START

DATA CENTER SOLUTION GUIDE

ENGINEERED
TO OUTRUN

PREVIOUS NEXT

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02. Power Distribution

03. Critical Power

04. Digital Solutions

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INTRODUCTION

AS AI RESHAPES OUR DIGITAL WORLD...ABB HELPS DATA CENTERS OUTRUN

ABB provides electrification and automation solutions to help customers design, build, and run data centers that are more reliable, efficient and scalable.

We partner with our customers to provide a winning combination of innovative solutions and operational excellence. We deliver advanced technologies and custom-engineered solutions to meet aggressive timelines, with the scale to ensure business continuity under the most demanding conditions. Quality, safety and sustainability are built into everything we do.

Working together to deliver the world's advanced data centers.

1 in 4
Data centers run on ABB technology.

Global solutions, engineered locally

Our local support teams and global footprint mean we respond and support quickly.

Investing in portfolio & production to support next-gen data centers

40% of our scientific research is in areas critical to next-gen data centers.

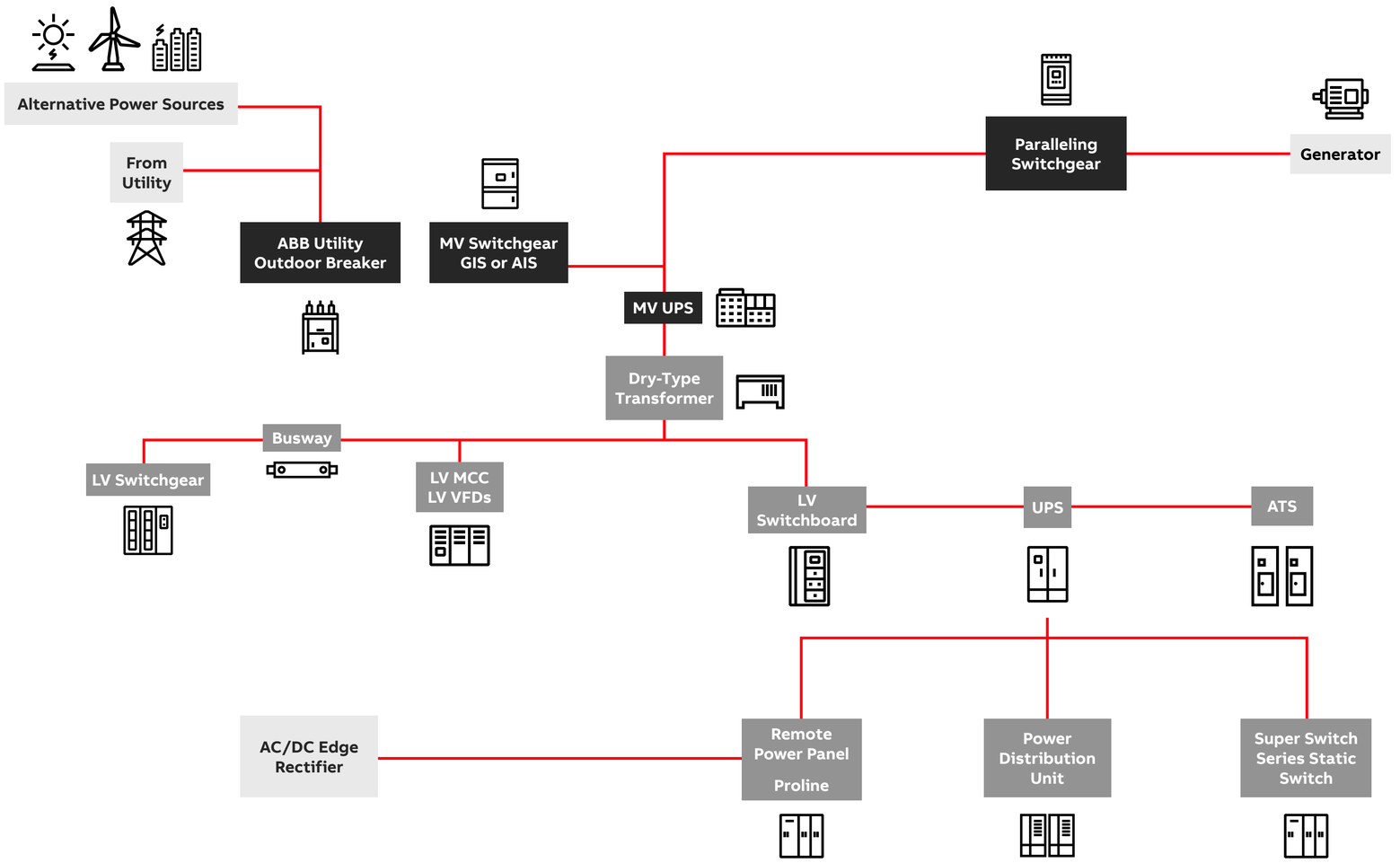
ONE-LINE APPROACH

MEDIUM VOLTAGE

(1KV-38kV)

LOW VOLTAGE

(120V-1kV)



FROM THE SOURCE TO THE RACK

PREVIOUS NEXT

LV POWER DISTRIBUTION
- LV Switchgear
- Busway
- Arc Flash Protection
- LV MCC
- LV Switchboards
- Remote Power Panels (RPP)
- LV Vacuum Circuit Breaker

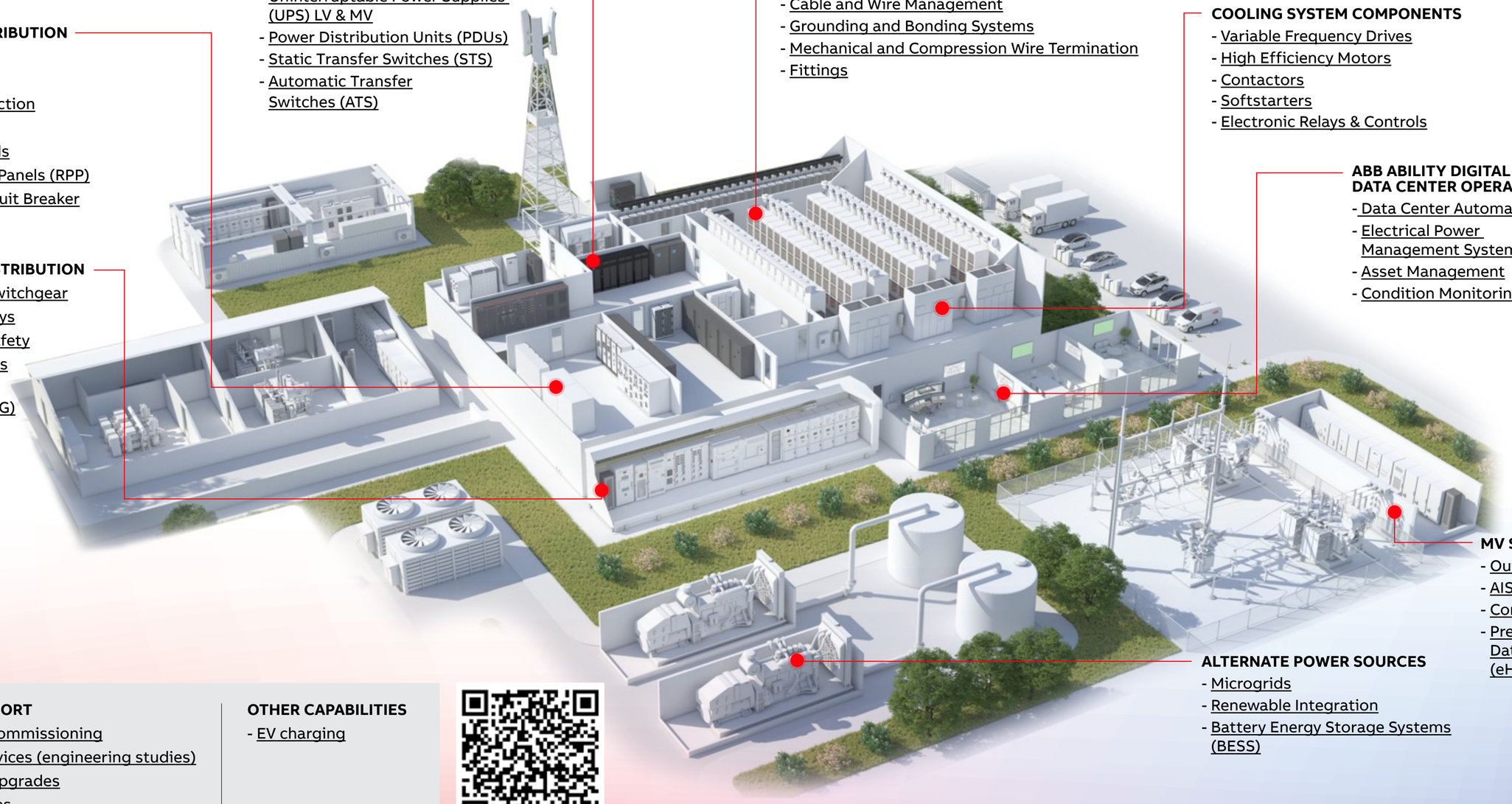
MV PRIMARY & SECONDARY DISTRIBUTION
- AIS & GIS MV Switchgear
- Protection Relays
- Protection & Safety
- Control Systems
- Paralleling Switchgear (PSG)
- MV Vacuum Circuit Breaker
- eHouse & PDC

CRITICAL POWER
- Uninterruptable Power Supplies (UPS) LV & MV
- Power Distribution Units (PDUs)
- Static Transfer Switches (STS)
- Automatic Transfer Switches (ATS)

INSTALLATION PRODUCTS
- Cable and Wire Management
- Grounding and Bonding Systems
- Mechanical and Compression Wire Termination
- Fittings

COOLING SYSTEM COMPONENTS
- Variable Frequency Drives
- High Efficiency Motors
- Contactors
- Softstarters
- Electronic Relays & Controls

ABB ABILITY DIGITAL DATA CENTER OPERATIONS
- Data Center Automation
- Electrical Power Management System
- Asset Management
- Condition Monitoring



MV SUBSTATIONS
- Outdoor Breakers
- AIS & GIS Switchgear
- Control Systems
- Prefabricated Modular Data Center Solutions (eHouses & skids)

ALTERNATE POWER SOURCES
- Microgrids
- Renewable Integration
- Battery Energy Storage Systems (BESS)

SERVICE & SUPPORT
- Installation & commissioning
- Consulting services (engineering studies)
- Retrofits and upgrades
- Digital upgrades

OTHER CAPABILITIES
- EV charging



PREVIOUS NEXT

POWER DISTRIBUTION

MEDIUM VOLTAGE SWITCHGEAR

Air-Insulated ANSI Switchgear

SAFETY BY DESIGN

- Rated for 5, 15 and 34.5 kV
- Galvanized steel construction with hem bending techniques on door for durability
- Modular one-high or two-high construction

RELIABILITY

- High reliability with withdrawable vacuum circuit breakers and mechanical interlocks
- Globally recognized circuit breaker technology with ADVAC® spring charged and AMVAC™ magnetically actuated vacuum circuit breakers

DIGITAL AND PREDICTIVE MAINTENANCE

- Available as Digital Switchgear with current and voltage sensors
- Integral temperature and humidity sensors

LEARN MORE ABOUT AIR-INSULATED ANSI SWITCHGEAR



ADVANCE®
NON-ARC-RESISTANT

Metal-clad switchgear rated for 5, 15 and 27 kV



SAFEGEAR®
ARC-RESISTANT

Metal-clad switchgear rated for 15 kV with options for 50 kA and 63 kA

Bolted frame construction for the highest level of arc-flash protection



POWER DISTRIBUTION

MEDIUM VOLTAGE SWITCHGEAR

Primary and Secondary Gas-insulated Switchgear (Ring Main Unit)

ZX PRIMARY GAS-INSULATED SWITCHGEAR for applications up to 40.5 kV/3150 A/40 kA

SAFEPLUS SECONDARY GAS-INSULATED SWITCHGEAR rated for 38 kV/600 A/25 kA

SAFETY BY DESIGN

- Minimized footprint, compact design
- Maintenance-free
- Completely sealed system with metal-enclosed design
- Arc-resistant and non-arc resistant available
- Auto-reclosing capability

LEARN MORE ABOUT GAS INSULATED ANSI SWITCHGEAR

EMBEDDED TECHNOLOGIES TO DRIVE OPERATIONAL EFFICIENCY

Medium voltage circuit breaker and relay protection

ADVAC®
SPRING CHARGED

- Largest installed base worldwide
- Ease of maintenance with one screw removal on motor, with coil pack
- **35% fewer moving parts** compared to other spring charged circuit breakers

LEARN MORE ABOUT ADVAC®



AMVAC™ MAGNETICALLY ACTUATED

- No maintenance required
- Controlled pulse to coils reduces coil burn-up failure
- Only one moving part, no springs utilized
- Lowest cost of ownership with standard **5-year warranty**

LEARN MORE ABOUT AMVAC™



OUTDOOR CIRCUIT BREAKERS

R-MAG® Outdoor Magnetically Actuated Circuit Breaker

EASE OF MAINTENANCE - only one moving part and no maintenance needed in magnetic actuator. Plug-and-play design of ED2.0 electronic control board for rapid replacement in field.

SAFER - provides protection against internal arc faults in all sides and with LV door open, Type 2B protection rating.

FLEXIBLE DESIGN - control and mechanical designs ready to be customized and meet most complex specifications. Available with NEMA 3R and NEMA 4 housing.

5-YEAR WARRANTY

LEARN MORE ABOUT R-MAG® OUTDOOR MAGNETICALLY ACTUATED CIRCUIT BREAKER



OUTDOOR CIRCUIT BREAKERS

Elastimold™ Solid Dielectric Switchgear

SAFE - Dead-front construction with clear visual verification of circuit isolation.

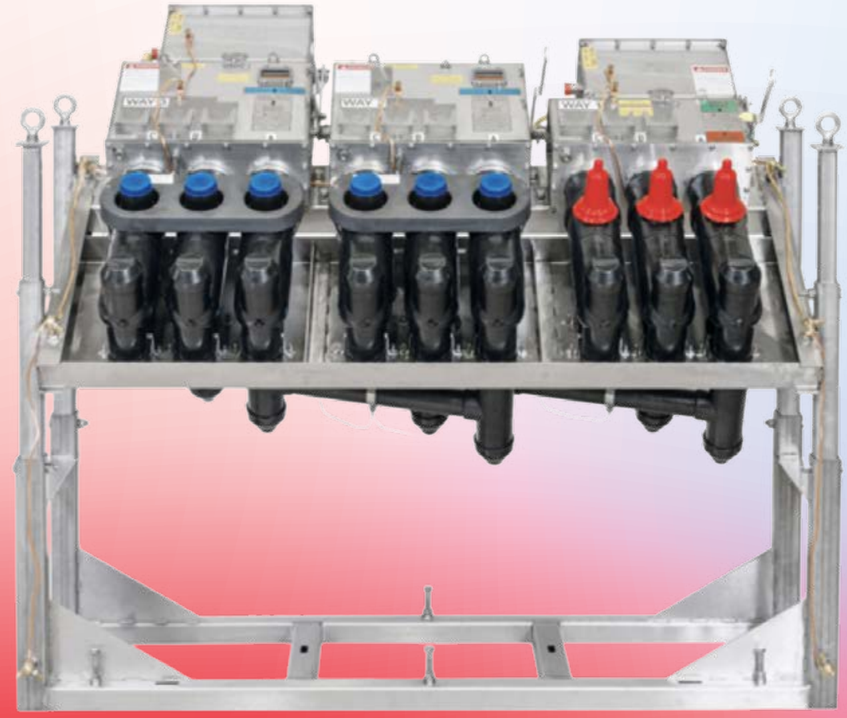
RELIABLE - Uses a proprietary EPDM rubber formulation, on a solid-dielectric platform.

EASE OF MAINTENANCE - Silicone diaphragm and air as an insulating medium. Contains no oil or gas for virtually maintenance-free operation.

FLEXIBLE - Rated for use with 15–29.3 kV, 630 A, 20 kA electrical distribution systems. Rugged and submersible for multiway pad-mount or vault applications.

*Tru-Break switchgear module is considered maintenance-free because it contains no oil or gas to monitor or maintain.

LEARN MORE ABOUT ELASTIMOLD™

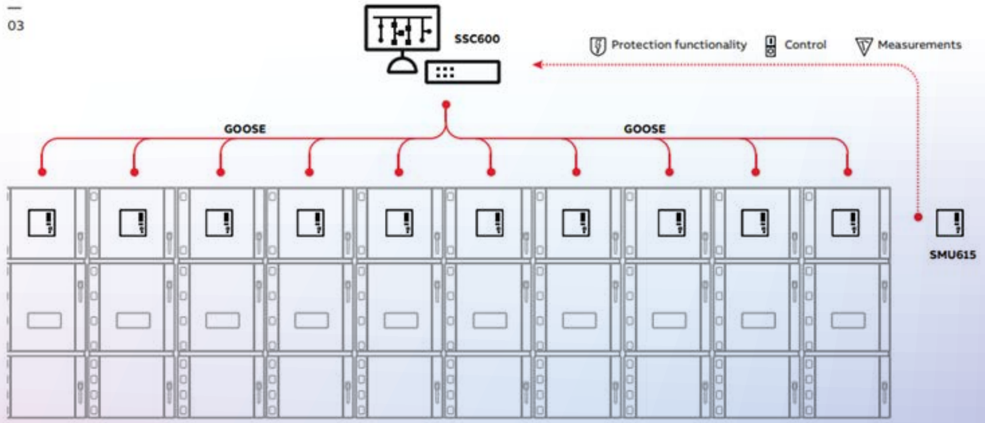


RELION® PROTECTION AND CONTROL RELAYS

The Relion® family offers the widest range of products for protection, control, measurement and supervision of power systems for IEC and ANSI applications – from generation and interconnected grids over primary distribution to secondary distribution kiosks.

- Feeder protection
- Transformer protection
- Motor protection
- Generator protection
- Voltage protection
- Capacitor bank protection
- Busbar protection
- Arc fault protection





LEARN MORE ABOUT RELION® PROTECTION AND CONTROL

CURRENT LIMITERS AND RECLOSERS

I_s-Limiter™ and GridShield®

I_s-LIMITER™

The I_s-Limiter™ is a short-circuit current limiting device that can switch off a short-circuit current before the first current's peak is reached.

- Clears grid faults fast to keep power flowing
- Automatically restores service after temporary disturbances
- Isolates only the problem area to product redundant feeds
- Reduces stress on UPS systems and generators



LEARN MORE ABOUT I_s-LIMITER™

GridShield®

GridShield® recloser makes the utility side of the power system behave more predictably and reliably for maximum uptime.

- Rapidly clears and restores power from upstream grid faults
- Maintains data center uptime by isolating only faulted sections
- Supports redundant utility feeds and automated MV switching
- Minimizes UPS discharge and generator start events



LEARN MORE ABOUT GRIDSHIELD®

LOW-VOLTAGE POWER DISTRIBUTION

ReliaGear® SB Switchboard

- Optimized footprint with multi-stack feeders and 4-high configurations
- Industry-leading circuit breaker technology with SACE® Emax 3 and SACE® Tmax® XT
- Available up to 6,000 A and 600 VAC
- Embedded technologies including embedded automatic throwover schemes, and metering functionality
- Flexibility with plug-in group mounted sections, such as circuit breakers, to be installed anywhere on the bus stack

LEARN MORE ABOUT RELIAGEAR® SB SWITCHBOARD



POWER DISTRIBUTION

LOW-VOLTAGE CIRCUIT BREAKERS

SACE® EMAX 3

ADAPTIVE
- Scalable and future proof designs with enhanced communication and daisy-chain capabilities
- Backward compatibility with Emax 2

RELIABLE
- Class 0.5% Certification for Active Power and Energy
- Insight-driven analytics including predictive maintenance, enhanced datalogger, asset health monitoring
- Create and control your distribution system with Custom Logics

SECURE
- First circuit breaker designed and tested to IEC 62443-4-2 security level 2
- Secure storage and third-party verified

SAFE
- Integrated arc flash protection
- Integrated breaker-to-breaker sensing
- Embedded features including remote racking and locking devices



LEARN MORE ABOUT SACE® EMAX 3 AIR CIRCUIT BREAKER

SACE® TMAX® XT



- Series of 7 molded case circuit breaker (MCCB) with protection features up to 1200A
- Various trip unit options - electronic Ekip trip unit allows for adjustability and precision either on display with Ekip touch or via the EPiC Mobile App

LEARN MORE ABOUT SACE® TMAX® XT

LOW-VOLTAGE POWER DISTRIBUTION

ReliaGear® busway

VERSATILE DESIGN - ReliaGear busway dimensions begin at 4.5” x 4.4” for 225-800 ampere ratings, and range up to 4.5” x 29.75” for the highest ratings.

RELIABILITY - Exclusive Blue Coat™ epoxy insulation provides the industry’s longest insulation life of 50+ years, helps reduce risk of failure, and helps enable performance across a wide temperature spectrum.

SECTION ISOLATION - Removable isolation joints allow operators to cleanly and safely remove a section of busway and allow the remaining system to come back on-line. This provides ease of maintenance and modification with minimal facility downtime.

LEARN MORE ABOUT RELIAGEAR® BUSWAY



LIGHTER

Lighter because it replaces the typical heavy wire and conduit used in most applications, making it easier to handle and hang.

SMALLER

Reduces congestion beneath raised floors, optimizing space and resulting in freer air flow.

EASY TO SCALE

Easier to modify due to its flexible modular design; busway runs can be easily added, disassembled and relocated with minimal effort.

PARALLELING SWITCHGEAR (PSG)

Available in both LV and MV systems

MULTIPLE POWER SOURCES CONNECTION - Seamlessly connect various power sources such as BESS, utility feeds, gas turbines, generators and solar.

SYNCHRONIZATION - Before connecting sources, synchronize voltage, frequency, and phase angle - to prevent disruptions.

LOAD SHARING AND CONTROL - intelligently distributes the load among the connected sources based on capacity and predefined settings.

PROTECTION AND ISOLATION - isolate faulty components to help prevent cascading failures.

LEARN MORE ABOUT PARALLELING SWITCHGEAR (PSG)





PREVIOUS NEXT

CRITICAL POWER

CRITICAL POWER



UNINTERRUPTIBLE POWER SUPPLY (UPS)

HiPerGuard Medium Voltage UPS

HIGH POWER - **Scalable power from 2.25 MW to 25MW** in parallel allows load growth with less stranded capacity, minimizing CAPEX.

REDUCED MAINTENANCE - **Up to 10 years** intervals between intrusive maintenance.

HIGH EFFICIENCY - Leading efficiency UPS – **98%** from **50 to 100% loading**.

SPACE SAVINGS - Protecting the entire facility from the outside, reduced cabling, saving valuable whitespace.

ENGINEERED FOR AI WORKLOADS

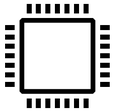
LEARN MORE ABOUT HIPERGUARD MV UPS

HiPerGuard

Powering your Data Center. Bigger, stronger, and more efficient - from grid to chip



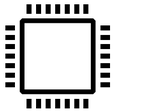
MEDIUM VOLTAGE-LOW VOLTAGE ▶ LOW VOLTAGE DISTRIBUTION ▶ LOW VOLTAGE UPS ▶ WHITESPACE/ IT RACKS



TRADITIONAL LV UPS POWER TRAIN



HIPERGUARD ▶ MEDIUM VOLTAGE-LOW VOLTAGE WITH DISTRIBUTION ▶ WHITESPACE/ IT RACKS



NEXT GENERATION MEDIUM VOLTAGE POWER TRAIN

CRITICAL POWER

UNINTERRUPTIBLE POWER SUPPLY (UPS)

MegaFlex Low Voltage UL UPS

FLEXIBLE, SCALABLE POWER - From 1,000 kW to 1,600 kW based on power block of 337 kW at 415 V and 400 kW at 480 V.

SIMPLE AND SAFE INSTALLATION - Pre-engineered interconnection between power section and power distribution cabinet enables trouble-free installation.

REDUCED FOOTPRINT - Maximized power density in compact, monolithic design with **up to 40% footprint savings** with ultra-high kW per square foot.

RPA™ **RELIABLE, REDUNDANT TECHNOLOGY WITH RPA™**
Redundant Parallel Architecture™ provides complete redundancy of all UPS modules in parallel, eliminating single points of failure.

SUSTAINABLE POWER TECHNOLOGY - Best-in-class efficiency of up to **97%** in double conversion mode and up to **99%** in VFD mode.

LEARN MORE ABOUT MEGAFLEX UL UPS



DESIGN LIFE UP TO 15 YEARS REDUCES COST OF OWNERSHIP

CRITICAL POWER

UNINTERRUPTIBLE POWER SUPPLY (UPS)

MegaFlex DPA Low Voltage UL UPS

MODULAR, SCALABLE POWER - From 1,000 to 2,000 kW, expandable to 2,500 kW at 480V.

UNIVERSAL - 380–480V, 50/60 Hz compatibility for global deployment.

AI-READY DESIGNED - High-density workloads in hyperscale, colocation, and neocloud environments.

MARKET-LEADING ENERGY - Delivers market-leading energy VFI system efficiency up to 97.6%.

XTRA VFI AND SMARTTRACKER™ INTEGRATION
Optimized energy use, predictive maintenance, and reduced CO_2 impact.

FOOTPRINT SAVINGS - **Up to 45% footprint savings** with optimal performance and true front access serviceability.

LEARN MORE ABOUT MEGAFLEX DPA



Footprint savings
45%

Outperforms its competitors up to 2,000 kW frame with VFI system efficiency of up to
97.6%

Design life of up to
15 YEARS
reduces total cost of ownership

CRITICAL POWER



STATIC TRANSFER SWITCH (STS)

Cyberex® SuperSwitch®4

PEAK PERFORMANCE AND RELIABILITY
- ≤1/4 cycle in-phase transfers
- ≤16ms out of phase transfers
-≤1.2x inrush for out of phase transfers

MINIMIZE RISK OF HUMAN ERROR
- On-screen software guided bypass operation
- Dedicated LED indicators to ensure proper bypass sequence

IMPROVED SAFETY AND SERVICEABILITY
- Sectionalized design for safety and ease of serviceability
- Isolation of consumable components allows for easier replacement

COMPREHENSIVE OFFERING
- Covering power range from 100A up to 4000A in 208V through 480V
- Ultra-dense optimized designs for low power applications
- Optimized front access only designs for higher power ratings

LEARN MORE ABOUT CYBEREX® SUPERSWITCH® 4

POWER DISTRIBUTION UNIT (PDU)

TruFit™

OPTIMAL FIT
- Front access only design for better fit into your floor plan
- Installation, operation and maintenance of any serviceable components from front
- Eliminates need for additional side or rear clearances

TRUE AND PROVEN RELIABILITY
- Equipped with ABB's SACE Tmax XT breakers
- True reliability through extreme breaking capacity in compact frames
- Safe and reliable interruption of faults

PREDICTIVE MAINTENANCE
- Optimal integrated thermal monitoring provides advanced visibility of system health
- Proactively identify potential losses at bolted connections
- Simplified communications through centralized native PDU monitoring system

LEARN MORE ABOUT TRUFIT™ PDU



ATS

TruOne™ ATS

ZENITH ZTS T-SERIES AUTOMATIC TRANSFER SWITCH

SIMPLIFY OPERATIONS - All-in-one ATS with the switch and controller in one unit.

EASY TO INSTALL - Reduce installation time by 80% with self-contained design. Simply fix the four mounting screws to the back-panel and done.

SAFETY AND PROTECTION - TruOne enables emergency manual operation - even under load - without opening the panel door when HMI is mounted to the ATS frame.

LEARN MORE ABOUT TRUONE™ ATS



24/7
monitoring

MINIMUM 3
embedded temperature sensors

200-480V
in a single design

UP TO 50%
faster commissioning with Ekip™ Connect

95%
fewer spare parts

<10 MINUTES
mechanism replacement



PREVIOUS NEXT

DIGITAL SOLUTIONS



ELECTRIFY WITH SMARTER DIGITAL TECHNOLOGY

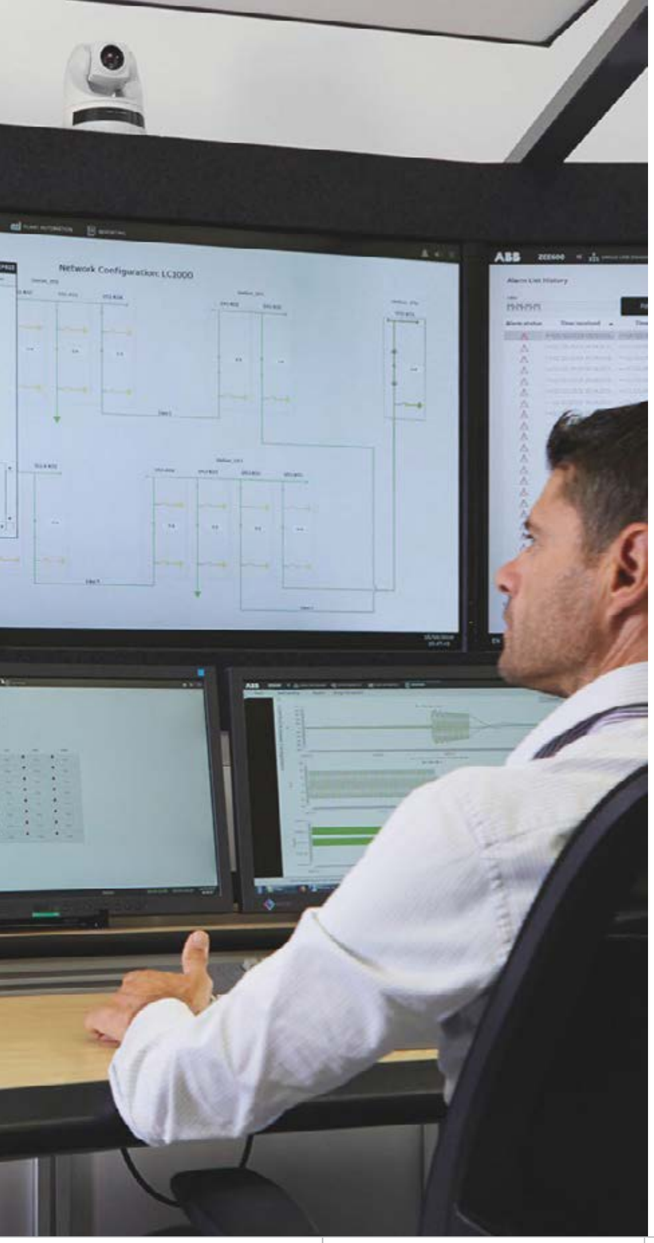
The power to inform with ABB digital solutions:

Optimize energy consumption
Real-time insights and analytics can help reduce inefficiencies and energy waste, saving up to 30% on your energy bill.

Maximize equipment performance
Power quality is essential for preventing damage to your site assets. Identify problems early to prevent unnecessary downtime and costs.

Improve productivity
Easier and smarter product configuration, installation, commissioning and assistance.

LEARN MORE ABOUT DIGITAL SOLUTIONS



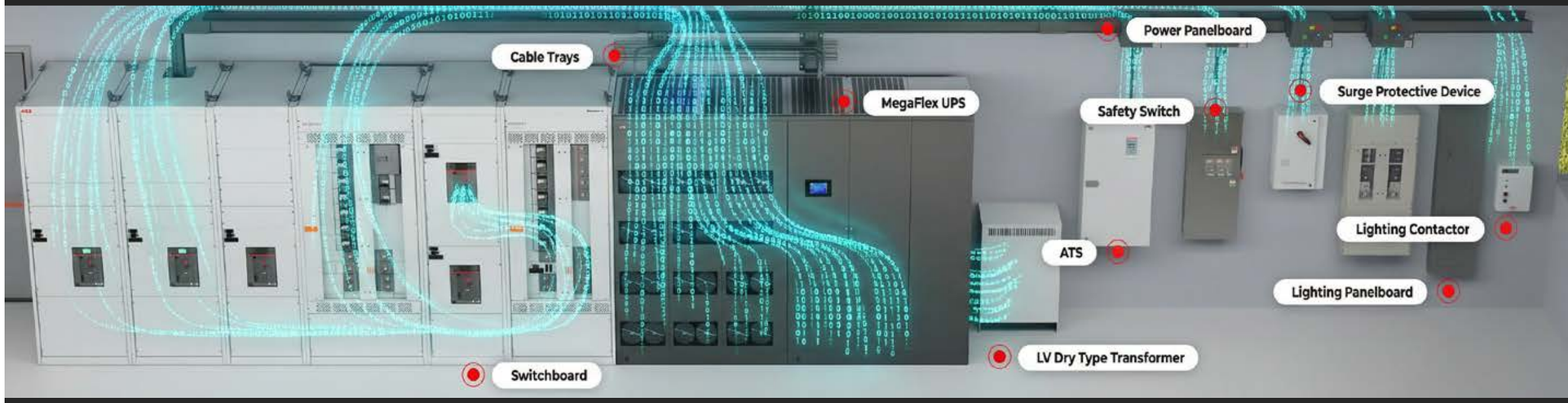
SUBSTATION SCADA AND PMCS SYSTEMS

Smart substations, smarter decisions
Supervisory Control and Data Acquisition (SCADA)

Grid Flexibility and Resiliency
Simple to integrate with many different communication protocols (IEC 61850, Modbus, DNP & Redundancy Communications) and devices available, helping ensure seamless operation.

Maximize Utilization and Uptime
Centralized system. Transform data into knowledge to provide operators with better insights for decision-making. Help prevent failures, identify problems early, and reduce downtime.

Safety
Remote monitoring and control help provide a safer environment by keeping operators away from the equipment.



LEARN MORE ABOUT SCADA AND PMCS SYSTEMS

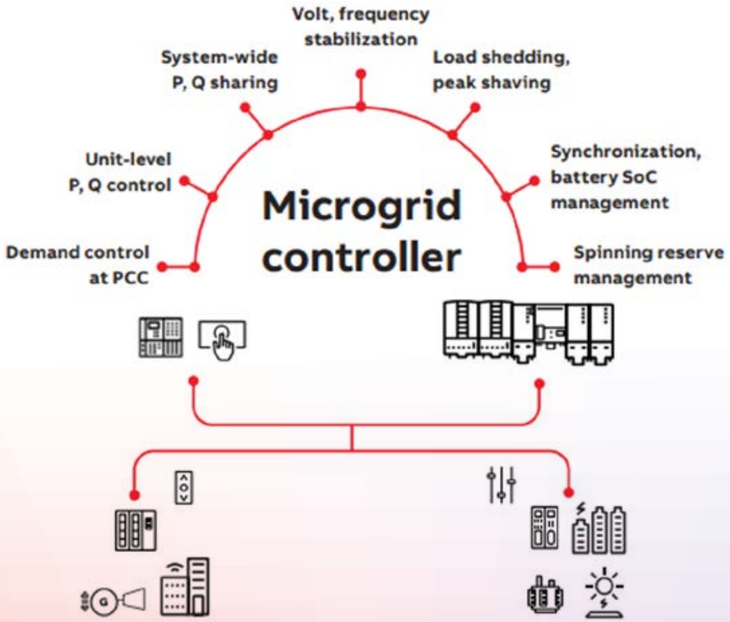
MICROGRID AND BESS CONTROLS

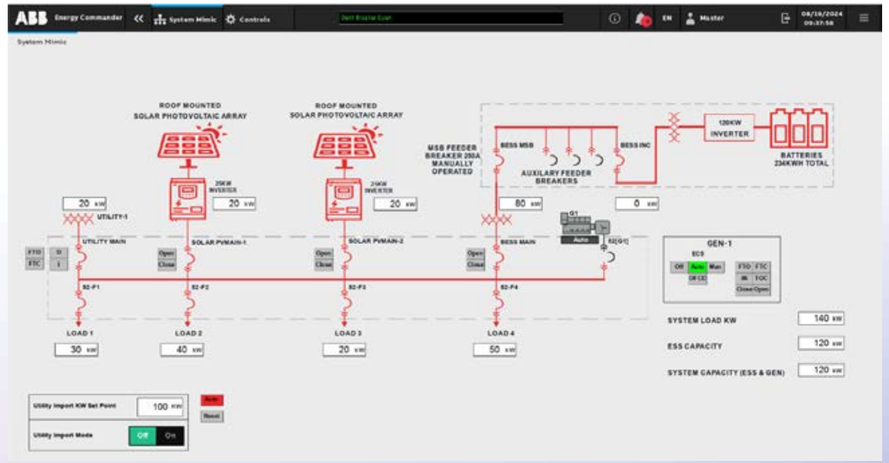
DERs MONITORING AND CONTROL
Allows for real-time monitoring and control of various Distributed Energy Resources (DERs) connected to the system.

ENERGY MANAGEMENT AND OPTIMIZATION
Involves balancing supply and demand, prioritizing renewable energy sources, managing energy storage, and minimizing energy costs.

GRID CONNECTION AND ISLANDING
Ability to operate in two modes; connected to the main grid or in “island mode” (operating independently).

LOAD SHARING AND CONTROL
Ensure optimal utilization of DERs resources, helps prevent overloading, and maintains system stability.





LEARN MORE ABOUT MICROGRID AND BESS CONTROLS



PREVIOUS NEXT

SERVICE

SERVICE SUPPORT

Improving availability, reliability, predictability and sustainability of your assets

HELP ENSURE ROUND-THE-CLOCK RELIABILITY, SAFETY AND SUSTAINABILITY OF CRITICAL ELECTRICAL DISTRIBUTION SYSTEMS.

Stay ahead of the game with tailored care and modernization services from ABB that help tackle potential issues before they become a problem, enhancing reliability, safety and sustainability to keep your data center's electrical distribution systems running and in peak condition.

- Start up and commissioning of new ABB equipment
- Retrofits to keep equipment up-to-date and running
- Digital or predictive maintenance to minimize unplanned downtime
- Advisory onsite services
- Local application engineering

LEARN MORE ABOUT ABB SERVICE





INSTALLATION PRODUCTS

INSTALLATION PRODUCTS

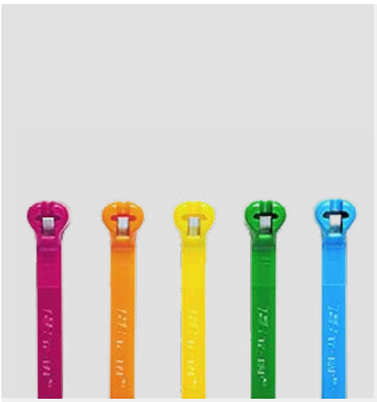
Complete portfolio across applications:
- Flexible cable protection systems
- Rigid conduit and fittings
- Wire and cable management
- Connectivity and grounding

LEARN ABOUT INSTALLATION PRODUCTS



COLOR-KEYED COMPRESSION LUGS

- Color-coded connectors and compression tool dies for easy die selection and proper lug installation
- Modularity/scalability: - Available in both copper and aluminum, one- and two-hole configurations, and 45° and 90° types
- Labor savings and sustainability
- Wide variety of mechanical, battery-powered and electrically powered hydraulic equipment



TY-RAP CABLE TIES

“Grip of Steel”:

- Corrosion resistant, stainless-steel barb provides secure cable locking

Durability and reliability:

- Nylon composition provides structural integrity and proven performance in humidity-controlled environments

Easy installation:

- Specially designed tail with grips facilitates installation even with gloves



T&B LIQUIDTIGHT FITTINGS

Series 5200/5300 Steel - liquidtight fittings
- Steel and malleable iron, zinc chromate-plated
- Insulated and non-insulated versions

Series 5300-HT Steel - high temperature liquidtight fittings
- For in/outdoor extreme temperature installations
- Steel and malleable iron, zinc chromate plated
- Insulated and non-insulated version

Series 5300/9300SST6 Stainless steel 316 - liquidtight fittings
- Insulated version
- NPT and ISO metric threads



SUSTAINABILITY

SUSTAINABILITY IN OUR PRODUCTS AND OPERATIONS

Enable a low-carbon society

ABB EcoSolutions™
Each product's circularity criteria and environmental impact are fully transparent and easily accessible through a QR code.



TARGETS

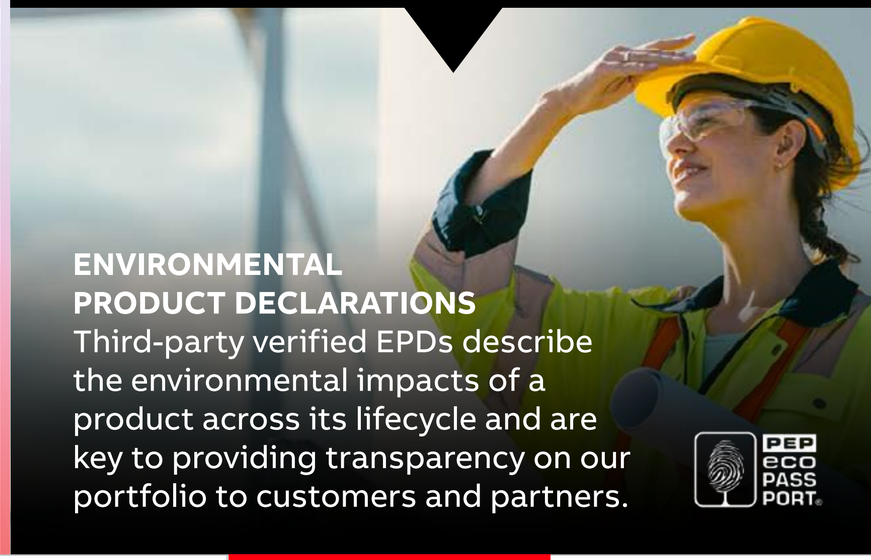
SCOPE 1 AND 2
CO_2 emissions reduction of 80% by 2030 - 1.5°C-aligned 100% by 2050- 1.5°C-aligned versus 2019 baseline

SCOPE 3
CO_2 emissions reduction of 25% by 2030 90% by 2050 - 1.5°C-aligned

SOLUTIONS



MISSION TO ZERO™
Our journey to reach net-zero emissions and more sustainable operations, powered by passionate people and driven by digital solutions.



ENVIRONMENTAL PRODUCT DECLARATIONS
Third-party verified EPDs describe the environmental impacts of a product across its lifecycle and are key to providing transparency on our portfolio to customers and partners.



PREVIOUS

CONNECT WITH US

Global solutions, local expertise

ASK AN EXPERT

WHERE TO BUY

RESOURCE PAGE

INDUSTRY LANDSCAPE

SUBSCRIBE TO E-NEWS

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