Superconductor LVDC Data Center Power Cables

any length, high current, no voltage drop

Gridtec Solutions™

Superconductor LVDC Data Center Power Cables

Solving power delivery problems and space limitations

Data centers dependent on DC power distribution, such as 48VDC-based telecommunication central stations, face huge challenges in the form of ever-increasing power requirements. In order to distribute the necessary amount of current from DC plants, large bundles of heavy copper conductors must be used. These copper cables, however, must be limited in length because of voltage drop requirements. Data centers are often forced to design around the limitations of copper, with equipment racks clustered around numerous DC plants. This results in an inefficient use of floor space, with the copper power cable bundles often creating significant installation and structural issues.

AMSC's superconductor LVDC power cables solve these problems

More current in less space, no voltage drop

AMSC's low voltage direct current (LVDC) power cables use superconductor materials instead of copper to transmit electricity. Superconductors carry well over 100 times the amount of electricity of copper wires the same size and do so without any electrical resistance. The result is a very compact cable that is capable of carrying an amount of current equaling dozens of conventional 350-750MCM copper conductors.

A typical high-capacity LVDC cable is 2–3" (5–8 cm) in diameter, weighs only 1 lb/ft (1.5 kg/m) and is capable of carrying thousands of DC amperes. Their lack of electrical resistance gives them the ability to carry current for an unlimited distance without any voltage drop. Their combination of compact size and no-voltage-drop offers significant economic benefits in the layout and design of data centers.

Smaller and lighter – with essentially unlimited current carrying capacity.

- **Simplify power supply upgrades with compact LVDC power cables**
- **Avoid installing tons of copper power cable**
- **Eliminate voltage drop, regardless of length**
- **Avoid costly system changes by maintaining 48VDC design**

Extremely compact and lightweight, AMSC's low voltage DC superconductor cable systems carry high currents without any voltage drop. Used in place of bulky, heavy bundles of copper power cables, they provide more flexibility in data center design, simpler installation and reduced floor space usage.

Refrigeration upgrade advantage

Superconductor materials must be refrigerated to exhibit their unique electrical characteristics. Supplied as a system, AMSC's LVDC power cables are pre-installed in flexible, thermally insulating vacuum jackets, and come complete with self-contained cooling systems.

Upgradeable, a change of the refrigeration cabinets is all that is needed to enable AMSC's LVDC cables to carry up to 200% of their rated current. This is because superconductor material inherently can conduct more current as operating temperatures decrease. These systems, in turn, can enable rapid, simple and cost effective data center upgrades or expansions without the need to install new cables.

Installation advantages

Ideal for high current, point-to-point or limited drop-point bus runs, LVDC superconductor cables:

- Reduce installation costs: AMSC's LVDC cables significantly minimize installed weight, simplifying busway and hanger systems, and greatly reducing the loading on ceilings or floors.
- Minimize structural impact: Eliminating tons of copper power cables reduces the structural load on buildings and improves seismic response.
- Speed time to market: Placing one small, lightweight cable is much faster than placing and training the dozens of conventional copper cables that would otherwise be required.
- Simplify placement: Minimal space requirements allow high-power cable runs in areas too constricted forentional copper cables or busways.
- Ease upgrades: Increasing the cable's current rating in-situ allows faster, simpler and more economical power system upgrades.

Improved data center design flexibility

With the high current ratings and no-volt-age-drop advantages of AMSC's supercon-ductor LVDC cables, a DC data center owner or operator has virtually unlimited freedom in layout:

- Better utilization of costly floor space: DC plants can be located further away from battery distribution fuse bays (BDFBs). Larger, centralized DC plants can be used to free space on the data center floor. DC plants can be located where space is not an issue or where the data center structure better supports heavy DC plant equipment. Batteries can be separated from AC inverters when using UPS-based AC data center design to minimize the footprint of large UPS systems.
- Reduced float voltage: DC supply power consumption can be reduced by decreasing its float voltage, as there is no voltage drop across the cable.
- Sustained 48VDC design: Featuring small diameters, very low weight, high-ampacity and zero voltage drop, LVDC cables help achieve many benefits of proposed higher voltage (AC- or DC-based) power distribution systems without new equipment investments.

Overcome issues with copper

AMSC's LVDC data center cable systems provide an ideal solution to many issues associated with copper cable bundles or busway for high-current DC power supply:

- Limited space
- Structural weight limitations
- Seismic loading
- Voltage drop

Advantages of using AMSC's LVDC superconductor cable systems

- More efficient floor space utilization
- Simplified placement requirements
- Reduced installation costs
- Reduced structural concerns
- More flexible data center design options
- Upgradable current capacity without changing cables

We offer full LVDC power cable solutions

- Cooperative consulting with your engineering department or preferred design firm
- Completely engineered and pre-installed cable systems
- Commissioning and testing

AMSC's LVDC Superconductor Cable

Superconductor LVDC Data Center Power Cables

About AMSC's Gridtec Solutions

AMSC's Gridtec Solutions® are a set of engineering planning services and advanced grid systems that optimize network reliability, efficiency and performance from the point of generation through transmission and distribution. We supply components, systems and solutions to some of the industry's biggest names. From wind parks to solar power plants and from utilities to large industrial manufacturers, our commitment is to deliver the right solution for our customers, each and every time. Whether a simple component or complex system-level solution, we focus on ensuring that the investment is right, and right for you – delivering reliability, security, efficiency, scalability and tangible long-term benefits.

For invaluable advice and compelling solutions, we are the partner you can turn to.

About AMSC®

AMSC (NASDAQ: AMSC) generates the ideas, technologies and solutions that meet the world's demand for smarter, cleaner … better energy. Through its Windtec Solutions, AMSC enables manufacturers to launch best-in-class wind turbines quickly, effectively and profitably. Through its Gridtec Solutions, AMSC provides the engineering planning services and advanced grid systems that optimize network reliability, efficiency and performance. The company's solutions are now powering gigawatts of renewable energy globally and enhancing the performance and reliability of power networks in more than a dozen countries. Founded in 1987, AMSC is headquartered near Boston, Massachusetts with operations in Asia, Australia, Europe and North America.

Talk to us about

- **Solving your most complex power challenges**
- **Enhancing competitive advantage**
- **Improving your system's performance, reliability and profitability**

Whether you wish to make new advances in renewable technology, optimize power generation or delivery, or simply gain a better understanding of the issues you face, please get in touch. We're here to help.

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