Webinar "Security in Buildings" Overview

- Introduction
- Basics of intrusion alarm systems
- Interior monitoring
- Exterior surveillance
- Setting/unsetting
- Alarming
- ABB-Solutions for security applications
- Standards and guidelines for intrusion alarm systems
Webinar "Security in Buildings"

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Webinar "Security in Buildings"
Situations in a residential Building during a day

- **Night:** Internal setting
- **Morning:** Unsetting
- **Absence:** External setting
- **Presence:** Unset
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Night: Internal setting

- Internal setting (Users asleep)
  - Peripheral sensors active (Window contact, glass break sensor …)
  - Motion detectors disabled
    → walking inside the building ok!

- Intrusion
  → internal Alarm (siren inside the building)
  → optional external Alarm (external siren, silent alarm)

- Technical sensors always enabled (e.g. smoke detector)
  → internal Alarm (siren inside the building)
  → technical Alarm (e.g. silent alarm)
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Morning: System unset

- System is unset (Users can act without restrictions)
  - No intrusion alarm sensors active
  - Hold up alarm possible

- Technical sensors always enabled (e.g. smoke detector)
  - internal Alarm (siren inside the building)
  - technical Alarm (e.g. silent alarm)
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Absence: External setting

- External setting (Users absent)
  - Setting either via device outside or delayed inside
  - All detectors are active
  - Intrusion!
    → external Alarm (Siren, Strobe light, silent alarm)
  - Technical sensors always enabled (e.g. smoke detector)
    → internal Alarm (siren inside the building)
    → technical Alarm (e.g. silent alarm)
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Presence: Unset

- System is unset (Users can act without restrictions)
  - No intrusion alarm sensors active
  - Hold up alarm possible

- Technical sensors always enabled (e.g. smoke detector)
  - internal Alarm (siren inside the building)
  - technical Alarm (e.g. silent alarm)
Deactivation of defined load circuits (cooker, socket outlets, illumination, washing machine, dryer, dish washer, etc.) in the event of external setting of the intrusion alarm system

Presence simulation in case of absence

Opening of roof windows together with fire alarm, closing in case of external setting

Switch off of power circuits in case of water leakage

Open electrical windows in case of gas leakage

Indication of values and states by means of a panel (e.g. status of windows and doors)

Signalisation of faults and alarms via SMS, EMail and voice messages

In case of intrusion alarm flashing illumination in the building
Webinar "Security in Buildings"  
Introduction

- Security systems are used to monitor properties against unauthorized intrusion as well as to protect persons against hold-up and technical hazards.

- Security systems should call a security service in case of emergency, therefore false alarms have to be avoided.

- From experience, it is clear that neighbours no longer respond to intrusion alarm systems after a few false alarms and thus ignore a real alarm.

- Normally false alarms are triggered because of bad project planning, wrong installation or incorrect operation of the customer.

- Therefore the first requirement for a failure-free and effective security system is a detailed project planning.
Webinar ”Security in Buildings“
Overview

- Introduction
- Basics of intrusion alarm systems
  - Secondary lines
  - Primary lines
  - Alarming matrix
- Interior monitoring
- Exterior surveillance
- Setting/unsetting
- Alarming
- ABB-Solutions for security applications
- Standards and guidelines for intrusion alarm systems
An intrusion alarm panel evaluates the signals originating from the intrusion detectors and implements corresponding measures (alarms) depending on the setting state.

**Monitor - Evaluate - Alarm**

- **Detectors**
- **Panel**
- **Signalling**
Webinar "Security in Buildings"
Basics of Intrusion Alarm Systems

Inputs = zones/circuits

- Detector for exterior surveillance
- Detector for interior monitoring
- Hold-up/panic alarm detector
- Detector for technical monitoring

Intrusion alarm panel

- Setting device
- Display and Operating
- Power supply mains and battery
- Status Messages (set/unset, faults)
- Local alarm
- Silent alarm
Intrusion detector: Zone/circuit

- An intrusion detector is a system component, which monitors suitable physical characteristics (e.g. motion) and will interrupt (open circuit) or short circuit a circuit
- Several intrusion detectors are included in a circuit of this type
- These detectors form a zone/circuit
- Each zone/circuit features its own state display (fault/no fault) on the intrusion alarm panel
- There are non-monitored lines (secondary lines) and lines monitored for a short circuit and open circuit (primary lines)

maximum of 20 intrusion detectors
Secondary lines: Open circuit types

- The secondary line is a non-monitored line and can be easily manipulated.
- Open circuit types are open in the normal state.
- Should at least one contact close, the circuit is closed and it is evaluated by the panel.
- Contacts in an open circuit type cannot be evaluated after an open circuit.
Secondary lines: Closed circuit types

- The secondary line is a non-monitored line and can be easily manipulated.
- The closed circuit type is closed in its normal state.
- Should at least one contact open, the circuit is interrupted and it is evaluated by the panel.
- Contacts in a closed circuit type cannot be evaluated after a short-circuit.
Primary lines

- The primary line is a monitored line and can not be manipulated
- On ABB intrusion alarm systems, zones are configured as primary lines with an end of line (EOL) resistor of 2.7 kΩ
- Typical primary lines are: Intrusion detector zone, hold-up zone, tampering zone, technical detector zone, …
- The primary line has the advantage that the normally open and normally closed contacts can be connected in the same zone/circuit
Primary lines with different sensors

- Zone and sensor have to match, depending on alarm behaviour and setting status, e.g.
  - Motion detector and glass break sensor NOT OK!
  - Window contact and glass break sensor OK!
  - Smoke detector and window contact NOT OK!
  - Smoke detector and water detector NOT OK!

![Diagram of alarm contacts and panel with end of line (EOL) resistor of 2.7 kΩ]
Primary lines

- Normally, a defined voltage is present at the input of the panel; an end of line resistor (2.7 kOhm) is used as a voltage divider.

- A measurable change in this voltage occurs when there is a short-circuit or open-circuit on the line.
Connection of sensors

- In each case any 2 cores running next to one another are connected to the zone loop or terminal and the two remaining wires to the next sensor.

- The end of line resistor must be connected across the circuit after the last sensor.
<table>
<thead>
<tr>
<th>Input</th>
<th>Unset</th>
<th>Internally set</th>
<th>Externally set</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intrusion detector: Peripheral protection</td>
<td>-</td>
<td>Internal alarm</td>
<td>External alarm</td>
</tr>
<tr>
<td>Intrusion detector: Internal protection</td>
<td>-</td>
<td>-</td>
<td>External alarm</td>
</tr>
<tr>
<td>Hold-up/panic alarm</td>
<td>Panic alarm</td>
<td>Panic alarm</td>
<td>-</td>
</tr>
<tr>
<td>Tamper contact</td>
<td>Internal alarm</td>
<td>Internal alarm</td>
<td>External alarm</td>
</tr>
<tr>
<td>Technical detector</td>
<td>Technical alarm</td>
<td>Technical alarm</td>
<td>Technical alarm</td>
</tr>
<tr>
<td>Lock monitoring*</td>
<td>Prevents setting</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

*no alarm sensor!
Webinar "Security in Buildings"
Overview

- Introduction
- Basics of intrusion alarm systems
- Interior monitoring
  - Motion in rooms
  - Technical hazards
- Exterior surveillance
- Setting/unsetting
- Alarming
- ABB-Solutions for security applications
- Standards and guidelines for intrusion alarm systems
Webinar ”Security in Buildings“
Interior monitoring

Motion in rooms

- Rooms are monitored by motion detectors
- High level of immunity to false alarms
- A change in some physical properties is evaluated and indicated as an attempted intrusion
- For conventional wiring to zone inputs or direct connection to the security-bus of the intrusion alarm panel
- The detector features an alarm memory, a remote controlled walking test and undervoltage monitoring
Motion in rooms:
Passive Infra-Red Detector

- The Passive Infra-Red Detector is an intrusion detector that detects signals motion within its range.
- A infrared motion detector reacts to movements of heat using infrared sensitive photo diodes.
- It facilitates monitoring of an area with a volumetric IR range (86°) of up to 15m.
- Mounting height of 2.3 m.
- Infrared range of 17 zones in 4 levels (subdivided by the optics of the lenses).
Webinar "Security in Buildings"
Interior monitoring

Motion in rooms: Dual Motion Detector

- The Dual-Motion Detector combines proven passive infrared technology with temperature-independent microwave technology.
- The combination of both functional principles results in a detector featuring high immunity to false alarms, even with unfavourable ambient conditions, and which ensures high detection security.
- It facilitates monitoring of an area with a volumetric range (86°) of 6m to 15m.
- Mounting height of 2.3 m.
Technical alarms: Fire/smoke Detector

- For early detection of fire or smoke in buildings
- For testing the detector, a testing aerosol can be used

Technical alarms: Gas Detector

- For measurement and evaluation of the concentration of natural gas or liquefied gas in the air
- High Sensitivity for Gas like Propan, Methan und Butan

An internal alarm will sound when these detectors are activated
Technical alarms: Water Detector

- A resin-encapsulated water detector with goldplated pins, detects water ingress, e.g.
  - Pipe fractures
  - Ingress of groundwater and sewage
  - Water damage caused by washing machines and dishwashers

An internal alarm will sound when the detector is activated
Hold-up detectors

- Hold-up detectors (emergency call buttons) are pushbuttons which can be pressed by a person in danger.
- The actuation of a hold-up detector immediately leads to a remote alarm.
- Alternatively, the actuation of a hold-up detector (threat) leads to a local alarm and serves as a deterrent.
Webinar ”Security in Buildings“
Overview

- Introduction
- Basics of intrusion alarm systems
- Interior monitoring
- Exterior surveillance
  - Opening surveillance
  - Lock monitoring of doors and windows
  - Breakage/rupture of glass panes
- Setting/unsetting
- Alarming
- ABB-Solutions for security applications
- Standards and guidelines for intrusion alarm systems
Opening surveillance

- The attempted break-in can be detected
- Magnetic reed contacts are used for opening surveillance of doors, windows and hatches
- Magnetic reed contacts consist of a magnet and a reed contact
- The magnet is mounted on the window or door leaf
- The reed contact is mounted directly beside or above the magnet on the window or door frame
- The reed contact closes due to the influence of the magnetic field

Exterior surveillance
**Opening surveillance**

- **Magnet Reed Contact Set:**
  - 1 magnet and 1 reed contact with 4.0 m connection cable
  - 2 surface-installation housings
  - 4 spacer plates, 2 flanges, 4 fastening screws (anti-magnetic)

- The installation must be carried out within the monitored area (inside)

- The two units are installed
  - opposite each other on the face side (for drill-in installation) or
  - in parallel (for surface installation)
Webinar "Security in Buildings“
Exterior surveillance

Opening surveillance

- The Rolling Door Magnet Reed Contact Set is used for monitoring rolling doors or other large doors.
- The reed contact is particularly resistant to dust, moisture and chemicals such as oil, petrol and similar substances.
- Its construction design facilitates installation on the edge areas of doors on the floor.
- It can withstand being run over by rubber-wheeled vehicles without any damage.
Monitoring of the glass panes

- The electronic glass break sensor is used to monitor the glass surfaces of windows and doors.
- The piezoelectric microphone registers the typical vibrations that are caused by forcible damage to a pane of glass.
- An LED on the detector indicates the detector that has triggered.
- The maximum monitoring radius is 2 m.
- It is possible to mount several detectors on a single pane.
- Mounted onto glass using Loctite Adhesive.
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Exterior surveillance

Lock monitoring: Windows – directly

- Direct monitoring is undertaken with the Window Lock Monitoring Contact
- A special round magnet is mounted on the push rod/driving plate of the window leaf
- The reed contact is mounted on the respective location on the window frame
- Turning the window handle will move the round magnet and the locked/unlocked status of the window can be detected
Lock monitoring: Windows – indirectly

- Indirect monitoring of a window is undertaken using the Window Opening Plunger in conjunction with magnetic reed contact
- The window opening plunger is fitted to the window frame
- If the window is closed but not locked, the pressure spring on the window opening plunger pushes the window slightly open
- As a result, the magnetic reed contact activates and thus creates a fault on the corresponding zone of the panel
Lock monitoring: Doors

- A Lock Bolt Switching Contact is used for lock monitoring of doors.
- It is mounted in the door frame behind the strike plate.
- The contact is actuated by the locking the door via the bolt.
Webinar "Security in Buildings"

Overview

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- Basics of intrusion alarm systems
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- Setting/unsetting
  - External setting – delayed or direct
  - Internal setting
- Alarming
- ABB-Solutions for security applications
- Standards and guidelines for intrusion alarm systems
External setting – direct

- External setting activates exterior and interior surveillance of the building
- This type of setting is utilized when no persons are located in the building
- Generally, external setting is performed outside the building to prevent a false alarm
- SafeKey Wall Reader by chip key insertion or code entry
- Electromechanical Bolt Lock prevents access to the set zone of an Intrusion Alarm Panel. The unit is mounted in the door frame.
External setting – delayed

- 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 system remains unset
- In order to unset the alarm system again, the interior and/or exterior detectors on the way to the unset device (e.g. keypad) must have an alarm delay
- If the system is not unset during the alarm delay, an intrusion alarm is issued
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Setting/unsetting

Internal setting

- With internal setting, the exterior surveillance of the building is activated
- This type of setting is utilized when persons are located in the interior of the building, e.g. when they are sleeping
- The internal monitoring of the building is not activated (e.g. the motion detectors are disabled)
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Overview

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- Alarming
  - External alarming – local and silent/remote
  - Internal alarming

- ABB-Solutions for security applications
- Standards and guidelines for intrusion alarm systems
External Alarming – local

- An external siren as well as a strobe can be used for local alarms
  - Combination Signalling Device
    - Siren and strobe light
  - Siren
- The acoustic alarm component consists of a tone generator with a power amplifier and loudspeaker
- The strobe light provides an optical alarm signal
- Protected against sabotage by a case tamper contact
External Alarming – silent/remote

- Using a Telephone Dialling Device the most important states (intrusion alarm, tampering, hold-up, fault, set/unset) can be transferred via the public telephone network, GSM or IP to a
  - Security company (digital protocol)
  - Private (voice messages)
- Dialling devices and the transmission protocol differ from to country to country
Internal Alarming – local

- The siren is used for issuing acoustic alarms within the protected area
  - Internal alarm
  - Technical alarm (fire or smoke)
- Fitted inside the supervised premises
- The internal siren must be audible everywhere within the supervised premises
- Installation in a sleeping area is not permitted
Webinar ”Security in Buildings“

Overview

- Basics of intrusion alarm systems
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- Exterior surveillance
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- Alarming
- ABB-Solutions for security applications
  - KNX Basic solution with one Security Terminal
  - KNX Extendable solution with Security Module and more Security Terminals
  - Professional solution with Intrusion Alarm Panel L240 and KNX Interface XS/S
  - Professional solution with KNX Security Panel GM/A
- Standards and guidelines for intrusion alarm systems
Webinar "Security in Buildings"
The ABB-Solutions for security applications

- KNX Basic solution with one Security Terminal
- KNX Extendable solution with Security Module and more Security Terminals
- Professional solution with Intrusion Alarm Panel L240 and KNX Interface XS/S (still available)
- Professional solution with KNX Security Panel GM/A
Webinar "Security in Buildings"
Basic Security Solution with only one Security Terminal

Security Terminal

Sensors
Arming Device

Local Alarm

Display and operation
Remote Alarm and operate TG/S

Uninterruptible Power Supply

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Webinar "Security in Buildings"  
KNX Extendable solution with Security Module and more Security Terminals

- Security Module
- Sensors
- Arming Device
- Local Alarm
- Zones
- Display and operation
- Remote Alarm and operate TG/S
- KNX
- 12V

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Webinar "Security in Buildings"
Professional solution with KNX Security Panel GM/A

- Magnet reed contact
- Glass break sensor
- Motion detector
- Water detector
- Gas detector
- Smoke detector

Keypads

Zone module

Motion detector

SafeKey Setting Device and SafeKey Evaluation Module

Bidirectional communication

Keypad-Bus

Security-Bus

LAN

Alarming

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Webinar "Security in Buildings“
Overview

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- Standards and guidelines for intrusion alarm systems
  - European Standard – EN 50131
  - International Standard – IEC 62642
Mostly each country has its own national guidelines for intrusion alarm systems.

National guidelines, standards and directives are to be observed and complied!
The European Union has decided to make one European standard for intrusion alarm systems.

→ The EN 50131

“Alarm systems - Intrusion and hold-up systems”
Now the ISO Technical Committee has decided to take over the EN 50131 and make an international standard for intrusion alarm systems → The IEC 62642 “Alarm systems - Intrusion and hold-up systems“

IEC 62642 specifies the requirements for intrusion and hold-up alarm systems (I&HAS) installed in buildings

These requirements also apply to the components of an I&HAS installed in a building
Webinar "Security in Buildings" Marketing Tools

- Application Manual “Security in Buildings” (English, German)
  - Introduction and Solutions

- KNX Security Panel GM/A
  - Product information
  - End user oriented

- KNX Security Terminal
  - Product Information
  - Security Solutions with KNX
Webinar "Security in Buildings"
Marketing Tools

- Video on YouTube: “safe&smart”
- “The simplest way to combine security and convenience”
- English and German
Webinar "Security in Buildings"
Marketing Tools

- Webinar: PowerPoint Presentation and Video clip
  - Security Terminal MT/x (November 2013)
  - Security Module SCM/S (June 2014)
  - KNX Security Panel GM/A (December 2014)
- E-Learning module: Security Terminals MT/x
Webinar "Security in Buildings“
Marketing Tools

- Website for KNX alarm topics:
  - www.abb.de/knx-alarm
  - www.abb.com/knx-alarm
    coming soon…

- Benefits:
  - All news and information at one place
  - Links to all needed additional information (e.g. Product information, e-Learnings, training dates, FAQ, etc.)
Webinar "Security in Buildings"

Next Webinar

- Wednesday 29th of April 2015
  - Morning 09:00 am Europe Time (Berlin, UTC + 2h) and in the
  - Afternoon 03:00 pm Europe Time (Berlin, UTC + 2h)

- New KNX Fan Coil Actuators
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