

SYSTEM SOLUTIONS GUIDE

Installation Products

Renewable energy industry - USA



Innovative electrical solutions to improve efficiency and reliability, enable safe and continuous operation, and promote sustainability.

System solutions for renewable energy

Creating reliable electrical systems with a focus on efficiency and sustainability

Addressing critical issues and challenges

Green energy solutions are fueling the new energy economy and increasing global demand for energy has raised awareness of the importance of clean, safe and renewable energy.



Safety



Continuous operation and reliability



Power quality and efficiency

The top renewable electricity sources are wind farms that generate power from air in motion and solar photovoltaic (PV) systems, which convert sunlight into electricity. Wind and solar power technologies are rapidly advancing and proliferating worldwide despite challenges including:

- Distributed and often remote installations
- Spread over several acres or miles
- Harsh weather and extreme temperatures
- Growing rate of energy consumption
- Changing government and industry standards
- Rapidly advancing technology solutions
- Narrow confines and sustained vibration of wind towers



Safety

Implementing active and passive safety systems for renewable power infrastructure

Cause: Arc flash hazards pose significant challenges in renewable power generation systems, as they can result in burns, electrical shocks, and even explosions and fires, putting employee safety at risk.

Impact: Improper grounding can increase the likelihood of capital equipment failures due to lightning or fault current, leading to **downtime** and **costly job interruptions**. Vapors and other contaminants may cause deterioration of conductors and equipment, which can be **time consuming** and **expensive to clean**.

Solution: All electrical terminations, lugs and connectors must provide protection against electrical shock and arc flashes. ABB **Shrink-Kon**[®] is moisture-proof, heat-shrinkable tubing, boots and end caps that insulate exposed conductors and wiring. ABB **Blackburn**[®] above-ground and direct-burial power and grounding compression connectors provide reliable electrical continuity for system protection.

ABB's **Hi-Tech**[®] current-limiting fuses greatly reduce energy let-through, minimizing the risk of catastrophic failures, addressing arc flash concerns, and generating no external arcing or by products.



Continuous operation and reliability

Designed to perform consistently and withstand the forces of nature

Cause: Corrosion is one of the greatest threats to safe and reliable operations. Solar and wind farms are, by their nature, exposed to meteorological forces such as harsh environments with high moisture, high winds, sand, dust and ice accumulation.

Impact: Extreme conditions, such as prolonged heat, can cause materials to age more rapidly, while hail can physically damage the systems.

Inferior quality products and poor installations can degrade operational capacity and increase the risk of costly downtime. Due to the remote nature of wind and solar farms, the extended response time to critical conditions and failures increases costs. Wind turbine heights add to the cost if the issue is located within the tower column or the nacelle.

Solution: ABB polypropylene **Ty-Rap**[®] cable ties are engineered for harsh environments and deliver superior corrosion resistance. **Ty-Met**[™] high-performance stainless steel cable ties provide long-lasting durability in the most challenging environments. **Sta-Kon**[®] Tefzel insulated wire terminals are suitable for high-temperature applications.

Downtime prevention is key. ABB's high-quality products improve the reliability of the system, prevent outages, and support sustained, low-maintenance operation of solar and wind power systems.



Power quality and efficiency

Generating enough power to satisfy demand

Cause / Impact: The fluctuating nature of wind power and the output of PV modules and power quality disturbance reduces system performance, resulting in increased losses and decreased system output. Tall, narrow wind towers also present unique challenges. Products are needed to fit smaller footprints and spaces without sacrificing efficiency.

Solution: ABB offers unique advanced components that provide predictable and reliable performance and control.

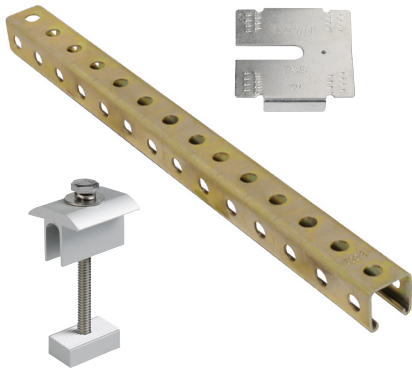
Designed for energy efficiency, ABB offers **Fisher Pierce**[®] faulted current indicators with adaptive trip reset to help reduce inventory and eliminate the need for replacement as the load changes. ABB **Joslyn**[®] capacitor switches use solid-dielectric insulation, eliminating maintenance.

ABB **Elastimold**[®] switchgears deliver space-saving solutions designed to maximize power in a smaller area, while ensuring adequate operating clearance and the ability to accommodate load growth within the available space. ABB offers **Blackburn**[®] narrow tongue lugs that can handle the same current as a conventional lug.

Metal framing solutions

Essential building blocks for effective cable management

Metal framing solutions



Kindorf®

Type / Description

Kindorf® channel and clamps

- **Wide selection** of metal framing channels and accessories, solar panel hold-down clamps and grounding washers
- **Eliminates** field drilling and welding, simplifying field cutting and layout
- **Modular fittings** fasten to bolt side or slot side for versatile use
- **Galv-Krom® finish** delivers high corrosion resistance, cleaner handling and storage flexibility

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T&B® Cable Tray

T&B Cable Tray® systems

- **Smart** and easy solutions for installing cable
- **Ladder tray** offers superior advantages over conduit and wiring systems
- **Protection** in corrosive and harsh environments with full line of products
- **Easy and quick installation** with extensive range of accessories
- **Easy to expand**, modify and update as needs evolve

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Abnex - An ABB and
Niedax joint venture

Superstrut® systems

- **Complete metal framing solutions**, offering protection in the harshest environments
- **Extensive range** of finishes, from GoldGalv® and SilverGalv® to hot dip and standard pre-galvanized
- **Clean finishes** with protected holes and ends deliver high corrosion resistance, easier handling and storage flexibility, and long-lasting performance

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Superstrut®

Cable management and fastening

Optimized wiring paths for easy scalability and expansion

Cable management and fastening

Type / Description



Deltec®

Deltec® cable strap

- Customized fastening in harsh outdoor environments
- **Select and customize strap length for any application**
- **Cut to desired length** for total flexibility and no waste
- **Easy storage** and reduced inventory
- **Safe and easy to install** with a guaranteed weatherable life
- **Corrosion protection** to withstand demanding conditions

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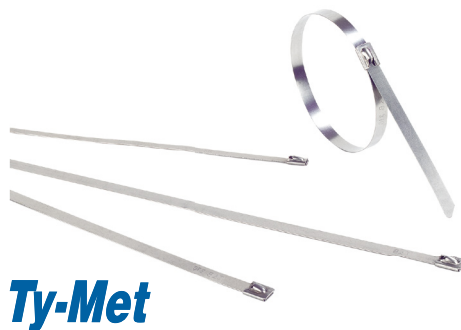
Ty-Rap®

Ty-Rap® cable ties and solar clips

- **Ty-Rap® high performance cable ties** perform in OEM applications, inside and outside
- **Special material ties** for high temperature, UV resistance and low smoke requirements
- **Quick and easy installations** and solar panel wire management
- **Solar clip** holds up to four #10 AWG solar cables
- **Corrosion-resistant materials**
- **Heat stabilized Nylon 6.6 option:** -85 °F to +220 °F

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Ty-Met

Ty-Met™ stainless steel cable ties

- **Extremely robust** for harsh environments, available in both coated and uncoated
- **High mechanical strength** combined with chemical durability and temperature resistance
- **Available in 316 grade** (marine grade) stainless steel, for extra corrosion resistance
- **Can be easily installed** with dedicated hand tools to cut and fasten

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Ty-Duct®

Ty-Duct® wiring duct

- **Fast and neat** internal wire bundling
- **Removes** easily yet will not accidentally slip
- **Fast, dust-free operation** with bench-mount cutter
- **Widths** from 0.75" to 6" and depths from 1" to 5"

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Cable protection solutions

Protect the electrical connectivity that powers your facility

Cable protection solutions



T&B Liquidtight Systems

Type / Description

T&B Liquidtight Systems® flexible metallic conduits and fittings/cord connectors

- **A complete line** of reliable cord and cable fittings of steel, stainless steel, aluminum, nickel plated brass and nylon
- **Wide range** of trade sizes from 3/8" to 6"
- **Highest quality** liquidtight fittings include steel, stainless steel, aluminum, nickel plated brass, non-metallic and high temperature
- **Superior protection** from corrosion, moisture, chemicals and UV
- **Cord connector design** utilizes liquidtight installations

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PMA

PMA® flexible non-metallic conduits and fittings

- **State-of-the-art** materials and advanced technologies through extensive R&D
- **Over 6,500 high performance** products for outdoor, indoor, static and dynamic applications
- **Excellent service performance**, including UL, CSA, IEC/EN, CE and RoHS
- **Customized** specific solutions

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T&B Fittings

T&B Fittings® rigid conduits and fittings

- **Feature rich fittings** reduce labor and inventory and deliver longer life and greater safety
- **BlueKote® internal finish conduit bodies** for easier wire pulling
- **Ideal for continuous** flexing or vibration applications
- **Ease of installation** helps lower installation costs
- **Suitable** for operating temperatures from -4 °F to +140 °F

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Ocal

Ocal® PVC coated rigid conduits and fittings

- NEMA RN-1 full undisturbed **zinc coating** under the **PVC coating**
- **UL-listed**, including UV resistance testing, meets NEMARN1
- **PVC-coated conduit system** provides superior corrosion protection against many harmful elements
- **Local** installation training and certification

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Carlon

PVC conduit, elbows and fittings

- **Non-Metallic** elbows and fittings are ¼ to ½ the weight of metallic systems
- **Resist sunlight** and are listed for exposed outdoor usage
- Carlon non-metallic elbows and fittings don't conduct electricity, the **system is safe**
- Manufactured to meet a **broad range** of NEMA and federal specifications

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Connectivity and grounding solutions

Supports safer, easier and more secure electrical connections

Connectivity and grounding solutions

Type / Description



Blackburn®

Blackburn® mechanical and compression grounding solutions

- **Features a broad range** of ground rod clamps, service post connectors, lay-in lugs and C-taps to meet any grounding requirements
- **EZ-Ground® range-taking products** reduce the number of connectors and dies needed for installation
- **UL-listed solutions** for direct burial application
- **Dual-rated** mechanical connectors for aluminum and copper conductor with tin plating for low contact resistance
- **Solar grounding lugs** simplify the attachment of copper ground wiring to solar arrays, allowing for easy daisy-chaining. The unique design of the set screw abrades tough anodized aluminum frames to ensure a reliable electrical connection
- **Dual-rated** lay-in lugs for aluminum and copper conductor

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Sta-Kon®

Sta-Kon® wire terminals

- **High-conductivity** copper terminals with corrosion-resistant plating
- **Includes marked** stud and wire sizes
- **Long chamfered barrel** to eliminate missed crimps
- **Deep internal serration** to produce a larger contact area
- **UL / imperial** portfolio

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Shrink-Kon®

Shrink-Kon® heat shrink tubing

- **Heat shrink tubing** protects wires against moisture, corrosion and abrasion
- For **heavy, medium, and thin** wall tubing
- **Heat and radiation** protection by Polyolefin material
- **Options with or without adhesion** by length or reel
- **Protects end caps** against liquid and dirt

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Color-Keyed®

Color-Keyed® cable terminals (lugs/splice)

- **Ensures a proper crimp** onto the conductor. Uses a color-coding system to match the right connector to the right tool and die
- **Stranded** wire termination
- **Verifiable** and inspectable
- **Shure-Stake® crimp** mechanism tooling
- **UL / CSA & IEC** (metric)
- **Comprehensive tooling portfolio** includes the widest variety of mechanical, battery-powered, and electrically powered hydraulic compression equipment

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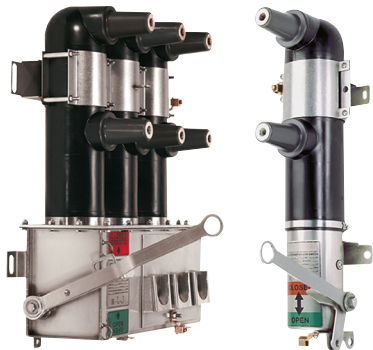
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Medium Voltage products and solutions

Connect, protect and control power continuity

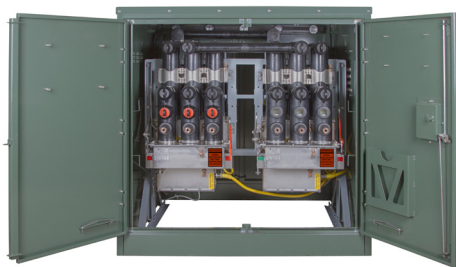
Utility solutions



Type / Description

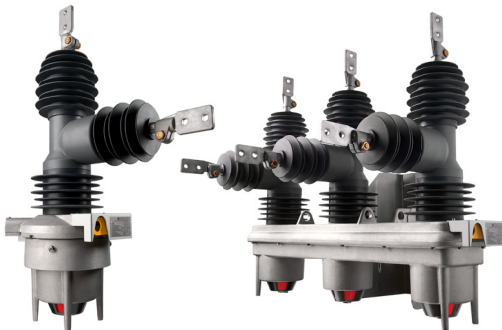
Elastimold® molded vacuum interrupters

- **Compact**, lightweight
- **Predictable tripping** for ease of coordination with upstream/downstream protection
- **Self-powered electronic control** monitors the circuit condition and tripping

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Elastimold® distribution switchgear to 38 kV

- **Uses no oil** or SF6 gas
- Solid **EPDM insulation** is maintenance free and environmentally friendly
- **Compact** and **modular** designs allow for smaller footprint
- **Field-reconfigurable** with field-replaceable components

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Recloser up to 46 kV

- **Modular design** – Enables fast, easy upgrades and retrofits
- **Simple design** – Maintenance-free magnetic actuator mechanism
- **Time-saving** - Does not require voltage correction factors
- **Smart** - equipped with current and load side voltage sensors

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Elastimold® cable accessories

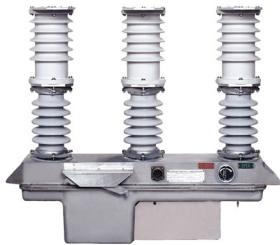
- **200A and 600A loadbreak** elbows and separable connectors incorporate safety features, increase range flexibility, and improve cost reduction over the life cycle
- **Elastimold fully shielded surge arresters** provide fully submersible lightning and switching surge protection
- **Elastimold 35 kV grounding aid device (GAD)** provides permanent, reliable and safe operation

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Medium Voltage products and solutions

Connect, protect and control power continuity

Utility solutions



Type / Description

Joslyn® capacitor switch

- **No oil, no gas** and vacuum interruption and solid dielectric insulation offer maintenance-free and environmentally friendly designs
- **Long-life** operating mechanisms

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Fisher Pierce® capacitor controller

- **Adaptive trip reset** reduces inventory and eliminates the need for device replacement when the load changes
- **Temporary fault detection** option to help locate nuisance temporary faults
- **Highly visible** strobe, LED, and fluorescent orange flag indication options, SCADA ready

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Hi-Tech® current limiting fuse


- **Greatly reduces energy** let-through, minimizing the risk of catastrophic failures
- **Interrupting capabilities** up to 50,000A
- **Used in molded fuses** for underground junction boxes and switchgear for full-range load overcurrent protection
- **Addresses arc flash** concerns and generates no external arcing or by products

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Homac® substation connectors

- **Full line** of couplers, taps, bus supports terminals and expansion connectors
- **Tested - 100%** of the Flood-Seal® bus connectors are subjected to a dielectric test at 4000 volts for 60 seconds to ensure insulation integrity

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Lightning produces currents of up to 200,000 amps within an extremely short period of time, testing the strength of the system's grounding capability. Are you prepared?





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**Technical support &
sample request**