

Amphenol®



Data Center

www.amphenol-datacenter.com

Company Introduction

Company Overview

Amphenol has been connecting the world since 1932. We are one of the world's largest manufacturers of interconnect products. The company designs and manufactures electrical and electronic connectors, coaxial and flat-ribbon cable, and integrated interconnection systems.

Amphenol has a broad range of products supporting virtually all markets including but not limited to the IT and Communications, Mobile Network, Automotive, Military, Commercial Air, Broadband, Defense, Industrial, and Mobile Devices markets.

Amphenol is consistently pursuing new and emerging markets in order to bring its deep knowledge and long history to the global marketplace.



Technology & Innovation



Amphenol prides itself on Enabling the Electronics Revolution by developing interconnect solutions that allow our customers the ability to produce products designed with greater power efficiency, higher data speeds, with more mobility, in harsher environments, and with advanced complexity.

Through our global engineering network, Amphenol is an established leader in technological innovation, leveraging our many core competencies in areas such as RF, harsh environment, high speed signaling, fiber optics, power management, and advanced sensor products.

Amphenol is constantly expanding its technology portfolio to stay at the forefront of innovation.

The Data Center Environment

The Data Center is a complex combination of technologies that requires its components to work together to maximize the speed, safety, and security of the data within.

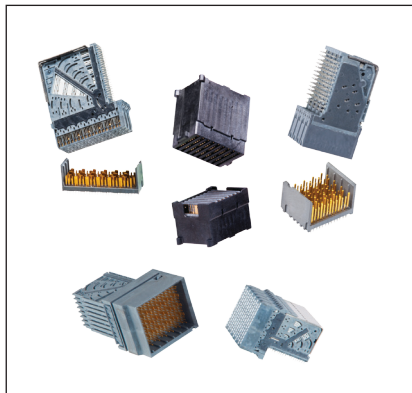
As a longtime leader in the development of interconnect products for server, storage, networking, and switching equipment, Amphenol has the experience and technology to ensure efficient and reliable connectivity within the Data Center.

Additionally, Amphenol has a portfolio of technologies that will ensure safe and efficient power distribution, as well as, environmental monitoring products to maximize data center thermal efficiency.



High Speed Interconnect

High Speed Backplane and Mezzanine



Amphenol designs and manufactures industry leading high performance interconnect solutions for I/O, backplane, and mezzanine applications. Solving system design challenges with cost effective, integrated solutions for data center equipment applications, Amphenol's high speed product offerings include XCede, XCede HD, XCede Plus, InfinX, and various custom connectors for unique applications.

Features & Benefits

- End-to-end high speed solutions scalable to 56G, with industry leading performance and density
- A variety of mating, mounting, and termination styles that can support virtually every application
- Technical experts ensuring optimal application for today's data center design challenges

High Speed IO Connectors



Amphenol offers a full range of high speed connectors with data rates ranging from 1 Gbps to 240 Gbps and beyond, meeting our customers' various high speed connector requirements. Products include the ExpressPort Series (SFP+, QSFP+), UltraPort (SFP+, QSFP+), CXP, SFP, QSFP, Mini-SAS, Mini-SAS HD, XFP, CFP2, and CFP4.

Features & Benefits

- Extensive range of high speed connector and cage solutions to support Fibre Channel, InfiniBand, Ethernet, and Gigabit technology
- Next generation UltraPort series provides premium level performance for SFP+ and QSFP+ interfaces
- Various EMI shielding and custom lightpipe options available



High Speed Cable Solutions

With over 55 years of experience in development and manufacture of engineered interconnect assemblies Amphenol is strongly positioned to support the varying demands in datacenter applications. We excel in Ethernet, InfiniBand, SAS, and Fibre Channel connectivity solutions. From loopback adapters used for port testing to passive and active copper cables. For extended distances, passive and active optical solutions from Amphenol go the distance. Amphenol's full range of innovative products and solutions are designed to meet the needs of demanding datacenter applications.

Splitter



Amphenol's QSFP to 4 x SFP+ Splitter Cable offers IT professionals a cost-effective interconnect solution for merging 40G QSFP and 10G SFP+ enabled host adapters, switches and servers. With the rapid evolution of high-speed networking standards, Amphenol QSFP to (4) SFP+ Splitter Cables allows one to bridge emerging 40-Gigabit QSFP equipment with mainstream 10-Gigabit SFP+ network gear.

Features & Benefits

- Cable Assembly Side A: One (1) QSFP+ Plug, 40Gbps
- Cable Assembly Side B: Four (4) SFP+ Plugs, 10Gbps Each
- Economically Links up a QSFP/QSFP+ port with an Upstream 10GbE-SFP+ Switch

AOC



Amphenol Active Optical Cables (AOC) are a high performance, low power consumption, long reach interconnect solution supporting InfiniBand, Gigabit Ethernet, Fibre Channel and Serial Attached SCSI. Amphenol's AOC provides a high density, high bandwidth solution while exceeding industry standard for performance and reliability. Amphenol currently offers both Mini-SAS HD and QSFP AOC's.

Features & Benefits

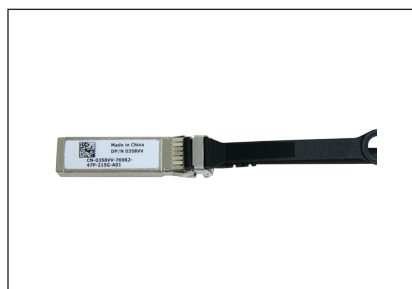
QSFP AOC

- Link distance to 100m
- 4X port density over SFP+
- Up to 14 Gbps channel for 56 Gbps total throughput
 - High reliability VCSEL technology

Mini-SAS HD AOC

- Link distance to 100m
- Guaranteed SAS 3.0 drive performance at 6.0 Gbps & 12.0 Gbps data rates
- Fully compliant to the latest SAS 2.1 and SAS 3.0 interface specs
 - High reliability VCSEL technology

SFP/SFP+



Amphenol SFP/SFP+ cable assemblies are high performance, cost effective I/O solutions for 10Gb Ethernet and Fibre Channel applications. SFP+ copper modules allow hardware manufacturers to achieve high port density, configurability and utilization at a very low cost and reduced power budget. Amphenol's high speed cable assemblies meet and exceed Gigabit Ethernet and Fibre Channel industry standard requirements for performance and reliability.

Features & Benefits

- Improved Pluggable Form Factor (IPF) compliant for enhanced EMI/EMC performance
- Data rates backward compatible to 1 Gbps
- Compliant to SFP+ MSA

Amphenol QSFP copper cable assemblies are high performance, cost effective

High Speed Cable Solutions

QSFP/QSFP+



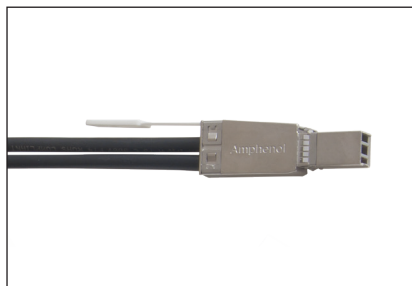
I/O solutions supporting Ethernet and Fibre Channel applications. QSFP+ copper assemblies provide a high density, high bandwidth solution at low cost and reduced power budget. Amphenol's high speed cable assemblies meet and exceed industry standards for performance and reliability as per SFF-8436 & IEEE 802.3ba.

We also offer copper based QSFP+ passive cable assemblies that are compliant to 100G Ethernet (IEEE 802.3bj), as well as, InfiniBand (EDR) supporting data rates of 25Gbps - 28Gbps respectively.

Features & Benefits

- Four channels transmit and receive
- 10 Gbps per channel capacity
- Copper link length up to 15m (active limiting)
- 4X Port density over SFP+

Mini SAS HD

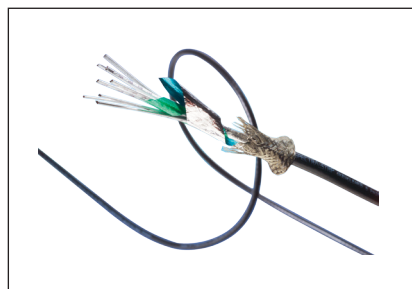


Amphenol's, Mini-SAS HD (High Density) External Passive Copper Cable Assemblies support the next generation of Serial Attached SCSI devices — operating at a blazing fast 12 Gbps per lane as per the latest SAS 3.0 specifications.

Features & Benefits

- Guaranteed SAS 3.0 drive performance at 6 Gbps & 12 Gbps data rates
- Universal key 4x HD Mini-SAS connectors feature pull-to-release lanyard
- Fully compliant to the latest SAS 2.1 AND SAS 3.0 interface specifications

Engineered Cable



Spectra-Strip's SkewClear® product line of flat internal or round external high precision bulk cable is designed to be scalable for high frequency applications carrying from 10Gb to 50Gb ++ signals. In cables such as this, minimum insertion loss, minimum deviation, and flattest possible frequency response over a wide band is critical for successful signal recovery in either active or passive cables. Precision extrusion, pair shielding, and cabling are key elements necessary for consistent performance.

Features & Benefits

- Industry standard Mini-SAS HD, SFP+ and QSFP+ product line ranging from 34 AWG to 24 AWG
- Unique 32 AWG EXD/OptiClear cable with thin polyester jacket QSFP cable for small diameter (.170 inch [4.32mm] OD) and 30GHz+ "Suckout" free cable throughput
- Internal SAS and PCIe cables with dual drain wires for 100, 92, or 85 ohm connectivity

Storage Interconnect

SAS/SATA/PCIe 12G

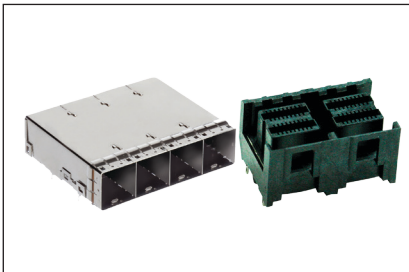


Amphenol is a leading contributor to the T10 and SFF committee and developed 12G/24G SAS and SCSI Express connectors to meet the increasing demand of high speed data transfer rates in server-based enterprise storage applications. With support of up to 12 Gbps, hot swap, and various PCB mounting solutions, Amphenol's 12G SAS interconnections provide tailor-made sockets to fit host backplane and plugs for devices of Hard Disk Drives (HDD) or Solid State Disk Drives (SSD) or Solid State Hybrid Disk Drives (SSHD) in any industry. Synced with T10 SAS roadmap, 24G SAS solutions are in development.

Features & Benefits

- SFF-8680 / SFF8639 compliant and backwards compatible with SFF-8482
- Utilizes proprietary resonance damping technology to extend a far end cross-talk noise magnitude of -40 dB up to frequency bandwidth of 9GHz
- Benefits from overall cost reduction by greater scaling due to increased bandwidth

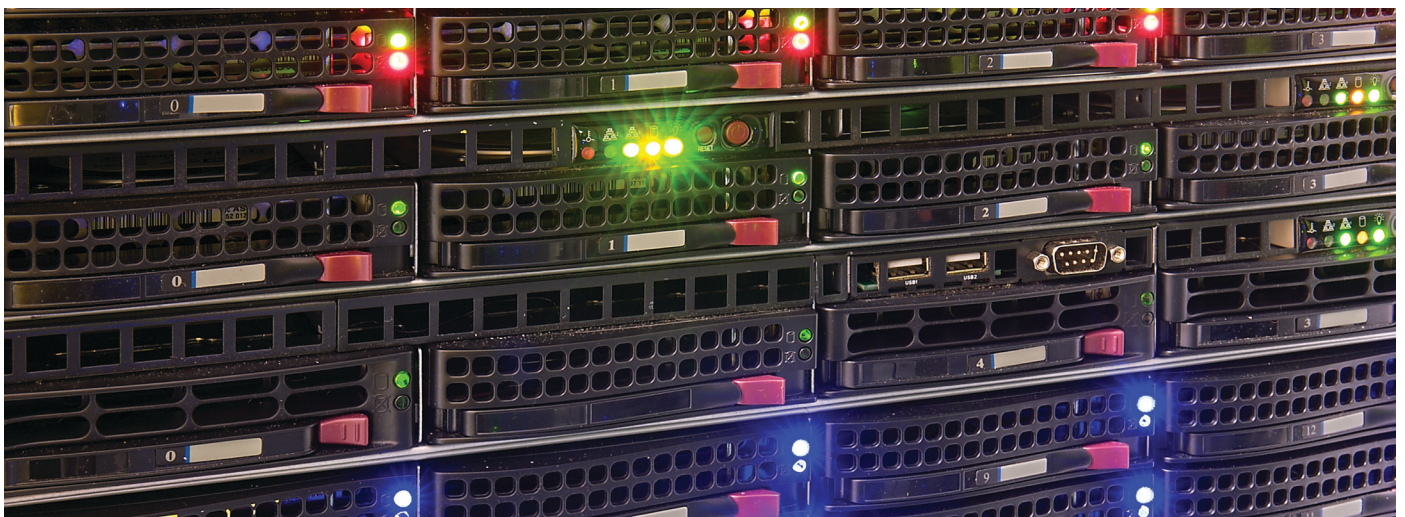
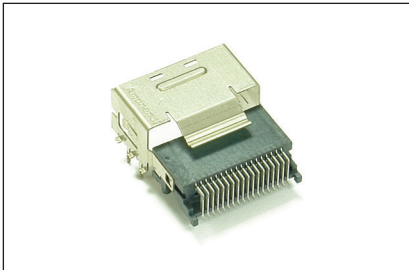
Mini-SAS and Mini-SAS HD



The Mini-SAS external I/O connector system consists of a die-cast metal cage and a Compact Multi-lane SMT Connector, featuring proven "cut edge" style contacts. The Amphenol Internal Mini-SAS connector is an ideal interconnection solution for the growing server and storage market. Mini-SAS HD connector is the next generation SAS system to provide the double port density over the existing Mini-SAS connector and provide faster data rate and more bandwidth for end users. Each Mini-SAS HD connector (port) handles 4 lanes of data rate for up to 48 Gbps of total bandwidth.

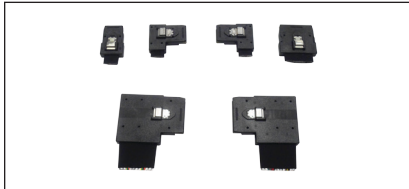
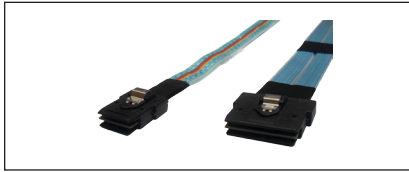
Features & Benefits

- Mini-SAS is designed to satisfy the needs of gigabit serial data transmission storage applications with signal speeds across the connector interface of 6 Gbps per channel.
- Mini-SAS HD has a 2-row, high density connector with 12 Gbps per channel



Internal and Accessory Cables

Mini-SAS (6G / 12G)

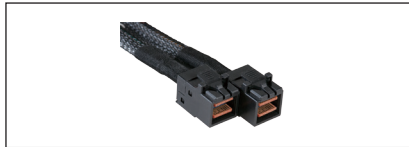


Amphenol offers one of the broadest product lines to support the emerging markets for Mini-SAS applications. The need for multiple Hard Disk Drives in a serial bus application, requires an interconnect capable of handling multiple-lanes of data. The Mini Multilane interconnect system supports 4 Lanes of Data and 8 Sideband signals in one connector and the foil in cable construction provides improved EMI protection. Amphenol technology provides end-to-end interface, signal integrity as well as performance at high speed Gbps.

Features & Benefits

- Straight, RA, Rev RA and Side Exit configuration
- 26 /36 /50 /68 Position Internal Assemblies
- Mini to Multilane (36 to 32 pin) Assemblies
- Host Base and Target Base Fan-out Cables
- Fan out Assemblies to SATA (7 pin) and to SAS (29 pin) - 26 AWG and 30 AWG from Amphenol Spectra-Strip

Mini-SAS HD (6G / 12G)

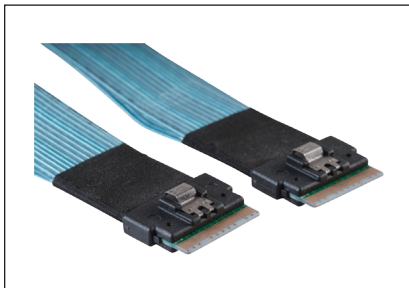


Amphenol high speed assemblies are an ultra-high performance, cost effective I/O solution for high speed applications such as data storage, switches, routers and computer clusters. Amphenol's Mini-SAS HD assemblies meet and exceed the standard requirements and have been tested to perform at emerging 12G per channel speeds. Our Mini-SAS HD 4X & 8X assemblies offer a solution to Mini-SAS, SATA, SAS and other high speed I/O interfaces.

Features & Benefits

- Transmission speed designed up to 12 Gbps
- Increased I/O density for current standard mechanical architectures
- Improved signal integrity performance/crosstalk

Slimline-SAS cable-24G



Amphenol is an active member of the Serial Attached SCSI (SAS) Standard (T10/SFF) working group. Amphenol's 24G Slim Line SAS product was developed to address the anticipated I/O and direct attached storage requirements. Amphenol's 24G Slim Line SAS product had been tested and conforms to SAS4 specification and transmits at speeds up to 24 Gbps.

Features & Benefits

- High density, flexible and compact
- Robust lock structure
- Transmission speed up to 24 Gbps
- Signal plus Clock
- 16 pair signal

SFF-8639 (PCIe)



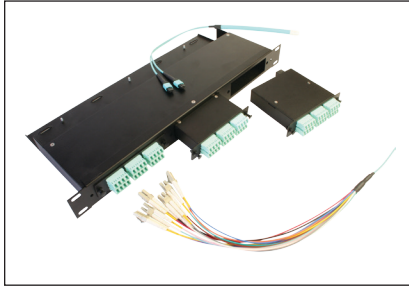
PCI (Peripheral Component Interconnect) Express is a point-to-point connection, which does not share bandwidth but communicates directly with devices via a switch that directs data flow. It also allows for hot swapping or hot plugging and consumes less power than PCI. SFF-8639 is designed for enterprise class backplane interfaces and meets the 12 Gbps electrical performance requirements as defined by SAS-3.0.

Features & Benefits

- High performance, speed can be up to 16GT/s
- 2 lane SAS/1 lane SATA, 4 lane PCIe
- I/O simplification, industrial standard
- Simultaneous charging to the mobile device
- Smaller physical footprint and ease of use
- Compatible with existing Operating Systems and PCI device drivers

Fiber Optic Solutions

Fiber Management Panels

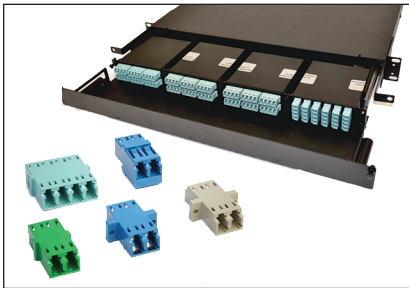


Complete line of high density and standard LGX based rack mount panels and enclosures for 19" & 23" racks, also includes premise wall mount and NEMA rated outside plant panels and enclosures.

Features & Benefits

- Made in the USA of powder coated steel
- Complete line of cable anchors for rack or panel attachment
- Custom preloaded panel options available

High Density Cassettes & Adapter Systems

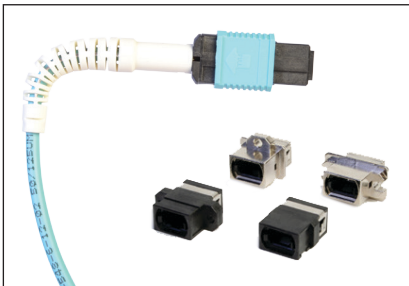


Fully customizable solution of high density cassettes and adapter panel systems offering flexibility and opportunity to make the most of Data Center spaces.

Features & Benefits

- Fully customizable high density modular designs and configurations
- Available in 12 fiber (6 Port) & 24 fiber (12 Port) standard configurations
- Easy to install and remove with "quick release" tabs

High Density MPO Components



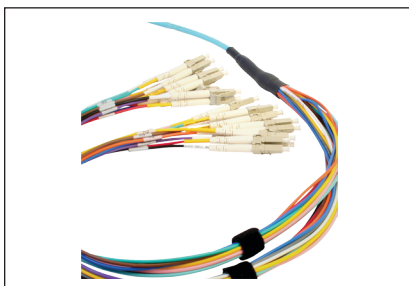
Amphenol has a complete line of MPO connector components used in high density, small footprint applications. The component line includes stackable MPO adapters, low profile pull tabs to ease installation and removal, and flexible boot options.

Features & Benefits

- Improves cable routing and avoidance of disturbing adjacent cables
- Enables higher fiber counts in a smaller footprint
- Ideal for QSFP+, CFP, and future 400G+ networks using MT based interconnects

Network Cabling

Structured Cable Assemblies



Amphenol manufactures a wide range of fiber cable assemblies for structured cabling applications using MPO, LC, and SC connector configurations on OS1, OS2, OM1, OM2, OM3, OM4, & OM4+ cabling.

Features & Benefits

- 100% insertion loss testing
- Available using OFNR, OFNP and LSZH (UL) listed premises cable options
- Custom labeling and breakout options available

Power Connectivity

Standard and Custom Power

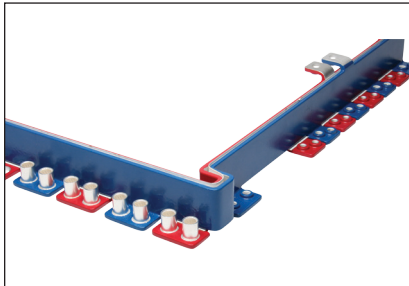


Amphenol provides many Standard and Custom Power Connectors for Data Center equipment applications that demand reliability and high performance. Combining unique high current power contact technology with connector design expertise, Amphenol Power solutions include low profile CoolPower Slim Drawer connectors with blind mate mixed power and signal, CoolPower Mezzanine used with InfinX, Power D-sub, Energy Razor, Energy Edge, Busbar connectors, and a variety of custom connectors for unique applications.

Features & Benefits

- RADSOK® and CoolBand sockets provide 30A to 250A+ with low T-Rise and high durability
- Integrated blind mate features provide reliable gatherability and mating polarization
- Variety of mating, mounting and termination styles can support virtually any application

Power Distribution



Amphenol is the global leader in low voltage power distribution busbars in rack or blade cabinet architectures. State-of-the-art design and components, plus global manufacturing capability, enable delivery of the highest efficiency, highest functionality, highest quality, at the lowest total cost.

Features & Benefits

- Punched, waterjet, or etched primary conductors from copper, aluminum, or bimetal alloys
- Epoxy powdercoat or high temp laminate insulation with optional edgefill solutions
- Industry leading connection options including RADSOK®, flat blade, mechanical fasteners
- Tolerance solutions with floating connections, high tolerance contacts, and flexible busbars

Environmental Control

Sensors for Environmental Monitoring and Control



Amphenol is a leading innovator in advanced sensing technologies and innovative embedded measurement solutions customized for regulatory and industry driven applications, creating value by providing critical information for real time data decisions.

We offer industry leading domain expertise, rapid customization, world-class manufacturing capability and lasting customer relationships to deliver the greatest value in cost of ownership to our customers.

Features & Benefits

Standard and custom sensors for Data Center environmental control and equipment optimization.

- Temperature: -80°C to 200°C
- Relative Humidity: 0% to 100%
- CO₂: 0 ppm to 200,000 ppm
- Water sensor for leak detection
- Airflow range 0 to 4m/s

Infrastructure Energy Solutions

Wind

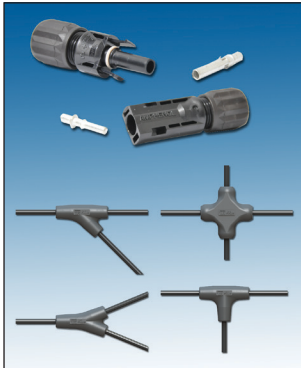


At Amphenol we know that wind turbines are in service for more than 20 years, residing in some of the harshest environments on the planet. Whether on-land or off-shore, we provide a competitive interconnection solution with both robust connectors and cable assemblies.

Features & Benefits

- RADSOK® Contacts, up to 2500V DC, 800 amp, and 2000 mating cycles
- Decreased weight & panel layout compared to the competition
- 300 Day Salt Spray Rating, UL 1682 & CSA

Solar



Amphenol is supporting solar EPCs with innovation from module to inverter. Our products includes H4 PV connectors, Hercules Junction Box and solar cable assemblies.

Features & Benefits

- Higher voltage systems: UL 1000V, IEC1500V, 2000V+
- Integrated Electronics: Monitoring, DC optimization, Safety
- Installation Labor Saving: Pre-terminated, bundled home run cable assemblies, pre-wired combiner boxes- Panel H4

Power Distribution



Amphenol provides a comprehensive product package in Power Distribution from low to medium voltage connectors, cable assemblies to cable management accessories.

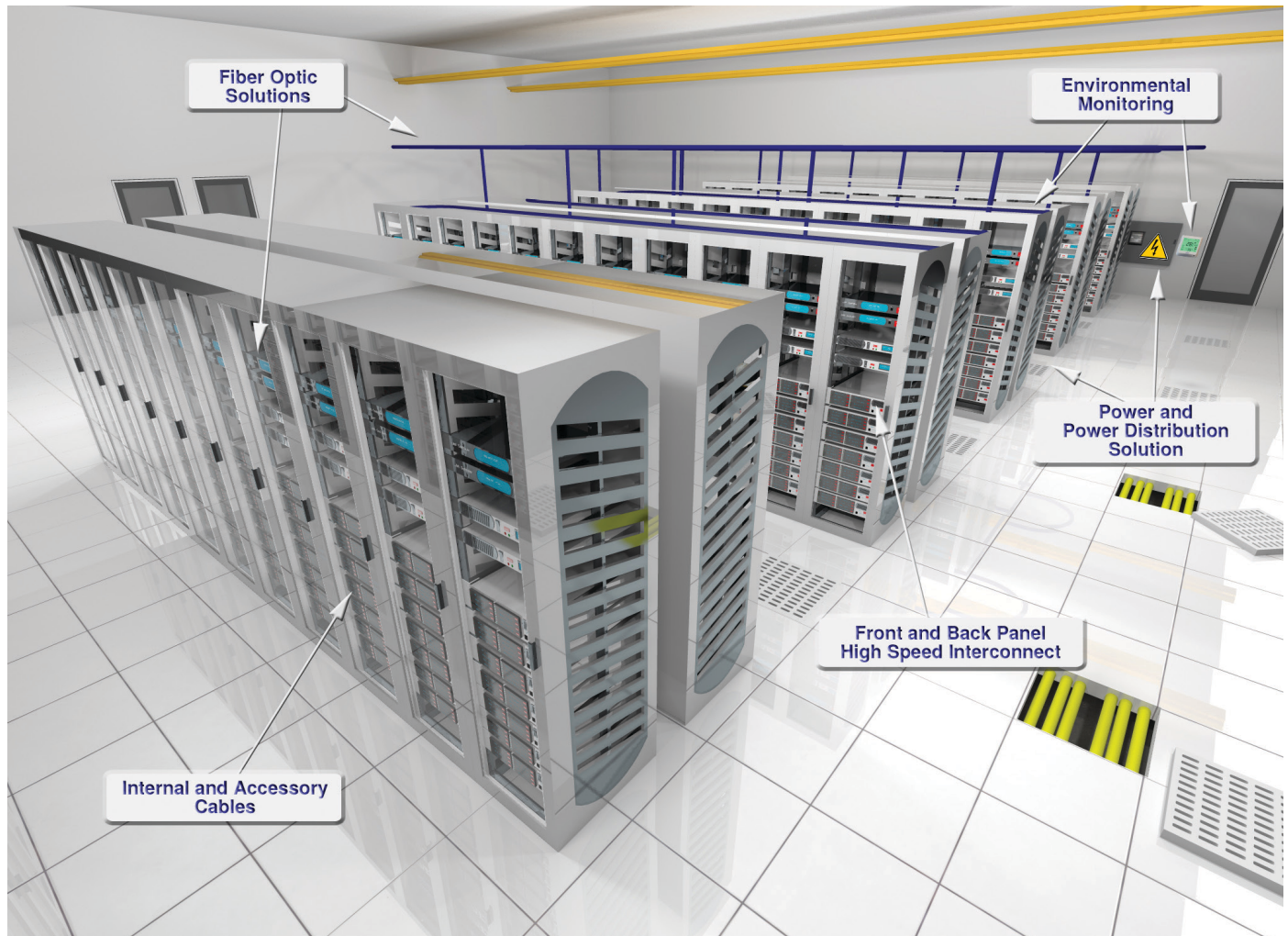
Features & Benefits

- Robust connectors up to 25KV with more than 100 configurations, serving both signal and power interconnection
- Over molded cable assemblies capability with multiple locations worldwide to provide the best service with proximity
- Cable management products including cable glands, conduit, cable reels, cable managers and assembly accessories
- Our new Amphe-309 with CE and UL certifications provide a cost saving solution for Data Center infrastructure power systems

Amphenol Data Center Solutions

Recognized throughout the industry as a technology leader in providing interconnect solutions for demanding Data Center applications

- High Speed Copper and Fiber Interconnect
- High Current Power and Power Distribution
- Internal and external cabling
- Advanced sensors and environmental monitoring



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