ABB i-bus® KNX
Application Manual
Security in Buildings

Power and productivity
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General

1 General

The ABB i-bus® KNX systems offer an attractive solution, which fulfils the highest standards in residential, commercial and public buildings. By interconnecting ABB Security Technology with the ABB i-bus® KNX system, the quality of living, comfort and safety can be easily combined with cost-effectiveness and environmental awareness.

The ABB i-bus® KNX products cover the entire range of applications in buildings: from illumination and blind control to heating, ventilation, energy management, security and surveillance. These demands can be realised cost-effectively by ABB Security Technology in combination with the ABB i-bus® KNX system with minimal planning and installation effort. Furthermore, the flexible usage of rooms and the continuous adaptation to changing requirements are simple to implement.

Important for the realisation of the elevated demands of building users is, however, professional and detailed planning. This application manual – from practical application for practical usage – is intended to assist simpler planning and implementation of a project.

1.1 Application manual ABB i-bus® KNX Security in Buildings

After a short introduction, this application manual will present some explanations about the fundamentals of security technology. They are independent of the KNX technology.
They include standards and norms as well as general security technology terminology.

Subsequently, the implementation of simple surveillance systems right up to sophisticated solutions incorporating all the classical functions of an alarm system are explained in detail. Furthermore, the benefits of the common system platform consisting of ABB Security Technology and ABB i-bus® KNX are depicted many times. Set-up of an ABB i-bus® KNX system exclusively for security functions is not useful.
ABB Security Technology offers a proven product range if security functions alone are to be implemented in a building without intelligent building control technology.

The selection possibilities of the individual security functions and their combination possibilities are very comprehensive. The checklist from ABB has proven to be very useful for simplification of the engineering involved.

A checklist template can be found in the Appendix.

Note
The application manual is intended for persons who already have acquired basic knowledge of ABB i-bus® KNX (basic functions, topology, addressing, …), e.g. in a certified ABB i-bus® KNX training session.
Detailed fundamental security technology knowledge is provided by the manual *Security Technology, Intrusion Alarm Systems, Planning and Wiring Instructions*. This security technology knowledge should be supplemented by the respective training sessions, e.g. at the regular security technology seminars at ABB.

ABB i-bus® KNX
Introduction

2   Introduction

The combination of ABB Security Technology components and the ABB i-bus® KNX devices enable optimum object surveillance and monitors buildings for unauthorized access. Furthermore, hold-up devices provide the opportunity to send emergency signals. Technical alarms (water, smoke, gas) can also be integrated.

The combination of ABB Security Technology with ABB i-bus® KNX allows extended functions to be implemented. They serve the comfort and the security needs of the occupants.

ABB i-bus® KNX is used in the following applications:

- Person and object protection
- Door and window surveillance
- Fire and smoke detection
- Hazard and intrusion detection
- Technical alarm
- Emergency signals
- Occupancy simulation
- Panic alarm (refer also to chapter 5.2 of the Lighting application manual)

Before solutions and their implementation are presented with ABB i-bus® KNX, it is necessary to consider a few fundamentals independently of KNX. They are standards and norms as well as general security technology terminology.

2.1.1   Standards and norms

In many countries and regions, there are guidelines for planning, operation and the components employed in surveillance and alarm systems. These ensure that the corresponding system meets all the necessary requirements. Should a system malfunction, it can lead to material and data losses and, in the worst case, can result in the loss of life.

Furthermore, it is essential for insurance companies to know how a building is protected when estimating the insurance risks of a building.

When surveillance systems are employed in buildings, national and international standards may need to be observed. Implementation using KNX is of course orientated to these standards. The options go partly beyond them.

However, full compliance with these standards is unnecessary with most projects. ABB Security Technology combined with ABB i-bus® KNX is the ideal solution for these projects.

2.1.1   German standards and norms

VdS 2311: Guidelines for planning and installation of intrusion alarm systems.
These guidelines are subdivided with regard to the project into three risk classes (A-C)

VdS 3431: Guidelines for hazard alarm systems
They relate specifically to domestic systems (Home Security).

The *VdS Schadensverhütungs-GmbH* (the German Authority on Safety and Security) is a wholly-owned subsidiary of the *Deutschen Versicherungswirtschaft (GDV)* (German Insurance Association (GDV). According to its own company information, it is the most important test institute in Germany for fire prevention and security. VdS certification is the established standard in Germany in surveillance systems.

For further information see: www.vds.de

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2.1.2   **Europe (within the European Union)**

EN 50131: EU standard for alarm systems, intrusion and hold-up alarm systems.
The standard defines the requirements for intrusion and hold-up alarm systems installed in buildings.
The requirements are classified into stage 1 for low risk to stage 4 for high risk.

For further information see: www.certalarm.org

Similar to Germany, there are, at least for the present, diverse national standards in other countries.

2.1.3   **Countries outside Europe or the EU**

Stringent national standards apply in countries outside the EU. The ISO organisation
(International Standards) plans to transform the EN 50131 to a worldwide applicable IEC 62642 standard.

IEC 62642: Draft standard for alarm systems, intrusion and hold-up alarm systems.
This international draft standard is intended to define the requirements in intrusion and hold-up alarm
systems for the international market.

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2.2   Terminology in security technology

The basic layout of an intrusion alarm panel (VdS - Intruder alarm control and indicating equipment I-CIE) is as follows:
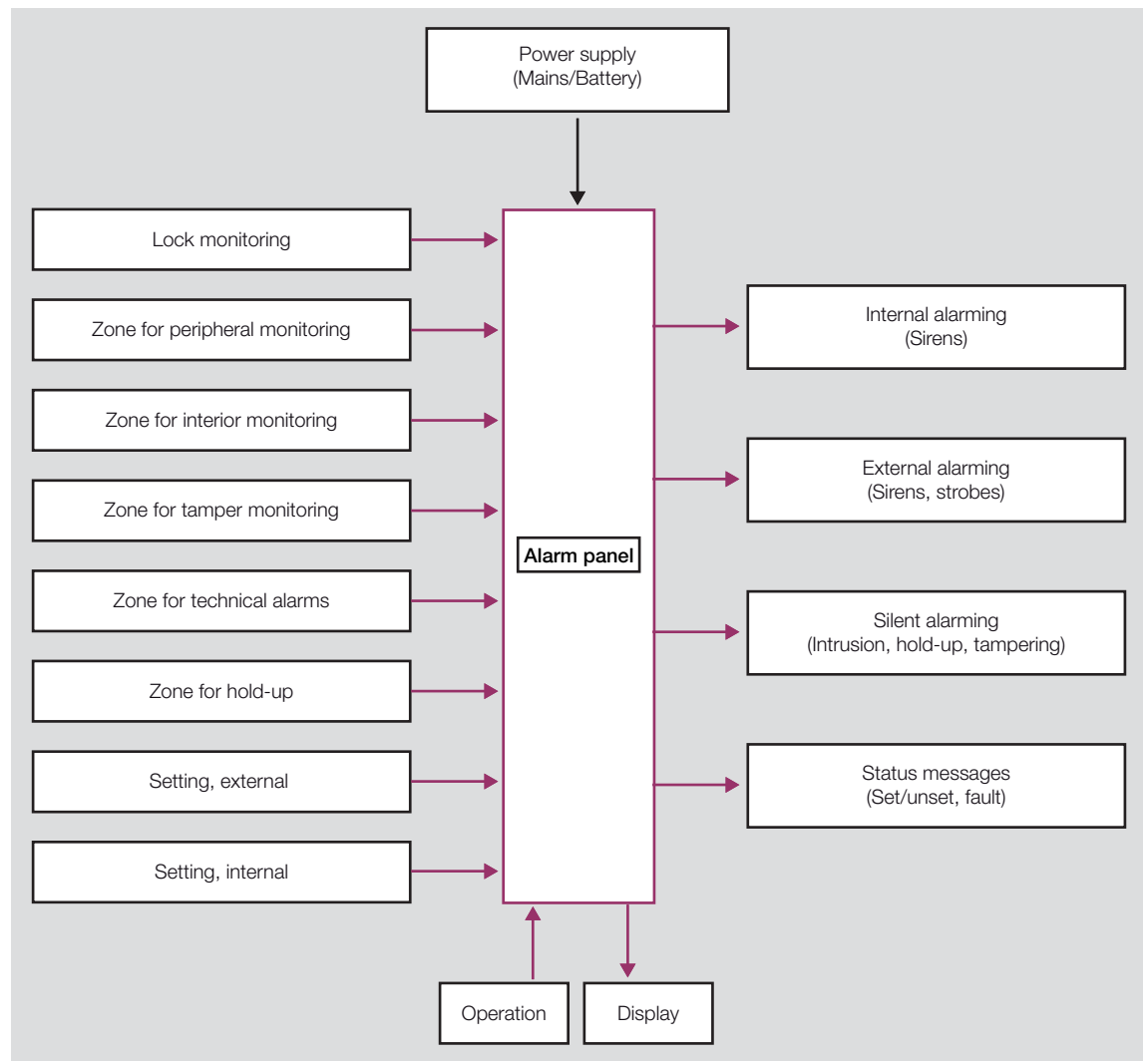
```
                          ┌─────────────────┐
                          │  Power supply   │
                          │ (Mains/Battery) │
                          └────────┬────────┘
                                   │
                                   ▼
┌──────────────────────┐    ┌──────────┐
│   Lock monitoring    │───▶│          │
└──────────────────────┘    │          │       ┌──────────────────────┐
┌──────────────────────┐    │          │──────▶│   Internal alarming  │
│ Zone for peripheral  │───▶│          │       │      (Sirens)        │
│     monitoring       │    │          │       └──────────────────────┘
└──────────────────────┘    │          │
┌──────────────────────┐    │          │       ┌──────────────────────┐
│ Zone for interior    │───▶│          │──────▶│   External alarming  │
│     monitoring       │    │          │       │  (Sirens, strobes)   │
└──────────────────────┘    │          │       └──────────────────────┘
┌──────────────────────┐    │          │
│ Zone for tamper      │───▶│ Alarm    │
│     monitoring       │    │ panel    │       ┌──────────────────────┐
└──────────────────────┘    │          │──────▶│   Silent alarming    │
┌──────────────────────┐    │          │       │(Intrusion, hold-up,  │
│ Zone for technical   │───▶│          │       │     tampering)       │
│     alarms           │    │          │       └──────────────────────┘
└──────────────────────┘    │          │
┌──────────────────────┐    │          │       ┌──────────────────────┐
│   Zone for hold-up   │───▶│          │──────▶│   Status messages    │
└──────────────────────┘    │          │       │ (Set/unset, fault)   │
┌──────────────────────┐    │          │       └──────────────────────┘
│  Setting, external   │───▶│          │
└──────────────────────┘    │          │
┌──────────────────────┐    │          │
│  Setting, internal   │───▶│          │
└──────────────────────┘    └──┬────┬──┘
                               ▲    ▼
                          ┌─────────┐ ┌─────────┐
                          │Operation│ │ Display │
                          └─────────┘ └─────────┘
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Basic term	Meaning
I-CIE = intrusion alarm panel	Central components, to which further devices and equipment are connected
Lock monitoring	Used, for example, to determine if the entrance door or windows are closed
Peripheral	Sensors connected to the windows, doors or walls, e.g. glass break sensors
Interior	Room surveillance sensors, e.g. motion detectors
Tamper	Self-monitoring of the system, e.g. cover tamper contact of an external siren
Hold-up	Hold-up device, e.g. with hold-up button
Setting, external	Activation of the alarm system when leaving the building
Setting, internal	Setting of the alarm system when persons are present, e.g. at night
Internal alarm	Alarm by an internal siren with internal setting
External alarm	Strobe/siren on the exterior
Silent alarm	Alarm via a telephone as a voice message, e.g. to a security company or as an SMS text message to a predefined number.
Status messages	Messages of the alarm system displayed on a display in the building, e.g. showing that the system is set
Operation and display	Operation of the system via the display and representation of the status messages, e.g. window open
Zone	Represents a circuit with security technology sensors. A zone or detector circuit can consist of several detectors connected as a group
Technical alarm	Connection of sensors, e.g. smoke, water and gas detectors

Note
Increasingly, the installation of smoke detectors in new buildings and in existing buildings is becoming mandatory. This provides effective protection of lives in the event of a fire.

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2.3 **Circuit principle with an alarm system**

Triggering of a detector in a surveillance system, referred to as a fault (alarm), is based on an open circuit or short circuit being applied. The intrusion alarm panel registers this by a series of measurements and implements appropriate measures.
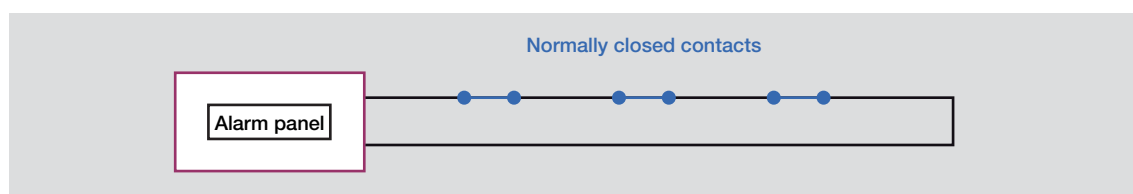
A differentiation is made between a primary line and a secondary line.

2.3.1 **Secondary line**

A secondary line is a non-monitored line that is easy to tamper. These are either open loop or closed loop circuits.

Closed loop circuits
Normally closed contacts are closed in their normal state (NC), and a current flows.

Normally closed contacts, e.g., are magnet contacts for monitoring window opening/closing.

Open loop circuits
Normally open contacts are opened in their normal state (NO), and no current flows.
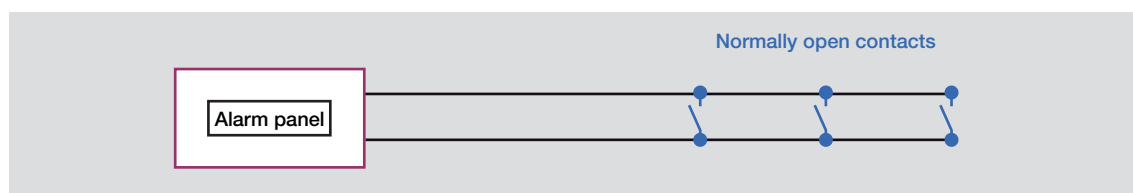
Normally open contacts, e.g., are for monitoring whether a door/window is closed or locked up.

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2.3.2 **Primary line**

A primary line is monitored for short circuits and open circuits.

Normally a certain current will flow. If the line is interrupted, current will no longer flow. A message is then sent. On a short circuit of the line, an increased current will flow, and a message is also sent. This functionality is achieved by the connection of a 2.7 kOhm termination resistor at the end of the line.

A primary line facilitates the connection of both normally closed contacts and normally open contacts in combination. Refer to the following circuit diagram:
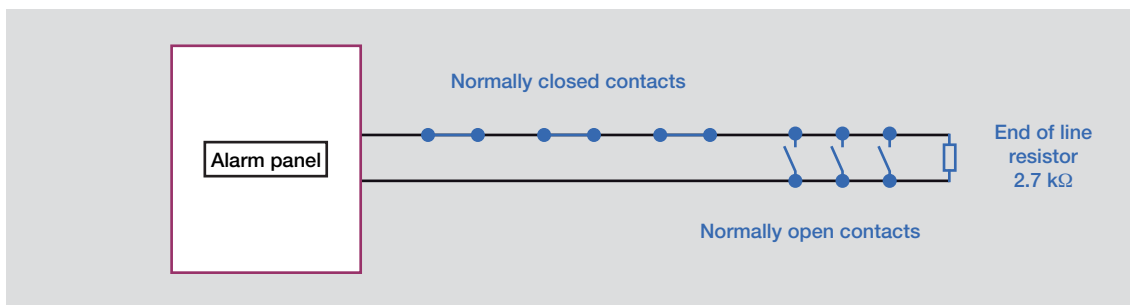
The primary line corresponds to a zone here. Various intrusion detectors, e.g. magnet contacts, glass break sensors or motion detectors are connected for each zone.

Tips
The VdS standard in Germany stipulates that a maximum of 20 sensors can be connected per zone. For reasons of clarity and easy identification of a message from a zone to the "faulty" sensor, the number of sensors should be reduced. Five or six sensors per zone has proved to be useful in practice.
When magnetic contacts are used on windows for heating/air conditioning control (window open ➔ heating/cooling should be switched off), ensure that a zone is planned for all contacts of a room.

Here you can see an electrical circuit diagram of a zone to clarify the function of a primary line.
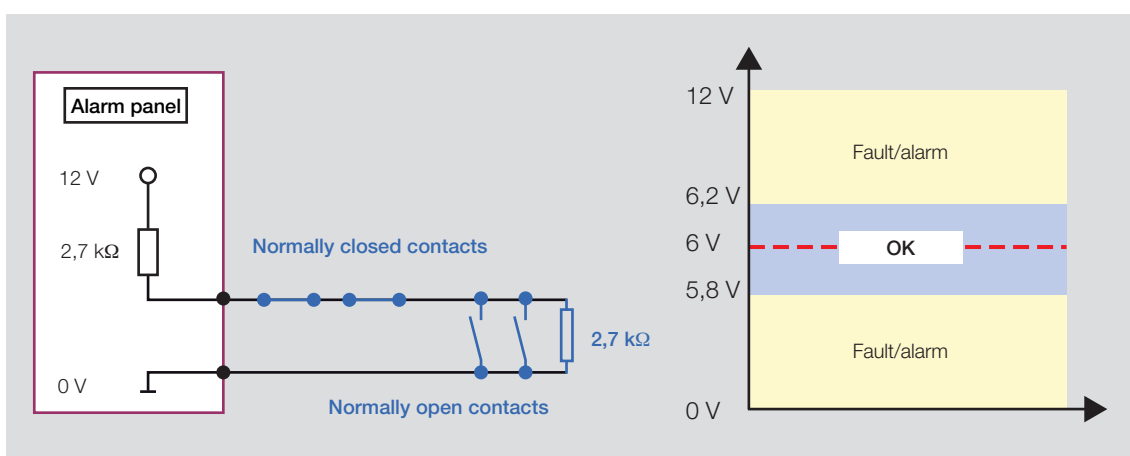
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The potential on the plus pole of the zone input is 6 V in the fault free state. A tolerance of +/- 0.2 V is permissible.

Should the line be short circuited at the input (normally open contact closed or shorted out due to tampering), the potential is practically 0 V, and fault/alarm is signalled.

Should the line have an open circuit at the output (normally closed contact opened or open circuit due to tampering/defect), the potential is practically 12 V, and fault/alarm is signalled.

Tip
In the event of a fault, the voltage value at the connection terminals should be measured with a Voltmeter (set to DC voltage).

2.4 Connection of a setting device

A setting device is a component that facilitates the activation of the alarm system, i.e. to put the system into the "set" state. When a sensor is triggered, e.g. by a motion detector, an alarm is activated. Setting can, for example, be implemented on a display in a building or externally via an electronic lock.
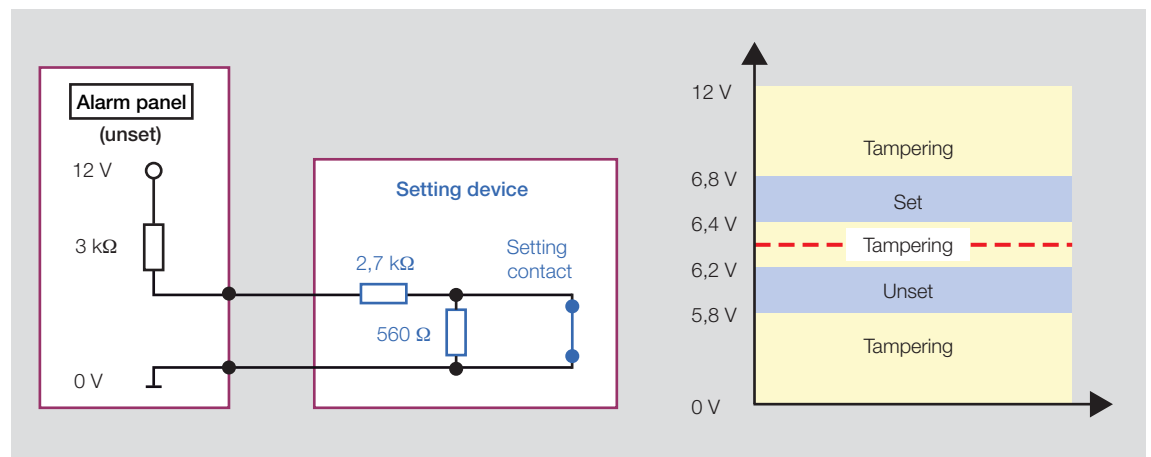

By connecting a 560 Ohm resistor in parallel with a setting contact, three states (set, unset and tamper) can be differentiated. A setting request is sent first of all. Now all devices are scanned. Setting is possible when all the devices are in the fault-free state. A message is sent if this is not the case. The system is set with an open contact and unset with a closed contact.

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2.5 Connection of strobes/sirens

Connection of strobes and sirens to the intrusion alarm panel is performed in the classic fashion via a relay contact with 12 V. On a combination of Safety Technology and ABB i-bus® KNX, the connection is via the output of a switch actuator.
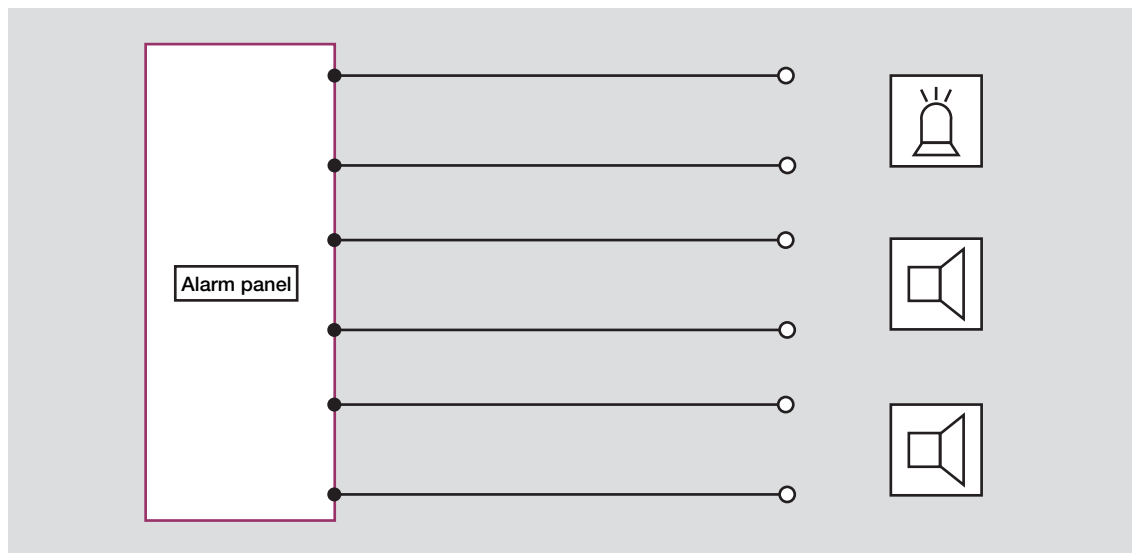
Tip
It is also very useful to integrate the cover tamper contact of the external siren/strobe into the zone, e.g. in a separate tamper group. Should there be an attempt at tampering or sabotage on the external siren/strobe, a separate tamper alarm is triggered in this way .

Alarm memory
When an alarm is triggered, it is important to be able to trace the detector or zone that has been activated. The path of an intruder can be determined in this way. The alarm memory ensures that the triggered zone cannot reset itself on alarm, e.g. due to closing of the window after a forced entry. The alarm memory can only be deleted, when the device is reset.

Reset
At a reset (reset of the system), the zones are briefly disconnected from the voltage supply, so that devices with an integrated alarm memory (water detectors, passive glass break sensors) are again ready to function.

Furthermore, the alarm memory as well as all existing alarms are reset. All triggered zones and existing faults must be remedied beforehand.

A reset can only be performed in the unset state.

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Emergency power back-up time

Emergency power back-up time is the time for which the monitoring system is powered by battery power in the event of a supply voltage failure. The battery capacity should be rated to ensure that the power supply is sufficient for the entire monitoring system in the event of a supply voltage failure, even over the course of several hours. Refer to chapter 4.8.

Unavoidability

It is essential that an alarm system always functions securely. As stated, it deals with the protection of people and valuable goods and malfunctions are highly problematic. Incorrect external alarms with strobes/sirens are not acceptable. In the worst case the customer will switch off the system and no longer use it.

Possible causes for malfunction are as follows:

- Poor quality or non-operationally safe components

- Poor planning

- Incorrect installation

- Improper operation

The first three points can be be excluded by the behaviour of a suitable and responsible installer and the selection of the right equipment.

It is important to leave the customer with a system where incorrect functioning due to improper operation is not possible.

Unavoidable setting/unsetting is important here:

- Setting should only be possible when all zones are fault free. This functionality is provided with all ABB solutions.

- Access to the building is only possible when the system is unset. This is possible, e.g. with an electro-mechanical blocking device in the entrance door, refer to chapter 4.5.1. ABB provides the corresponding components for this basic functionality.

However, a malfunction cannot always be excluded by improper operation; here are two classic examples:

1) *Delayed setting:* The user neglects to deactivate the alarm within the delay time after entering the building and unintentionally activates an alarm.

2) *Internal setting:* The user opens a window after internal setting and triggers an alarm.

This situation can only be avoided by the discipline of the user and requires the customer to be instructed accordingly.

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Configuration of an alarm/surveillance system with
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3   **Configuration of an alarm/surveillance system with ABB i-bus® KNX**

Necessary components of an alarm/surveillance system with KNX are:

- Sensors/detectors
- Signalling device
- Setting device
- ABB i-bus® KNX device as an interface

3.1   **Sensors/detectors**

The following sensors are generally used:

- Glass break sensors for monitoring glass in windows and doors
- Magnet contacts for monitoring opening of doors and windows
- Locking sensors to ensure that windows and doors are locked
- Motion detectors for indoor surveillance (persons)
- Hold-up buttons for alarming during a hold-up

Further special detectors, e.g. vibration detectors are not mentioned here, as they are practically never used together with KNX.

Additionally, you can also connect technical alarm sensors:

- Fire/smoke detectors
- Water sensors
- Gas sensors

All of these detectors are standard sensors that provide a contact (normally open or normally closed).

Use of technical detectors, e.g. for compliance with mandatory smoke alarm requirement, provides added value for a surveillance system by the detection of all dangers.

In principle, a wide range of devices are available on the market.

ABB provides a diverse range of security technology components, refer to the *brochure Intelligent Building Control Technology* or to the *Catalogue Product Range Overview*. Please consult the technical data for the corresponding devices.

These components from ABB are high-grade, VdS certified products. They have a very long service life and are very high quality.

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Interior monitoring

Passive infra-red detector

Hold-up button

Technical detectors

Water detector

Optical smoke detector

Gas detector

Peripheral monitoring

Magnet contact

Glass break sensor

Lock monitoring

Lock bolt switching contact

Lock monitoring for windows

Figure 1: Overview of security technology sensors

3.2   **Alarming**

In case of an event, the respective alarm must follow, i.e. it is necessary to externally indicate that something has happened. A differentiation is made between external and internal alarm as well as a silent alarm:

- *External alarm:* A siren and/or strobe are installed in a highly visible but difficult to access location on the building exterior. A second siren is also installed externally at a non-visible location. Usually combined strobe/siren units are installed. In the alarm condition the strobe remains active until it is reset. The alarm for the siren is generally limited to a maximum of three minutes to avoid a sustained level of nuisance noise. Connection to the KNX is implemented via relay outputs, e.g. on a Security Terminal or via a Switch Actuator.

- *Internal alarm:* An internal siren is quieter and smaller than an external siren and is installed indoors. It is connected to the KNX via a Switch Actuator.

- *Silent alarm:* If an alarm is triggered, a message is sent to a predefined telephone using the Telephone Gateway TG/S 3.2. The recipient can be any telephone, e.g. your own mobile telephone, the telephone of a trusted person or neighbour as well as a private security company, and in selected cases, the police.

Benefits
During a silent alarm it is possible to send additional voice messages about the type of alarm concerned, e.g. whether it is an intrusion, hold-up, tamper or a technical alarm. The Telephone Gateway can send this message by SMS or e-mail.

Siren / strobe

Internal warning device ("Solid State Siren")

Telephone Gateway

Figure 2: Warning devices and Telephone Gateway

In the following, various alarming methods and types are represented depending on the message and setting state. They are standard assignments that can, however, be modified thanks to the flexibility of the KNX.

Type of message	Setting state	Internal warning device	External warning device	Telephone Gateway
Intrusion alarm	Internally set	yes	no	no
	Externally set	no	yes	yes
Tamper alarm	Unset	yes	no	no
	Internally set	yes	no	no
	Externally set	no	yes	yes
Fault	irrelevant	no	no	yes
Personal attack alarm	irrelevant	no	no	yes
Technical alarm	Unset	yes	no	no
	Internally set	yes	no	no
	Externally set	no	no	yes

Figure 3: Alarming types

3.3 Setting device

A setting device allows the system to be activated, that is to say set. A differentiation is made between internal and external setting. An external setting can be implemented with a delay.

- *Internal setting:* This continues as long as occupants are in the house, e.g when they go to bed at night. With this type of setting, only the building peripherals (windows and door contacts, glass break sensors) are activated. Any motion detectors that may exist are not included so that occupants may move around inside the house or apartment without triggering an alarm. The internal setting is normally undertaken with the help of a display, where the system can be operated with a password-protected page.

- *External setting:* This is undertake externally after you have left the premises. The entire alarm/surveillance system is activated, including any existing motion detectors.

- *Delayed external setting:* With delayed setting, external setting is performed within the building. A delay time determines the time frame in which the building must be vacated after the setting has been implemented. If the building is not vacated within this time, the alarm is not set as the internal and/or peripheral detectors register the presence of persons in the building. In order to unset the system again, the interior and/or peripheral detectors in the delayed setting area must feature an alarm delay, and the system must again be unset. If the system is not unset during the alarm delay, an intrusion alarm occurs.
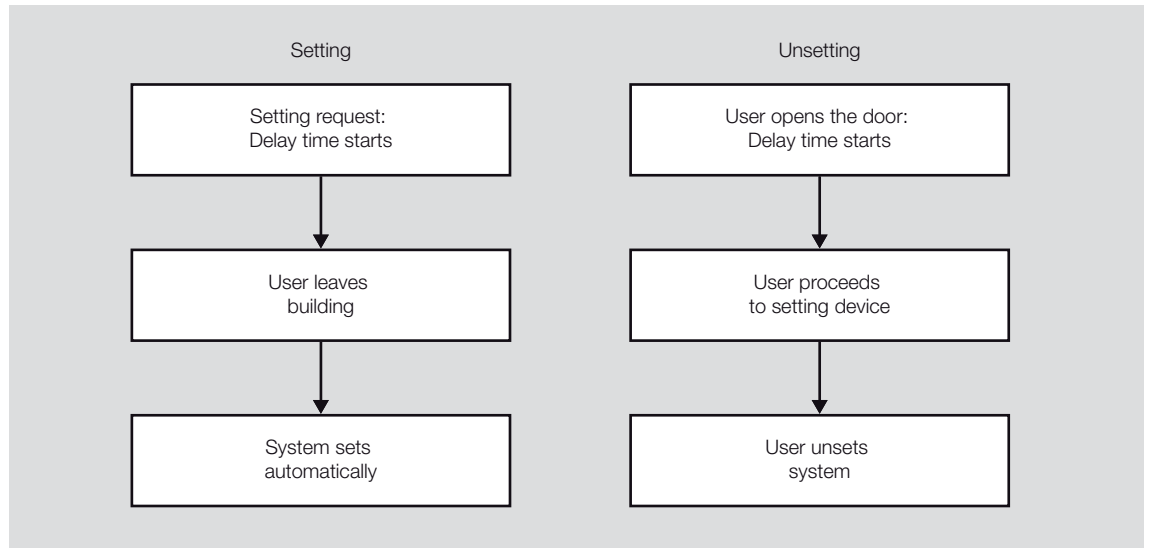
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Setting	Unsetting
Setting request: Delay time starts	User opens the door: Delay time starts
↓	↓
User leaves building	User proceeds to setting device
↓	↓
System sets automatically	User unsets system

Figure 4: Principle of delayed setting/unsetting

Different components can be considered as setting devices:

Internal or delayed external setting, operation in the building
For this purpose, control panels, displays or other KNX push buttons are available. A KNX push button with a long button push or multiple operation can, for example, be programmed for this function, so that incorrect operation can be avoided. Setting can be undertaken on a KNX display using a PIN code.

External setting operation outside the building
A keyswitch, setting locks, e.g. SafeKey or similar components are used here. In the simplest case, a binary contact is used for connection to the KNX.
A SafeKey is connected to a Security Terminal via a switch module.

For further information see: Chapter 4.5.1.

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SafeKey

Keyswitch

Non-contact setting device

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3.4   Further devices and functions

Internal setting can be undertaken via a KNX display. This allows it to be used for further displays and operations:

- Display concerning the state of the sensors, e.g. window open/closed

- Reset of the system after a fault (Reset)

- Limited shutdown of a zone, e.g. a bedroom window may be opened at night in summer for ventilation

- Event log – what has happened (read out of the log)

Also possible, depending on the technical solution via KNX, is the use of intelligence in the form of a logic module or application unit. This is very rarely the case because of the performance of the corresponding KNX devices (security terminal or security module).

Busch Room/ControlPanel®

Application Unit ABL/S 2.1

Busch ComfortPanel® or *Busch ComfortTouch*®

3.4.1   **How do I connect the devices, sensors, sirens/strobes and setting unit to the KNX**

The sensors concerned are generally binary contacts, i.e. a KNX component is required, featuring inputs for connection of the contacts. Use of Binary Inputs (Universal Interface US/U x.2 and Binary Inputs BE/S) is not useful as the job is usually not completed just with the detection of the signals. Other aspects also speak against Binary Inputs, refer to Advantages of Security Terminals compared to Binary Inputs on the following page. Binary Inputs were only used at the early origins of the KNX when no other special components were available.

The basis component for connection of security sensors is the Security Terminal.
At the present time there are three versions available:

- MT/U 2.12.2 (2-channel device, FM)

- MT/S 4.12.2M (4-channel device, MDRC)

- MT/S 8.12.2M (8-channel device, MDRC)

The Security Terminal is used for monitoring connected passive detectors, e.g. magnet contacts and/or glass break sensors on the ABB i-bus® KNX and/or for connection of other floating contacts in applications with enhanced security requirements.
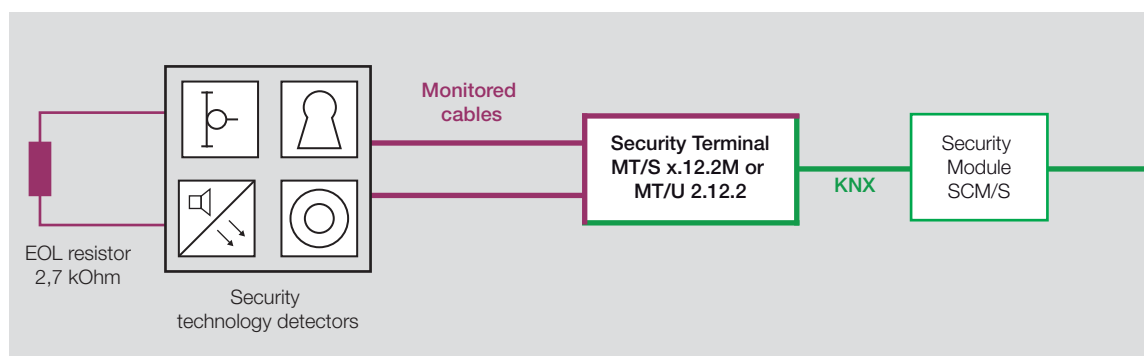
Figure 5: Sensor connection principle to the Security Terminal

The cable between sensors and the input on the Security Terminal is monitored by a 2.7 kOhm end of line resistor against short circuits and open circuits.

For further information see: Chapter 2.3.2.

Note
By modification of the programming of the Security Terminal, it is still possible to connect sensors without monitoring (without end of line resistor (EOL)) just like normal binary inputs.
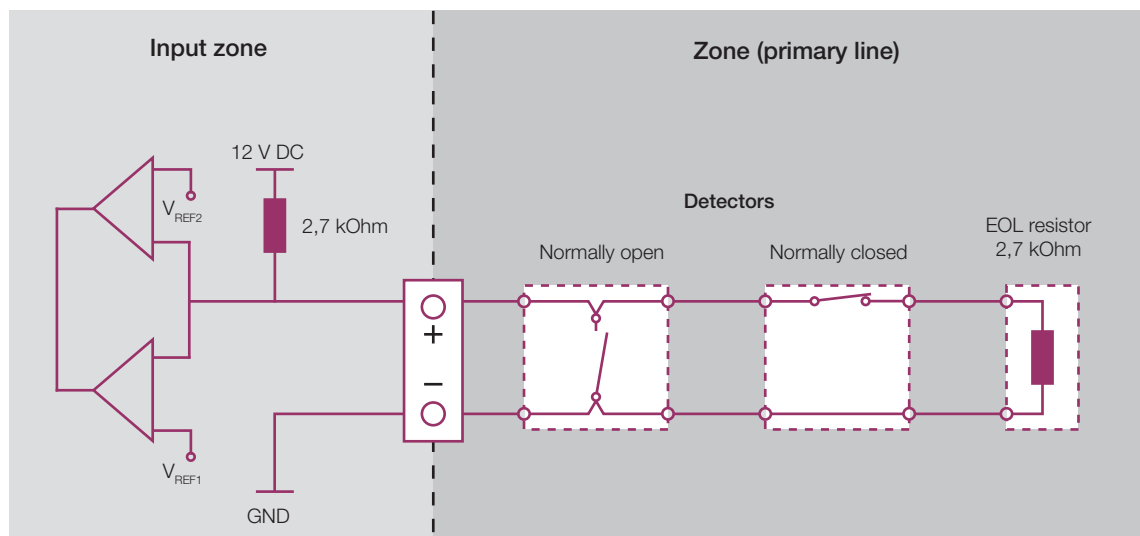
Figure 6: Circuit diagram of a detector circuit

Normally open (NO) and normally closed (NC) contacts represent real sensors in this case, e.g. a magnet contact. Sensors in a zone are compiled to logical units (zones) in practice.

Example
All windows in a room with magnet contacts and glass break sensors are assigned to a group.

Advantages of Security Terminals compared to Binary Inputs

- Monitored lines (primary circuits) offer protection against unintentional or intentional disconnection/short circuit.

- The max. cable length is considerably longer than a Binary Input with contact scanning

- At reset the zones are briefly disconnected from the voltage supply. This is necessary for resetting of certain detectors, e.g. glass break sensors

- The scanning voltage is compatible to intrusion detection detectors. They are electrically isolated from the KNX

- The Security Terminal delivers control signals "Walk test" or "set-unset" for motion detectors or setting devices

- Relay outputs are provided for connection of strobes/sirens

- The logic of a surveillance system is available in a Security Terminal, so that no external logic is generally necessary. Thus no "self-made solutions" that lead to frequent incorrect alarms occur.

3.4.1.1   **Security Terminal MT/S X.12.2M**

Two devices are available:

MT/S 8.12.2M for up to 8 zones

MT/S 4.12.2M for up to 4 zones

Both devices are identical apart from the number of channels.

MT/S 8.12.2M, Security Terminal, 8-fold, MDRC

Technical data:
– 8 zones
– 1 floating relay output (12 … 24 V DC)
– 2 x 12 V DC relay outputs with max. short-circuit current 0.6 A
– 12 V DC auxiliary voltage (current consumption: 13 … 83 mA)

Zones A...H
LEDs:
● Zones A...H
○ Set/Unset
○ Manual operation
○ 12 V DC relay outputs

Push buttons:
Manual Operation
Reset
12 V DC relay outputs

12 V DC relay outputs
Floating relay output
12 V DC auxiliary voltage input

Figure 7: Overview of Security Terminal MT/S

This device provides all basic functions of the security technology, i.e. Setting/Unsetting, Reset, Set feedback.
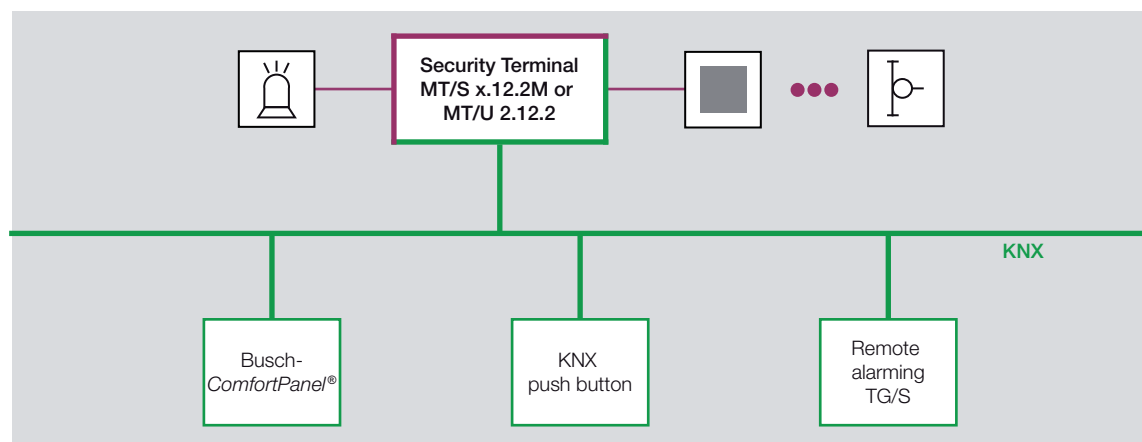
Figure 8: Principle of configuration of a surveillance system with a Security Terminal

Example
Typical application areas of this device are in smaller projects (detached house) with a **maximum of 8 zones** and the following functions: • Monitoring of the windows on the ground floor and cellar using magnet contacts   • Indoor surveillance (staircase, hall) with motion detectors   • Monitoring of the entrance doors   • Setting via corresponding devices on the entrance doors   • Alarming via strobes/sirens

3.4.1.2 **Security Terminal MT/U 2.12.2**

This device differentiates in terms of the physical design (FM version) and the number of channels (2 channels) of MDRC devices MT/S. The MT/U 2.12.1 is installed on a distributed basis in rooms in FM switch boxes.

Benefits
Conventional wiring of the sensors is reduced. Not every zone must be wired right up to the distribution board.

12 V DC auxiliary voltage input
12 V DC relay outputs
Zones A…B
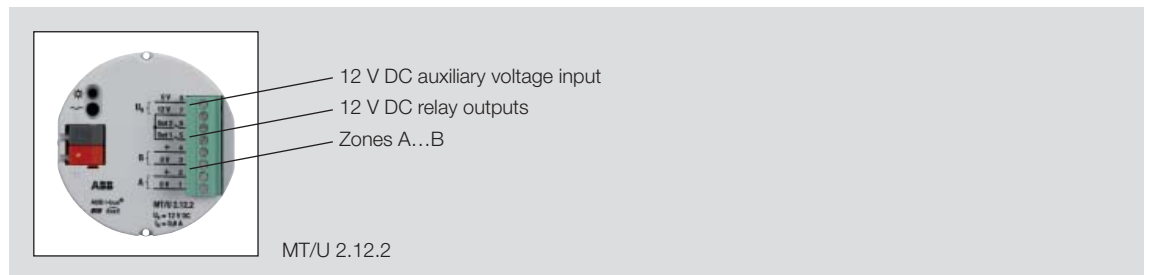
MT/U 2.12.2

Figure 9: Security Terminal MT/U 2.12.2

Important
The use of Security Terminals is limited to one device per system, i.e. a maximum of eight zones (MT/S 8.12.2M). In practice, this means that the Security Terminal is suitable for smaller domestic projects, e.g. an apartment. Connection of several terminals in parallel is only possible with additional external logic. This should be rejected for technical and costing reasons.   If more than eight zones are required, use of a Security Module SCM/S 1.1 is recommended.

3.4.1.3 **Security Module SCM/S 1.1**

The SCM/S 1.1 means a functional expansion of the Security Terminal. The following overview images should help to clarify the situation:
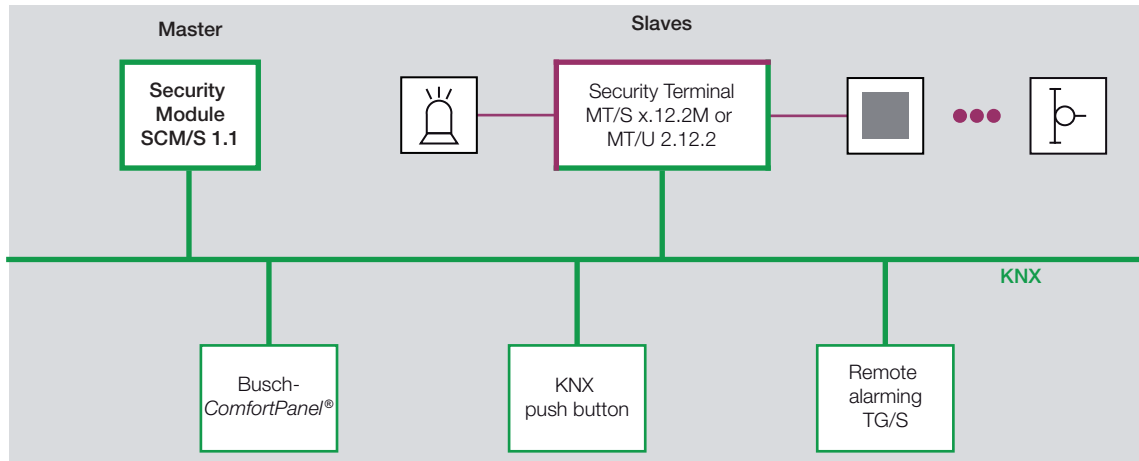
Figure 10: Principle of configuration of a surveillance system with a Security Module
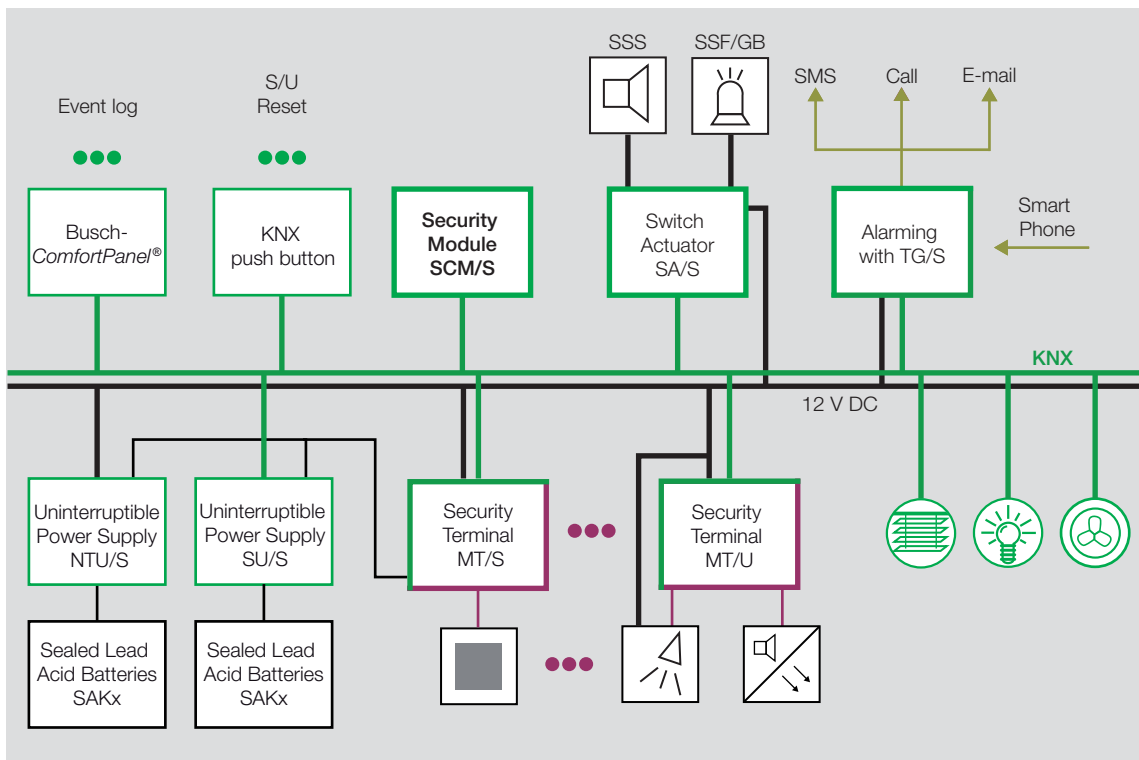
Figure 11: Detailed principle of configuration of a surveillance system with a Security Module

ABB i-bus® KNX
Configuration of an alarm/surveillance system with
ABB i-bus® KNX
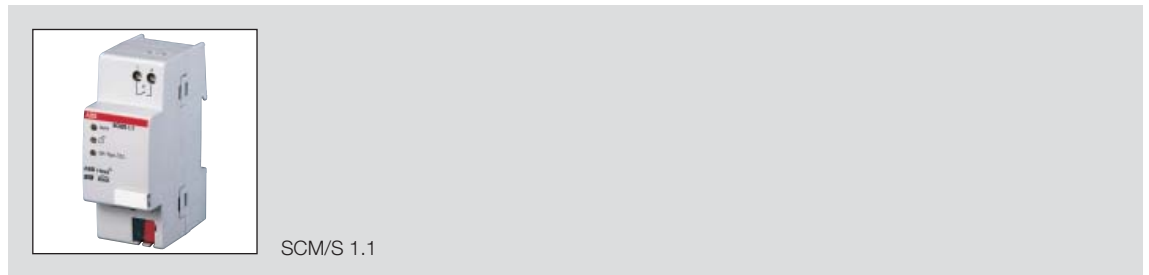
SCM/S 1.1

Figure 12: Security Module SCM/S 1.1

The connection is to the KNX, which the device uses to communicate with the other devices by telegrams. A relay installed in the Security Module SCM/S 1.1 can be set to be normally closed or normally opened. The following functions can be programmed:

- Actuation on bus voltage failure

- Actuation on bus voltage recovery

- Alarm

- Set state

- Actuation via a communication object, i.e. just like a normal Switch Actuator

Note
Any other available Security Terminals are only used as inputs for the sensors but, in contrast to the Binary Inputs, only for the monitored cables.
In this way, several Security Terminals can be installed in parallel, the entire security logic for this solution is present in the Security Module.

Advantage of the Security Module compared to the Security Terminal.
- Evaluation after intrusion, hold-up, tampering, technical alarm, locking device, fault

- Comprehensive status displays

- User-friendly plain text displays with Busch *Room/ControlPanel*® or Busch *ComfortPanel*®

- Event log with date, time, event and alarm type

- 64 zones, in master-slave mode can be extended to 500

- Differentiation between internal and external setting

- Delayed external setting:

3.5 Where are the limits of the "KNX Solutions"?

If VdS or other standards are required, it is not permitted to assume security functions actively via the KNX, e.g. setting or connection of sensors via the KNX.

All the solutions described up to now are not permitted for alarm/surveillance systems.

Furthermore, sometimes the following demands are requirements

*   Special functions of a conventional alarm system are required,
    e.g. several setting areas.

*   A visible, classical alarm panel is required.

The only possibility to implement an alarm/surveillance system with KNX according to VdS/EN standards is the use of an alarm panel as an autonomous system with supplementary functions in the KNX.

Here too ABB provides a solution, the Intrusion Alarm Panel L240.

3.5.1 Solution with Intrusion Alarm Panel (EMZ) L240

First of all it is a solution independent of the KNX that can be connected to the KNX when required using the Interface XS/S 1.1. Bi-directional communications (L240 ➔ KNX and KNX ➔ L240) can be set.
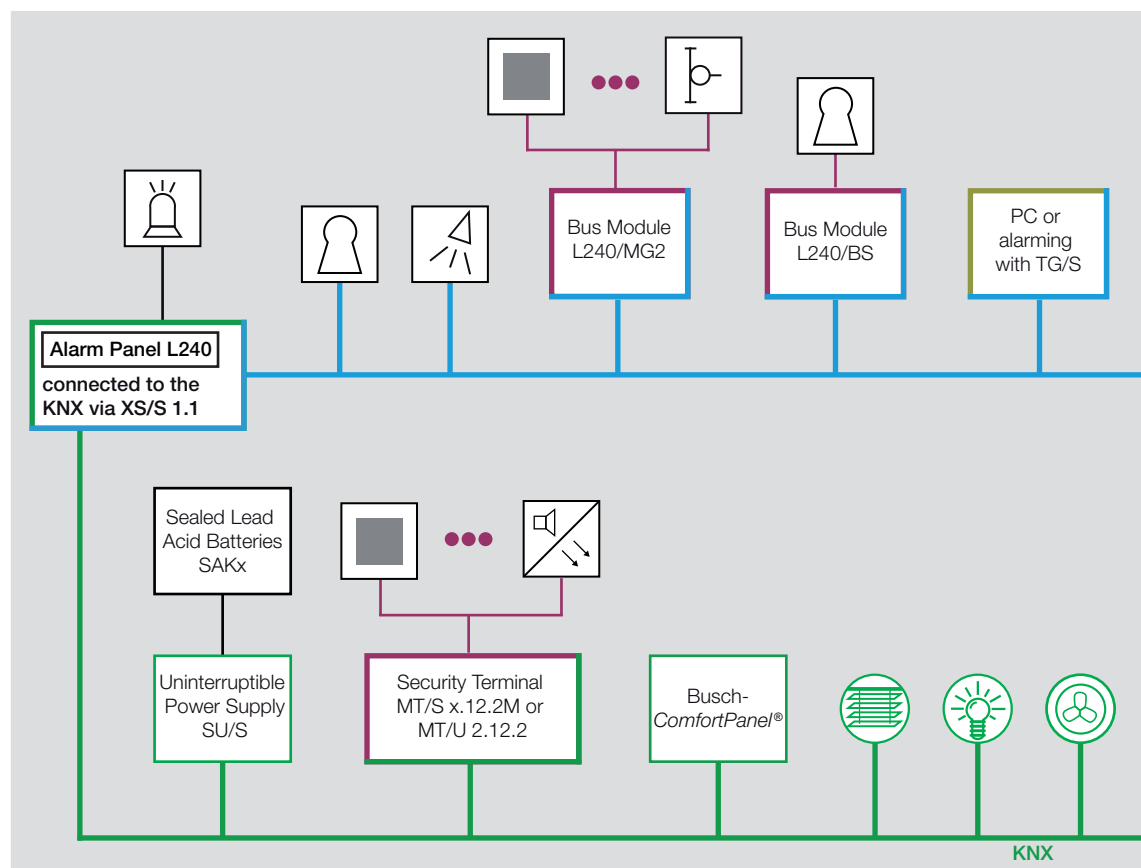
Figure 13: Principle of configuration of a surveillance system with the Intrusion Alarm Panel L240

ABB i-bus® KNX
Configuration of an alarm/surveillance system with
ABB i-bus® KNX

3.5.1.1   **The most important features of the Intrusion Alarm Panel L240**

Risk allocation, classification

*   VdS approved as an Intrusion Alarm Panel for VdS classes A, B, C

*   Corresponds to DIN VDE 0833 parts 1 & 3

*   Stage 3 according to European standard EN 50131-1 "medium to high risk"

Typical areas of application

*   Residential and commercial properties with more than one security zone

*   Commercial zones up to stage 6, (security guidelines for businesses and companies), banks, with an insurance company/police requirement for a medium to high risk alarm system

Application limitations

*   The Intrusion Alarm Panel is suitable for all types of risk

*   The limits of the application are only in the system (number of zones)

Degree of expansion

*   4 setting zones

*   80 programmable inputs

*   XIB Bus motion detector can be connected to the internal security bus XIB

*   Window contacts and glass break sensors can be connected to the bus via the Bus Module L240/MG2

Other features

*   Programmable via PC software directly or via IP Interface L240/IP

*   KNX Interface XS/S 1.1 for complete integration of the intelligent building control technology KNX

For further information see: Intrusion Alarm Panel L240 product manual.

3.5.1.2   **Solution with Intrusion Alarm Panel L240 and KNX Interface XS/S 1.1**
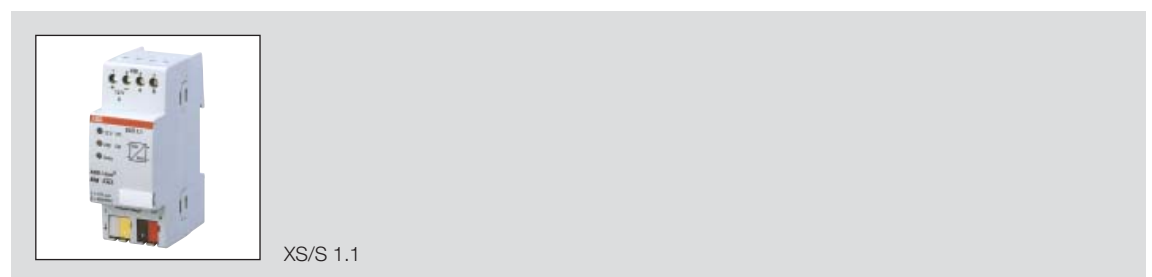
XS/S 1.1

Figure 14: Interface to the Intrusion Alarm Panels XS/S 1.1

The following representation indicates all options of the connection principle to the L240 with the KNX. The zones (up to 80) can be connected directly to the L240, to the internal security bus XIB as well as to the KNX via Security Terminals.

The strobes/sirens can be connected directly to the L240 or via a Switch Actuator with the KNX. The Setting Device SafeKey is connected to the security bus XIB via the SafeKey Evaluation Module L240/BS or with the help of the Switch Module SSM/x via a Security Terminal MT/x.
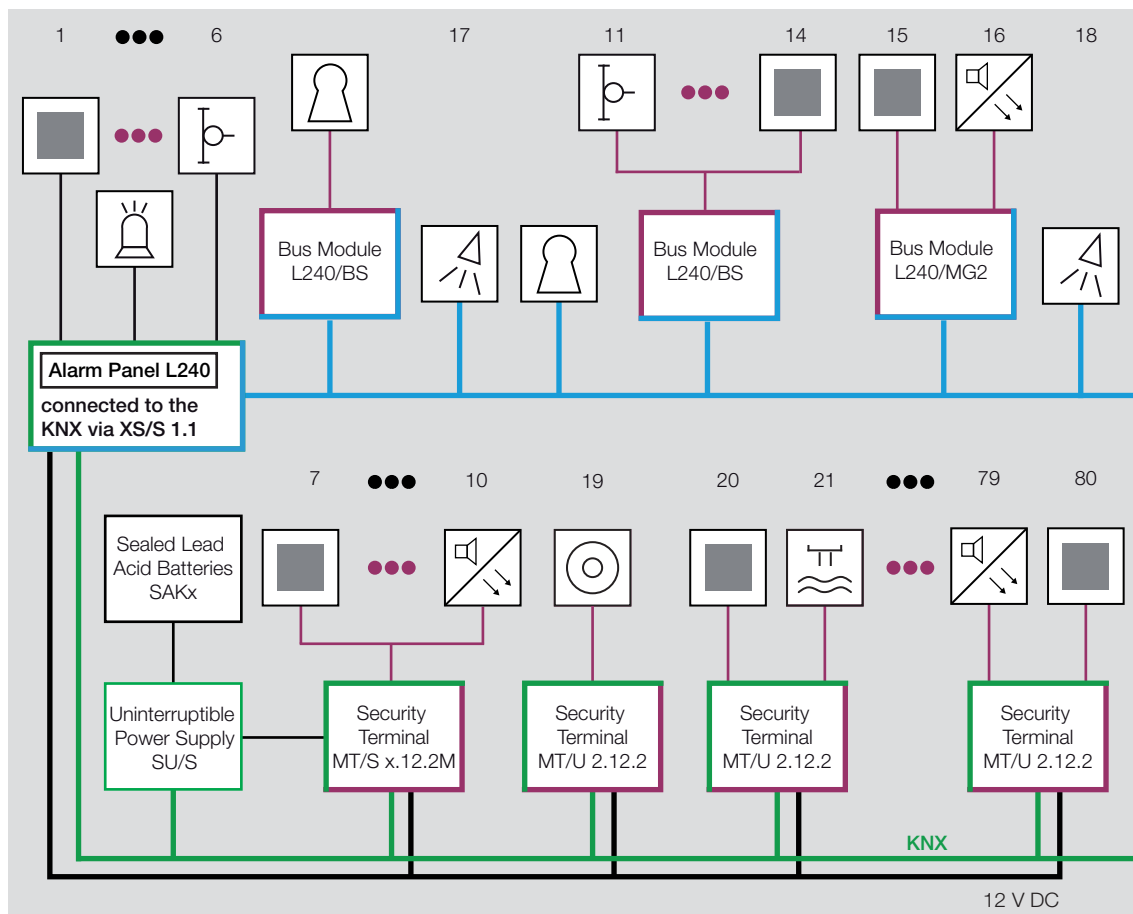
Figure 15: Detailed principle of configuration of a surveillance system with the Intrusion Alarm Panel L240

Two different operating modes can be set with regard to the communication between the Intrusion Alarm Panel L240 and the KNX.

Default: L240 ← → KNX
Bi-directional data communication is allowed; full functionality ia available.

Outputs only: L 240 → KNX
Data communication from the L240 to the KNX is permitted and is thus compatible with the VdS standard EN 50131

Important
In practice, the operating mode *Standard* is generally used, as it is possible to use all possibilities here.
Systems, which only permit *Outputs only* because of the standards, are not the focus of possible projects with ABB Security Technology and ABB i-bus® KNX.
However, it is still possible to obtain added value in comparison to conventional surveillance systems without KNX connection, e.g. additional functions such as flashing of the lighting in the event of an alarm or representation of status information on a KNX display.
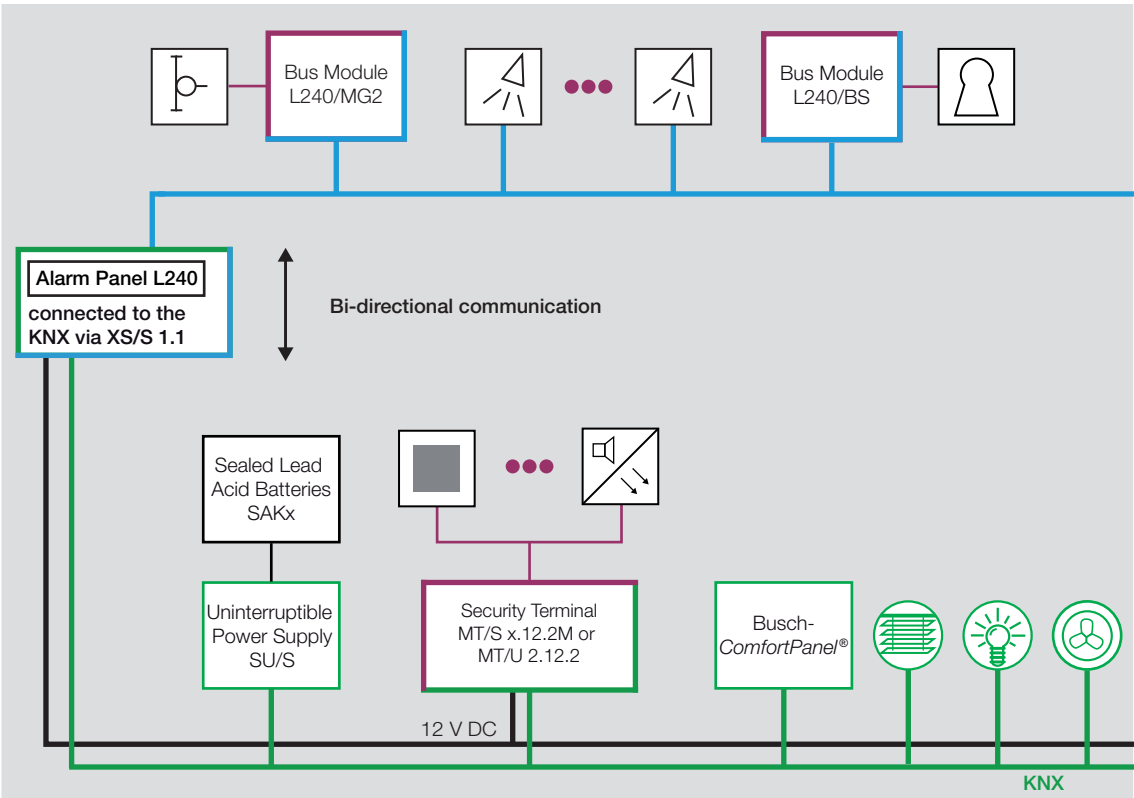
Figure 16: L240 and KNX with bi-directional communication
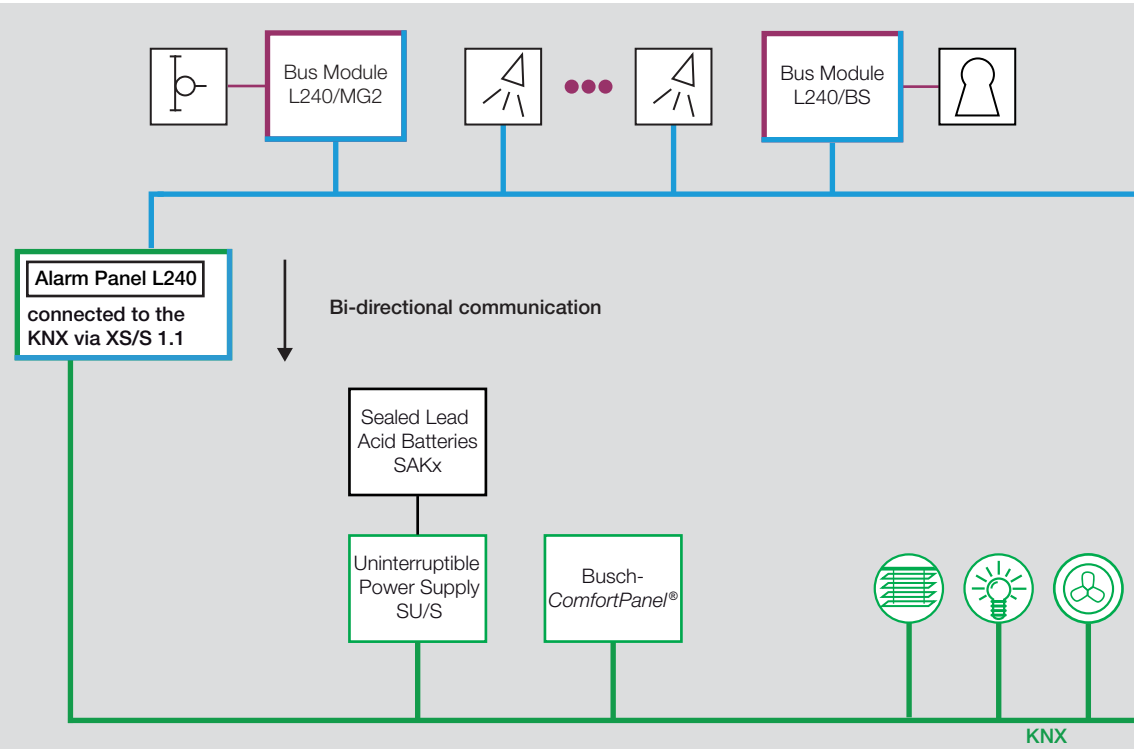
Figure 17: L240 and KNX with uni-directional communication

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Extended safety functions with ABB i-bus® KNX

4   Extended safety functions with ABB i-bus® KNX

In this chapter, you will find more detailed explanations about the security functions, the resulting benefits and improved possibilities offered by connection to the ABB i-bus® KNX.

4.1   Hold-up button

A hold-up button has the task of triggering an alarm when persons are located in the premises and in danger. These buttons are distributed at different, easily accessible points in the building to ensure that they are only a short distance away when required.

This button is wired in a classical manner to the Intrusion Alarm Panel on conventional alarm systems. A hold-up button is protected against unintentional actuation by a protective film or cover.

Hold-up button

Hold-up button

Cover

Disadvantage of this solution

a) Optical appearance, buttons do not fit into existing design, have a very technical appearance

b) Cables wired to a panel

c) (Intentional) improper operation cannot be excluded, children are attracted to the button

---

These disadvantages can be eliminated by the connection of security functions with the KNX:

- regarding b), can be remedied by connection via the Universal Interface US/U x.x to the KNX
- regarding a) and c): Solution via KNX possible in two ways:

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4.1.1

Method 1: Universal Interface US/U x.2

Usage of the US/U x.x together with a conventional button in the visual design of the switch range already in use. In order to avoid incorrect operation, select the function long operation or multiple actuation.

Additional benefit
It is possible to assign the rocker with a further (normal) function that only requires a short operation.

4.1.2

Method 2: KNX push button

Use of normal KNX buttons, also using long operating.

As not all KNX buttons offer the diverse possibilities of the US/U x.x, select the alternate method via the function *Blinds*, which also facilitates the differentiation between long and short operation.

For further information see: Lighting Application Manual, Chapter 2.1.1.1.

Further possibilities for using a long operation
The push button Busch-triton® allows an increase in the time for long operation up to 2.1 s. Thus, unintentional operation is very unlikely.

The **Busch** *priOn*® push button features a time up to 3 s for long operation. Furthermore, the function *Multiple operation* is available here. Depending on the programming, a function is activated only after actuation repeated one to 5 times.

With the function *Blind*, on the left side there is a button with a logical 1 (move DOWN), and the other side is assigned with the corresponding 0 (move UP) or vice versa, depending on the programming.

If both ends of the rocker are intended to trigger a hold-up alarm, you will need to invert one side of the rocker.

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Centre rocker with function
Blind sensor

I0-1 Bit	1, Timer	O2-1 Bit
1/1/4	F1	1/1/5
	te=00:00:00	
	ta=00:00:00	
	tp=00:00:00	

I1-1 Bit	2, Timer	O3-1 Bit
1/1/4	F0	1/1/5
	te=00:00:00	
	ta=00:00:00	
	tp=00:00:00	
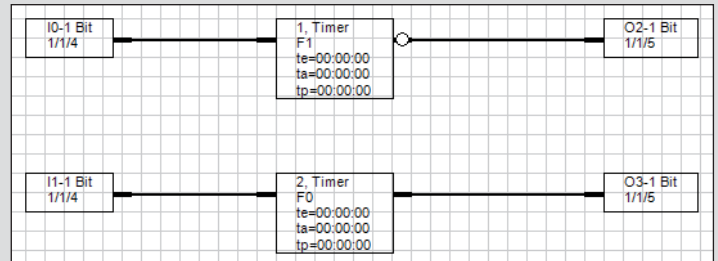
1/1/4 short operation   1/1/5 hold-up alarm group address

This function in the ABL/S 2.1 converts the telegram with the value 0 to a telegram with the value 1 (inversion in block 1), whereas the telegram with the value 1 remains unchanged (block 2).
The telegram with the value 0 is filtered out in block 2, the telegram with the value 1 is filtered in block 1.

| **Important** |
| As the outputs of both blocks always send the group address with the same value, the parameters of the outputs must be programmed so that this is also possible. |

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Extended safety functions with ABB i-bus® KNX
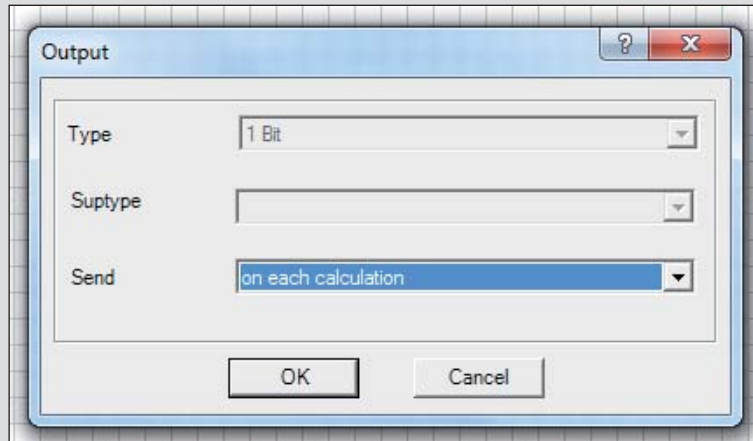
A further possibility to realize the long actuation of the button is to set the rocker, so that on actuation a 1 is sent and when released a 0 is sent, see parameter *Switching function of rocker right* with option *rising = ON, falling = OFF*, Fig. x.

With the additional function in ABL/S 2.1 (Switch ON delay), you can achieve that the switch on delay operates as long as the button is pressed. If the button is released within this time, a 0 is sent, and the process is stopped. If this time is exceeded during actuation, the timer sends a 1. If the push button is released, the switch off delay is started. This is, however, generally meaningless with a correspondingly long time duration (can be set up to 18 hours), as alarming is switched off via a reset, before it times out. Of course, you can also set a time duration to be actually used here, i.e. how long an alarm should remain present.

Device: 1.1.3 6126 2f-Switch sensor,FM	
BCU-Type	
Rocker 1	Operation mode of rocker — Flexible allocation
Rocker 2	Reaction on rocker right — switch defined
	Switching function of rocker right — rising = ON, falling = OFF

1/1/10   1/1/11 alarm group address

| I4-1 Bit 1/1/10 | 3, Timer - te=00:00:00 ta=18:12:15 tp=00:00:00 | O5-1 Bit 1/1/11 |
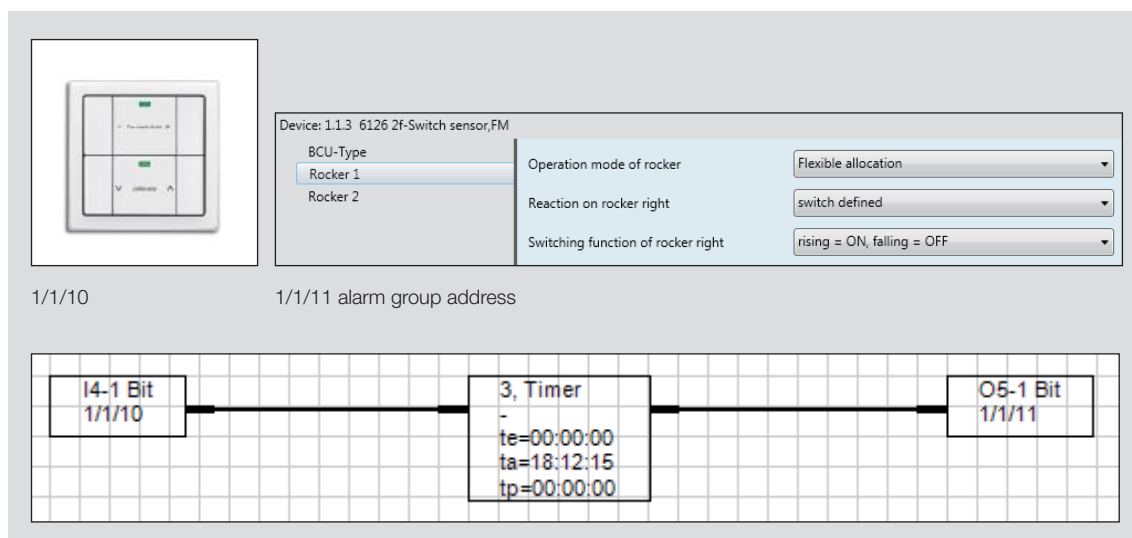
4.1.3   What type of alarm is triggered with a hold-up button?

The standard is a silent alarm that is issued via the Telephone Gateway TG/S 3.2. Of course an internal/external alarm is also conceivable as well as additional functions in the KNX installation.

For further information see: Chapter 3.2 Alarming

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4.2	**Occupancy simulation**

Should you want to protect a building against intrusions, one method is the use of alarm systems. The alarm systems only activate after the intrusion, i.e. the damage to the building or installation has already occurred.

It is even better to take preventative measures. One method employed to prevent intrusions is an occupancy simulation.

4.2.1	**What is an occupancy simulation?**

The objective is to make the building look as if it is occupied. The electrical installations controlled via ABB i-bus® KNX offer the following possibilities:

- Switching of lights

- Control of roller blinds and blinds

- Switch on of the garden irrigation

- Switching of TV or music centres

This means that functions can be controlled using the respective timer control.

For further information see: Lighting Application Manual Chapter 3.4. Timer control

To ensure that the timer controls do not occur every day at the same time, the following opportunities are available.

ABL/S 2.1 with application Times/Quantities
This software features 800 switching times, so that in principle a separate switching point can be selected for every day of absence and every function. The timer program can be activated or deactivated by a telegram as required, e.g. by an absence button.

Busch Room/ControlPanel® **or Busch** *ComfortPanel*®
It is possible here to record the telegram traffic on the KNX for a period of up to seven days and then to replay this sequence later on up to ten assigned loads.
The device practically learns the operating preferences of the user.

Benefits
Operation and implementation is even simple for the occupants.

Conventional timers with random generator
Timers partly offer the opportunity to vary the switching times within a defined window, i.e. switching times randomly vary from day to day by +/- 15 min. This helps avoid the impression of regularity.

Connection of a conventional timer is implemented using binary inputs.

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4.3	**Triggering actions in the house with setting/unsetting or alarm and technical alarms**

Using the following security solutions from ABB, it is possible to implement a variety of basic monitoring functions right up to professional security installations.

Typical applications range from simple functions, e.g., opening surveillance or lock monitoring of doors and windows, reporting fractures in water pipes or the early detection of smoke to installations in buildings, up to VdS requirements (class A, B or C) or demands in accordance with the European standard EN 50131 stage 1-3.

In terms of an integrated solution, it is useful to allow certain functions of the alarm system to be carried out automatically in the KNX installation.

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Setting of the system

– Enable the motion detector in the peripheral area,
so that when a detector is triggered, all outdoor lights are switched on
– Flashing of the external lighting to confirm setting (Setting confirmation)
– Switch on of the path lighting and the light in the garage
for a certain time
– Closing of the electrical roof-light with external setting

– Shut off of the water supply
– Shut off of all load circuits with external setting
– Occupancy simulation with absence
– Lowering of the roller blinds or enabling of timer control
of the roller blinds or enabling of the roller blind control
in dependence on the brightness and external temperature

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Unsetting of the system

– Rescinding of all enable functions (occupancy mode, timer programs for the roller blinds, motion detectors in the peripheral area)
– Switch on of designated lights in the house
– Raising of the set temperature (heating) or lowering of the set temperature of the air conditioning for cooling
– Release of the water supply

Additional benefits of KNX
– Window contact: Switch off of air-conditioning when a window is open
                      Closing of a heating valve when a window is open
– Motion detectors: Switch on of illumination when a motion is detected

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System alarms

- External alarming with external sirens
- Remote alarming (silent alarm) with Telephone Gateway TG/S

- Lighting and blinds are controlled on alarm, e.g. roller blinds are raised and the entire house lighting flashes
- Switches on other loads, e.g. music systems

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Technical alarm (smoke, water, gas)

Active at every alarm system state

– Switch off of the power circuits
– Internal alarm (internal siren)
– Raising of the roller blinds, opening of the roof-lights
– Remote alarming (silent alarm) with
  Telephone Gateway TG/S

Benefits
Some components now have a double usage, which enhances the efficiency of the system

Examples
• Magnetic contact: Alarm message and control of the heating and air conditioning
• Motion detectors: Alarm message and control of the lighting
• Touch panel: Control of different KNX functions and operation/display of the alarm system
• Telephone Gateway: Control of different KNX functions and messages of the alarm system

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4.3.1   **Implementation of additional functions enable/disable as well as flashing**

Enabling and disabling of functions can be easily implemented via the function GATE of the Logic Module LM/S 1.1 or the Application Unit ABL/S 2.1.

Example
Enable of timer control of blinds with the ABL/S 2.1.
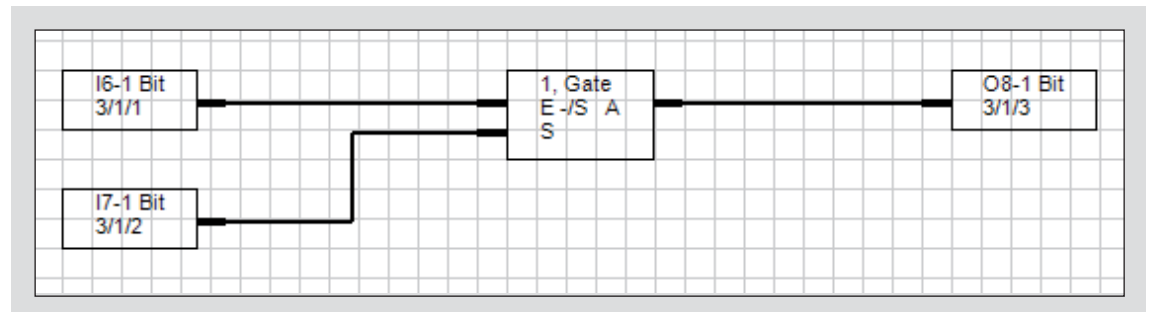
- Group address (GA) 3/1/1 GA of the timer, e.g. at 22:00 a 1 is sent; at 08:00 a 0 is sent
- GA 3/1/2 from the setting unit
- GA 3/1/3 goes to the blind actuators communication object move UP/DOWN
- 3/1/2 enables the GATE, so that after setting, the GA 3/1/1 is passed through the GATE and as GA 3/1/3 can move the blinds UP and DOWN.

It may be sensible in the blocked state of the GATE (with occupancy) to save the timer telegrams (parameter: *Additional function - Save during blocking phase*).

Example
If the building is vacated, e.g. at 23:00, and the alarm is set, the yet to be executed function *Move blind DOWN* is carried out.

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Function *Flashing* for the house lighting

If Switch Actuators SA/S x.x are in use, this function is easy to implement. There are different parameters and a designated communication object for this purpose. The flashing frequency and duration can be adjusted.

Device: 1.1.4 SA/S8.16.5S Switch Actuator,8-fold,16A,MDRC

General	
A: General	Time function — Flashing
A: Function	
B: General	Flashing if object "Switching" is — always flashing, ON (1) or OFF (0)
B: Function	
C: General	Time for ON: Min. (0...65.535) — 0
C: Function	
D: General	Time for ON: Sec. (1...59) — 3
D: Function	
D: Time	Time for OFF: Min. (0...65.535) — 0
E: General	
E: Function	Time for OFF: Sec. (1...59) — 3
F: General	
F: Function	Number of ON-impulses: (1...100) — 100
G: General	
G: Function	Contact position after flashing — calculate present contact position
H: General	
H: Function	Remamber: Attend contact live and switching number per minutes — see technical data

If the function Flashing is selected, normal operation (permanent ON/OFF) is possible via a separate communication object *Permanent ON*.

70	Output D	Switch	1 bit	C	-	W	-	-	Low
71	Output D	Permanent ON	1 bit	C	-	W	-	-	Low
72	Output D	Disable Time Funkt	1 bit	C	-	W	-	-	Low

Note
The shortest duration that can be set for lighting ON/OFF with flashing is 1 s each. A shorter time is not useful due to the mechanical properties of the relay and the Switch Actuator.
On fluorescent lamps and energy-efficient lamps, the function *Flashing* is not useful due to the switch-on behaviour.

If Switch Actuators SA/S are not in use or Dim Actuators are installed, the function *Flashing* must be implemented externally. The ABL/S 2.1 once again is helpful in this respect:

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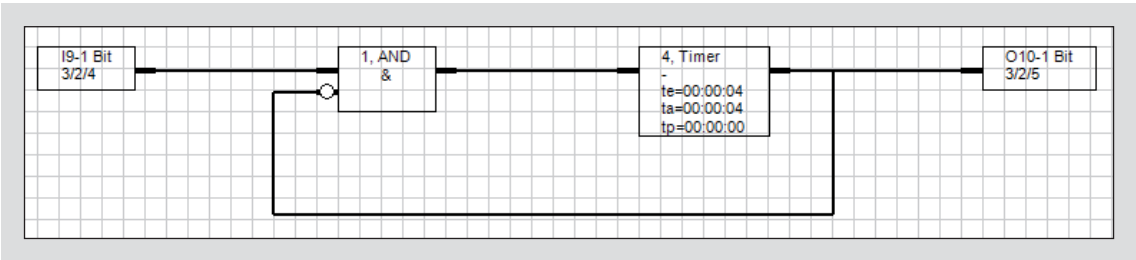
The GA 3/2/4 (alarm group address) with the value 1 starts the logic. With this setting, the light switches ON for 4 s and then OFF for 4 s, etc. GA 3/2/4 with the value 0 stops the function.

Important
The parameter of output O10 must be set, so that it is only sent on a change. Otherwise, the OFF state will cyclically send a 0.
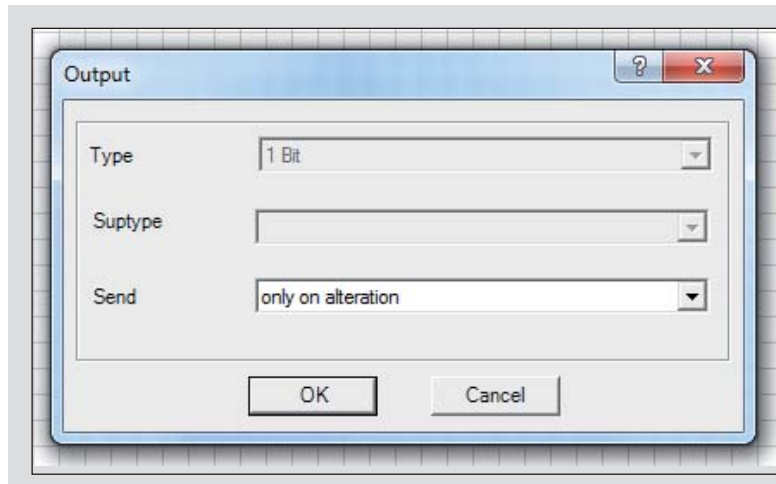
Tip
Do not select the ON and OFF duration to be too short, as on the one hand the Switch Actuators have a limited switching frequency, and on the other hand the dimming up and down times must be considered on dimmable lamps. Times from 3s for switch ON and OFF duration are possible.

4.4 Buffering the KNX voltage and the 12 V voltage supply (Uninterrupted operation)

It is essential that a surveillance system always functions. With a malfunction a message is sent, so that the user can react immediately.

A prerequisite for safe operation is the supply voltage. This must be available with a power outage, e.g. in regions with poor mains supply infrastructures as well as with tampering on the 230 V mains supply.

There are two different voltage supplies in a surveillance system with KNX:

- 12 V power supply
- KNX power supply 30 V DC

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4.4.1   **12 V supply of the Security Terminal, L240, sirens/strobes as well as selected sensors**

For this purpose, ABB component **NTU/S 12.2000.1** with a rated current of 2 A is available:
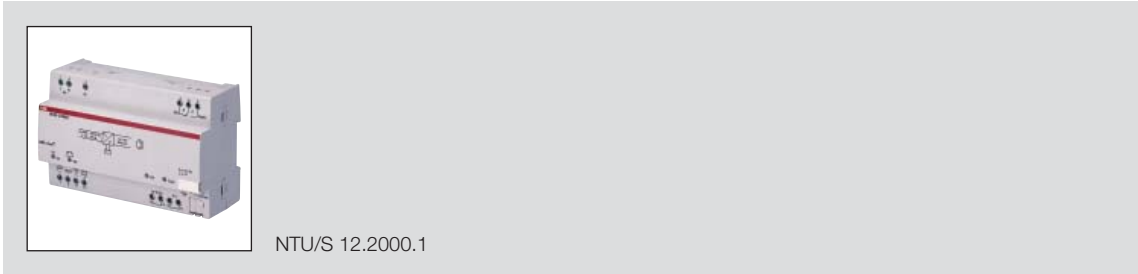
NTU/S 12.2000.1

Uninterruptible Power Supply NTU/S 12.2000.1	Devices that can be connected
	2-fold Security Terminal MT/U 2.12.2
	4-fold Security Terminal MT/S 4.12.2M
	8-fold Security Terminal MT/S 8.12.2.M
	IP Router IPR/S 2.1
	IP Interface IPS/S 2.1
	Telephone Gateway TG/S 3.2
	Universal I/O Concentrator UK/S 32.2
	Technical detectors (gas detector, water detector, …)
	Motion detectors
	All other devices, utilizing 12 V DC

A fault message can be sent via a floating changeover contact installed in the device for indicating mains voltage failure, battery malfunction, overload and short circuit and device malfunction.

Tip
The error message can be sent to the KNX via the connection to a Security Terminal.

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4.4.2   **KNX power supply 30 V DC**

For this purpose, the Uninterruptible Power Supply SU/S 30.640.5 with a rated current of 640 mA is available:

SU/S 30.640.5

SAK 7, SAK 12, SAK 17

KS/K 4.1, KS/S 2.1

Note
Every line requires an Uninterruptible Power Supply SU/S 30.640.5 for a continous KNX power supply.

A fault message can be sent via a floating changeover contact installed in the device for indicating mains voltage failure, battery malfunction, overload and short circuit and device malfunction.

Tip
The error message can be sent to the KNX via the connection to a Security Terminal.

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4.4.3   **Batteries (identical for both power supplies)**

Batteries are connected to the power supplies to buffer the voltage.

Available are:

Sealed Lead Acid Battery Module AM/S 12.1 with 12 V DC and 1 Ah

AM/S 12.1

Sealed Lead Acid Batteries SAK 7, SAK 12, SAK 17 with 12 V DC and 7/12/17 Ah. Two batteries can be connected in parallel, so that there is a maximum capacity of 34 Ah.

SAK 7, SAK 12, SAK 17

KS/K 4.1, KS/S 2.1

With both components you are dealing with a complete, low-maintenance solution with all the necessary accessories (temperature sensor for temperature-dependent control of the charging voltage, cable set with SAK)

Note
Malfunction-free operation is only possible with the stated ABB device types AM/S and SAK.

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4.5   Connection of sensors to the security terminals

As already stated, the Security Technology sensors feature floating contacts with normally open and normally closed behaviour, which are connected in the respective zones.
Some components require an auxiliary 12 V power supply.
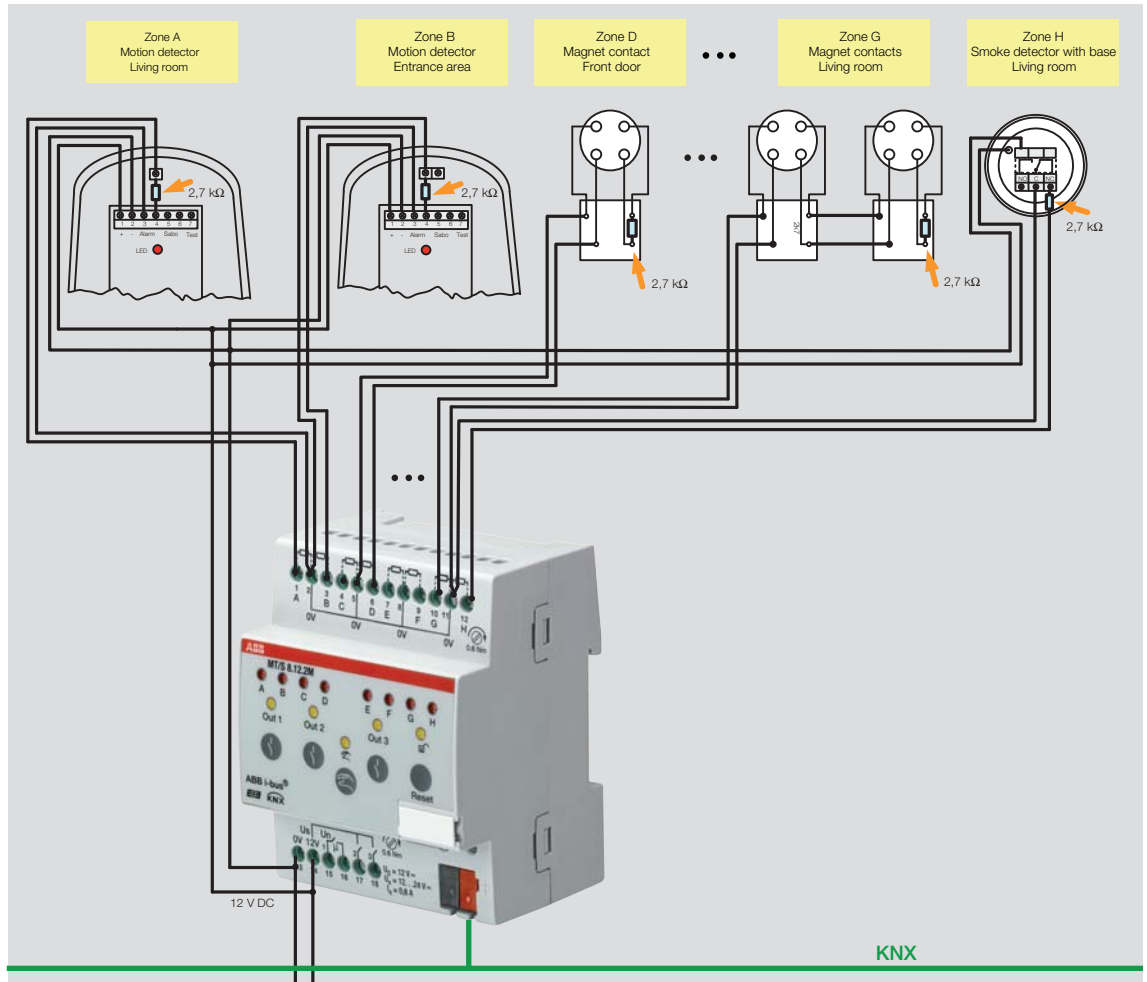
Figure 18: Connection of motion detectors, magnet contacts, smoke detectors

The following images are intended to show how a magnet contact is connected:
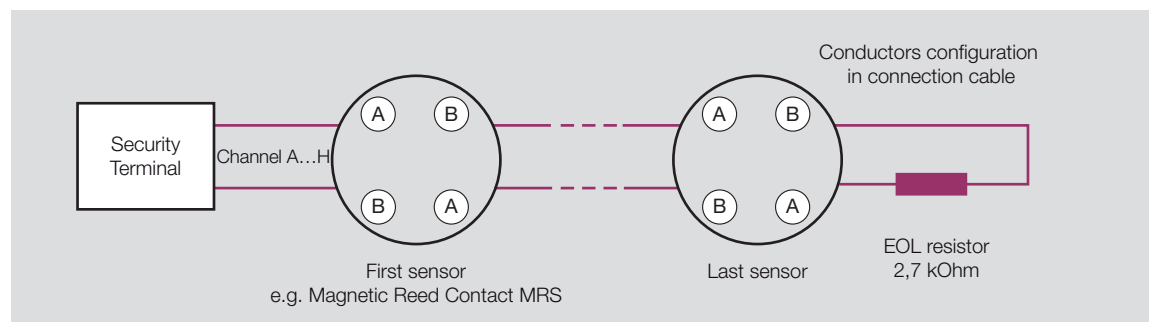
Figure 19: Connection of 4-wire sensors to the Security Terminal

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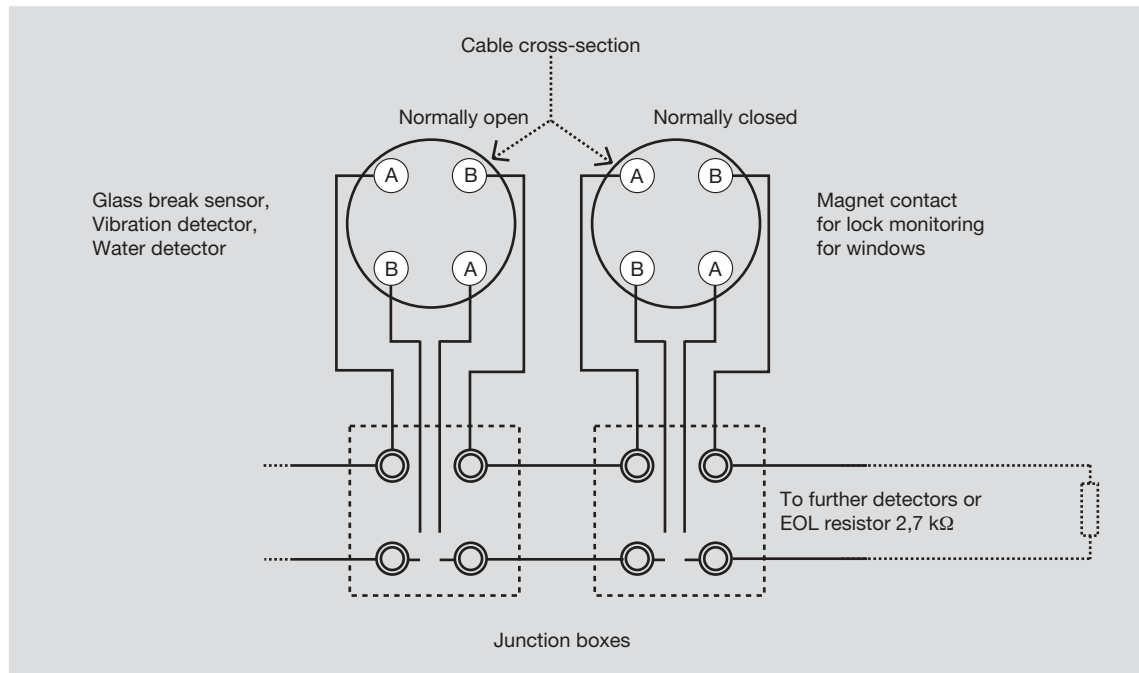
Figure 20: Connection principle of 4-wire sensors in a zone with end of line resistor

Two adjacent conductors are connected to the Security Terminal (primary line) and the other two conductors to further detectors.

Note
The end of line resistor is connected only after the last sensor. It is frequently wired directly on the zone group termination. The function is initially guaranteed; however, it is not monitored.
For further information see: Circuit principle with an alarm system page 9.

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4.5.1   **Connection of the Setting Device SafeKey via Switch Module SSM**

This is a circuit board, available in two versions as surface mount or flush mount variants.

Basis version: Without door monitoring

A typical application is the installation of the wall reader in the building for surveillance system with delayed setting/unsetting:
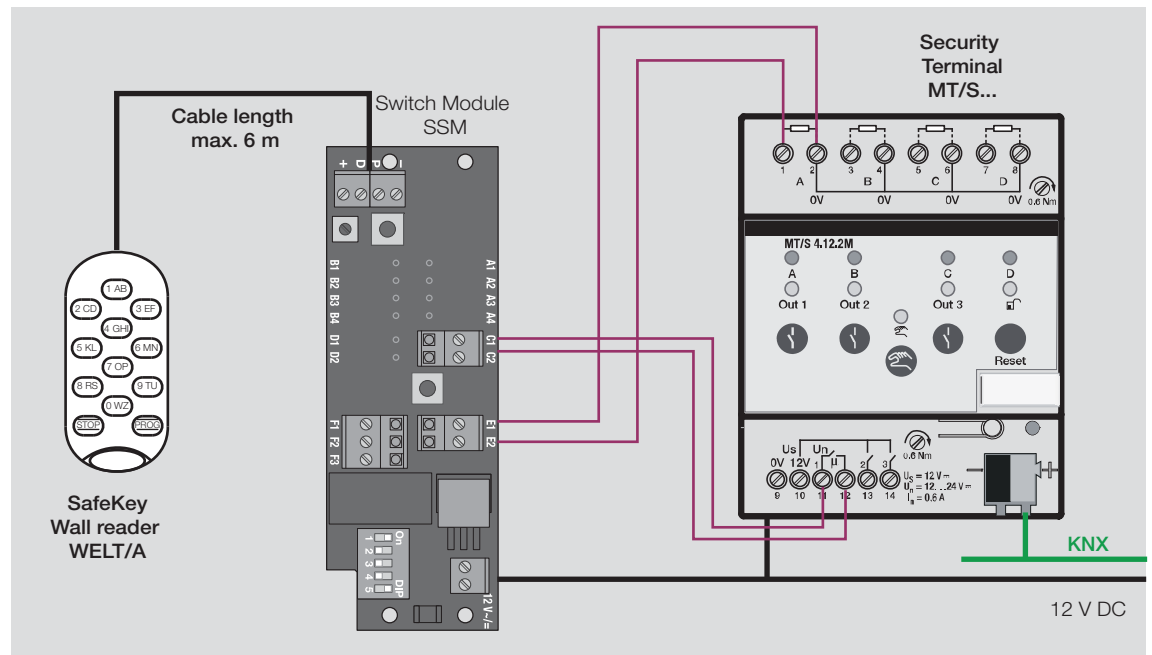
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Premium version: With door monitoring

A typical application is the installation of the wall reader outside the building for surveillance systems with immediate setting/unsetting:
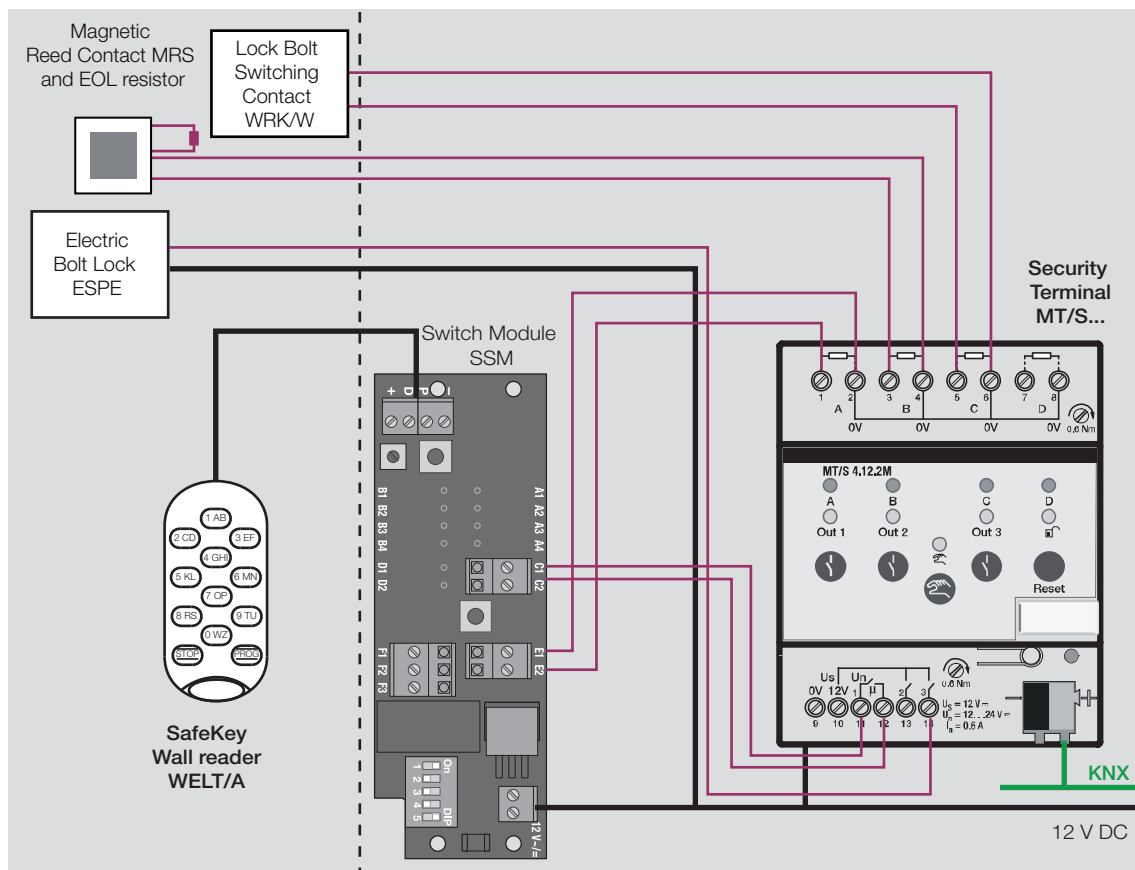
The magnet contact monitors the door (open or closed). The lock bolt switching contact monitors whether the door is locked. The respective detector zone is programmed for lock monitoring. Thus, setting is only possible with a locked door.

The electro-mechanical locking element is mounted in the door panel. When the system is armed, the bolt engages in the door frame. This prevents that the door can be opened when the system is set and prevents unintentional triggering of an alarm.

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4.6   **Connection of the Combination Signalling Device SSF/GB (strobe/siren)**
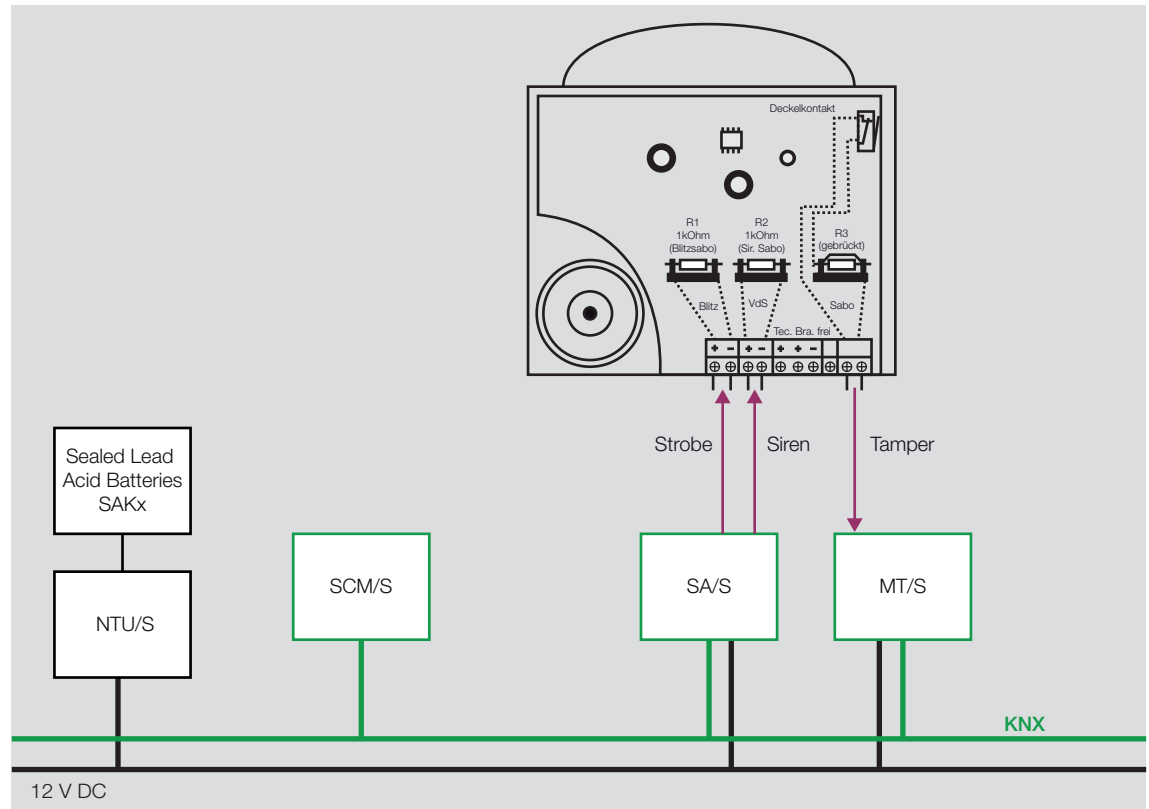
The control of the strobe/siren is implemented directly on the terminal strip of the Intrusion Alarm Panel L240 or via 12 V on a Switch Actuator SA/S or directly on an output of the Security Terminal MT/S.
As this device is mounted externally, it is recommended that a cover tamper contact is monitored by a further tamper zone.
If the connection to the siren/strobe is disconnected, a tamper alarm will also be triggered.

Note
The function *Staircase light* for time limited control of the siren is available with the ABB i-bus® KNX Switch Actuators, Security Terminals and Security Modules.

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4.7　　　　**Integration of an alarm system with ABB i-bus® KNX in the telephone network or Internet using the Telephone Gateway TG/S 3.2**
(IP addresses as an example)
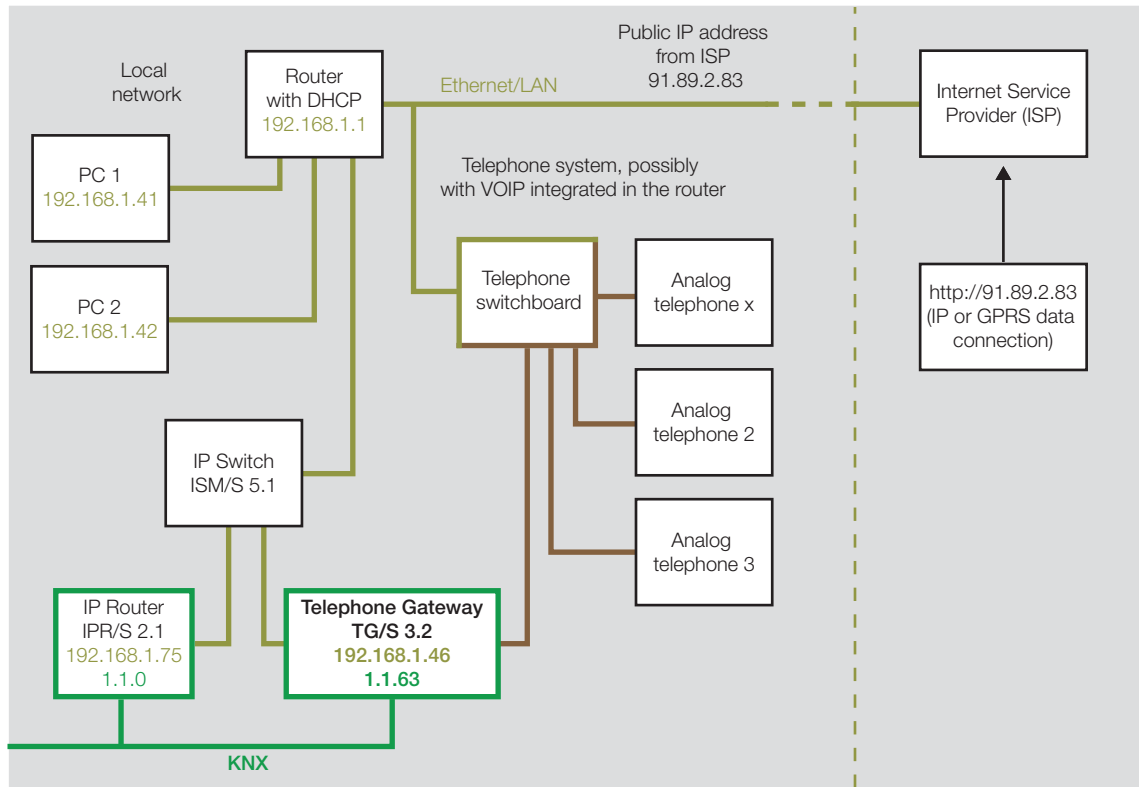
The Telephone Gateway TG/S 3.2 facilitates sending messages, e.g. alarm, or status system set/unset, as short text messages (SMS), voice messages or as e-mail, provided that an Internet connection is available.

The voice messages can be recorded individually in any language and assigned accordingly to the respective messages, which is a very user-friendly solution. Furthermore, it is possible to access the integrated web server of the Telephone Gateway TG/S 3.2 using a web browser. Thus, easy access to the functions linked to the KNX is possible with the TG/S 3.2. If a Smart Phone is used, the representation is optimized for the screen size.

The IP Router IPR/S 2.1 connects the 2-wire KNX bus cable to the local network (LAN). This connection is not necessary for the functionality just described, as the Telephone Gateway has its own network connection. The router is the interface from the local network in the building to the Internet, and with VoIP (Voice over IP) it is also for communication by telephone.

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Tip
Remote access to the integrated web server of the TG/S 3.2 is possible as follows:
In the Router, the so-called port forwarding (frequently port 80) to the internal IP address of the Telephone Gateway is set up. Queries from the Internet are thus passed onto the TG/S. External connections via the Internet are possible via the external IP address of the router. This can be a fixed or dynamic address. As this is usually unknown with access via the dynamic address, DynDNS services are accessed. In the case where there is a change to the external IP address by the Internet Provider, the Router reports it to the DynDNS service. Here this address is assigned with a fixed Host name that can be used to access the router at any time.
For further details refer to the manual of the respective Router or to the DynDNS service, e.g. www.dyndns.org.

4.8   Self-monitoring of a security system with ABB i-bus® KNX

The question repeatedly asked is what happens if the with system has malfunctions.

A differentiation is made between the following situations:

* Short circuit or open circuit of the sensor connections
* Monitoring of the KNX connection and the 12 V supply with Security Terminal MT/x and Security Module SCM/S 1.1
* Monitoring of the strobes/sirens
* Monitoring of the Switch Actuator with connected strobes/sirens
* Monitoring of the KNX power supplies (SU/S 30.640.5) and 12 V (NTU/S 2000.1)
* Monitoring of the Telephone Gateway TG/S 3.2

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4.8.1 **Short circuit or open circuit of the sensor connection**
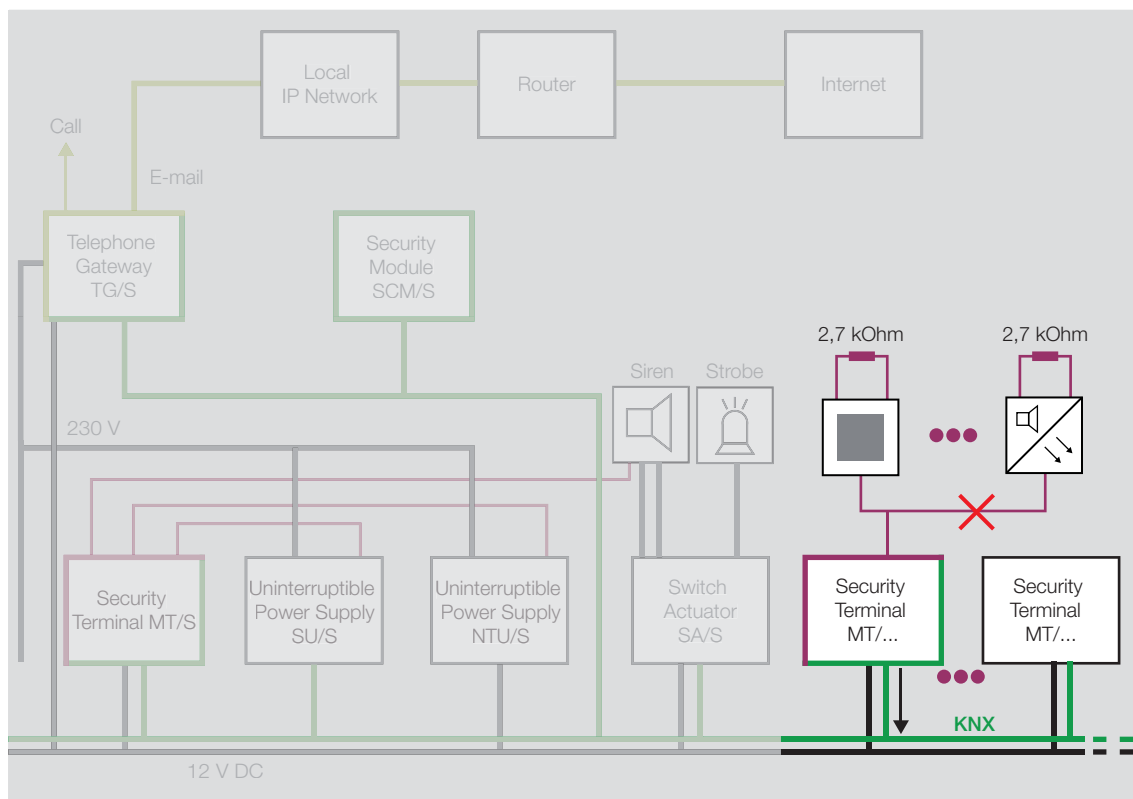
The line is monitored, and a fault is signalled with the 2.7 kOhm end of line resistor.

For further information see: Circuit principle with an alarm system page 9.

Note
The Security Terminal in the application also offers the function binary input without setting an end of line resistor. Thus, you have a secondary line in this case without monitoring.

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4.8.2   **Monitoring of the KNX connection and the 12 V supply with Security Terminal MT/x and Security Module SCM/S 1.1**
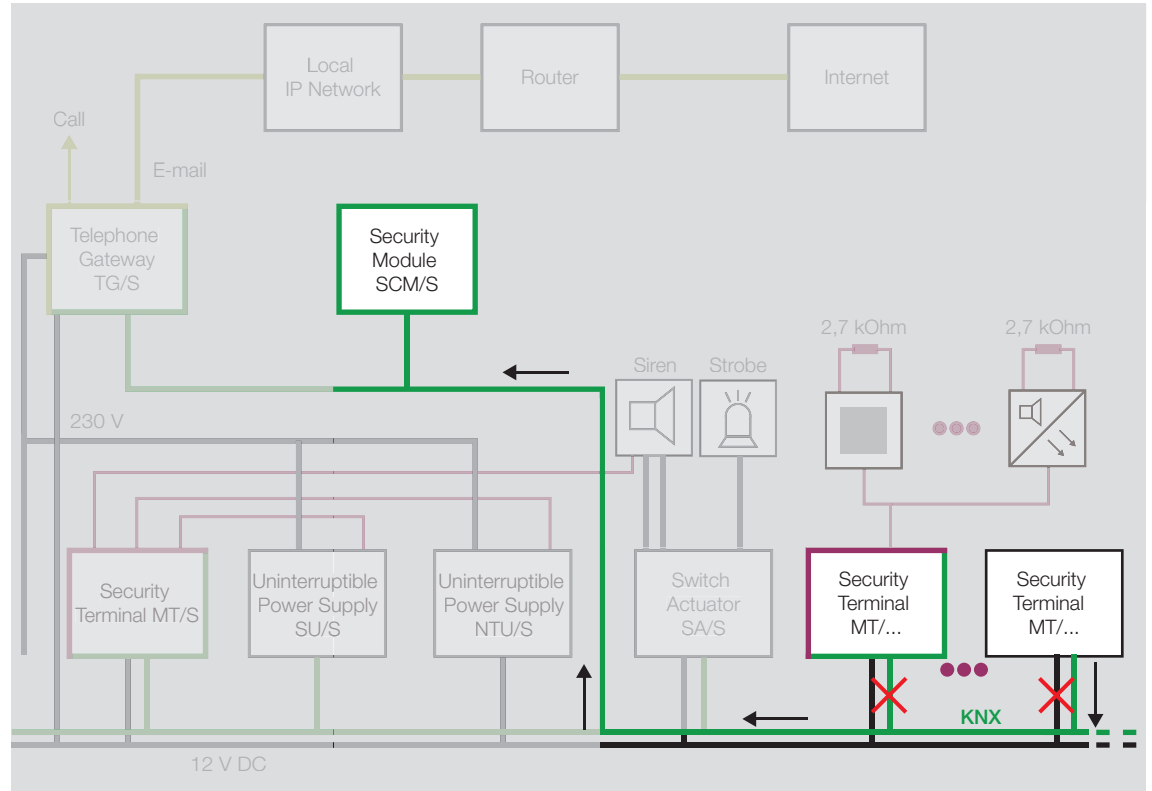
This device has a communication object *In operation/error 12 V* or *Heartbeat*, which is cyclically sent with a fault-free 12 V supply and KNX connection. With the Monitoring Unit EUB/S 1.1, a telegram can be monitored, and a message is sent if it fails.

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Extended safety functions with ABB i-bus® KNX

4.8.3 **Monitoring of the sirens/strobes**
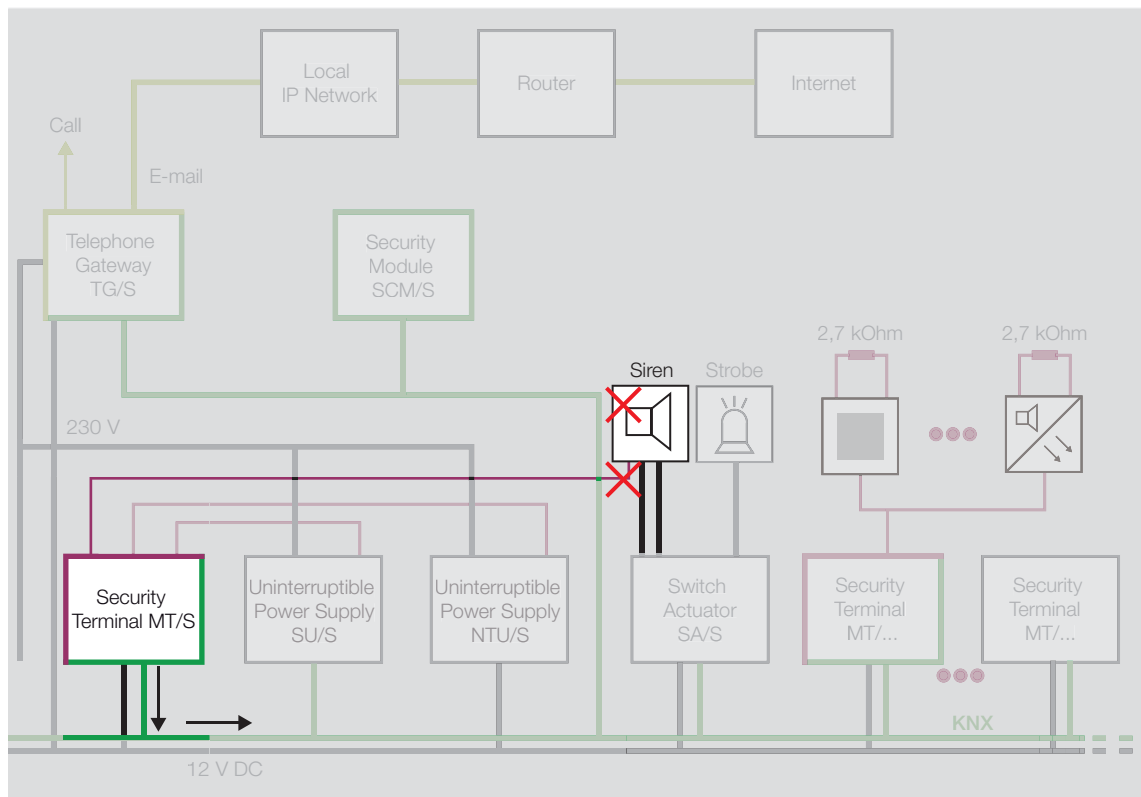
If the panel tamper contact of the Combination Signalling Device SSF/GB is connected as an autonomous zone to the 2.7 kOhm end of line resistor on the Security Terminal, panel tamper monitoring of the cover as well as monitoring of the siren cable is established.

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4.8.4   **Monitoring of the switch actuator with connected siren/strobe**
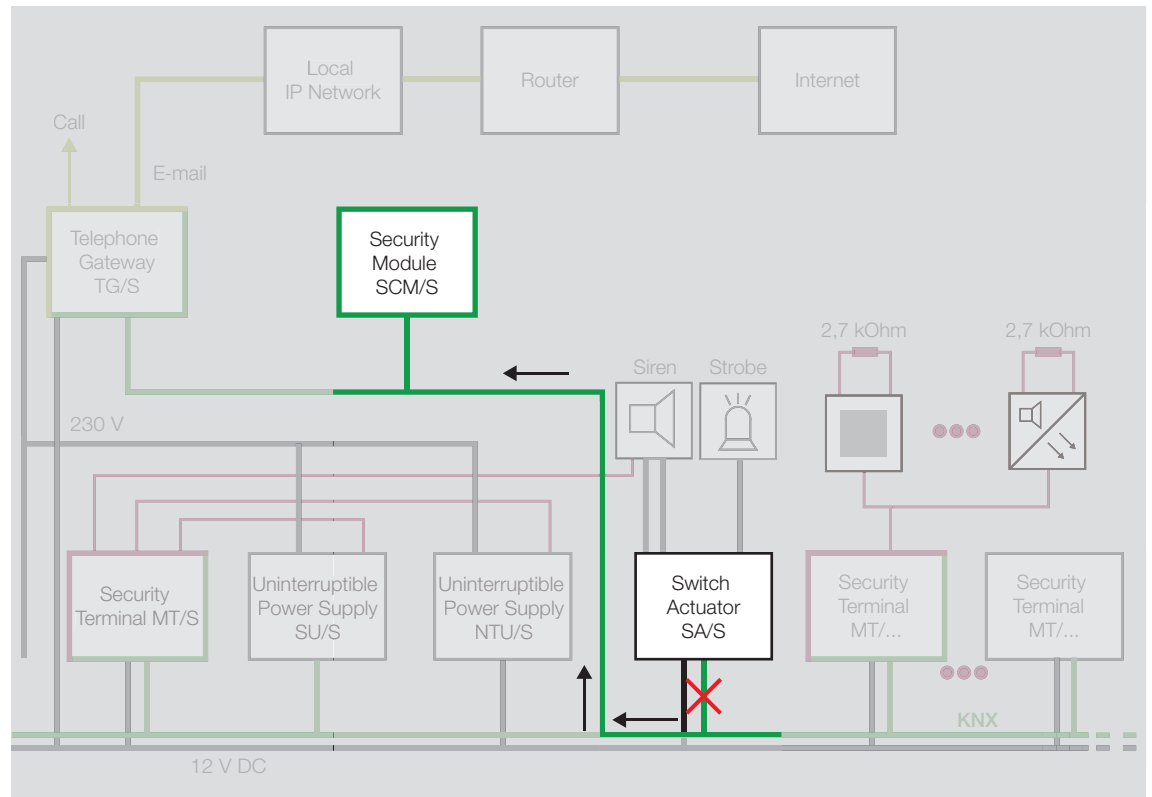
A Switch Actuator SA/S has a communication object in operation, which can be sent cyclically and that facilitates device monitoring with the Monitoring Unit EUB/S 1.1.

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Extended safety functions with ABB i-bus® KNX

4.8.5 **Monitoring of the KNX power supplies (SU/S 30.640.5) and 12 V (NTU/S 2000.1)**
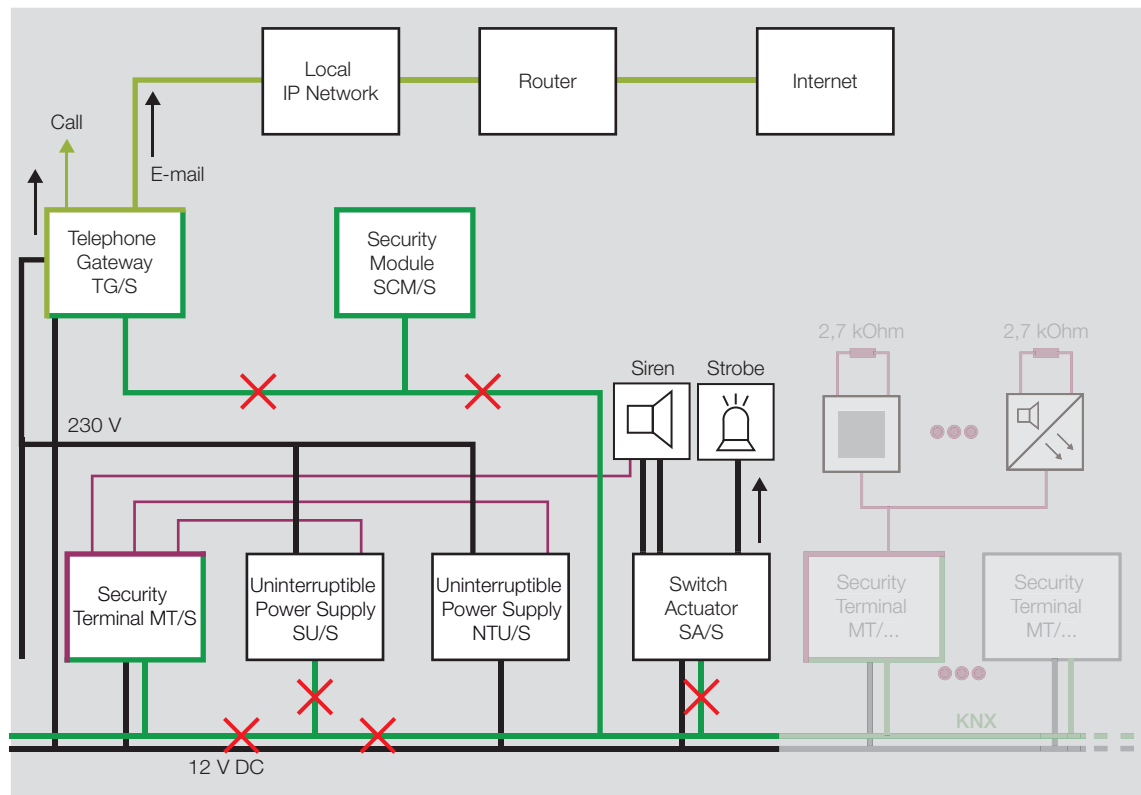
Both power supplies feature a changeover contact that can switch with a fault (230 V, battery fault, over voltage and short circuit). Monitoring is established when the contact is connected to a zone of the Security Terminal.

A KNX voltage failure (interruption or short circuit) is detected by the Telephone Gateway TG/S 3.2. This then reports the problem using its external communication features (SMS, e-mail, voice mail).

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Extended safety functions with ABB i-bus® KNX

4.8.6   **Monitoring of the Telephone Gateway TG/S 3.2**
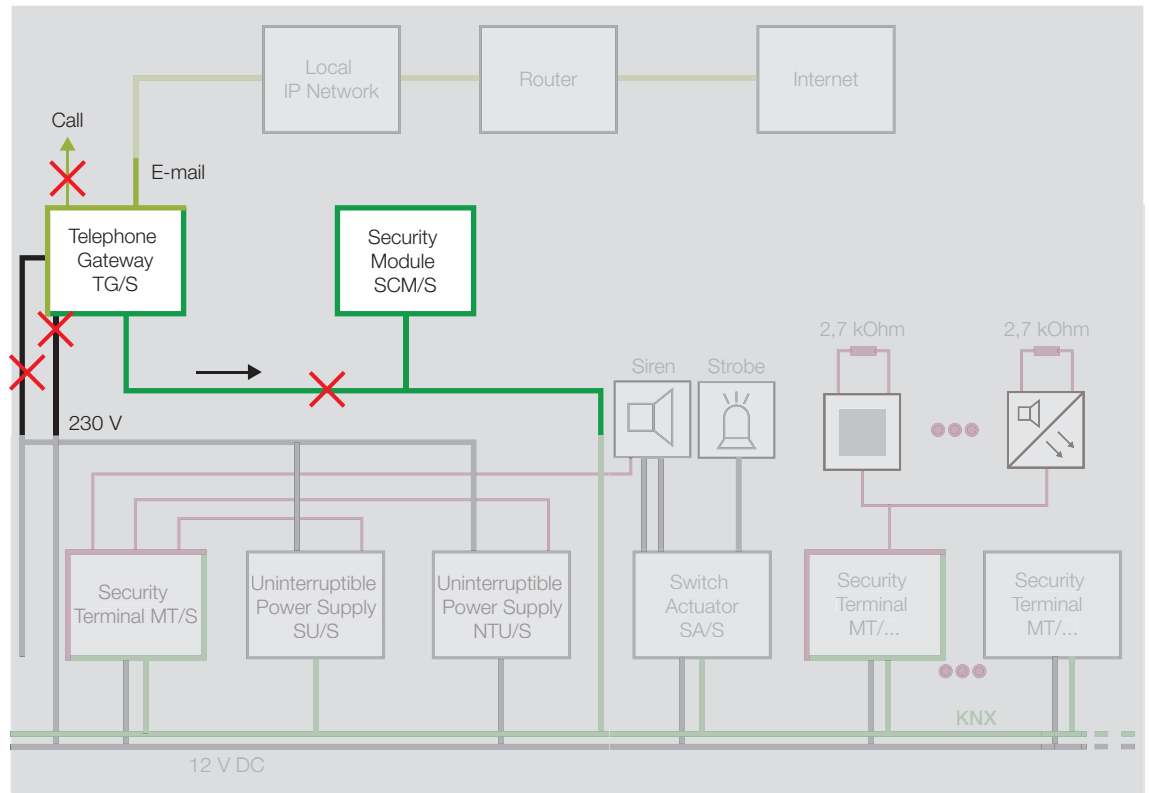
The TG/S 3.2 features four communication objects that can be used for the respective function:

- In operation (as with the Switch Actuator or Security Module)
- Fault mains voltage (230 V)
- Fault auxiliary voltage (12 V)
- Fault connection (telephone communication)

ABB i-bus® KNX
Apartment project example with Security Terminal MT/S 8.12.2M

4.9 **Comparison of the three solutions Security Terminal MT/x, Security Module SCM/S 1.1 with Security Terminal MT/x, Intrusion Alarm Panel L240 with KNX Interface XS/S 1.1**

	Security Terminal MT/S or MT/U	Security Module with Security Terminal	Intrusion Alarm Panel L240
Detector circuit groups	2…8	64 (512)*	10…80 (via XIB)
VdS, EN 50131	no	no	yes (com. L240 → **KNX**)
Keypad	KNX	KNX	KNX or L840PT (VdS, EN display only via KNX)
Primary line connection	yes	Via M/TS or MT/U	yes
Secondary line connection	yes	Via MT/S or MT/U	no
Manual operation	yes (MT/S)	no	no
Zone can be switched off	yes via KNX	yes via KNX	yes via Keypad L840 PT
Alarm memory	yes	yes	yes
Delayed setting	yes	yes	yes
KNX independent	no	no	yes
Relay outputs	3	1	3
Transistor outputs	no	no	8 + 3 for warning device
Security bus XIB	no	no	yes (tamper protection)
Installation	MDRC, FM	MDRC	Surface mounting
Internal setting	yes	yes	yes
Emergency power supply	NTU/S + SU/S + Battery	NTU/S + SU/S + Battery	Battery (integrated)
Remote alarming	TG/S 3.2	TG/S 3.2	TG/S 3.2 or dialling device integrated (VdS, EN)
Programming	ETS	ETS	Keypad L840 PT or software WinPC
Detector connection	KNX Bus	KNX Bus	Terminal strip or XIB bus

* 64 zones with a SCM/S 1.1 as a master.
  Up to 512 zones with 9x SCM/S 1.1 in master/slave operation

ABB i-bus® KNX
Apartment project example with Security Terminal
MT/S 8.12.2M

5   Apartment project example with Security Terminal MT/S 8.12.2M

The following project indicates the possible functions as well as the solution and the devices used.

Sensors such as motion detectors, magnet contacts and glass break sensors are used in an apartment. Windows and doors are monitored for locking. A Wall Reader is installed inside (with delayed setting) or outside with immediate setting.

Furthermore, there are technical detectors (water, smoke), an external strobe/siren, an internal siren for issuing an alarm with an internal alarm as well as a hold-up button.

The KNX and the 12 V supply are buffered with batteries.

Further operation in the building is undertaken either with a Busch Touch Panel or using KNX push buttons. The corresponding page on the panel can be accessed via a PIN code. Improper and unauthorized operation can be eliminated when push buttons are used, as it is possible to execute the functions only after long operation.
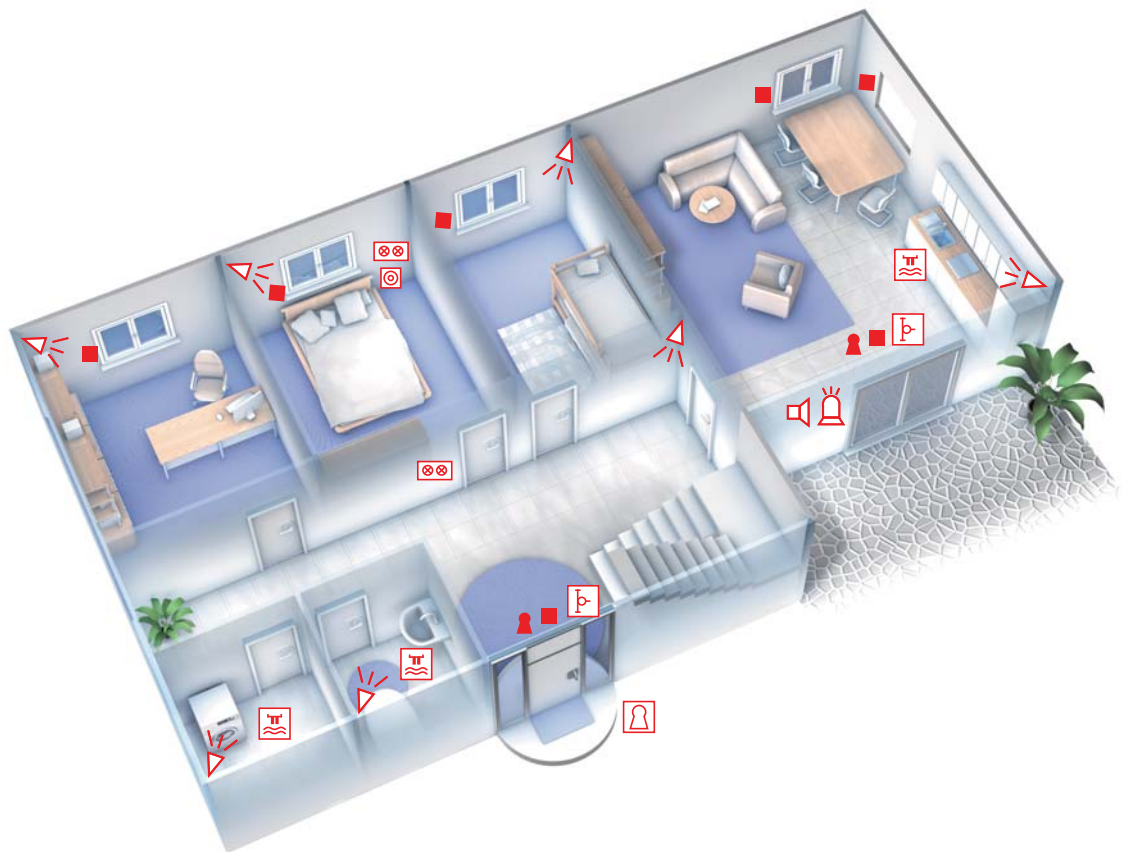
Figure 21: Overview of the sensors and warning devices used

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Apartment project example with Security Terminal
MT/S 8.12.2M
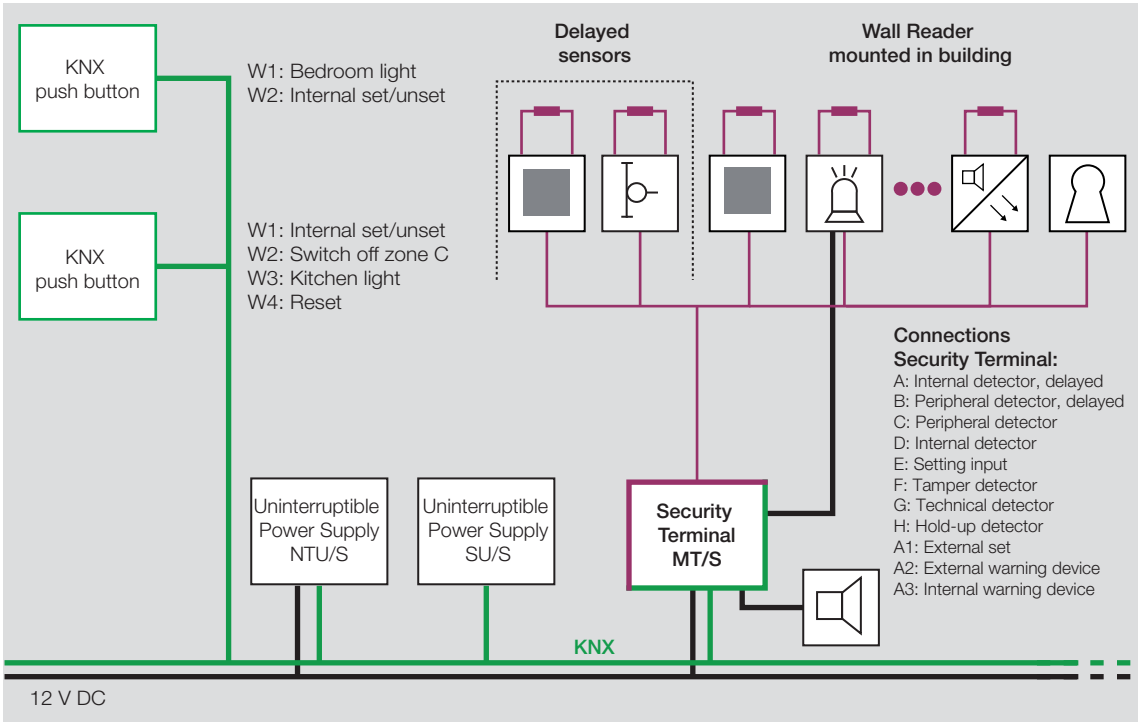
Figure 22: Principle schematic
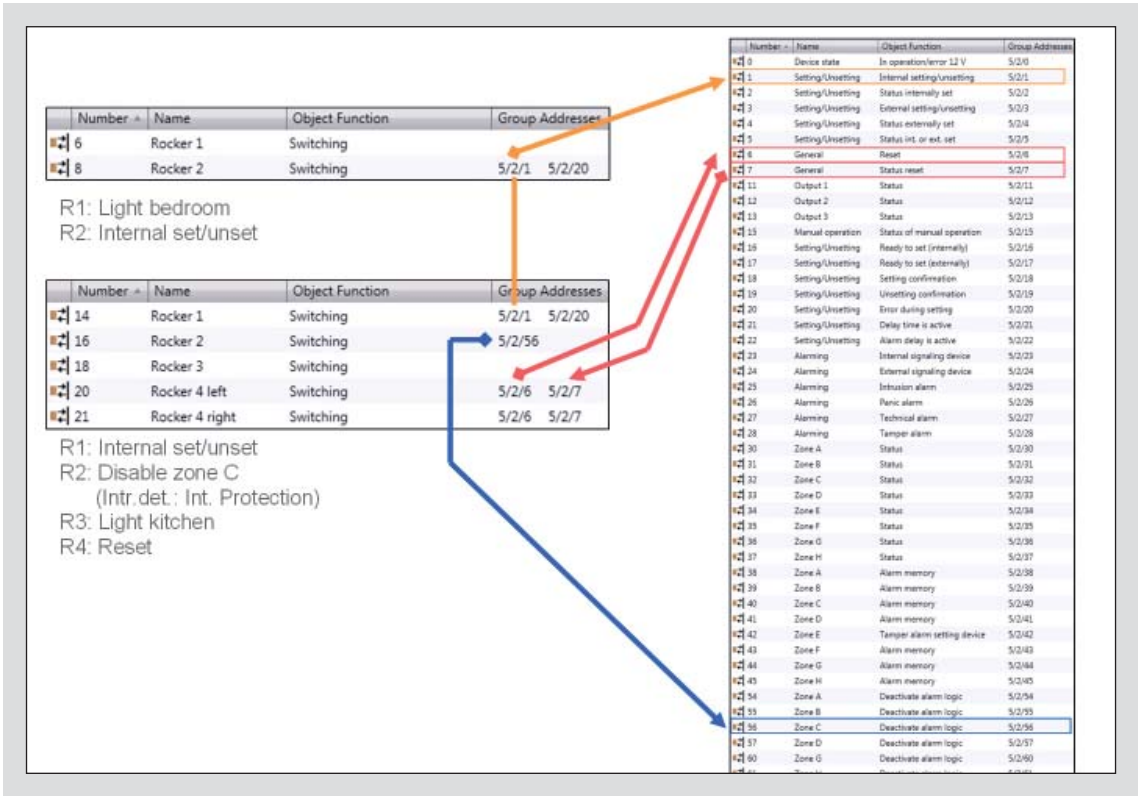
Figure 23: Linking of the communication objects of the operating buttons and the Security Terminal MT/S 8.12.2M

ABB i-bus® KNX
Security checklist

6   Security checklist

Building: _____

Level: _____

Room: _____

Peripheral monitoring

☐ Monitoring of the windows/doors for opening
    ☐ Magnet contacts _____

☐ Monitoring of the windows/doors for reaching through
    ☐ Vibration detector
    ☐ Passive glass break detector
    ☐ Acoustic glass break sensor

☐ Monitoring of the windows/doors for locking/closing
    ☐ Lock bolt switching contact
    ☐ Blocking bolts in conjunction with magnet contacts
    ☐ Special magnet contacts for lock monitoring

Room surveillance

☐ PIR (passive infra-red) motion detector

☐ PIR and microwave motion detectors (Dual detector)

☐ IR barriers

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Security checklist

Technical detectors

☐ Gas detectors

☐ Water detectors

☐ Optical smoke detectors

☐ Static heat detectors

☐ Static heat / rate-of-rise temperature detectors

Operation/display at a remote location

☐ Can be switched remotely
    ☐ Via telephone
    ☐ Via LAN
    ☐ Via Internet

☐ Status message
    ☐ On visualization system
    ☐ Query via telephone
    ☐ Query via LAN
    ☐ Query via Internet

For further information see: Security Technology, Intrusion Alarm Systems, Planning and Wiring Instructions product manual.

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Notes

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
Notes

Description of the colours/symbols:

—— KNX

—— DALI

—— XIB

—— Power supply, e.g. 12 V DC, 230 V

—— Security technology

—— Ethernet/LAN

—— Phone

Symbol	Description	Symbol	Description
	Motion detectors		Lighting
	Sirens/strobe lights		Heating
	Sirens		Shading
	Magnetic contact		Ventilation
	Lock monitoring		Security technology
	Glass break sensor		Communication
	Hold-up detector		Comfortable operation
	Water detector		Automation
	Setting device		Energy management
	Smoke alarm		Air conditioning
	Operation and display device		
	End of line resistor 2.7 kOhm		
●●●	Further detectors can be connected		

Contact

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