

Critical power  
Solutions for OEMs  
GEN SET and UPS manufacturers

# Profile

Critical applications, such as hospitals, airports, communications systems and data centers, require a constant and reliable power supply to keep fundamental services running and prevent serious consequences due to power interruption. This need is even stronger nowadays since increased capacity of these systems is required. In order to ensure end to end reliability, the system must include diesel generators and UPS which ensure the power supply to the critical loads in case of outages from the grid.

## **The importance of a reliable and uninterruptible power supply**

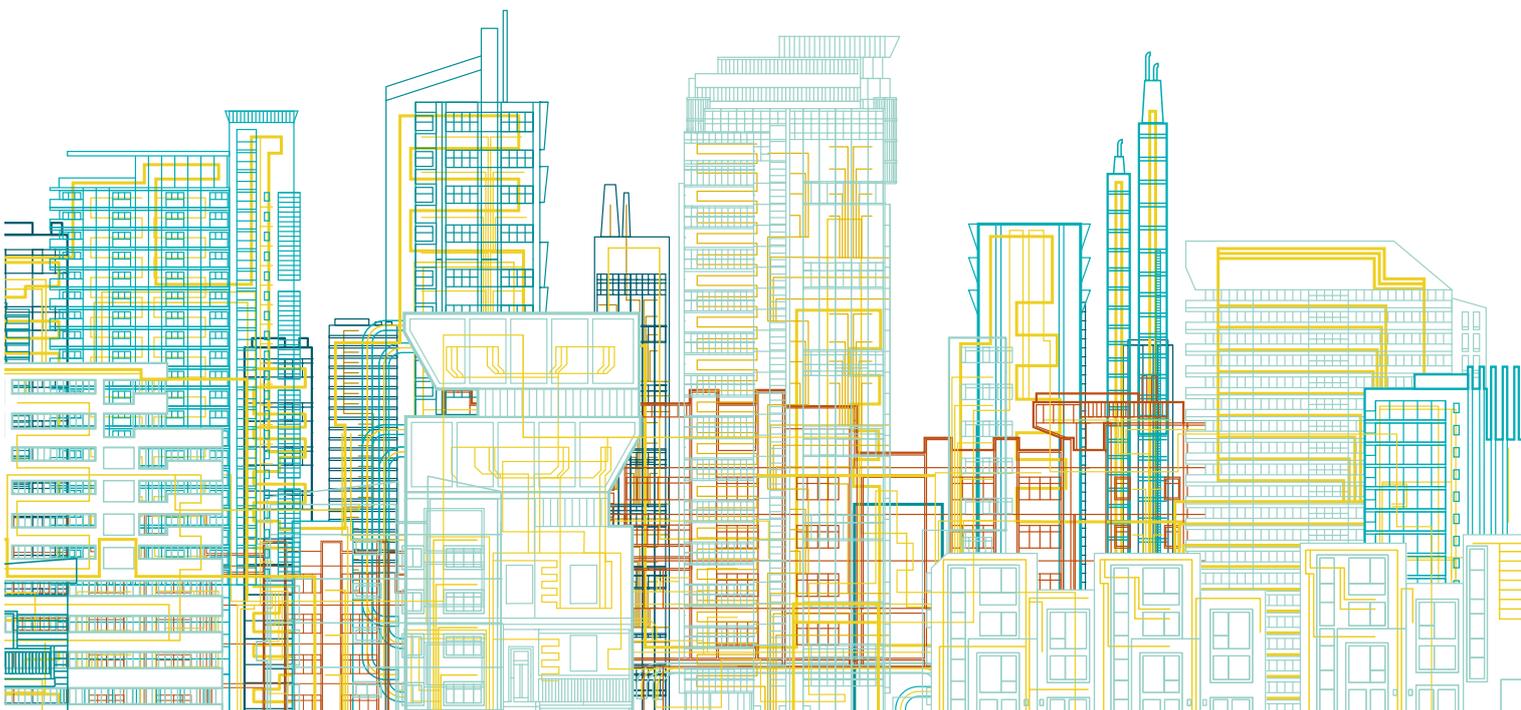
In the present-day world, technology and information play a key role in every activity and in many aspects of the daily life of each of us.

All this is based on an absolute need to be able to guarantee a constant and reliable power supply free of disturbance, especially when the powered equipment is “critical”, both from functions served and technological characteristics point of view.

Suffice it to say that digital electronic equipment – now found everywhere – do not tolerate power cuts longer than just a few milliseconds.

From this point of view, communications systems, hospital activities, security systems, water and gas distribution, banking computer systems and other indispensable services may run into serious problems without suitable emergency power equipment, with consequences that can easily be imagined due to power cuts.

In addition to this, the equipment must be protected from over-voltages, over-currents and transitory voltage drops.



The “Critical Power” applications are specifically designed to satisfy all these needs and, as such, are now essential for all activities in which a constant and secure power supply is required, for example using power generators and UPS.

They may be placed at various levels in a distribution network, wherever there are “critical power nodes”, both large or small: large industrial or service sector facilities, data processing centres, small structures, and even individual items of machinery or devices that are of paramount importance for the plant to which they belong.

### **ABB’s technological solutions for the OEMs in this area**

ABB can offer OEMs specialised in “Critical Power” applications a truly wide and complete range of products, including both components for installation on board machinery and power distribution systems.

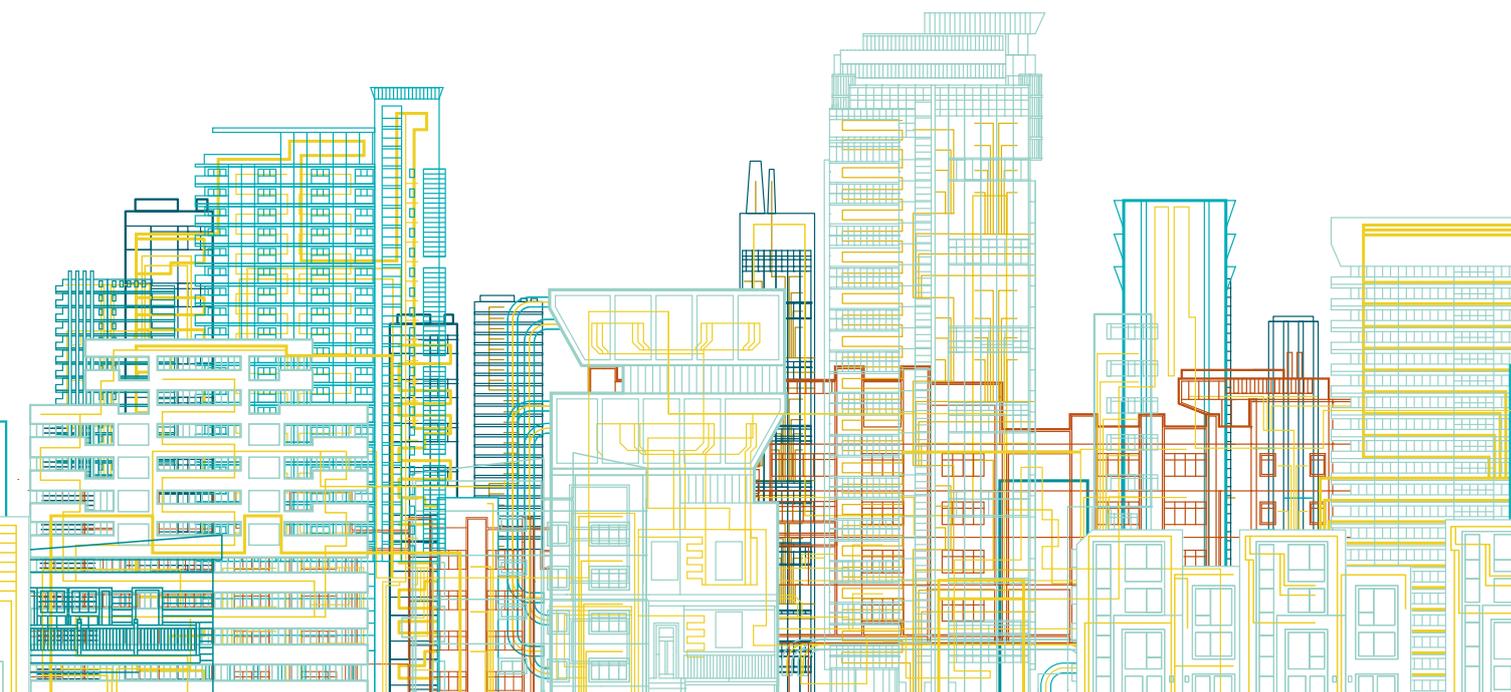
These products range from low voltage generators for generator sets to iPDU (intelligent Power Distribution Units) switchboards, is specially designed for data centres and computer rooms, and include all types of equipment specifically required to provide safety and reliability: air, moulded-case and miniature circuit breakers, protections

against over-voltages, isolators and switch disconnectors, contactors, motorized change-over switches, current sensors and other devices.

In general ABB products comply with the most important international standards, in particular with the European and North American ones and with the requirements of the Navy Registry; they are also designed and made to the most modern and advanced standards of environmental compatibility.

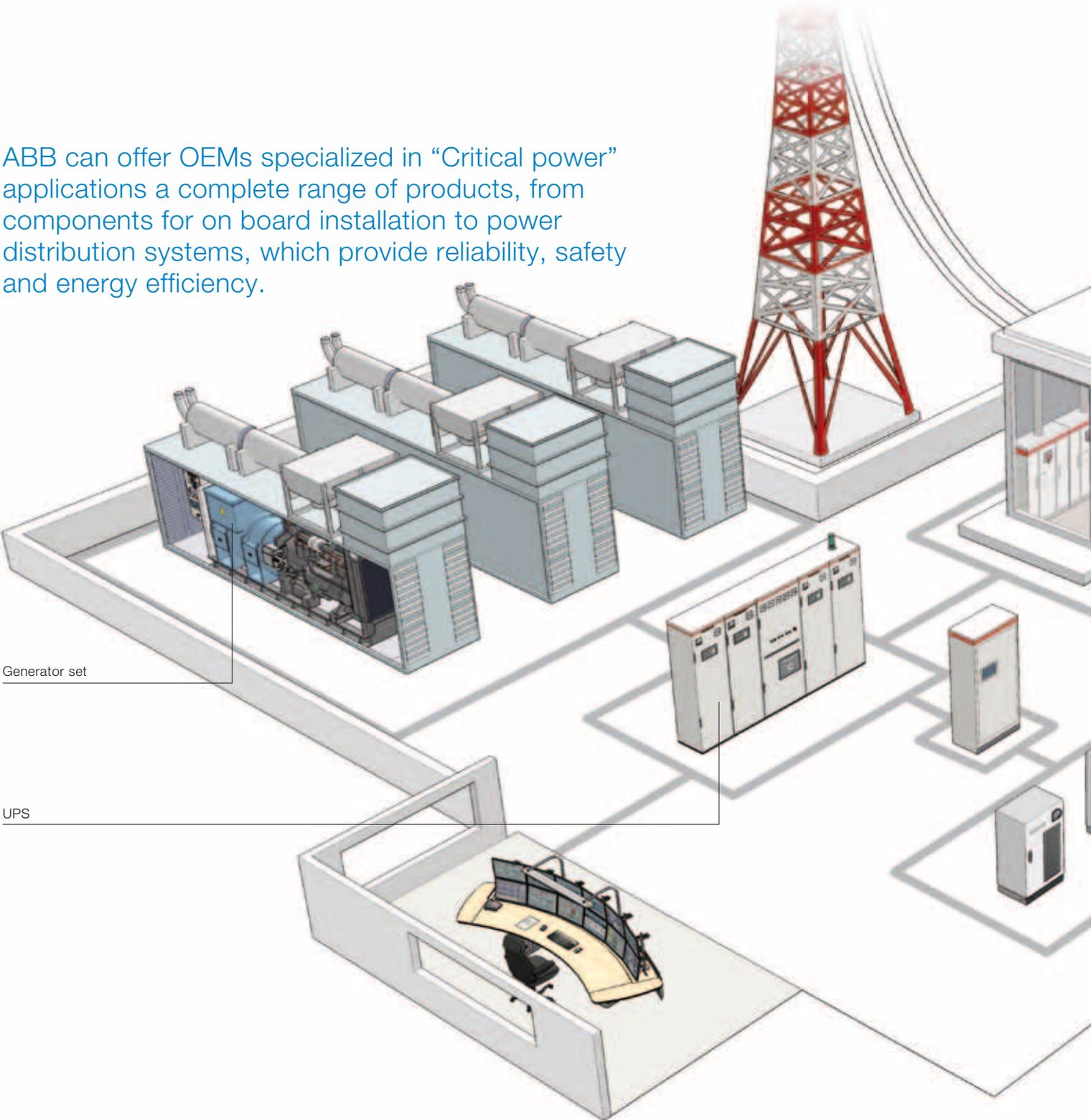
### **Technical assistance and service**

With its consolidated experience in power and automation technologies, and thanks to branches in over 100 Countries all over the world, ABB is able to offer numerous technical assistance and service activities including conformity to new technology and regulations (revamping and retrofit), technical promotion, after-sales service, diagnosis and maintenance, spare parts and many others, according to the various types of product and plant.



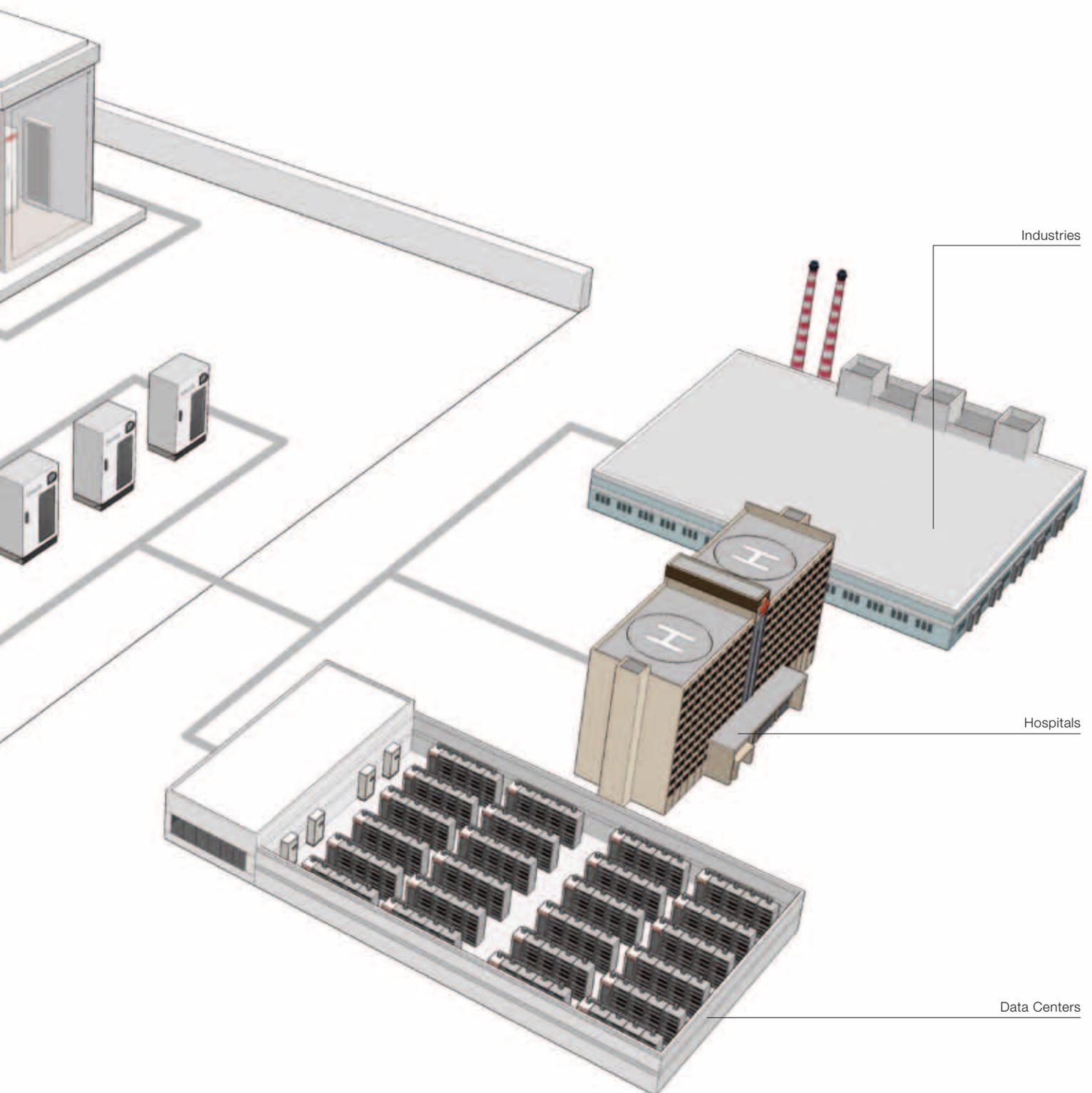
# Application

ABB can offer OEMs specialized in “Critical power” applications a complete range of products, from components for on board installation to power distribution systems, which provide reliability, safety and energy efficiency.



Generator set

UPS



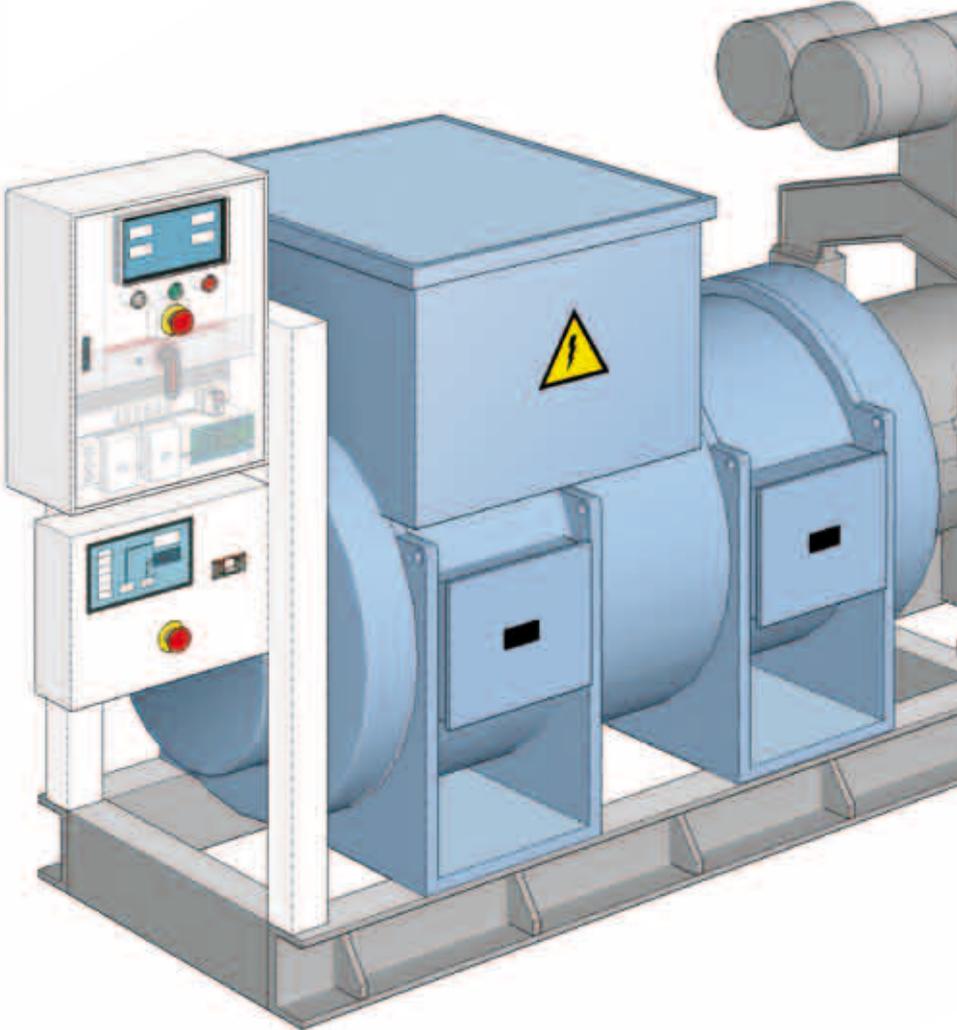
Industries

Hospitals

Data Centers

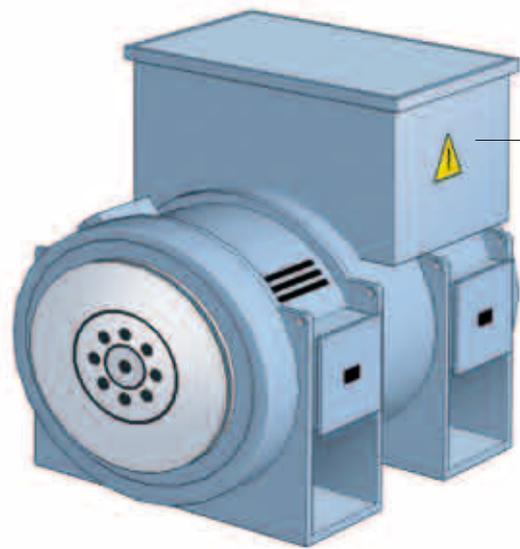
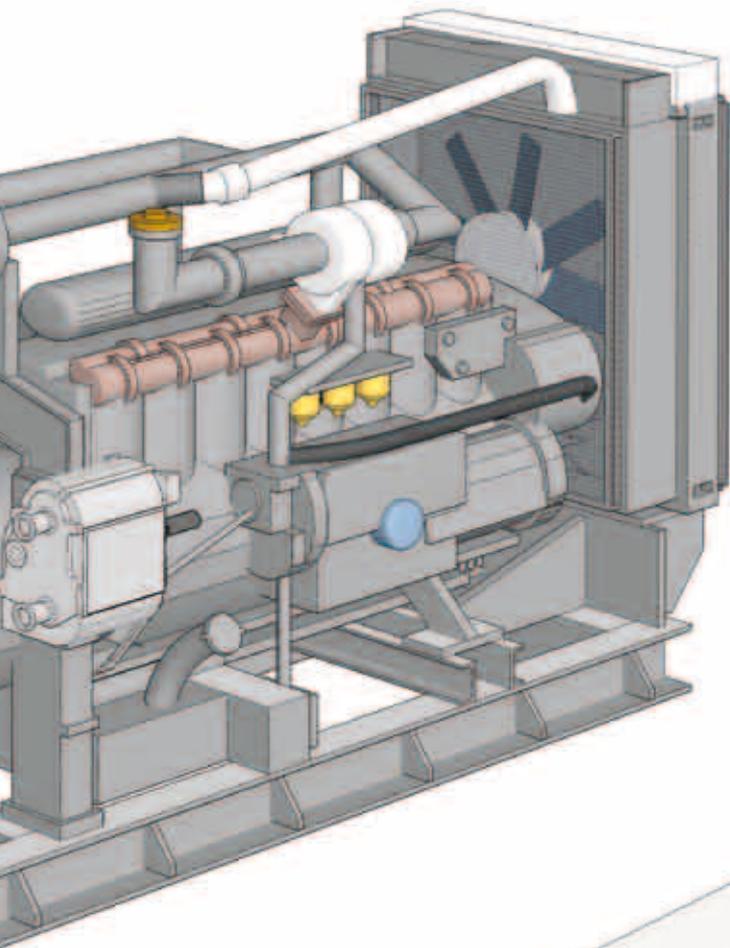
# ABB products for GEN SET

Control panel  
- ATS Panels  
(Change-over switch,  
monitoring relays,  
push buttons)

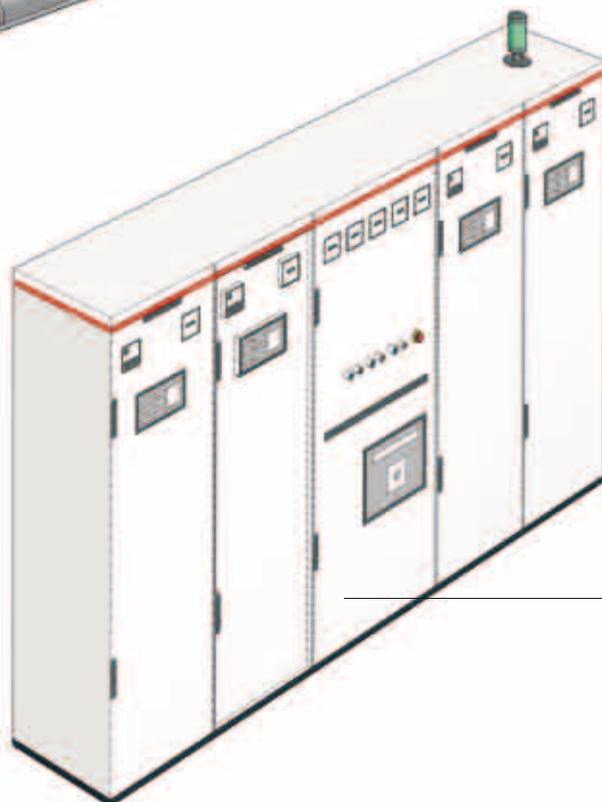


Circuit breaker  
- ACB, MCCB  
- MCB





Alternator



Paralleling Switchgears

# ABB solutions for Generator Set

## On board of GEN SET

Emergency or standby power systems are fundamental in many industrial and building applications where a constant power supply is required. Backup generator set is installed to temporarily provide power to the grid when the primary source fails.

### Low voltage synchronous generators

ABB produces low voltage generators for marine and industrial applications. The generators can be used with diesel or gas engines and are ideal for supplying continuous, standby or emergency power for residential buildings, commercial premises, hospitals, schools, telecommunication facilities, industrial sites, mines and marine auxiliary power stations

AMG - Frame size 180 - 500:

- 15 – 3125 kVA at 400 V / 50 Hz,  
19– 3750 kVA at 480 V / 60 Hz
- 4-poles, 3-phase
- IP 21 or 23
- Insulation class H / Temperature rise class H
- ICOA1 / IP23, main terminal box IP44
- Built-in AVR, shunt, auxiliary winding or PMG for excitation power supply
- PTC, PT100, Digital Voltage Regulator optional for all frame size.

### Residual current devices

ABB range of modular and front panel residual current devices includes F200 RCCB, DS200 RCBO and RD residual current relays. Specific versions AP-R ensure maximum service continuity preventing unwanted trippings. For complete protection, DS200 RCBO range ensures both line and earth leakage protection in most reduced overall dimensions.

### Measuring instruments and current transformers

System pro *M compact*<sup>®</sup> offer of measurement devices and accessories ranges from analogue single function instruments for direct insertion to digital multifunction devices for complete system monitoring and remote management.



### Air, moulded-case and miniature circuit breakers to protect generators

ABB can offer an extremely wide range of air (Emax), moulded-case (Tmax), modular (System proM compact) circuit breakers suitable to satisfy every possible plant engineering need.

Emax and Tmax circuit breakers are available in versions compliant with IEC and UL standards, and are characterised, in particular, by modularity and compactness with regard to the size/performance ratio. They may be fitted with protections suited to generators, motors and transformers. In particular, Tmax circuit breakers can be fitted with protections that are not just suitable, but also specific for generators (for example Ekip-G-LS/I releases). Currently Emax and Tmax are the only circuit breakers in the world that offer wireless communication, using Bluetooth technology, to permit configuration and diagnosis from a PC or a palmtop. In particular, the equipment listed below can be used for applications on board generator sets:

- Emax air circuit breakers in five sizes for alternating current, with rated uninterrupted currents  $I_u$  from 400A to 6300A and rated ultimate short-circuit breaking capacity  $I_{cu}$  up to 150kA (380/415V AC)
- Tmax moulded-case circuit breakers in eight sizes for alternating current, with rated uninterrupted currents  $I_u$  from 1A to 3200A and rated ultimate short-circuit breaking capacity  $I_{cu}$  up to 200kA (380/415V AC)
- system pro *M* compact® miniature circuit breakers: the full range includes various series of circuit breakers with rated currents from 0,5A to 125A and breaking capacity from 4,5kA to 50kA
- S200 series miniature circuit breakers are available in B, C, D, K and Z curves as well as UC types. Miniature circuit breakers are compliant with EN 60898 and IEC 947-2. The globally manufactured MCBs could be equipped with different accessories and are available with the requested certifications.



# ABB solutions for Generator Set

## On board of GEN SET

### Process instrumentation

In addition to the devices most suited to the specific application, ABB can supply other useful devices to accompany generator set installations, such as some of the numerous types of available process instruments. The 2600T pressure transmitter series (model 261 and 266) can be used to reliably measure the pressure of the diesel fuel, lubricating oil and cooling water; the choice of the appropriate pressure transmitter will depend upon performance, installation and hazardous area classification requirements.

### Excitation and Synchronization

UNITROL® and SYNCHROTACT® product range. ABB combines the knowledge of synchronous machines, specific applications and ongoing research for the development of innovative and functional products, able to meet the latest requirements of easy Human-Machine Interface. The result is the range of products for the regulation and control of generators for generator set: Unitrol 1000 -7 and 15A and Synchrotact 5 series for paralleling of synchronous line. AVR Unitrol 6080 is the ideal solution for the most demanding applications.



# ABB solutions for Generator Set ATS components (Automatic Transfer Switch)

Every backup generator needs a reliable Automatic Transfer Switch (ATS) to transfer electrical power from the primary source to the emergency or standby power system.

## **Air and moulded-case switch-disconnectors and circuit breakers with interlocks**

The complete range of products combined with the wide availability of electrical and mechanical accessories allow the integration of ABB low voltage circuit breakers in any system of automatic transfer switch - ATS.

The molded case circuit breakers of Tmax XT serie cover low voltage applications up to 250A, while the Tmax T family offer current ratings up to 3200A.

The Emax air circuit breakers reach 6300A and it ensures short circuit performances up to 150kA.

ABB circuit breakers can be equipped with a wide range of protection releases; the switch-disconnector versions are also available and they can be accessorized by the same mechanical and electrical accessories available for the automatic version.

In particular, Tmax XT series provides total flexibility of mechanical interlock between all available sizes, while the Emax series offers three-breakers special mechanical interlocks that allow to apply the breakers in all scenarios involving three independent power supplies or two power supplies with a bus tie.

The electrical accessories are available to be used at the main supply voltages; special digital contacts of status are also available ensuring integration with any programmable logic controller.

In addition, the availability of a range of electronic automatic transfer switch controllers ATS021-ATS022 offers a complete system to manage even complex switching logic.



# ABB solutions for Generator Set ATS components (Automatic Transfer Switch)

## Motor protection and starting solutions

Manual Motor Starters (MMS) are protection devices for the main circuit. They combine motor control and protection in a single device.

MMS are used mainly to switch motors manually ON/OFF and protect them and the installation fuse less against short-circuit, overload and phase failures. Fuse less protection with a manual motor starter saves costs, space and ensures a quick reaction under short-circuit condition, by switching off the motor within milliseconds.

The ABB Manual Motor Starter covers a range up to 100 A for motors protection up to 45 kW / 400 V.

## Three and four poles contactors

ABB three and four poles contactors fully satisfy the specific usage requirements of generator sets, thanks to their technical performances and specifications, including high rated currents, high permissible operating voltages, long electrical and mechanical life, compact dimensions coordinated between the various devices.

In particular, electronic coils (standard supply for the AF three poles range) can be used for these applications too, in all cases where the auxiliary voltage is not very stable.

The range includes:

- AF series three poles contactors from 9A to 2050A (AC1, 40°C), with electronic interface coil
- A and AF series four poles contactors up to 125A (AC1, 40°C)
- EK series four poles contactors from 110A to 1000A (AC1, 40°C)

ABB offers a range of installation contactors up to 63A for DIN Rail enclosures.

## Arc Guard System™

Arc Guard System™ - Arc monitor type TVOC-2 is ABB's state-of-the-art solution for arc fault protection in all applications, providing functional safety. Arc Guard System™ quickly detects an arc fault and trip the incoming circuit-breaker. Using light as the main condition, Arc Guard System™ trips instantaneously. Thanks to this key functional advantage, it overrides all other protections and delays, which is crucial when reaction times need to be measured in milliseconds.

## Residual current devices

ABB range of modular and front panel residual current devices includes F200 RCCB, DS200 RCBO and RD residual current relays. Specific versions AP-R ensure maximum service continuity preventing unwanted trippings. For complete protection, DS200 RCBO range ensures both line and earth leakage protection in most reduced overall dimensions.

## Measuring instruments and current transformers

System pro *M* compact® offer of measurement devices and accessories ranges from analogue single function instruments for direct insertion to digital multifunction devices for complete system monitoring and remote management.



### Components for change-over panels

All the automatic network-generator set change-over functions can be provided by ABB products which, depending upon the chosen plant engineering philosophy, may be as following.

#### Manual, motorized and automatic transfer switches

Manual OTC, motorized OTM\_C and automatic transfer switches OTM\_C\_D, the smallest currently offered on the market, are tested according to IEC 60947-3 and IEC 60947-6, guaranteeing correct operation both in normal conditions and in emergencies.

In fact, they are particularly suitable for applications with generator sets, since they guarantee an effective and rapid switchover from network power supply to the generator set when there is a network voltage drop and they feature various integrated safety criteria.

The three fixed-position change-over switches that characterizes the mechanism, for example, ensures that the two different power supplies always remain isolated; additionally, in the motorized versions, the electric control circuit offers further safety: if the motor receives two commands simultaneously, the OFF command always takes priority.

Furthermore, for all cases in which the auxiliary voltage is not particularly stable, ABB suggests an electronic coil (standard supply for the AF three poles series) which permits wide margins for control, guaranteeing closing of the contact even in the most critical conditions. A very large variety of accessories that can solve even the needs of particularly advanced applications complete the range.

The range includes:

- OTC series manual change-over switches from 16A to 2500A, tested for operation with a high number of operations, with safe and separate opening of contacts in all possible positions.
- OTM\_C series motorized change-over switches from 40A to 2500A, interlocked to prevent simultaneous connections, tested in compliance with the IEC60947-6 standard categories AC31 and AC33.
- OTM\_C\_D series automatic transfer switches from 160A to 1600A, providing intelligent and fully automatic solution for GenSet manufacturers and OEMs who want improved user-friendliness.



# ABB solutions for Generator Set ATS components (Automatic Transfer Switch)

## Automatic Transfer Switch (A.T.S.) control electronics

These switching devices can be managed and controlled by PLC, in the most complex cases, or by special electronic devices. ABB can supply the necessary PLC devices, available in the AC500 serie, or the ATS family automatic transfer switchover devices, specially designed to function perfectly with both ABB moulded-case circuit breakers (with stored power or direct action motor operation) and with ABB air circuit breakers, thus guaranteeing availability of a complete and coordinated system.

ATS devices are able to check the supply characteristics of the normal power line and, if anomalies are found, send start/stop commands to the generator and control the two circuit breakers by means of an interlock system.

## Electronic products and relays (EPR)

The versatile range of electronic products and relays offers a maximum of security, economic efficiency and capacity. The range covers products from analog signal converter up to measuring and monitoring relays and time relays.

### Timer

Electronic time relays are specially adapted mechanical or solid state relays. They include a solid state or mechanical relay as well as an electronic timing circuit. Multiple switching contacts are available: 1 c/o (SPDT) or 2 c/o (SPDT), as well as a large selection of timing functions, time delay ranges and adjustment options.

### Insulation monitor for IT system

The high reliability of an IT system is guaranteed thanks to continuous insulation monitoring. This prevents operational interruption caused by a second, more severe insulation fault. ABB offers a range of insulation monitors for AC, DC or mixed AC/DC IT Systems up to 690V AC or 1000V DC.

### Motor protection

The thermistor motor protection relays are used to control motors equipped with PTC temperature sensors. Depending on the products also ATEX approvals for use in hazardous areas are available. ABB also offers PTC temperature sensors C011 (according to DIN 44081) which are suitable for embedding in motor windings.

### Voltage and current monitor

Single and three phase voltage and single phase current monitors protect sensitive equipment and control systems against undervoltage (brownout) or undercurrent events or overvoltage or overcurrent events. Different units with adjustable or fixed threshold values (trip points) are available.

### Interface relays

ABB offers a wide range of pluggable interface relays, boxed interface relays and optocouplers.

The ABB EPR family also includes power supplies, logic relays, safety relays analog and data signal converter.



# ABB solutions for Generator Set Paralleling switchgears

Some critical applications require multiple generators to be paralleled, in order to increase reliability, flexibility and cost saving in critical load management. Paralleling switchgears are able to control and protect paralleled generators providing redundancy.

## Air, moulded-case and miniature circuit breakers to protect generators

ABB can offer an extremely wide range of air (Emax), moulded-case (Tmax), modular (System proM compact) circuit breakers suitable to satisfy every possible plant engineering need.

Emax and Tmax circuit breakers are available in versions compliant with IEC and UL standards, and are characterised, in particular, by modularity and compactness with regard to the size/performance ratio. They may be fitted with protections suited to generators, motors and transformers. In particular, Tmax circuit breakers can be fitted with protections that are not just suitable, but also specific for generators (for example Ekip-G-LS/I releases). Currently Emax and Tmax are the only circuit breakers in the world that offer wireless communication, using Bluetooth technology, to permit configuration and diagnosis from a PC or a palmtop. In particular, the equipment listed below can be used for applications on board generator sets:

- Emax air circuit breakers in five sizes for alternating current, with rated uninterrupted currents  $I_u$  from 400A to 6300A and rated ultimate short-circuit breaking capacity  $I_{cu}$  up to 150kA (380/415V AC)
- Tmax moulded-case circuit breakers in eight sizes for alternating current, with rated uninterrupted currents  $I_u$  from 1A to 3200A and rated ultimate short-circuit breaking capacity  $I_{cu}$  up to 200kA (380/415V AC)
- system pro M compact® miniature circuit breakers: the full range includes various series of circuit breakers with rated currents from 0,5A to 125A and breaking capacity from 4,5kA to 50kA, to protect installations against overload and shortcircuit, warranting reliability and safety for operations.

- Three series - S 200, S 200 M and S 200 P - with three different breaking capacities up to 25 kA are available, in all characteristics (B, C, D, K and Z) and configurations (1P, 1P+N, 2P, 3P, 3P+N and 4P), in all the sizes up to 63 A. All minitature circuit breakers are compliant with IEC/EN 60898 and IEC/EN 60947-2 Standards. The range includes also the S 200 U and S 200 UP in accordance to UL 489/CSAC22.2 N 05 Standard.

The globally manufactured MCBs could be equipped with different accessories and are available with the requested certifications.

It is also available the integrated auxiliary contact on the bottom side which permits to save 50% space.

S 200 series devices obtained different marks and approvals, so they can be installed in all world's markets.

## Residual current devices

ABB range of modular and front panel residual current devices includes F200 RCCB, DS200 RCBO and RD residual current relays. Specific versions AP-R ensure maximum service continuity preventing unwanted trippings. For complete protection, DS200 RCBO range ensures both line and earth leakage protection in most reduced overall dimensions.

## Measuring instruments and current transformers

System pro M compact® offer of measurement devices and accessories ranges from analogue single function instruments for direct insertion to digital multifunction devices for complete system monitoring and remote management.



# Products for UPS

HMI (on front)

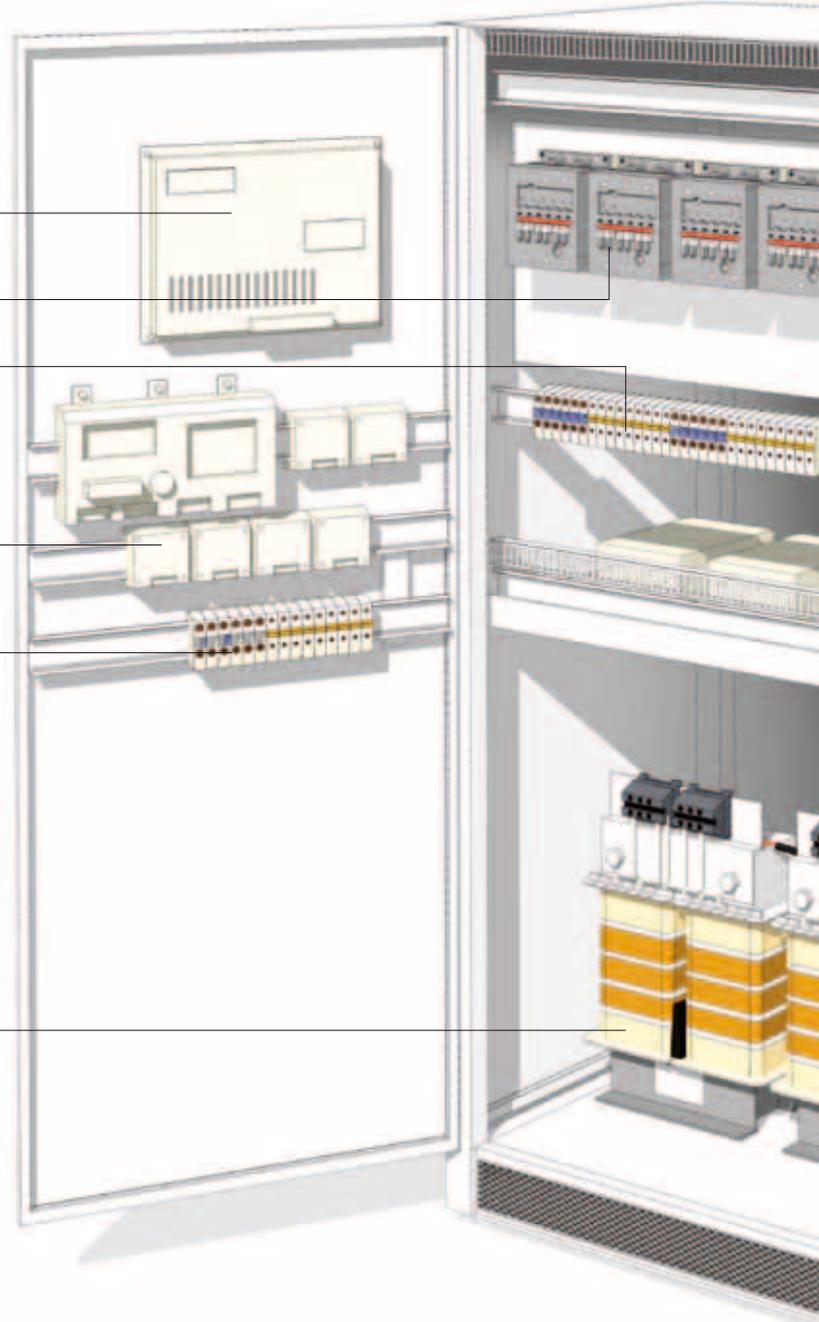
Contactors

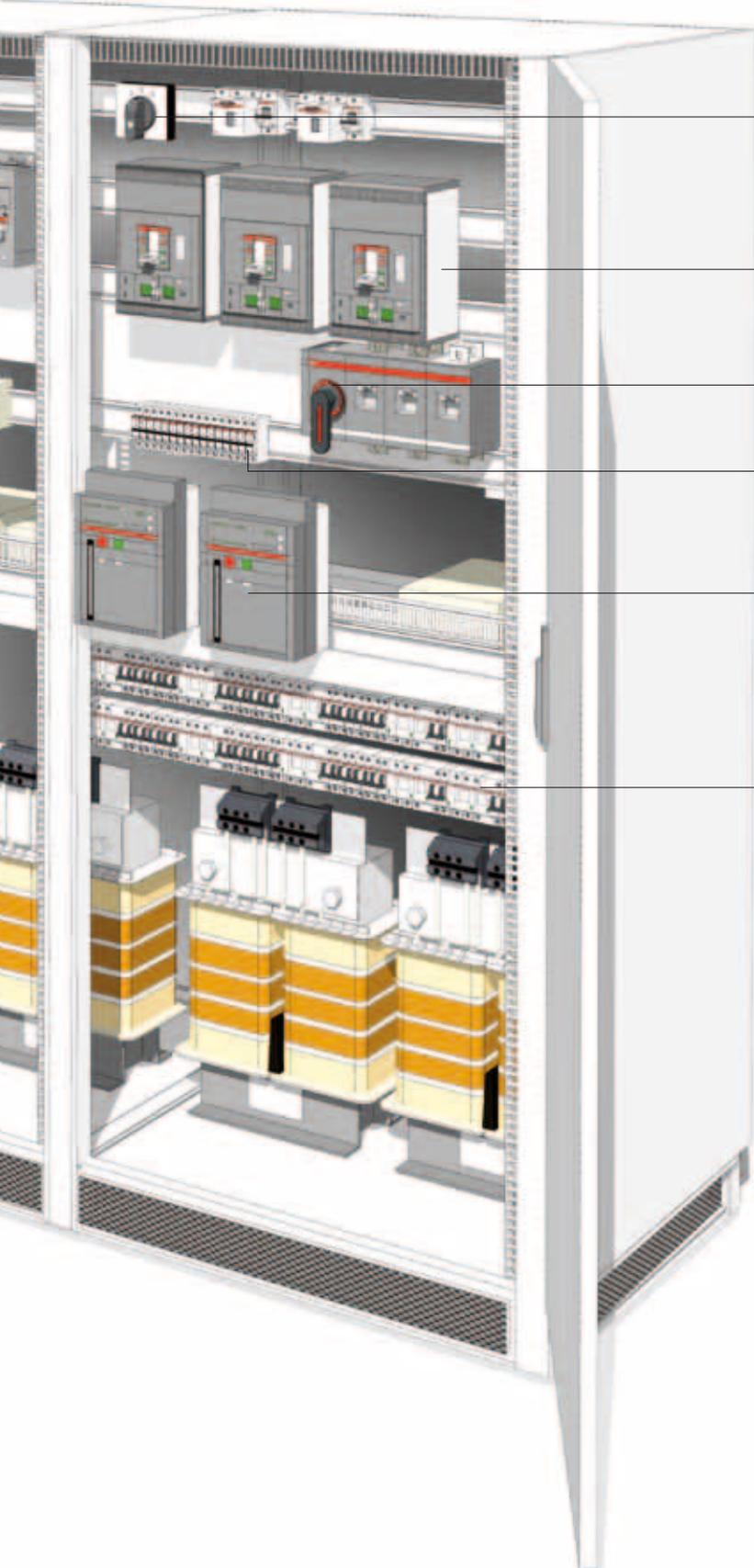
MCBs

Pilot Devices (on front)

Terminal Blocks

Insulation transformers





Cam Switch

Bypass Breakers

Switches

Fuseholders

Input Breaker

Mini contactor/relay

# ABB solutions for UPS (Uninterruptible Power Supply)

UPS provides a reliable instant backup power in the event the primary power source is temporarily lost. The choice of suitable UPS must consider different aspects such as configuration and load type and requirements, ensuring reliability and productivity while saving costs.

## Air, moulded-case and miniature circuit breakers

Of the wide range of ABB circuit breakers previously mentioned, the following devices are designed for DC application and can be used for UPS application:

- Emax air circuit breakers for direct current, with rated uninterrupted currents  $I_u$  from 800A to 5000A and rated ultimate short-circuit breaking capacity  $I_{cu}$  up to 100kA (500V DC); currently the only circuit breakers in the world to offer integrated electronic short-circuit releases, offering a wide range of protections, adjustments and measurements
  - Tmax moulded-case and Emax air circuit breakers for direct current applications up to 1000V, for 250A to 800A
  - Miniature circuit breakers for direct current, with rated  $I_n$  currents of up to 125A and breaking capacity  $I_{cu}$  of up to 30kA.
  - System pro *M* compact® miniature circuit breakers: the full range includes various series of circuit breakers with rated currents from 0,5A to 125A and breaking capacity from 4,5kA to 50kA, to protect installations against overload and shortcircuit, warranting reliability and safety for operations.
- Three series - S 200, S 200 M and S 200 P - with three different breaking capacities up to 25 kA are available, in all characteristics (B, C, D, K and Z) and configurations (1P, 1P+N, 2P, 3P, 3P+N and 4P), in all the sizes up to 63 A. All minitature circuit breakers are compliant with IEC/EN 60898 and IEC/EN 60947-2 Standards. The range includes also the S 200 U and S 200 UP in accordance to UL 489/CSAC22.2 N 05 Standard. The globally manufactured MCBs could be equipped with different accessories and are available with the requested certifications. It is also available the integrated auxiliary contact on the bottom side which permits to save 50% space. S 200 series devices obtained different marks and approvals, so they can be installed in all world's markets.



### Three and four poles contactors

All ABB three and four poles contactors are suitable for direct current applications and, therefore, fully satisfy the specific requirements for use with UPS.

In particular, electronic coils (standard supply for the AF three poles range) can be used for these applications too, in all cases where the auxiliary voltage is not very stable.

The range includes:

- AF series three poles contactors from 9A to 2050A (AC1, 40°C), with electronic interface coil
- A and AF series four poles contactors up to 125A (AC1, 40°C)
- EK series four poles contactors from 110A to 1000A (AC1, 40°C)



### Arc Guard System™

Arc Guard System™ - Arc monitor type TVOC-2 is ABB's state-of-the-art solution for arc fault protection in all applications, providing functional safety. Arc Guard System™ quickly detects an arc fault and trip the incoming circuit-breaker. Using light as the main condition, Arc Guard System™ trips instantaneously. Thanks to this key functional advantage, it overrides all other protections and delays, which is crucial when reaction times need to be measured in milliseconds.

### Remote Switching Unit for all MCB's

ABB MCBs up to 125A are known for its outstanding high breaking capacity up to 50kA and voltages up to 690V AC/1200V DC. A small and comfortable top or side mounted Remote Switching Unit with low stand-by current characteristics is able to operate in a fast and reliable way to provide a continuous power supply.



# ABB solutions for UPS (Uninterruptible Power Supply)

## Switch-disconnectors

The technological and functional characteristics of the switch-disconnectors offered by ABB make these devices the highest quality isolation products currently available at world level.

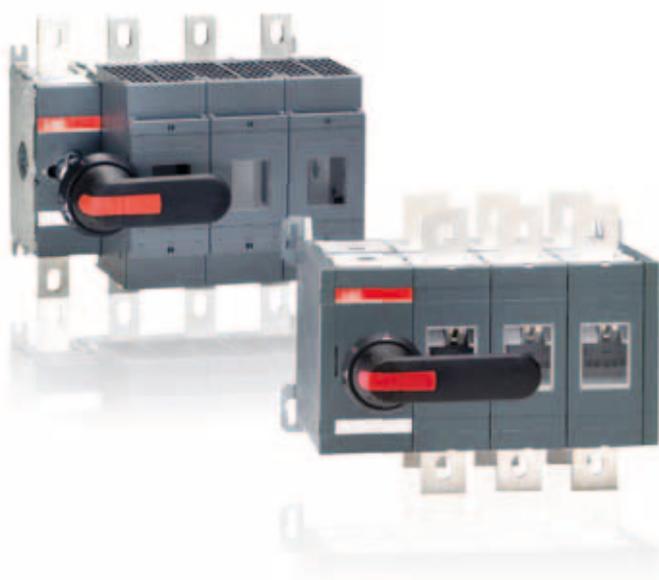
Use of a new kind of double rotary contact has made it possible to make the isolators considerably more compact (up to 50% smaller than other products on the market) thus saving space and plant costs, while maintaining absolutely excellent performances both for alternating and direct currents (AC20...23, DC 20...23). In particular, they maintain the same level of thermal current both in the air (Ith) and enclosed (Ithe) versions without any need to increase the size of the switchboard for ventilation.

Easy to install, they can be placed in any position, whether vertical or horizontal and even on the ceiling without risk of downgrading of any kind; they offer an IP3X protection class and feature terminals protected by special guards. Safety is guaranteed both by clear visibility of the contacts through the front windows, and by the handle which always indicates the exact position of the contacts themselves (ON/OFF, 0/1).

ABB switch-disconnectors are certified by all the most important national and international bodies (including UL in North America) and are on sale all over the world.

The range includes:

- OT switch-disconnectors, from 16A to 2500A
- OS switch fuses, from 16A to 1250A
- OT\_CL manual closed transition change-over switches from 160A to 2500A, with space saving double-stack design. They are used in manual by-pass circuit as an output/by-pass switch
- OM/ON/OL series of configurable cam switches from 10A to 315A are used to build manual by-pass circuits



## Surge Protective Devices (SPDs)

Several models of SPDs are available in Type 1 with Iimp from 7 to 25kA and in Type 2 with I<sub>max</sub> from 15 to 120kA.

Both in single block version and with pluggable cartridges, each model offers the maximum protection to ensure the right protection level to the equipment along the power distribution line. The versions with pluggable cartridges make it possible to replace only the cartridge at the end of its life cycle and, like the single-block versions, may be equipped for remote signalling. ABB has also developed a new generation of Surge Protective Devices to conform to the new UL 1449 3rd Edition standard. Built in a Nema 12 enclosure, the OVR NE12 is suitable for all network voltage configurations, Split phase, Wye and Delta network up to 480V AC with surge capacity from 160kA to 320kA per phase. Suitable for use in service entrance locations in all types of applications, the OVR NE12 series provides protection against all kind of surges. Using fast acting varistors (MOVs) technology and EMI/RFI noise attenuation filter, they limit overvoltages to values compatible with your sensitive equipment connected to the network.

The OVR NE12 series offer 6 standard versions with a front display for diagnostics and an audible alarm and 6 premium versions that include a surge counter. Combined with the OVR T2 range, the OVR NE12 series offers complete protection against surges and lightning strikes.



### Harmonic filter systems

The ABB PQF (Power Quality Filter) is an active filter that can eliminate harmonics from the network power supply, in controlled conditions, monitoring the supply current in real time and injecting harmonic currents with phases opposite to those to be filtered. They are available in four versions described below.

- PQFI: three-phase three-wire filter for medium/high industrial loads, available in two voltage ranges:
  - from 208V to 480V, 50/60 Hz, with 250A and 450A modules
  - from 480V to 690V, 50/60 Hz, with 180A and 320A modules.
- PQFM: three-phase filter for medium/low loads, available in two voltage ranges:
  - from 208V to 480V, 50/60 Hz, with 70A, 100A, 130A and 150A modules
  - from 480V to 690V, 50/60 Hz, with 100A modules.

PQFK: three-phase four-wire filter for electric power supplies with high harmonic distortions, ideal for electric loads at commercial businesses with high neutral currents. Available for voltage ranges from 208V to 415V, 50/60Hz, with 70A and 100A modules.

PQFS: compact three-phase three or four-wire filter that permits elimination of the neutral current caused by unbalanced loads connected between phase and neutral. Balancing of the power line current between phases and between phase and neutral (the only one in the world offering this feature).

Available for two voltage ranges from 208V to 240V and from 380V to 415V, both 50/60 Hz with 30A to 100A modules, up to max 4 modules.



# ABB solutions for UPS (Uninterruptible Power Supply)

## Other components for UPS

### Current sensors

ABB produces a wide range of current and voltage sensors for applications in industry and on railways. ES100, ES300 and ES500 series sensors for direct and alternating current in particular are available for application on UPS, and are suited for rated primary currents from 100A to 500A.

### IGBT (Insulated Gate Bipolar Transistor)

IGBT components are part of the range of semiconductors offered by ABB for applications in which currents and voltages reach medium/high levels (currents from 300A to 4500A, voltages from 1200V to 8500V), suited for use in numerous kinds of equipment in industry, in electrical traction and in the power industry.

### Residual current devices

Full protection of three phase UPS without double insulated transformers is ensured by ABB B Type F200 and DDA200 RCDs, which, in addition to standard AC fault current protection, can detect DC earth faults on AC network.

### Network Analyzers

ANR network analyzers, in addition to measurement of all electrical parameters, display network wave shape, THD and single harmonics intensity. Thanks to multiple communication interfaces, ANR data can be managed remotely for complete control of installation.

### Autoreclosing and motor operating devices

Motor operating devices ensure full remote control of miniature circuit breakers S200 and residual current circuit breakers F200. Autoreclosing units furthermore allow automatic switching-on of F200 residual current circuit breakers in case of unwanted tripping.

### Electricity Meters

The DIN rail mounted electricity meters are available in several models: ODINsingle and the brand new A41 and A42 for single phase metering, ODIN and the brand new A43 and A44 for three phase metering.

The meters are designed for use in sub-metering and are available in various configurations to suite many applications.

# Other ABB products



Plastic and metal trunking systems



Insulating enclosures and installation material



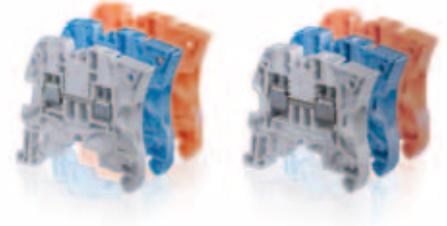
Distribution switchgear



Enclosures for Automation



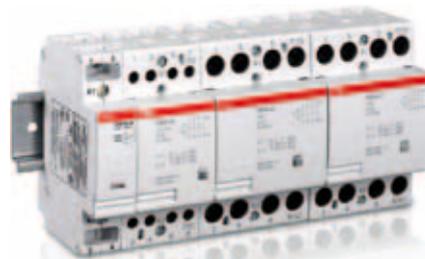
Pilot Devices



Terminal blocks



Rotary cam switches  
Enclosed cam switches



Installation contactors

# Contact us

[www.abb.com](http://www.abb.com)

[www.abb.com/lowvoltage](http://www.abb.com/lowvoltage)

[www.abb.com/motors&generators](http://www.abb.com/motors&generators)

The data and illustrations are not binding. We reserve the right to modify the contents of this document on the basis of technical development of the products, without prior notice.

Copyright 2011 ABB. All rights reserved.

1SDC007250E0203 - 11/2011 - 1.000