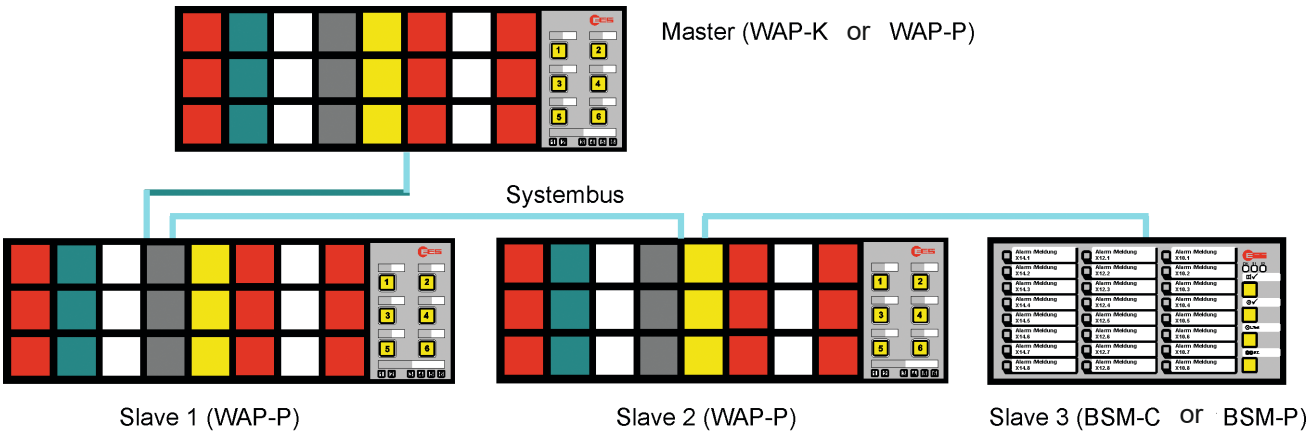
With cascading, up to four WAPs can be combined to form a fault alarm system. In this case the devices are connected via the system bus provided on the CAN bus sockets. One WAP-K works as the "master" and the connected WAP-P as a "slave". This allows systems with a maximum of 96 alarm inputs (4*24) can be realized.

A BSM-C or BSM-P can also be used instead of a WAP-P (see also data sheet MSM-BSMUSM-DB-UK).

Systems formed in this way behave like a (virtual) fault annunciator with joint alarm processing (alarm sequence, collective alarm formation, horn control). Acknowledgement and output of the collective alarms and horn control can be distributed as required to the buttons and relays of the individual fault indicators within the system. Cascading multiplies the number of function inputs according to the number of devices.

Type WAP-K fault annunciators can only be operated as masters within a cascaded fault annunciator system.

Example of a cascaded fault annunciating system:



The parameterization of cascaded fault annunciators is only carried out in full in the "master fault annunciator" and is then automatically distributed to the "slave fault annunciators". Cascading multiplies the number of function inputs according to the number of devices. A maximum of 16 function inputs are available.

Fault annunciator with communication interfaces WAP-K

The basic functionality of the WAP-K corresponds to that of the WAP-P. The WAP-K is equipped with various interfaces for communication with higher or lower-level external systems (e.g. process control system or control system).

Standard interfaces

- 1st network interface LAN - Ethernet / RJ45 (parameterization, diagnostics and protocol interface)
- COM - parameterizable RS232 oder RS485 / pluggable terminals (serial protocol interface)
- USB-C - factory interface (service interface)
- USB-C - currently not used
- CAN-Bus / RJ45 (System bus for the connection of expansion modules or the creation of alarm cascades - see also section "Cascading")

The WAP-K with 24 alarms can also have an optional second network interface.

- LAN - Ethernet / RJ45 (protocol interface)
  alternatively optical interface Multimode 50-62,5/125 µm @1300 nm;
  plug LC-duplex according to norm IEC 60874-13) (protocol interface)

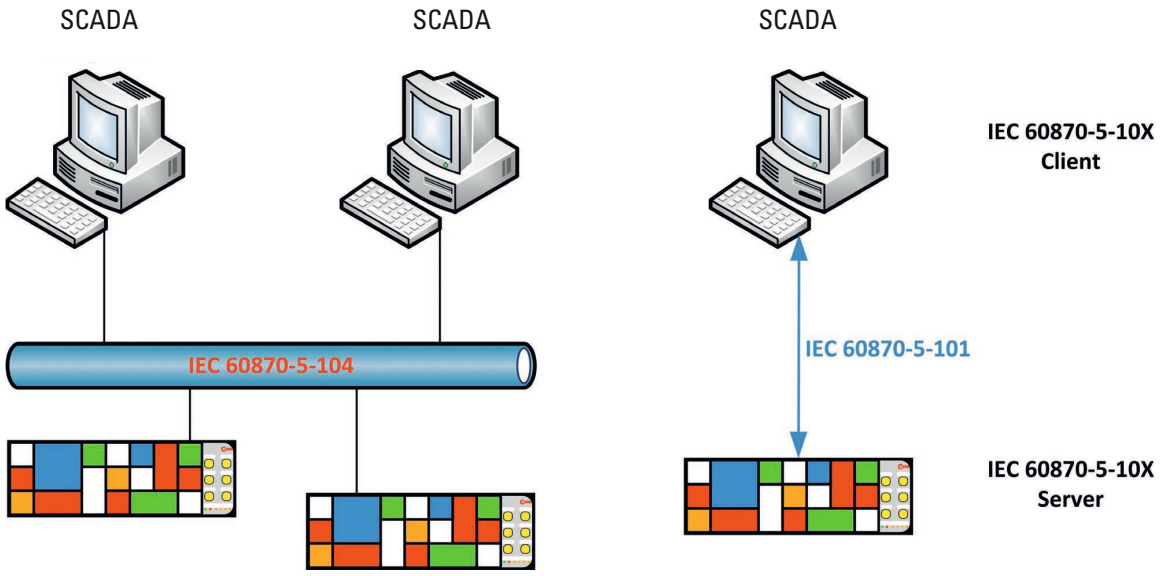
1. Protocol interfaces

Using the protocol interfaces, the fault annunciators can be connected via the following protocols:

- Modbus RTU/TCP (fault annunciator is Modbus slave)
- IEC 60870-5-101 (fault annunciator is IEC server)
- IEC 60870-5-104 (fault annunciator is IEC server or Client)
- Optionally IEC 61850 (fault annunciator is IEC-Server or Client)
- SNMP V1, V2, V3 (transmission of status information and device errors)
- Syslog (transmission to up to 2 Syslog servers)

A fault annunciator with the IEC 60870-5-101/104 interface, which is operated as a server, can establish a connection to a maximum of 4 clients (multilink). It is possible to combine several of the above protocols in one fault annunciator. For detailed information on the interfaces, please refer to the separate interface descriptions.

1. WAP-K as acquisition device

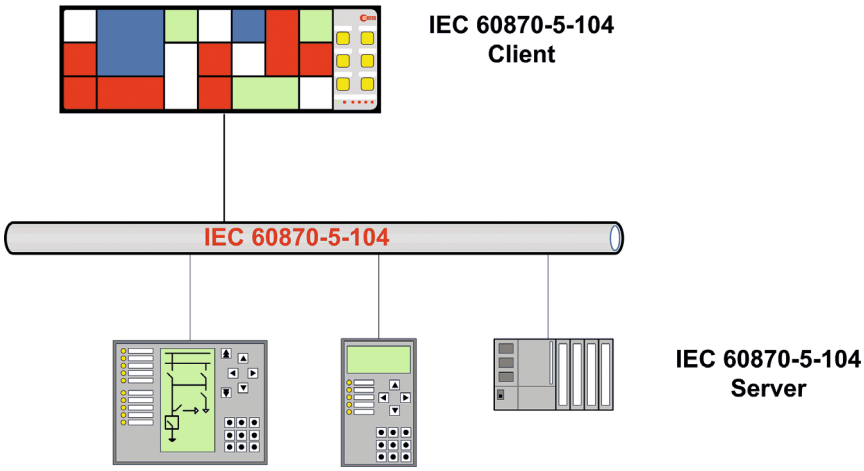


The graphic above shows an application example in which the WAP-K serves as acquisition device that process and signals fault alarms on site. In addition, the alarms are transferred via an IEC 60870-5-101/104 interface to the control level.

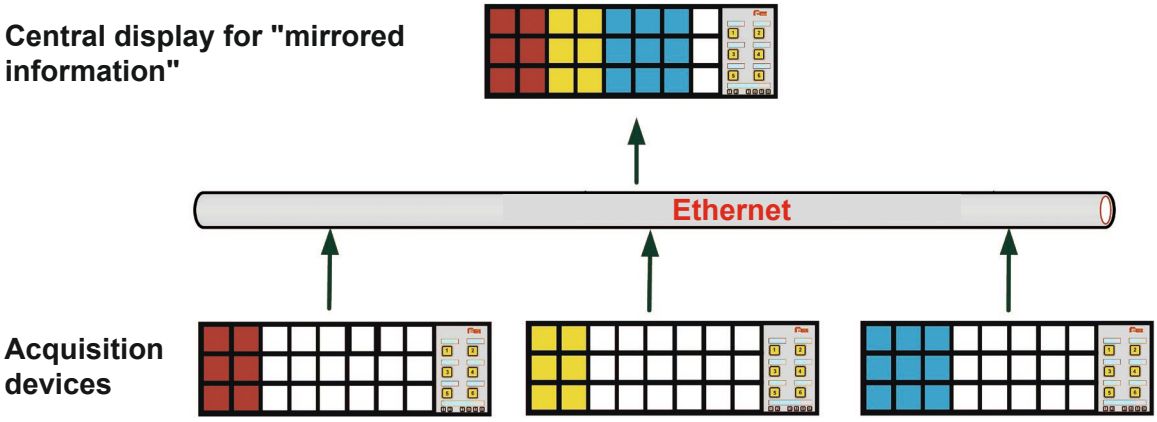
The signaling channels can alternatively be controlled via the galvanic input or the IEC interface. Which of these two options is used for each individual channel can be parameterized. Acknowledgement via the IEC interface is also possible.

3. WAP-K as a display module

In this application example, the WAP-K is used to signal faults that are "collected" from various devices via the IEC interface.
Additional wiring of the individual faults is therefore not necessary.



4. Mirroring of single alarms



In large plant areas and complex processes, important individual alarms from the field are often required at central points or in control rooms. In classic systems, 1:1 relays are used here, which means a high wiring effort. With WAP fault alarm systems, this effort can be greatly reduced. 32 WAP field stations can send individual alarms to a central WAP or another WAP field station via a network connection (copper or fiber optic) and thus mirror them. The mirrored alarms do not have to be wired individually or acknowledged "at the mirror", but are always in the status of the alarm of the triggering WAP.

5. Integration in IEC 61850 bus

The IEC 61850 protocol is used to transmit information from field and protection devices in automated switchgears. In addition, various individual alarms are generated which - depending on the type of alarm - must also be transmitted to the process control system or other devices at field or station level.

The WAP-K performs this "ragpicker" function with the help of the optionally integrated IEC 61850 server. Individual alarms and, with the help of the optional analog inputs, measured values can also be transmitted. Individual reports and datasets can be configured easily, providing all relevant information about the alarm and device status.

Data is exchanged accordingly:

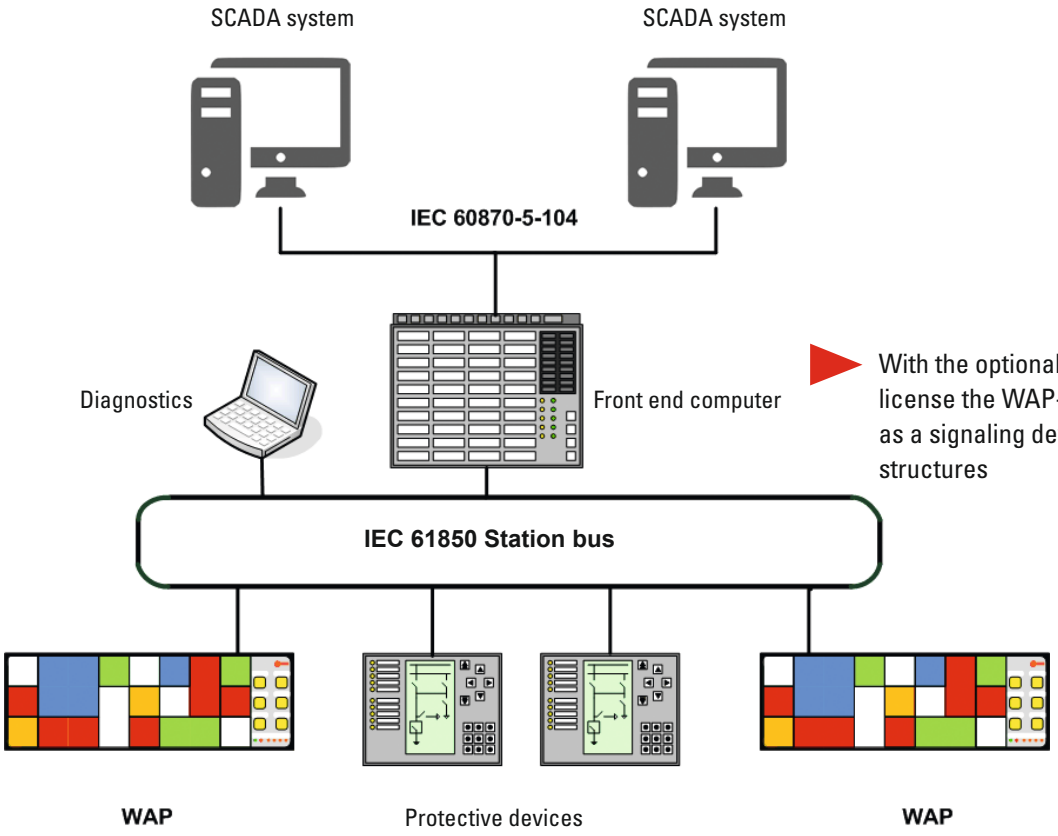
- MMS via GGIO (WAP-K is Server)
- GOOSE (WAP-K is Server or Client)

GOOSE Implementation

In accordance with the IEC61850 standard, the WAP-K can send GOOSE alarms both as a publisher - i.e. as a server - and as a subscriber - i.e. as a client. CID files from third-party devices are read in and WAP-K CID files are generated on the WAP-K web interface.
Received GOOSE alarms can either be routed directly to fault alarm channels or pre-processed using Boolean logic.
Up to 1024 alarms from up to 32 IEDs can be processed.

Watchdog

In addition, the WAP-K can be configured as a 61850 watchdog for third-party devices. In this case, a configurable time is monitored during which the third-party device must periodically report to the WAP-K via a 61850 object. If the time is exceeded, a freely assignable digital input is activated.



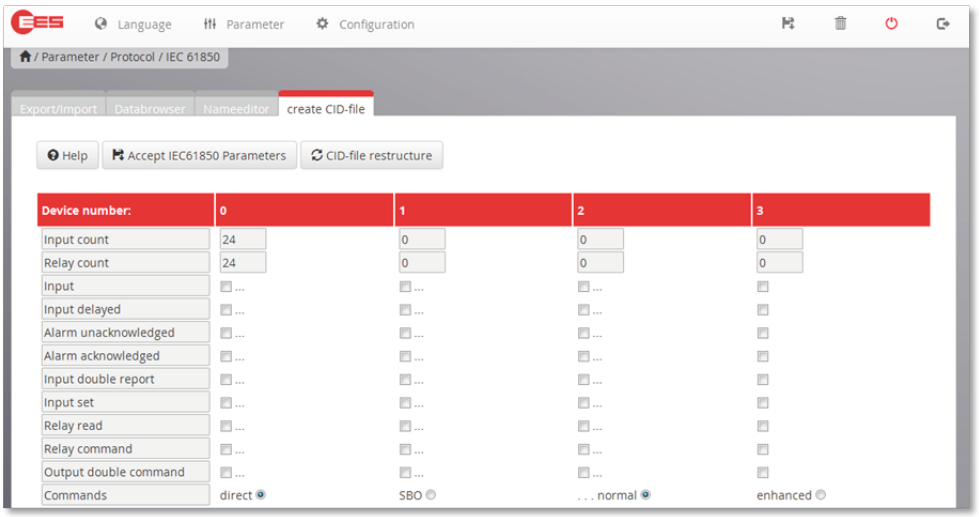
With the optional IEC 61850 software license the WAP-K can be integrated as a signaling device in IEC 61850 structures

The signaling channels can alternatively be controlled via the galvanic input or the 61850 interface. Which of these two options is used for each individual channel can be parameterized. Acknowledgement via the 61850 interface is also possible.

6. CID configurator

As standard, every WAP-K fault annunciator provides a wide range of information about the status of the inputs and outputs as well as the device status on the communication interface.

Not every application requires all this information to be made available on the IEC 61850 bus, for example.
The CID configurator makes it possible to select the relevant information in advance.
In this way, the CID file of the fault annunciator only contains the information required in each case. When creating the file, you can choose between editions 1.0, 2.0 and 2.1 of the IEC standard.



7. Integrated web server

The WAP-K has an integrated web server. Parameterization can therefore be carried out via the network using all common web browsers. All alarm and interface parameters are available via the web server and can be parameterized this way. Additional parameterization software or special parameterization cables are not required.
Parameters from previous generation devices can also be imported and processed, like manually completed Excel templates or Excel files converted into this format from other lists. This saves time and reduces the causes of errors during fault annunciator parameterization.

Service access, an online monitor for the fault annunciator and the option to import updates are also part of the web server's range of functions.

8. Integrated logic functionality

The WAP-K offers integrated logic functionality. The universal parameter editor can be used to create formulas in accordance with the IEC61131-3 ST syntax. Hereby, inputs and virtual channels are defined in boolean expressions with the operators AND, OR, NOT and parentheses.

In the following example, Goose signals that were assigned to a virtual channel in a previous configuration step are linked to a signal. The result of this link is routed to a fault signal input of the WAP-K and thus processed like a normal physical input in the fault annunciating logic.

Example:
%QX0.0.1:= (%IX14.1 AND %IX14.2) OR (%IX14.3 AND %IX14.4)

Activation of the fault message input of the master WAP-K channel 1 according to the result of the operation (virtual channel 1 AND virtual channel 2) OR (virtual channel 3 AND virtual channel 4).

Further details on the logic functionality can be found in the operating instructions for the WAP

9. IT-security according to BDEW guidelines

A white paper with basic security measures for control and telecommunications systems has been developed for companies in the energy industry. The aim is to adequately protect the systems against security threats in daily operation. To comply with the BDEW Whitepaper 2.0 05/2018 standard, the following functions were functions have been added or extended.

- User management with password guidelines
  (by default, only one administrator with a unique device-specific start password is created)
- Firewall settings
- Management of certificates
- File transfer via SFTP (Secure File Transfer Protocol)
- Communication by using HTTPS (Hypertext Transfer Protocol Secure)
- If two Ethernet interfaces are available, services can be assigned to both interfaces via the port selection (e.g. productive network and service network)
- Update- and rollback function

In addition, the port security extension can be integrated as an option, which allows authentication of the fault annunciator according to the IEEE 802.1X protocol (availability on request).

10. User management

The WAP-K has a user administration function that allows users to be created in 3 groups with different access rights.

- Administrator (User group rights, user administration, updates, security settings (firewall) as well as import and export of users)
- User (Authorization to view the non-security-relevant settings)
- Engineer (Rights of the User group, setting up the fault message parameters, importing and exporting device configurations)

The password rules can be activated with complexity guidelines and validity period.

11. Event recorder

An event recorder is kept in the WAP-K, in which the following event groups can be archived with consecutive event numbers and time stamps:

- Alarm events including acknowledgement
- System error messages incl. switching the power supply on and off
- Events of the Protocol interface
- Security relevant events

The user can determine which event categories are included in the archive. These events can be displayed on the web server, exported as a CSV file or sent as syslog messages.

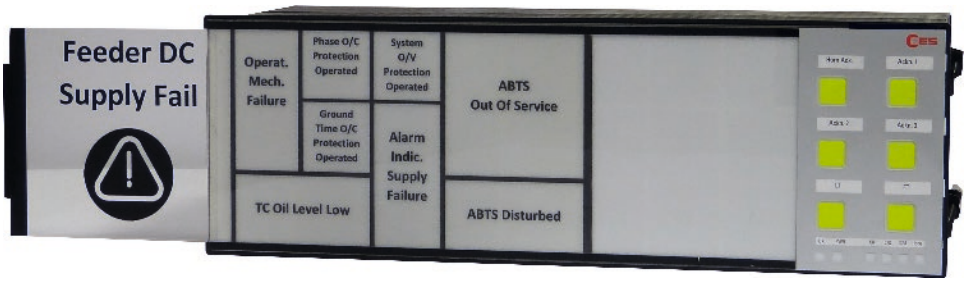
The event recorder is managed as a ring buffer and can hold 100,000 alarms. If the event recorder overflows, an error message is put out as standard (can be parameterized).

By default, only the system-relevant part of the event recorder is active. The logging of alarm events must be activated manually. A warning at a parameterizable fill level can also be generated.

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. The fonts and font sizes can be adapted individually.



Available Options

The fault indicators can be equipped with the following available options:

1. 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 unit can be selected independently of the voltage level of the primary power supply unit. If the WAP is equipped with a redundant power supply unit, switching between the power supplies takes place automatically without interruption.

Both power supplies can be operated with AC or DC voltage. A specification is not necessary.

Both the primary and the redundant power supply unit are included in the fault indicator's self-monitoring function and faults are output via the alive relay. In addition, the presence of the supply voltage on both power supply units is signaled via the PWR/S LED on the front of the device. With the WAP-K, the failure of a power supply unit is also is also reported via the communication interface.

2. Additional feature cards

Optionally, analog input cards and relay cards can be integrated into the fault annunciator. The mixed use of analog input cards and relay cards is also possible. The possible combinations can be found in the matrix with the ordering designations further back in the data sheet.

2.1 Analog Input Cards (only available for WAP-K)

A WAP-K can be equipped with up to 3 analog input cards, depending on the size of the device. Each input card has 4 analog inputs with a common reference ground. The inputs can be configured as voltage or current inputs depending on the application. The following options are available:

- 0 … 10 V
- -10 … 10 V
- 0 … 20 mA
- 4 … 20 mA (with wire break monitoring in the fault annunciator)

The measured values can be forwarded to a higher-level system via the Modbus RTU, IEC 60870-5-101/104 or the IEC 61850 interface. Furthermore, the measured values can be monitored and a fault alarm can be generated in case of a fault.

The alarm can be parameterized so that it is triggered at one of the following events:

- if the value exceeds the limit value
- if the value falls below the limit value
- if the measured value is within a range
- if the measured value is outside a range

2.2 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 - free parameterization, whether a relay is controlled by any input or via the interface

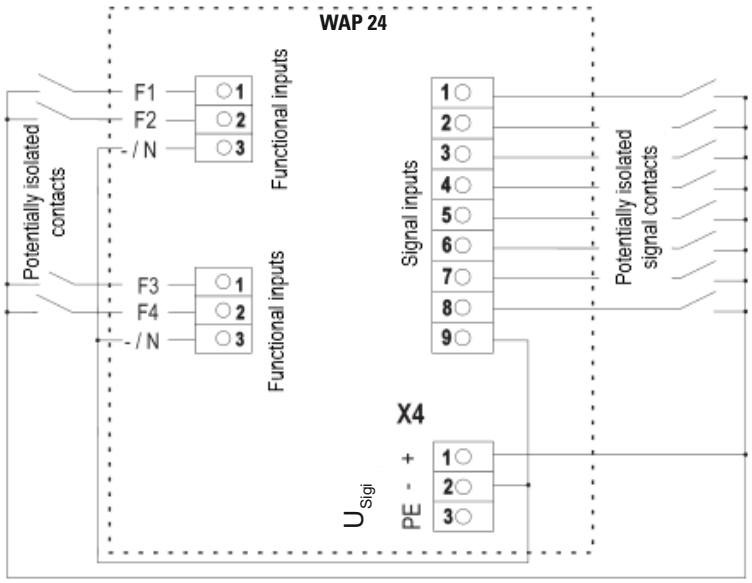
The eight relay contacts on a relay card have one common root. The triggering and function of the repeat relays can be configured individually by means of the parameterisation software or web-server, respectively. An individual definition, which signal input triggers the respective relay, is possible. 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.

Other parameters are also available, e.g. inversion of the signals and the wipe duration for pulse output.

2.3 Internally generated voltage for signal and function inputs (WAP with 24 inputs only)

The 24 WAP can optionally generate a 24 V DC signaling voltage itself from the operating voltage, which can then be used to supply the potential-free signaling contacts or to control the function inputs. If this option is used, the signaling and function inputs are automatically set to 24 V.

This option is particularly interesting if redundant power supply units are used, as the 24 V signaling voltage is then generated without interruption from the active operating voltage U_{S1} or U_{S2}.



Application example for the use of the internally generated signalling voltage U_{Sigi}

Technical Data

Supply voltage U_S

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	88…370 V DC or 85…264 V AC

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
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
W	50 - 250	25	45	250	1,6

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

Internally generated signalling voltage U_{Sigi} (only WAP 24)

Output voltage	24V DC +/- 10%
Output power	125 mA max. permanent
Output current limit	200 mA +/- 20%
Integrated protection function	short circuit proof, overload
Dielectric strength against internal supply	1500 V DC resp. 500 V AC for 1 min.

Analog Inputs	
Resolution	12 Bit
Measuring tolerance from measuring range end value	T_{amb} = -20…60 °C: <= +/-0,5 %
Voltage Inputs	
Measuring range (U_{DIFF})	-10…+10 V (SELV, PELV)
Overvoltage strength	+/- 26 V
Input resistance (U_{DIFF})	>= 200 kΩ
Measuring value resolution	<= 5 mV
Common mode voltage (U_{COM})	-10…+10V
Electrical Inputs	
Measuring range (I_{DIFF})	0…20mA (SELV, PELV)
Overvoltage strength	+/- 10 V
Input load	<= 100 Ω
Measuring value resolution	<= 5 µA
Common mode voltage (U_{COM})	-0,2…+0,2 V
Relay contact	
Load capacity	24 ... 250 V AC 2 A; 110 V DC 0,5 A; 220 V DC 0,3 A

Power consumption

Number of channels	Power consumption [W]	
	WAP-P with the maximum amount of additional cards	WAP-K with the maximum amount of additional cards
4	< 6	< 10
6	< 7,5	< 11,5
8	< 6	< 10
24	< 13	< 17

General Data

Backup time for	
Failure / short circuit	100 ms
Response delay default	100 ms
Response delay WAP-P, WAP-K	configurable (5 ms … 9 h)
Flashing frequency	
flashing	2 Hz
slow flashing	0,5 Hz
System bus	
Connection	RJ45 based on CAN Bus
Bus cable	Ethernet patch cable Cat5e IEC11801
Terminal resistance	120 Ω
Length	10 m maximum (from device to device)
Overall length	30 m maximum
Ethernet connection (WAP-K only)	100 Base-T / RJ45
Optical fibre connection (optional)	Multimode 50-62,5/125 µm @1300 nm; Connector LC-duplex according to standard IEC 60874-13

Mechanical Data

Number of Signal Inputs	Front frame H x W x D [mm]	Front panel [mm]	Depth with front frame and terminals [mm]	Weight [kg]
4	96 x 96 x 8	92 x 92	132	approx. 0,90
6	96 x 96 x 8	92 x 92	132	approx.0,90
8	96 x 96 x 8	92 x 92	132	approx. 0,90
24	96 x 287 x 8	92 x 282	135	approx. 1,50

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]

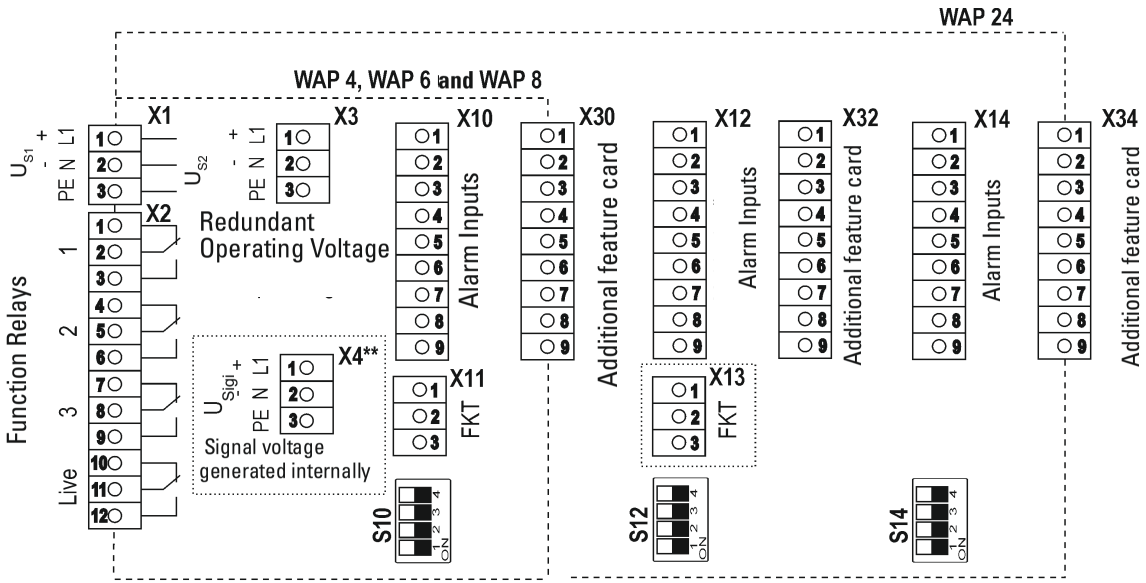
Dielectric strength

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

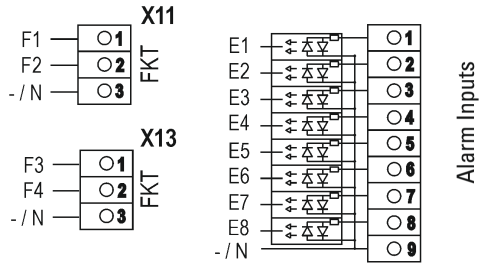
Electromagnetic Compatibility

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 61000-4-8 DIN EN 61000-4-11 DIN EN 61000-4-12
Noise irradiation acc. to	DIN EN 61000-3-2 DIN EN 61000-3-3 DIN EN 55011 DIN EN 55022

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

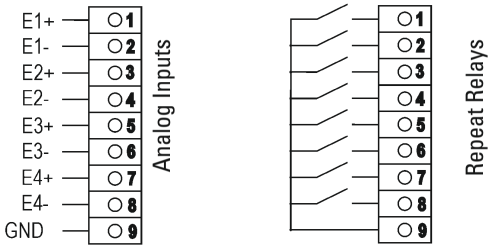


Terminal assignment

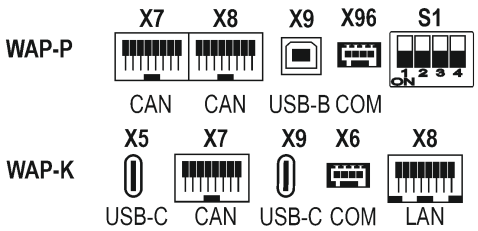


Voltage of the function inputs = Signal voltage

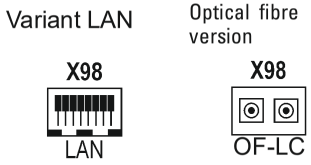
Additional feature cards



1. Interface / Switches



2. Interface (Optional)



WAP-P on the CAN bus sockets X7 and X8, a system bus is available for expansion modules or for setting up cascaded fault indication systems.

WAP-K at the CAN-bus socket X7, a system bus is available for expansion modules or for setting up cascaded fault indication systems.
The DIP switches S10, S12 and S14 are not available on the WAP-K.

***Terminal X13 - Function inputs F3 and F4**
is located only on WAP 24

****Terminal X4 - Supply voltage for the alarm inputs**
optionally and only possible for WAP 24

Assignment of the function relays (factory setting)
Relay 1: all collective
Relay 2: not used
Relay 3: external horn
Relay 4: Live contact

Assignment COM as RS232
1- +5V max 10mA
2- RxD
3- TxD
4- GND

Assignment COM as RS485
1- +5V max 10 mA (only optional RS485 termination)
2- A (no inverted signal)
3- B (inverted signal)
4- GND

Ordering Code

59	W	x	x	x	x	x	x	x	x	x	
											Number of Signal Inputs
		4									4 Signal Inputs
		6									8 Signal Inputs
		8									16 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
				S							24 V DC generated internally (only for WAP with 24 inputs)
				3							48 - 60 V AC/DC
				4							110 V AC/DC
				H							125 V AC/DC
				5							220 V AC/DC
				W							50V - 250 V AC/DC wide range
											IT Security options
					0						none (only WAP-P)
					S						Security configuration, security functionality included according to BDEW guidelines
					P						Port Security, enhanced security configuration incl. option S *2
											Interfaces
						P					WAP-P only with USB parameterization interface
						M					WAP-P additionally Modbus RTU (switchable RS232 / RS485)
						W					WAP-K with standard interfaces without IEC61850
						F					WAP-K additionally IEC61850 *1
											2. Network interface
							0				Not equipped
							W				LAN (RJ45) (only WAP-K)
							L				Optical fibre -LC-socket (only WAP-K)
								R			RGB-LED, Colour parameterisable
											Optional feature cards
									0		no repeat relays and no analog cards
									R		8 repeat relays (for annunciator with 4, 6 and 8 signal inputs)
									R		24 repeat relays (for annunciator with 24 signal inputs)
									1		8 repeat relays (for annunciator with 24 signal inputs)
									2		16 repeat relays (for annunciator with 24 signal inputs)
									A		4 analog inputs (for annunciator with 4,6 or 8 signal inputs)
									A		12 analog inputs (for annunciator with 24 signal inputs)
									3		4 analog inputs (for annunciator with 24 signal inputs)
									6		4 analog Inputs + 16 repeat relays (for annunciator with 24 signal inputs)
									7		8 analog Inputs + 8 repeat relays (for annunciator with 24 signal inputs)
											Redundant Power Supply
										0	No redundant power supply
										1	24 - 60 V AC/DC
										5	110 - 220 V AC/DC
59	**W**										

*1 Communication via IEC 61850 is only available on one network interface, regardless of the total number of interfaces of the fault annunciator

*2 availability on request

Example for ordering

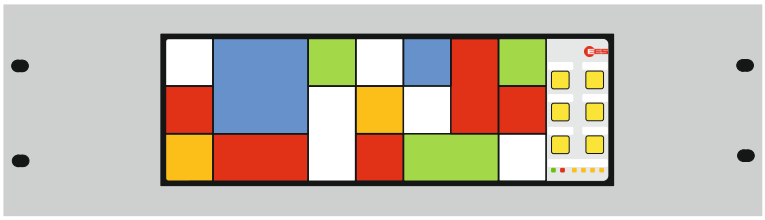
59WC55SWLRR1

WAP-K with 24 signal inputs and communication interface card
Supply voltage 220 V / Signal voltage 220 V, IT security according to BDEW guidelines,
Modbus RTU/TCP + IEC60870-5-101/-104
2nd interface equipped optical fiber, 24 relay outputs
Redundant power supply 24 – 60 V

Art. No. 59ZLICP61850 - License for communication through IEC 61850

Accessories

Frontplates for 19“-rack-mounting



In order to be able to use the fault annunciator in 19" systems as well, we offer a variety of dummy and front panels with different sections. We seperate in:

- Blanking plates, which are attached to a 19" system instead of a subrack
  and
- Front panels that are integrated into an existing subrack

Order number	Description
58ZFPWAP-01	Transparent foil for laser printer for labelling of the alarm window (for insertion into the alarm window panel)
59ZUSB20A-B	Parameterization cable for connecting parameterizable fault indicators WAP-P to a PC (type USB-A to USB-B). The parameterization software can be downloaded for free from our homepage (www.ees-online.de).
59ZUPGRADE40	Software upgrade WAP from firmware 2.x / 3.x to 4.x (most recent firmware)
58MSMRM16000	MSM-RM-16-0-00, relay expansion module, UB = 12 V AC/DC
58MSMRM16100	MSM-RM-16-1-00, relay expansion module, UB = 24 V AC/DC
58MSMRM16200	MSM-RM-16-2-00, relay expansion module, UB = 48 V AC/DC / 60 V DC
58MSMRM16500	MSM-RM-16-5-00, relay expansion module, UB = 110 - 220 V AC/DC

Patch cable for cascading the fault indicators or for connecting MSM expansion modules.
If different cable lengths are required, please contact our service team.

K118-0.25	Patch cable 0,25 m
K118-0.5	Patch cable 0,5 m
K118-1	Patch cable 1 m
K118-3	Patch cable 3 m
K118-5	Patch cable 5 m

Our service team will gladly assist you in choosing the right accessoiress.

Contact

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