QwikConnect®

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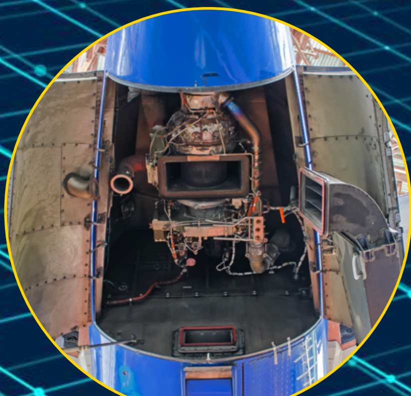
POWERING THE PLATFORM

ELECTRICAL DISTRIBUTION IN MODERN AEROSPACE AND DEFENSE SYSTEMS

POWERING THE PLATFORM

ELECTRICAL DISTRIBUTION IN MODERN AEROSPACE AND DEFENSE SYSTEMS



ELECTRIC FIXED-WING AND EVTOL AVIATION

- From motors to inverters
- From inverters to controllers
- From battery to inverters

MILITARY GROUND VEHICLES

- From generators to power distribution units
- From power distribution units to weapon systems
- Optics and Targeting: Operating laser rangefinders, thermal sights, and fire control computers

Modern aerospace and defense platforms depend on robust electrical power distribution systems to support an expanding range of mission-critical functions. Engine-driven generators remain the primary source of onboard power in most aircraft, producing electrical energy that must be transmitted safely and efficiently to loads distributed throughout the platform. These loads include avionics, flight control systems, actuation, sensors, communications, and mission equipment, all of which rely on the integrity of the Electrical Wire Interconnect System (EWIS).

> **Higher voltage systems demand interconnect designs that can withstand electrical stress over long operational lifecycles.**

This interconnect infrastructure—comprising cable, connectors, contacts, and integrated harness assemblies—must perform safely and reliably under simultaneous electrical, thermal, and environmental stress, particularly as system voltages increase and power architectures evolve toward greater electrification.

Conventional aerospace platforms typically generate 115 VAC, 400 Hz power and convert it as needed to 28 VDC. More-electric architectures increasingly use variable-frequency AC and high-voltage DC systems to improve efficiency and reduce weight. Regardless of the specific architecture, power must be routed through feeder cables, distribution networks, and harness assemblies to equipment located throughout the airframe. These systems often include power electronics for conversion and regulation, as well as redundant pathways to ensure continued operation in the event of a fault.

> **As aerospace platforms become more electrified, reliable power distribution depends on interconnect systems engineered to withstand extreme electrical, thermal, and environmental stress.**

Fundamentals of Voltage

A fundamental principle in the design of aerospace interconnect systems is the relationship between working voltage and dielectric withstanding voltage. The operational voltage defines the maximum continuous voltage the system is expected to carry, while the dielectric withstanding voltage represents the level at which the insulation system is tested to verify integrity. In aerospace applications, these values are deliberately separated by a substantial safety margin. This practice, known as derating, ensures that interconnect systems maintain reliable performance over time despite environmental exposure, material aging, and transient electrical conditions. The conservative nature of these margins reflects the fundamental requirement that electrical failures be avoided under all foreseeable operating conditions.

One of the most important considerations in high-voltage interconnect design is resistance to partial discharge. Partial discharge refers to localized breakdown within an insulation system that does not immediately result in complete failure but gradually degrades material integrity. These micro-scale events may originate from voids within insulation, contamination on surfaces, or high electric field gradients in air gaps.

WARFIGHTER

- C4ISR power and data support (STAR-PAN™)
- Smart battery power management
- High-current charging, universal power port connectivity, USB C power delivery

COMMERCIAL AEROSPACE

- Main power distribution systems
- Engine and System Starting: Providing high peak power to start main engines or the APU
- Emergency In-Flight Power: Ram Air Turbine (RAT) systems providing emergency power for critical flight systems
- Ground Backup Power: Battery systems providing backup power when the aircraft is stationary or on the ground
- External Power (GPU): Plugged in while parked to save fuel and reduce wear on the APU
- Grounding in very high flex zones within the wing

POWERING THE PLATFORM

ELECTRICAL DISTRIBUTION IN MODERN AEROSPACE AND DEFENSE SYSTEMS

Although each event is small, the cumulative effect over time can erode insulation, reduce dielectric strength, and potentially lead to failure. In aerospace environments, where maintenance opportunities are limited and consequences of failure are severe, interconnect systems must be designed to minimize the likelihood of partial discharge through careful material selection, geometry control, and rigorous testing.

Variable Frequency

Electrical frequency introduces another layer of complexity. While traditional aircraft systems operate at 400 Hz, modern platforms increasingly incorporate power electronics that generate a wide range of frequencies, including high-frequency switching associated with variable frequency drives and converters. These higher frequencies place additional stress on both conductors and insulation systems. Dielectric materials tend to exhibit reduced breakdown strength at elevated frequencies, while conductors experience increased losses due to skin effect, where current is forced toward the outer surface of the conductor. This reduces the effective conductive area and increases resistance, leading to greater heat generation. As a result, interconnect systems must be evaluated not only for voltage and current, but also for the frequency characteristics of the electrical environment.

NAVAL VESSELS

- Power distribution systems within the secured communications room
- Connection to land-based power when docked, allowing the ship to turn off its generators (known as "cold iron" status) to save fuel and maintenance
- Connection of internal ship equipment to power panels, switchboards, and generators

Environmental and operational conditions further complicate interconnect performance. Elevated temperatures accelerate insulation aging and reduce dielectric strength, while humidity and contamination can promote leakage currents and surface tracking. Vibration and movement contribute to material fatigue and contact wear, and chemical exposure can degrade both conductors and insulation. Altitude adds another challenge, as lower air density reduces heat dissipation. Together, these factors create a demanding operating environment that must be addressed through comprehensive design and qualification.

> **"Current carrying capability depends as much on thermal environment and installation conditions as conductor size.**

Thermal performance is closely tied to current carrying capacity and cable bundling. As electrical current flows through a conductor, resistive losses generate heat, raising the temperature of the conductor above ambient conditions. The allowable current for any given conductor is therefore determined by the maximum permissible temperature rise, which depends on the conductor material, size, insulation rating, and installation environment. In aerospace applications, the ability to dissipate heat is inherently limited, particularly at altitude, where lower air density reduces convective cooling. This constraint often results in lower allowable current ratings compared to ground-based systems. Effective thermal management is therefore critical to maintaining long-term reliability and preventing insulation

Super ITS high-ampacity reverse-bayonet connector with high-temperature thermoset insulator and low insertion-force contact system

> **At Glenair, electrical, thermal, and mechanical challenges are addressed together—not treated as separate power interconnect design problems.**

degradation, connector damage, or premature system failure. Careful conductor sizing, material selection, routing, and shielding design all play an important role in optimizing power transmission performance in weight- and space-constrained aerospace platforms.

To ensure safe operation, current ratings must be adjusted to reflect actual installation conditions. Factors such as elevated ambient temperature, bundling of multiple conductors within a harness, reduced cooling at altitude, and increased electrical frequency all contribute to higher operating temperatures. As these conditions become more demanding, the allowable current must be reduced accordingly. While industry standards provide general guidance, accurate assessment typically requires detailed analysis of the specific application and harness configuration.

The Interconnect Solution

Meeting these combined electrical, thermal, and mechanical challenges requires advanced interconnect technologies specifically engineered for aerospace environments. High-flexibility power cable plays a central role in this context, particularly in applications where routing constraints and dynamic movement demand both durability and ease-of-installation. Glenair TurboFlex cable technology is designed to maintain mechanical flexibility without compromising electrical performance, offering stable dielectric properties at elevated voltages and temperatures—enabling reliable power transmission in complex routing scenarios where conventional cables may be prone to fatigue or failure.

At the connector interface, contact design is equally important. High-power systems demand low-resistance, thermally stable electrical connections capable of withstanding vibration, repeated mating cycles, and elevated temperatures. Crown Ring contacts address these requirements through a spring-member design that maintains consistent radial contact force while preventing socket tine splaying under thermal and mechanical stress. By preserving stable contact geometry and uniform current distribution, Crown Ring contacts minimize resistance increases and localized hot spots that can develop in conventional split-tine designs. This results in improved current carrying capability, reduced thermal rise, and greater long-term reliability in high-power, high-voltage aerospace applications.

As aerospace and defense platforms evolve toward higher power density and more electrically intensive architectures, the demands placed on electrical interconnect systems continue to increase. Reliable power distribution depends not only on power generation and control, but also on the integrity of the cables, connectors, contacts, and shielding systems that deliver it. Higher voltage and current levels, tighter packaging constraints, elevated temperatures, and exposure to vibration, fluids, moisture, and EMI all place added stress on modern interconnects. Addressing these challenges with advanced interconnect technologies optimized for durability, thermal performance, and weight reduction is essential to ensuring safe and reliable operation.

SATELLITE AND ROCKET POWER

- Electrical power distribution from solar arrays and on-board batteries to propulsion systems, avionic boxes, sensors, and communication equipment throughout the satellite
- Launch vehicle power distribution for flight computers, avionics, engine controls, and other onboard systems

ELECTRICAL POWER DISTRIBUTION Q&A

ENGINEERING FUNDAMENTALS

What is the difference between breakdown voltage, DWV, and voltage rating?

Breakdown voltage is the level at which insulation fails and permanent damage occurs. It represents the physical limit of the insulation system.

Dielectric withstanding voltage (DWV) is a proof-test voltage applied to verify that an interconnect component is free from manufacturing defects and capable of meeting design intent. It is not intended to represent continuous operating conditions.

Voltage rating, also referred to as working voltage, defines the maximum continuous voltage at which the equipment is designed to operate.

In aerospace applications, a safety margin is always maintained between working voltage and DWV. Glenair provides DWV test data to confirm insulation integrity and manufacturing quality, but system designers are responsible for applying appropriate derating based on the specific application. When a formally qualified voltage rating is required, additional testing and validation may be performed to establish that rating under defined operating conditions.

What does "current rating" mean?

Current rating defines the maximum current a conductor can carry without exceeding its allowable temperature rise. This limit is commonly standardized using a UL criterion of +30°C rise above ambient for a single conductor under controlled conditions at sea level.

In practice, acceptable current levels depend on the system's ability to tolerate temperature rise. Factors such as altitude, ambient temperature, and harness configuration—particularly wire bundling—can significantly affect thermal performance and require derating. Applications operating beyond standard current ratings should be evaluated individually to ensure safe operation. Glenair engineering supports these assessments in accordance with established aerospace guidelines such as SAE AS50881.

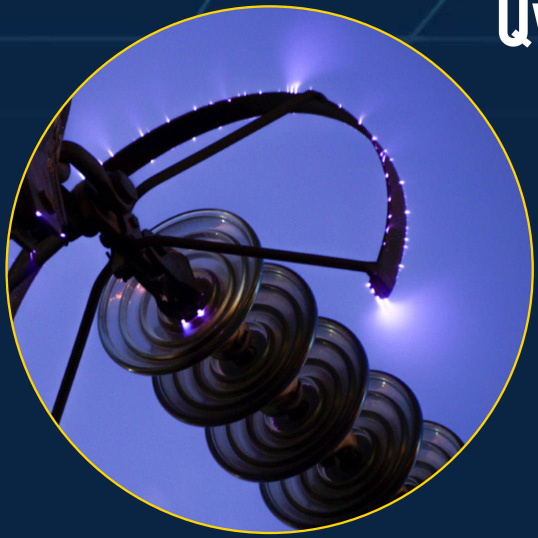
What is partial discharge, and how does it affect performance?

Partial discharge is a localized electrical breakdown within insulation that does not completely bridge the gap between conductors. It typically originates from small defects such as air voids, contaminants, or geometric irregularities that create localized electric field concentrations.

Although partial discharge does not cause immediate failure, it progressively degrades insulation through chemical and physical erosion. Over time, this reduces dielectric strength and shortens the service life of the interconnect system. Common forms include void discharge, surface discharge, corona discharge, and treeing. For high-reliability aerospace systems, resistance to partial discharge is a key system design and qualification requirement.

How does altitude affect voltage performance?

Altitude has a direct impact on the dielectric strength of air, which is often present within connector interfaces and insulation systems as small gaps or clearances. As altitude increases, air pressure decreases, reducing its insulating capability.



Corona discharge ionizing the surrounding air on a high-power transmission line—a visible reminder of the electrical stresses high-voltage systems must safely contain.
Photo by Nitromethane, Wikimedia commons

Because these air gaps effectively function as part of the overall insulation system, reduced dielectric strength at altitude lowers the total voltage withstand capability. This must be accounted for in system design through appropriate spacing, material selection, and voltage derating.

How does source frequency affect voltage performance?

Increasing electrical frequency places additional stress on insulation systems and generally reduces dielectric strength. As frequency rises, dielectric heating and loss mechanisms become more pronounced, lowering the effective breakdown voltage.

Direct current (DC) is typically less stressful on insulation than alternating current (AC), allowing for higher operating voltages under comparable conditions. However, most interconnect qualification testing is performed at standard power frequencies of 50 or 60 Hz. When systems operate at elevated frequencies, particularly in modern power electronics applications, additional derating and analysis are required to ensure safe voltage performance.

How does source frequency affect current performance?

Higher frequencies reduce effective current carrying capability due to skin and proximity effects, causing current to concentrate near the surface of the conductor as opposed to the full cross-sectional area.

This effect becomes more pronounced as frequency increases and is especially significant in larger conductors. The resulting increase in effective resistance leads to higher heat generation and reduced efficiency. For high-frequency applications, detailed analysis is necessary to accurately predict current performance and temperature rise.

How is long-term reliability estimated?

Reliability of electrical interconnect systems is commonly validated through accelerated life testing, in which components are exposed to elevated electrical, thermal, and mechanical stresses to induce failure under controlled conditions. Test variables may include increased voltage and current loading, elevated temperatures, thermal cycling, vibration, humidity, and high-frequency operation.

The resulting performance data is used to model expected service life and failure probability under normal operating conditions. Among statistical methods used for reliability prediction, Weibull analysis is widely recognized for its ability to characterize wear-out behavior, identify dominant failure mechanisms, and forecast long-term reliability with a high degree of confidence.

For mission-critical aerospace and defense systems—particularly high-voltage, high-current, and high-frequency applications—this level of reliability analysis is essential to validating interconnect durability, ensuring system safety, and reducing the risk of in-service failure over extended operational lifecycles.

HARNESS-LEVEL DESIGN CONSIDERATIONS FOR HIGH-POWER ELECTRICAL SYSTEMS

FROM THERMAL MANAGEMENT TO SHIELDING AND GROUNDING

Overmolded PowerTrip / TurboFlex power distribution cable assembly

While equipment-level architectures establish system voltage, current, and redundancy requirements, long-term signal integrity and power transmission reliability are ultimately determined at the harness level. Conductor selection, cable construction, connector and contact design, and shielding effectiveness all govern electrical performance, environmental durability, and overall system reliability.

Harness Thermal Management

Harness configuration has a direct impact on current carrying capability. As conductors are grouped into bundles, their ability to dissipate heat is reduced—particularly near the center of the bundle where temperatures are highest. In high-power defense systems, harness spacing, segmentation, and routing can become as important as conductor size in managing thermal rise and maintaining safe operating margins.

Mechanical Integration and Routing

Power harnesses must often be routed through tightly constrained airframe geometries exposed to vibration, movement, and mechanical loading. Bend radius limitations, attachment methods, and strain relief provisions all influence long-term durability. High-flexibility cable constructions such as Glenair TurboFlex® help reduce mechanical fatigue while simplifying installation in complex routing environments.

Shielding and Grounding

In modern aerospace platforms, high-power circuits frequently coexist with sensitive signal and data systems. Effective shielding and grounding practices are therefore essential to controlling EMI, minimizing unintended current paths, and preserving overall system integrity. These considerations must be addressed as part of the complete harness architecture rather than as isolated design features.

Connector Interface Reliability

Connector interfaces remain a primary thermal and mechanical stress point in high-power systems. Even small increases in contact resistance can generate localized heating and accelerate degradation over time. Glenair PowerPlay connectors with Crown Ring contacts maintain stable contact geometry and uniform current distribution under vibration and thermal cycling, improving current carrying capability and long-term reliability.

Harness Qualification and Validation

Aerospace harness validation extends well beyond continuity testing. Qualification programs may include dielectric withstanding voltage (DWV), insulation resistance, partial discharge, thermal rise, vibration, and mechanical shock testing to verify reliable performance under realistic operating conditions. Evaluating combined electrical, thermal, and mechanical stresses is particularly important, as many failure mechanisms emerge only through their interaction.

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POWER DISTRIBUTION GLOSSARY

FROM AC TO WEIBULL ANALYSIS

AC Alternating Current, electrical current that cyclically changes direction.

Ampacity The maximum current a conductor can carry continuously without exceeding its allowable temperature rise.

Arc Tracking Progressive conductive path formation across an insulation surface caused by contamination, moisture, or electrical stress.

Breakdown Catastrophic failure of electrical insulation resulting in instantaneous loss of dielectric integrity.

Conductor Metallic path used to carry electrical current, typically copper or copper alloy in aerospace interconnect systems.

Contact Resistance Electrical resistance at the interface between mating connector contacts. Excessive resistance can produce localized heating.

Corona Discharge Ionization of air surrounding a high-voltage conductor caused by intense electric fields, often visible as a faint glow.

Creepage Distance Shortest path along an insulating surface between conductive elements. Increased creepage improves resistance to surface tracking / flashover.

Current Rate of flow of electrical charge, usually measured in amperes (A).

Current Density Electrical current carried per unit cross-sectional area of a conductor. Higher current density generally increases thermal stress.

DC Direct Current, electrical current flowing continuously in one direction.

Derating Intentional reduction of voltage or current operating limits to improve reliability and safety margin.

Dielectric Strength Maximum electric field an insulating material separating conductors can withstand before electrical breakdown occurs.

DWV Dielectric Withstanding Voltage, proof-test voltage applied to verify insulation integrity and manufacturing quality.

Flashover Electrical discharge across the surface of an insulator or through air between conductive elements.

Frequency Cyclical rate of current reversal in AC systems, typically measured in hertz (Hz).

Grounding Establishment of a controlled electrical return path and common reference potential for safety and EMI management.

Hi-Pot Test Common term for high-potential dielectric testing used to verify insulation integrity.

Hot Spot Localized region of elevated temperature caused by excessive resistance, inadequate cooling, or current concentration.

Insulation Resistance Resistance of an insulation system to leakage current flow, typically measured in megohms or gigaohms.

OpV Operational Voltage, maximum continuous working voltage for safe system operation under defined conditions.

PD Partial Discharge, localized electrical breakdown within insulation that progressively degrades dielectric integrity, typically measured in picocoulombs (pC).

Power Density Amount of electrical power transmitted relative to system size or weight. Increasing power density is a major trend in aerospace electrification.

Resistance Opposition to electrical current flow, typically measured in ohms (Ω).

Safety Factor Margin between operational voltage and dielectric withstanding voltage intended to ensure reliable operation under worst-case conditions.

Skin Effect Reduction in effective conductor utilization at high AC frequencies as current concentrates near the conductor surface.

Surface Tracking Formation of conductive carbonized paths along insulation surfaces caused by contamination and electrical stress.

Thermal Runaway Self-accelerating cycle in which increasing temperature raises resistance losses and further increases heat generation.

Voltage Electrical potential difference between conductors, usually measured in volts (V).

Voltage Derating Reduction of allowable operating voltage below theoretical maximum limits to improve long-term reliability.

Weibull Analysis Statistical reliability analysis method used to model failure probability and predict service life.

POWERING THE PLATFORM

turboflex
THE ULTRA FLEXIBLE RUGGED POWER CABLE ®

For Demanding Military and Aerospace Systems

TurboFlex® is a high-flexibility, ruggedized power cable solution engineered for advanced aerospace and defense electrical distribution systems. Designed to simplify routing in compact, dynamic platforms, TurboFlex enables reliable high-voltage power transmission in applications subject to vibration, motion, tight bend-radius requirements, and harsh operating environments. Constructed from rope-lay copper or aluminum conductors and jacketed with Glenair signature Duralectric™ insulation, TurboFlex cables are optimized for compatibility with Glenair power connectors and contacts and are available as fully tested turnkey connectorized or lugged assemblies. TurboFlex delivers reliable high-temperature performance up to 4500 VAC in a PFAS-free, zero-halogen cable system.

TURBOFLEX IS A FULL-SPECTRUM POWER CABLE PRODUCT LINE

Crimp terminal lugs and turnkey jumper cables

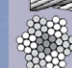
Flexible rope-lay grounding straps

AutoShrink™ Duralectric D straight-wall tubing

Turnkey, connectorized power cable assemblies

Duralectric™ is the high-performance TurboFlex® jacketing material. Different compounding formulas are optimized for weight savings, radiation resistance, ultra low temperatures, and immersion in chemical or caustic fuels. Available in a broad range of colors including safety orange.

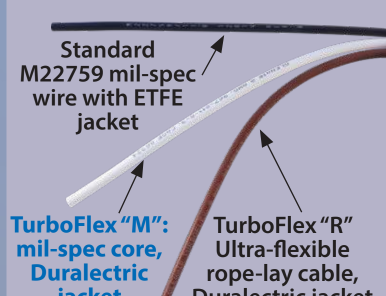
ROPE-LAY TURBOFLEX "R" VS. STRANDED TURBOFLEX "M"



TurboFlex "R" rope-lay wire construction

TurboFlex "M" stranded M22759 wire construction

TurboFlex cables are jacketed with Duralectric insulation, which contributes significantly to the flexibility of the product. Available wire cores include rope-lay (TurboFlex "R") for maximum flexibility, and stranded M22759 wire (TurboFlex "M") with the flight-heritage of a mil-spec core and a slightly larger bend radius, but far superior flexibility compared to standard ETFE-jacketed M22759 wire.



ULTRA-FLEXIBLE
TurboFlex® Rugged Power Cable

GLENAIR
QwikConnect

Rope-lay · stranded-core · copper or aluminum conductor · Duralectric™ jacketing

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THE ULTRA FLEXIBLE RUGGED POWER CABLE

ULTRA-FLEXIBLE ROPE-LAY AND STRANDED-CORE CABLE FOR HIGH-POWER ELECTRICAL INTERCONNECT APPLICATIONS

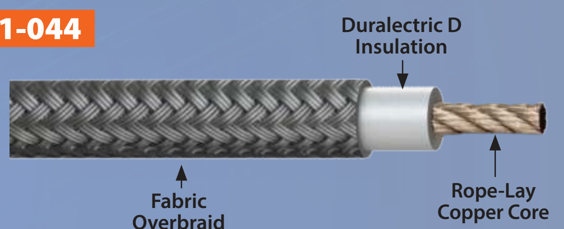
961-004

TurboFlex® "R" Copper Core, Duralectric™ D Insulation, 2000 VAC

967-600

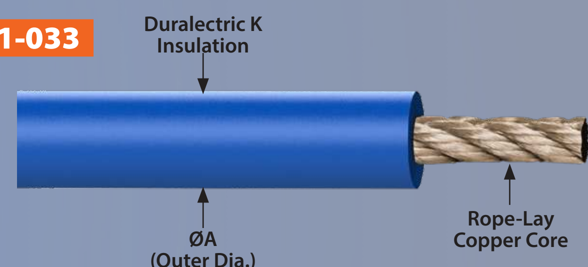
TurboFlex® "M" AS22759-type conductor, Duralectric™ D Insulation, 725–2875 VAC

961-044



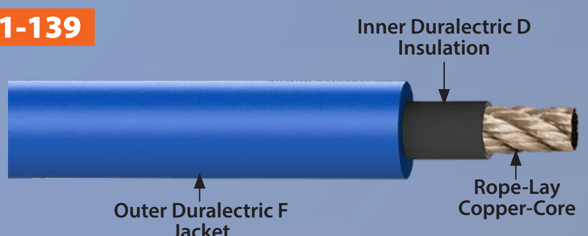
TurboFlex® "R" Copper Core, Duralectric™ D Insulation, Fabric Overbraid 2000–4500 VAC

961-033



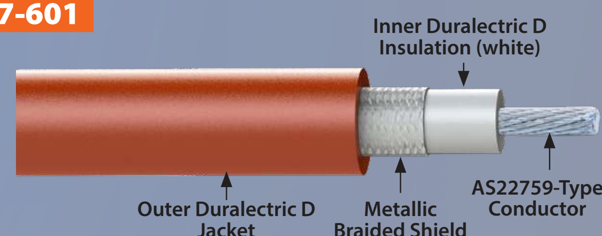
TurboFlex® "R" Copper Core, Duralectric™ K Insulation, 1000–3000 VAC, -110°C – +200°C

961-139



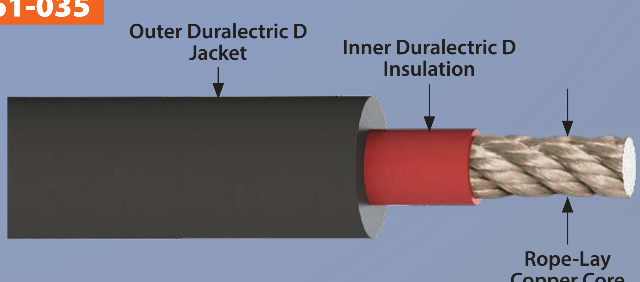
TurboFlex® "R" Copper Core, Dual-layer Duralectric™ D Insulation/ Duralectric F Jacket, 1000 VAC

967-601



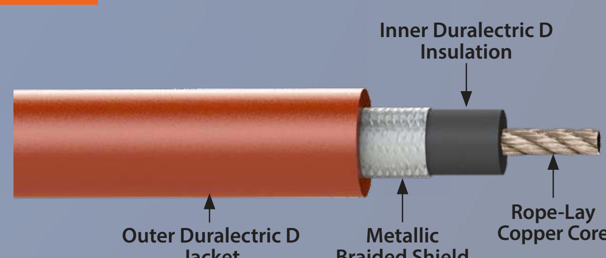
TurboFlex® "M" Copper Core, Dual-Layer Duralectric™ D Jackets and Metallic Braided Shield, 725–2875 VAC

961-035



TurboFlex® "R" Copper, Dual-Layer Duralectric™ D Insulation and Duralectric™ D Jacket, 3000 VAC

961-007

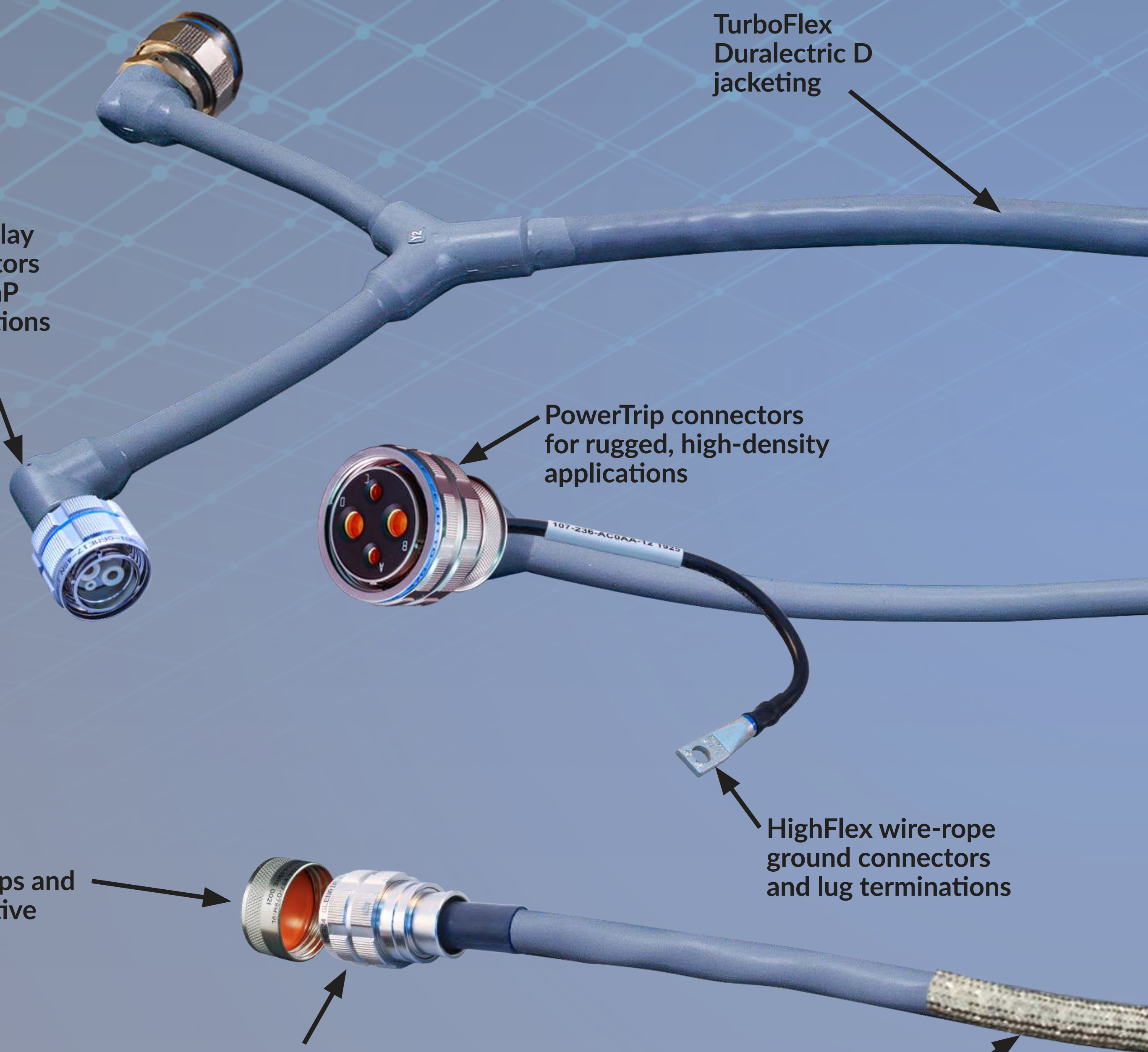


TurboFlex® "R" Copper Core, Dual-Layer Duralectric™ D Jackets and Metallic Braided Shield, 3000 VAC

POWERING THE PLATFORM

turboflex
THE ULTRA FLEXIBLE RUGGED POWER CABLE

For Demanding Military and Aerospace Systems



ULTRA-FLEXIBLE

TurboFlex Rugged Power Cable

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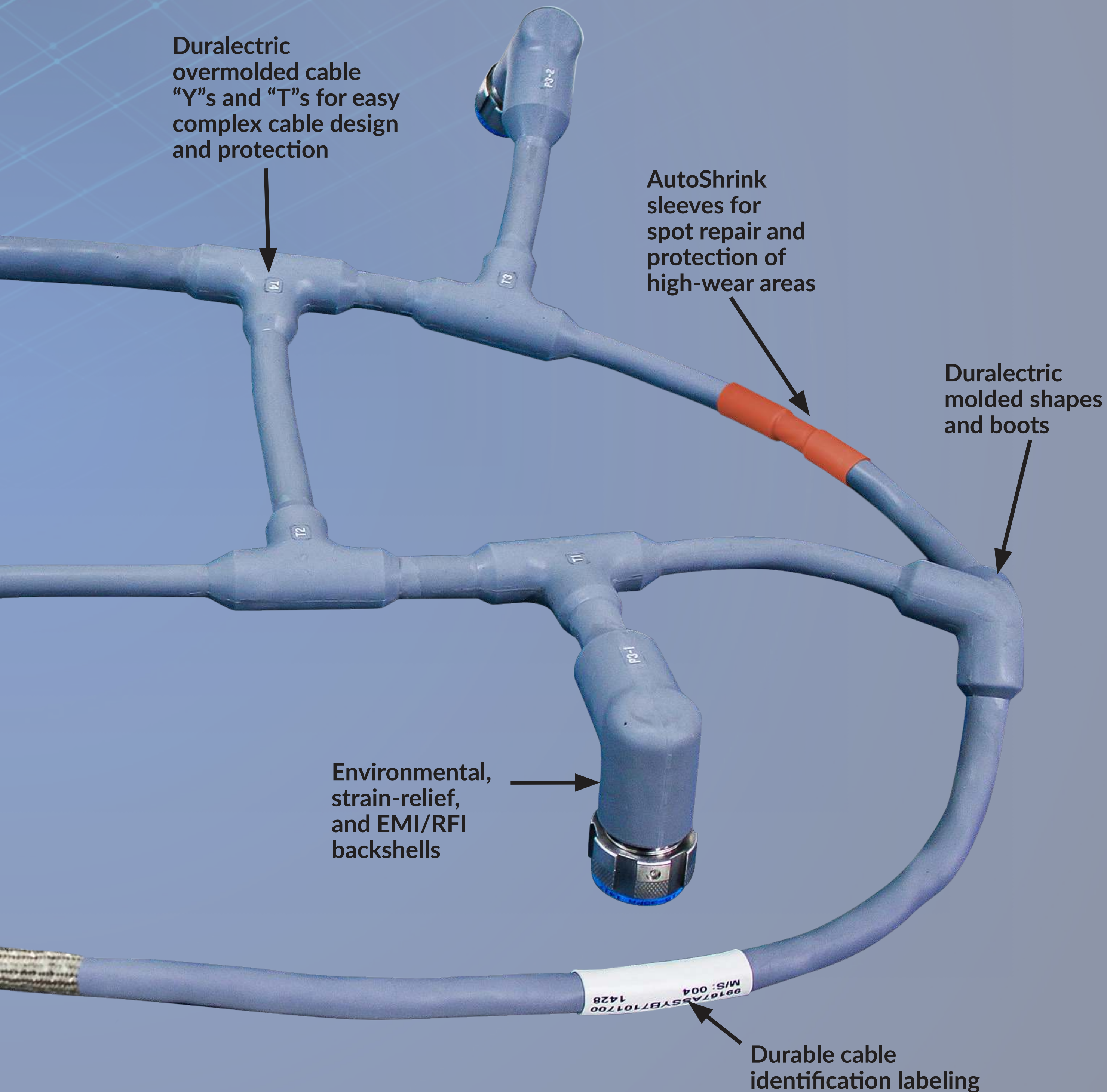
The TurboFlex Ecosystem is an integrated family of cables, contacts, connectors, and termination solutions engineered for compatibility in advanced aerospace power distribution systems. Optimized for compact packaging, high power density, and harsh-environment operation, the ecosystem simplifies system integration while improving routing flexibility, electrical performance, and long-term reliability.

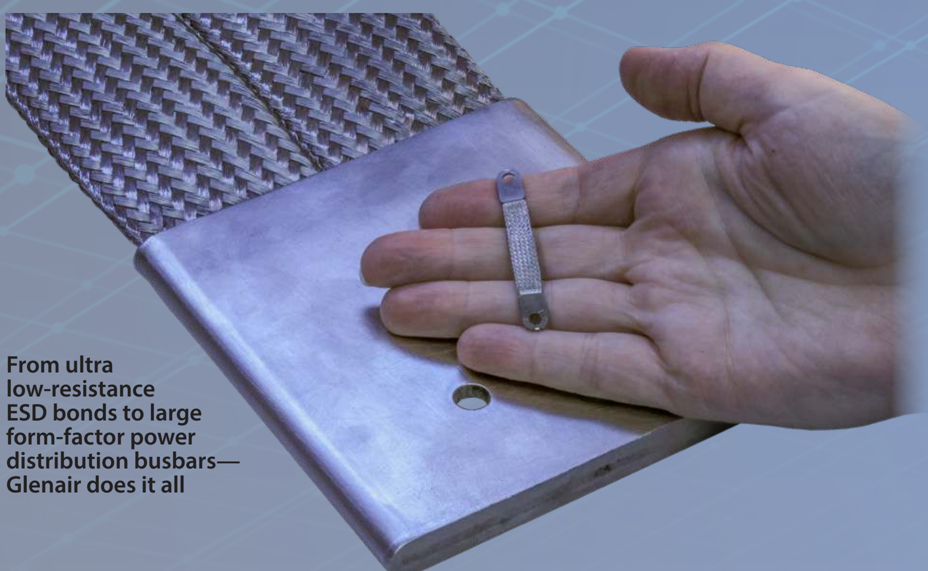


POWERING THE PLATFORM

HIGHFLEX™ GROUNDING CONDUCTORS

Ground Straps, ESD Bonds, Busbars and Shunts

Glenair flexible braided ground straps are key system components in harsh sea, air, and space environments. They are used to establish reliable ground path connections, dissipate lightning strike energy, and prevent the build-up of electrostatic discharge. Special large form-factor straps are also employed in busbar applications for electrical power distribution up to 1000 Amps. Special-purpose heat dissipation conductors find use in satellite and space applications.



From ultra low-resistance ESD bonds to large form-factor power distribution busbars—Glenair does it all

Series 680-162 Ground Plane Connector Adapters for composite panel grounding

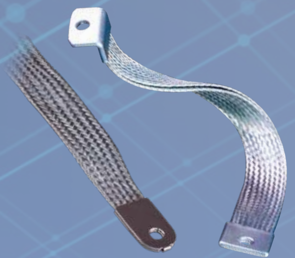
Glenair supplies a complete range of flexible braided bonding, grounding, heat dissipation, and power distribution solutions with lightweight ArmorLite microfilament material as well as low-resistance plated copper. In addition to high-availability catalog designs, we also supply custom solutions in virtually any form factor, wire gauge, amperage, resistance, and mounting-lug configuration. Straps may also be supplied with and without insulation jacketing in wire rope (jumper) and flat profiles.

PRODUCT LINE OFFERINGS

- **Durable, low-resistance ground straps with highly conductive or dissipative performance**
- **Signature ArmorLite microfilament ESD bonding conductors**
- **TurboFlex rope-lay wire rope variants**
- **Lightweight, low-resistance flexible bond straps for ESD dissipation**
- **Heavy-duty variants for low-voltage, high-current power distribution busbar applications**
- **Mil-qualified (QPL) straps are available for both topside and submarine applications**

Ground Straps, Bonds, and Busbars

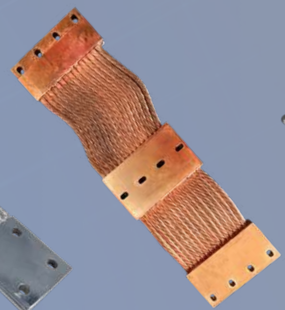
Flexible braided mil-spec and Glenair signature lightweight designs



Ultra flexible, lightweight ArmorLite microfilament ground straps and bonds

Flat and round cross-section straps, plus wire rope jumpers

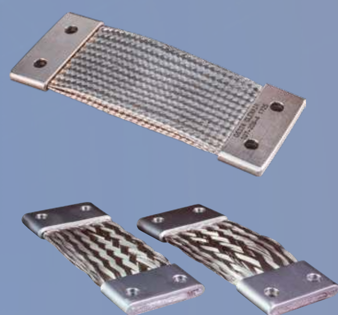
High current AC and DC flexible busbars and shunts



Flexible thermal (heat) dissipation strap

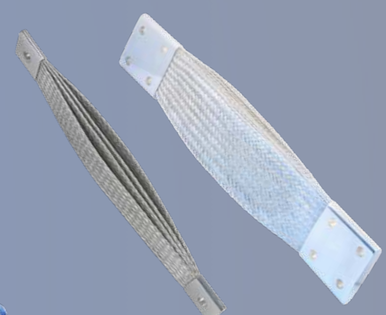
Harsh-environment jacketing for user safety and short-circuit prevention

Single and multi-leg wire rope grounding and bonding straps



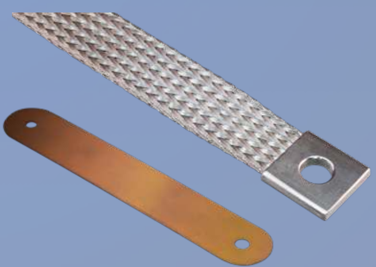
Short-length form-factor designs ideal for ESD bonding

Microfilament cable grounding designs with integrated heat-shrink termination



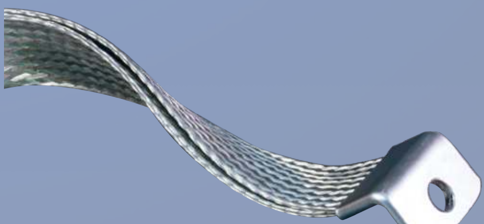
Multi-layer flexible braided busbars up to 10 layers

M24749 TYPE I, II, III, AND IV MIL-SPEC CONFIGURATIONS



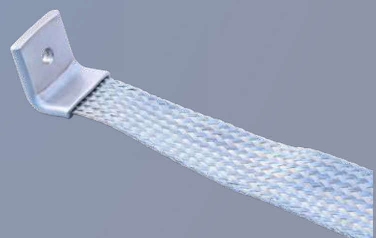
- **M24749 Type I: SST wire rope, Type II: flat CRES 316 bond strip, Type III: flat copper bond strip, and Type IV: flat braided ground strip**
- **Meets the rigorous specifications of MIL-DTL-24749 Rev. C**
- **Custom configuration options beyond standard mil-spec designs**
- **Tested to survive 1000 hours salt spray**
- **Unique steel/nickel hybrid braid**
- **Consult factory for 107-086 ground straps for submarine applications**

VARIABLE LUG / HOLE / STRAP CONFIGURATION OPTIONS AVAILABLE ON ALL STYLES



Choose single-layer straps or dual-layer for strength and electrical performance.

Available black or clear sleeving over strap. Square or radiused lugs and variable hole sizes.

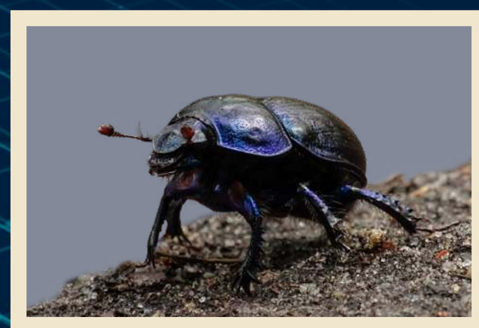


Straight, single right-angle, and dual right-angle configurable lugs.

THE MOST POWERFUL THINGS ON EARTH

11 1,000 Times Its Own Weight

No, it is not Manny Pacquiao (although that would be a good guess). It's the Dung Beetle, a mighty bug that can muscle up on more than 1,000 times its own body weight. Photo by dasWebweib via Wikimedia



10 A Bite That Can Snap Through Bone

The saltwater crocodile is known to deliver the most powerful bite force ever measured in an animal, easily crushing bone with a single snap of his jaws.

9 A Record-Setting Hurricane

Hurricane Patricia set records for sustained wind speed, concentrating enormous atmospheric energy into a single rotating system.

8 40 Gigajoules Every Second

Every second, 40 gigajoules of energy flows across Inga Falls on the Congo River—a relentless flow of kinetic energy without a close second on Earth.

7 32 Billion Tons of TNT

The 1960 Valdivia earthquake was the strongest ever recorded, with a magnitude of 9.5. The energy released was equivalent to 32 billion tons of TNT.

6 17.5 Million Pounds of Thrust

The distinctive SpaceX Starship exerts a record-shattering 17.5 million pounds of thrust, making it massively more powerful than any rocket ever imagined, let alone built. Photo via Wikimedia

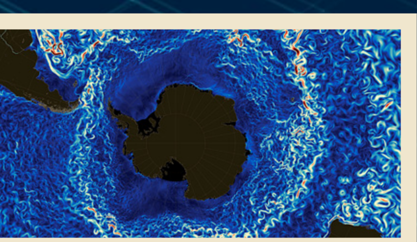
5 Generating Up to 100 Terawatt-Hours of Electricity

The Three Gorges Dam is the most powerful hydroelectric plant in the world. It generates roughly 95 to 100 terawatt-hours (TWh) of electricity per year by harnessing the relentless force of the Yangtze River.

4 The Most Powerful Jet Engine Ever Built

The General Electric GE9X produces 110,000 lbs. of thrust — that's about 65% more power than the next most powerful commercial jet engine in service today.

Photo by Dan Nevill via Wikimedia



3 Polar Current That Outdoes All of the World's Rivers

The Antarctic Circumpolar Current is the the largest and most powerful ocean current on Earth, moving far more water than all the rivers of the world combined every day.

Photo: Copernicus Sentinel ESA Satellite

2 Earth-Altering Migration

The annual Wildebeest Migration is the most powerful kinetic event in nature. Over 1.5 million animals moving in unison create a physical force that literally reshapes the Earth.

1 Wall of Water 1,700 Feet Tall

The tallest and most powerful wave ever recorded was the Lituya Bay Megatsunami in Alaska. At well over 1,700 feet tall (taller than the Empire State Building), the massive wave was triggered by a tremendous landslide.

POWERING THE PLATFORM

PowerPlay™ High-Density Power Connectors and Cables

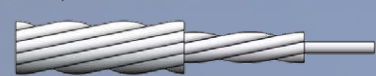
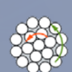
PowerPlay is a high-density, single-pin and multi-pin power connector series offered in four packaging designs: SuperNine Sr. III triple-start, SuperNine Sr. I bayonet, Series 806 micro-miniature, and Micro-Crimp precision rectangular. Blind-mate variants are also available. PowerPlay combines Glenair signature raised tower insert architecture, Crown Ring contacts, and TurboFlex cable compatibility to deliver elevated power density and ruggedized environmental performance for next-generation high-density electrification platforms. Applications include battery modules, motor controllers, power distribution, regulation, and conversion units, along with mission electronics in satellites, UAVs, and other weight- and space-constrained systems.

PowerPlay's high-conductivity Crown Ring contacts and dielectric insert technology deliver 5,000 VAC dielectric withstanding voltage. Raised-tower socket architecture and safe-touch pin contacts meet industry protection requirements for high-power distribution applications while improving creepage and arc-resistance performance. PowerPlay connectors also employ high-temperature materials throughout, increasing current-carrying capacity in these high-density, small form-factor interconnects compared to conventional mil-aero designs.

ABOUT TURBOFLEX "M" AND TURBOFLEX "R" CABLE CONSTRUCTION

TurboFlex cables are jacketed with Duralectric insulation, which contributes to the flexibility of the product. TurboFlex R (rope-lay core) provides maximum flexibility. Stranded TurboFlex M (M22759 core) has a slightly larger bend radius but far superior flexibility compared to standard ETFE-jacketed M22759 cable. Both configurations are supplied in gauges optimized for use with PowerPlay.


TurboFlex R with rope-lay cable construction

TurboFlex M with stranded M22759 cable construction

kV SEAL HIGH-VOLTAGE CONTACT ASSEMBLIES FOR DC CIRCUITS

kV Seal™ high-voltage contact assemblies are drop-in solutions for compact aerospace and defense electronic systems. kV Seal enables reliable HVDC transmission by protecting against dielectric breakdown, surface tracking, and arcing at altitude.

- 5000 VAC dielectric withstanding voltage
- Support for bus-bar and other wire terminations
- High current, low-resistance, and superior vibration performance
- Safe-touch finger-proofing
- Integrated band platform cable shield termination
- Compatible with TurboFlex high-flexibility cable
- Multi-pin arrangements for size 8 and 4 AWG contacts. Single-pin arrangements for #2, #1/0, #2/0, and #4/0 contacts. Options for 20 AWG interlock contacts on all sizes

POWERPLAY CONNECTOR PACKAGING WITH PRECISION-MACHINED HIGH-DENSITY SHELLS, LOW-TEMPERATURE CROWN RING CONTACTS, AND RAISED TOWER ARCHITECTURE

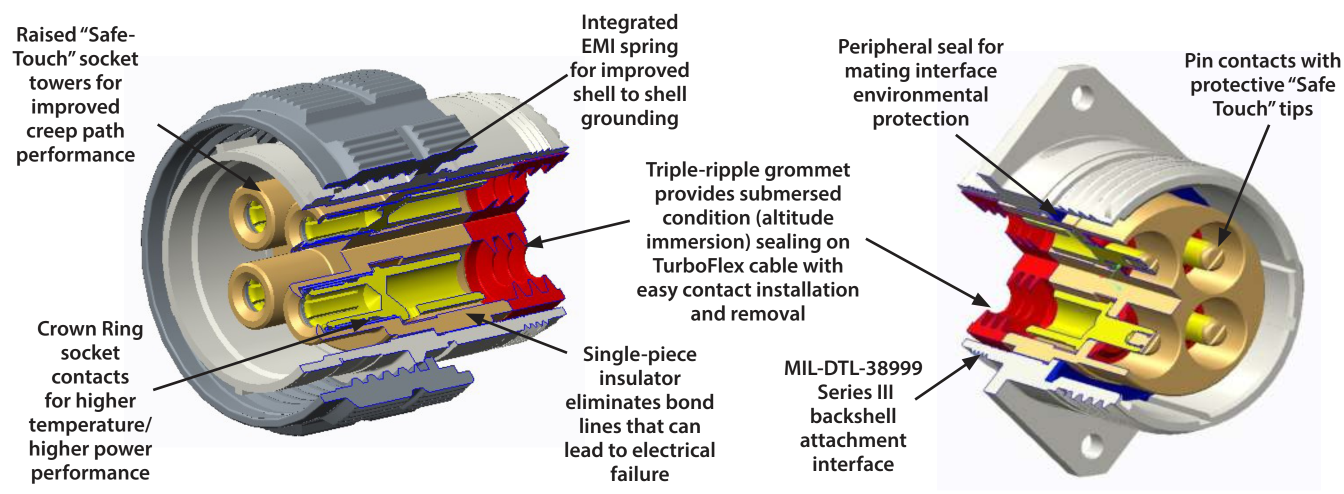
SuperNine Series III
PowerPlay Triple-Start

SuperNine Series I
PowerPlay Bayonet

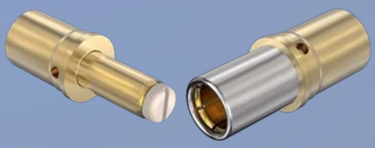
Series 806 Mil-Aero
PowerPlay High Density

Micro-Crimp
PowerPlay Rectangular

PowerPlay™: KEY CONNECTOR AND CONTACT DESIGN FEATURES, PLUG/RECEPTACLE CUTAWAY VIEWS



GLENAIR SIGNATURE CROWN RING CONTACTS



- **High vibration-resistant, high-conductivity gold-plated copper alloy. Socket contact adds stainless steel Crown Ring; pin contact adds thermoplastic finger-safe tip**
- **Up to 60% lower contact resistance than equivalent AS39029 contacts**
- **High operating temperature resistance compared to other specialized high-power contacts**
- **Available in contact gauges from size #23 to #4/0**

TURBOFLEX® ULTRA FLEXIBLE / RUGGED POWER CABLES WITH DURALECTRIC JACKETING

TurboFlex high-flexibility power cabling is optimized for use with PowerPlay connectors and is supplied with Glenair signature Duralectric jacketing material for rugged fluid immersion, caustic chemical exposure, temperature extremes, and UV radiation. Duralectric is available in a broad range of colors including safety orange. Two cable core constructions are supplied: TurboFlex M with AS22759-type conductors, and TurboFlex R with ultra-flexible rope-lay conductors.

Available with cable gauge selections from 8 AWG to 4/0, to provide suitable margins for DWV, frequency derating, and peak-load electrical performance.

DURALECTRIC JACKETING	
Abrasion Resistance	Good
Wear Resistance	Good
Flame Resistance	Excellent
Sunlight Resistance	Excellent
Flex Resistance	Excellent

POWERING THE PLATFORM

PowerPlay™ High-Density Power Connectors and Cables

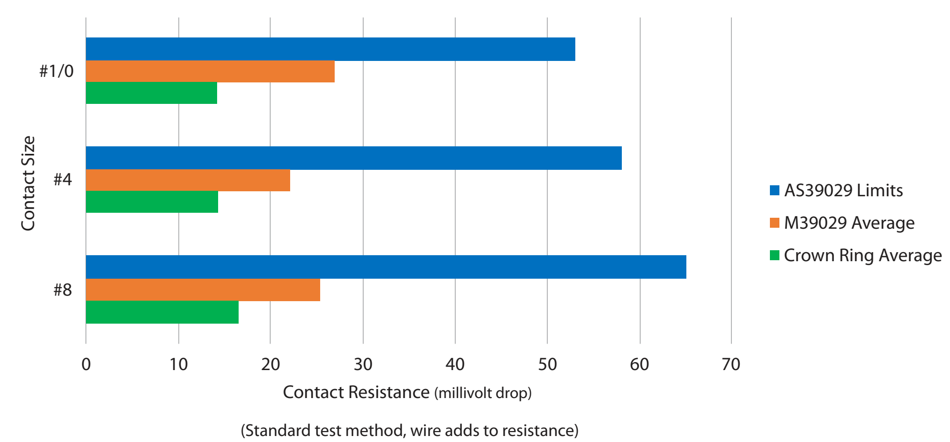
CROWN RING CONTACTS MAXIMIZE CURRENT CARRYING CAPACITY

Current carrying capacity can be defined as the maximum level of current that a connector can handle, while keeping all the components of the connector at or below their temperature limits. Temperature rise is caused by the heat generated from current flowing against the resistance of the conductive path. The two main sources of resistance in a cable system are the bulk resistance of the wire and the contact junction within a pair of connectors.

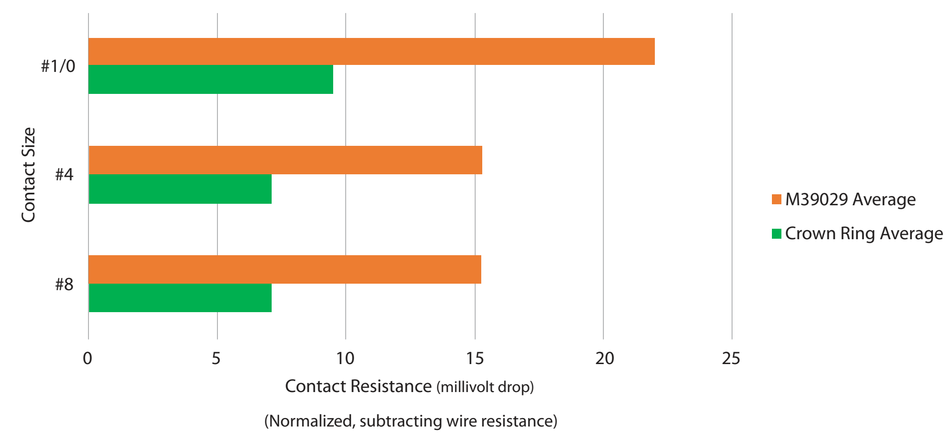
CROWN RING CONTACTS MINIMIZE CONTACT RESISTANCE

To keep temperature rise to a minimum, Glenair developed its signature Crown Ring contacts for use in PowerPlay connectors. Crown Ring contacts are designed to minimize contact resistance by using high conductivity copper alloy and a stainless steel ring for contact normal force. The results are contact resistance values 75% less than AS39029 required limits and as much as 60% less than average M39029 contact performance. (see graphs here). Crown Ring contacts, with extremely low contact resistance, also exhibit lower temperature rise when compared to standard M39029 contacts and specialized high-power contacts from other manufacturers.

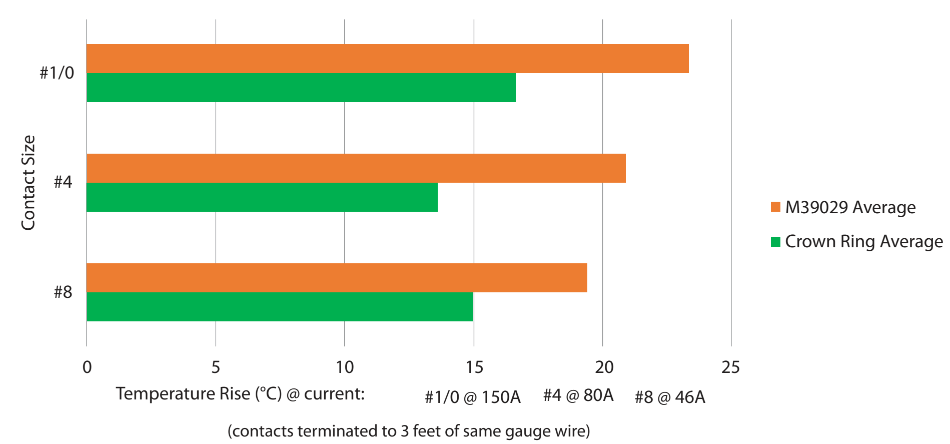
STANDARD CONTACT RESISTANCE (PER AS39029 TABLE 6)



CONTACT RESISTANCE AFTER SUBTRACTING RESISTANCE OF WIRE



TEMPERATURE RISE



PowerPlay High-Power Connectors

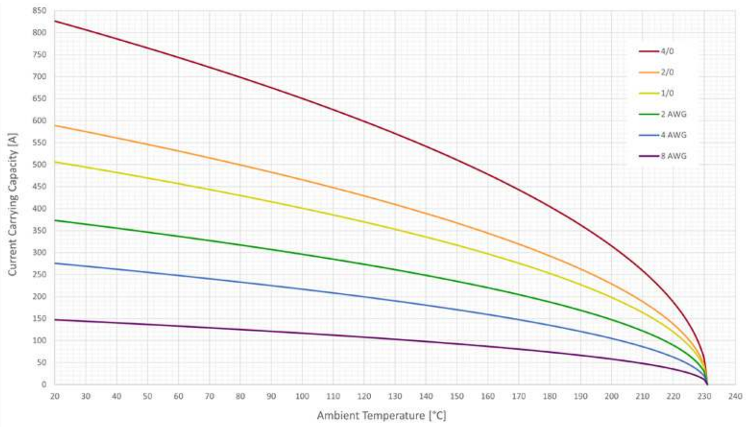
POWERPLAY CONNECTOR MATERIALS AND DESIGN MAXIMIZE CURRENT CARRYING CAPACITY IN STAINLESS STEEL AND ALUMINUM CONNECTOR SHELLS

PowerPlay connectors employ high-performance, high-temperature materials throughout. This means that the interconnect system can withstand higher temperature rise than the typical Mil-Aero connector. In the case where the application can allow wire and connector temperatures to run at or near their rated temperatures (up to 230°C), PowerPlay connectors can handle even higher current levels than already afforded by the low-resistance Crown Ring contacts.

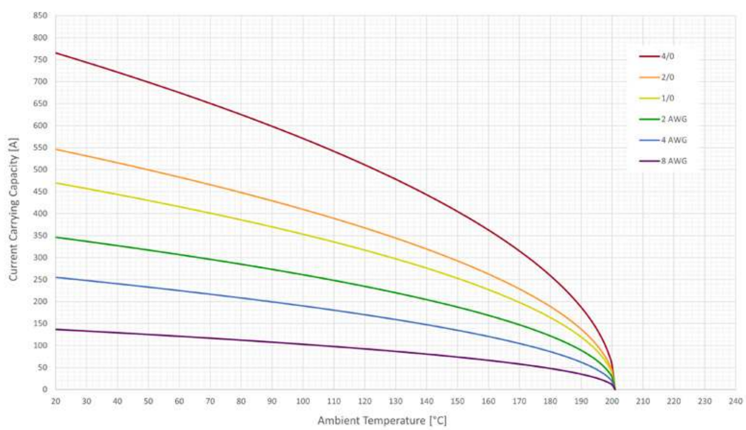
Current carrying capacity is an application-specific rating, requiring many system level inputs. Some of these inputs are: maximum ambient temperature(s), operating altitudes, physical environment (operating in enclosure or open air), cable construction/insulation and others.

For most aerospace applications, Glenair suggests using SAE AS50881 as a baseline for current carrying capacity for PowerPlay connectors. These baseline current levels are shown in the graphs here for single pin connectors. Glenair welcomes the opportunity to work with your team to provide performance estimates and product suggestions, maximizing the power delivered by PowerPlay connectors for your specific application.

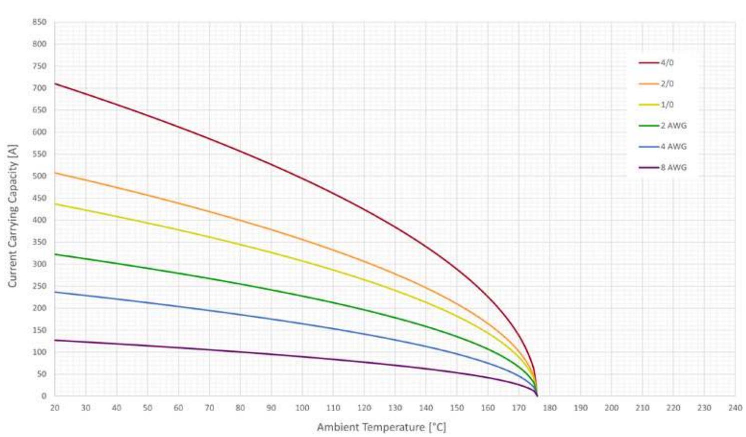
MAX CURRENT CARRYING CAPACITY VS. AMBIENT TEMPERATURE: CROWN RING CONTACTS IN 230°C RATED SST POWERPLAY CONNECTORS



MAX CURRENT CARRYING CAPACITY VS. AMBIENT TEMPERATURE: CROWN RING CONTACTS IN 200°C RATED AL POWERPLAY CONNECTORS



MAX CURRENT CARRYING CAPACITY VS. AMBIENT TEMPERATURE: CROWN RING CONTACTS IN 175°C RATED AL POWERPLAY CONNECTORS



NOTE: Lower temperature rise reduces heat aging of surrounding insulation, leading to longer life and higher reliability of the connector.

HIGH CURRENT-CARRYING CONTACTS: PARTIAL DISCHARGE, HOT-SIDE CONNECTORS, AND "SAFE-TOUCH" DESIGN

Glenair Series 973 PowerPlay connectors may be specified with pin or socket contact genders in plugs and receptacles. The raised socket contact towers serve to prevent partial discharge (surface tracking) and arcing events. The design has the additional benefit of functioning as a "safe-touch" system on hot-side components, protecting the user from exposed live contacts.

PowerPlay with "safe-touch" contacts

POWERING THE PLATFORM

POWER TRIP®

The Ruggedized Power Connector for Extreme Environments

Series 970 PowerTrip connectors address the need for a military-grade harsh environment power connector with improved mechanical, environmental, and electrical performance. PowerTrip delivers reduced size and weight compared to lower-density 5015 type power connectors and features triple-start mating threads, crimp rear-release contacts, IP68 environmental sealing, splined backshell interface, and improved EMI protection. PowerTrip is designed for power distribution units, hybrid electric drives, motors, and other high current applications, particularly in harsh application environments such as military ground power, military vehicles, and transport aircraft.

SERIES 970 POWERTRIP RUGGED APPLICATION ADVANTAGES

Ruggedized plug with ratcheting coupling nut, LouverBand socket contacts, and splined backshell interface

Complete range of receptacle styles including box-mount, wall-mount, jam-nut, and hermetic

- **Fast, easy mating with triple-start ACME thread: ratcheting coupling nut with 360° turn for full mating**
- **Reduced size and weight compared to 5015/VG95234 solutions**
- **Crimp, rear-release high-ampacity LouverBand contacts for improved current ratings and longer life, rated to 500 mating cycles**
- **Ruggedized performance: high-shock, high-vibration, advanced environmental sealing, five-key polarization, and EMI ground spring**
- **Splined backshell interface for improved backshell attachment and EMI shielding or integral banding platform**
- **Operating temperature -65° C to +200° C**

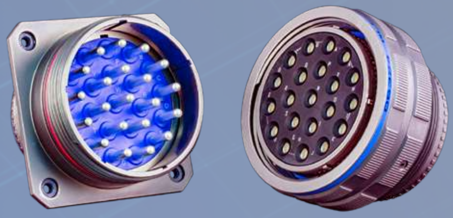
The Series 970 PowerTrip is a fully mature power product connector series with 36 high-density power insert arrangements and a wide range of rugged cable management back-end accessories

RUGGEDIZED PowerTrip® Connectors and Cables

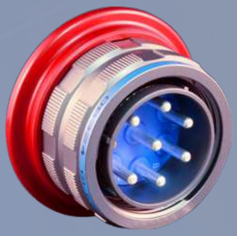
The power connector for extreme environments

SIGNATURE POWERTRIP CONNECTOR CONFIGURATIONS

Ruggedized plug with integrated banding porch

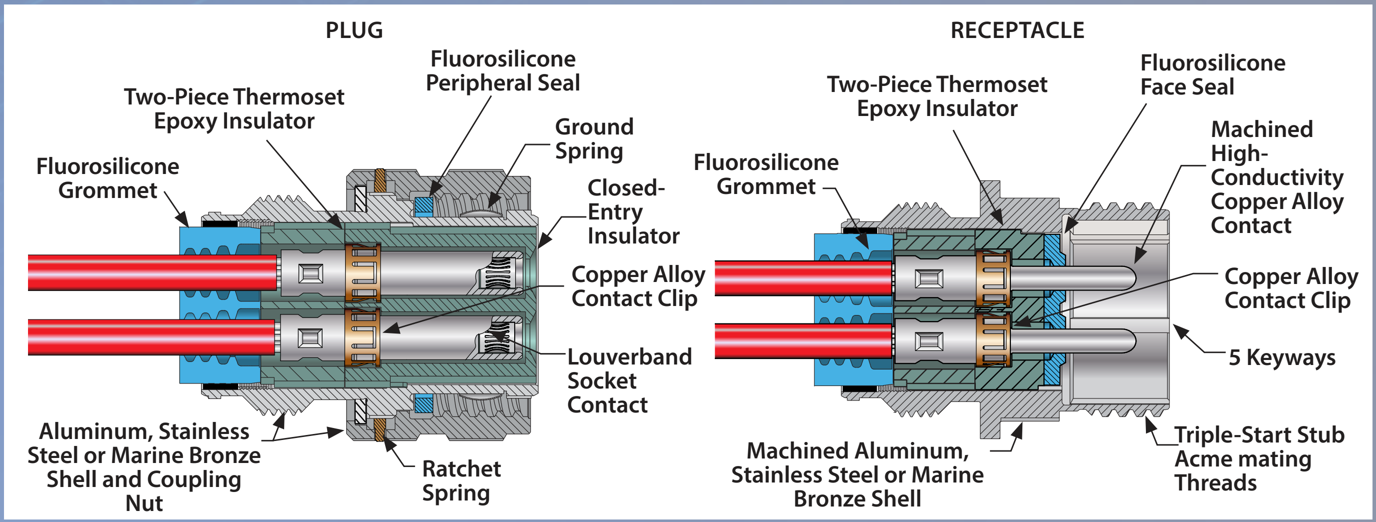


High-density LouverBand contact insert arrangements



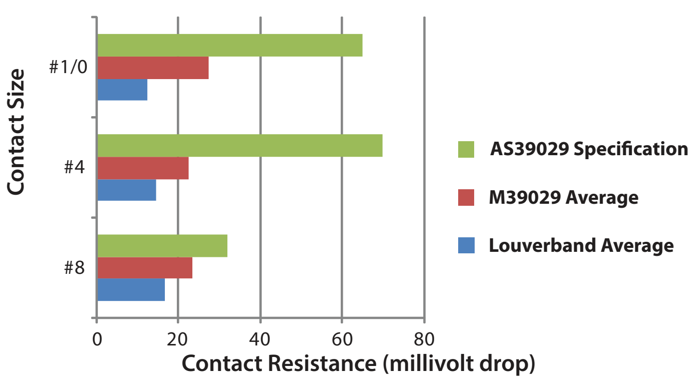
Plug designs with integrated safety lock

Hermetic receptacles with solder cup wire terminations



SERIES 970 POWERTRIP™ SPECIFICATIONS	
Current Rating	Up to 225 A.
Dielectric Withstanding Voltage	2000 VAC
Insulation Resistance	5000 megohms minimum
Operating Temperature	-65° C. to +200° C.
Shock	300 g
Vibration	43.92 g
Shielding Effectiveness	65 dB minimum from 1GHz to 10GHz.
Durability	2000 mating cycles

CONTACT RESISTANCE AFTER 1000 MATING CYCLES



ABOUT THE POWERTRIP CONTACT SYSTEM

Series 970 contacts are precision-machined using high conductivity copper alloy. A stamped and formed spring ("LouverBand") is installed into the socket contact. Testing has demonstrated that this contact system outperforms conventional split-tine contact systems. The LouverBand spring provides many points of electrical contact with the mating pin, as opposed to a few "high spots" on a conventional four-finger contact. The size #8 PowerTrip socket contact has a total of 18 louvers. The #4 has 27 louvers, and the #1/0 has 42 louvers. The LouverBand design offers lower voltage drop for reduced Joule heating, and has consistent, stable normal force even when subjected to thousands of mating cycles and extreme temperatures.

Conventional contact on the left, LouverBand contact on the right

LouverBand socket contact cutaway

POWERING THE PLATFORM

POWER TRIP®

The Ruggedized Power Connector for Extreme Environments

PowerTrip Contacts

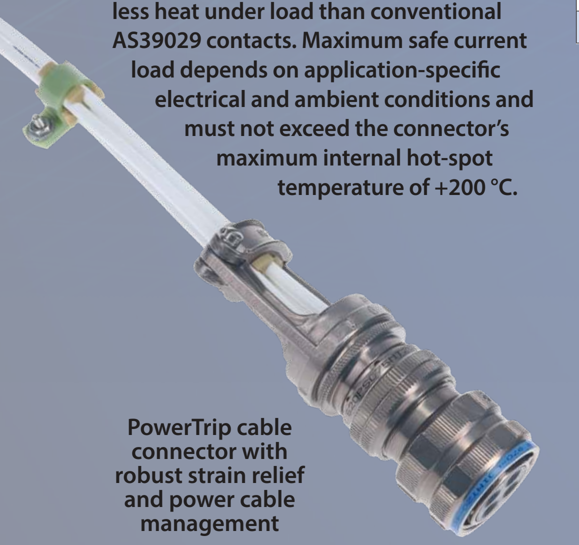
Series 970 socket contacts have a spring ("LouverBand"). Testing has demonstrated that LouverBand contacts have better mechanical and electrical performance compared to split-tine contacts. The spring provides multiple points of electrical contact, as opposed to a few "high spots" on a conventional four-finger contact. The LouverBand design offers low voltage drop for reduced temperature rise and higher current carrying capacity. The LouverBand spring has consistent, stable normal force, even when subjected to high mating cycles and temperature extremes.

Last-Mate, First-Break for Interlock Circuits

The Powertrip insert arrangements include layouts with size #12 and #16 contacts. These contacts are designed to mate only after the larger power contacts are mated. When connectors are uncoupled, the size #12 and #16 contacts separate before the power contacts are disengaged. These smaller contacts are typically used for safety interlock circuits.

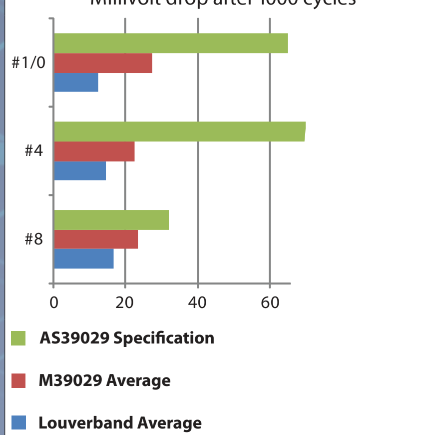
Current Rating

PowerTrip contact resistance (voltage drop) is up to 60% lower than AS39029 limits. Temperature-rise testing demonstrates that LouverBand contacts generate less heat under load than conventional AS39029 contacts. Maximum safe current load depends on application-specific electrical and ambient conditions and must not exceed the connector's maximum internal hot-spot temperature of +200 °C.

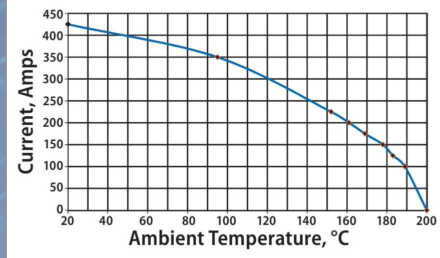


PowerTrip cable connector with robust strain relief and power cable management

LOUVERBAND CONTACT RESISTANCE

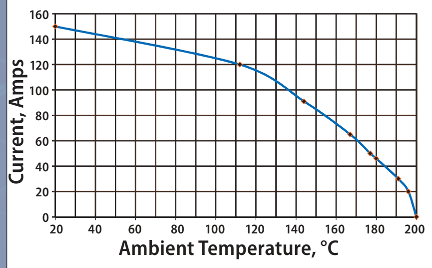


SIZE 1/0 CONTACT DE-RATING CURVE AND T-RISE



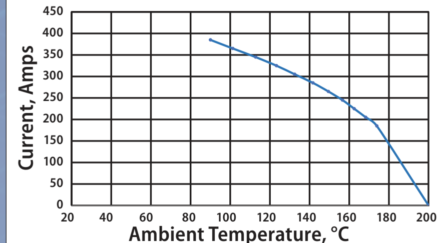
Current, A	T-Rise, °C	Current, A	T-Rise, °C
100	11	200	39
125	17	225	48
150	22	350	104
175	31	425	177

SIZE 8 CONTACT DE-RATING CURVE AND T-RISE



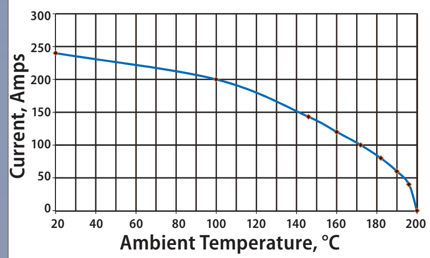
Current, A	T-Rise, °C	Current, A	T-Rise, °C
20	4	60	33
30	9	80	56
46	20	120	88
50	23	150	179

SIZE 2/0 CONTACT DE-RATING CURVE AND T-RISE



Current, A	T-Rise, °C	Current, A	T-Rise, °C
100	11	200	39
125	17	225	48
150	22	350	104
175	31	425	177

SIZE 4 CONTACT DE-RATING CURVE AND T-RISE

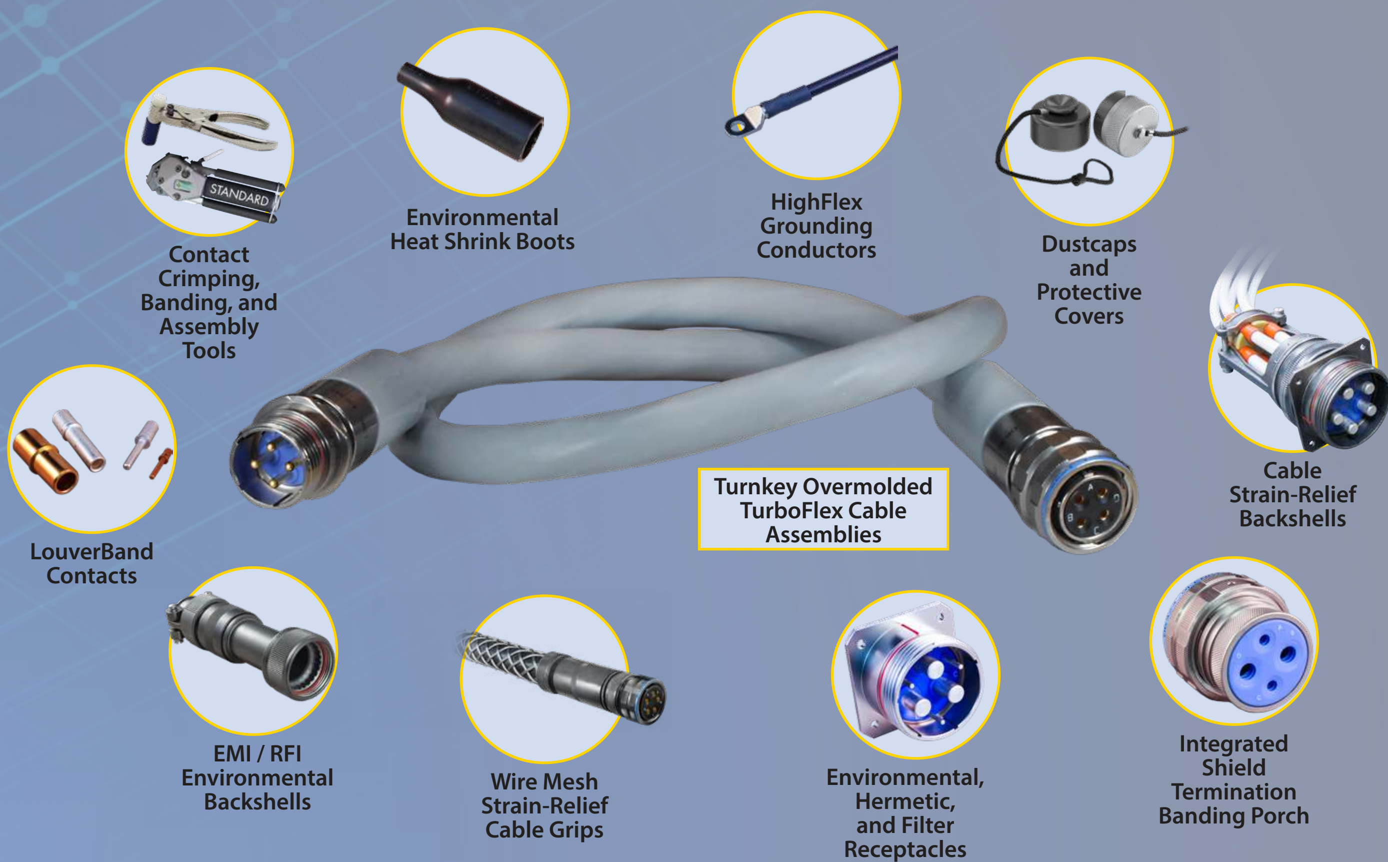


Current, A	T-Rise, °C	Current, A	T-Rise, °C
40	4	120	40
60	10	140	54
80	18	200	100
100	28	240	176

CURRENT RATING

Contact Size	Amps Environmental	Amps Hermetic
#16	13	10
#12	23	17
#8	60	33
#4	100	60
#1/0	175	100
#2/0	205	150

SERIES 970
The PowerTrip® Ecosystem



SERIES 970 POWERTRIP INSERT ARRANGEMENTS

Insert Arrangement	Contact Size and Quantity					
	#16	#12	#8	#4	#1/0	#2/0
18-2			2			
18-4		2	2			
20-3			3			
20-4			4			
20-5		2	3			
20-7	4		3			
24-1					1	
24-2				2		
24-3				3		
24-5			5			
24-6		4		2		
24-A1						1
24-A6		3		3		
28-12	6		6			
28-15	15					
28-4				4		
28-8		1	7			
28-9	5			4		

Insert Arrangement	Contact Size and Quantity					
	#16	#12	#8	#4	#1/0	#2/0
32-12	2		10			
32-2					2	
32-20	1	19				
32-3					3	
32-4				2	2	
32-5				5		
32-6		3			3	
32-7				7		
32-A22		22				
36-16	3		13			
36-2						2
36-4					4	
36-9	14	14	2	1		
36-A8				8		
36-B8	4				4	
40-10	16		9	4		
40-21			21			
40-5					5	

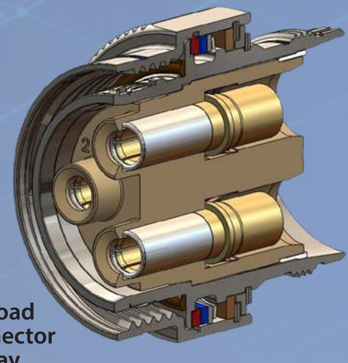
POWERING THE PLATFORM

POWER LOAD™

Glenair's Highest Power Aerospace-Grade Power Connector

Built for the highest-power aircraft electrical generation and distribution systems

As aircraft electrical loads continue to increase, power distribution systems require larger conductors, higher-current contacts, and more robust connector architectures. PowerLoad extends Glenair power interconnect capability beyond lighter-weight power connector solutions such as PowerPlay with shell sizes up to 40, contact sizes up to 4/0, and heavy-duty cable termination hardware designed for the most demanding aircraft power distribution networks.



PowerLoad Plug connector cutaway

- **PowerLoad™**, the high-vibration, high-temperature interconnect optimized for higher-voltage, higher-altitude, and higher-frequency, with insert arrangements up to shell size 40 with three #2/0 contacts
- **TurboFlex®**, the Glenair signature high-flexibility power cable solution
- **Crown Ring** crimp, bus bar, and lug style contacts, optimized for high current carrying, high temperature performance

A GLENAIR SIGNATURE SOLUTION FOR HIGHER POWER AND LARGER CABLE / CONTACT APPLICATIONS

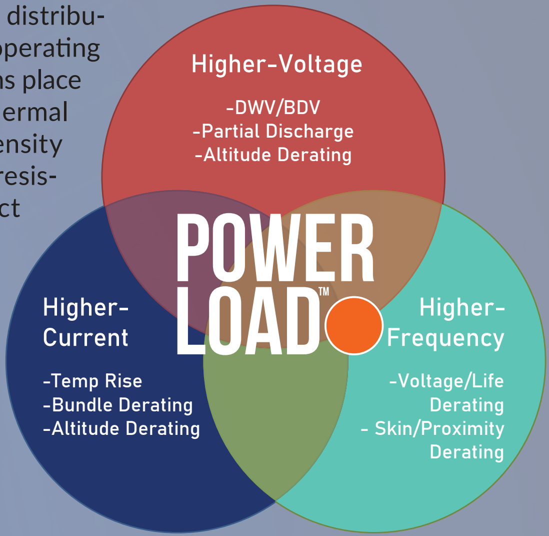
- **230°C maximum operating temperature connectors (stainless steel bodies and shells)**
- **TurboFlex® rope-lay power cables optimized for PowerLoad™ connectors, from 8 AWG to 4/0**
- **Ultra-flexible cable configurations with ruggedized Duralectric or FEP jacketing:**
  - **Single-wall hookup wire**
  - **Dual-wall jacketed interconnect cabling**
- **High-temperature Crown Ring contact technology**
- **Patented wire sealing grommet**
- **Heavy-duty accessory interface**

POWERLOAD

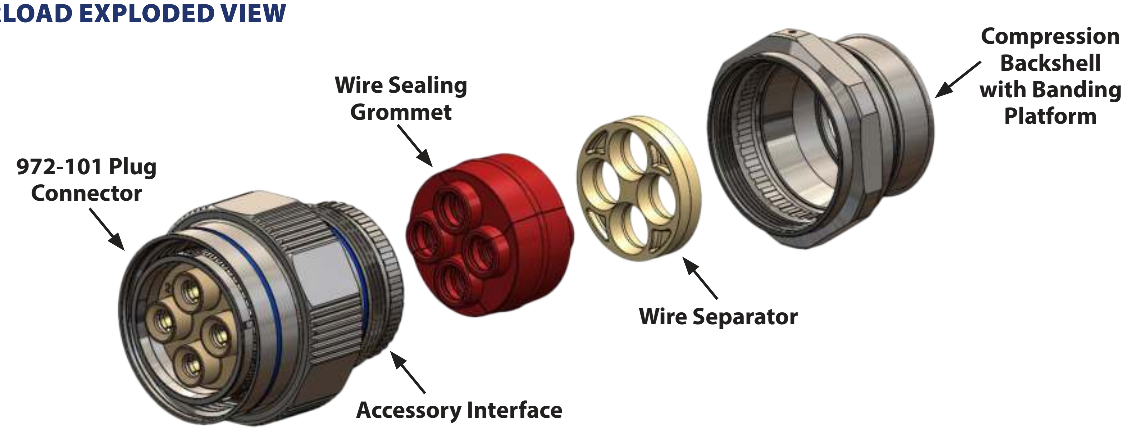
Optimized by Design for High-Voltage, High-Current, and High-Frequency

GLENAIR QwikConnect

When specifying interconnect technology for aircraft electrical power distribution, engineers must evaluate the combined effects of electrical load, operating environment, and system architecture. Advanced electrification platforms place increased demands on insulation systems, conductor performance, thermal management, and frequency-dependent behavior. Elevated power density and compact packaging require careful attention to partial discharge resistance, temperature rise, wire gauge selection, and skin/proximity effect derating. In next-generation aerospace EWIS and electrified propulsion systems, cable-to-contact terminations must be precisely controlled to eliminate voids that can initiate dielectric failure over time. Designed for power requirements beyond those addressed by lightweight PowerPlay interconnects, the Glenair PowerLoad ecosystem supports contact sizes up to #4/0 with corresponding large-gauge cables, robust backshells, and strain-relief accessories. Combining engineered connectors, TurboFlex cables, and Crown Ring contacts, PowerLoad is optimized for harsh-environment power distribution in high-current aerospace and defense applications.



POWERLOAD EXPLODED VIEW



High power capability

- Superior current carrying capacity
- 100% DWV tested at 5,000 VAC (all arrangements)
- Single-piece insulator eliminates internal bond-lines
- Extended creepage distances with tower/recess interface design

230°C max. operating temperature (stainless steel)

- High-temperature advanced engineered thermoplastic insulators
- High-temperature fluorosilicone blend for all seals
- Stainless Steel EMI spring provides excellent EMI shielding and shell-to-shell grounding at elevated temperatures

High-temperature Crown Ring contact technology

- Body is precision-machined from high conductivity copper alloy
- Up to 60% lower contact resistance than equivalent AS39029 contacts (normalized, less wire)
- Outstanding conductivity up to 260°C
- Gold plated for enhanced durability in high-vibration applications

Patented, removable wire sealing grommet (US Patent 9356387)

- Provides superior sealing on all wire, including tape-wrapped wire
- Allows for easy contact installation and removal
- Can also be used with extrusion insulated wire
- Connector fully sealed from moisture in submersed condition (altitude immersion)

Heavy-duty accessory interface

- Spline design ensures proper alignment of backshell during assembly
- Robust interface handles weight of large-gauge heavy wire

POWERING THE PLATFORM

POWER LOAD™

Glenair's Highest Power Aerospace-Grade Power Connector

POWERLOAD CONNECTOR MATERIALS AND DESIGN MAXIMIZE CURRENT CARRYING CAPACITY

PowerLoad connectors employ high performance, high-temperature materials throughout. This means that the interconnect system can withstand higher temperature rise than the typical Mil-Aero connector. In the case where the application can allow wire and connector temperatures to run at or near their rated temperatures (up to 230°C), PowerLoad connectors can handle even higher current levels than already afforded by the low-resistance Crown Ring contacts.

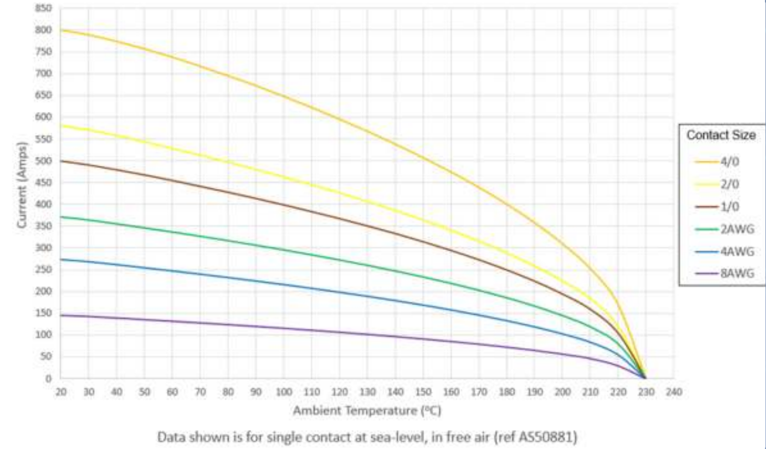
Current carrying capacity is an application-specific rating, requiring many system level inputs including: maximum ambient temperature(s), operating altitudes, physical environment (operating in enclosure or open air), cable construction/insulation and others.

For most aerospace applications, Glenair suggests using SAE AS50881 as a baseline for current carrying capacity for PowerLoad connectors. These baseline current levels are shown in the graphs here for single pin connectors. We welcome the opportunity to work with your team to maximize the power delivered by PowerLoad connectors for your application.

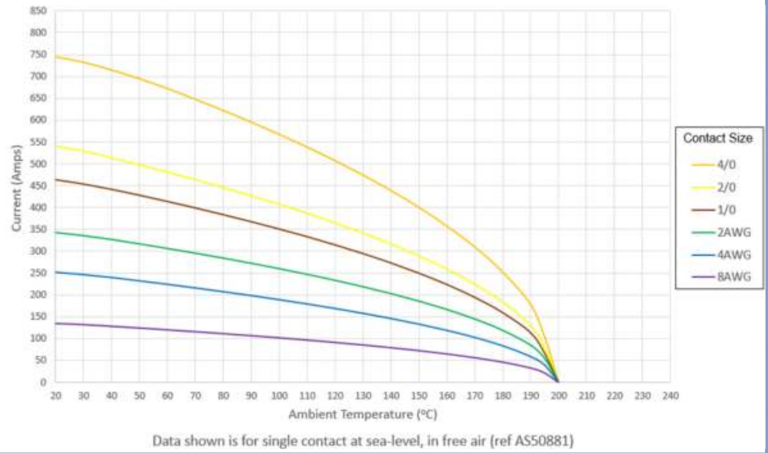
HIGH CURRENT-CARRYING CONTACTS: PARTIAL DISCHARGE, HOT-SIDE CONNECTORS, AND "SAFE-TOUCH" DESIGN

Glenair Series 972 PowerLoad connectors may be specified with pin or socket contact genders in plugs and receptacles. The raised socket contact towers serve to prevent partial discharge and arcing events. The design has the additional benefit of functioning as a "safe-touch" system on hot-side components, protecting the user when connectors are separated under load.

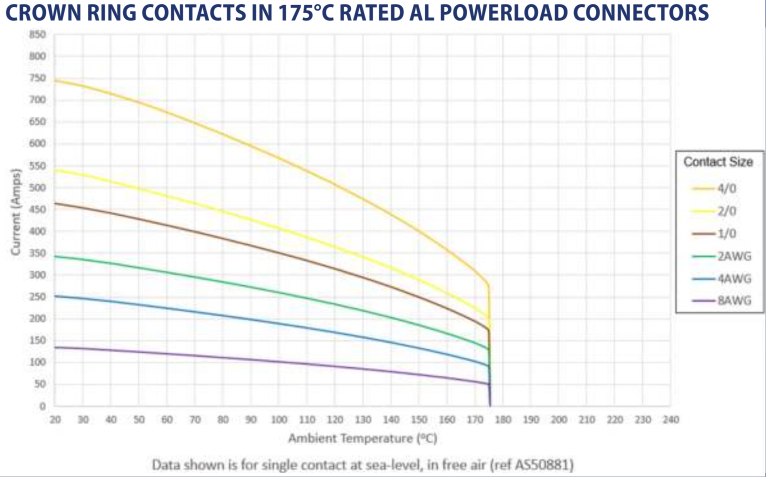
MAX CURRENT CARRYING CAPACITY VS. AMBIENT TEMPERATURE: CROWN RING CONTACTS IN 230°C RATED SST POWERLOAD CONNECTORS



MAX CURRENT CARRYING CAPACITY VS. AMBIENT TEMPERATURE: CROWN RING CONTACTS IN 200°C RATED AL POWERLOAD CONNECTORS



MAX CURRENT CARRYING CAPACITY VS. AMBIENT TEMPERATURE: CROWN RING CONTACTS IN 175°C RATED AL POWERLOAD CONNECTORS



Optimized by Design for High-Voltage, High-Current, and High-Frequency

GLENAIR QwikConnect

<table>
<tr><th colspan="3">POWERLOAD™ PERFORMANCE SPECIFICATION</th></tr>
<tr><th>Test Description</th><th>Requirement</th><th>Procedure</th></tr>
<tr><td>Dielectric withstanding voltage (DWV)</td><td><table><tr><th>Insert Arrangement</th><th>Altitude</th><th>Voltage</th></tr><tr><td>All Shown Herein</td><td>Sea level</td><td>5,000 VAC</td></tr><tr><td></td><td>50,000 ft</td><td>2,250 VAC</td></tr></table></td><td>EIA-364-20 Method A
2 mA maximum leakage current
Mated pairs</td></tr>
<tr><td>Partial discharge, typical values</td><td><table><tr><th>Inception/ Extinction</th><th>Altitude</th><th>Voltage</th></tr><tr><td rowspan="5">PDIV</td><td>Sea level</td><td>4,500 VAC</td></tr><tr><td>15,000 ft</td><td>3,800 VAC</td></tr><tr><td>35,000 ft</td><td>3,000 VAC</td></tr><tr><td>50,000 ft</td><td>2,000 VAC</td></tr><tr><td>70,000 ft</td><td>1,000 VAC</td></tr><tr><td rowspan="5">PDEV</td><td>Sea level</td><td>3,700 VAC</td></tr><tr><td>15,000 ft</td><td>3,100 VAC</td></tr><tr><td>35,000 ft</td><td>2,500 VAC</td></tr><tr><td>50,000 ft</td><td>1,500 VAC</td></tr><tr><td>70,000 ft</td><td>800 VAC</td></tr></table></td><td>5pc threshold
(See GT-20-270 for full report)</td></tr>
<tr><td>Insulation resistance at ambient</td><td>5000 megohms minimum</td><td>EIA-364-21, at 500 VDC</td></tr>
<tr><td>Insulation resistance at elevated temperature</td><td>400 megohms minimum at max. rated temp.</td><td>EIA-364-21, at 500 VDC</td></tr>
<tr><td>Contact resistance at 25°C, crimp contacts</td><td><table><tr><th rowspan="2">Contact / Wire Size</th><th rowspan="2">Test Current Amperes</th><th colspan="2">Voltage Drop (millivolts)</th></tr><tr><th>Initial Max</th><th>Crown Ring Typical</th></tr><tr><td>0000</td><td>225</td><td>53</td><td>13</td></tr><tr><td>00</td><td>185</td><td>48</td><td>11</td></tr><tr><td>0</td><td>150</td><td>53</td><td>14</td></tr><tr><td>2</td><td>100</td><td>43</td><td>12</td></tr><tr><td>4</td><td>80</td><td>58</td><td>14</td></tr><tr><td>8</td><td>46</td><td>65</td><td>17</td></tr></table></td><td>AS39029 Para. 3.5.4 (Table 6),
EIA-364-06</td></tr>
<tr><td>Contact engaging /separation force</td><td>Contact forces shall meet AS39029 Table 9 requirements</td><td>AS39029 Para. 3.5.5,
EIA-364-37</td></tr>
<tr><td>Temperature cycling (thermal shock)</td><td>No evidence of damage detrimental to the function of the connector</td><td>EIA-364-32, Method A, Duration A, Mated connectors, max/min temps in accodance with temperature rating of connector</td></tr>
<tr><td>Random vibration, 37.8 grms</td><td>No discontinuities of 1 microsecond or longer</td><td>EIA-364-28, Test Condition V, Letter J, Ambient, 8 Hrs, 2 Axis</td></tr>
<tr><td>Mechanical shock, 50g</td><td>No discontinuities of 1 microsecond or longer</td><td>EIA-364-27, Test Condition A</td></tr>
<tr><td>Fluid immersion</td><td>No damage to plastic, elastomeric or bonding materials detrimental to the function of the connector. Connector shall mate and unmate properly and meet coupling torque and DWV requirements after immersion.</td><td>EIA-364-10
Various aviation fluids, fuels and oils
(See GT-21-155)</td></tr>
<tr><td>Altitude immersion</td><td>At the end of the third cycle, while still submersed, connectors shall meet dielectric withstanding voltage and 1,000 megohms insulation resistance.</td><td>EIA-364-03
50,000 feet</td></tr>
<tr><td>Salt spray, dynamic</td><td><table><tr><th>Finish Code</th><th>Shell Mat'l/ Finish</th><th>Hours</th></tr><tr><td>ME</td><td>Al / EN</td><td>96</td></tr><tr><td>MT</td><td>Al / Ni-PTFE</td><td>500</td></tr><tr><td>NF</td><td>Al / OD Cad</td><td>500</td></tr><tr><td>ZR</td><td>Al / Zn-Ni</td><td>500</td></tr><tr><td>Z1</td><td>SST / pass.</td><td>1000</td></tr><tr><td>ZL</td><td>SST / Ni</td><td>1000</td></tr></table></td><td>MIL-DTL-38999 Para. 4.5.13.2
EIA-364-26
150 mating cycles total</td></tr>
</table>

ENGINEERING THE COMPLETE POWER INTERCONNECT ECOSYSTEM SOLUTION

Integrated solutions for next-generation aerospace and defense electrification platforms

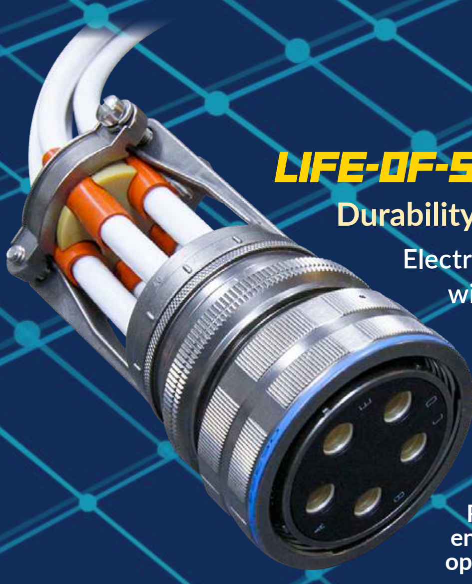
Modern aerospace and defense platforms demand more from electrical interconnect systems than ever before. Elevated power density, compact packaging, harsh operating environments, and advanced electrification architectures require tightly-integrated solutions that address every aspect of power generation and transmission—from conductor flexibility and contact resistance to thermal management, EMI protection, dielectric performance, and long-term reliability. Increasing electrical loads, tighter packaging constraints, and aggressive SWaP requirements continue to challenge conventional interconnect technologies in next-generation electrical power platforms.

HIGH-DENSITY ELECTRIFICATION

Compact Packaging • Higher Power • Circular and Rectangular

Modern aerospace and defense systems require unprecedented levels of electrical power generation and distribution within increasingly constrained physical envelopes. High-power-density interconnects with efficient packaging deliver the current and voltage capabilities demanded by advanced military and commercial aircraft, spacecraft, and ground vehicles. Glenair power interconnect technologies support next-generation electrification with optimized connectors, contacts, and cable assemblies engineered for efficient panel mounting in space- and weight-sensitive equipment.

Compact high-power interconnect systems optimized for aggressive SWaP requirements in UAV, satellite, and advanced air mobility platforms



LIFE-OF-SYSTEM RELIABILITY

Durability Under Load and Over Time

Electrical interconnect systems in aerospace and defense applications must withstand continuous exposure to vibration, thermal cycling, environmental contamination, altitude effects, and sustained electrical loading over decades of operation. Glenair solutions are engineered to minimize temperature rise, resist dielectric breakdown and partial discharge, maintain low contact resistance, and ensure long-term mechanical and electrical stability in harsh operating environments.

Ruggedized power interconnect solutions engineered for long-life reliability in extreme operating environments

High-flexibility rope-lay power cables engineered to solve complex routing and integration challenges

ROUTING AND ASSEMBLY EFFICIENCY

Flexibility Enables Better System Design

Cable routing complexity has become a major engineering challenge in densely packaged electrical platforms. Tight bend-radius requirements, restricted installation spaces, dynamic motion, and serviceability demands require cable systems that simplify integration without compromising performance. Glenair TurboFlex® cable technologies improve routing flexibility, reduce installation stress, and enable efficient harness design for compact aerospace and defense applications.

Turnkey interconnect assemblies providing mechanical protection, grounding, thermal management, and electromagnetic shielding

COMPLETE ELECTRICAL PROTECTION

Preventing Problems Before They Happen

Reliable electrical power distribution requires more than connectors and cables alone. Effective grounding, EMI/RFI shielding, indirect lightning strike protection, high-altitude environmental sealing, ESD mitigation, and thermal management all play essential roles in system performance and survivability. Our innovative microfilament shielding technologies deliver robust power cable screening to protect sensitive electronics from emitted electromagnetic interference. Glenair delivers these and other integrated protection technologies to safeguard power interconnect systems across the full spectrum of electrical, mechanical, and environmental operating conditions.

PLATFORM-OPTIMIZED INTEGRATED SOLUTIONS

Engineered for the Mission Profile

No two aerospace or defense platforms share the same electrical architecture, environmental exposure, or operational requirements. From satellites, to dismounted soldier systems, to military vehicles, commercial aircraft, naval systems, and advanced air mobility platforms, Glenair power interconnect solutions are optimized for the specific voltage, current, frequency, thermal, vibration, and environmental demands of each application. Glenair delivers complete interconnect ecosystems engineered for compatibility, reliability, and long-term performance—eliminating integration gaps between connectors, contacts, cables, grounding systems, shielding technologies, and environmental protection components. From high-availability catalog solutions to rapid-turn derivative designs and fully customized systems and platforms, Glenair provides comprehensive engineering support for the most demanding power interconnect challenges.

Fully integrated and mission-focused power interconnect solutions—from high-current-capacity power ports to software-enabled battery power management (Glenair STAR-PAN™ NG 4/4 shown).

Outlook

A Signature Difference

When the U.S. Navy first began experimenting with angled flight decks on aircraft carriers in the 1950s, many old-school aviators were skeptical. The straight-deck carrier had already won a world war. Why reinvent it? But the engineers and pilots working the problem understood something important: the new generation of faster jet aircraft had fundamentally changed the operating environment. Landing speeds were higher. Margins for error were smaller. The old solution still worked—right up until it didn't.

I've always thought the interconnect industry works much the same way. Our business is full of "good enough" solutions. Standard connector families, established specifications, and proven legacy designs. Now of course there is nothing wrong with established standards. In fact, many of Glenair's most successful products began life as industry-standard interconnect platforms.

But over the years, we have developed a habit of asking a key question: what if the standard solution could do more? What if a MIL-DTL-38999 connector could deliver dramatically improved EMI shielding, higher density, faster assembly, better environmental performance, or reduced weight? What if power distribution hardware could survive current and temparature limits previously considered impractical? What if cable technologies could combine flexibility, survivability, and power handling in ways the industry had not yet considered?

This mindset gave rise to many of what we now call Glenair Signature Solutions. Products such as TurboFlex® power cables and PowerPlay® power distribution connectors, developed because our customers faced application challenges that conventional power interconnects simply could not resolve. In those cases, we were not just improving an existing lane in the road—we were paving an entirely new one.

At Glenair, that point of view has always been rooted in the belief that interconnect systems should not merely survive harsh environments—they should actively improve mission performance. They should save weight, simplify installation, increase reliability, accelerate maintenance, improve signal integrity, and solve operational issues before those problems ever reach the field.

As you read through this issue of *QwikConnect*, you'll encounter numerous examples of innovative power products that reflect years of accumulated engineering insight, manufacturing expertise, and application experience. Some are refinements of proven military standards, but most represent entirely new approaches to interconnect design for harsh-environment power distribution. All of them reflect this underlying philosophy: never assume the current solution is destined to be the best solution forever. This kind of thinking is what contributes to the "signature difference" of Glenair.

QwikConnect

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