WHITE PAPER

Continuous operation in Healthcare Buildings

Providing reliable and safe power for critical loads

Hospitals require some of the highest levels of power availability in the industry. Patient safety is indeed a top priority in healthcare facilities, where uninterrupted services must be maintained in critical areas to ensure the utmost patient well-being.

Thanks to our cutting-edge solutions for continuous power and intelligent distribution, we can become your foremost partner and guarantee reliable, uninterrupted and energy-efficient power supply in your hospital buildings.

Contents

Introduction

Multiple factors, such as safety, maintainability and economics, must be considered when emergency electrical systems for critical facilities are designed. In healthcare facilities, one of the top priorities for designers is ensuring the reliability and availability of the electrical distribution system. This is crucial to maintaining uninterrupted services in critical areas and safeguarding patient safety. One of the primary challenges faced by healthcare facilities is, in fact, providing high-quality power. This must be backed by reliable emergency and standby power systems, to ensure an uninterrupted flow of electricity throughout the facility, particularly during crises and natural disasters. **Outages must also be prevented** since in hospitals, their **cost amounts to an average $7900 per minute.** [Source: Ponemon Institute, 2016]

But the healthcare sector also demands extra precautions beyond standard electrical systems. Flexibility in design to accommodate critical load expansions is essential. Neglecting this aspect during the initial design stages can lead to overloads and serious failures.

Electrical outages in healthcare facilities cost $7900 per minute

Driven by their life-saving functions and the integration of advanced technology, hospitals are embracing resilient and redundant electrical designs. The need for redundancy is accentuated, particularly due to the increasing use of electronic equipment in critical care, while there is a growing use of uninterruptible power supplies needing robust electrical solutions to ensure seamless operations.
Designers also face the challenge of addressing environmental impact and energy consumption as they strive to innovate in order to achieve higher levels of reliability and availability.

Conceivably, the the next generation of hospital electrical distribution systems will resemble those found in data centers, reflecting the growing importance of reliable and efficient power infrastructure.

ABB offers products and solutions that prioritize safety, reliability and system uptime to meet the intricate needs of hospital electrical systems. ABB's Continuous Power (CP) solutions cater to various hospital standards and sizes since they can adapt to capacity demands while safeguarding critical energy supplies.

Compliance with the Standards

The ABB solutions presented in this document conform to the hospital standards listed below.

- **IEC 60364-5-56** covers the general requirements for safety services, selection and erection of electrical supply systems for safety services and electrical safety sources.
- **IEC 60364-7-710**, applies to electrical installations in medical locations so as to provide safety of patients and medical staff.
- **EN 50171** specifies the general requirements for central power supply systems (CPSS) for an independent energy supply to essential safety equipment without any restriction in power output.

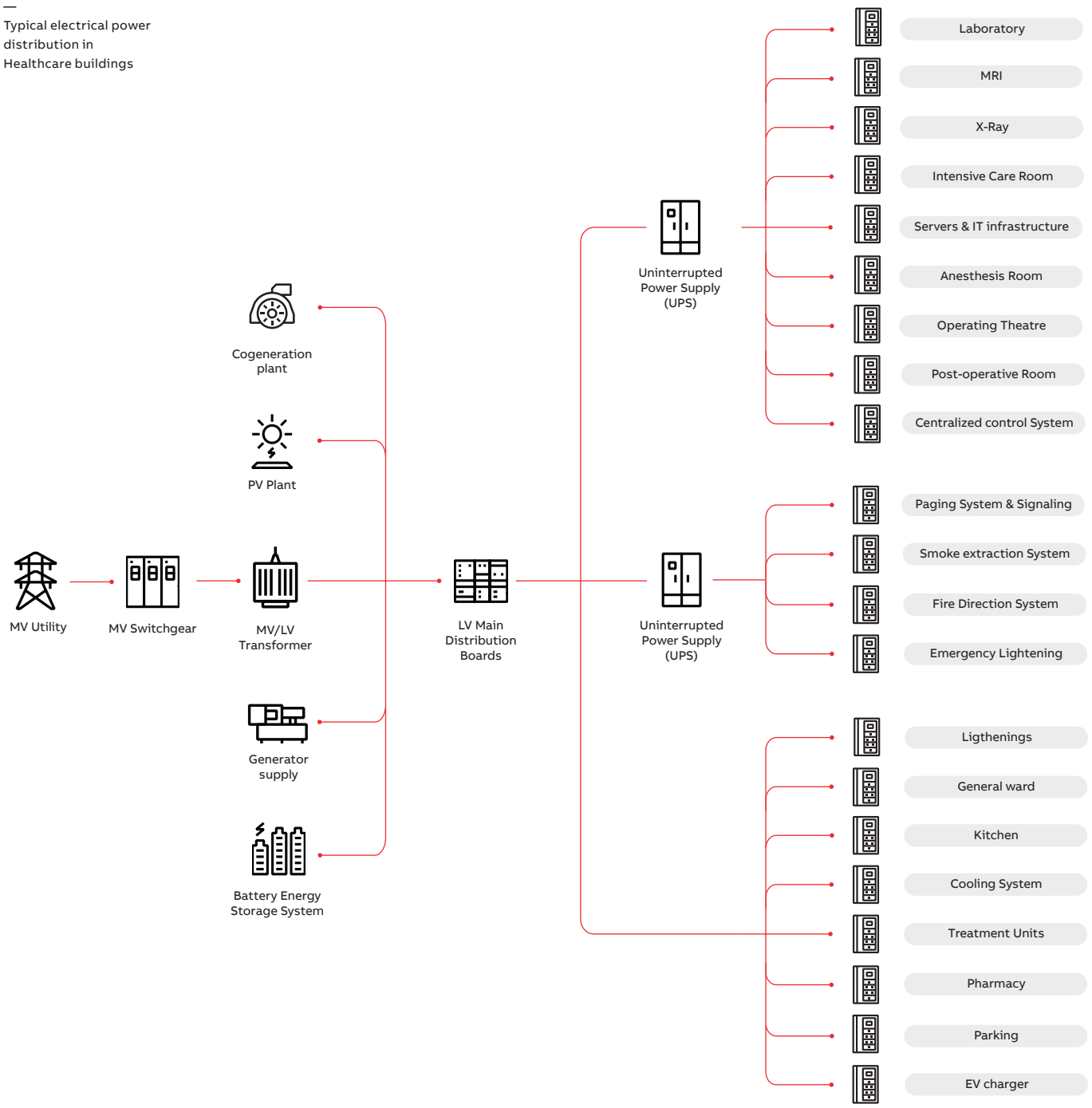
Typical electrical power distribution
Healthcare buildings

A typical reference power distribution architecture for a hospital involves several components. The architecture may vary, since it depends on the size, complexity and location of the hospital, but the following elements are common in most hospital power distribution systems:

- **Main Utility Supply:** The hospital is primarily connected to the main electrical grid of the local utility company and receives power from the public power supply network. This is its primary source of electricity.
- **MV Switchgear:** Essential for controlling, protecting and distributing electrical power in medium voltage systems (1 kV to 36 kV).
- **Transformer:** Transformers are used to step up or step-down voltage levels in power distribution systems.
- **Main Distribution Board:** The main distribution board connects a transformer and generator to the healthcare building. It acts as the crucial point of control and protection for the electrical distribution system, ensuring safe and efficient power delivery to critical and non-critical areas.
- **Generator:** Hospitals require a reliable emergency power supply. Generators are one of the common backup sources.
- **Automatic Transfer Switch (ATS):** The ATS automatically detects power loss from the main utility supply and switches the load over to the emergency power source without interruption.
- **Uninterruptible Power Supply (UPS):** The UPS is a backup system that provides continuous electrical power during short-term power outages or fluctuations. It safeguards critical equipment, such as computers, servers and medical devices, by instantly switching to battery power if the main power supply is disrupted. UPS systems prevent data loss and ensure uninterrupted operation of sensitive equipment.
- **Central Power Supply system (CPSS):** This is a centralized emergency power supply that delivers backup power to essential safety equipment in buildings, especially in critical locations like hospitals. It ensures that critical equipment, emergency lighting, fire alarms and other life-saving systems remain operative during power failures.
- **Sub-Distribution Board:** A secondary electrical panel that receives power from the main distribution board and distributes it to specific areas or departments within the hospital. It acts as a localized control and protection point for electrical circuits serving different floors, wings or specialized units, thereby ensuring efficient power distribution while facilitating maintenance and troubleshooting in specific sections of the hospital.
- **Loads:** These include critical equipment like life support systems, ventilators and operating room equipment, as well as semi-critical equipment such as imaging machines and laboratory equipment. Additionally, non-critical loads include lighting, administrative systems and other non-medical equipment.
- **Monitoring and Control Systems:** Advanced power distribution systems in hospitals often include monitoring and control systems to track power consumption, voltage levels and other electrical parameters. This enables facility managers to monitor the health of the electrical infrastructure and respond promptly to any issues.

It is important to note that hospitals must comply with specific safety standards and regulations to ensure the safety and reliability of their power distribution systems.
Additionally, hospitals may implement determined redundancy measures and backup strategies based on their individual needs and local regulations.

—
Typical electrical power distribution in Healthcare buildings



Classification of Medical locations

—
Practical guide for group 2 medical locations

By classifying medical locations into groups, healthcare facilities can tailor their electrical safety measures and backup power solutions to suit the specific needs and risks associated with each area.
This ensures that essential medical equipment functions properly and that patients receive the highest level of care and safety, even during power disruptions or electrical incidents.

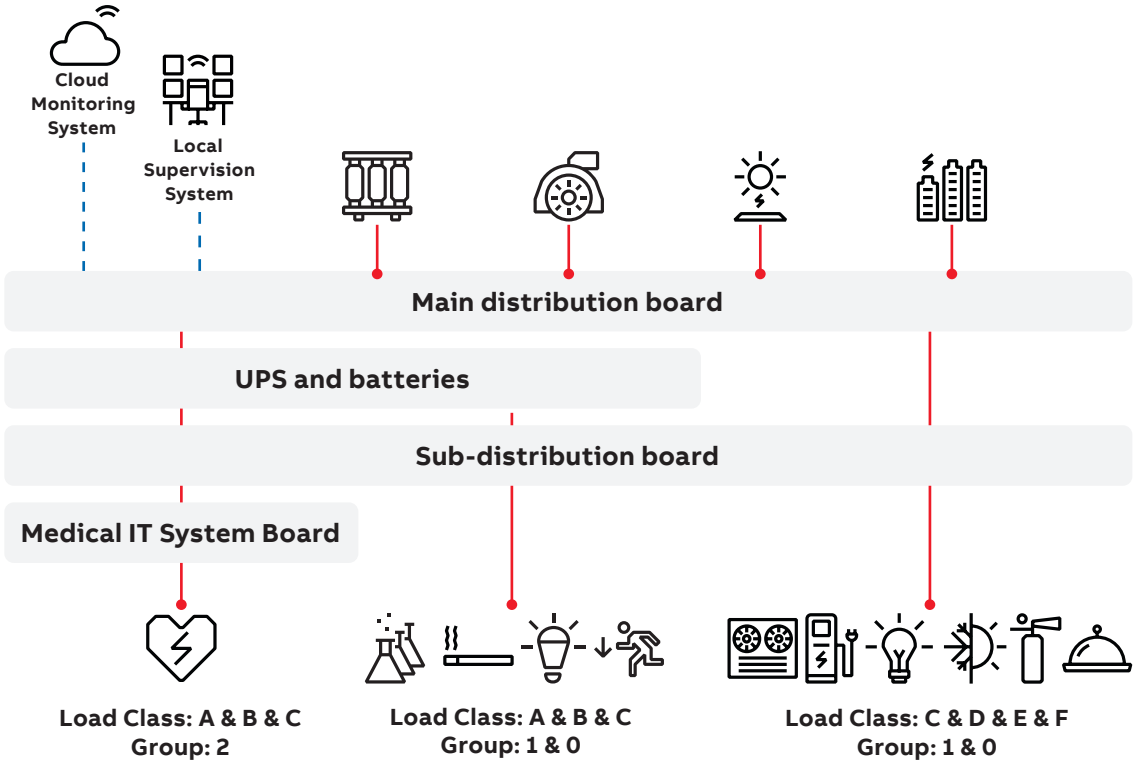
IEC 60346-710 classifies medical location use as follows:

- **Group 0:** Medical location where medical electrical (ME) equipment or ME systems are not intended to be used.
- **Group 1:** Medical location where ME equipment or ME systems are intended to be used externally or invasively on any part of the patient and where discontinuity of the electrical supply, such as protection against electric shock, does not represent a risk to the safety of the patient himself.
- **Group 2:** Medical location where ME equipment or ME systems are intended to be used intrusively, externally, or invasively on any part of the patient and where discontinuity of the electrical supply, such as protection against electric shock, represents a risk to the safety of the patient himself.

In addition, classification of automatic power supply systems based on the maximum changeover time is crucial for medical locations. It ensures the safety and reliability of medical operations during power disruptions by providing the appropriate level of backup power. By matching operational needs and complying with regulations, hospitals can optimize resource allocation and prepare for emergencies.

IEC 60364-5-56 classifies automatic supply systems as follows, according to the maximum changeover time:

- **Class A – no break:** an automatic supply system which can ensure a continuous supply within specified conditions during the period of transition, for example as regards variations in voltage and frequency.
- **Class B – very short break:** an automatic supply system available within 0.15s.
- **Class C – short break:** an automatic supply system available within 0.5s.
- **Class D – average break:** an automatic supply system available within 5s.
- **Class E – medium break:** an automatic supply system available within 15s.
- **Class F – long break:** an automatic supply system available in more than 15s.



Quick changeover time, such as Class A (no break) and Class B (very short break), is used for critical loads in healthcare facilities. These loads are directly related to patient care, life-supporting equipment and essential medical services. Examples of such critical loads include operating rooms, intensive care units (ICUs), anesthesia machines, ventilators, cardiac monitors and other medical devices vital for patient treatment and support.

Medium changeover time, represented by Class C (short break) and Class D (average break), is typically used for loads in healthcare facilities that are important but not directly related to critical patient care or life-supporting equipment. These loads fall under the category of semi-critical equipment and areas where slightly longer power interruptions can be tolerated without causing immediate harm to patients, such as laboratory equipment and other medical devices in diagnostic centers and treatment areas.

Longer changeover time, such as Class E (medium break) and Class F (long break), is typically used for non-critical loads in healthcare facilities. These loads are essential but not directly related to patient care or life-supporting equipment. Examples of such loads include general lighting in non-critical areas, HVAC (Heating, Ventilation and Air Conditioning), etc.

Listing medical facilities by group classification may not be practical, as the function of individual rooms may vary from country to country and within the same country. It may even change, depending on the preferences of the health personnel or health facility.
Table 1 is provided as as a guide in annex A of IEC 60346-710 and is included below as an example only.

List of examples of medical locations and their group classification

—
Table 1

Medical location		Group			Classification	
		0	1	2	Class C ≤ 0.5s	Class E > 0.5s - ≤ 15s
1	Massage room	•	•			•
2	Bedrooms		•			•
3	Delivery room		•		• 1)	•
4	ECG, EEG, EHG room		•			•
5	Endoscopic room		• 2)		•	• 2)
6	Examination or treatment room		•		•	•
7	Urology room		• 2)		•	• 2)
8	Radiological diagnostic and therapy room		•			•
9	Hydrotherapy room		•			•
10	Physiotherapy room		•			•
11	Anaesthetic room			•	• 1)	•
12	Operating Theatre			•	• 1)	•
13	Operating preparation room			•	• 1)	•
14	Operating plaster room			•	• 1)	•
15	Operating recovery room			•	• 1)	•
16	Heart catheterization room			•	• 1)	•
17	Intensive care room			•	• 1)	•
18	Angiographic examination room			•	• 1)	•
19	Haemodialysis room		•			•
20	Magnetic resonance imaging (MRI) room		•	•	•	•
21	Nuclear medicine		•			•
22	Premature baby room			•	• 1)	•
23	Intermediate care unit (IMCU)			•	•	•

1) Life supporting ME equipment and specific luminaries, such as operating or procedure lights, that need power supply within 0.5s or less.
2) Not being an operating theatre.

Make Healthcare Buildings reliable and safe with ABB

—
Healthcare Building Solution - Whitepaper

In the pursuit of providing top-notch healthcare services, the reliability and safety of healthcare buildings are of paramount importance. ABB Solutions offer cutting-edge technologies and advanced electrical systems to ensure seamless operations and enhanced safety in healthcare facilities. By harnessing ABB's expertise, healthcare buildings can optimize their power distribution, implement robust backup solutions and conform to stringent safety standards. With a focus on continuous power supply, protection against electrical disruptions and efficient energy management, ABB Solutions empower healthcare facilities to deliver exceptional patient care while maintaining a secure and reliable environment for all stakeholders.

Why to choose ABB Solutions

Energy Efficiency
Enhance energy-efficiency through monitoring and reporting systems and devices that are more efficient. UPS with up to 97.6% high efficiency in double conversion mode is one of these solutions.

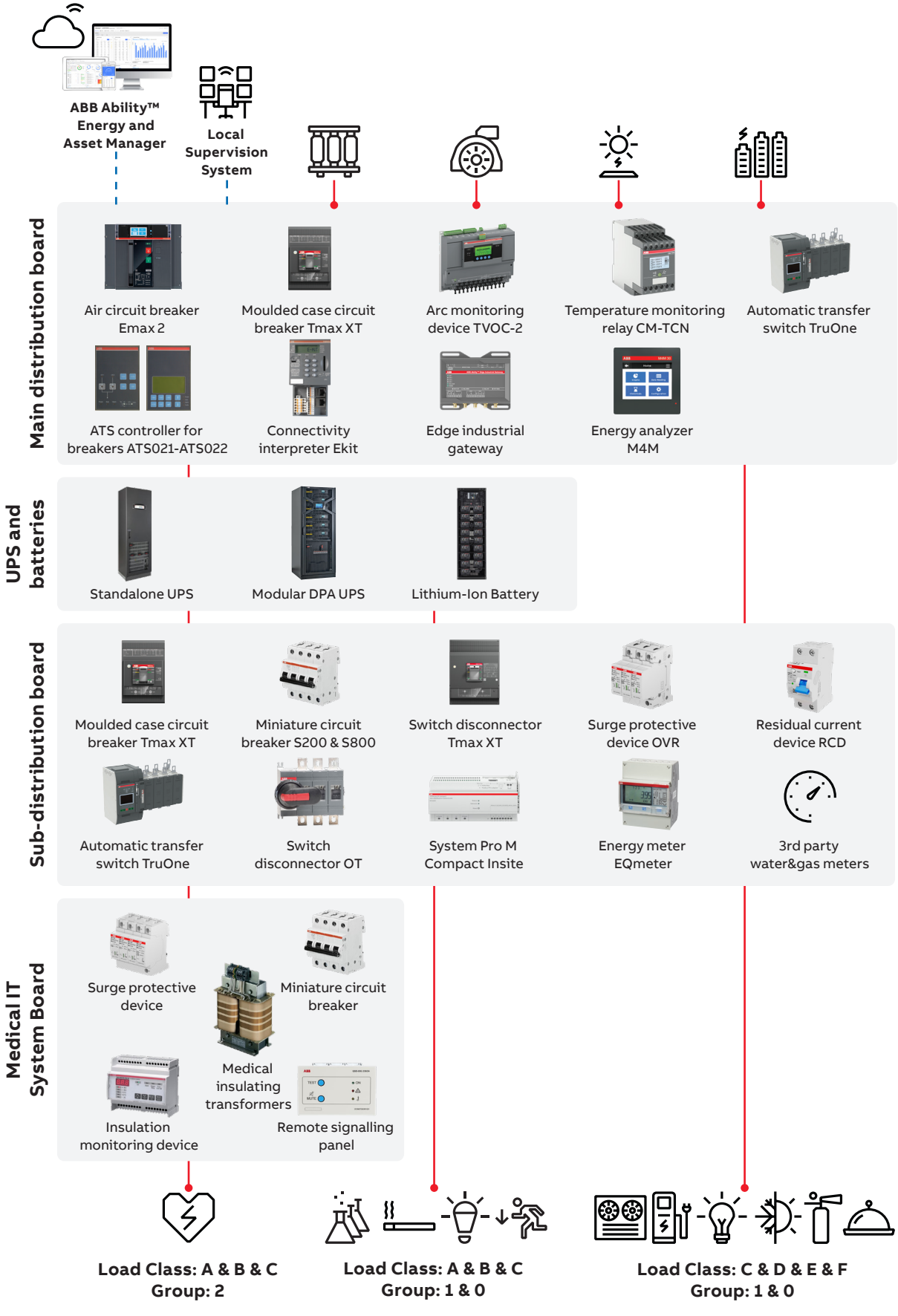
Continuous operation
Avoid downtime and costly service interruptions by protecting the whole electrical circuit thanks to our solutions with advanced specifications.

Flexibility
The ability to adapt quickly to challenging situations, including major crises like Covid, is crucial since they generate significant pressure on staff and patients. Reducing lead times for implementing changes in the Continuous Power System is one of the key factors today.

Total Cost of Ownership
Give the building owner full transparency of operational and maintenance costs throughout the life-cycle of the building. Proper energy management systems enable issues to be identified and dealt with quickly.

Connectivity
Enables secure data flow for connecting buildings and their intelligent components. Facilitates the integration of building and medical systems, thereby enhancing operational efficiency. Provides digital data repositories for seamless information sharing across various disciplines.

ABB Solutions for Healthcare Buildings



Uninterruptible Power Supply (UPS)

ABB, a pioneer and leader in large, modular UPS innovation, proposes a full range of modular DPA power protection products. ABB's UPS products employ a variety of technologies – from traditional designs to our leading range of modular products enabling a power protection system to be added to module by module, as and when required. This reduces the initial capital outlay and reduces maintenance & repair Time & Cost (MTTR).

Each UPS module in the **DPA (Decentralized Parallel architecture)** contains all the hardware and software required for full UPS system operation. Thus, potential single points of failure have been eliminated.

Modular DPA UPSs are ideal for buildings like hospitals since modules can be added or removed with an MTTR in less than 30 minutes. More specifically, UPSs like DPA S4, DPA 500 or UPScale are optimal for supporting critical loads of the IT, Operating Theatre, Delivery Room, Premature baby Room type, etc., where specific medical equipment is used (e.g. CT's, Vascular, Mammo, MRI, etc.)

The main key benefits to using a DPA modular UPS are:

- Distributed control and power
- No single point of failure
- Modules can be replaced or added without downtime
- Simple power upgrading
- No downtime during maintenance
- Vertical and horizontal scalability
- Low service costs
- Easy configuration and reconfiguration.

Standalone UPSs are more suitable for supporting medical equipment that generates a big spike of current demand during start-up (e.g. MRI, CT systems, X-rays).

After deep analysis, we have created a reference table (table 2) to help you combine standalone UPSs with specific medical equipment.

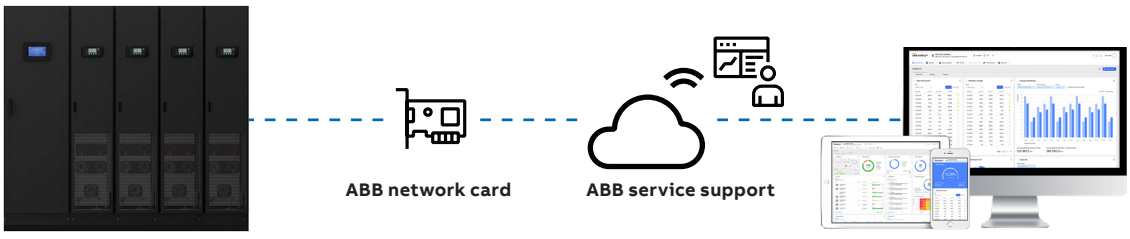
Standalone UPS combined with medical equipment category

Table 2

Medical Equipment category	Peak Power of Medical Equipment System	ABB UPS Type	UPS Rated Power
CT	From 40 to 50 KVA	SG-CE 60 PUREPULSE	60 KVA
		PowerWave 33 S3 60 kVA	60 KVA
	75 kVA	SG-CE 80 PUREPULSE	80 KVA
		PowerWave 33 S3 80 kVA	80 KVA
	90 kVA	SG-CE 100 PUREPULSE	100 KVA
		PowerWave 33 S3 100 kVA	100 KVA
	From 100 to115 kVA	SG-CE 120 PUREPULSE	120 KVA
		PowerWave 33 S3 120 kVA	120 KVA
	150 kVA	SG-CE 160 PUREPULSE	160 KVA
RADIOPHARMACY	120kVA	SG-CE 160 PUREPULSE	160 KVA
	50 KVA	SG-CE 60 PUREPULSE	60 KVA
		PowerWave 33 S3 60 kVA	60 kVA
NM & NM/CT	3.6 kVA / 6.2 kVA	PowerScale 33 CE UPS – cabinet type B	25 kVA
	1.8 kVA / 1.9 kVA	PowerValue 11RT G2 B 3kVA	3 KVA
	0.65 kVA	PowerValue 11RT G2 B 2kVA	2 KVA
	6 kVA	Power Value 11T G2 6kVA	6 KVA
	19 kVA	PowerScale 33 CE UPS – cabinet type B	25 kVA
	40 kVA	SG-CE 60 PUREPULSE	60 KVA
		PowerWave 33 S3 60 kVA	60 kVA
	90 kVA	SG-CE 100 PUREPULSE	100 KVA
		PowerWave 33 S3 100 kVA	100 KVA
	150 kVA	SG-CE 160 PUREPULSE	160 KVA
PET & PET/CT	90 kVA	SG-CE 100 PUREPULSE	100 KVA
		PowerWave 33 S3 100 kVA	100 KVA
	150 kVA	SG-CE 160 PUREPULSE	160 KVA
VASCULAR	150 kVA	SG-CE 160 PUREPULSE	160 KVA
MAMMO	4.6 KVA	Power Value 11T G2 6kVA	6 KVA
	9 kVA	Power Value 11T G2 10kVA	10 KVA
	6.8 kVA/ 6.9 kVA	Power Value 11T G2 10kVA	10 KVA
	9 kVA	Power Value 11T G2 10kVA	10 KVA

Monitoring solution for UPS

ABB Ability™ SmartTracker



To increase UPS reliability, ABB Ability™ SmartTracker oversees site performance, analyzes collected data, predicts equipment condition trajectories and recommends corrective actions to avoid problems. As well as implementing an effective maintenance strategy, ABB Ability™ SmartTracker also ensures that equipment runs as efficiently as possible, saving energy and reducing greenhouse emissions.
With ABB Ability™ SmartTracker the user can monitor voltages, currents, frequencies and other important device life parameters.

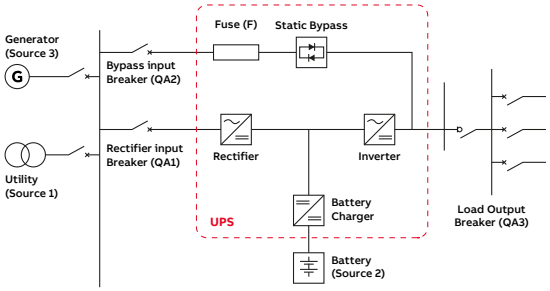
- Battery temperature
- Earth leakage current
- Fan speed variation
- Ambient humidity
- Output voltage behavior
- Output power changes
- Internal heat sink temperatures
- Output current variation
- Ambient temperature.

—
Continuous Power in Data Centers - Selectivity in UPS networks (IEC) (abb.com)

Selectivity

UPSs are crucial for continuity of service and power factor correction but using them without a proper selectivity chain could lead to unwanted downtime as well as financial and physical damage. This means that selectivity coordination of different protection devices (upstream and downstream of the UPS) during faults plays a vital role, especially in a hospital.

When the downstream circuit-breaker is selected, ABB Selectivity studies consider the internal fuse protection for the static bypass of the UPS, this to avoid blowing during a short circuit or overload coming from the load. The DC (Direct Current) connection between the UPS and the batteries is also considered.



Central Power Supply System (CPSS)

A centralized power supply system (CPSS), also known as an electrical backup, differs from a common UPS because it has specific characteristics. A CPSS is used to power emergency systems, mainly for security lighting in public and private buildings, but also for automatic fire systems, fume extraction equipment, alarms and carbon monoxide detection systems.

In Europe there is a standard that lists all the characteristics that a CPSS must have in order to be used. This standard is EN 50171.
The EN 50171 standard applies to systems permanently connected to alternating current supply voltages not exceeding 1000 V and which use batteries as an alternative energy source.

Furthermore, the structure of the CPSS electric rescuer must comply with standard CEI EN 62040. According to this standard, the CPSS must meet the following requirements:

- The batteries used in CPSS electric rescuers must have a life expectation of at least 10-12 years;
- The inverters used in CPSSs must be able to handle a constant 120% overload;
- The chargers used must recharge the batteries within 12 hours, starting from a flat battery condition;
- The casing of the CPSS must have excellent mechanical strength, capable of withstanding heat and fire.

ABB offers 2 types of CPSS:

- PowerScale from 10 to 50 kVA
- PowerWave 33 50 & 100 kVA.

—
Transfer switch solutions

Automatic Transfer Solutions

ABB offers transfer switching solutions with cutting-edge advantages like predictive maintenance, extensive diagnostic data and rapidly replaceable critical modules ensuring continuous operation. By reducing the number of connection points, ABB enhances reliability and minimizes downtime for critical loads. ABB easy-to-install solutions with integrated designs and dedicated guides can reduce installation time by up to 80% and lower commissioning and cabling costs by up to 50%. ABB also provides cloud-based connectivity enabling real-time power and maintenance data to be obtained through the ABB Ability™ Energy Manager. Safety features are incorporated into every transfer switch solution to protect operators from injury. ABB's e-Configure online configurator speeds up product selection and ordering by up to 30%, while the automatic commissioning feature or Ekip Connect software significantly reduces commissioning time by 80-95%.
With a range of options catering to different voltage levels and capacities, ABB ATS systems are reliable, efficient and compliant with industry standards. Whether for emergency backup or planned maintenance, ABB ATS solutions ensure peace of mind by providing uninterrupted power availability and enhanced reliability in diverse applications.

—
ATS021-ATS022
Automatic transfer switching

Intelligent Distribution
Intelligent distribution systems in healthcare buildings contribute to enhanced reliability, patient safety, energy efficiency, remote management, predictive maintenance, compliance and adaptability to future needs. These benefits make intelligent distribution a critical aspect of modern healthcare facility management:

- **Reliability and Continuity:** monitoring power quality, detecting faults and automatically switching to backup power sources, minimizing downtime and ensuring continuous operation.
- **Energy Efficiency:** optimizing energy usage by balancing loads, implementing demand response strategies and identifying energy-saving opportunities, leading to cost savings and reduced environmental impact.
- **Remote Monitoring and Management:** enable facility managers to access real-time data, troubleshoot issues and make informed decisions quickly and efficiently.
- **Predictive Maintenance:** for analyzing equipment performance and providing predictive maintenance alerts. By identifying potential failures early on, healthcare facilities can proactively address maintenance needs, thereby reducing downtime and minimizing unexpected breakdowns.
- **Compliance and Reporting:** generate detailed reports and documentation, facilitating compliance with regulations and audits.

Power quality is vital for critical electrical loads in hospital buildings to ensure patient safety, maintain medical equipment functionality and comply with the regulations. Fluctuations in voltage, frequency or harmonics can disrupt medical procedures and equipment, emphasizing the need for continuous monitoring. Monitoring allows early detection of issues, aids in maintenance planning, evaluates equipment performance, ensures regulatory compliance, assists in energy management and supports data-driven decision-making for optimized patient care. Circuit breakers with embedded measuring functions provide detailed information about consumptions and network power quality, all of which is easily achievable without any extra devices.

All the parameters and measurements collected by the **ABB Edge Industrial Gateway can be transmitted to the ABB Ability™ Energy Manager cloud platform** and to any supervision system, such as building management systems or Scada.
Thanks to ABB Ability™ Energy Manager Scanning it is possible to:

- **Detect power quality anomalies** from medium voltage and low voltage electrical distribution systems.
- **Identify power quality recurrent issues** and impacts
- **Keep track of improvement action** to verify benefits
- **Set up alerts** to increase operational efficiency
- **Monitor continuously critical power devices** like UPS, ATS, circuit breakers, gensets.

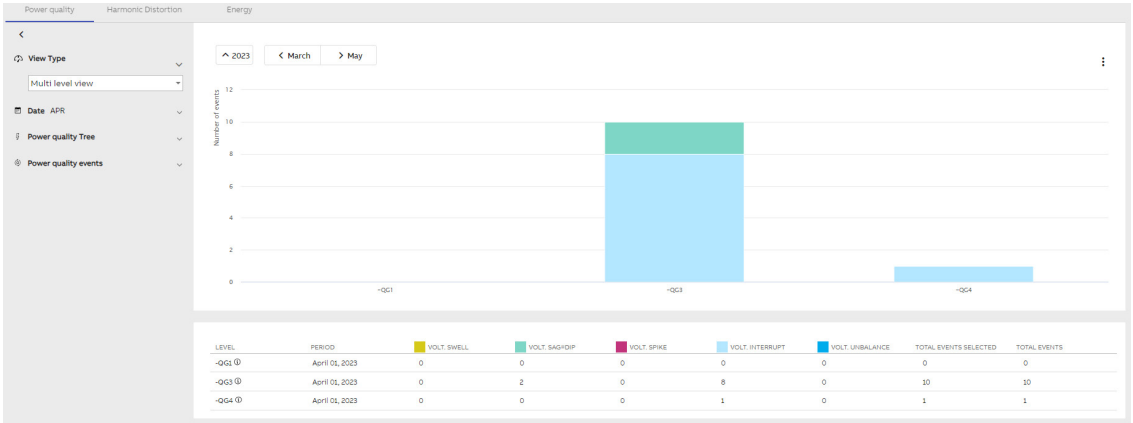
Moreover, this platform enables the hierarchical structure of the plant to be created, including both virtual levels and linking the connected devices in the installation to obtain a clear view of the measurement structure. There are also different levels of navigation such as data groups, view type, time range, event type for single devices or group of devices.

Even pareto analysis can be selected for a device-level view to set the events in order, from that with the highest impact to the one with the least impact.
Data groups:

- Power quality events: Voltage swell, Voltage sag, Voltage spike, Voltage interrupt, Voltage unbalance
- Harmonic distortion: THD voltage, THD current
- Energy: Neutral Current, Power factor, Active Energy, Reactive Energy, Apparent energy.

To achieve high reliability, the functionality of the installation must be preserved over time and an effective maintenance program must be relied upon to avoid unexpected failures that can degenerate into power outages. Obviously, the cost of maintenance is not negligible in a mid-large hospital structure, which is why a predictive model can help to reduce cost without compromising safety and plant performance.

A predictive maintenance function via the cloud or local platform of ABB Ability™ Energy and Asset Manager for Emax 2 and TmaxXT/XT7 circuit breakers will make optimum maintenance planning possible while reducing maintenance costs and increasing system reliability.



Power quality analysis dashboard

Circuit breaker health analysis diagram

An analysis of the breaker's health conditions that considers age, installation date, maintenance, environmental and utilization conditions.

Temperature Monitoring

Early detection of potential faults can be obtained and the need for maintenance ascertained using CM-TCN temperature monitoring relays. For example, temperature rises in transformers in overload situations or busbars/cables with tightening problems can be monitored, enabling prompt action to be taken.
The ABB portfolio includes temperature monitoring relays designed to measure the temperatures of solids, liquids and gaseous media using a variety of different sensors. In combination with temperature sensors, such as PT100, PT1000, NTC or PTC, they monitor the temperature of electric motors, control cabinets and busbars, protect transformers from overheating and can be installed in main or sub distribution boards depending on what they monitor.
The ABB smart temperature monitoring relay offers innovative features for easy setup and configuration. It can be programmed via a back-lit LCD or the ABB EPiC smartphone app, reducing installation time by 80%. With a back-lit LCD, users can quickly access and read measured values and maintenance data. NFC parametrization via the smartphone app makes configuration intuitive and fast, enabling settings to be copied to different devices. The relay provides thermal protection and condition monitoring, detects potential failures in advance and safeguards assets by identifying unacceptable temperature rises and the need for maintenance.

Arc Flash Mitigation

Arc flash mitigation solutions are crucial for ensuring safety in operations, saving lives and protecting assets. Taking the right precautions today can lead to cost savings in the future by reducing injuries, downtime and maintenance expenses. ABB offers a broad range of innovative solutions that go beyond compliance with the standards, ensuring maximum protection, uptime and peace of mind. From passive protection to ultra-fast arc mitigation, the ABB portfolio exceeds the current regulations, with features like remote condition monitoring and predictive maintenance. With over a century of experience in power and automation, ABB is a trusted partner for businesses worldwide, offering high-quality solutions to ensure safety and reliability.

The TVOC-2 Arc Guard System™ offers safety and protection by providing a market-leading reaction time of less than 1 millisecond, making it one of the most reliable solutions available. It quickly detects arc flashes and cuts the current feeding the arc, minimizing damage to equipment and ensuring continuous operation.
It can be mounted anywhere in the LV and MV switchgear, e.g. in the breaker cubicle or in a separate control or metering cabinet.

Product offering

UPS Portfolio:

WEB PAGE
CATALOG

Lithium- Ion Battery:

BROCHURE

Emax2:

WEB PAGE
CATALOG

Tmax XT:

WEB PAGE
CATALOG

TruOne ATS:

WEB PAGE
CATALOG

Compact ATS:

CATALOG

CM-TCN:

WEB PAGE
CATALOG

Arc Guard System™ – TVOC-2:

WEB PAGE
CATALOG

ABB Ability™ Energy Manager – Scanning:

WEB PAGE

ABB Ability™ Edge Industrial Gateway:

WEB PAGE

E-kit:

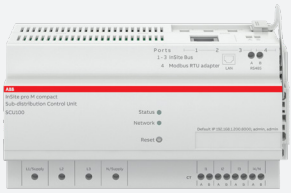
WEB PAGE

PRODUCT NOTE

Ekip Signalling 3T devices:

PRODUCT NOTE

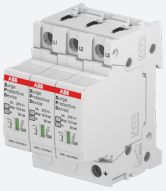
Circuit Monitoring System:



WEB PAGE

CATALOG

OVR:



CATALOG

TECHNICAL INFO

RCD:

CATALOG

TECHNICAL INFO

S200:

CATALOG

TECHNICAL INFO

ABB S.p.A.
Electrification Business Area
Smart Power Division
5, Via Pescaria
I-24123 Bergamo - Italy
Phone: +39 035 395.111
new.abb.com/low-voltage

To discover more

APPLICATION FINDER

Find the reference architecture tailored to your needs and speed up your project thanks to our new Application Finder Tool!

CONTACT US

Do you have a similar project and are you searching for the right Application configuration? Contact us and talk to our experts!

RATE US

Your opinion matters! Let us know if you found the document useful and how can we improve!

9AKK108468A5785 - 2023.09