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Salahaddin University -Erbil

College of Engineering

Electrical Engineering Department 2023-2024

ELECTRICAL INSTALLATION OF HOTEL WITH EMERGENCY SUPPLY

A Project Submitted to the Electrical and Electronics Engineering Department Salahaddin University -Erbil In the Partial Fulfillment of the Requirement for the Degree of Bachelor of Science in Electrical and Electronics Engineering

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Abstract

As the hospitality industry continues to evolve, the need for resilient and efficient electrical installations within hotels becomes increasingly critical. This research endeavors to address the challenges and opportunities inherent in designing and implementing an advanced electrical system for hotels, with a specific focus on integrating emergency power supply. The study encompasses a comprehensive feasibility assessment, incorporating technical, economic, and cultural dimensions, to ensure the proposed electrical installation not only meets the operational needs of the hotel but also aligns with local regulations and cultural practices. The methodology involves system analysis and design, utilizing simulations, experiments, and prototypes to validate the proposed solutions. The objectives include optimizing energy efficiency, enhancing system resilience, and ensuring economic viability. By exploring recent advancements in energy technologies, safety measures, and smart grid solutions, this research contributes valuable insights to the field of hotel electrical systems. The findings aim to guide the design and implementation of electrical installations that not only meet the highest standards of reliability and safety but also contribute to sustainable and culturally compatible practices within the hospitality sector.

Table of contents

Chapter One

Introduction

The successful operation of a hotel depends heavily on its electrical infrastructure, which powers essential systems ranging from lighting and HVAC to communication and security. In the event of power outages or emergencies, maintaining these critical functions becomes paramount to ensure guest comfort and safety.

This report explores the intricacies of designing and implementing the electrical installation for a hotel, with a specific focus on incorporating an emergency power supply system. By ensuring uninterrupted power, this system not only safeguards the hotel's reputation but also protects guests and staff from potential disruptions.

Key considerations include load requirements, voltage distribution, safety measures, compliance with regulations, and the selection and installation of emergency power sources such as backup generators and UPS. Through meticulous planning and adherence to industry standards, the report aims to provide insights into creating a resilient electrical infrastructure that meets both current needs and future challenges.

Understanding the project scope

Every electrical design has unique requirements, depending on the scope of the project. The project scope will determined by the customers' requirements and the type of the structure that the customer will occupy. For example, if the project requires new electrical system for an existing building, then the electrical designers works to incorporate all the new electrical wiring into the existing system. When the design for a new proposed facility, then the scope of the project is much greater. Electrical designs for these types of projects requires an entirely new electrical system design.

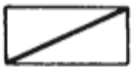
Distribution Cable Route Plans

On large installations there may be more than one position for the electrical supplies. Distribution cables may radiate from the site of the electrical mains intake position to other sub-mains positions. The site of the sub-mains and the route taken by the distribution cables may be shown on a blank copy of the architect's site plan or on the electricians 'As-fitted' drawings.

Site Plans or Layout Drawings

These are scale drawings based upon the architect's site plan of the building and show the position of the electrical equipment which is to be installed. The electrical equipment is identified by a graphical symbol. The standard symbols used by the electrical contracting industry are those recommended by the British Standard EN 60617, Graphical Symbols for Electrical Power, Telecommunications and Electronic Diagrams. Some of the more common electrical installation symbols are given in Fig. 1.13

Main control or intake point



Main or submain switch

Socket outlet (mains) general symbol

Switched socket outlet

Socket outlet with pilot lamp

Multiple socket outlet
Example: for 3 plugs

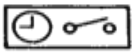
Push button

Luminous push button

Electric bell: general symbol

Electric buzzer: general symbol

Time switch



Automatic fire detector

Single-pole, one-way switch

Note: Number of switches at one point may be indicated

Two-pole, one-way switch

Three-pole, one-way switch

Cord-operated single-pole one-way switch

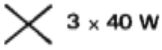
Two-way switch

Intermediate switch

Lighting point or lamp: general symbol

Note: The number, power and type of the light source should be specified

Example: Three 40 watt lamps



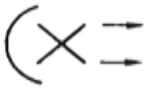
Lamp or lighting point: wall mounted

Emergency (safety) lighting point

Lighting point with built in switch

Projector or lamp with reflector

Spotlight



Single fluorescent lamp

Power system

1-Transformer

Transformers, along with other power distribution apparatus, remain a fundamental component in electrical systems distribution for commercial buildings. This article presents several useful design concepts for selecting and sizing transformers in the design of electrical systems for commercial buildings.

Transformers change voltage levels to supply electrical loads with the voltages they require. They supply the required incoming electrical service to the buildings. Transformer primary and secondary voltages can be 2,400; 4,160; 7,200; 12,470; and 13,200 for 15-kV Class, and 120, 208, 240, 277, and 480 for 600-V Class

Transformers are located either outdoors or inside buildings in an electrical room or other areas as permitted by code. The electrical phase characteristics associated with the transformer's primary side is 3-phase, 3-wire or Delta connected. The secondary is 3-phase, 4-wire or Wye connected.

Application types

There are different ways in which transformers are installed and used as part of a commercial building electrical system. These application types include: *Indoor distribution transformers* are used with panel boards and are separately mounted to supply the specific electrical load requirements in a system-specific application within the system distribution. Several transformer types rated higher than 600 V for oil insulated type, higher than 35,000 V for dry type, and other transformers rated higher than 600 V are required to be located in vault rooms, which must be built with fire-rated enclosures depending on the transformer type and applicable local authority requirements, when indoors. Transformers that are not over 600 V and are part of the indoor building electrical system distribution have both primary and secondary voltages below 600 V with the most common voltage level change from 480 V to 208 Y/120 V.

Pad-mounted transformers are installed outside and are considered the first option for supplying service entrance voltage to the building electrical system based on the project size and requirements. They typically have primary voltages higher than 600 V and secondary voltages lower than 600 V with compartments for the associated protective devices assembled in an integral tamper-resistant and weatherproof unit.

In addition, the size of the commercial facility will determine the appropriate approach for designing the electrical distribution system for the specific application. In this electrical system design, the transformer can be used as part of a substation, primary unit substation, secondary unit substation, or network configuration.

Sizing

The electrical size of the transformer load is rated in kVA. This rating provides the associated power output delivered for a specific period by the loads connected to the transformer on the secondary side of the equipment. The loads, which are calculated as part of the building electrical system design phase, are shown in the construction documents' respective equipment schedules in VA or kVA.

A general approach to determining transformer capacity and selecting the proper rating for the design application is to obtain the calculated design load

from the respective electrical schedule and add 20% spare capacity for future load growth to be shown in the equipment schedule, unless otherwise directed by the facility based on design parameters. For example, the code-based demand load of a 208 Y/120 V, 3-phase, 4-wire panelboard is 42 kVA, which does do not include spare capacity for future growth. Therefore, the transformer size required for converting the system voltage from 480 V, 3-phase, 3-wire to 208 Y/120 V, 3-phase, 4-wire is:

Transformer size in kVA = 42 kVA x 1.25 = 52.5 kVA

Therefore, a 75 kVA transformer would be selected for this application out of the available standard ratings for a 480 V primary to 208 Y/120 V secondary. The most common building industry standard ratings are 3, 6, 9, 15, 30, 37.5, 45, 75, 112.5, 150, 225, 300, 500, 750, and 1,000 kVA.

The above simple calculation meets the intent to achieve the normal life expectancy of a transformer, which is based on the following basic conditions:

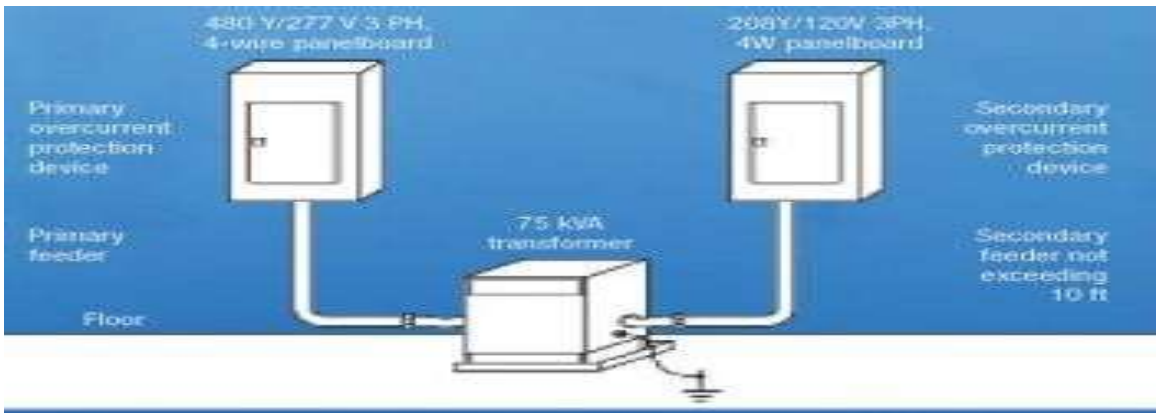
- The transformer is equal to or less than its rated kVA and rated voltage.
- The average temperature of the cooling air during a 24-hour period is 86 F.
- The temperature of the cooling air at no time exceeds 104 F.

Installation

The installation of power transformers and transformer vaults must comply with the requirements of National Electrical Code (NFPA 70) article 450 and specific local authority having jurisdiction requirements. Some principles to consider for transformer installation include locating them in isolated rooms with proper ventilation, clearances, and accessibility. Otherwise, they can be installed on open walls or steel columns or above suspended ceilings

In addition, there are other specific requirements based on the transformer type, such as weatherproof enclosures for dry-type transformers installed outdoors or a transformer vault room for oil-insulated transformers installed indoors. In addition, a good design and installation require the proper

transformer feeder and overcurrent protection device size based on NEC articles 240, 250, 450, and applicable sections of Article 310 (Figure 2)



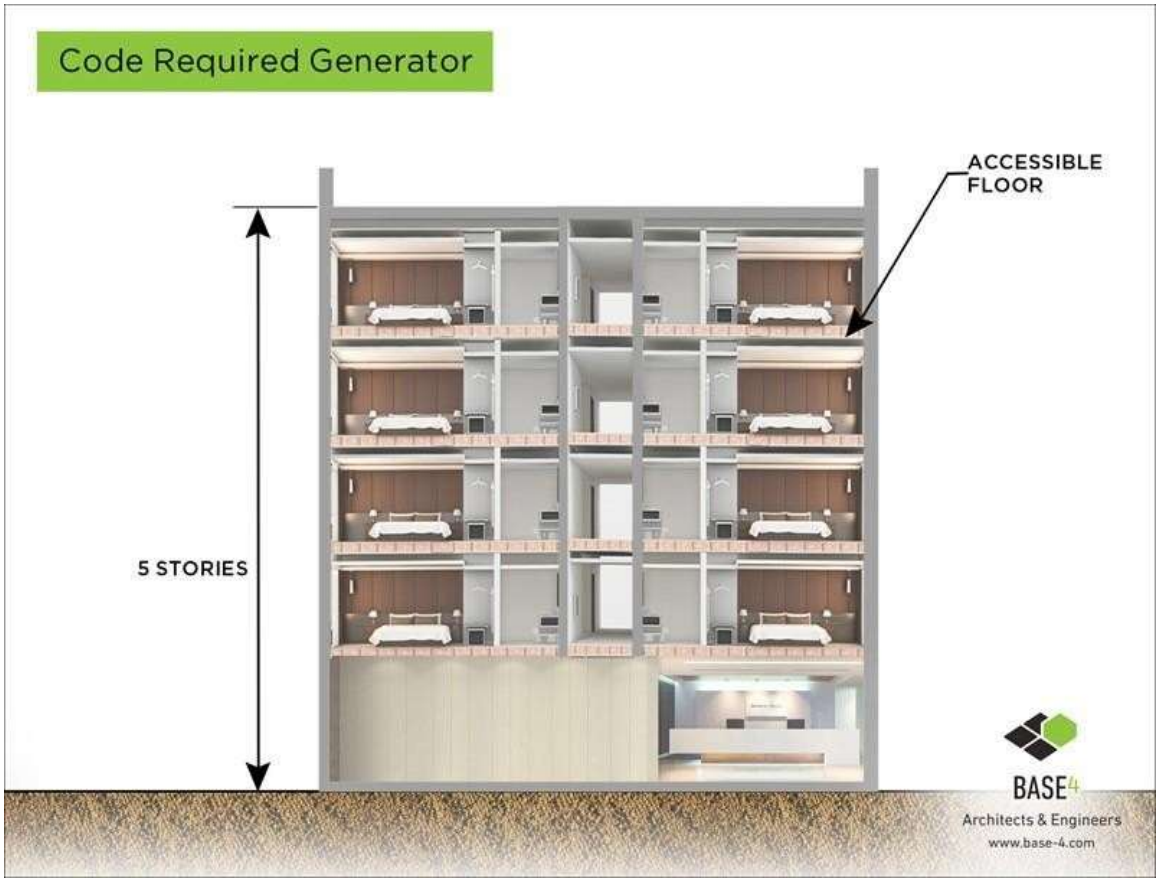
PRIMARY	SECONDARY
Transformer primary current FLA = kVA ÷ (V x √3) FLA =75 kVA÷(480 V x √3)= 90 A	Transformer secondary current FLA = kVA ÷ (V x √3) FLA = 75 kVA÷(208 V x √3)= 208 A
Transformerprimaryovercurrent protection device Overcurrentprotectiondevice= FLA x 1.25 = 90 A x 1.25 = 112 A Therefore,overcurrentprotection device is 125 A	Transformer secondary overcurrent protection device Overcurrentprotectiondevice= FLA x 1.25 = 208 A x 1.25 = 260 A Therefore,overcurrentprotection device is 250 A
Transformer primary feeder Based on the above overcurrent protection device requirements, the feeder is three #1 copper and one #6 copper for ground in 1¼-in. conduit.	Transformer secondary feeder Based on the above overcurrent protection device requirements, the feeder is four #250 Kcmil and one #4 copper for ground in 3-in. conduit.

Notes:

1. The above approach might vary per NEC Article 450 and others for specific project requirements.
2. If the transformer is located within a room that can reach 104 F, the conductor in the primary must be rated by a factor of 0.88 since NEC Table 310-16 is based on 86 F.
3. Grounding electrode condustor size is #2 copper.

2-Emergency Power Systems

In most cases, a generator required if a hotel has 5 or more floors above the grade



What types of generators are used?

Both natural gas and diesel generators are acceptable. However, for a typical 100-key, limited service hotel, a natural gas generator is used for the following reasons:

- Natural gas doesn't require storing large quantities of fuel or signing a fuel delivery contract.
- Natural gas units are typically smaller and more appropriately sized (100-250 kW) for typical hotel demands.

What does a generator need to power in my hotel?

According to National Electrical Code **(NEC)**, a generator typically supplies power to three main areas

1. Emergency Circuits:

- Egress path lights
- Exit lights
- Fire pumps
- Fire alarms
- Card readers
- Magnetic door holds
- Other critical and life safety circuits

2. Code Required Standby Circuits

- Elevators
- Building emergency lighting
- Data & communication system
- Ventilation and smoke removal
- Front desk outlets

3. Optional Standby Circuits:

- Food storage & processing
- HVAC units
- Electric socket

What should I consider when I place a generator on site?

- **Flooding –** Generators should be elevated, especially in coastal areas.
- **Sound Considerations –** Generators are loud, so designing sound barriers is advised.
- **Guest Site Lines –** Generators are large, bulky pieces of equipment that require strategic placement to remain out of sight.
- **Access –** Technicians must be able to access and service generators, requiring proper clearances around the units.

What is the size of a typical hotel generator?

A typical 150 kW generator is approximately 10’ long by 5’ wide by 6’ tall and weighs 7,000 lbs. This is a very large piece of equipment that must be accounted for during the early design phase.

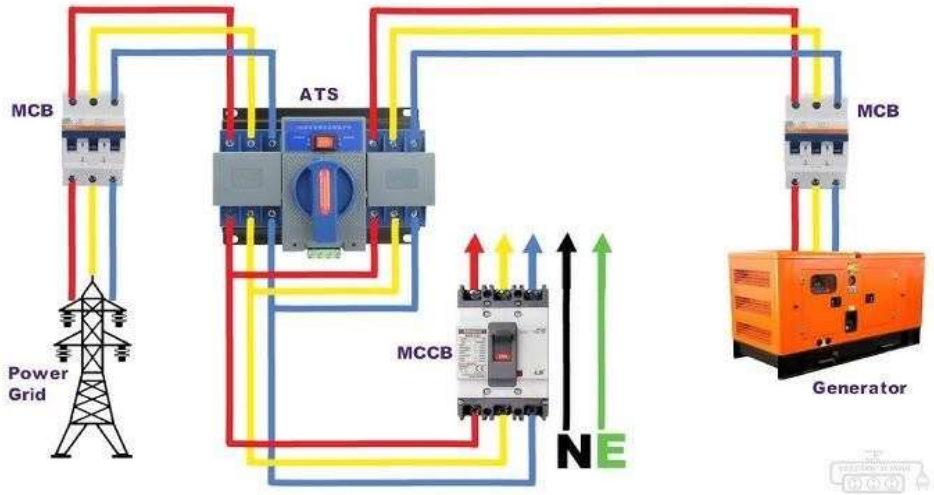
Uninterruptible power source (UPS)

is an electrical apparatus that provides emergency power to a load when the input power source or mains power fails. A UPS differs from an auxiliary or emergency power system or standby generator in that it will provide near-instantaneous protection from input power interruptions, by supplying energy stored in batteries, super-capacitors, or flywheels. The on-battery run-time of most uninterruptible power sources is relatively short (only a few minutes) but sufficient to start a standby power source or properly shut down the protected equipment. It is a type of continual power system.

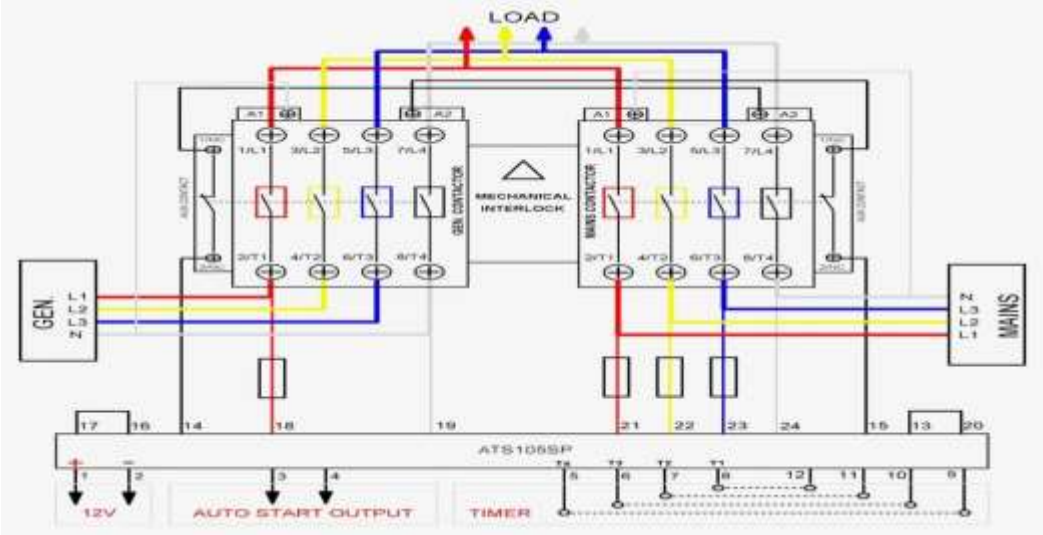
UPS is typically used to protect hardware such as computers, data centers, elevator, telecommunication equipment or other electrical equipment

3-Auto Transformer ATS switch

Auto transfer switch (ATS) is an electrical switch that switches a load between two sources. Some transfer switches are manual, in that an operator effects the transfer by throwing a switch, while others are automatic and trigger when they sense one of the sources has lost or gained power



An Automatic Transfer Switch (ATS) is often installed where a backup generator is located, so that the generator may provide temporary electrical power if the utility source fails operation of a transfer switch Edit As well as transferring the load to the backup generator, an ATS may also command the backup generator to start, based on the voltage monitored on the primary supply. The transfer switch isolates the backup generator from the electric utility when the generator is on and providing temporary power. The control capability of a transfer switch may be manual only, or a combination of automatic and manual. The switch transition mode (see below) of a transfer switch may be Open Transition (OT) (the usual type), or Closed Transition (CT).



4-Power Distribution (MDB – SMDB)

Power Distribution is a system, consisting of a Main Distribution Board (MDB), Sub Main Distribution Boards (SMDBs) and Final Distribution Boards, by which the electrical energy is transmitted via branches to reach the exact end user .Main Distribution Board(MBD)An MDB is a panel or enclosure that houses the fuses, circuit breakers and ground leakage protection units where the electrical energy, which is used to distribute electrical power to numerous individual circuits or consumer points, is taken in from the transformer or an upstream panel. An MDB typically has a single or multiple.

incoming power sources and includes main circuit breakers and residual current or earth leakage protection devices. A MDB is comprised of a free standing enclosure, a bus bar system, MCCB's, metering and support equipment's and required current transformers. Panels are assembled in a systematic manner such as incomer section and outgoing section.

Sub-Main Distribution Boards (SMDB)

The MDB then feeds SMDBs, which is installed generally at the point where a large distribution cable terminates and several smaller sub-circuits start. These are the switchboards that although similar construction, are larger than a final distribution board circuit. The boards are installed midway through the power distribution system, at the point in a large distribution cable ends, and several smaller starting sub-circuits.

The Sub-Main Distribution Boards feeds the Final Distribution Board, which then feeds electrical energy to the end user**.**

Final Distribution Boards

Data-telephone system

A hotel phone system is not that much different than your average business telephone network. The key differences arise when you start to look at the features available for hotel phone systems and how they expand beyond the provision of a simple telephone handset.

In the hospitality sector, hotel telephone systems can use specially designed handsets to be used in guest rooms. These handsets have a limited set of features and only allow internal calls.

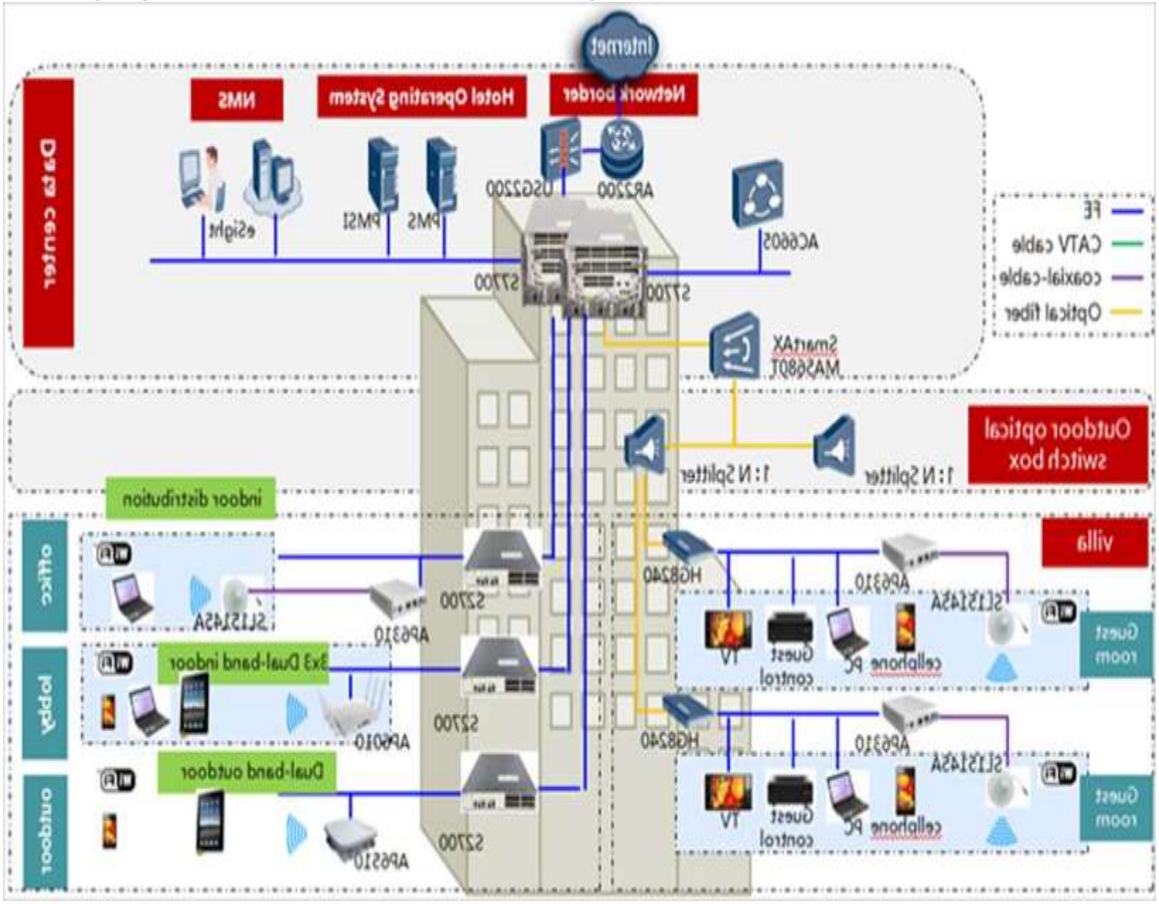
Many phone systems within the hotel industry today will either use PBX or VoIP technology. A PBX system is a more traditional telephone solution and they're thought to be more reliable, but costs can soon add up.

A VoIP phone system, on the other hand, is more advanced and hosted in the cloud, eliminating the requirement for a traditional phone system. They also offer a range of advanced features and improved call quality.Hotels may sometimes require an internet phone system to connect to each room and an external phone system to reach suppliers, customers, and other contacts. Although some smaller hotels can cope very well with a basic phone system, there are a number of benefits to installing a more modern system that can better fulfill the requirements of both guests and hotel management.

The more advanced hotel phone systems offer your guests the usual functions of a telephone in addition to features such as a wake up call, a specific reminder, or the ability for hotel guests to make external calls with automated billing.

Advanced phone systems can bring several benefits to hotels, from improved customer service to increased efficiency and better communications between staff. Other advantages include:

Managing reservations & room bookings



Improving internal communication processes
Dealing with hotel guest inquiries & requests
Allowing reception staff to transfer and hold calls easily for guests

Fire detection in hotels

A total surveillance concept is most applicable for fire detection systems in hotels, ensuring that the entire building is monitored. This includes not only all rooms, corridors, staircases and anterooms, but also all air conditioning and cable ducts, supply shafts, false ceilings, raised floors, and similar structures which permit smoke and fire to spread .

Most hotel fires are started by heat generated by overheating or malfunctions in electrical equipment, or electrical arcing. Another important category of ignition source is heat or open flames from candles, cigarettes, lighters, and matches. Hot embers or ashes, molten, hot material, and heat generated by friction are further fire sources .

Special attention should be given to critical areas where many people may be present, areas with numerous heat sources, large fire loads or significant deception phenomena .

Critical areas include the following

- Guest rooms
- Kitchens
- Laundries
- Restaurants
- Stairways
- Parking garages
- Plant rooms

Alarming, smoke control and evacuation

Once a fire has been detected by an automatic detector, by sprinkler flow monitoring, or by a person activating a manual call point, the fire detection system will generate the preprogrammed control and alarm signals.

A major factor that can affect the success of building evacuation is that many people do not take the sounding of fire alarm sufficiently seriously or do not understand the meaning of the acoustic signal. Such doubts lead to unnecessary delays in people's reaction to the warning and may mean the difference between life and death. The more clearly the information can be conveyed to the public, the better the situation will be understood and the more quickly the necessary actions will be taken.

A fast and efficient evacuation procedure is essential. This not only saves lives, but once the evacuation of the building has been completed, the fire services can concentrate on minimizing the damage to property.

1. Alarming

The purpose of a fire alarm is to warn people about the presence of a fire within the premises. In a hotel context these people may be divided into 3 target groups:

- Hotel guests
- Members of staff
- The municipal fire service

For each of these target groups various technical solutions are available, which can alert the people concerned in the most appropriate and efficient manner.

2. Alerting members of staff

Alarms to the in-house staff are always generated without delay to allow the cause of the alarm to be investigated. Time is of the essence: investigation must begin immediately. It is still possible that the fire is small enough to be dealt with by local means. The aim is to prevent any unnecessary disruption to guests or normal business functions until absolutely necessary.
Without activating the main alarm, members of staff may be alerted in one (or more) of the following ways:
Pager Alarm activation via an in-house pager system , causing the pagers carried by all members of staff to vibrate.

Mobile/Cell phone (SMS) Transmission of a preprogrammed text message.

Local acoustic Activation of buzzers or speakers in staff areas only: e.g. front desk, manager's office, engineer's office, laundry, kitchens, plant room, security control room

Silent/coded alarm Broadcasting of a "silent" alarm in the form of a coded message transmitted via the hotel PA system e.g. "Will Mr. Black please report to the manager's office.

3. Alerting hotel guests

Hotel guests can be warned of the impending danger in several ways depending on where the guests are currently located (bedrooms, restaurants, bars, discos, parking garages, etc.).

1. Alerting the public fire department

The municipal fire department may be alerted in one of two ways:

- Automatically via the fire detection system by remote transmission.
- Manually from the hotel front desk or control room by telephone.

In certain regions the initial alarm may be transmitted to an Alarm Receiving Center (ARC) which, in turn, will notify the local fire department

2. Alarm strategies

General alarms A general alarm is a defined audible signal which is sounded throughout the building. The alarm is automatically activated by the fire detection system, or manually from the hotel front desk (or control room). In the majority of buildings this should trigger the immediate and total evacuation of the building.

Staged alarms

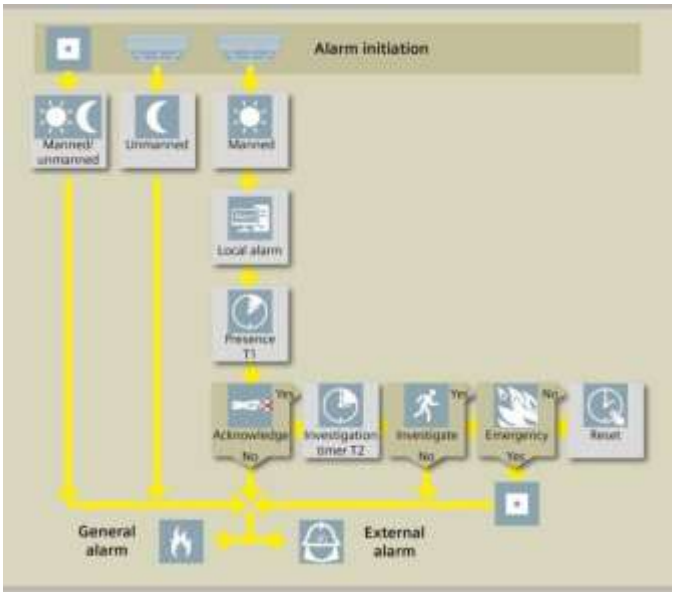
Staged alarms are based on systems capable of generating an ‘alert signal’ and a different ‘evacuate signal’. Such systems may be applicable in large or complex buildings. Generally those people potentially most at risk are those closest to the point where the fire was detected or where the manual call point was activated. These people should leave the building immediately and therefore an ‘evacuate signal’ will be sounded in this area. In other areas of the building an ‘alert signal’ will be sounded, indicating that people in those areas will only have to leave the building if it becomes necessary, see phased evacuation.

As mentioned earlier, systems based on the interpretation of different acoustic signals may be useful for office buildings (or similar) where employees can be trained to recognize and understand the difference. In hotel environments, however, guests are unfamiliar with the system and are unable to interpret the alarm signals correctly and reliably. Only a voice alarm system (including live voice messaging) can be recommended for hotel applications.

Alarm Verification Concept AVC

The Alarm Verification Concept (AVC) allows in-house personnel to carry out a local investigation before the municipal fire service is alerted or the building evacuated. This reduces the number of unnecessary calls and is based on a dual timing principle. It is only applicable to the “day/manned” mode of the fire detection system. In the “night/unmanned” mode (when a local investigation cannot be ensured) the fire service will be alerted without delay. Manual call points and sprinkler flow switches also alert the fire service without delay (at all times).

In the “day/manned” mode any alarm initiated from an automatic smoke detector will start timer T1. If T1 times out without any response from an operator, the fire service is called immediately. If the alarm is acknowledged on the fire alarm panel while T1 is running, the system recognizes this as a sign that an operator is present. In this case, timer T2 is started for a predetermined investigation period. The duration of this investigation period should be determined in consultation with the fire service.



If the local investigation verifies the existence of a major fire, the fire service can be summoned immediately by simply activating any manual call point. The fire service will also be called if T2 times out. On the other hand, if local investigation establishes that only a minor, easily dealt with fire exists, the fire alarm can be reset while T2 is still running.

Chapter Two

Earthing

Earthing system Type A

Information about earthing layout, Type A

The Type A radiative or deep earthers do not fulfil the need for equipotential bonding or potential control.

A Type A earthing system is useful for low building structures (e.g. family homes), existing building structures, for LPSs with interceptor rods and wires, and for separate LPSs.

This type of arrangement incorporates horizontal and vertical earthers connected to every conductor.

Earthing system Type B – foundation earther

1.foundation earther:

Note 1:
In this standard, foundation earther means the earthing system embedded in the foundation.
If the earther is, for instance, outside the foundations because the foundations are insulated, then in this standard it is referred to as a ring earther.

2.ring earther

Conductive, closed ring embedded in and in contact with the earth or in the granular sub-base.

3.closed ditch

A seal surrounding all sides of the building at ground level, made of bitumen or plastic (also called a black ditch); or made from water-impermeable concrete (also known as a white ditch); or combination seals (e.g. ground plate made from water-impermeable concrete in conjunction with seals on the basement walls).

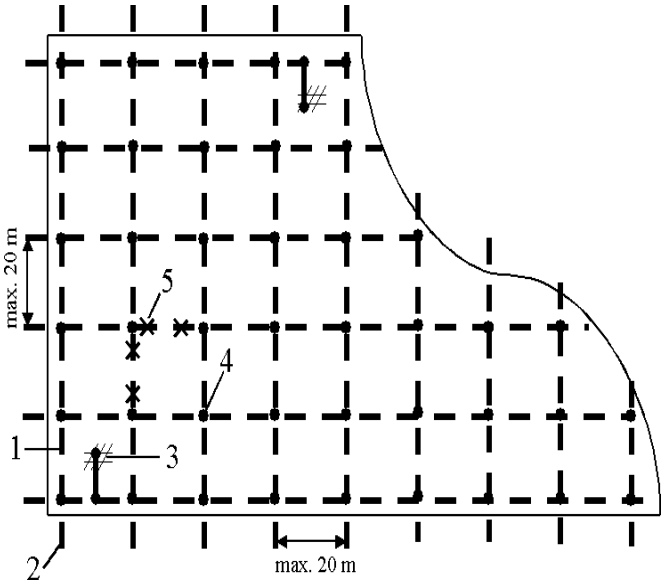
4.perimeter insulation

Heat insulation surrounding the outside of the building at ground level.

5. Execution

on Materials for foundation earthers
Foundation earthers:
Round steel of at least 10 mm diameter ***or***
Steel strips of minimum dimensions 30 mm × 3.5 mm
The steel may be galvanised or ungalvanised.
If using the foundation earther as part of the lightning protection system, materials must be used that comply with DIN EN 50164-2 (VDE 0185 Part 202).

Foundation earther



1. Foundation earther, e.g. flat strips 30 mm*3.5 mm, galvanised
2. Connection lug for foundation earther, e.g. flat strips 30 mm*3.5 mm, V4A (1.4571)
3. Connection to reinforcement with reinforcement clamp
4. Connection clamp for foundation earther
5. Additional connections every 2 m (clamps) between foundation earther and reinforcements

5. Execution

On Connecting foundation earther components

The components of a foundation earther must be connected together using welded, screw or clamp connections which are electrically conductive and mechanically strong.

…..Welded connections to reinforcement rods are only permitted with the approval of the
construction engineer.
If the foundation earther is used as part of a lightning protection system, then

connecting components compliant with DIN EN 50164-1 must be used.

Connectors for foundation earthers

It is often important when installing a foundation earther to include the foundation reinforcements in the earthing system. The way foundation earthers are usually tied to reinforcements is often inadequate.

Closed ditch (black, white ditch or combined seals)

In the case of buildings with closed ditches a **ri ng ea rther** is to be installed outside the ditch.

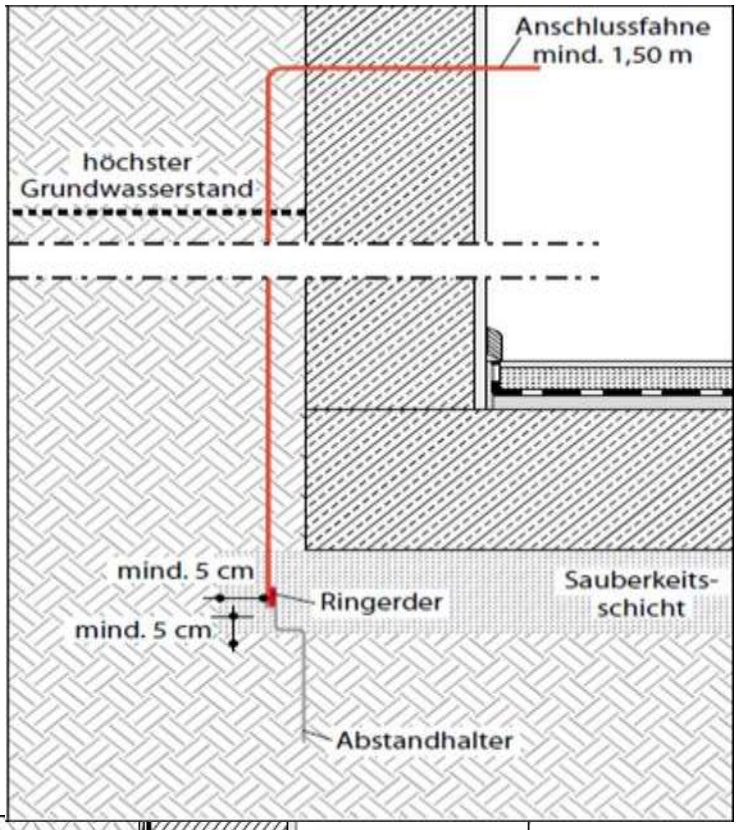
-The connection lugs are to be routed up either on the outside surface or inside the back seal liner in the concrete, and then fed into the building above the highest groundwater level.

The ring earther must have the same loop width as a foundation earther.

In order to establish equipotential bonding in lightning protection systems and for EMC purposes, steel rods or strips must be laid in the foundations and connected to the reinforcements and the equipotential bonding bar.

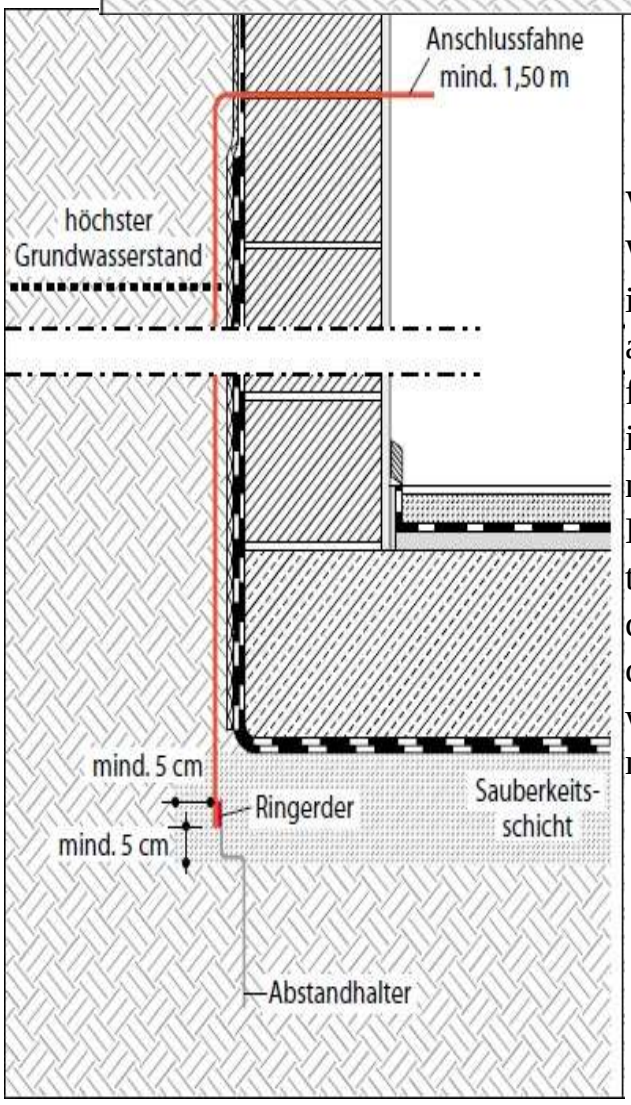
In the event of a lightning strike, sparks may not jump through the insulation from the foundation to the earthing system. According to DIN EN 62305-3 (VDE 0185-305-3) this is achieved by means of a maximum loop width of 10 m × 10 m.

The ring earther and the connection lugs are to be made from corrosion-resistant material such as rust-proof steel, material number 1.4571 or at least the equivalent.



Black ditch

Black ditch – this is a water-pressure-proof seal around a building consisting of multiple layers of plastic or bitumen strips (black material).



White ditch

White ditch – a white ditch is made from impermeable concrete. This concrete can absorb water, but even if exposed to water for long periods the water does not penetrate it completely. In other words, moisture does not appear on the inside. According to DIN EN 206- 1/DIN 1045-2, the maximum depth to which water may penetrate impermeable concrete is 5 cm. The types of impermeable concrete available on the market only allow water to penetrate about 1.5 cm after a 12 month setting period.

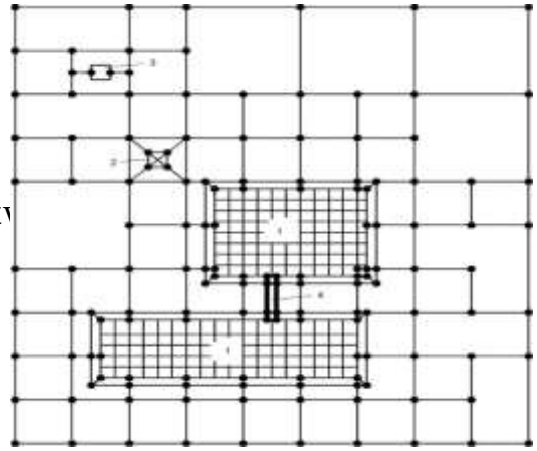
Conductor systems: Earthing system

Earthing steel girders

Earthing systems in extensive building complexes

If earthers belonging to a number of buildings are connected together, then a looped earthing system is created as shown in

Fig. E.42.



Legend

1. Building with looped reinforcement net
2. Tower inside plant
3. Separate facility
4. Cable routes

Note

This system offers a low impedance and considerable EMC benefits. The loop size near buildings and other objects should be around 20 × 20 m.

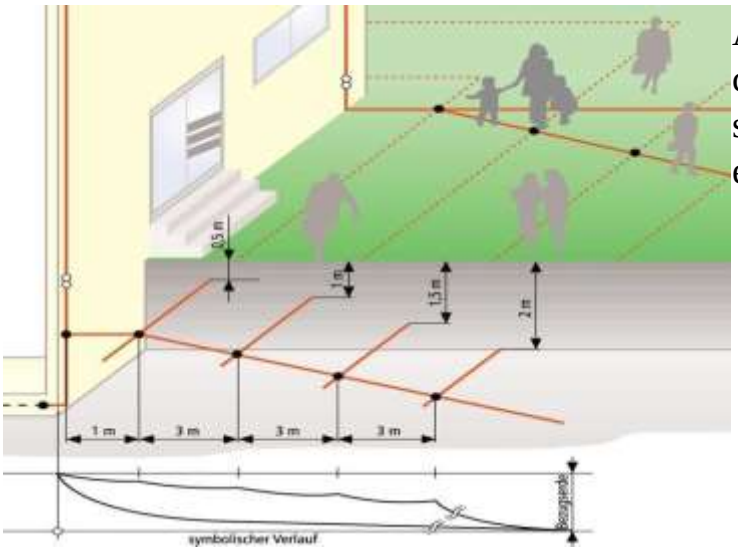
Ring earther / potential control

If **many people are often near** the building structure you intend to protect, then **potential control** should be **envisaged** for that area in order to protect those people.

Other ring earthers should be installed around 3 m away from the first and the other ring earthers.

These ring earthers should be connected to the first ring earther using connection conductors

Ring earther / potential control

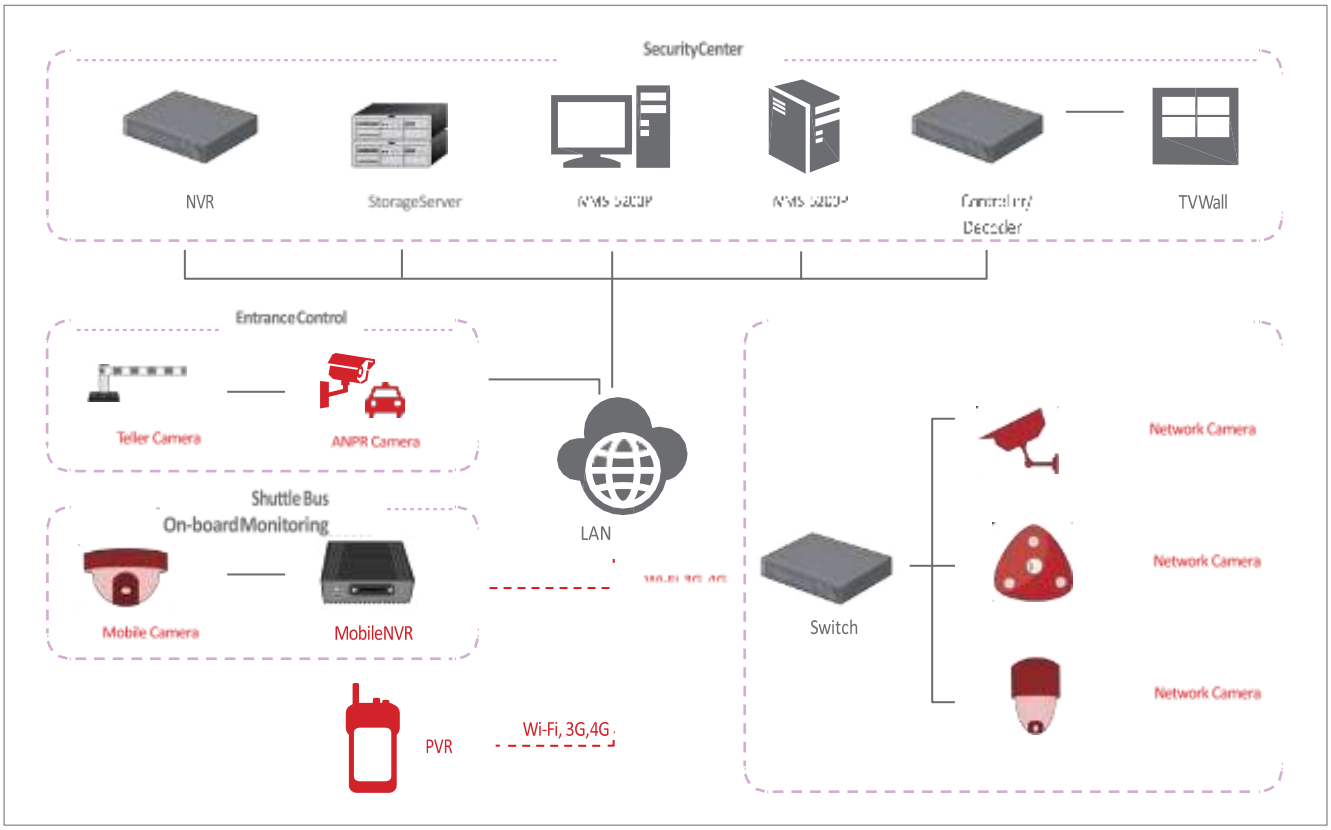


An example of potential control in a building structure using a looped earthing system.

CCTV

SMART SOLUTION FOR HOTEL SAFETY

- Ensure around-a-clock safety for guests and staff
- Improve vehicle access management and customer experience
- Decrease CCTV intrusiveness
- To have a reliable footage for post-investigation



HIGHLIGHTED TECHNOLOGY

Smart Codec – H.264+ Optimized Compression

An efficient way to manage super high resolution video footage

Analytic +

Compression

The moving target is extracted from the static background, using a different codec for each element.

- Background-based predictive smart encoding
- Enhanced noise suppression
- Optimized, long-term bitrate control

H.264{25fps}

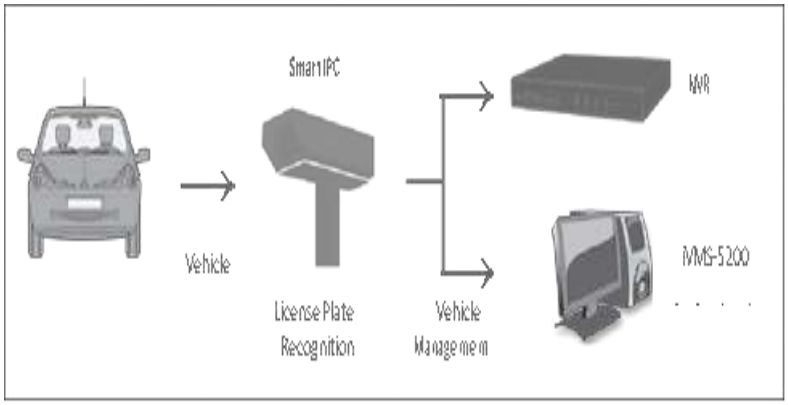
H.264+ {25fps}

In a static nighttime environment, the bitrate of H.264+ can reach up to 50~60Kbps, 10~20x over standard H.264 codec, that not only saves bandwidth rresources, but efficiently decreases storage requirements.

- more encoding improvement
- more transmission efficiency
- more storagesaving

ANPR Module

A critical element in access control



Hikvision ANPR System

- License Plate Comparison
- B/W List Filtering
- Alarm Triggering
- Result Query
- Result Export
- Auto Network Recovery (ANR)
- ANPR Remote Configuration

*The exact functionalities may vary based on local strategy and product development

PRODUCT SHOWCASE

Vehicle Access

DS-2CD4626FWD-IZS(H)

ANPR Camera

DARKFIGHTER

- Darkfighter Ultra-low light technology
- 1920x1080 high resolution
- Full HD1080p video, up to 60fps
- 120dB WDR
- 2.8~12mm Motorized VF lens Smart Auto Focus
- Up to 70m IR range
- IP66 and Vandal-proof protection
- AC24V & High PoE
- Support on-board storage, up to 128GB
- On-board ANPR Analytics, B/W list filtering
- Built-in Smart Heater (-H)
- Audio/Alarm IO connectors (-S)
- Support Barrier linkage via RS485

DS-2CD4A24FWD-IZ (4.7-94)

ANPR Camera

DARKFIGHTER

- Darkfighter Ultra-low light technology
- 1920x1080 high resolution
- Full HD1080p video, up to 60fps
- 120dB WDR
- 2.8~12mm Motorized VF lens Smart Auto Focus
- Up to 50m IR range
- IP67 Weather-proof protection
- DC12V & PoE
- Support on-board storage, up to 128GB
- On-board ANPR Analytics, B/W list filtering
- Built-in Smart Heater (-H)
- Audio/Alarm IO connectors (-S)
- Support Barrier linkage via RS485

DS-2CD2022(F)WD-(I)W(S)
2MP WDR IR Mini Bullet Network Camera

- 2MP real-time resolution
- Intrusion & line crossing detection
- 120dB WDR
- On-board storage(optional)
- Up to 30m IR range
- Metallic housing, IP66

DS-2CD2122(F)WD-(I)W(S)
2MP WDR IR Fixed Dome Network Camera

- 2MP real-time resolution
- Intrusion & line crossing detection
- 120dB WDR
- 3-axis adjustment
- On-board storage(optional)
- Up to 30m IR range
- Vandal-proof metallic housing, IP66

DS-2CD2322WD-I
2MP WDR EXIR Turret Network Camera

- 2MP real-time resolution
- Intrusion & line crossing detection
- 120dB WDR
- Up to 30m IR range
- Metallic housing, Vandal-proof, IP66

DS-2CD2422FWD-IW
2MP WDR IR Cube Network Camera

- 4MP high resolution
- Intrusion & line crossing detection
- PIR detection
- 120dB WDR
- On-board storage(optional)
- Up to 10m IR range
- Built-in Speaker, Mic, WIFI

DS-2CD2522FWD-(I)W(S)
2MP WDR Mini Dome Network Camera

- 2MP real-time resolution
- Intrusion & line crossing detection
- 120dB WDR
- 3-axis adjustment
- On-board storage
- Up to 10m IR range
- IK8 protection, IP66

DS-2CD2622FWD-(I)Z(S)
2MP WDR Vari-focal IR Bullet Network Camera

- 2MP real-time resolution
- 2.8-12mm motorized Z/F lens
- Intrusion & line crossing detection
- 120dB WDR
- On-board storage
- Up to 30m IR range
- Metallic housing, IP66

DS-2CD2722FWD-(I)Z(S)
2MP WDR Vari-focal IR Dome Network Camera

- 2MP real-time resolution
- 2.8-12mm motorized Z/F lens
- Intrusion & line crossing detection
- 120dB WDR
- On-board storage
- Up to 30m IR range
- Metallic housing, IP66

DS-2CD2942F-(I)W(S)
4MP 180°Panoramic Network Camera

- 4MP high resolution
- 180° horizontal panoramic view
- ePTZ control
- Compact design
- IR, WIFI, Audio&Alarm optional

DS-2CD4A24FWD-(Z)(H)(S)
2MP 20X Zoom Bullet Network Camera

- 1/2.8" progressive scan CMOS sensor
- Full HD1080p, up to 60fps
- 4.7-94mm motorized VF lens with Smart Focus
- 130dB WDR
- Full smart feature-set
- Up to 128GB on-board storage
- Up to 100m IR range
- IP67

DS-2CD4026FWD(-AP)
DarkFighter Series 2MP Box Network Camera

DARKFIGHTER

- DarkFighter ultra-low illumination technology
- 1/1.8" progressive scan CMOS sensor
- Full HD1080p, up to 60fps
- 120dB WDR
- Full smart feature-set
- Auto back focus
- P-Iris optional
- Up to 12+C36+C34+C38E34+C38+C34+C37

DS-2CD4126FWD-(Z)
DarkFighter Series 2MP Indoor Dome Network Camera

DARKFIGHTER

- DarkFighter ultra-low illumination technology
- 1/1.8" progressive scan CMOS sensor
- Full HD1080p, up to 60fps
- 130dB WDR
- Full smart feature-set
- Motorized lens with Smart Focus
- Up to 128GB on-board storage
- Up to 30m IR range

DS-2CD4A26FWD-(Z)(H)(S)
DarkFighter Series 2MP Bullet Network Camera

DARKFIGHTER

- DarkFighter ultra-low illumination technology
- 1/1.8" progressive scan CMOS sensor
- Full HD1080p, up to 60fps
- 120dB WDR
- Full smart feature-set
- Motorized lens with Smart Focus
- Up to 128GB on-board storage
- Up to 50m IR range
- IP67