SecuriFire fire detection system

System description

SECURITON

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1 The SecuriFire system family

The SecuriFire system family consists of various control panels, devices, map case variants and components which can be combined and coordinated perfectly for any configuration level and system size.

All devices are compatible with each other, work with the same software and the same commissioning tools. The user interface is also identical for all SecuriFire devices. The same external indication and control maps can be connected to all control panels.

Thanks to modular design and networking options, the required devices can be combined in any variation and adapted precisely to the system-specific requirements.

Fig. 1 SecuriFire FCP

SecuriFire FCP fire alarm control panel

- 100% redundant system
- Modular, decentral design
- From individual control panels to large-scale systems can be networked
- Up to 16 rings (3,500 elements) per sub-control panel

Fig. 2 SecuriFire ECP / FEP

SecuriFire ECP / FEP extinguishing control panel

- Automated electrical control and delay device for actuating multi-zone extinguishing systems
- Selectable as combined fire alarm control panel + control panel or only as control panel
- Up to 32 extinguishing areas
- Network capable
- Tested and VdS approved in compliance with 12094-1

2 The system concept

A fire detection system is in operation 8,760 operating hours a year: day, night, Sundays and holidays, and often under adverse ambient / weather conditions. The question arises:
What happens if there is a simple fault in the fire alarm system and what are the consequences of this fault?

Fig. 3 System concept

Microprocessors have been used in alarm systems since the mid 1980s. After initial, justified security reservations concerning the reliability of these components, a number of failure philosophies for fire detection systems controlled and monitored by microprocessors have developed in the European market.

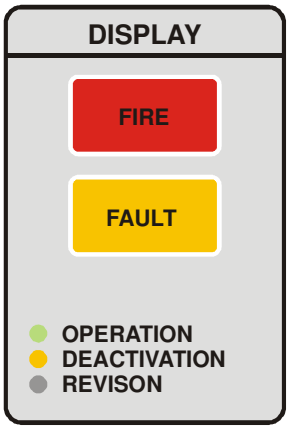


Fig. 4 1980s display

The so-called “Bypass” and “Emergency” systems developed in the 1980s for microprocessor-controlled fire alarm control panels (still the standard in many systems on the market) quickly resulted in serious problems for operators and intervention teams.
When the microprocessor fails, a switch is made to a simple emergency system which, in the event of an alarm, is only able to output a buzzer alarm and indicate an alarm.
When the fire brigade arrives at the scene, all important information about the fire event (e.g. detector address and location information) and the fire incident controls, designed to prevent smoke dispersion across sections, are rendered inoperable. Important delay times are no longer maintained, detection zone deactivation is lost, fire protection doors are closed, smoke hatches are closed and more.

The failure philosophy of European Standard EN 54-2

According to European Standard EN 54-2 (pt. 13.7), “… no more than 512 detectors and their assigned binding functions are affected…” in the event of a system malfunction.
Since less than 512 detectors are connected to 80% of all installed fire detection systems, the failure model of EN 54 is rejected by many experts because a single fault in a fire alarm system can result in the complete failure of the system. This means that not a single alarm actuation could take place, all fire incident controls would be rendered inoperable, and the type and cause of the system fault could no longer be determined.

Requirements for the development of the SecuriFire fire detection system

- Fully compatible fire alarm control panels for all system sizes
- Maximum reliability and full redundancy for optimal security
- Modular, decentral design
- Networking for small-scale systems up to large-area networked comprehensive systems
- Well organised and easily understandable display and operation in the language of the country
- Simple, structured configuration with PC software
- Tested and approved in compliance with current standards and directives (e.g. EN 54, VdS)

What full redundancy means

Securiton relies on fully redundant fire detection systems. The term redundancy (from Latin *redundare:* more than needed is present) refers in general to the multiple presence of functional, content-related and similar objects.

In device and system technology, redundancy specifically means that additional functional and similar resources are present in a technical system when they are in fact not required during normal, trouble-free operation.

For the SecuriFire fire detection system this equates to a second, identical system that is always working in “Hot-Stand-By-Betrieb” parallel to the operating system. It is not only the microprocessor structure which is duplicated but also all system structures, components and elements in the fire alarm control panel. A fault in an active system causes an automated seamless switch to the second, parallel running system and the indication of a system fault.

All functions (including detecting, alarming, plain text display, and actuation of the fire incident controls etc.) are retained and continue to work without limitation.

Fig. 5 B5-MCB15

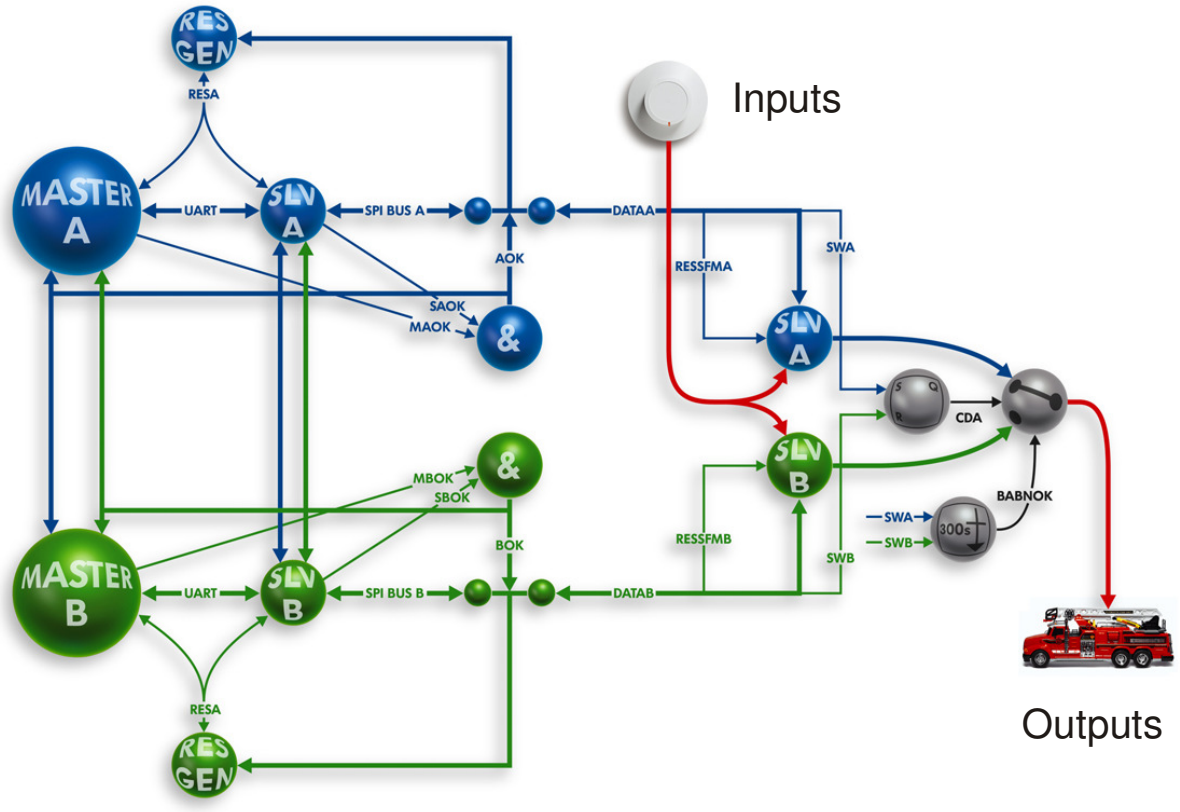


Fig. 6 Schematic of a redundant SecuriFire SCP fire alarm control panel design

Redundant connections

The data lines, too, to the external indication and control maps and connections between control panels are redundant to ensure full functionality of the system in the event of line interruptions or faults.

Fig. 7 Redundant design of a SecuriLan

The additional formation of ring circuits means fully functional efficiency of the SecuriFire system even if there are 3 faults. The control panels can also be networked amongst themselves. This provides even greater failure protection of the system.

Secured data transmission

Securiton's development engineers paid particular attention to ensuring secure data communication. Due to increasing environmental and electromagnetic influences on control panels, detectors, peripheral devices as well as on the line network, a digital data protocol with fault-detecting redundant coding was specially developed for fire alarm control panels.
The continuous, intelligent communication of peripheral elements and subsystems is assured maximum data security (hamming code distance 4). This filters out false alarms caused by electromagnetic interference such as radio emissions, overvoltage, interference impulses etc.
Data lines to operating devices or connections between subsystems are also redundant (doubled) so that full availability of all system components is always guaranteed in the event of line interruptions and external faults.
All Securiton fire detection systems are equipped with automatic checking cycles, fault-detecting test routines, and measures against electromagnetic interference. But with each new generation of performance features and operational reliability, key improvements have been achieved.

Overvoltage protection

The SecuriFire system is equipped with a comprehensive and integrated overvoltage protection design which protects all peripheral inputs, including the mains power supply in compliance with EN 50130-4 (EMC) and EN 61000-6-2 (immunity for industrial environments). The EMC protection concept protects the electronics by means of a zone concept, Transzorp diodes, filters and broadband decoupling of the power supply.
Thus when the system is used in buildings with installed basic protection (lightning protection, mains overvoltage arresters), no further measures are required (e.g. overvoltage arresters).

Fig. 8 Overvoltage protection

2.1 Modular system design

The SecuriFire fire detection system is a modularly designed, centralised system which consists of individual components and can be adapted to individual system requirements.

This completely modular system approach enables use in nearly all applications, from small systems to large area networked comprehensive systems; it can be expanded and adapted – also in the future – easily and quickly. Even already installed Securiton detectors can be integrated into a SecuriFire system problem-free.

Thanks to the fully redundant system design, SecuriFire is also tested and approved as a control panel for multi-zone extinguishing systems (EN 12094-1 compliant).

The fire alarm control panel is not a single device to which all lines are conveyed, as was formerly the case, but rather consists of up to 16 control panels (SCPs) which can be distributed throughout a building as needed. It is, of course, also possible to use just one control panel (SCP) if the system does not exceed a certain size.

Conventional central fire detection system

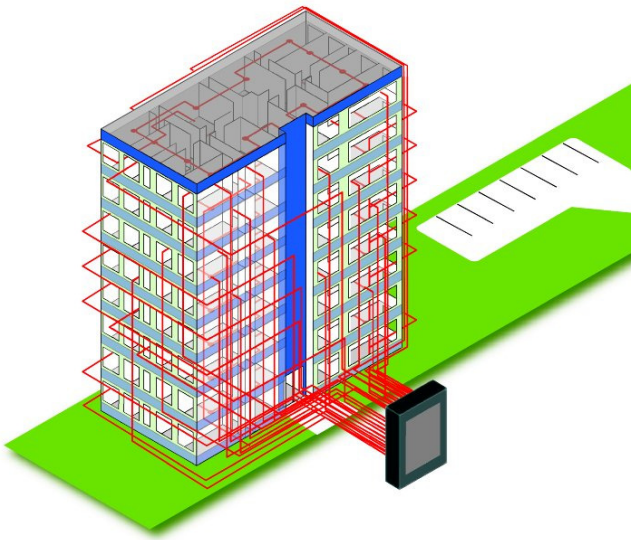


Fig. 9 Conventional central fire detection system

Decentral fire detection system

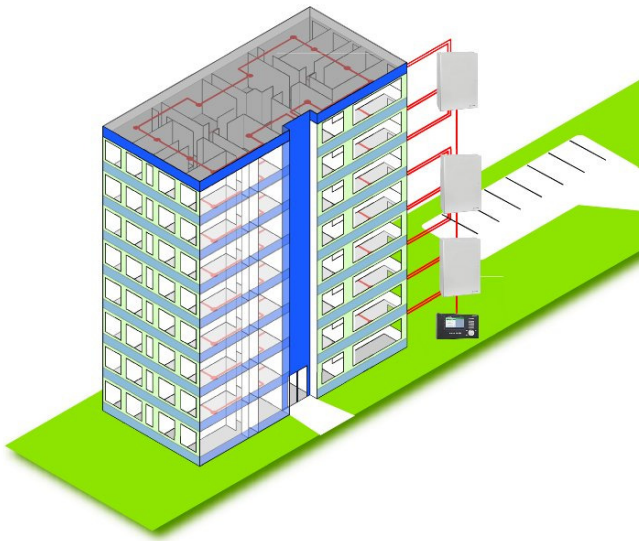


Fig. 10 Decentral fire detection system

One of the key advantages of this decentral design is the significantly reduced wiring: each of the control panels is located at the centre of its area of responsibility and the cable lengths can therefore be much shorter. Also, system changes and expansions are easier and less expensive.

2.1.1 Sub-control panel (SCP)

Each SecuriFire SCP fire alarm control panel is planned and programmed based on its area of use and the requirements. The basic configuration of a control panel consists solely of the main control board (B5-MCB15) and the power supply unit (B5-PSU). All other functions are added customer-specifically by adding the needed boards and loading the necessary programming.

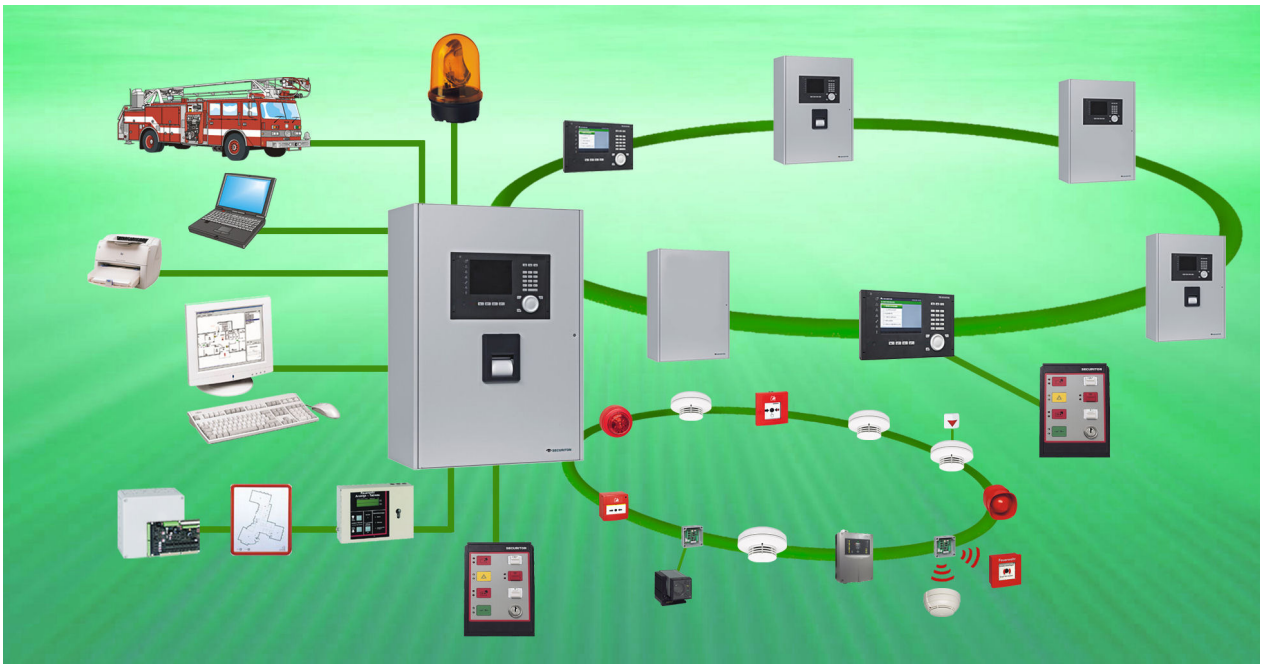


Fig. 11 SecuriFire FCP fire alarm control panel

Fig. 12 SecuriFire FEP combined fire alarm / extinguishing control panel

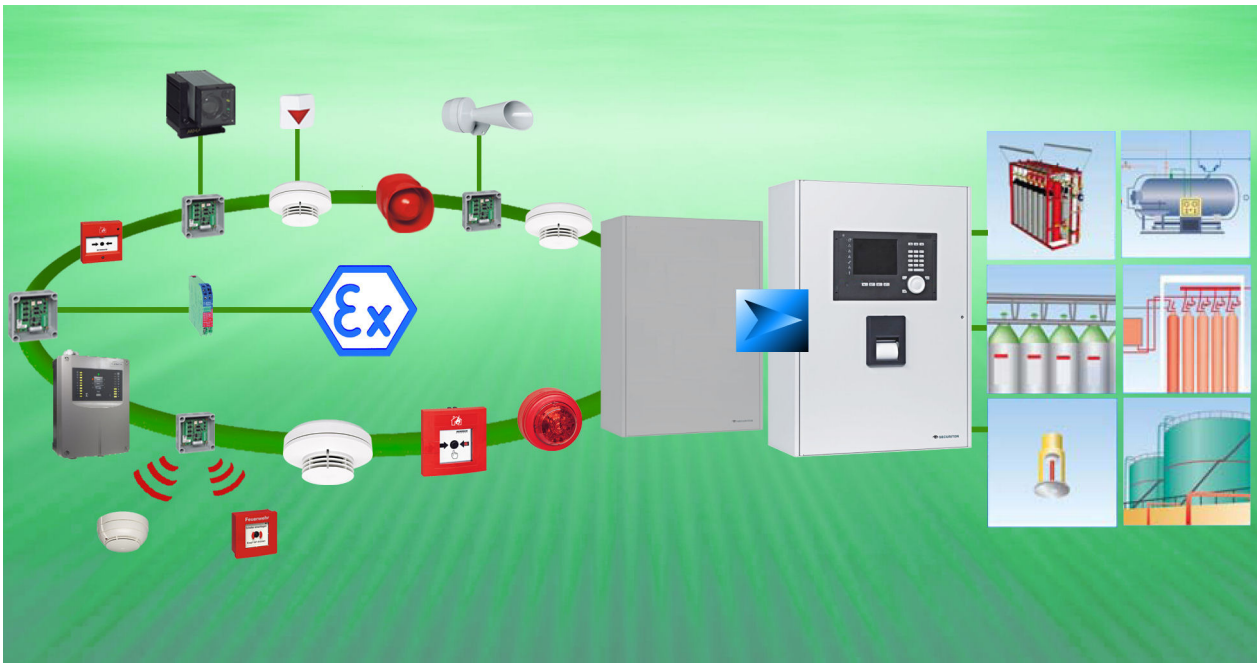


Fig. 13 Control facility for SecuriFire ECP multi-area extinguishing systems

2.1.2 SecuriLan

- Up to 16 SecuriFire control panels
- Up to 31 B5-MIC711 main indication and control maps (max. 32 participants)

When several SCP fire alarm control panels are combined, it is called a “SecuriLan”. Straightforward operation is provided from one location. Despite its decentral design, from outside the fire detection system appears to behave as if it were a conventional “central” fire alarm control panel. The topology of the SecuriLan is freely selectable; control panels and indication and control maps can be networked in redundant or non-redundant rings and stub lines amongst themselves.

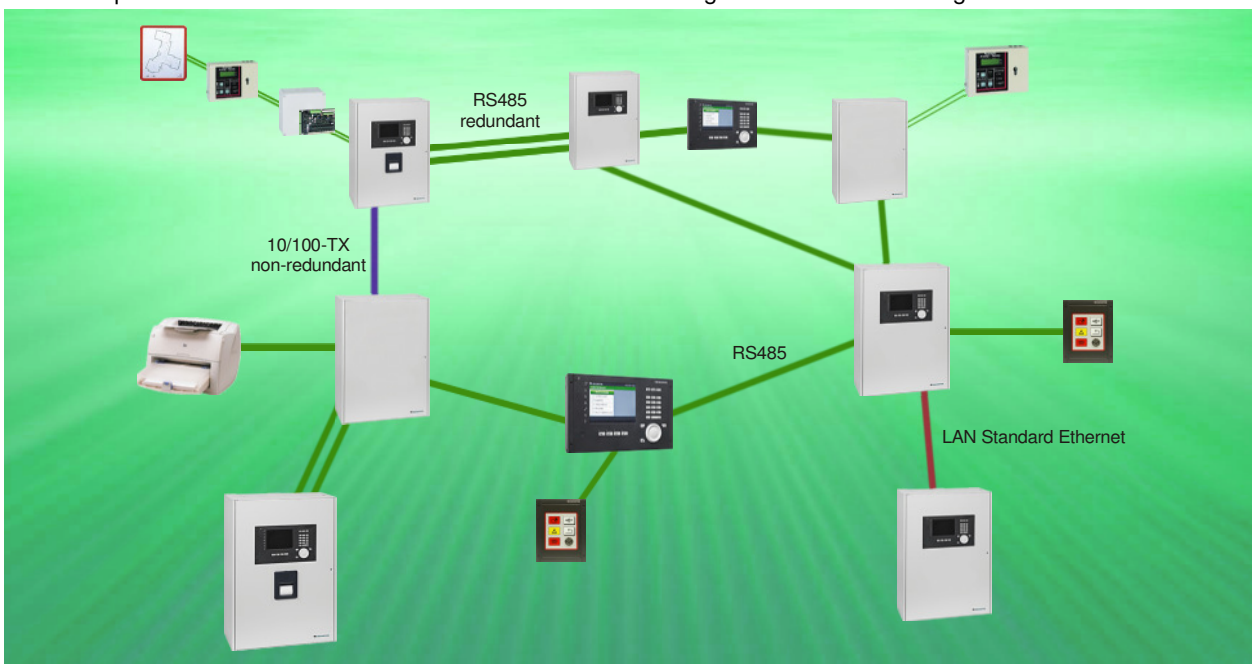


Fig. 14 Topology of a SecuriLan

Detection zones, fire incident controls etc. can be connected to any SCP in the SecuriLan, whereby links between elements of various SCPs are also possible (2-detector dependency, controls etc.).

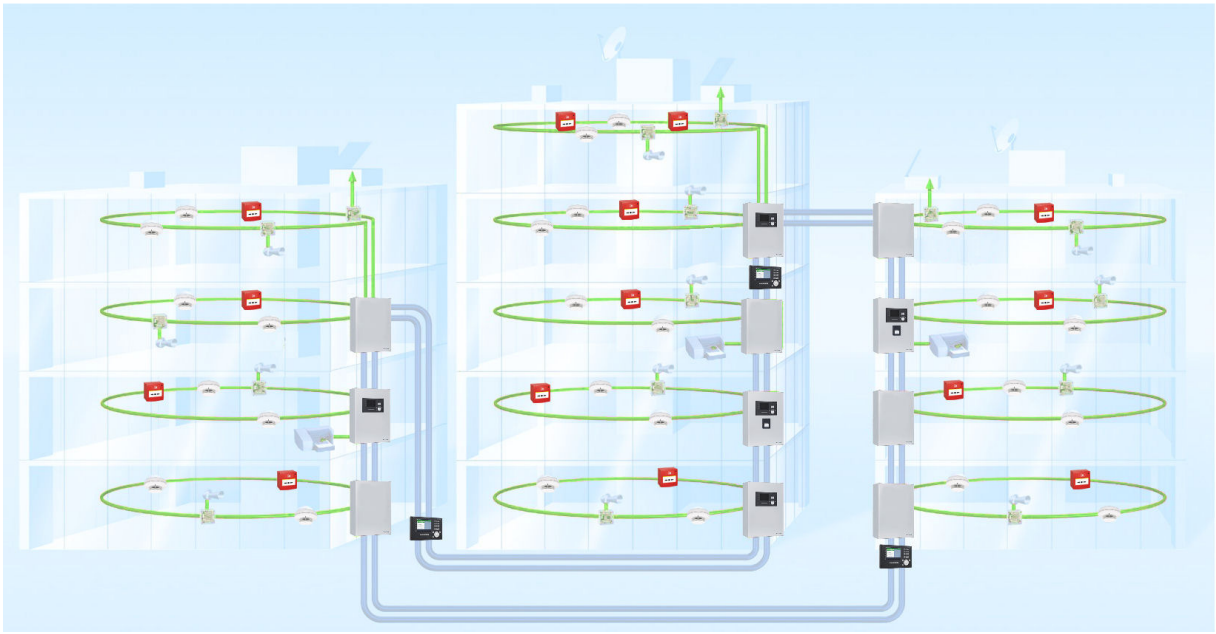


Fig. 15 Schematic of a SecuriLan

Each of these fire alarm control panels (SCPs) is responsible only for its immediate surroundings and communicates with the other fire alarm control panels (SCPs) via a redundant ring circuit which ensures unrestricted functioning of the system (wire breakage, short-circuit etc.) with up to three faults.

Data transmission

So that several devices (control panels and indication and control maps etc.) can be logically grouped to a control panel, it is necessary that they communicate with each other. The continuous intelligent communication between the control panels is achieved with maximum data security via a redundant (doubled) ring circuit. Even under adverse ambient conditions, the digital protocol with fault-detecting redundant coding specially developed for this purpose ensures communication of the subsystems. False alarms caused by electromagnetic interference, such as radio emissions, overvoltage, interference impulse etc., are filtered out.

Line lengths

The maximum distance between two control panels or indication and control maps is 1,200 m. Neither repeaters nor other devices such as modems are necessary. Only cable types and ambient conditions must be taken into consideration. In special cases, if the distance has to be more than 1,200 m, other communication media (fibre-optic cable or modems) can be used.

Central download

The “Central download” function centrally downloads the planning data in a SecuriLan to any SCP. From there the data is distributed throughout the entire SecuriLan. This function saves considerable time and cost when expansions and modifications are the issue, especially when SCPs are far from each other.

Expanded event memory

The default SecuriFire event memory is designed for 200 messages and can be expanded to 65,000 events by using an SD card.

LOCK OUTPUTS

The “LOCK OUTPUTS” function “freezes” all outputs in a defined state in the SecuriLan from a control panel by means of a software command so that they are not unintentionally triggered. This function saves considerable time and cost when service work and maintenance work are performed or when planning software is downloaded, especially when SCPs are far from each other.

Network capable

Every SecuriLan is suitable for connecting to building management systems and field buses.

Remote system diagnosis

Every SecuriFire SCP fire alarm control panel as well as the SecuriLan is pre-equipped for remote system diagnosis (remote polling) of system states (e.g. detector soiling, faults) via modem.

Notice

Before this function is activated, it is imperative to take note of the relevant country-specific regulations and specifications concerning remote polling and remote planning of security systems.

Key features at a glance

- Microprocessor controlled and monitored system technology
- Fully redundant system design to ensure unrestricted functioning, even in the event of a fault or failure of a processor or system half.
- Continual, automatic check routines for all system components and programs.
- Easy connection of the units by means of flat plugs.
- Can be built into a 19" rack.
- Up to 31 remote main indication and control maps per SecuriLan with graphic display; up to 4 languages can be toggled during operation.
- Serial data protocol printer with emergency power, event memory and message filters; suitable for connecting to the public alarm system of the fire brigade.
- Intervention switch for checking unwanted alarms.
- 2-detector dependency and operational group dependency etc. freely programmable with software.
- Links and dependencies of fire incident controls and fire hatches freely programmable with software.
- Automatic winter time / summer time changeover.
- 16 day/night levels with automatic on/off switching, date-based controls.
- Can be connected to superordinate computer systems and fire alarm deployment management systems via serial data interfaces with the full functional scope (alarm/command directions).
- Fully redundant interconnection of up to 16 fire alarm control panels (SCPs) without superordinate central computer, whereby each individual SCP is a self-sufficient unit with its own power supply and batteries; external indication and control maps, fire brigade maps, printers etc. can be connected to the sub-detection-zones and controls.
- The control panel structure permits nearly any number of fire alarm control panels to be networked, even at a later date.
- The communication between the fire alarm control panels (SCPs) is via a redundant (doubled) ring circuit so that the connection remains in tact without restrictions even in the event of three simultaneously occurring connection faults.
- Digital communication paths connect main indication and control maps, protocol printers, parallel indicator boards and other system components can be used in any number of combinations independent of location.
- Because of its special redundancy concept, the SecuriFire fire detection system is suitable (standards compliant) for actuation of more than one extinguishing area.
- Compliant with or exceeds the following relevant standards and directives: European standards EN 54, DIN, ÖNORM, ÖVE, VDE, CPD and many more.
- VdS devices and system approval, CDP approval

Overview of system limits

	per control panel	per SecuriLan
Control panels	--	Max. 16
Indication and control maps (internal)	Max. 1	Max. 16
Indication and control maps (external)	--	Max. 31
Printer (external, internal)	Max. 3	Max. 16 x 3
Fire brigade panels	Max. 8	Max. 16 x 8
Detection zones	Max. 256	Max. 16 x 256
Inputs, outputs, repeat signals	Each max. 256	Each max. 16 x 256
External (e.g. sprinkler systems)	Max. 256	
Delay layers	Max. 16	
Customer-specific texts	6,500 if average is 25 characters per element	

3 Display, operation and indication

3.1 SecuriFire MIC indication and control maps

The SecuriFire standard indication and control maps provide well-organised, convenient, standards-compliant display and operation of a SecuriFire system and can be built into an SCP or separately mounted in their own housings.

Fig. 16 SecuriFire MIC indication and control maps

They include a 5.7'' TFT colour display for displaying all system states in plain text. No labelling on the front of the housing (only display elements). Intuitive operation with operating elements and SecuriWheel.

3.2 External device bus

3.2.1 EPI-BUS

External devices and indication and control maps can be connected to the “EPI-BUS” on each MIC. A maximum of 3 participants can be connected to this data bus at a distance of up to 1 m from the main indication and control map (B5-MIC711).

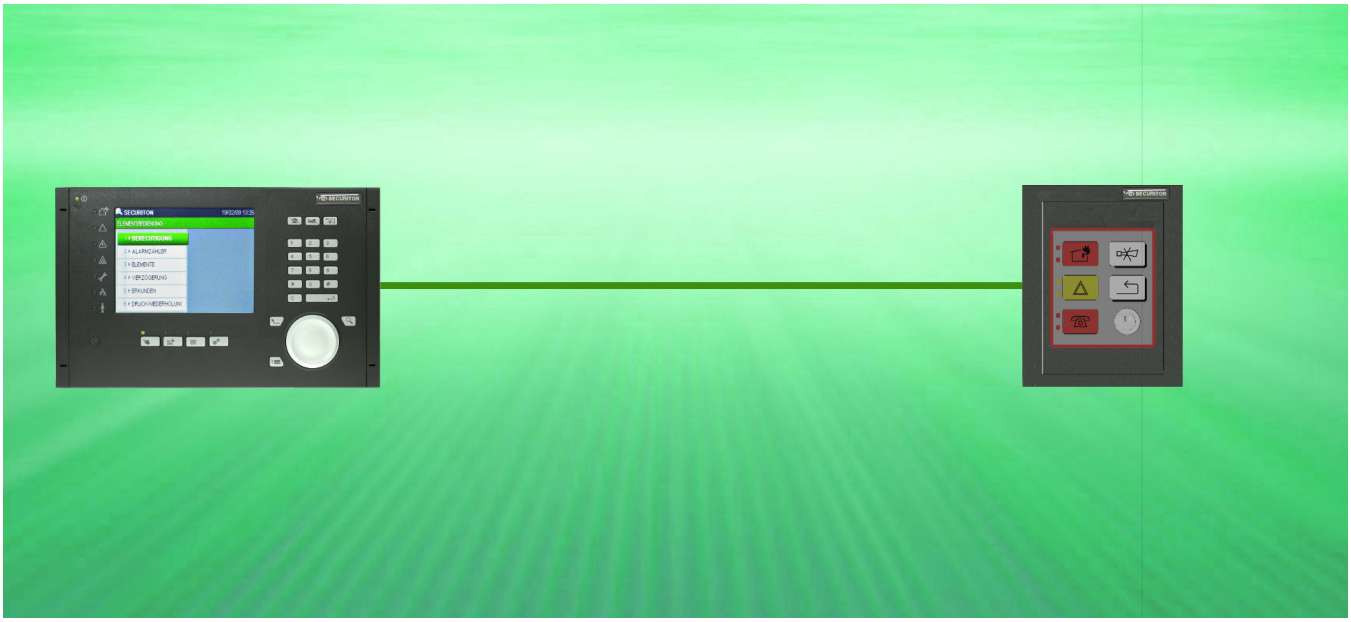


Fig. 17 Schematic of an EPI-BUS

EPI-BUS features

- MIC device bus
- Up to 1 m line length
- Up to 3 devices on one EPI-BUS
- Swiss fire brigade panel compliant with SN 054 002 can be connected

3.2.1.1 B5-EPI-FPC-GS Swiss fire brigade panel

The B5-EPI-FPC-GS is compliant with Swiss standard SN 054 002. In Switzerland it must be mounted in the immediate vicinity of every fire alarm system in the fire brigade access area. It displays certain operational states of the fire alarm systems and enables fire brigade personnel to carry out essential procedures in a coordinated and unified manner.

Fig. 18 B5-EPI-FPC-GS

3.2.2 MMI-BUS

External devices and indication and control maps can be connected to the “MMI-BUS” on each MIC. Without additional devices such as repeaters, up to 15 participants can be connected to this data bus and operated up to 1,200 m from a control panel.

Fig. 19 Schematic of MMI-BUS

MMI-BUS features

- Redundant devices bus
- Up to 1,200 m line length
- Up to 15 devices on one MMI-BUS
- Fire brigade panel compliant with DIN 14661 can be connected

Data communication via redundant, digital communication lines. The devices can be deployed in any number of combinations with each other independent of location.

Notice

For security reasons the data line and power supply are redundantly implemented and should be separately conveyed.

3.2.2.1 B3-MMI-EAT64 indication map for 64 alarm lines

The B3-MMI-EAT64 has LEDS that indicate the states of the individual detection zones. The “Alarm”, “Fault” and “Deactivation” states of a detection zone can be indicated by two LEDs (red and yellow).
The B3-MMI-EAT64 is mounted separately in its own housing. Insertion strips are used to label the detection zones.

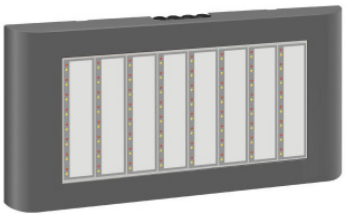


Fig. 20 B3-MMI-EAT64

3.2.2.2 B3-MMI-IPEL indication map for 8 extinction areas

The B3-MMI-IPEL is a standards-compliant state indicator of connected extinguishing systems.
The B3-MMI-IPEL can also be mounted separately in its own housing. Insertion strips are used to label the extinguishing areas.

Fig. 21 B3-MMI-IPEL

3.2.2.3 B3-MMI-UIO universal input/output module

The B3-MMI-UIO is primarily used for controlling layout plan and repeat signal boards of the SecuriFire system. It can also be used by the SCP remote input/output module for polling potential-free contacts and keys and for controlling unmonitored horns, lamps, relays etc. Depending on its use, the B3-MMI-UIO is integrated in the concerned boards or branch sockets and connected to the MMI-BUS. The module is fully redundant to ensure security and reliability. Two Twisted Pair bus cables connected to the B5-BAF provides the data traffic via the MMI-BUS to the other SCP participants. It is designed with the appropriate fastening options and connectors.

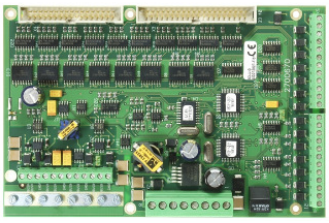


Fig. 22 B3-MMI-UIO

3.2.2.4 Fire brigade indicator board compliant with DIN 14662

Indicator board compliant with the requirements of DIN 14662 for visually indicating the most important operating states of the fire alarm control panel to facilitate easy and standardised operation of a fire alarm control panel for fire brigade personnel.

Fig. 23 Fire brigade indicator board compliant with DIN 14662

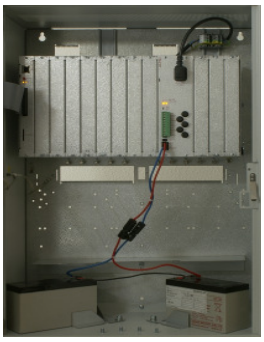
3.2.2.5 Fire brigade control board compliant with DIN 14661

Fire brigade map compliant with DIN 14661 for indicating operating states and for standardised operation of a fire alarm control panel by fire brigade personnel.

Fig. 24 Fire brigade map compliant with DIN 14661

4 Housing variants and expansion options

4.1 SecuriFire SCP



The basic configuration of every SecuriFire SCP includes:

- Rear wall with cut-outs for cable entry and battery holder
- Unit rack with bus connection prints for installing 8 freely selectable line boards and input/out boards as well as 3 relay boards
- B5-MCB15 main control board with interface for built-in indication and control map and service PC
- B5-PSU power supply unit
- 2 batteries for emergency power supply
- Mains terminals and battery cable

Fig. 25 SCP basic configuration

The map case of the SCP is available in various designs:

Fig. 26 SCP with closed door

Fig. 27 SCP with mounting main indication and control map

Fig. 28 SCP with mounting main indication and control map and protocol printer

All other functions are planned customer-specifically. This takes place in two ways: a) by inserting the required boards into the board slots of the unit rack, and b) by equipping the doors with the SecuriFire B5-MIC11 in the desired language variants.
The appropriate customer-specific programming is created with PC software and loaded via the service PC interface in the B5-MCB15 main control board.

4.2 SecuriFire B5-MIC11 mounting main indication and control map

Fig. 29 B5-MIC11

The B5-MIC11 is integrated into the doors of the SecuriFire cabinets. It includes a 5.7'' TFT colour display of all system states in plain text. Operation with function keys and SecuriWheel. No labelling on the front of the housing (only symbols). It is connected to the B5-MCB15 main control board with a ribbon cable. If the SCP has a protocol printer, it is also controlled by the B5-MIC11.

4.3 Protocol printer with event memory

Fig. 30 MIC-PPE

The serial data protocol printer is included in several SecuriFire map case variants and in some designs of the external indication and control maps.
Compliant with EN 54-4, the SecuriFire protocol printer is always supplied with emergency power for a least 72 h and saves all fire alarm system changes (e.g. alarms, faults, deactivations, activations, actuations, operation procedures, alarm delays, service notices) in plain text with date, time and other information. The printer includes an event memory which can be printed out any number of times. All information is displayed on the display and output to the protocol printer in clearly understandable plain text.

5 Unit rack

The unit rack contains the entire electronics of a SecuriFire SCP except for the indication and control map and protocol printer. It is attached to the rear wall of the SecuriFire map case and contains 13 board slots designed to house flat units. Thanks to this modular design, various line technologies (ring and stub lines) can be connected to a control panel.

Fig. 31 Empty unit rack with bus printed circuit boards

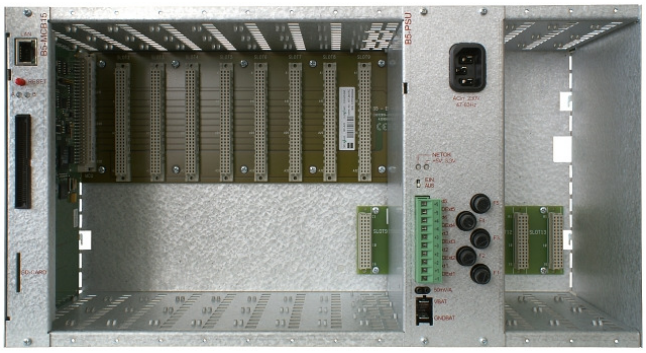


Fig. 32 Unit rack fitted with B5-PSU and B5-MCB15

The power supply and data communication between the individual boards is by means of the bus printed circuit boards (using connectors) on the rear side of the unit rack.

Slot 1 at the very left is always fitted with the B5-MCB15 main control board. The B5-PSU power supply unit is always on slot 10.

Slots 2 to 9 are freely selectable for all of the boards described below. Only the relay boards must be fitted exclusively on slots 11 to 13 (when using relay boards, a B5-BAF board or B5-MRI board must be on slot 9, since only these two boards are suitable for actuating the relay bus).

6 Boards

B5-MCB15 main control board

The B5-MCB15 is included in every SecuriFire SCP. In conjunction with the B5-BUS and the B5-PSU power supply unit, it forms the basis for the B5 SecuriFire SCP 3000 hardware platform. As the main control board of every SecuriFire SCP, the B5-MCB15 stores all of the prepared data from the other boards. It carries out all processing necessary for the logical behaviour of the system and manages planning data and system time.

The B5-MCB15 is built to be fully redundant to ensure system availability, i.e. all functional blocks are doubled.

Two Flash-Memory elements which can be cleared and written block by block during operation are used for storing the program and planning data. It does not have to be exchanged if there is a program or planning change. Two synchronous, dynamic RAMs (SDRAM) serve as variable memory.

The system time of each SecuriFire SCP is generated with the help of two real-time clocks (RTC) with integrated quartz. In the event of a power failure, the real-time clocks continue to operate up to eight hours thanks to the emergency power supply.

Fig. 33 B5-MCB15

B5-PSU power supply unit

The B5-PSU is an internal 7 A power supply unit, and together with the B5-MCB15 Main Control Board and the B5-BUS it forms the basis for the B5 hardware platform.

The B5-PSU provides output voltages of 3.3 V, 5 V and 27 V to each SCP 3000. In the event of mains failure, the standards-compliant battery buffered DC voltage for the SCP and peripheral devices must be ensured. This is accomplished by connecting two (or four) batteries of a type which has been tested by VdS and approved by Securiton AG. The batteries are connected on the front side of the B5-PSU with a 2-pin terminal and monitored.

Fig. 34 B5-PSU

B5-BAF control board

The B5-BAF includes the basic functions of a fire alarm control panel. They comprise two surveyed outputs which are for connecting transmission and alarm units among others. In addition, there is an interface for controlling a parallel FBF in accordance with DIN 14661 and a parallel FBA in accordance with SN 054002 and controlling 3 relay boards (B3-REL10, B3-REL16, B3-REL16E) as well as the interface for the MMI BUS, which is for connecting all external B3 indication and control maps and MMI BUS modules. Communication with the B5-MCB15 main control board is via the B5-BUS.

Fig. 35 B5-BAF

B5-DXI2 SecuriLine eXtended board

The B5-DXI2 is used for power supply and evaluation of two ring circuits with the associated detectors and modules of the SecuriLine eXtended. Alternatively, a ring circuit and two X-LINE stub lines or four stub lines can also be connected. The digitised states of the detectors and modules are further processed by the B5-DXI2 and forwarded via the B5-BUS to the B5-MCB15 Main Control Board.

Fig. 36 B5-DXI2

B3-DCI6 direct current technique board

The B3-DCI6 is for the power supply and evaluation of 6 inputs which are either planned as detection zones in direct current technique or as surveyed inputs (e.g. VdS extinguishing interface, valve monitoring) via jumper and programming. A maximum of 10 detection areas can be differentiated by means of optional 3-wire wiring.

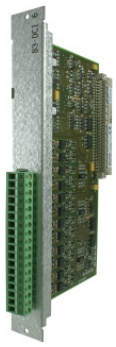


Fig. 37 B3-DCI6

B3-OM8 surveyed output board

The B3-OM8 is for connecting up to 8 peripheral devices (sirens, flashing lights, etc.). It includes 8 quiescent current surveyed control outputs for max. 1.5 A and for loads of 20 Ω to 1,000 Ω in 3 load ranges. It is important to note that the monitored consumers are supplied with power directly from the B5-PSU power supply unit (maximal current 7 A). This must be taken into account when planning the simultaneously actuated surveyed outputs.

Fig. 38 B3-OM8

B3-IM8 surveyed input board

The B3-IM8 is designed for connecting a total of 8 detection zones or surveyed inputs. Each detection zone or surveyed input connection has its own current-limited output driver which supplies the connected peripheral devices with power.
The B3-IM8 is suitable for combining any surveyed inputs as well as for connecting the SecuriStar detector series 521 / 523 / 563, HX 130, Hochiki Ex-i detectors and the sabotage line technology.

Fig. 39 B3-IM8

B3-USI4 universal interface board

The B3-USI4 is a universal communication board and serves primarily to connect SecuriFire 3000 to management systems and to actuate external printers, pagers, ComBOX, telephone servers, etc. The connection to management systems can be line type or ring, redundant or single. The selection of operation mode of each interface pair is performed by programming.

Line 0: ISP or SPP
Line 1: ISP (if not yet Line 0 = ISP)

Fig. 40 B3-USI4

B5-MRI16 relay board with 24 V contacts

The B5-MRI16 has 16 freely programmable bistable 24 V / 3 A relay contacts. The function of working or normally closed contact can be set in the software. Further, for each relay an “Active in Fail-Safe-Position” can be defined for instances in which there is a power failure or the SCP is switched off. In the maximum configuration, an SCP can be equipped with up to 160 (176) relay contacts (excluding ring modules): 8 pcs. B5-MRI16 plus 3 pcs. B3-RELx.

Fig. 41 B5-MRI16

B3-REL10 relay board with 230 V contacts

The B3-REL19 has 10 freely programmable bistable 230 V / 3 A relay contacts. Defining whether the contact is a working or normally closed contact is done with planning software. By programming an “Active in Fail-Safe-Position” the state of each individual relay can be defined for power supply failure or shut down of the SCP. For actuating the relay bus, a B5-BAF, B3-LPI or B5-MRI16 board must be fitted to slot 9 of the unit rack.

Fig. 42 B3-REL10

B3-REL16 relay board with 24 V contacts

The B3-REL16 has 16 freely programmable bistable 24 V / 3 A relay contacts and serves to actuate sirens, permanent magnets, relays, etc. Defining whether the contact is a working or normally closed contact is done with planning software. By programming an “Active in Fail-Safe-Position” the state of each individual relay can be defined for power supply failure or shut down of SCP. For actuating the relay bus, a B5-BAF, B3-LPI or B5-MRI16 board must be fitted to slot 9 of the unit rack.

Fig. 43 B3-REL16

B3-REL16E relay board with 24 V contacts

The B3-REL16E has 16 freely programmable bistable 24 V / 3 A relay contacts and serves to actuate sirens, permanent magnets, relays, etc. Defining whether the contact is a working or normally closed contact is done with planning software. The contacts are protected against overload with a 3 A fuse. By programming an “Active in Fail-Safe-Position” the state of each individual relay can be defined for power supply failure or shut down of SCP. For actuating the relay bus, a B5-BAF, B3-LPI or B5-MRI16 board must be fitted to slot 9 of the unit rack.

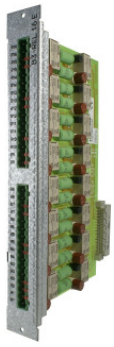


Fig. 44 B3-REL16E

B5-NET2-485 network board

The B5-NET2-485 is for redundant networking of the SecuriFire 3000 and for connecting PC applications. It has four network ports which are implemented based on the RS485 standard and two 100 Base-TX ports.

Fig. 45 B5-NET2-485

B5-NET4-485 network board

The B5-NET4-485 is for redundant networking of the SecuriFire 3000 and for connecting PC applications. It has four network ports which are implemented based on the RS485 standard and two 100 Base-TX ports.

Fig. 46 B5-NET4-485

B5-LAN interface board

The B5-LAN is for non-redundant networking of PC applications and non-redundant networking of SecuriFire 3000; it is always fitted at slot 2 of the unit rack. There is the possibility that only the active processor establishes a connection to the Ethernet or both processors at the same time. This mode can be changed using a jumper.

Fig. 47 B5-LAN

B3-LEE23 alarm lines board for HX 140

The B3-LEE23 supplies power to and monitors up to 8 stub lines each with a maximum of 30 detectors of the HX 140 detector series.

Each stub line has its own current-limited output driver which supplies it with power and generates the voltage-modulated telegram.

The purpose of the board is to replace existing fire alarm systems with detectors of the HX 140 series by the SecuriFire 3000 and to be able to connect the peripherals unchanged. Max. five B3-LEE23 boards can be fitted on slots 2 to 9 of the unit rack of an SCP.

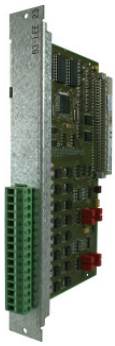


Fig. 48 B3-LEE23

B3-LEE24 alarm loop board for HX 150

The B3-LEE24 supplies power to and monitors up to four ring circuits each with a maximum of 127 detectors of the HX 150 detector series.

It is possible to install addressable stubs on the ring without an additional branching module. The maximum number of detectors on stubs must be taken into account.

Each ring circuit has its own current-limited output driver which supplies it with power and generates the voltage-modulated telegram. The line current is evaluated by an analogue/digital converter.

The purpose of the B3-LEE24 is to replace existing fire alarm systems with detectors of the HX 150 by the SecuriFire 3000 and to be able to connect the peripherals unchanged.

Max. five B3-LEE24 boards can be fitted on slots 2 to 9 of the unit rack of an SCP.

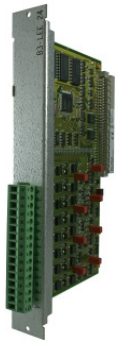


Fig. 49 B3-LEE24

6.1 Mains connection and emergency power supply

The country-specific setup regulations, connection conditions of the fire brigade as well as the standards, regulations and directives apply when installing the SecuriFire system. The mains connection must also be implemented in accordance with the relevant country-specific regulations (e.g. DIN, ÖNORM, VDE etc.).

The emergency power batteries must be able to maintain the proper functioning of the fire alarm system for a certain length of time in the event of a mains failure, and they must remain fully charged for their entire service life. Due to these high product requirements, the charging and discharging characteristics of the batteries are subject to special requirements, specifications and tests. Also, the charge curves of the batteries must exactly match the power supply unit in use.

If batteries are used whose charging curves and characteristics are other than those specified, proper functioning of the emergency power supply cannot be guaranteed. Moreover, it is possible that the entire system may be damaged as a result. For these reasons, only battery types expressly approved by Securiton and certified by VdS should be used.

The installation location for the batteries is on the housing base of each SecuriFire SCP. Two batteries connected in series are always used.

7 SecuriLine eXtended

The B5-DXI2 SecuriLine eXtended board is for connecting SecuriLine eXtended (ring) to a SecuriFire SCP; on each of the 2 ring circuits a maximum of 250 elements can be connected.

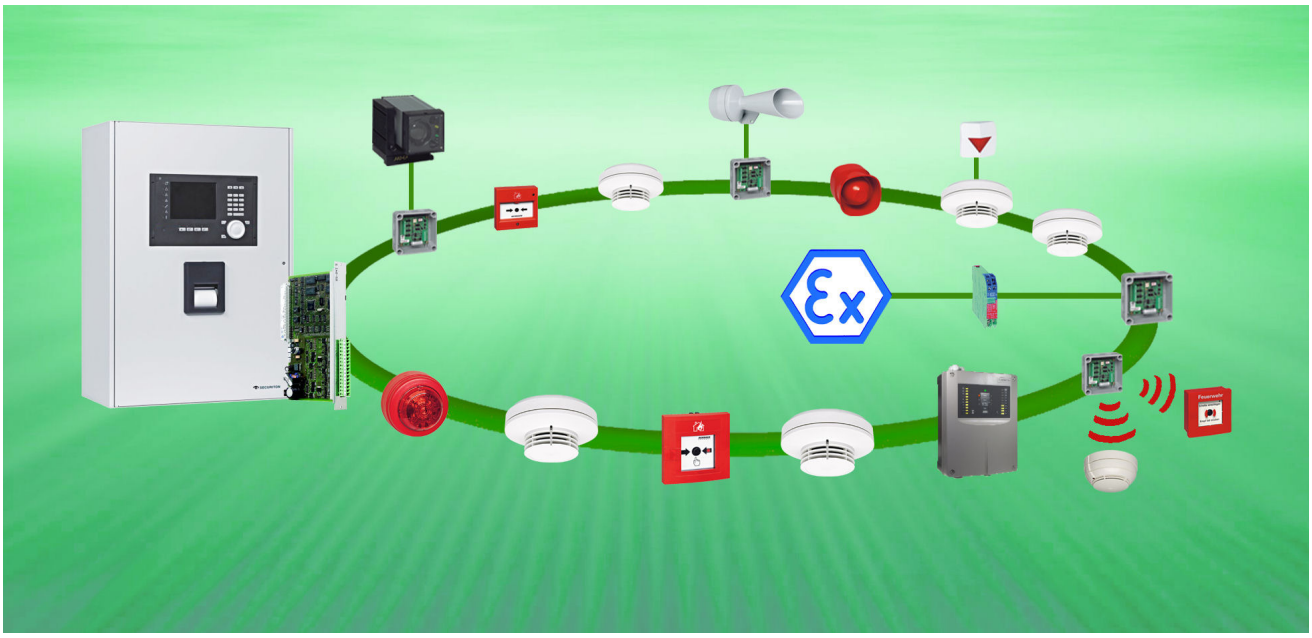


Fig. 50 Schematic of SecuriLine eXtended ring circuit

Maximum transmission security

The continuous, intelligent communication between control panel and detectors (modules) is effected with maximum transmission security and enables seamless monitoring and evaluation of the current actual states. Faults in the line network or false alarms due to electromagnetic interference (e.g. radio emissions, overvoltage, interference impulses) are automatically filtered out and localised by data transmission with fault detecting redundant coding from the control panel.

Integrated short circuit isolator

Thanks to the short-circuit isolator integrated in each detector and in each ring circuit module, the SecuriLine eXtended remains fully functional even in the event of a fault. If a detector fails or in the event of a short-circuit or wire breakage on the line, all other detectors and connected input and output modules remain functional without restriction. The fault is localised and information about its exact position is shown in plain text on the display and printer. This is why cable routing beyond fire sections can be optimised.

Intelligent data communication

Detector zone assignment for the SecuriLine eXtended is performed independently of the wiring, which is optimised and considerably reduced. A detection zone can be divided into various rings (also limited distribution across several SCPs). Inputs and outputs can be freely programmed without additional settings. Further, thanks to the microprocessor integrated in each detector, soiling detection, detector self-tests and detector analyses add to the performance spectrum to prevent false alarms and reduce unwanted alarms.

Programming and commissioning

Programming and commissioning the SecuriLine eXtended is performed exclusively with the SecuriFire Studio software. A calculation program is included for computing the maximum possible ring circuit length based on the connected elements and the wire cross-section in use.

7.1 Key features at a glance

- Digital ring communication and data backup
- Monitoring of all connected detectors and modules
- Integrated short-circuit isolator in each element
- Automatic and non-automatic detectors as well as input and output elements for fire doors, sirens, flashing lights etc. can be connected directly to the ring circuit.
- Alarm and control criteria linking
- Alphanumeric or graphical for individual alarm display and group display of all alarm statuses
- Individually programmable, auxiliary text for alarm, fault, deactivation and activation messages with date and time
- Customer-specific software for freely programmable inputs and outputs
- Individual addressing and deactivation of detectors and control modules as well as transmission and operating groups
- The formation of detection zones is also possible with elements of different ring circuits; detection links can be implemented beyond boards and SCPs.
- Multi-detector and multi-zone dependencies are programmable
- Subsequent additions to a detection zone are easy to implement and do not result in address changes or re-programming of other detectors
- Ex areas monitoring via branching module and stub line
- Evaluation of detector states (detectors which are soiled or needing maintenance) are displayed in plain text in the control panel

7.2 System limits

- Max. 7 (8) B5-DXI2 boards per SecuriFire SCP
- Max. 2 ring circuits per B5-DXI2 board
- Max. 250 physical elements per ring circuit
- Max. 3,500 elements on 16 ring circuits
- Max. 63 detectors per detection zone
- Max. 1 repeat signal per detector
- Max. 3,500 m ring circuit length

8 Components of the SecuriLine eXtended

Standard for all elements of the SecuriLine eXtended are integrated short-circuit isolators, individually deactivated, not sensitive to electromagnetic interference. In addition to automatic and non-automatic fire detectors, ring circuit modules with various functions are also available; these modules can be built into a plastic housing with protection class IP66.

MCD 573 multi-criteria detector

Depending on need and application, the MCD 573 can be implemented as smoke, temperature or combined detector and is programmed system-specifically and set for its area of use. The detector recognises smouldering fires and open fires early by detecting and evaluating smoke (using the Tyndall principle) and heat (NTC sensor principle) fire characteristics.

Fig. 51 MCD 573

USB 501 universal base

The USB 501 serves to connect the MCD 573 multi-criteria detector and is also available in various special variants for mounting on false ceilings and cement ceilings as well as for use in wet rooms. A repeat signal or a base siren can be connected to the USB 501.

Fig. 52 USB 501

LKM 531 ventilation duct detector

The LKM 531 is suitable for use in locations with high air velocity and strong smoke dilution, e.g. in air-conditioning and ventilation ducts. It consists of a plastic housing with built-in smoke detector and can be used with air velocities of 1 to 20 m/s. The housing is fitted with a clear cover so that the alarm LED of the smoke detector is visible from outside.

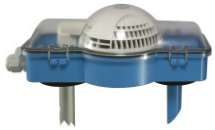


Fig. 53 LKM 531

BX-SOL loop siren

The BX-SOL is for audibly signalling a fire alarm in interior rooms (environmental category type A compliant with EN 54-3) and is available in red or white. Three different sounds can be selected from the control panel (also during operation). The volume can be adjusted with the software.

Fig. 54 BX-SOL

BX-FOL loop flashlight

The BX-FOL is for visually signalling a fire alarm in interior rooms (environmental category type A compliant with EN 54-23) and is available in red or white. The flash rate and light intensity adjustment is done with the software.

Fig. 55 BX-FOL

MCP 545 manual call point

The MCP 545 is for manually triggering a fire alarm. It is tested and approved in compliance with EN 54-11; the MCP 545 is a type A (direct triggering) device. It is available in red and other colours and designs (protection class etc.).

Fig. 56 MCP 545

MCP 535 manual call point

The MCP 535 is for manually triggering a fire alarm. It is tested and approved in compliance with EN 54-11 and EN 12094-3; the MCP 535 is a type B (indirect triggering) device. It is available in red and other colours and designs (protection class etc.).

Fig. 57 MCP 535

BX-OI3 output/input module

The BX-OI3 can be used either as O/I module or as detector / detection zone for connecting special detectors.

Fig. 58 BX-OI3

BX-AIM advanced input module

The BX-AIM can be used either as monitored input for polling potential-free contacts or as detection zone for connecting collective detectors. It serves, among other things, to connect intrinsically safe detectors (Ex-i) with intermediate switching of a Zener barrier. An output for a repeat signal is also available.

Fig. 59 BX-AIM

BX-IOM input/output module

The BX-IOM has a galvanically isolated output for actuating monitored consumers (e.g. sirens) which are supplied by external voltage sources. The input can be used to scan potential-connected voltage sources. The monitored output is divided into three load ranges and can actuate and monitor a load between 20 Ω and 1 kΩ.

Fig. 60 BX-IOM

BX-REL4 relay module

The BX-REL4 consists of four potential-free relay outputs for switching loads of up to 2 A and up to 230 V. All relays are bistable changeover contacts and each one has a screw terminal for the normally closed contact and normally open contact. For each output an “Active in Fail-Safe-Position” can be programmed in the event of ring voltage failure.

Fig. 61 BX-REL4

BX-IM4 input module

The BX-IM4 has 4 primary inputs for scanning potential-free contacts. These inputs monitor the lines for creeping wire breakage and short-circuit. The “monitored” or “unmonitored” operation mode is separately planned for each input; further, each input can be programmed inverted.

Fig. 62 BX-IM4

BX-ESL end switch module eXtended Line

The BX-ESL determines the position of the activation pin. The state active/passive is reported to the FAS and indicated on the BX-ESL by means of a LED.

Fig. 63 BX-ESL

9 Programming and software

The SecuriFire from Securiton is a modern microprocessor-controlled system equipped with a multitasking-capable real-time operating system.
A functional basic program is downloaded to the system; the program is then configured customer-specifically for the object to be protected while taking into account the relevant standards.
All program components are stored in the B5-MCB15 main control board; during startup they are distributed to all computer components of the SecuriFire units, which then operate independently and are monitored by the B5-MCB15. All necessary software components are provided in SecuriFire Studio, which contains all of the necessary planning, commissioning, maintenance and diagnostic data of the SecuriFire system.

9.1 Projection

The SecuriFire Studio planning software is used for creating the project-specific programming of a fire alarm control panel. This is where the hardware configuration of the control panel is defined, the addresses and parameters of all elements (except for the SecuriFire ring circuit technology) are assigned, and the logical links are created.
This Windows-based program offers easy programming and the use of default programming, libraries, macros and programming by blocks.
The completed program is complied, prepared and transmitted to the B5-MCB15 main control board.

9.2 Loop configuration

With the help of the ring configuration, the complete addressing and parametrization of the SecuriLine eXtended ring circuit technology is centrally performed. The program also includes helpful functions for commissioning and troubleshooting.

9.3 Object texts

The text program offers a graphical user interface for creating customer-specific texts of the individual elements. For each control panel element, defined by type and logical number, any customer-specific text can be specified. The text is converted to a format (compiled) which can then be downloaded to the control panel.

9.4 Download / Upload

These functions download and upload the individual software components which are necessary for the operation of a control panel (operating program, standard text, language, customer program and customer text).
Central downloading makes it possible to download planning data on a SecuriLan via one single control panel and to distribute it throughout the entire network.

9.5 Service tools

These programs establish an online connection to the fire alarm control panel, whether to a single control panel or a complete SecuriLan.

9.5.1 ServiceMonitor

ServiceMonitor essentially serves service and maintenance purposes as well as system diagnostics. Also, telegram filters that record certain system states can be set. In addition, in the event of a fault the user is shown relevant, comprehensive information and possible causes.

9.5.2 ServiceCenter

In the ServiceCenter you can send various commands to the control panel.

9.5.3 SystemInformation

This is where the hardware and various versions of the software in use are called up and different kinds of lists are generated (e.g. fault counter, alarm counter, fault list etc.).

9.5.4 LoopAnalysis

With LoopAnalysis you can evaluate the data of all detectors present in the system. Recordings from the data logger can also be evaluated.
The document “Module faults”, which will provide a complete description of all module faults, is in the pipeline.

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