



CONNECT AND PROTECT

nVent Battery Energy Storage System



Building a More Sustainable and Electrified World



As energy storage becomes increasingly vital in meeting the world's growing energy demands, nVent's range of innovative products offers OEMs the means to enhance the performance, safety, and reliability of utility-scale energy storage systems. nVent has you covered with products that easily integrate into battery racks, power converters and inverters and provide the connection between the container and the power grid.

SOLUTION BENEFITS:

- Reliable, space saving solutions
- Maximize energy efficiencies
- Resilient protection to maximize uptime and create system longevity
- Scalable solutions and technology for a wide variety of applications

APPLICATIONS

nVent battery energy storage system solution offering covers several applications within the BESS container.

- Battery Cell and Module
- Battery Cell and Module > Power Conversion System
- Power Conversion System (PCS)
- Power Connections of Subsystems
- Overvoltage Protection



Trusted Partner in Energy Storage Systems



Resiliency and Protection

Our solutions add resiliency to critical systems by helping keep them safe from natural and manmade disruptions.



Lifespan and Serviceability

Our solutions extend the lifespan of our customers' systems, reducing waste and lowering cost.



Safer Solutions

Our solutions improve end-user safety and help our customers enhance the safety of their operations.



Customer Productivity

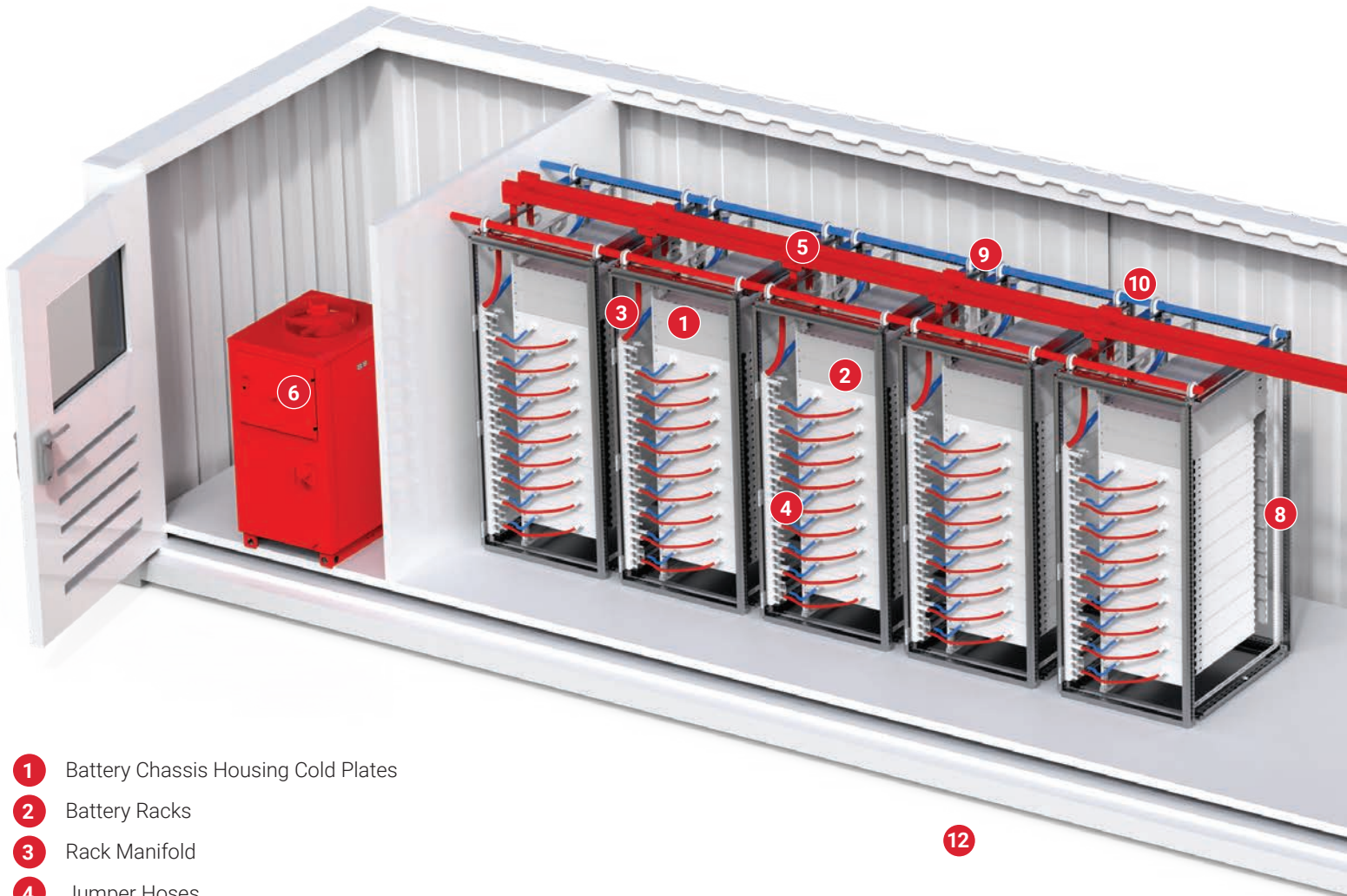
Our solutions reduce labor cost in design and installation, improve utilization and reduce total cost of ownership



Learn more about nVent Energy Storage solutions.
<https://www.nVent.com/en-us/energy-storage>

Energy Storage System Arrangements

Typical layout of a battery-based containerized/indoor energy storage system

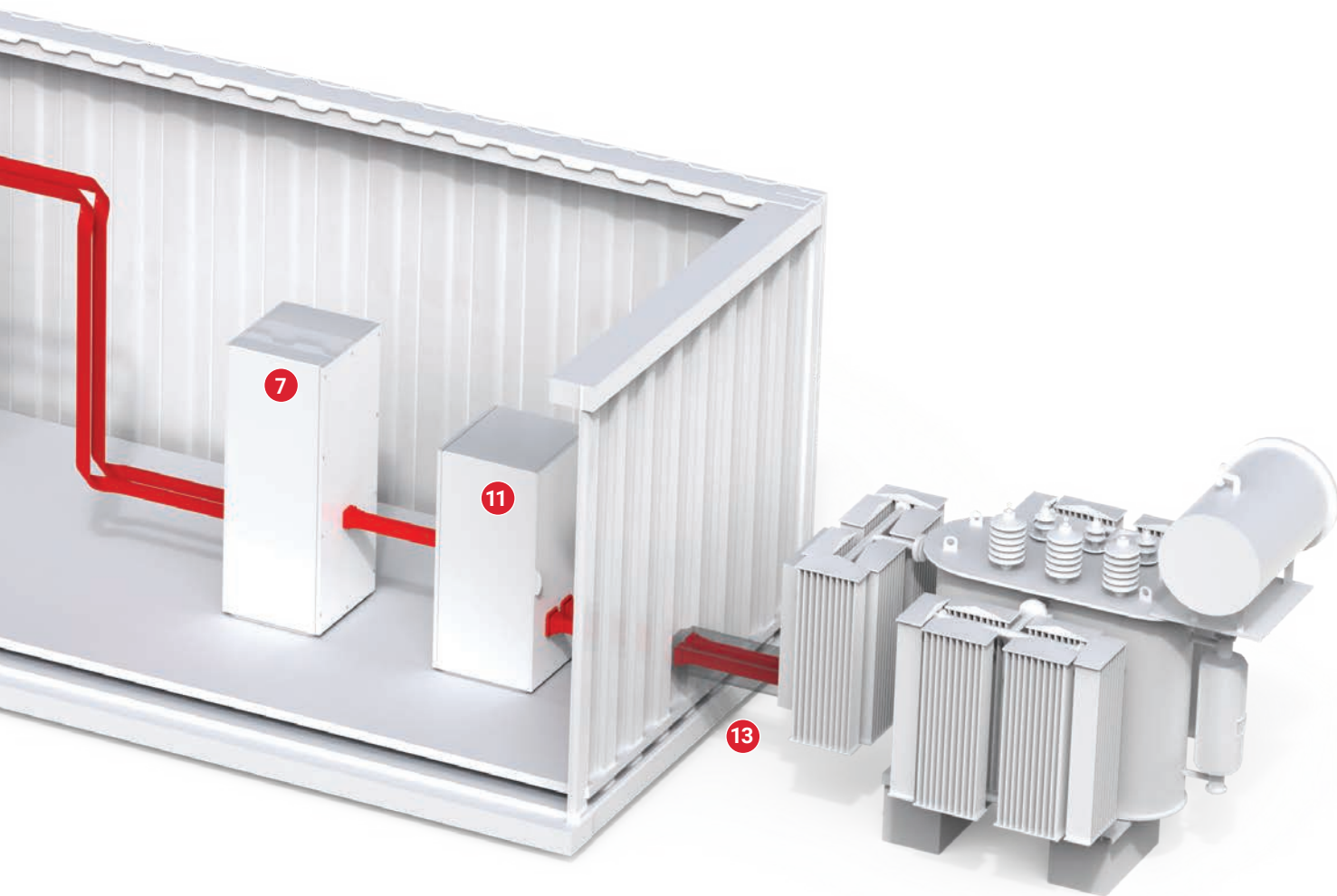


- 1 Battery Chassis Housing Cold Plates
- 2 Battery Racks
- 3 Rack Manifold
- 4 Jumper Hoses
- 5 System Manifold
- 6 Chiller
- 7 Power Conversion System
- 8 Modular Frame
- 9 Low-Voltage Power Distribution
- 10 Busbar Supports
- 11 Surge Protection Devices
- 12 Grounding and Bonding
- 13 Electrical System Interconnections



Learn more about nVent Energy Storage solutions.

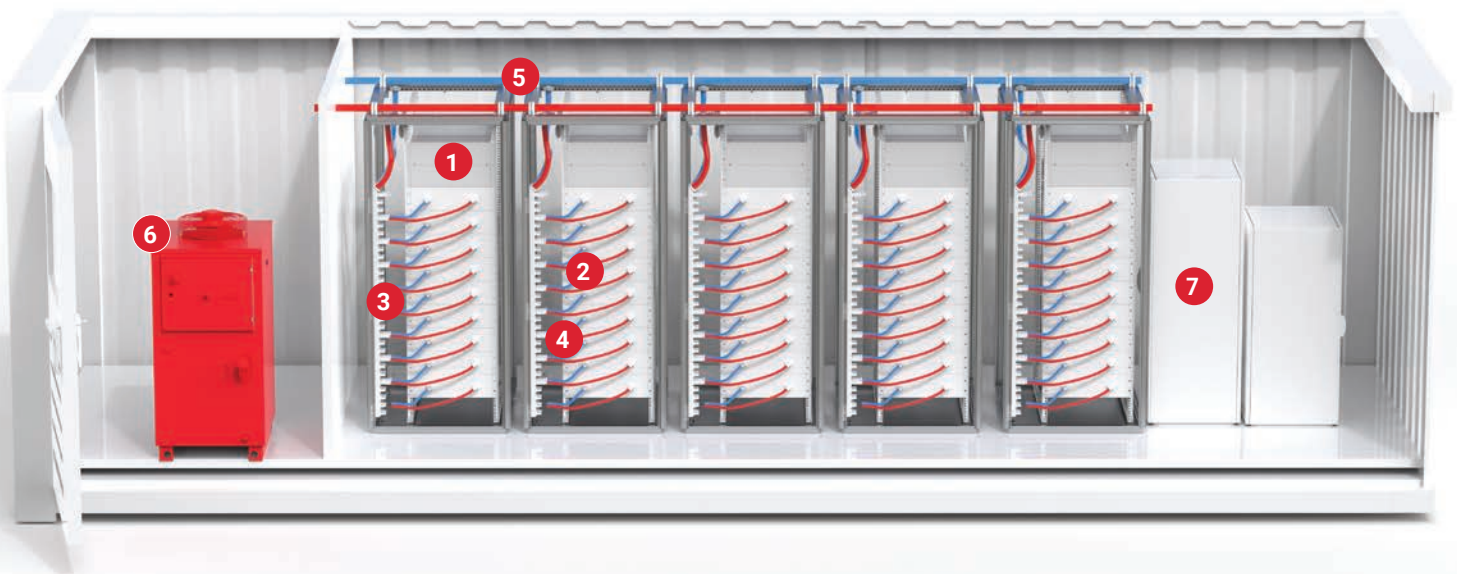
<https://www.nVent.com/en-us/power-utilities/products/energy-storage>



Ultimate Protection for Critical Power Infrastructure

nVent offers electrical connection and protection systems that can be configured and scaled to meet both indoor and outdoor needs in a wide range of applications and environments. Designed for flexibility, superior quality and ease of use, the portfolio makes it easier than ever to keep pace with rapidly emerging sustainability and energy storage demands.

UTILITY



- | | |
|--|----------------------------------|
| 1 Battery Chassis housing Cold Plates | 5 System Manifold |
| 2 Battery Racks | 6 Chiller |
| 3 Rack Manifold | 7 Power Conversion System |
| 4 Jumper Hoses | |

BENEFITS



Scalable solutions
for all applications



Resilient protection
to maximize uptime



Maximize
energy efficiencies



Reliable, space
saving solutions

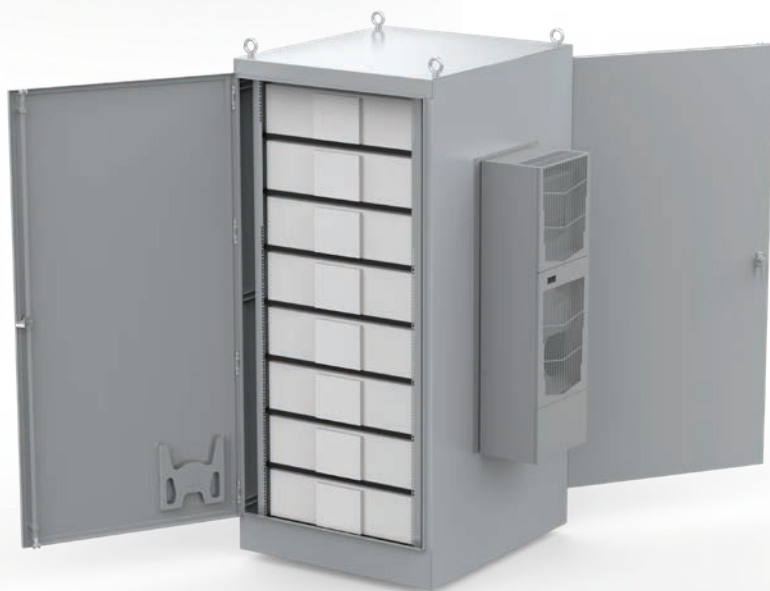


Easy Integration

COMMERCIAL & INDUSTRIAL



**Outdoor Free-Stand Battery
Protection System with
Multi-door Enclosure**



**Outdoor Free-Stand Battery
Protection System with Single-door
Dual Access Enclosure**

Enclosure Solutions

A FLEXIBLE, CUSTOMER-DRIVEN APPROACH TO SOLVING YOUR APPLICATION CHALLENGES

nVent HOFFMAN and nVent SCHROFF products provide a wide range of standard enclosures, climate control solutions and accessories that provides ultimate protection and reliability for all energy storage applications.



BMS Chassis

- Durable construction, customizable features, and reliable protection to optimize the performance and lifespan of your energy storage system
- Space-saving Flat-Pack design



Modular Frame

- Easy to bay together and fast assembly with patented tool-free click-in technology
- Streamline ordering with a single, global part number
- Multiple interchangeable accessories



Outdoor Modular Enclosure

- Aluminum single wall compact floor standing enclosures, designed for outdoor use
- Configurable to meet a variety of enclosure needs



Universal Free-Stand Enclosures

Design, model, and assemble faster with six different base units with universal type ratings to meet a variety of enclosure needs

Climate Control and Liquid Cooling Solutions

LIQUID COOLED BATTERY PROTECTION SYSTEM

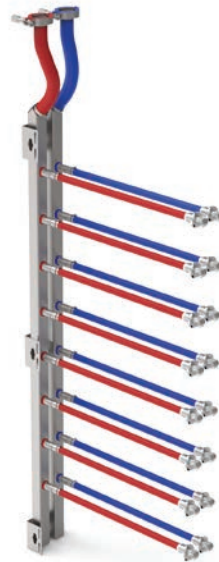
Efficiently manage battery temperature for system reliability and longevity with the nVent Liquid Cooled Battery Protection System. Chillers provide cooled fluid to the manifolds which then distribute fluid directly to the battery module through the hoses and fittings.



TAL Floor-Standing Chiller

1 Kw – 134 Kw

Provides chilled/heated fluid to system
Intelligent design drives efficiency



Manifold & Hoses

System and rack level manifold
Hoses and fittings complete
distribution circuit

AIR CONDITIONERS

Effectively and remotely maintain container environment for improved reliability with our portfolio of Air Conditioners, designed for robust cooling performance in a variety of environments.



Indoor and Outdoor
4,000-59,000 BTU/Hr
1,172-17,287 Watts



Door or Wall-Mount
1,295-18,414 BTU/Hr
380-5,400 Watts

Climate Control Solutions

MORE WAYS TO COOL CRITICAL EQUIPMENT

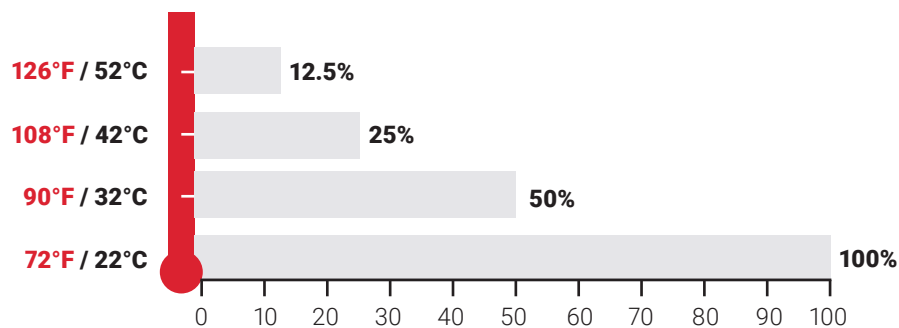


CONSEQUENCES OF HEAT

- De-rated module performance
- Intermittent fluctuations in I/C-based devices
- MTBF decreases exponentially
- Catastrophic component failure
- Warranty revocation
- Component replacement costs
- Late shipments
- Customer dissatisfaction
- Lost revenue
- Service outages
- Hours of system downtime

WHY USE COOLING? HEAT DAMAGES AND REDUCES THE LIFE OF YOUR ELECTRONICS

Electronics life expectancy is reduced by half with every 18°F (–7.8°C) increase above room temperature. (Every 10°C increase)



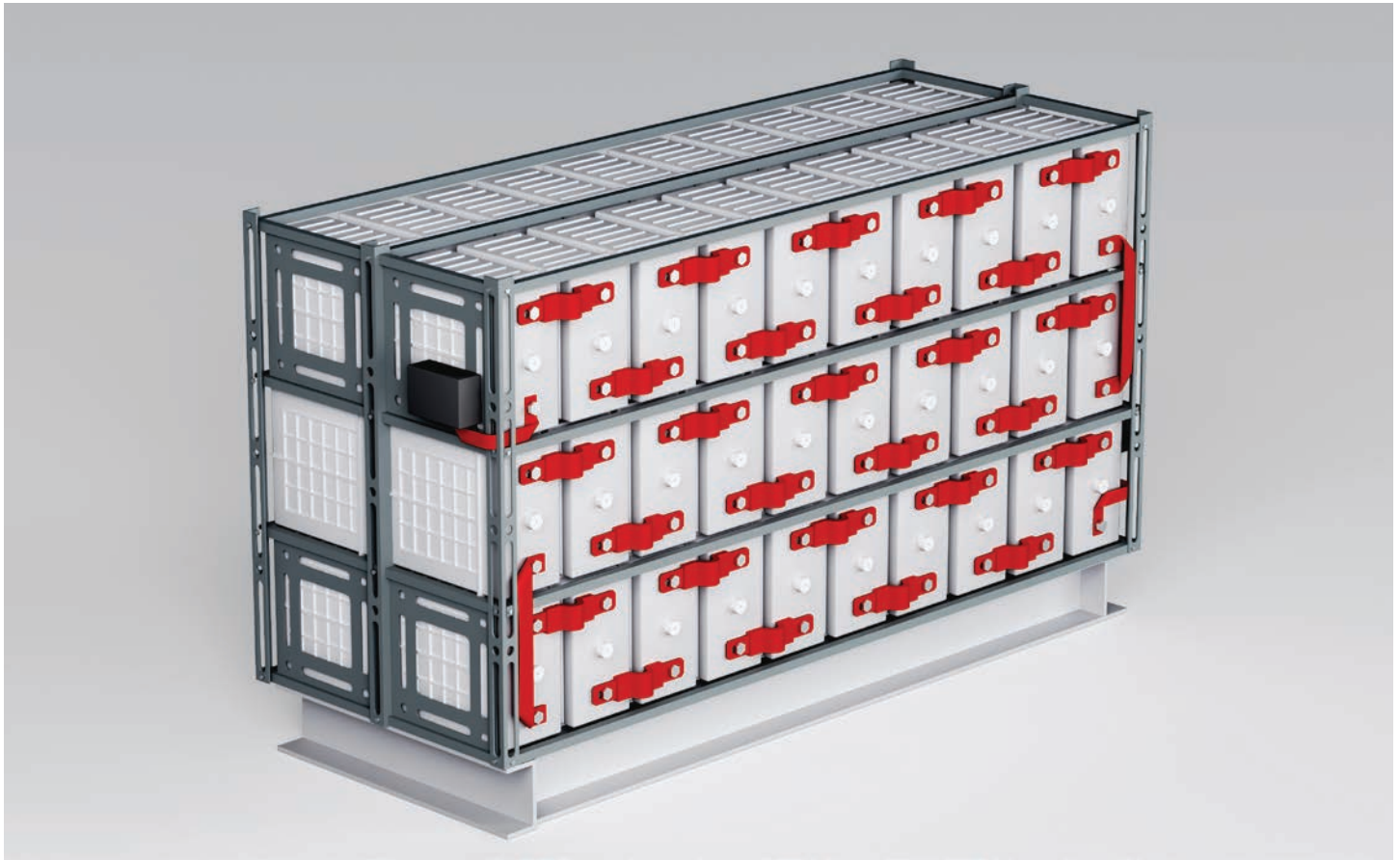
ELECTRONICS LIFE EXPECTANCY = %

Source: Digital Equipment Corporation

Power Connection and Electrical Protection Solutions Ecosystem

BATTERY CELL AND MODULE

nVent solutions offer scalability, reliability and flexibility. nVent low-voltage power distribution connections offer a reliable connection point that prevents overheating and offer design flexibility in compact areas.



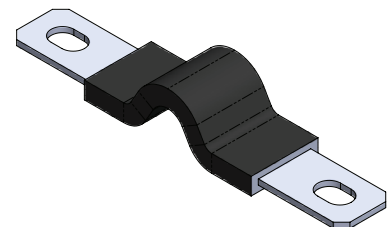
nVent ERIFLEX Flexibar Advanced



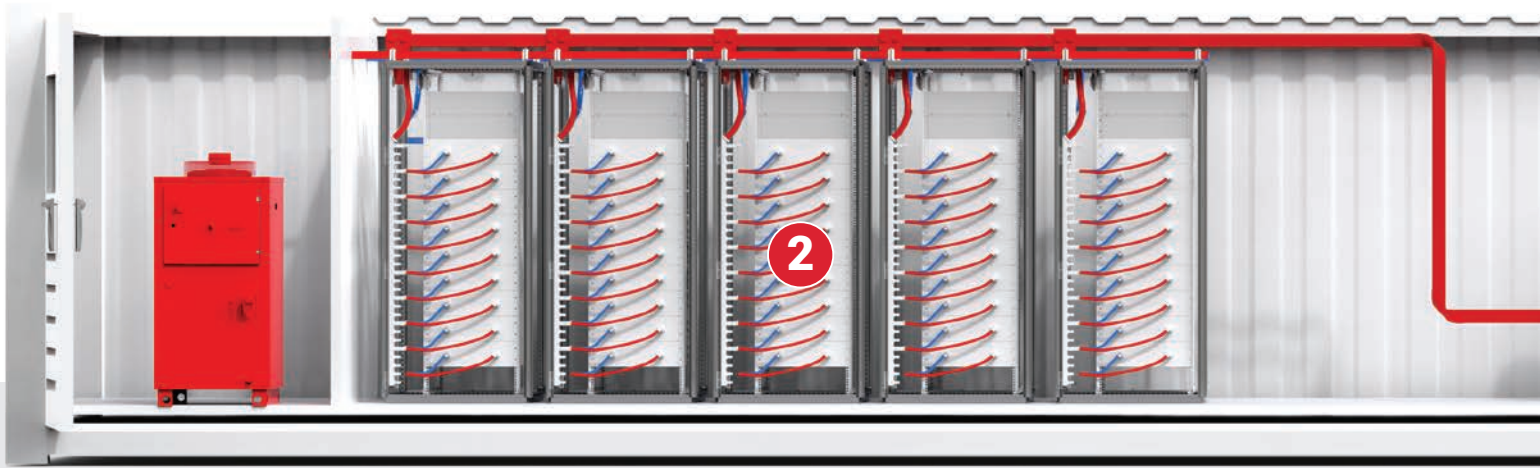
nVent ERIFLEX IBSB Advanced Insulated Braided Conductor



Made-to-Order nVent ERIFLEX Flexibar Solutions



Power Connection and Electrical Protection Solutions Ecosystem BESS System



- 1 nVent ERIFLEX Flexbus
- 2 Compact Power Distribution System (including Flexibar, IBSB Braids, Power Distribution Blocks, Busbar Support Systems, Insulators)
- 3 Surge Protection

POWER CONNECTION SOLUTIONS AND ELECTRICAL PROTECTION SOLUTIONS

We deliver low voltage power distribution solutions that reduce installed costs and increase design flexibility. Our deep knowledge of end-user applications provides a wide range of safe and reliable products for practically any electrical system need.

Customized Engineered Solutions with nVent ERIFLEX Flexibar Advanced



Work with the nVent team to build a customized, compact low-voltage power distribution panel solution.

- Available in standard sizes or made-to-order configurations
- Low smoke, halogen-free and flame-retardant insulation
- Direct connection for easy installation
- Low profile, light weight and flexible
- up to 2800 A, 1000 VAC 1500 VDC

Power Distribution System



nVent ERIFLEX Flexibar and IBSB Conductors:

- Utilizes proprietary Low Smoke, Halogen-Free, Flame Retardant Advanced Insulation

nVent ERIFLEX IBSB Braids:

- Current ratings from 125A to 630A
- Features integral palms for superior electrical connections

Compact Power Distribution Blocks:

- Designed to complement our flat conductors for efficient power distribution

Busbar Support Solutions:

- Includes stand-off insulators and compact adjustable busbar support systems for secure and flexible installation



Space Savings

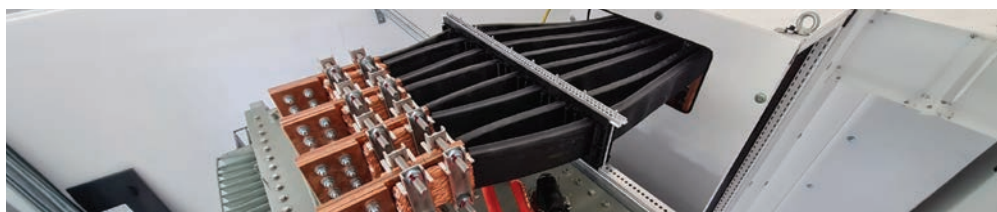
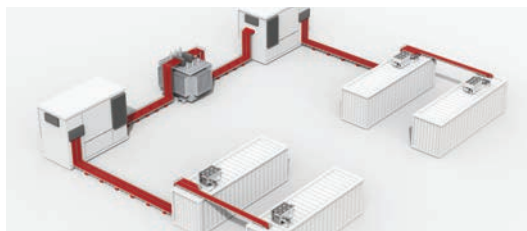


Time Savings



Safety and Reliability

nVent ERIFLEX FleXbus System



nVent ERIFLEX FleXbus is an innovative and patented connection solution between two electrical equipment installations, such as transformers, switchboards, generators or large uninterrupted power supplies (UPS).

Due to its unique concept, nVent ERIFLEX FleXbus is an alternative power connection solution for up to 50% quicker installation and 20% reduction in total installed cost at a minimum.

- Flexible insulated copper-plated, aluminum flat braid
- Better current/ampacity than cable due to skin effect
- More flexible than cable
- No bending radius to respect
- Ready-to-use from one side with direct connection on busbar or circuit breaker palm

POWER CONNECTION SOLUTIONS AND ELECTRICAL PROTECTION SOLUTIONS

nVent provides reliable protection of property and personnel with several product solutions.

Surge Protection Devices



nVent surge protective devices work together to create a coordinated defense. Safeguard your technology from impulses generated internally and externally with systems designed to provide primary and secondary protection at distribution panels and the point of use.

Grounding and Bonding Solutions



An extensive product offering including ground rods, grounding busbars, conductors and more that are easy-to-install, cost-effective, reliable and theft-deterrent.

Cable Management



nVent offers several solutions for energy storage needs including single wire, large bundle and cable tray.

Lightning Protection



nVent ERICO offers a comprehensive portfolio of conventional and proprietary lightning protection systems (active and passive lightning protection systems):

- Full system consisting of air terminal, down conductor, mounting masts and lightning event counter Product lines include: nVent ERICO System 1000
- Early Streamer Emission (ESE) Lightning Protection System compliant with NFC 17-102 nVent ERICO System 2000
- Rolling Sphere Method Lightning Protection System compliant with European IEC 62305, USA UL 96, NFPA 780 Standards nVent ERICO System 3000
- Collection Volume Method Lightning Protection system recognized by IEEE 998

nVent Energy Storage Customized and Engineered Services

nVent offers a variety of services from design assistance to field maintenance and service support.



Standardized and customized product solutions



Engineering and prototype installation support



Global standards compliance



Post-installation support



ENCLOSURE SERVICE AND SUPPORT

Our global product experts and experienced distribution and service networks are available to support you every step of the way from design to maintenance, for the simplest to most complex solutions. We also offer a wide range of online tools and resources to support your engineering work.

- System Design & Configuration
 - Professional engineering design services help ensure critical system specs are met
- Field Service & Maintenance Programs
 - Our experts can provide service & maintenance to ensure system uptime and longevity

POWER CONNECTION AND ELECTRICAL PROTECTION ENGINEERING DESIGN ASSIST

Work with the nVent team to build a specialized solution in the following areas:

- Customized, low-voltage power distribution panel solutions
- Customized battery energy storage solutions
- Standards and codes guidance
- Grounding and bonding system design
- Takeoffs and site surveys
- Lightning protection services and software

nVent also offers a state-of-the-art equipment and expanded the in-house Engineering Electrical Lab to meet evolving regional trends and needs.



nVent Energy Storage Resources



Find more resources for understanding energy storage electrical connection, protection and thermal management requirements on nVent.com.



Visit the nVent Energy Storage Site



Learn about nVent Sustainability and Electrification Efforts



Tour the nVent Virtual World



nVent Training Center







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RAYCHEM

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