Thorsten Reibel/Jürgen Schilder – ABB Customer Training Center Heidelberg – March 2015

ABB STOTZ-KONTAKT GmbH
ABB i-bus® KNX
Webinar “Security in Buildings“

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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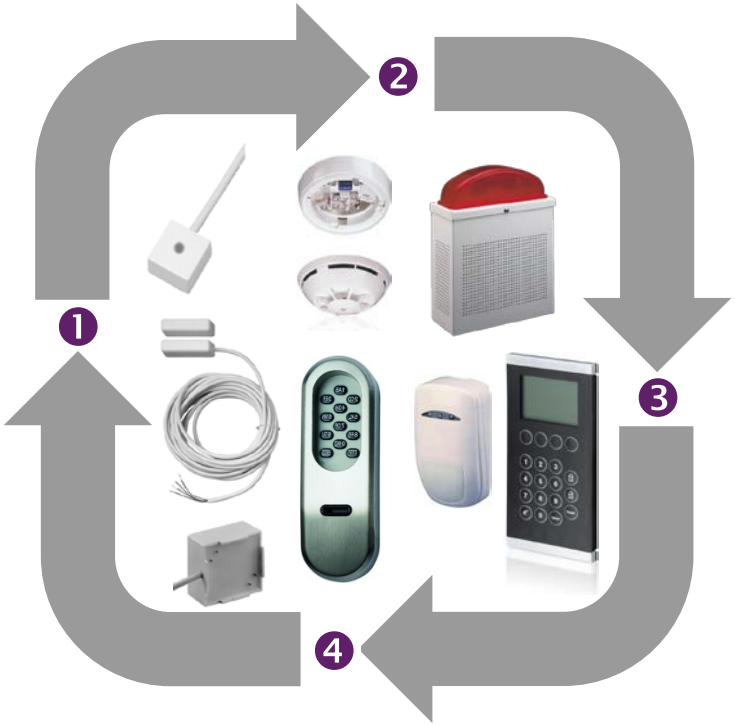
Webinar ”Security in Buildings“
Situations in a residential Building during a day

- Morning:
  Unsetting

- Night:
  Internal setting



- Absence:
  External setting

- Presence:
  Unset

Webinar ”Security in Buildings“
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)

Webinar ”Security in Buildings“
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)

Webinar ”Security in Buildings“
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)

Webinar ”Security in Buildings“
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)

Webinar ”Security in Buildings“
Further Functions and Solutions

- 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

Webinar ”Security in Buildings“
Basics of Intrusion Alarm Systems – main principle

An intrusion alarm panel evaluates the signals originating from the intrusion detectors and implements corresponding measures (alarms) depending on the setting state

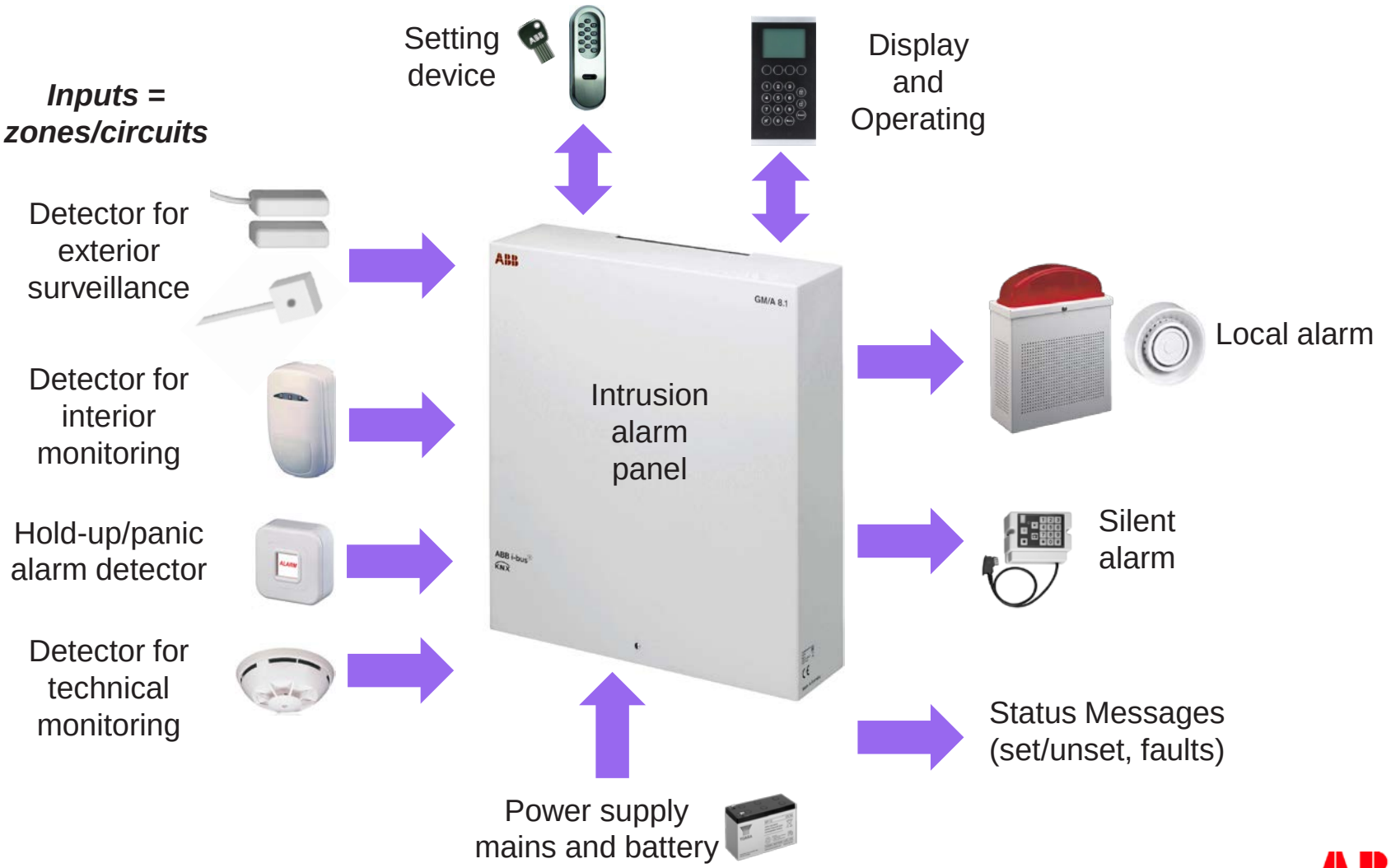
Monitor - Evaluate - Alarm

Detectors

Panel

Signalling

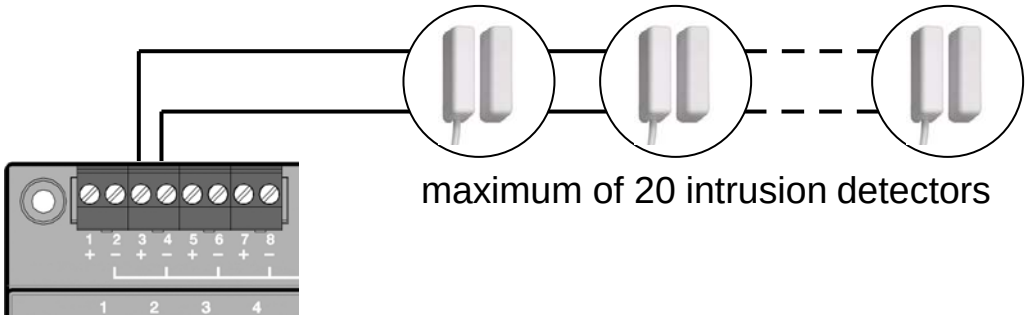
Webinar ”Security in Buildings“
Basics of Intrusion Alarm Systems



Webinar ”Security in Buildings“
Basics of Intrusion Alarm Systems

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

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Basics of Intrusion Alarm Systems

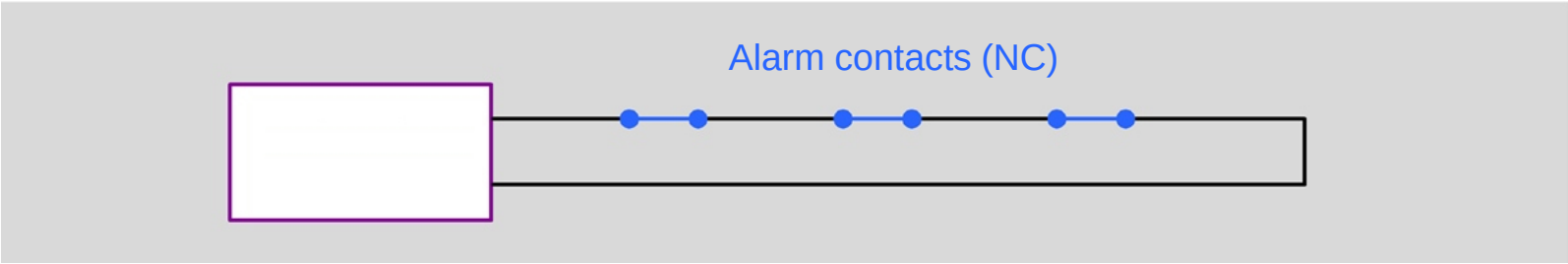
Secondary lines: Open circuit types

- 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 a in an open circuit type cannot be evaluated after an open circuit

Webinar ”Security in Buildings“
Basics of Intrusion Alarm Systems

Secondary lines: Closed circuit types

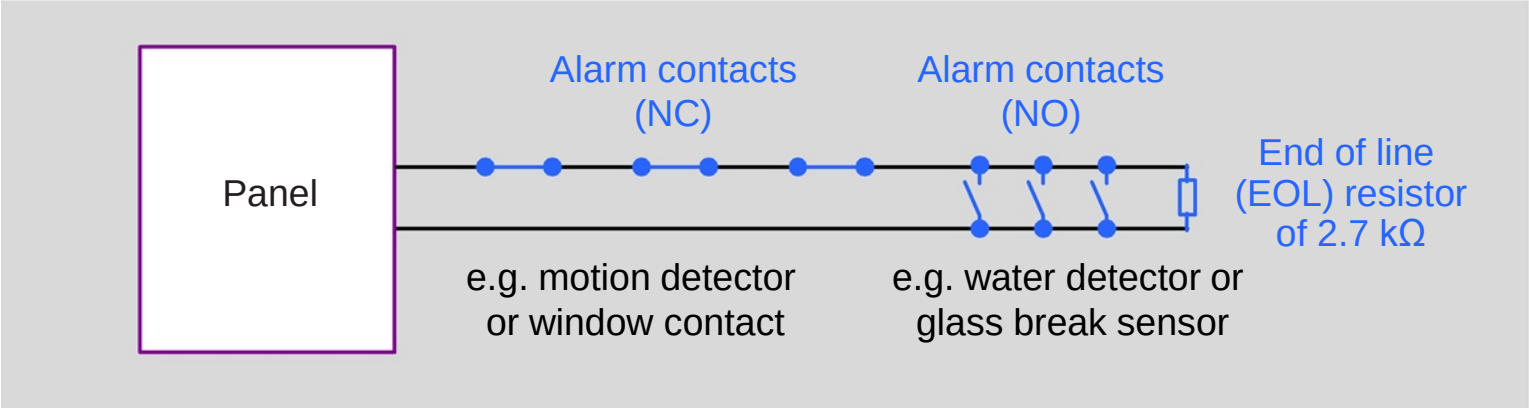
- The secondary line is a non-monitored line and can be easily manipulated
- The closed circuit type is closed in its normal state
- Should at least one contact open, the circuit is interrupted and it is evaluated by the panel
- Contacts in a closed circuit type cannot be evaluated after a short-circuit



Webinar ”Security in Buildings“
Basics of Intrusion Alarm Systems

Primary lines

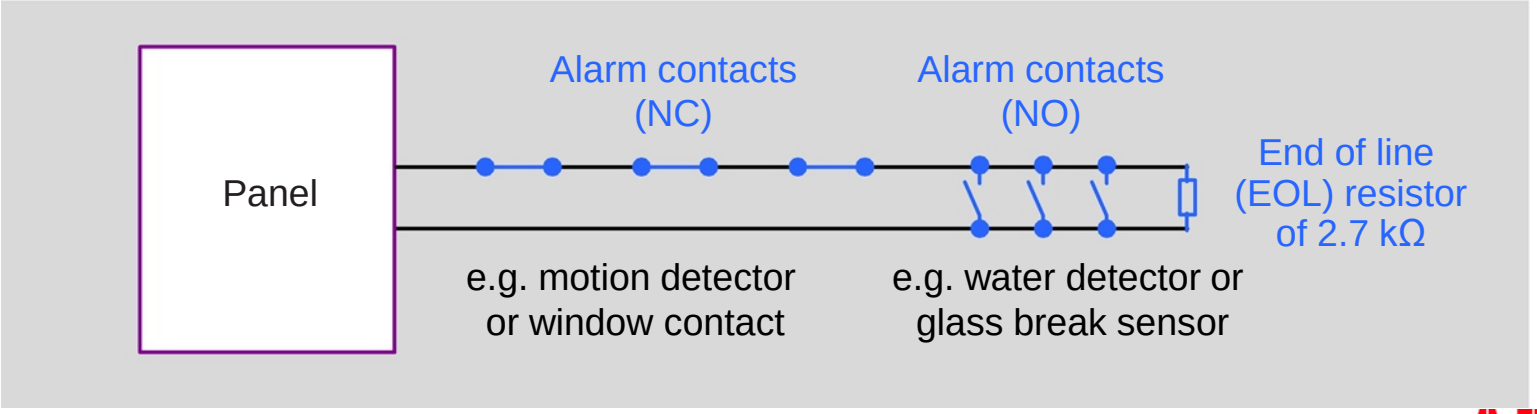
- The primary line is a monitored line and can not be manipulated
- On ABB intrusion alarm systems, zones are configured as primary lines with an end of line (EOL) resistor of 2.7 kΩ
- Typical primary lines are: Intrusion detector zone, hold-up zone, tampering zone, technical detector zone, …
- The primary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



Webinar ”Security in Buildings“
Basics of Intrusion Alarm Systems

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 !



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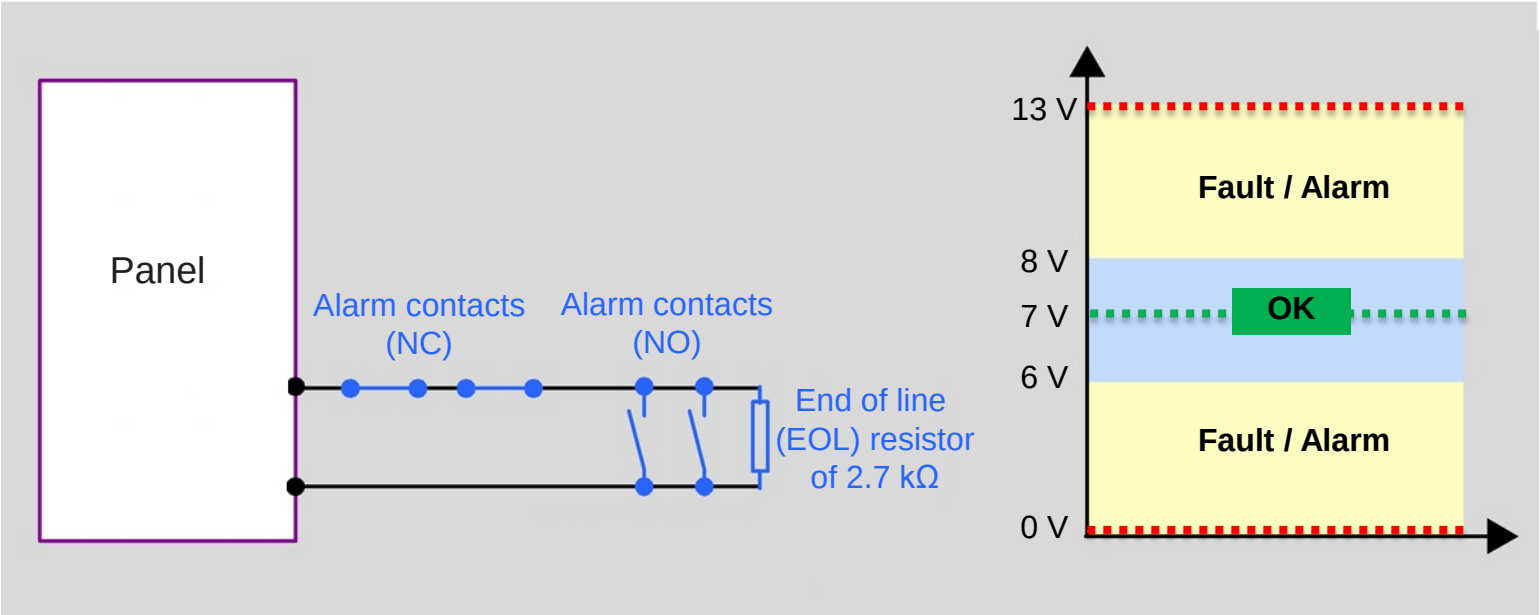
Basics of Intrusion Alarm Systems

Primary lines

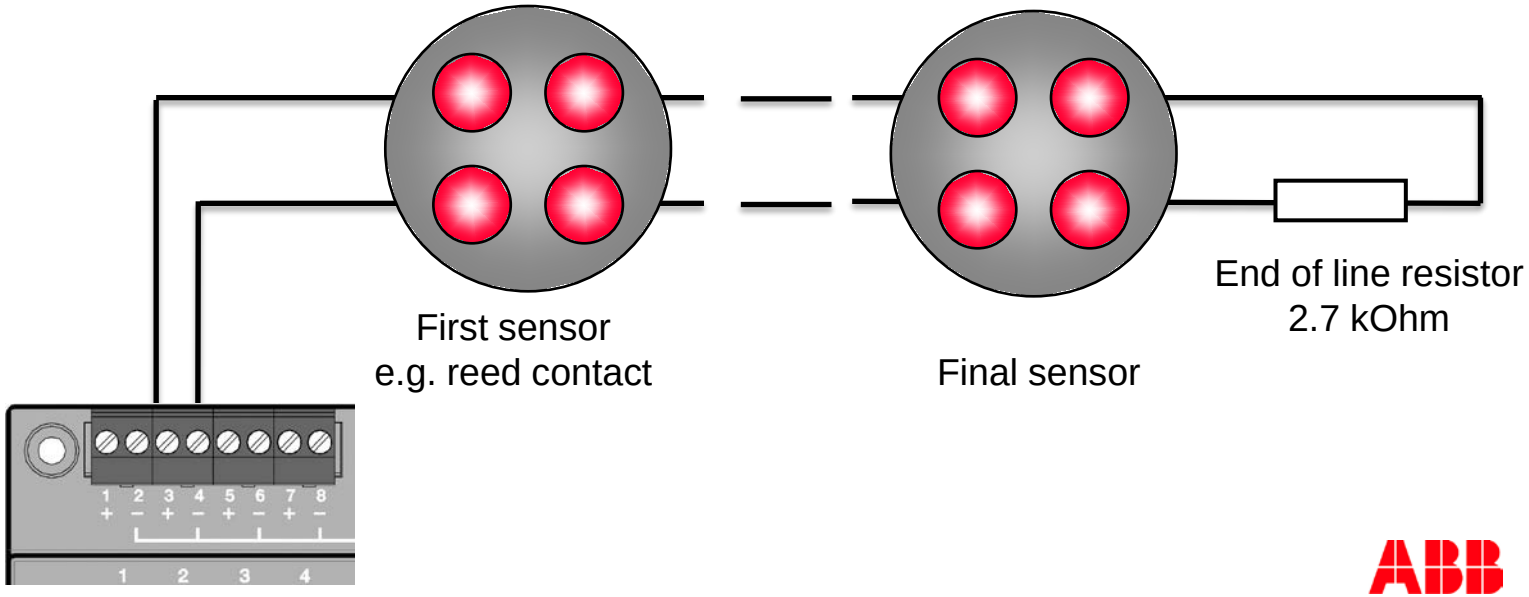
- Normally, a defined voltage is present at the input of the panel; an end of line resistor (2.7 kOhm) is used as a voltage divider
- A measurable change in this voltage occurs when there is a short-circuit or open-circuit on the line



Webinar ”Security in Buildings“
Basics of Intrusion Alarm Systems

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



Webinar ”Security in Buildings“
Alarming matrix




Input	Unset	Internally set	Externally set
Intrusion detector: Peripheral protection	-	Internal alarm	External alarm
Intrusion detector: Internal protection	-	-	External alarm
Hold-up/panic alarm	Panic alarm	Panic alarm	-
Tamper contact	Internal alarm	Internal alarm	External alarm
Technical detector	Technical alarm	Technical alarm	Technical alarm
Lock monitoring*	Prevents setting	-	-

*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
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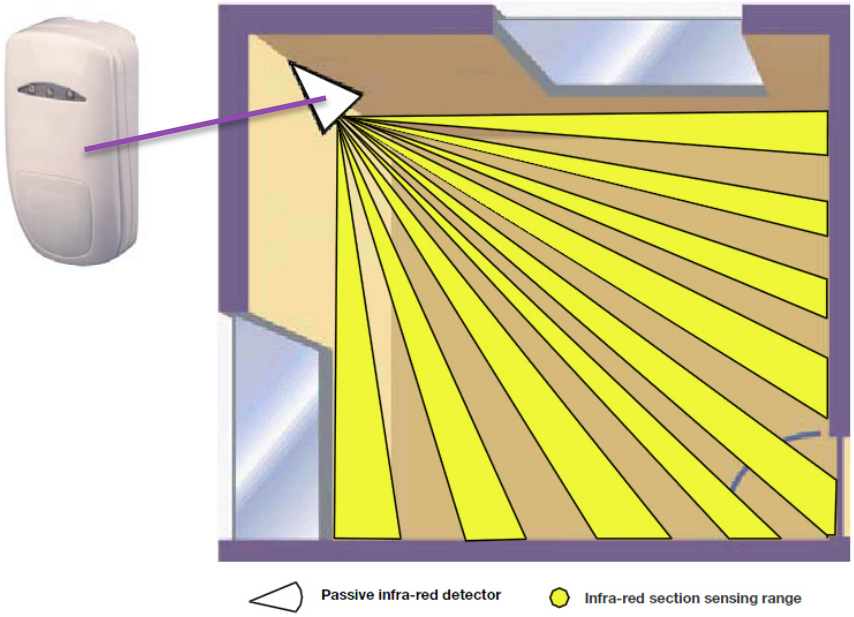
- Standards and guidelines for intrusion alarm systems

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

Webinar ”Security in Buildings“
Interior monitoring

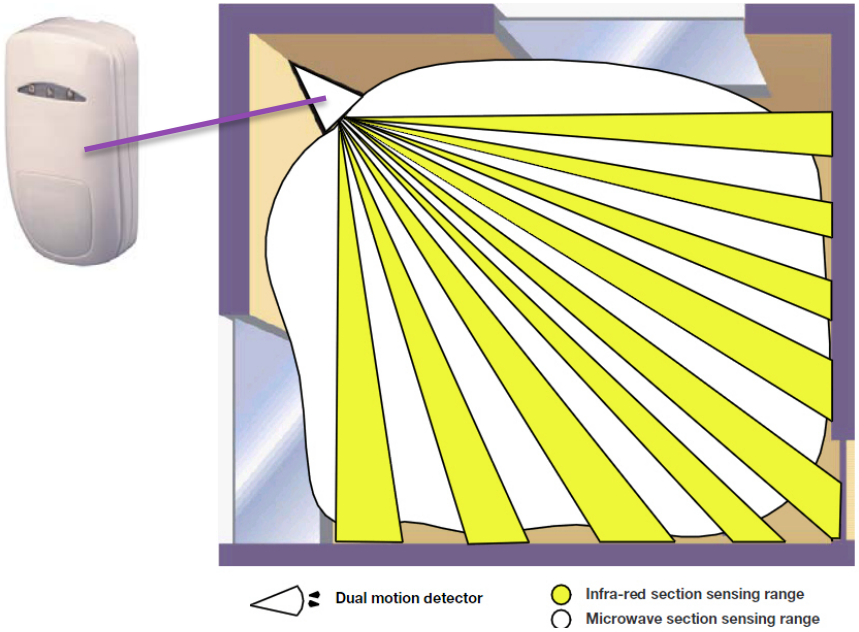


Mounting location detection range

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

Webinar ”Security in Buildings“
Interior monitoring

Fire Detector

Gas Detector

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

Webinar ”Security in Buildings“
Interior monitoring

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

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Interior monitoring

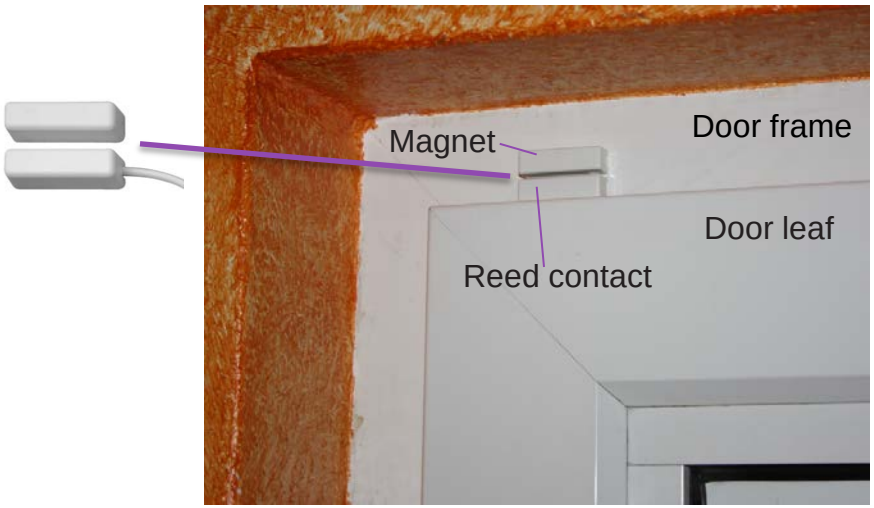
Hold-up detectors

- 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

Webinar ”Security in Buildings“
Exterior surveillance



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

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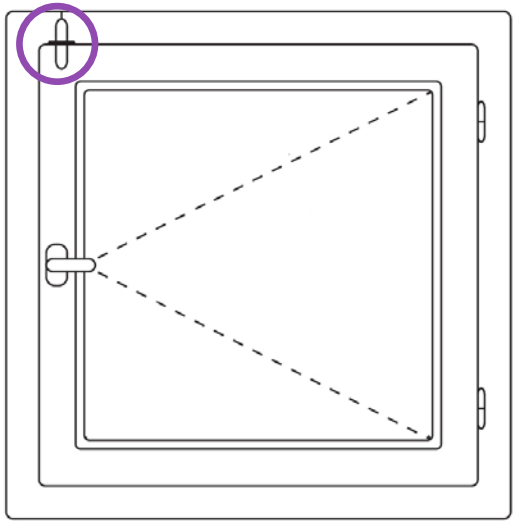
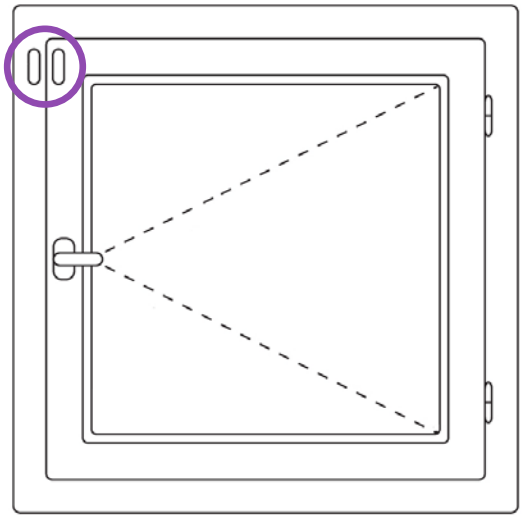
Exterior surveillance





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)

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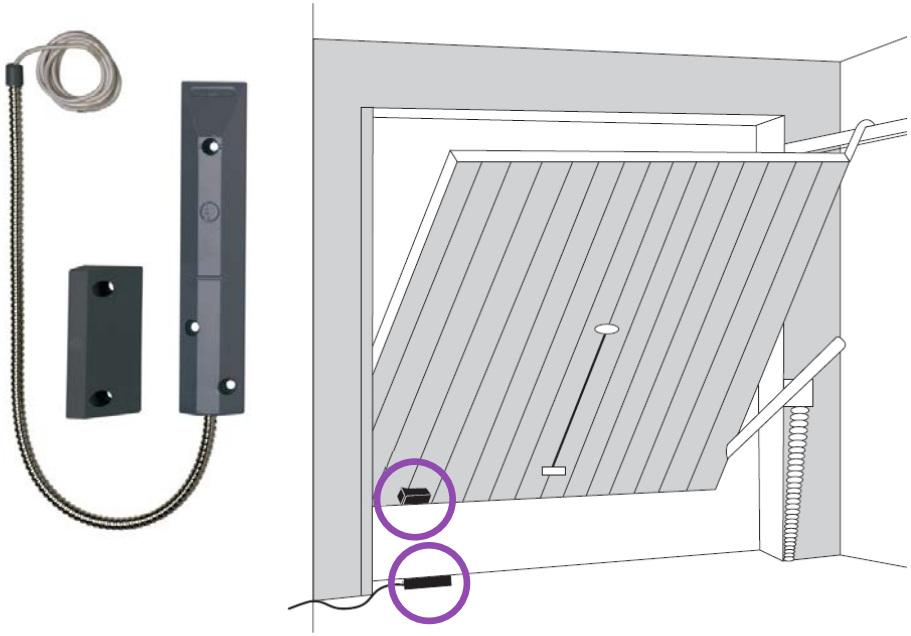
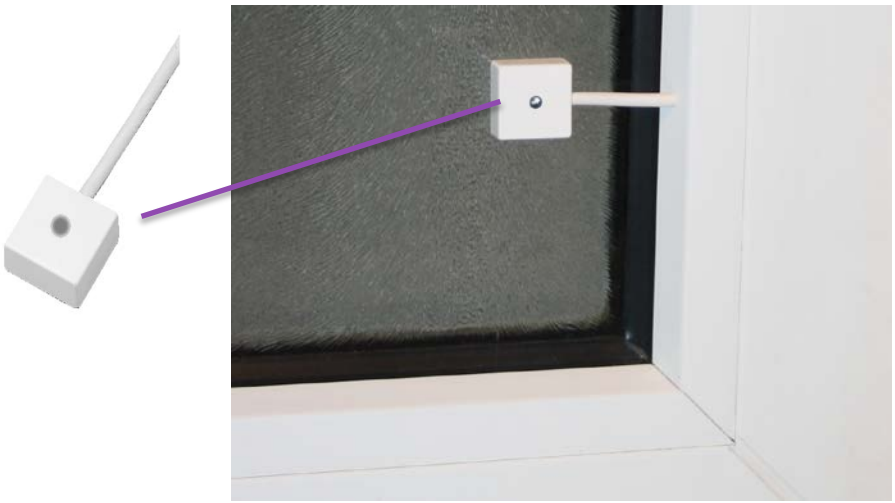
Exterior surveillance

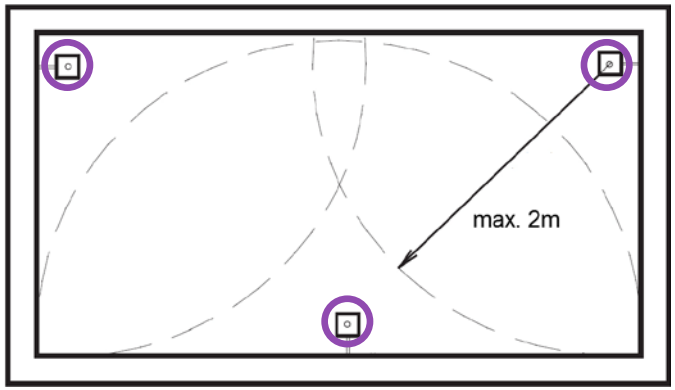


Opening surveillance

- 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

Webinar ”Security in Buildings“
Exterior surveillance





Monitoring a pane of glass from a display window measuring 4.5 x 2 m

Monitoring of the glass panes

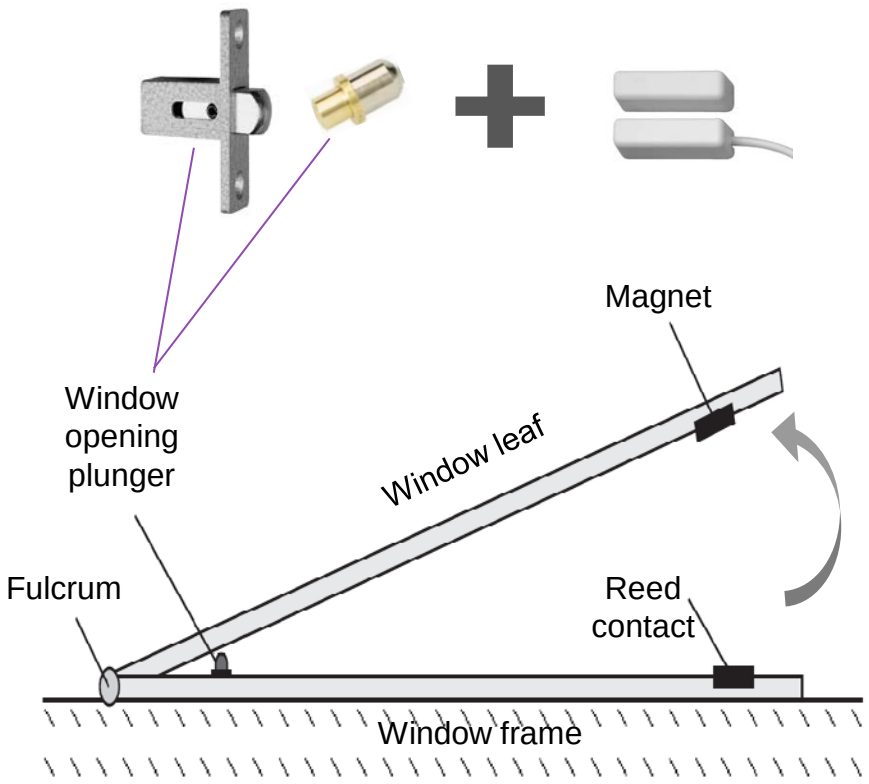
- The electronic glass break sensor is used to monitor the glass surfaces of windows and doors
- The piezoelectric microphone registers the typical vibrations that are caused by forcible damage to a pane of glass
- An LED on the detector indicates the detector that has triggered
- The maximum monitoring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

Webinar ”Security in Buildings“
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

Webinar ”Security in Buildings“
Exterior surveillance



Top view of a window

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

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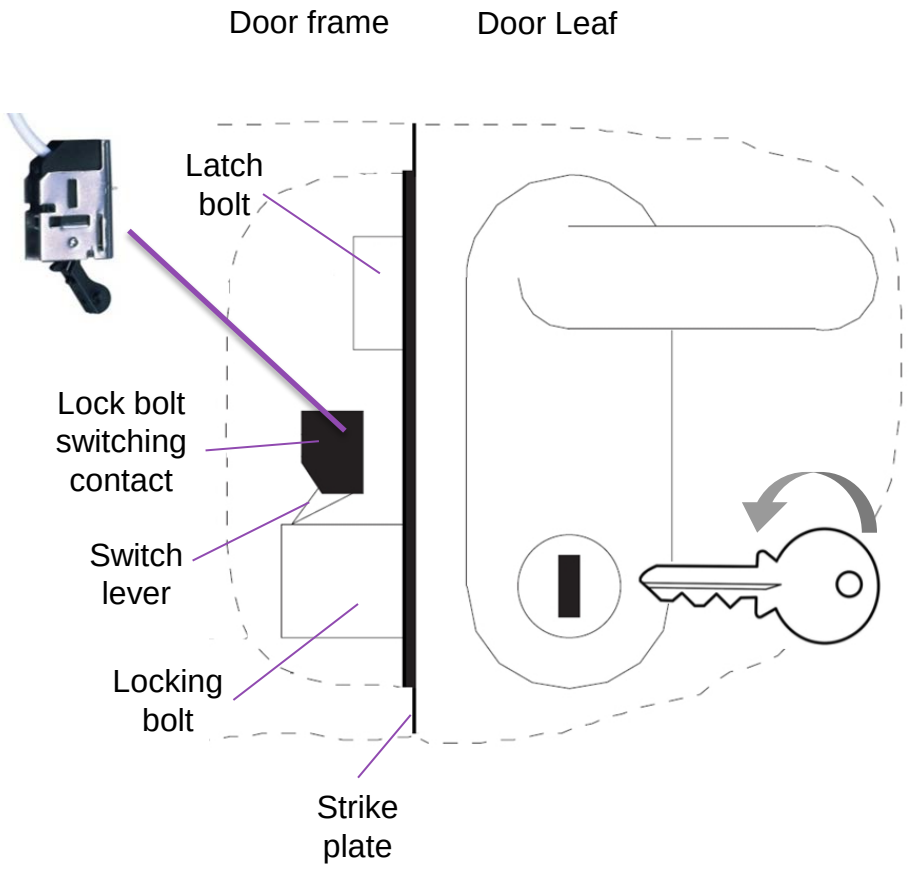
Exterior surveillance



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“
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- Introduction
- Basics of intrusion alarm systems
- Interior monitoring
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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

Webinar ”Security in Buildings“
Setting/unsetting

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.

Webinar ”Security in Buildings“
Setting/unsetting

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

Webinar ”Security in Buildings“
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)

Webinar ”Security in Buildings“
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- Basics of intrusion alarm systems
- Interior monitoring
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  - External alarming – local and silent/remote
  - Internal alarming
- ABB-Solutions for security applications
- Standards and guidelines for intrusion alarm systems

Webinar ”Security in Buildings“
Alarming

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

Webinar ”Security in Buildings“
Alarming

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

Webinar ”Security in Buildings“
Alarming

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“
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- Basics of intrusion alarm systems
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- 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

NEW

Webinar ”Security in Buildings“
Basic Security Solution with only one Security Terminal

Security Terminal

Sensors

Arming Device

Local Alarm

KNX

Display and operation

Remote Alarm and operate TG/S

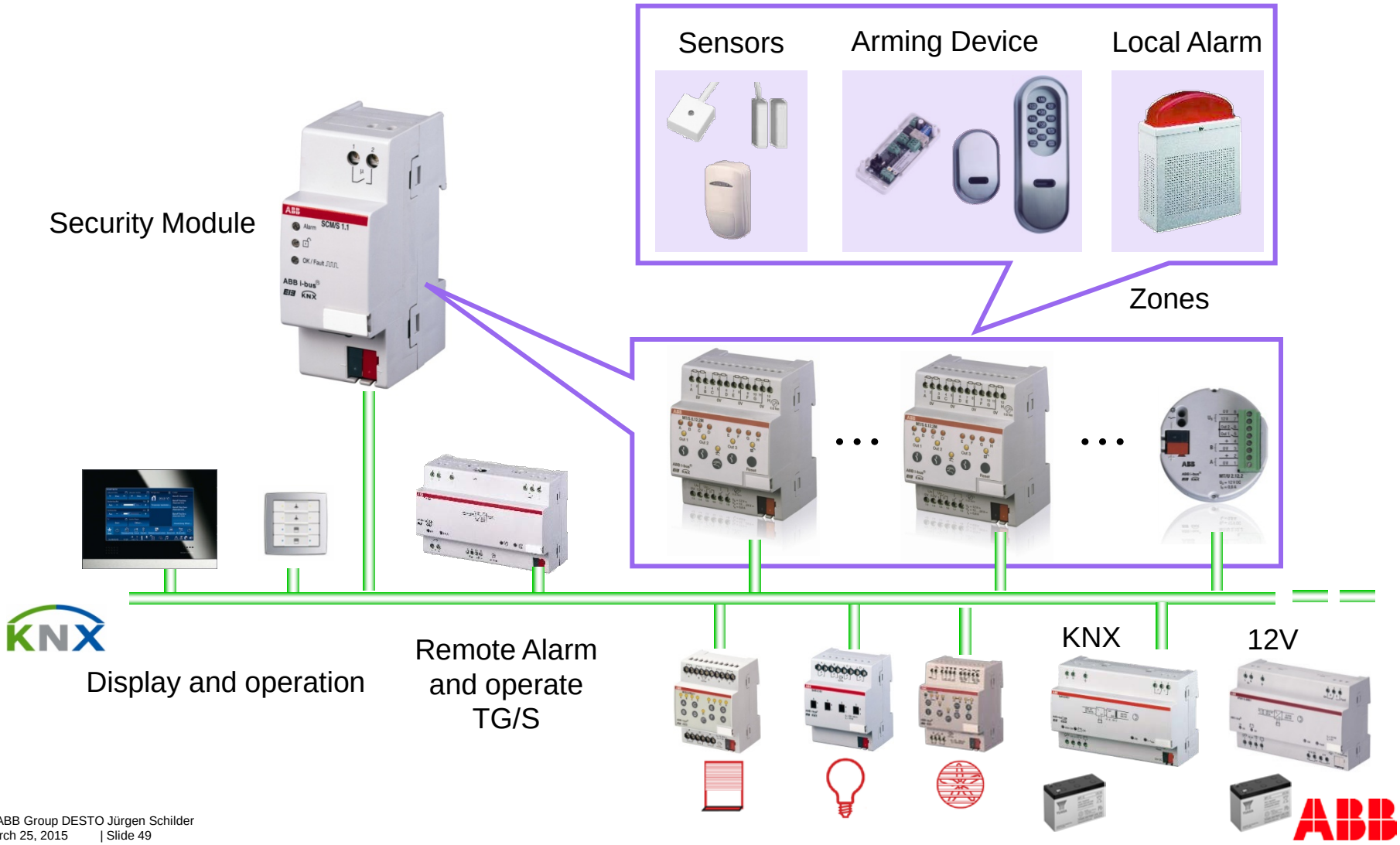
KNX

12V

Uninterruptible Power Supply

Webinar ”Security in Buildings“

KNX Extendable solution with Security Module and more Security Terminals



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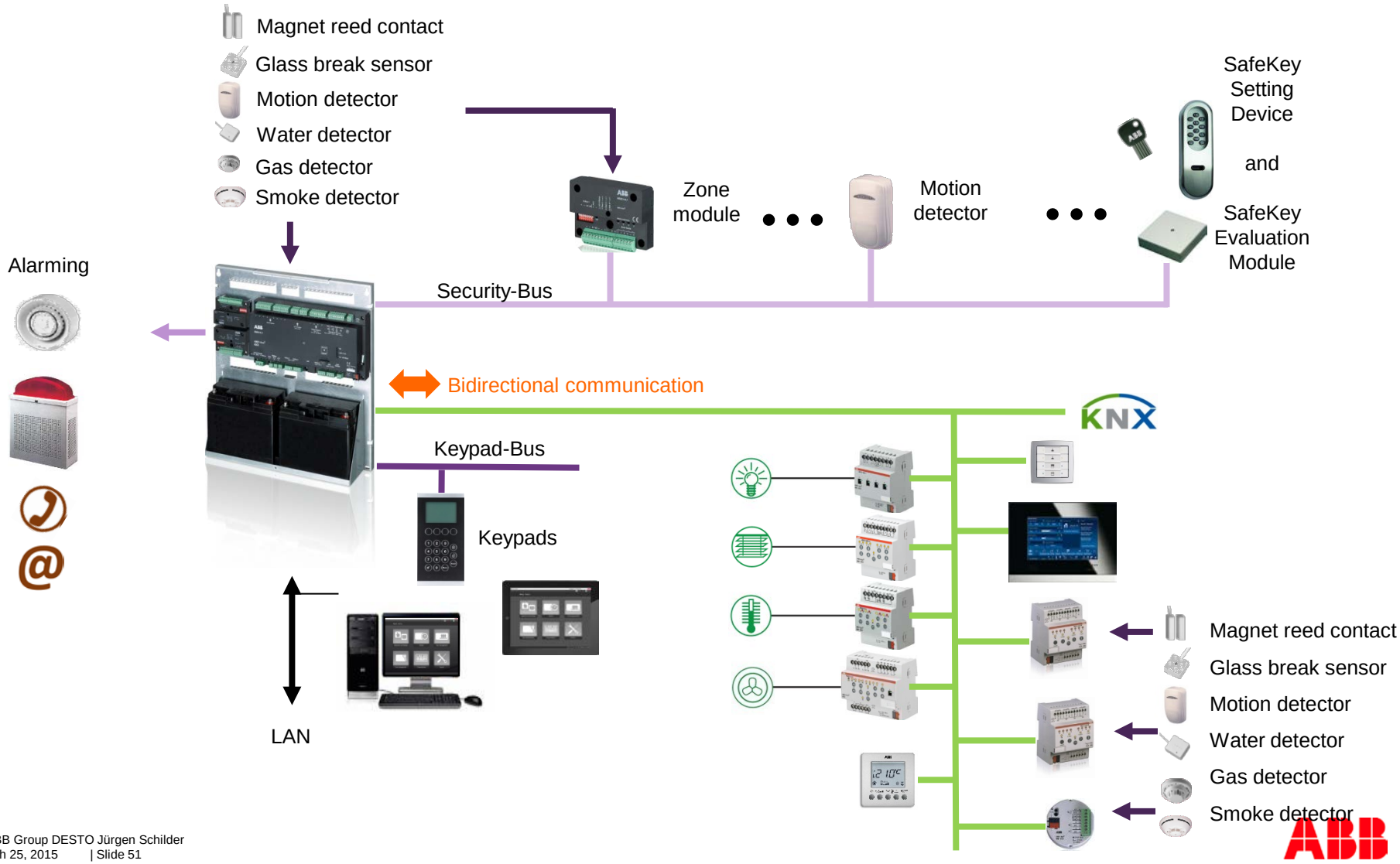
Professional solution with KNX Security Panel GM/A



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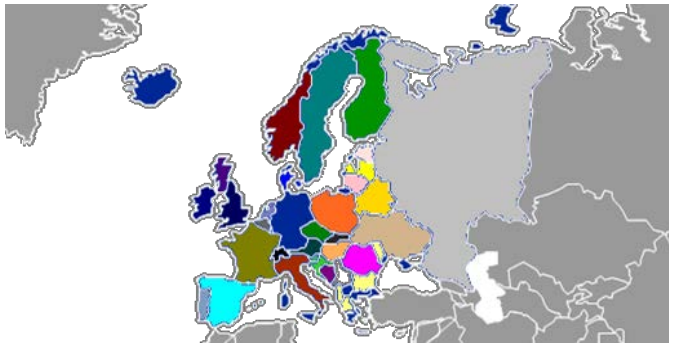
- Standards and guidelines for intrusion alarm systems
  - European Standard – EN 50131
  - International Standard – IEC 62642

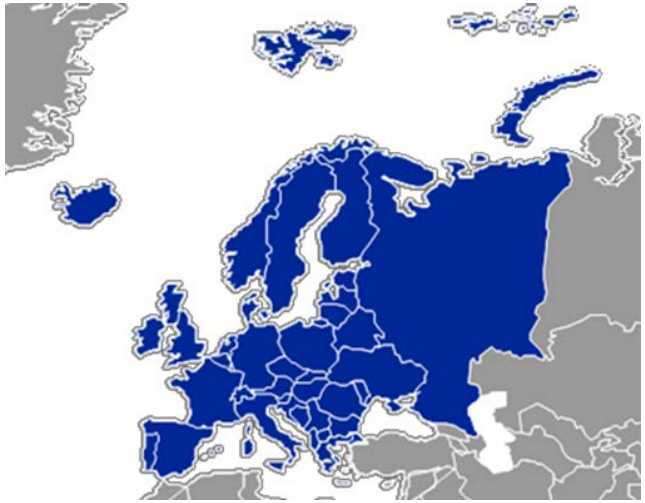
Webinar ”Security in Buildings“
National Standards and Guidelines in the Countries

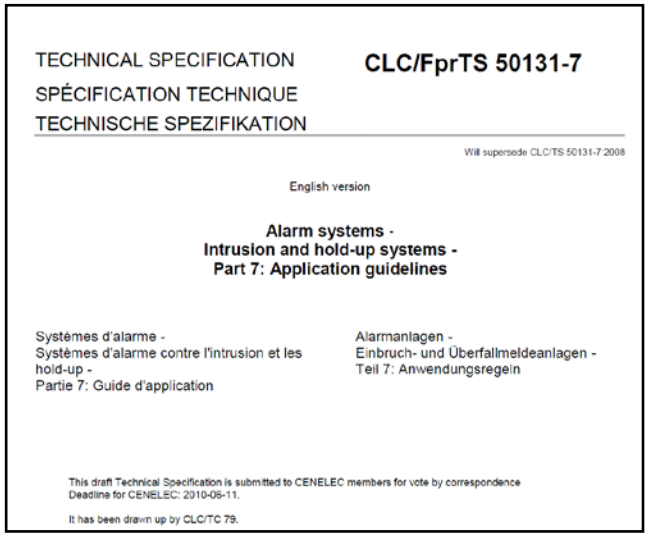


- Mostly each country has its own national guidelines for intrusion alarm systems
- National guidelines, standards and directives are to be observed and complied!

INCERT
FG FORSIKRINGSSELSKAPENES GODKJENNELSESNEVND
VdS
VSÖ Verband der Sicherheitsunternehmen Österreichs
IMQ
LPCB
Forsikring & Pension - sikring
Försäkrings Förbundet
NCP Certificatie HET CERTIFICATIE-INSTITUUT VOOR VEILIGHEID EN BEVEILIGING
NF
FK|Finanssialan Keskusliitto

Webinar ”Security in Buildings“
European Standard – EN 50131





TECHNICAL SPECIFICATION
SPÉCIFICATION TECHNIQUE
TECHNISCHE SPEZIFIKATION

CLC/FprTS 50131-7

Will supersede CLC/TS 50131-7:2008

English version

Alarm systems -
Intrusion and hold-up systems -
Part 7: Application guidelines

Systèmes d'alarme -
Systèmes d'alarme contre l'intrusion et les hold-up -
Partie 7: Guide d'application

Alarmanlagen -
Einbruch- und Überfallmeldeanlagen -
Teil 7: Anwendungsregeln

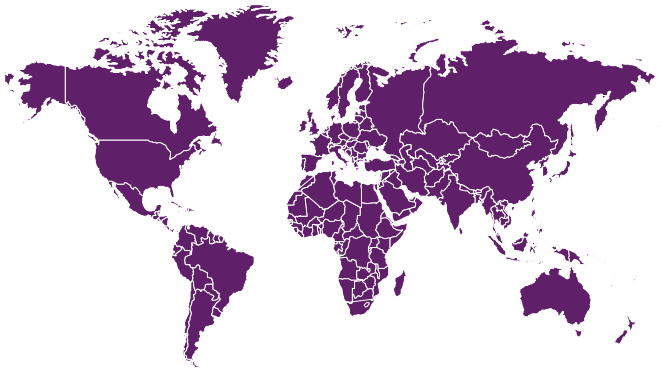
This draft Technical Specification is submitted to CENELEC members for vote by correspondence
Deadline for CENELEC: 2010-06-11.

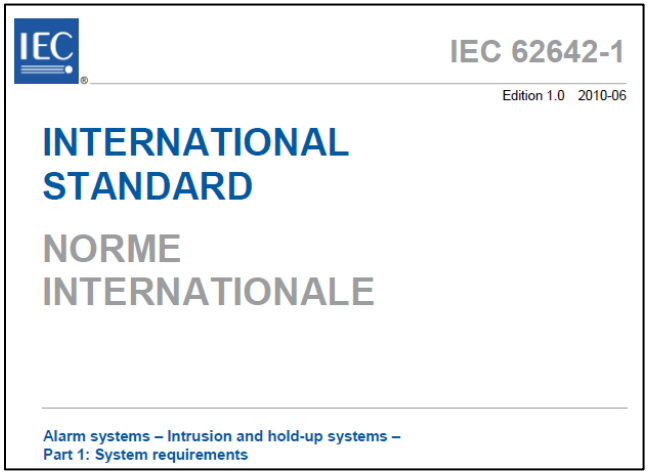
It has been drawn up by CLC/TC 79.

- The European Union has decided to make one European standard for intrusion alarm systems

→ **The EN 50131**
“Alarm systems - Intrusion and hold-up systems”

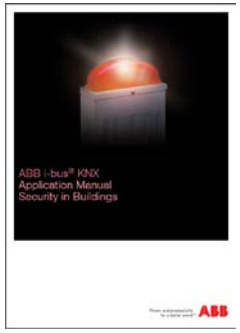
Webinar ”Security in Buildings“
International Standard – IEC 62642





- 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

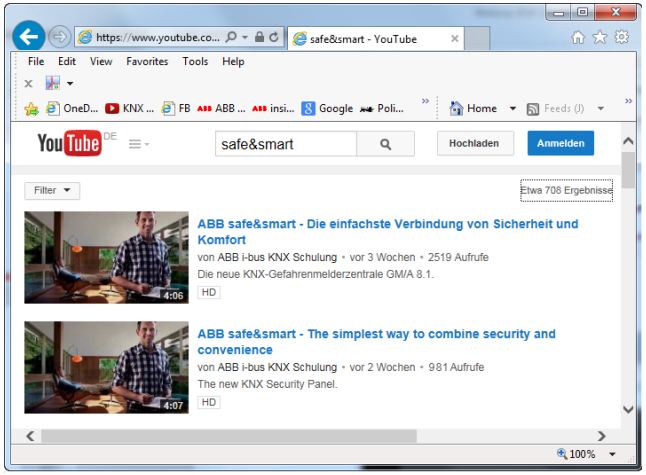


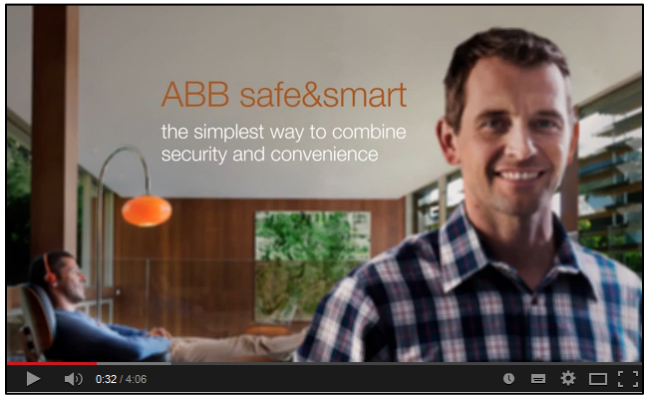
- Application Manual “Security in Buildings” (English, German)
  - Introduction and Solutions

- 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

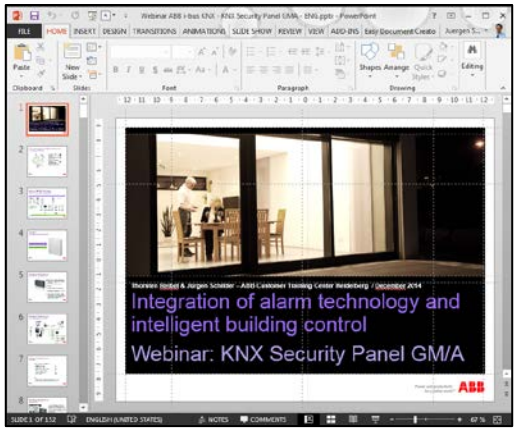


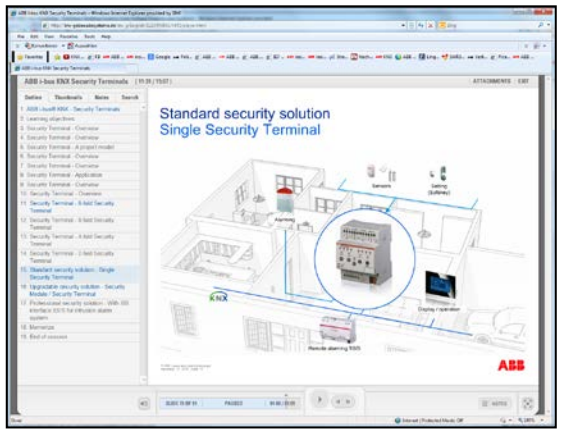


- Video on YouTube: “safe&smart“
- “The simplest way to combine security and convenience”
- English and German

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



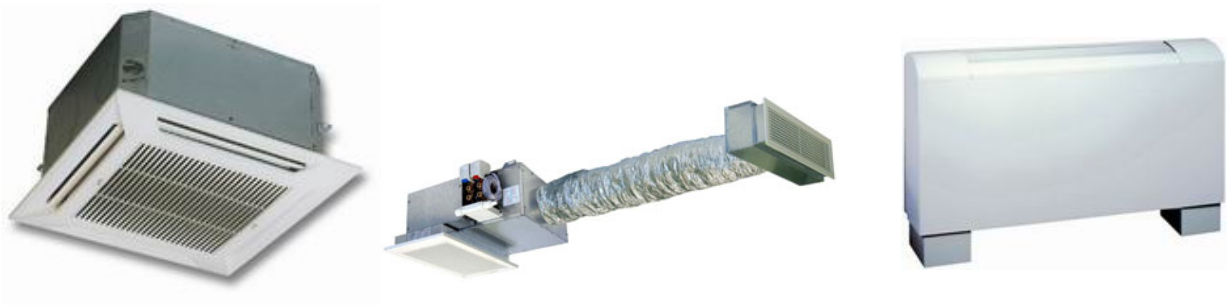


Webinar ”Security in Buildings“
Marketing Tools

- 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 additonal 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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