



# Keeping the world's power flowing

Transfer switch solutions



- Continuous operation
- Easy to install
- Data and connectivity



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**Whether you need to ensure the steady delivery of critical power or simply keep the lights on, ABB is your one stop for transfer switch solutions.**

**Our breakthroughs in transfer switch technology and the recent addition of Zenith products enable us to offer one of the most comprehensive and advanced portfolios of transfer switch solutions in the world, from well-established technologies to the latest in digital innovation.**

**You can choose the functionality and features that are just right for your facility, knowing that you'll get outstanding reliability, even in the most demanding conditions.**

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# Transfer switch solutions

## Power security starts here

Causes of power outages can range from growing power demand, extreme weather conditions, technology failures, scheduled outages and human error- all often out the control of the electricity customer.

# 124%

increase of power outages in the last two decades, according to research by the University of Minnesota

# 86%

of facilities and energy managers of commercial and industrial businesses across the United States experienced power outage in 2017<sup>1)</sup>

# 6.5

million USD

is the loss of revenue a major organization may amount to in one hour<sup>2)</sup>

# 9000

USD

was the cost per minute of data center outage in 2016<sup>3)</sup>



A smooth and safe transition to back-up power

A secondary source is needed to provide power in case power supply from utility is interrupted or differs from nominal values. There are several types of back-up power sources for essential and critical loads:

- Generator sets
- Separate feeder of supply network that is independent of the normal feeder
- Uninterruptible power supply (UPS)

Transfer switches are devices used to switch loads from a primary to a back-up power source if the primary power source fails. In case of power source failure, whether planned or unplanned, a reliable switching device is crucial.

<sup>1)</sup> Source: S&C/Frost and Sullivan, State of Commercial & Industrial Power Reliability Report 2018

<sup>2)</sup> Source: General Electric

<sup>3)</sup> Source: Ponemon Institute



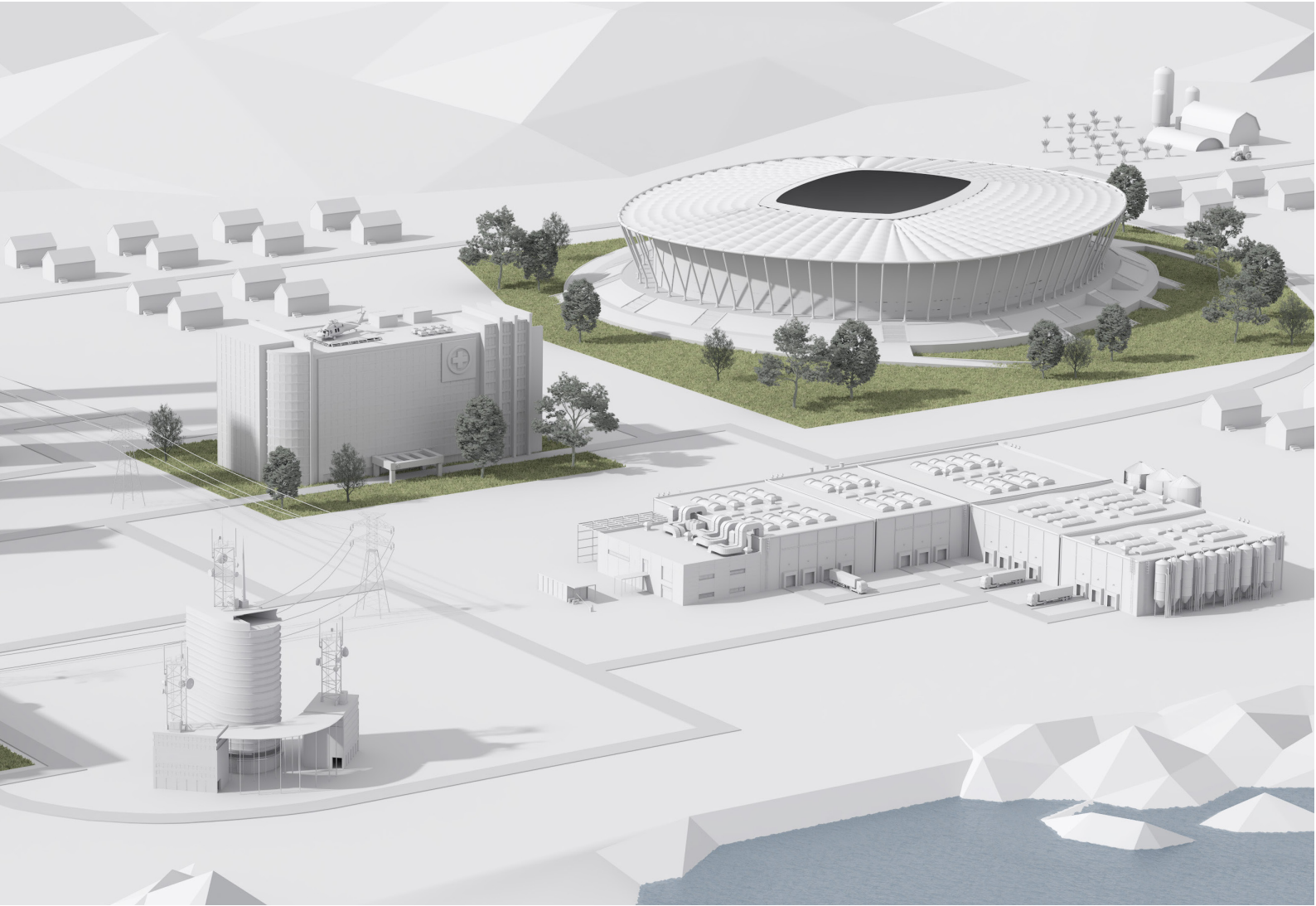


ABB transfer switches bring the highest level of convenience, efficiency, and power security to your product, project, or facility.

**ABB transfer switch solutions for every application**

- Hospitals
- Commercial buildings
- Residential buildings
- Data Centers
- Water treatment plants
- Infrastructure
- Industry
- And more..

# Transfer switch solutions that empower you

ABB offers a wide variety of transfer switch solutions—from well-established technologies to the latest digital innovations—with all the advantages to empower you.



## Continuous Operation

ABB transfer switching solutions include cutting-edge advantages such as predictive maintenance, extensive diagnostic data, and quickly replaceable critical modules to keep you up and running. By significantly reducing the number of connection points, ABB increases reliability and decreases the likelihood of downtime of your most critical loads and processes. In addition, we offer solutions with fast in-phase transition and closed transition to reduce outage time.



## Easy to Install

Our solutions are engineered to save time during the installation process, thanks to revolutionary integrated designs, dedicated guides, and wiring diagrams. In fact, depending on the solution you choose, you can reduce installation time by up to 80% and cut commissioning and cabling costs by up to 50% compared to conventional ATS solutions.



## Data and connectivity

Many ABB transfer switch solutions include cloud-based connectivity that works in conjunction with the ABB Ability Electrical Distribution Control System (EDCS) to provide power and maintenance data in real time. Operators can measure and monitor a wide variety of parameters to stay proactive, save time, and reduce costs.



## Safety and Protection

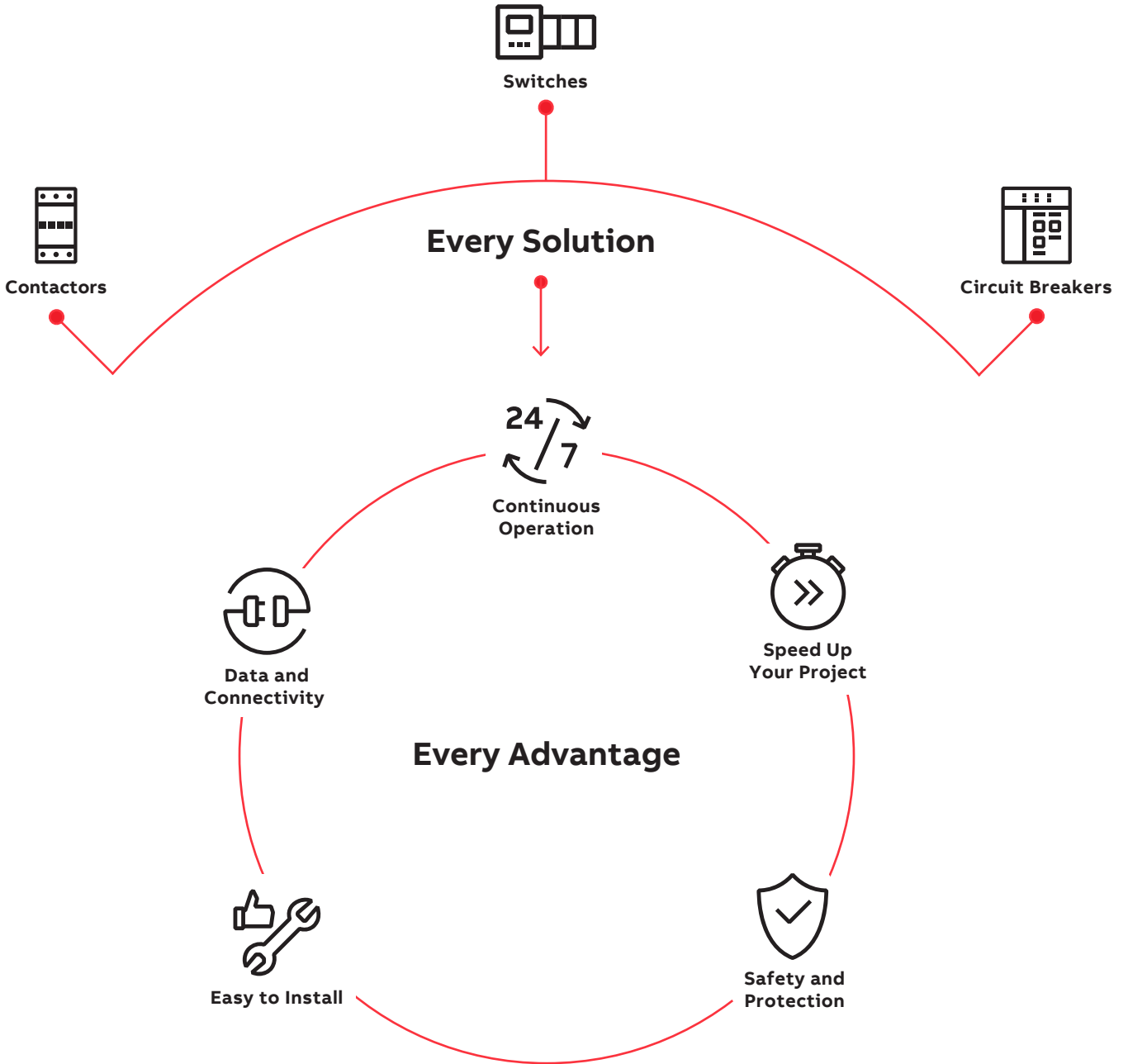
Safety, a priority for ABB, is built into every transfer switch solution we make. Available safety features include mechanical isolation of unsynchronized power sources, manual emergency operation, and protection from current-carrying parts to reduce the risks for operator injury.



## Speed Up Your Project

Select and order up to 30% faster with our e-Configure online configurator. Reduce commissioning time 80-95% using ABB's automatic commissioning feature or Ekip Connect software in conjunction with our advanced ATS options. Files can be configured while you are still in the office and uploaded from your PC to the ATS with no need to apply power to the unit.

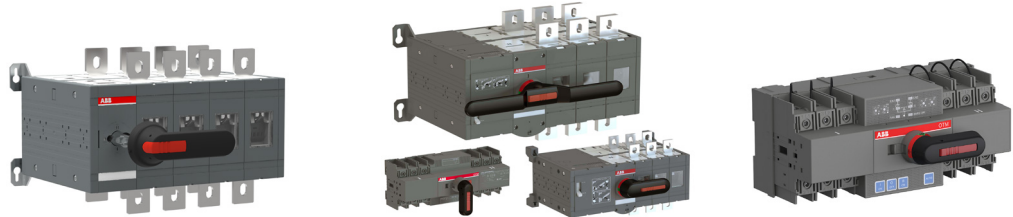




# Perfectly matched solutions. Unmatched performance.

Open type transfer switches

## Switching technology Switches/Power contactors



	OT_C	OTM_C	Compact ATS
Current range	16...3200 A (IEC) 30...800 A (UL)	40...3200 A (IEC)	40...125 A (IEC)
Standards	IEC 60947-3 IEC 60947-6-1 UL98 GB/T 14048.11	IEC 60947-3 IEC 60947-6-1 GB/T 14048.11	IEC 60947-3 IEC 60947-6-1 GB/T 14048.11
Transition types <sup>1)</sup>	Delayed: I-0-II Closed: I-I+II-II	Delayed: I-0-II	Delayed: I-0-II
Controlling method	Manual transfer switch	Motorized transfer switch (Remote operation)	Automatic transfer switch with inbuilt controller

### Key features

- Three mechanically interlocked definite positions (I-0-II)
- Dedicated power pole design
- Modular and flexible construction
- Adjustable shaft

- Three mechanically interlocked definite positions (I-0-II)
- Emergency manual operation
- AC/DC applications
- Multiple motor power supply options
- OMD controller can be used to build an automatic transfer switch

- Compact, purpose built and cost effective solution
- Inbuilt automatic controller with mimic panel
- Inbuilt 3 phase voltage sensing
- Fully self supplied unit
- Emergency manual operation
- Fixed and adjustable controllers
- Main-Main and Main-Gen applications

<sup>1)</sup>Delayed transition is also know as Open transition with stable OFF between positions I and II

<sup>2)</sup>Utilization category AC-1

<sup>3)</sup>Only required for ATS022 with Modbus and in networks with frequency of 16 2/3 Hz



**Contactors**

**Circuit breakers**



TruONE ATS	AF contactors with relays	Emax 2 and Tmax XT with ATS021/ATS022	Embedded ATS
200...1600 A (IEC) 30...1200 A (UL)	3-pole: 25...2850 <sup>2)</sup> A (IEC/UL) 4-pole: 25...525 <sup>2)</sup> A (IEC/UL)	160...6300 A (IEC)	630...6300 A (IEC) 800...6000 A (UL)
IEC 60947-6-1 UL1008 GB/T 14048.11	IEC/UL 60947-4-1 GB/T14048.4	IEC 60947-2 UL1066 UL489 GB/T14048.2	IEC 60947-2 UL1066 GB/T14048.2
Open: I-II Delayed: I-0-II In-phase monitor	Open: I-II Delayed: I-0-II	Delayed: I-0-II	Delayed: I-0-II Closed: I-I+II-II Synchrocheck
Automatic transfer switch with inbuilt controller	Automatic transfer switch with relays-based control circuit	Automatic transfer switch with external controller	Automatic transfer switch with embedded software function
<ul style="list-style-type: none"> <li>• Below 50 ms in-phase transfer</li> <li>• Emergency manual operation</li> <li>• Overlapping neutral</li> <li>• Power measurements</li> <li>• ABB Ability™ EDCS for cloud-based services</li> <li>• Ekip Com modules for uniform platform</li> <li>• Programming via Ekip Connect</li> <li>• Predictive maintenance</li> <li>• Modular structure to simplify service</li> <li>• Main-Main and Main-Gen applications</li> </ul>	<ul style="list-style-type: none"> <li>• Electronic AC/DC coil, wide control voltage range</li> <li>• Only 4 coils cover 24 V–500 V AC and 20 V–500 V DC</li> <li>• Reduced coil consumption by 80%</li> <li>• Continuous monitoring of voltage and current applied to the coil</li> <li>• Built-in surge suppression</li> </ul>	<ul style="list-style-type: none"> <li>• No auxiliary power supply required<sup>3)</sup></li> <li>• Parameters selection with dip switches or graphical display</li> <li>• Up to 3 low-voltage circuit breakers or switch-disconnectors can be controlled</li> <li>• ATS022 allows Modbus RS485 communication</li> <li>• Manual CBs and generator control from front interface</li> <li>• Test of the entire switching procedure</li> </ul>	<ul style="list-style-type: none"> <li>• Embedded ATS function is enabled by the license.</li> <li>• Compatible with ABB Low voltage circuit breakers and Ekip platform</li> <li>• Tested and ready-to-go ATS templates: Main-Gen delayed transition, Main-Tie-Main closed transition.</li> <li>• Load shedding logics available</li> <li>• Basic settings via Ekip Connect</li> <li>• Ekip G trip unit version for generator protection</li> <li>• No need for external controller</li> <li>• Self-diagnostics of internal connections</li> </ul>

# Perfectly matched solutions. Unmatched performance.

Enclosed transfer switches

## Switching technology Switches/Power contactors



	Spec Setter Double Throw	Emergency transfer	Enclosed TruONE ATS
Current range	0 - 1200 A (UL/NEMA) <ul style="list-style-type: none"> <li>UL Listed and cUL Listed (UL98 Enclosed Switches/ CSA-C22.2 No. 4-04</li> <li>Federal Specification W-S-865C</li> <li>NEMA Enclosed Switch Standard KS1 – 2013</li> </ul>	100-200 A (UL/NEMA) <ul style="list-style-type: none"> <li>UL Listed and cUL Listed (UL98 Enclosed Switches/ CSA-C22.2 No. 4-04</li> <li>Federal Specification WS-865C</li> <li>NEMA Enclosed Safety Switch Standard KS1-2013</li> </ul>	200...1250 A (IEC)
Standards	<ul style="list-style-type: none"> <li>Seismic Certified</li> </ul>	<ul style="list-style-type: none"> <li>Seismic Certified</li> </ul>	IEC 60947-6-1
Transition types <sup>1)</sup>	Delayed: I-0-II	Delayed: I-0-II	Delayed: I-0-II In-phase monitor
Controlling method	Manual control <ul style="list-style-type: none"> <li>Highly visible ON/OFF label</li> <li>Bright red handle</li> <li>Self-leveling three point mounting pattern</li> <li>Lockable cover latch</li> <li>Quick-make, quick-break mechanisms 30-1200 amps</li> <li>Use of common fuses in stacked design; fewer fuses required and reduced enclosure size: 600-1200A (not displayed)</li> </ul>	Manual control <ul style="list-style-type: none"> <li>Plated copper current-carrying parts increase longevity and performance</li> <li>Positive make and break is provided by fiber loop straps between knife blade contacts and one-piece operating yoke</li> <li>Bonding strap can be used to ground factory installed neutral for service entrance applications</li> <li>Galvanized steel enclosure with drip shield</li> </ul>	Automatic transfer switch with inbuilt controller <ul style="list-style-type: none"> <li>Below 50 ms in-phase transfer</li> <li>Emergency manual operation</li> <li>ABB Ability™ EDCS for cloud-based services</li> <li>Ekip Com modules for uniform platform</li> <li>Programming via Ekip Connect 3</li> <li>Predictive maintenance</li> <li>Modular structure to simplify service</li> <li>Main-Main and Main-Gen applications</li> </ul>
Key features			

<sup>1)</sup> Delayed transition is also known as Open transition with stable OFF between positions I and II

<sup>2)</sup> IEC and CCC certification available for the current range 1600...3000 A





Zenith ZTX	Zenith ZTG	Zenith ZTS
30...1200 A (UL)	30...3000 A (UL) 1600...3000 (IEC)	40...4000 A (UL/IEC)
UL 1008	UL 1008 IEC 60947-6-1 <sup>2)</sup> GB/T 14048.11 <sup>2)</sup>	UL 1008 IEC 60947-6-1 GB/T 14048.11
Open: I-II In-phase monitor	Open: I-II Delayed: I-0-II In-phase monitor	Open: I-II Delayed: I-0-II Closed: I-I+II-II Bypass withdrawable In-phase monitor
Automatic transfer switch with inbuilt controller	Automatic transfer switch with inbuilt controller	Automatic transfer switch with external controller
<ul style="list-style-type: none"> <li>Below 50 ms in phase transfer</li> <li>Emergency Manual operation under load</li> <li>Modular structure to simplify service</li> <li>Simplified HMI for ease of use</li> <li>Main-Main and Main-Gen applications</li> </ul>	<ul style="list-style-type: none"> <li>One button commissioning with Auto-Configure feature</li> <li>Ekip Com modules for uniform platform</li> <li>Programming setpoints via Ekip Connect without the need for power to the transfer switch</li> <li>ABB Ability EDCS for cloud based services</li> <li>Service Entrance</li> <li>Main-Main and Main-Gen applications</li> </ul>	<ul style="list-style-type: none"> <li>Full product offering up to 4000 A and 600 V AC</li> <li>Closed Transition offering eliminate outages from planned transfers.</li> <li>UL Short Time Ratings for supporting a selectively coordinated system.</li> <li>Make-First-Break-Last switched neutral</li> <li>Main-Main, Main-Gen and Gen-Gen applications</li> </ul>





No matter what your switching requirements are, ABB can meet them while exceeding your expectations for ease, energy efficiency and, above all, reliability.



# Application example: data center

To keep data centers up and running it is necessary to ensure a reliable and redundant power supply. For this reason, the most usual data center designs, Tier III and Tier IV, include two redundant power supplies for IT and mechanical loads.

### Main challenge

33% of Data centers with N+1 architecture have experienced at least one outage per year with an average estimated cost of 900k USD per event. The most usual cause of outages, up to one third of total, is power supply failure inside data center premises.

Reliable Automatic Transfer Switches (ATS) are needed to provide power supply both to IT loads and cooling systems in case of power outages.

### Solutions for main power distribution board

Emax 2 circuit breakers are used in the main distribution board as incoming protection devices. They are equipped with Embedded ATS function (Main-Gen, delayed transition<sup>1</sup>) to manage automatic switching in case of main power supply failure.

Feature	Benefit
Fully integrated solution, no need for external devices	Up to 30% space saving on the power switchboard
Plug&play, ready to go application template	95% estimated time and cost savings on the ATS engineering
Self-diagnostics of all connections	Enhanced reliability thanks to reduced potential points of failure

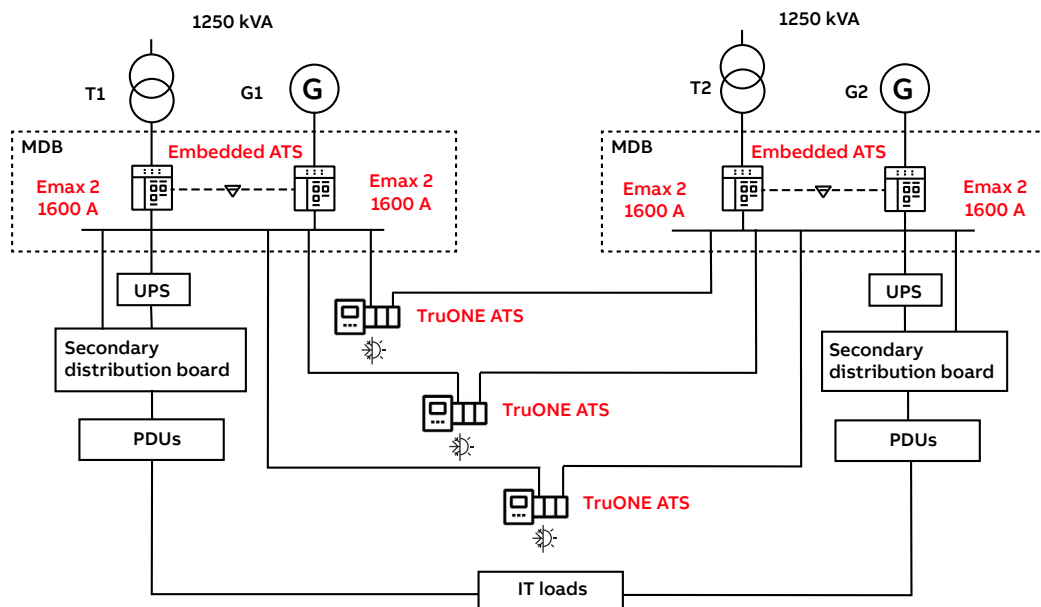
### Solutions for chillers

TruONE ATSs are installed inside the chiller control panel to keep required cooling capacity in case of power outages.

Feature	Benefit
All-in-one solution, including the controller with detachable HMI	Installation time reduced by up to 80%
Automatic commissioning feature and pre-made configuration files	Reduce risk of human error and programming time by 80%
Predictive maintenance and quickly replaceable critical modules	Significantly reduce downtime and service costs

### Example

This example shows a Tier III, N+1 cloud data center typical design, with a total facility input power of 1MW and an IT load of 550kW.



<sup>1</sup>Delayed transition is also known as Open transition with stable OFF between positions I and II

# Application example: high-rise building

Continuous power supply is required to ensure operation of safety services and to maintain comfort for residents in case of a power outage.

### Main challenge

Continuous power supply has to be ensured to guarantee operation of safety services during main supply failure and in fire conditions. This includes equipment such as fire pumps, emergency lighting, smoke extraction equipment or firefighting lifts.

The ATS for safety services has to be located in a dedicated enclosure and must be capable of being operated without exposing the operator to live voltage parts. To ensure availability of safety services, the ATS has to allow replacement of critical components such as controller and motor without causing disturbance to the loads.

In addition, to keep comfort for residents and to avoid panic in case of main power supply failure, a dual power system should also be included for loads such as general lighting, outlets groups and air conditioning.

### Solutions for Main Distribution Board (MDB)

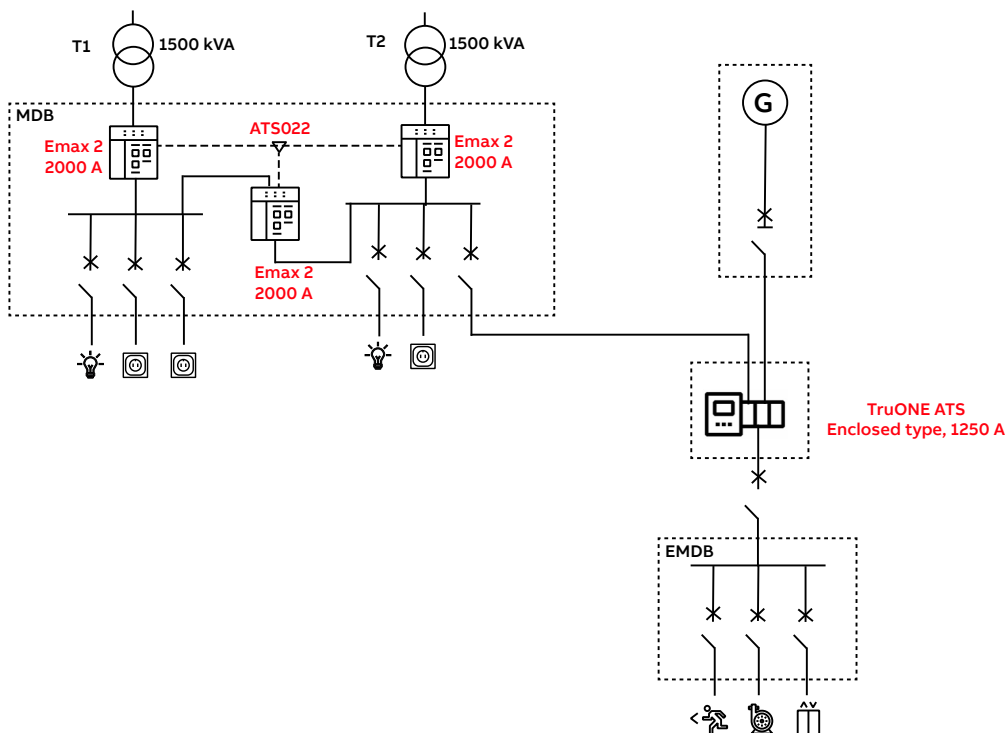
ABB low circuit breakers such as Emax 2, were selected as incomers and bus-tie circuit breakers.

To achieve automatic transfer switching logic among three circuit breakers, they were equipped with internal accessories and the external automatic control unit ATS022. The automatic control unit ATS022 does not require an auxiliary power supply, it has a graphic operation interface and Modbus RS485 communication interface.

### Solutions for emergency load power supply

Enclosed TruONE ATS – ABB's latest breakthrough in transfer switching technology - was selected for critical loads.

Feature	Benefit
Purpose-built ATS in one seamless unit	Reduces installation time by up to 80%
Manual operation — even under load — without opening the panel door	Reduces risk of operator injury
Quickly replaceable critical module	Reduce downtime and service cost



### Example

This example shows a simplified diagram of a 15 floor building. The building has a power supply from two independent power sources from utility, the transformers power is 1500 kVA. In case of unavailability of both power sources from utility, the critical loads (such as fire prevention low voltage system, emergency lightening, lifts etc.) will be supplied from a diesel-engine generator set with power of 800 kVA.



# Application example: healthcare

As per IEC 60364-7-710, the most critical equipment is located in groups 1 and 2 of medical locations. A power outage of the main supply from utility can compromise safety and health of patients and medical staff.

## Main challenge

Continuous power supply is one of the most important aspect of hospital operations. For groups 1 and 2, the IEC standard defines a minimum period of time the backup source shall maintain power supply for the safety services and also a change-over time.

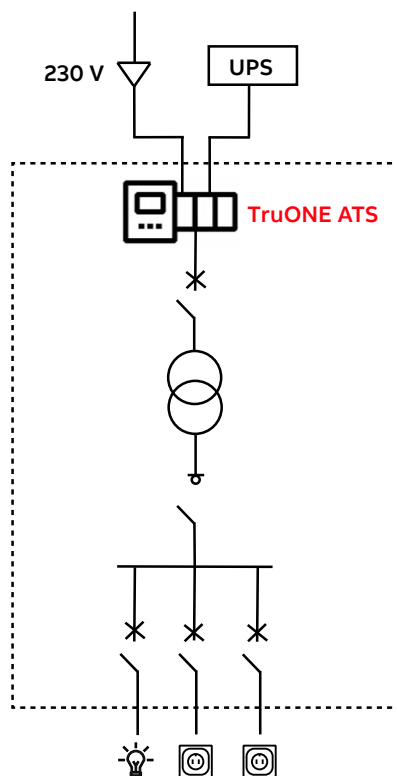
In the specific case of group 2 medical locations, the ATS has to restore the power within 500ms. In addition, the ATS equipment must be integrated in a monitoring system with cloud-based connectivity.

A periodical test of the ATS procedure – every 6 months – has to be done at the installation.

## Solutions

To grant enhanced reliability to the application, TruONE is installed in the sub-distribution board feeding group 2 areas.

Feature	Benefit
Fast in-phase open transition of power within 50 ms (contact transfer time) and operating transfer time less than 500ms.	Unnoticed generator test during business hours, compliance to the requirements for group 2 medical locations
7 communication protocols and cloud connectivity through the ABB Ability™ EDCS	Easy installation and connectivity now and far into the future
Scheduled periodic ATS tests	Significantly reduce downtime and service costs



## Example

This example shows a single line diagram of a sub-distribution board for the group 2 medical location. The board feeds safety services (anesthetic room, operating theatre, heart catheterization room, intensive care room) that require 37 kW in total.

# Application example: industry

Power interruption in an industrial plant can lead to economic losses usually associated with loss of revenue, failure of process equipment, idle labor and facilities or late fees.

### Main challenge

In addition to economic losses, power outages cause other intangible costs for a company, such as market perception of the company, stock losses and lost opportunities. According the survey conducted among automotive industry manufacturing executives, each minute of power outage costs 22kUSD<sup>1</sup> for the companies.

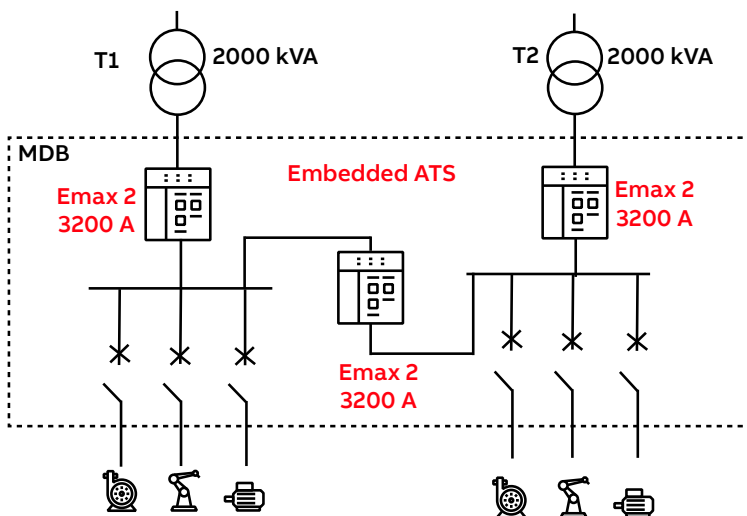
In case of a malfunction of one power supply, an ATS must transfer the load to the remaining active power source according to the standard open transition (break-before-make) principle. To avoid the loss of power during the reverse switching phase, and, as a result, the restarting of corresponding production lines, make-before-break (short paralleling/closed transition) principle is required.

In addition, a wide range of electrical parameters (current, voltage, energy, power factor...) have to be measured. The measurements and circuit breakers status information have to be available for the Distributed Control System (DCS).

### Solutions

Low voltage circuit breakers Emax 2 with integrated software-based solution for automatic transfer switching – Embedded ATS. Main-Tie-Main closed transition template perfectly fits the requirements in this application.

Feature	Benefit
No complex wiring compares to conventional solutions with external controller, CTs and VTs	50% estimated time and cost savings on cabling of the power switchboard
Ekip Connect graphical interface to adjust settings and upload configuration	95% estimated time and cost savings on ATS engineering for a low voltage project
Emax 2 acts as a measurement device with extreme accuracy and up to 9 communication protocols embedded with options for redundancy	Flexible and easy integration into local DCS



### Example

This example shows a simplified diagram of an industrial plant with a total installed power of 2000 kVA. In normal conditions, each single transformer will power about 50% of the total installed power.

<sup>1</sup>Advanced Technology Services, Inc. (ATS)





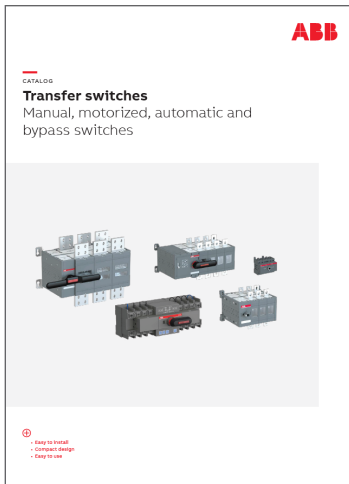
TISSOT ARENA

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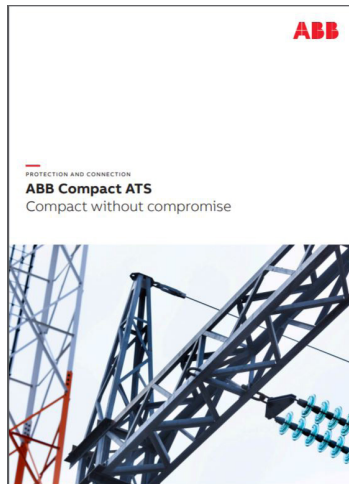


# Additional resources

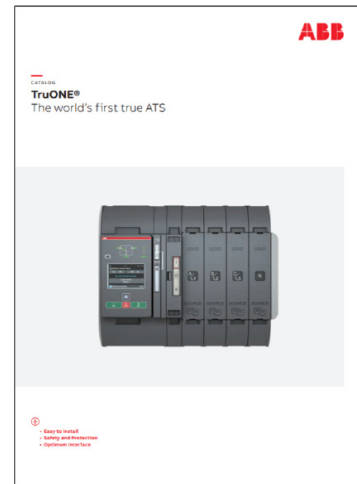
## Product catalogs and documentation



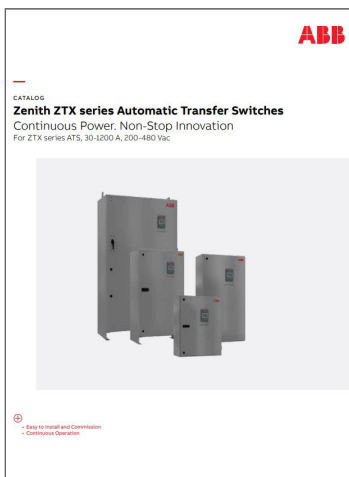
Manual and motorized transfer switches (OT\_C, OTM\_C)



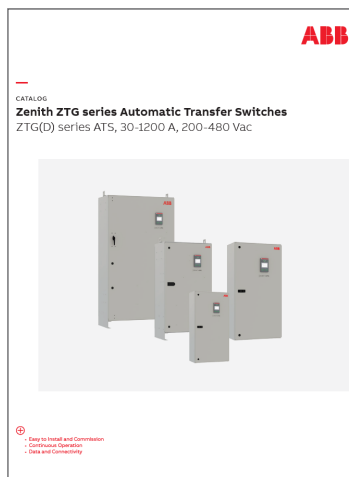
Compact ATS



Automatic transfer switches TruONE ATS



Zenith ZTX



Zenith ZTG



Zenith ZTS

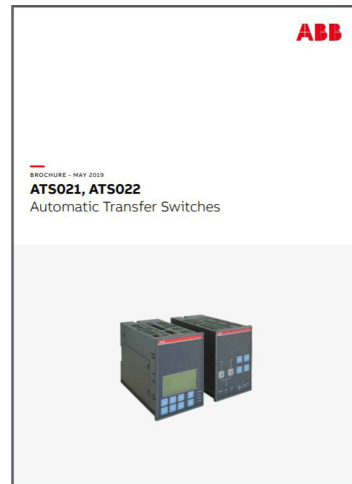




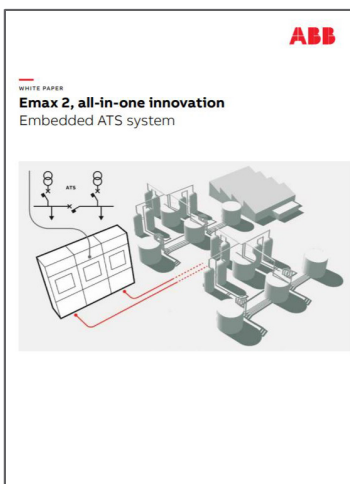
Contactors



Electronic relays and control



ATS021 and ATS021



Embedded ATS

## Web and online tools



**Webpage:** Transfer switch solutions  
Find news, videos and documentation.



**e-configure**  
The easiest way to find, select, configure and order ABB products, quickly and simply.



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<http://solutions.abb/transferswitches>

