



SUBSEA AND NAVY

INTERCONNECT SOLUTIONS

Prepared for ICC • Nov. 2017





Committed to Customer Satisfaction



Glenair is committed to customer satisfaction and the key principles of our military, defense and aerospace quality systems

Glenair is committed to on-time and on-price delivery, including same-day stock on over 100,000 mission-critical interconnect components

1 Mil-Spec Certifications:

Glenair is qualified to hundreds of rigorously controlled product and process certifications administered by the US government.



3 Satisfied Customers: *Hundreds of world-class OEMs and system manufacturers have tested and qualified our products. Many conduct independent audits of Glenair quality on an annual basis.*



2 Certified Quality System: *Glenair is ISO 9001:2008 and AS9100:2009 Rev. C certified and registered in North America; IRIS (International Railway Industry Standard), AS9100 SAE Aerospace and ISO 9001 certified and registered in Italy, and AS9100 certified and registered in the U.K.*

4 Design Partner: *Not just a supplier, Glenair has been a key design partner on dozens of submarine and surface ship builds*



6 Factory Capacity: *Our first-world factories, the largest in the mil-aero interconnect industry, are positioned for ongoing growth and materials/process compliance.*



7 In-House IEC Qualified Laboratory: *Our commitment to qualification testing and product quality includes comprehensive environmental, mechanical, and electrical test capabilities.*

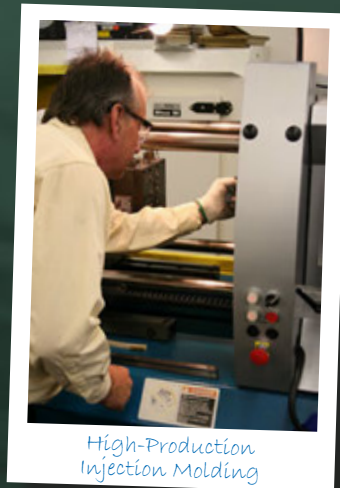


5 Go-To Supplier: *In applications where a single fault can lead to mission failure, Glenair is selected time and time again—from high-pressure subsea applications to missions to Mars.*





Glenair is committed to short lead times and on-time delivery: every factory operation is controlled by Glenair—from machining to molding, plating, testing and assembly



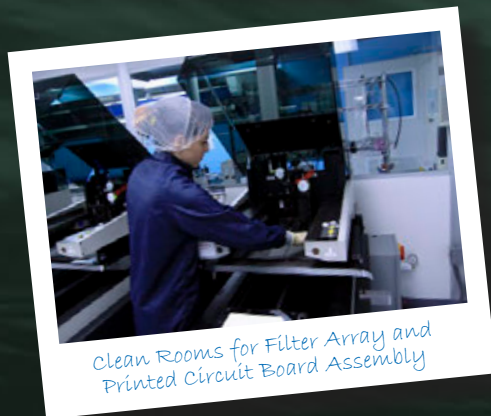
High-Production Injection Molding



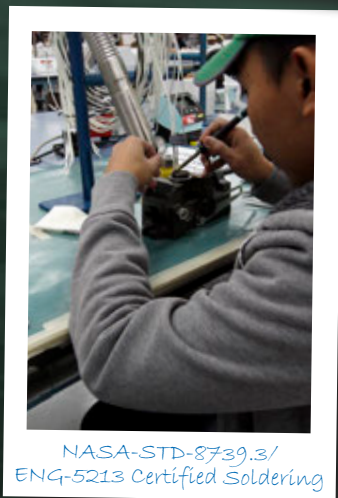
One of North America's Largest CNC Milling and Machining Installations



Cable Assembly Overmolding



Clean Rooms for Filter Array and Printed Circuit Board Assembly



NASA-STD-8739.3/ENG-5213 Certified Soldering



The Industry's Most Advanced EMI/RFI Braided Shielding Operation



State-of-the-Art Plating Capabilities



In-House Connector and Cable Harness Assembly



Test and Burn-In Labs for Both Electrical and Optical Systems

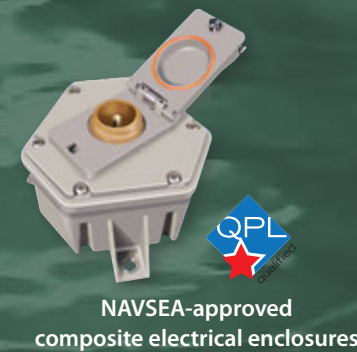


HARSH ENVIRONMENT NAVAL INTERCONNECT SOLUTIONS

High-performance, mission-critical interconnect technologies with proven topside and submarine performance

Designed for use in topside, submarine and subsea naval applications, Glenair ruggedized interconnect solutions include a wide range of wire and cable management and electrical interconnect technologies. From NAVSEA qualified junction boxes to next-generation fiber optic technologies, Glenair has been in the business of serving naval and defense interconnect requirements for over 50 years.

HARSH-ENVIRONMENT WIRE MANAGEMENT TECHNOLOGIES



NAVSEA-approved composite electrical enclosures



MIL-PRF-24758 wire protection conduit systems and Cable Seal Grounding Assemblies



BacNav OFS harsh-environment repositionable backshells, Glenair Firewall Feed-Thru technology



Navy-qualified MIL-DTL-24749 Type IV ground straps · Duraelectric® jacketing · AutoShrink™ cold-action tubing

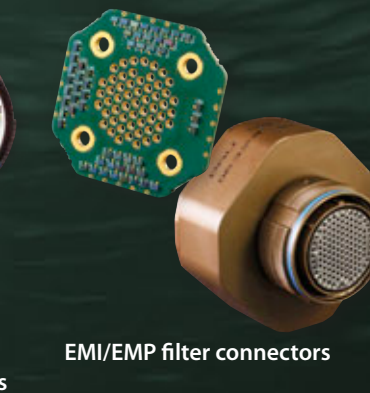
HARSH-ENVIRONMENT INTERCONNECTS



Series ITS 5015-derivative power connectors



Super ITS ultra high-performance reverse-bayonet power connectors



EMI/EMP filter connectors



Opto-Electronic connectors and media converters



MIL-DTL-28840 qualified Navy electrical connectors



SuperSeal™ RJ45 and USB harsh environment connectors



OctoByte™ ruggedized 4/8 pole Ethernet connectors



MIL-PRF-28876 Navy-approved fiber optic connectors and turnkey cables



SERIES ITS & DERIVATIVES Harsh-Environment Power and Signal Connectors



- Dozens of proven connector technologies for harsh application environments
- Hundreds of power and signal contact arrangements (crimp and solder)
- Threaded, reverse bayonet, and innovative latch-and-lock coupling technologies
- Flame-resistant, caustic substance-free material choices for RoHS and other compliance standards

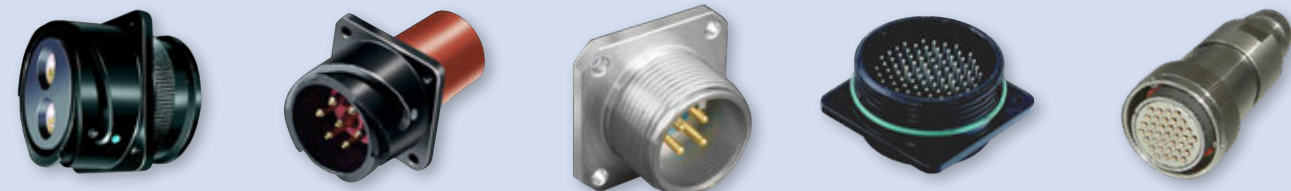
Circular Reverse-Bayonet and Threaded Coupling Connectors

- Series ITS** - Reverse-Bayonet Power and Signal
- Series ITS-RG** - RadGrip™ Rubber Coupling Nut Circular
- Series FRITS** - Flame-Resistant Insert for Rail Applications
- Series IT** - Threaded Coupling Power and Signal
- Series ITH** - Rigid Insert / Mechanical Contact Retention
- Series ITK** - High-Temperature Ceramic
- Series ITZ** - Triple-Start Thread Power and Signal
- Series IFO** - Reverse-Bayonet Fiber Optic
- Series IGE** - High Current, Low Voltage Single Pole
- Series 901** - High Current Medium Voltage Circular
- Series 500** - Reverse-Bayonet Single-Pole High Voltage
- Series IPT** - Standard Bayonet Power and Signal
- Series IPT-SE** - Standard Bayonet Crimp Contact



Series IT, ITS and derivative connector families are available with three plug coupling nut designs: Standard, Arctic, and rubber-covered RadGrip™

Circular Industrial/Rail Power and Signal Connectors: 5015 Type Derivatives



Series ITS Reverse-Bayonet Series ITH Rigid Insert Series IT Threaded Coupling Series ITZ Triple-Start Coupling Series ITK High-Temperature Ceramic Insert



Seacrow Marine Bronze Series 901 Multi-Pin High Voltage Series 500 Single-Pole High Voltage Series IGE Single-Pole Low Voltage Series ITS Bayonet with Wing Locks

High-Speed / Ruggedized Connectors for Industrial and Rail Applications



SuperSeal™ with RJ45 Ethernet Series CX High-Speed Coaxial Octobyte™ QuadraX Contact Ethernet Series IFO High-Speed Fiber Optic

Series ITS-RG RadGrip™ Reinforced Rubber Coupling Nut Connectors



ITS-RG (Basic Black) ITS-RG (Semper Tan) ITS-RG (Fiber Optic Blue) ITS-RG (Safety Red) ITS-RG (Safety Orange)



SERIES 921

Super ITS



Ultra high-performance reverse-bayonet power connectors

Reverse-bayonet derivatives of MIL-DTL-5015 (VG95234) connectors have long been preferred for their rapid mating and rugged resistance to vibration and shock in harsh environment applications such as mass transit, rail, and military vehicles. Now Glenair introduces an ultra high-performance version of the reverse-bayonet 5015 power connector called the Super ITS. This series is designed for high-ampacity applications where low insertion force LouverBand type contacts, mechanical contact retention, broad temperature tolerance, and superior connector and wire sealing is required.

Super ITS is an extremely durable and environmentally-sealed connector, designed in accordance with legacy MIL-C-5015, EN50124, and VDE 0110-1 requirements. Unlike conventional 5015-type connectors designed for industrial and rail applications, the Super ITS offers uncompromised electrical, mechanical, and environmental performance—including an unprecedented 2000 mating cycles. Designed for extreme harsh environments such as are found in heavy industries, mining, military vehicles, offshore and shipboard applications, the Super ITS delivers contact and wire support from #16 to 2/0 and 1 mmq – 70 mmq respectively. With ampacity up to 350 amps, and a max working voltage of 2450 VCC / 1750 VCA, the Super ITS represents the ultimate in industrial power interconnection.

- **Low insertion force, high-ampacity front-release contacts**
- **Rigid insulator with internal retention clip**
- **Aluminum, stainless steel or marine bronze shells with polarization keys**
- **Connector O-ring and individual wire sealing grommets**
- **High temperature range: -55° to +180°C**
- **2000 mating cycles**

PRODUCT SELECTION GUIDE

Wall Mount Receptacle Connector	Straight Plug connector	Jam Nut Receptacle Connector	In-Line Receptacle Connector

CONTACT ARRANGEMENTS

CONTACT SYMBOLS

○ #16 ⊕ #12 ⊗ #8 ⊙ #4 ⊕ #0

Mating face views, pin connectors. Socket arrangements are reversed.

24-GL9 2 #4, 2 #16	24-06 4 #8, 2 #16	28-GL3 3 #8, 3 #16	28-22 3 #4, 3 #16
32-1 2 #0, 3 #12	32-17 4 #4	32-GL5 2 #0, 2 #16	40-A4 4 #0, 2 #12

Performance Comparison: ITS vs Series 921 Super ITS		
	ITS	Series 921 Super ITS
Mating Cycles	500	2000
Mating Face Sealing	FRONT O-RING	SEALING O-RING
Polarization Key	NO	YES
Power Contacts	COPPER ALLOY	LOUVER BAND, HIGER AMPACITY, L.I.F.
Insert	RUBBER	HIGH TEMP/RIGID INSERT + INTERNAL CLIP
Grommet	RUBBER	INDIVIDUAL CONTACT SEAL (Silicon)
Hard Anodization	NO	YES
Temperature Range	-55 / +125°C	-55 / +180°C
Working Voltage	MIL-C-5015	MIL-C-5015, EN50124, VDE 0110-1





QUALIFIED

MIL-DTL-28840

Connectors and accessories



MIL-DTL-28840 qualified connectors in-stock and ready for immediate, same-day shipment

- High density, scoop proof contact arrangements
- Flange mount, box mount, jam-nut and in-line receptacles
- Straight, 45° and 90° strain reliefs and backshell assemblies
- Sav-Con® connector savers
- MIL-DTL-28840 qualified
- Additional glenair commercial part numbers with features not available in the mil-spec

Qualified military standard electrical connectors and accessories for shipboard—and all rugged environmental applications

Performance Specifications	
Current Rating (Maximum)	Size #20 Contact with 20AWG wire=7.5Amps, with 22AWG wire=5.0Amps
Test Voltage (DWV)	1000 VAC RMS at sea level. Test per EIA-364-20
Insulation Resistance	5000 megohms minimum (at ambient temperature) per EIA-364-21
Contact Resistance	Per SAE-A539029
Operating Temperature	-55° C to +200° C
Immersion	per test method EIA-364-09
Shock	in accordance with MIL-S-901 grade A
Vibration	per EIA-364-28 test procedure
Magnetic Permeability	2.0 μ (Aluminum), 5.0 μ (Stainless Steel) maximum; ASTM-A342/A342M



Splined MIL-DTL-28840 connector-to-backshell interface is ideally suited for heavy backshells and cables



QUALIFIED MIL-DTL-28840 Connectors and Accessories



STANDARD PIN CRIMP CONTACT FOR MIL-DTL-28840 CONNECTORS



Mating End Size	Wire Accomodation	Military Part Number	Glenair Part Number
20	28-32 AWG	M39029/83-451	850-004-20-451
20	22-26 AWG	M39029/83-450	850-004-20-450
20	20-24 AWG	M39029/83-508	850-004-20-508

STANDARD SOCKET CRIMP CONTACT FOR MIL-DTL-28840 CONNECTORS

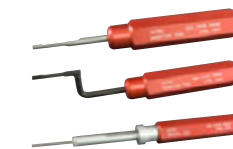


Mating End Size	Wire Accomodation	Military Part Number	Glenair Part Number
20	28-32 AWG	M39029/84-453	850-005-20-453
20	22-26 AWG	M39029/84-452	850-005-20-452
20	20-24 AWG	M39029/84-509	850-005-20-509



Crimping Tools

M22520/34-01 Basic Crimp Tool
M22520/34-02 Positioner
M22520/35 Gage



Insertion & Removal Tools

M81969/33-01 Straight Insertion Tool
M81969/33-02 Offset Insertion Tool
M81969/34-01 Removal Tool



Pin Contact

M39029/83 Standard Duty Electrical Pin Contact



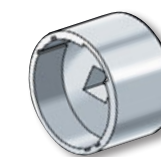
Socket Contact

M39029/84 Standard Duty Electrical Socket Contact



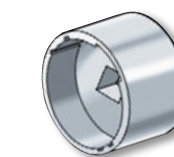
Environmental Backshells

M28840/6 B Straight
M28840/9 B 45°
M28840/8 B 90°



EMI/RFI Environmental Backshells

M28840/6 A Straight
M28840/8 A 90°
M28840/9 A 45°



Connector Sockets

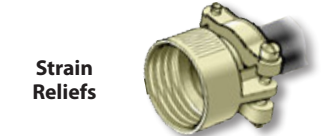
600G005



"E" Nuts

Non-Self-Locking

M28840/23



Strain Reliefs

Non-Self-Locking

M28840/1 Straight
M28840/3 45°
M28840/2 90°



Dummy Storage Receptacles

M28840/7



Protective Plug Covers

M28840/15



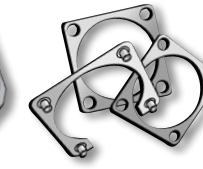
Protective Receptacle Covers

M28840/13



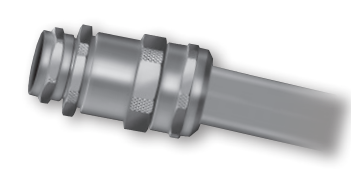
Jam Nuts

MS3186



Mounting Flanges and Gaskets

M28840/24 Gasket



MIL-PRF-24758A Conduit Fittings

M24758-14 Straight (M24758/14 Straight.)
M28840/5 Straight • M28840/25 90° • M28840/27 45° • M28840/30 Coupling



SUPERSEAL 28840

Ruggedized RJ45 and USB connectors for harsh-environment naval applications

MIL-DTL-28840 type connectors with IP68 sealing (mated condition), robust insert-to-shell grounding, and a complete range of wire, cable, and circuit board terminations



MIL-DTL-28840 receptacle with sealed USB insert

MIL-DTL-28840 plug with sealed USB insert

High-capacity, high-speed USB data stick

- Superior sealing—IP67 unmated—for complete system protection against water, sand and dust
- Shielded/grounded coupler designs in both receptacle and plug connectors
- Highly durable RJ45 and USB designs, including enhanced operating temperature, increased life cycle, and rugged vibration and shock performance
- Crimp, solder-cup, and PC tail contact/wire termination options

SUPERSEAL™ MIL-DTL-28840 TYPE RJ45 and USB Connectors



SUPERSEAL™ MIL-DTL-28840 TYPE CONNECTORS PRODUCT SELECTION GUIDE



900-320

SuperSeal™ Coupler with Accessory Threads and RJ12 Plug-to-Jack (Plug) or Jack-to-Jack (Receptacle).



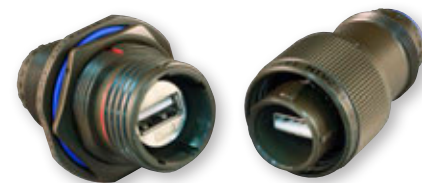
900-300

SuperSeal™ Coupler with Accessory Threads and RJ45 Plug-to-Jack (Plug) or Jack-to-Jack (Receptacle).



900-301

SuperSeal™ Connector with Accessory Threads and RJ45 Plug (Plug) or Jack (Receptacle) to Crimp Removable Contacts.



900-340

SuperSeal™ Coupler with Accessory Threads and USB Male-to-Female (Plug) or Female-to-Female (Receptacle).



900-345

SuperSeal™ Connector with Accessory Threads and USB Male (Plug) or Female (Receptacle) to Crimp Removable Contacts.



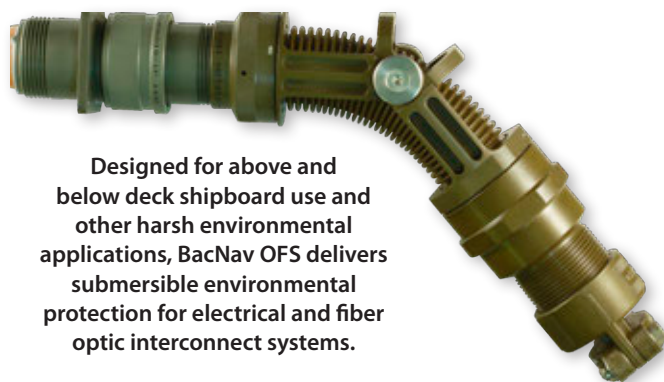
SERIES 390
BacNav OFS repositionable
harsh-environment backshell
Outstanding, flexible performance



SERIES 390
BacNav OFS

Outstanding repositionable
backshell for harsh-environment
applications

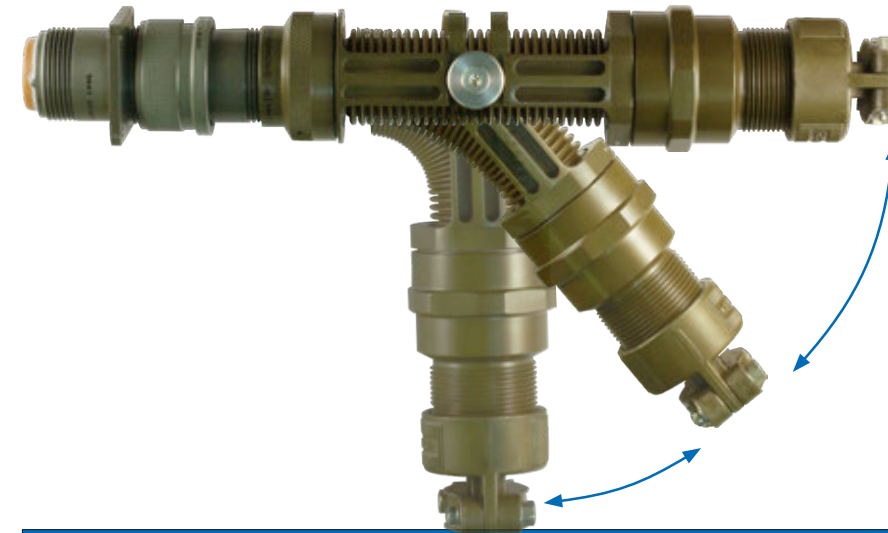
Designed for use in rugged shipboard applications as well as military ground systems such as armored vehicles, the Glenair BacNav OFS delivers outstanding mechanical, electrical, and environmental performance. The innovative design incorporates an environmentally-sealed, EMI shielded core with a locking pivot that facilitates cable routing and eliminates the need to stock discrete straight, 45° and 90° variants of standard wire sealing, strain relief, and EMI shield termination backshells. Built to withstand the handling abuse that topside and below-deck electrical and fiber optic interconnect systems are routinely subjected to by ham-fisted sailors and marines, the BacNav OFS is purpose-designed to deliver life-of-ship and life-of-system performance and durability. Available for the broad range of power, signal, and fiber optic connector systems—including MIL-PRF-28876 and MIL-PRF-64266 (fiber optics) to MIL-DTL-28840, AS50151, and more—BacNav OFS meets every current requirement for backshell-equipped connectorized cabling.



Designed for above and below deck shipboard use and other harsh environmental applications, BacNav OFS delivers submersible environmental protection for electrical and fiber optic interconnect systems.



- **Easy repositioning from straight, 45° and 90° cable-exit orientations**
- **Submersible performance without the need for shrink boots**
- **Durable, flexible EMI/RFI and environmentally-sealed core with locking-pivot Swing-Arm™ frame**
- **Accommodates power, signal and fiber optic jacketed cables**
- **Reposition terminated cables with no impact on signal integrity or system performance**
- **Easy repeatable assembly process using standard tools**



BacNav OFS is the only fully-sealed EMI/RFI backshell and strain relief device that delivers fast and easy cable angle configuration in the field—using a common 7/64" hex wrench, and without decoupling from the connector and/or cable. The sealed, flexible connector backshell adjusts to straight, 45° and 90° cable angles with zero impact on signal integrity or system performance.

PERFORMANCE DATA		
DESCRIPTION	REQUIREMENT	STANDARD
Magnetic permeability	Less than 2.0μ	EIA-364-54
Shell conductivity	< 2.5 milliohms ⁽²⁾	EIA 364-83
Salt spray (corrosion)	No exposure of basis material as defined in AIR4789 for 500 hours ⁽²⁾	EIA 364-26
Vibration	CIT <0.5dB No discontinuities ⁽¹⁾ No damage	MIL-STD-167-1A (SHIPS), paragraph 5.1.2.4.6 (endurance test)
Shock	CIT <0.5dB No discontinuities ⁽¹⁾ No damage	MIL-S-901D, grade A, Class 1
Water pressure	10 meters for 48 hours (IP68)	QTP-384
Cable pullout	No slippage exceeding 1/8" CIT <0.5dB ⁽¹⁾	EIA 364-38 TIA-455-6
Coupling thread strength	No damage at 3X magnification	AS85049 (Heavy Duty)
External bending moment	300-750 in-lbs (size dependant)	AS85049 (Heavy Duty) QTP-384
Fluid immersion	No changes detrimental to performance ⁽²⁾	EIA 364-10
Insertion loss	MIL-STD-1678-2 Appendix C, Table 2101 C-1	TIA-455-34 Method A
Cable seal flexing	100 cycles/axis	TIA-455-1
Twist	50 cycles • No damage/leaks	TIA-455-36
Impact	8 drops • No damage detrimental to performance	TIA-455-2 Method B
Crush	7 cycles 1,250 N (281 lbs)	TIA-455-26
Thermal Shock	5 cycles -40°C to +85°C (-40°F to +185°F)	TIA-455-71
Temp/humidity cycling	No damage detrimental to performance	TIA-455-5 Method B
Temperature cycling	No damage detrimental to performance	TIA-455-3
Life Aging	10 cycles	QTP-384-F
Freezing water immersion	No damage detrimental to performance	TIA-455-98
Sand and dust	No damage detrimental to performance	TIA-455-35
Modified SO2/salt spray	240 hours • No damage detrimental to performance ⁽²⁾	ASTM G85 + Annex A4

⁽¹⁾ Tested with MIL-PRF-28876 Multi-mode Fiber-Optic connectors ⁽²⁾ Tested with Cadmium/Olive-Drab finish option (code NF)

MORE ADVANCED GLENAIR BACKSHELL TECHNOLOGY: FIREWALL AND PRESSURE BOUNDARY FEED-THRU



- **High-grade engineering thermoplastic or machined metal**
- **Six pressure-boundary feed-thru layouts with accommodation for 1 – 6 cables**
- **Split-shell jam nut versions with EMI/RFI shield termination porch**
- **O-ring sealed panel and box mounting interface**
- **Conductive and non-conductive finish options**



SERIES 75

Helical Metal-Core Conduit

The ultimate in highly flexible, crush-proof EMI/EMP protection



- Hermetically sealed, flexible metal-core conduit for interconnect applications
- Choice of three materials: Brass, Stainless Steel, and Nickel Iron Alloy
- Turnkey, factory-terminated assemblies for landing gear and other rugged aerospace applications
- All materials deliver superior EMC performance as well as crush resistance and environmental sealing

Part Number 750-098



Select for superior crush resistance and corrosion protection

Highly flexible crush-proof metal conduit in stainless steel with Viton, Neoprene, or Bluejacket protective covering

Part Number 750-192



Select for low-frequency EMC protection in and around motors and control equipment

Nickel-iron conduit material plus shielding and jacking

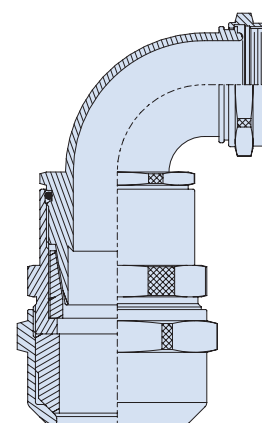
SERIES 75 Metal-Core Conduit Systems

US Navy Qualified CRES, Nickel-Iron, and Bluejacket systems

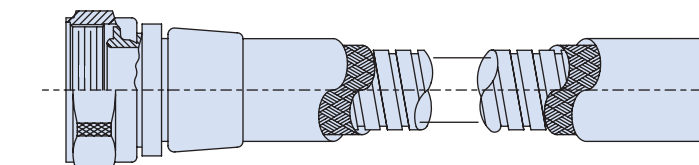


- Qualified to MIL-PRF-24758A(SH)
- User-installable and factory terminated configurations
- Innovative stainless steel fittings with advanced environmental sealing, EMI shield termination and rotatable coupling nut
- Adapters for all shipboard interfaces—fully compatible with legacy MIL-C-24758 conduit system components

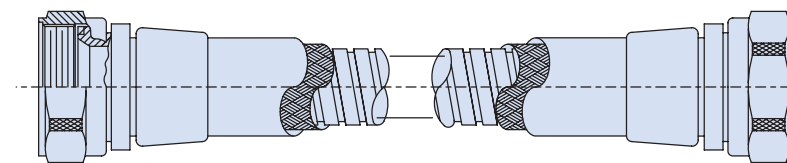
Do it once, do it right with Glenair MIL-PRF-24758 wire protection conduit systems



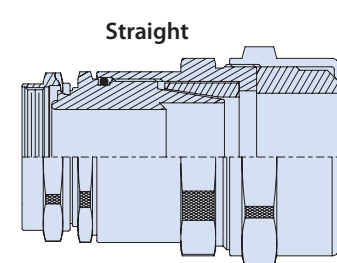
90°



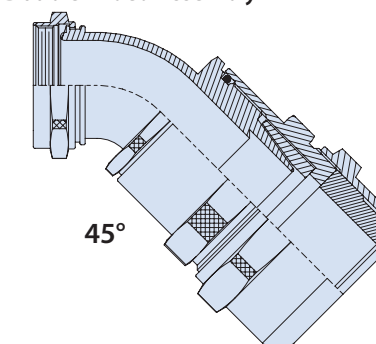
Single Ended Assembly



Double Ended Assembly



Straight



45°

MIL-PRF-24758 Configuration Options: Choose from high-performance user-installable fittings or lighter weight factory terminated assemblies



SERIES 75 FITTINGS AND ADAPTERS FOR METAL-CORE CONDUIT



Composite conduit splice fitting



Stainless steel conduit feed-thru fitting



Low-Profile RP Plus System



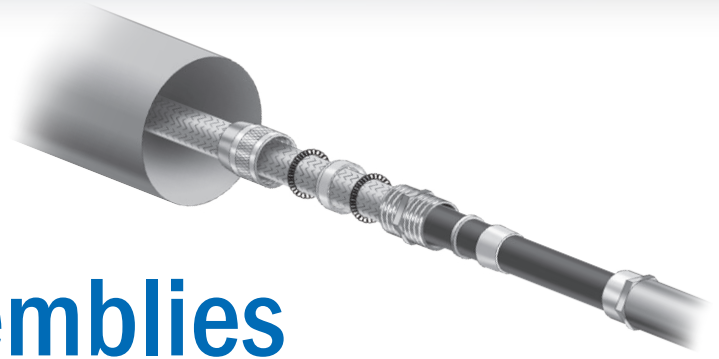
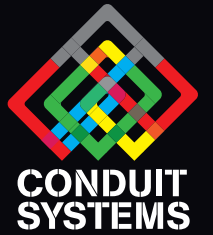
Heavy-duty environmental conduit-to-panel fitting



Heavy-duty environmental conduit-to-connector fitting



CSGA Cable Shield Grounding Assemblies



CSGA Cable Shield Grounding Assemblies for reliable 360° EMI/EMP grounding

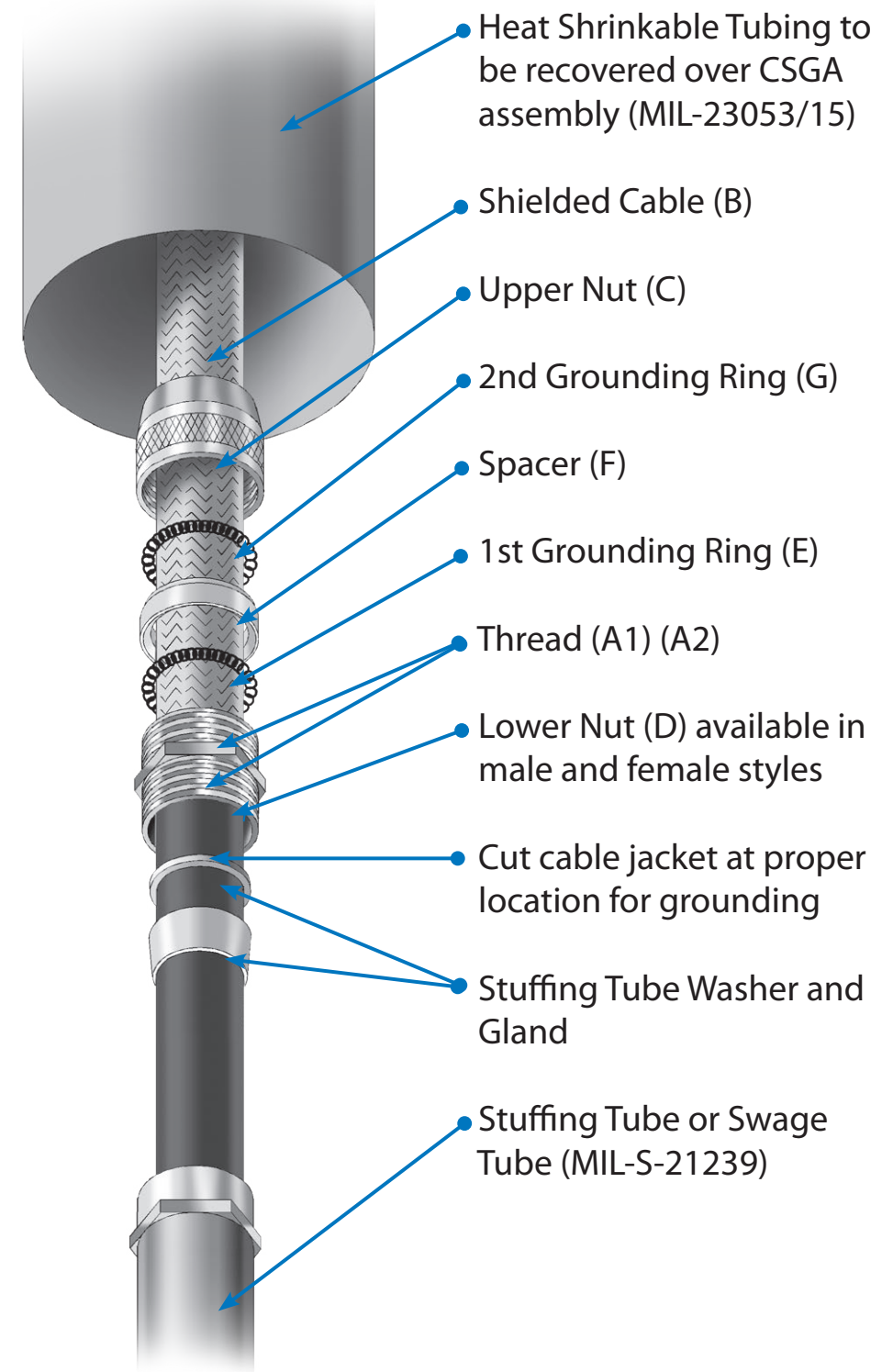
Glenair Cable Shield Grounding Assemblies are available in male, female and split versions and provide completely reliable 360° grounding of shielded cables to above-deck stuffing tubes and swage tubes.

Glenair's CSGA are designed to ensure both reliable EMI/EMP shielding as well as strict environmental protection. Glenair's CSGA meet MIL-STD 1310 grounding requirements and NAVSEA 803-5001-27 sealing requirements. Glenair CSGA are available in 18 sizes to accommodate stuffing tube sizes A through V.

Supplied in kit form, each CSGA includes the complete grounding assembly as well as an adhesive-coated heat shrinkable sleeve and Permatex 133A antisieze compound. Products meet NAVSEA requirements.

- **Temperature rating:** -55°C to 90°C
- **Minimum shrink temperature:** 121°C
- **CSGA Material:** 6061-T6 Aluminum with electroless nickel finish, or passivated stainless steel
- **Supplied adhesive shrink boots meet NAVSEA 803-5001-27 sealing requirements**

CSGA EXPLODED-VIEW DIAGRAM





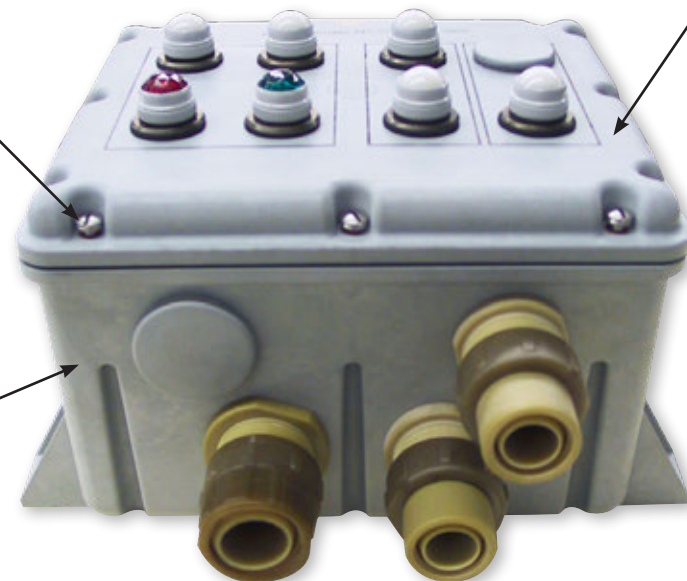
NAVSEA-APPROVED Composite Junction Boxes for Naval applications



NAVSEA-APPROVED Shielded Composite Junction Boxes

Durable, lightweight corrosion-free EMI/RFI shielded composite junction boxes NAVSEA standard drawing 803-6983506 Rev. A

- Over a dozen different tooled sizes and shapes.
- Extremely durable, corrosion-free, high temperature engineering composite thermoplastic
- Tested and qualified to U.S. Navy, UK MOD and hundreds of commercial aircraft and marine applications



Series 316 stainless steel hardware provides long-term durability

Unlimited corrosion resistance compared to metal junction boxes reduces repair and maintenance costs.

IP67 rated seals and gaskets protect equipment from moisture and dust

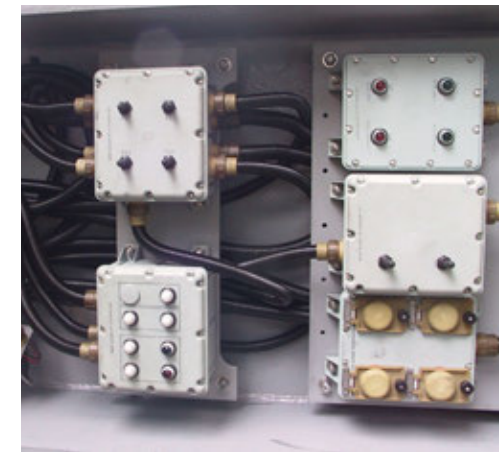
Glass reinforced composite thermoplastic material is strong and durable and yet extremely lightweight.

Example box shown: one of a series of NAVSEA-approved signal, switch, sound power, control boxes designed to eliminate corrosion damage and reduce maintenance cost on Navy ships

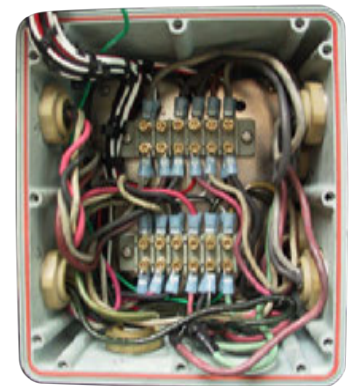
TESTED AND QUALIFIED THROUGHOUT THE FLEET: GLENAIR CORROSION-FREE COMPOSITE BOXES



Broad range of sizes and shapes

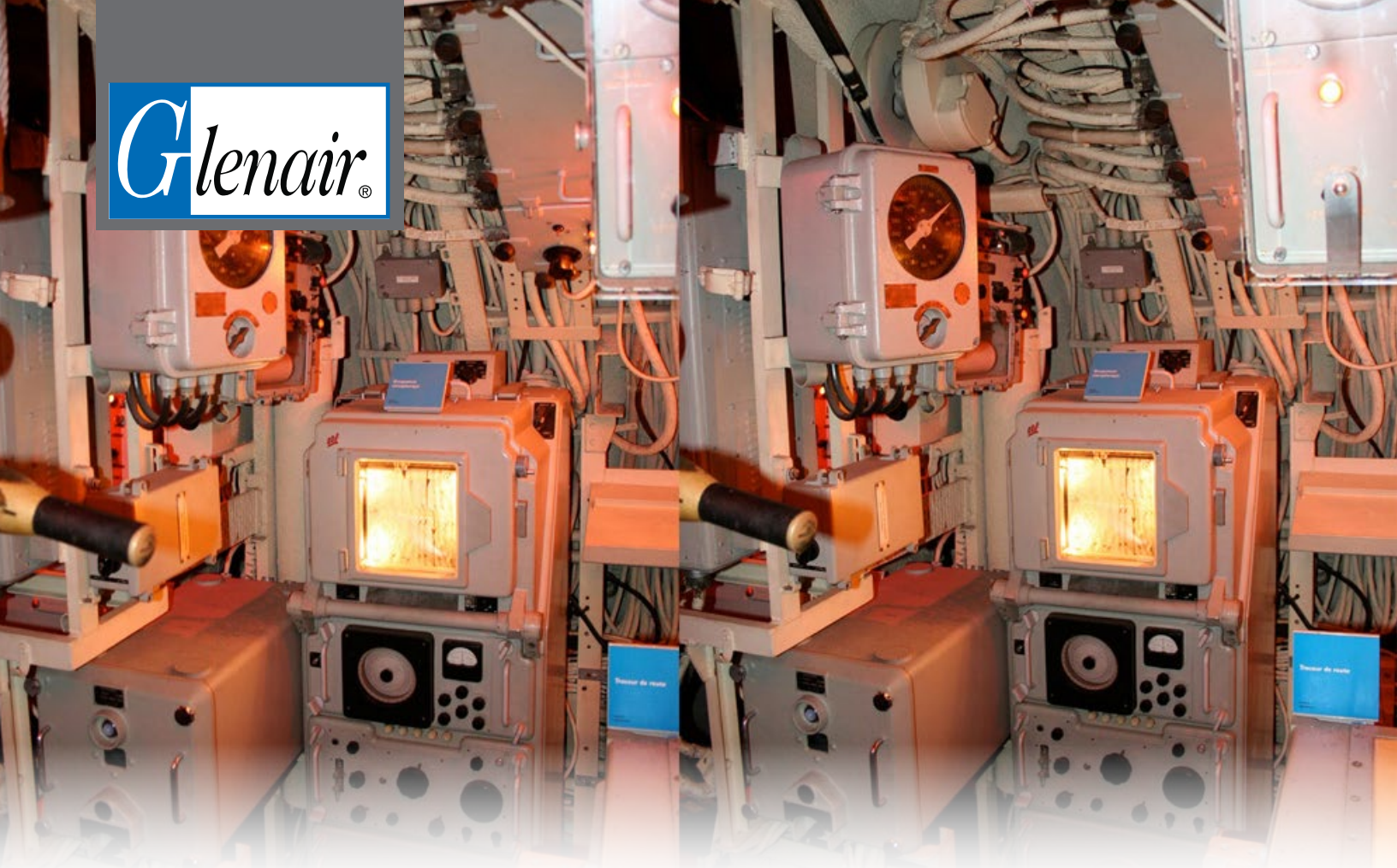


Complex installations fully supported with feed-thru fittings and wire protection conduit



Discrete components or turnkey wired and connectorized systems

Glenair Composite Box Product Specifications		
Description/Test Report	Requirement	Procedure
Plating Adhesion <i>Glenair #9-44-18/TN94-159</i>	Should not exhibit any blistering, peeling or other separation of the units plating.	Tested IAW MIL-DTL-38999.
Vibration <i>NTS #973-7369-2</i>	Should not exhibit loosening of component parts or evidence of damage.	Tested IAW MIL-STD-167 Type 1 for box units and MIL-STD-1344, Method 2004 Condition II for fittings and accessories.
Shock <i>MOD #BR8470 Grade C and F</i>	There shall be no loosening of parts or evidence of damage.	Tested IAW MOD BR 8470 Grade C and F.
Salt Spray <i>Glenair #9-44-18/TN94-159</i>	Should exhibit no exposure of underplate or base material.	Tested IAW MIL-STD-1344, Method 1001.
Dust <i>NTS #973-7369-1</i>	Should conform to required torque limits and functional requirement within 25%.	Tested IAW MIL-STD-202.
UV Light Resistance <i>GE RDM88050255-6042</i>	No degradation of the mechanical properties defined in the specification after testing.	Tested IAW ASTM D2565.
Impact <i>MIL-STD-1344, Method 2017</i>	No evidence of breaking or cracking of components or other damage that could affect the product performance.	Tested IAW MIL-STD-1344, Method 2017.
Temperature Cycling <i>NTS #575-9249</i>	No cracking, peeling or separation of plating or other functional damage.	Tested IAW MIL-STD-1344, Method 1003 at -65°C to 200°C.
Hydrolytic Stability <i>NTS #878-536</i>	No evidence of increased weight greater than 1% and no evidence of cracking, breaking or loosening of component parts.	Tested IAW ASTM D570-81.
Flammability <i>MIL-STD-1344, Method 1012, Smoke Index, NES 711 Issue 2, NES 713 Issue 3 and ISO 4589</i>	The item flame and after flow extinguishing time shall not exceed the defined limits.	Tested IAW Table II of of MIL-STD-1344, Method 1012, Smoke Index, NES 711 Issue 2, NES 713 Issue 3. Burning behavior by Oxygen Index, ISO 4589.
Water Tightness <i>EA #0C13513-039514</i>	Water tightness and internal pressurization is maintained.	Tested IAW EA #0C13513-039514.
Outgassing <i>JPL #081892</i>	Maximum allowable weight loss is 10%.	Tested IAW ASTM E 595.
Electromagnetic Shielding <i>TRW/ABQ-55C-1186-0</i>	Should demonstrate shielding effectiveness and transfer impedance conforming to military industry standards and specific customer requirements.	Tested IAW TRW/ABQ-55C-1186-0.



Lightweight or heavy-duty—Glenair keeps you grounded!

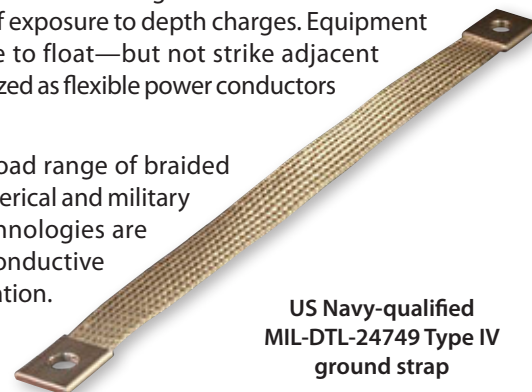
SERIES 107

Braided Ground Straps

for submarine equipment grounding and bus bar applications

Braided ground straps are utilized in submarine applications for equipment grounding. Equipment is affixed to X-brace shock mounts and grounded to the submarine's hull. This prevents damage in the event of exposure to depth charges. Equipment is safely electrically grounded, and able to float—but not strike adjacent equipment. Ground straps can also be utilized as flexible power conductors connected to bus bars.

Glenair has designed and supplied a broad range of braided ground strap technologies to both commercial and military naval customers. Our ground strap technologies are exactly designed with appropriate conductive and dissipative materials for each application.



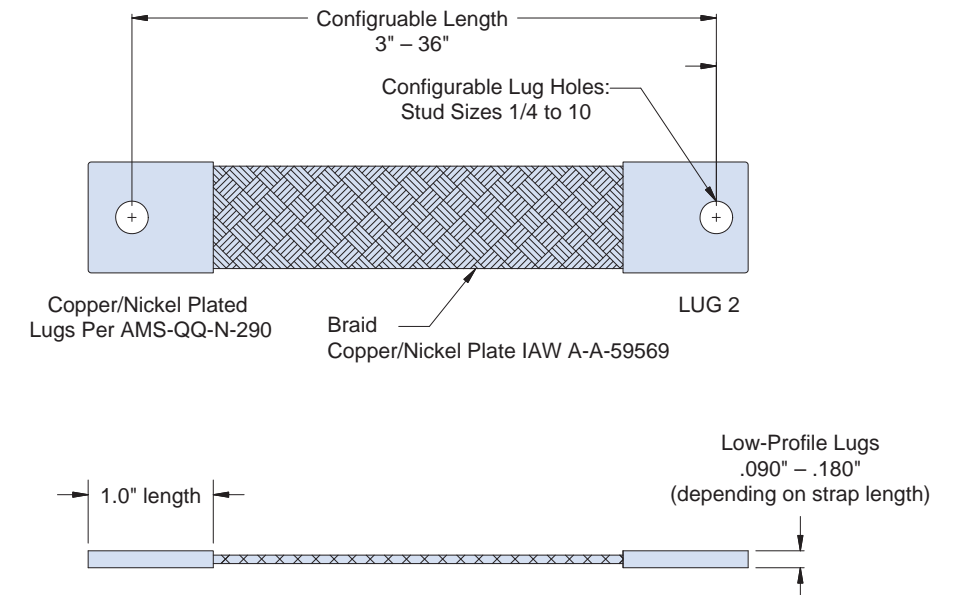
US Navy-qualified MIL-DTL-24749 Type IV ground strap



- Durable conductive braided straps for equipment grounding
- Highly flexible and conductive for bus bar power connections
- Exotic metal-clad microfilament braided solutions
- Heavy-duty variants for electrical potential grounding from engines, starters, and power units
- Fast turnaround on requests for unusual and build-to-print requirements

107-086 GROUND STRAPS FOR SUBMARINE APPLICATIONS

- Materials and design in accordance with Commercial Item Description A-A-59569 for grounding bonds
- Low-profile nickel-plated copper lugs with configurable mounting hole size options
- Nickel-plated copper braid material conforms to ASTM B355
- Variety of lengths available, from 3 to 36 inches



CUSTOM CAPABILITIES



GROUND CONTROL EARTH BOND SYSTEM



The Ground Control Earth Bonding system is an efficient, easy-to-use method to create an electrical bond between structures and equipment for the secure passage of high intensity current in case of electrical short circuit.

How To Order	
600-120	Hydraulic Setting Tool for 1/4" Earth Bonds
600-123	Hydraulic Setting Tool for 3/8" Earth Bonds
600-124	Hydraulic Setting Tool for M6 Earth Bonds
600-125	Hydraulic Setting Tool for M10 Earth Bonds

The tools feature one hand operation and ram retract mechanism actuated by release trigger. Consult factory for control gauges and earth bond part numbers for each material type and size.



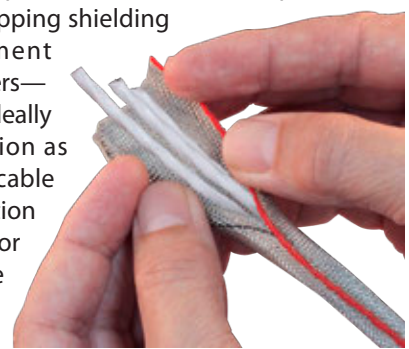
WITH ARMORLITE™ TECHNOLOGY
**MasterWrap™ flexible, lightweight wraparound
 EMI/RFI shielding/abrasion protection
 for spot coverage and repair**



MasterWrap™

**Flexible,
 lightweight
 wraparound EMI/
 RFI shielding
 and abrasion
 protection**

Tubular braided sleeving meets the broad range of EMC shielding and mechanical protection requirements of wire harness assemblies. But the need to apply conductive shielding materials over installed wire and cable bundles requires new technology. Legacy self-wrapping cable braid has long been available for EMI/RFI applications and abrasion protection, albeit with poor performance due to its heavy weight, inflexibility, and “windowing,” which results in poor shielding performance. MasterWrap™, a lightweight, easy-to-install, side-entry, self-wrapping shielding solution—incorporating Glenair microfilament ArmorLite™ and composite thermoplastic PEEK fibers—solves these problems and more. MasterWrap™ is ideally suited for both long-run wire harness protection as well as spot coverage and maintenance of EMC cable applications—all with outstanding weight reduction and ease-of-assembly. MasterWrap™ is qualified for use for both long cable runs and spot coverage and repairs.



- Up to 70% weight reduction compared to standard metallic EMI shielding
- Replaces harder-to-install tubular EMI/RFI sleeving
- Fast and easy side-entry installation and removal
- Reduces windowing and coverage gaps
- Superior flexibility, durability and repairability
- Temperature tolerant from -65°C to 200°C
- High-frequency EMI shielding performance comparable to standard metallic and lightweight tubular braid
- Outstanding abrasion and mechanical protection
- Halogen-free and RoHS compliant
- 500 hour salt spray corrosion resistance
- 50,000 cycle 90°-120° bend flex tested
- Outstanding caustic chemical and corrosive fluid resistance

MATERIAL CONSTRUCTION AND HANDLING PERFORMANCE

Flexible material eliminates kinking and windowing · Spring members ensure shielding stays tight to wire bundle

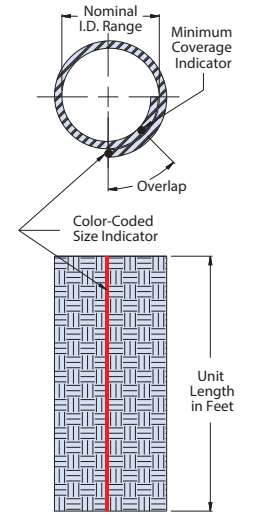
Material design provides uniform surface with limited interference to structures and clamps. Reduces kinking and windowing compared to full metal braid solutions for excellent shielding performance



Interwoven with high-temperature PEEK composite thermoplastic spring members that ensure up to 95% optical coverage

HERE'S WHAT YOU NEED TO KNOW ABOUT WEIGHT

EMI Braided Shielding Type (measured samples all 1/2" diameter)	Weight g/ft	Weight g/m
Glenair nickel-clad copper braid	21.6	70.9
Raychem RAY-103-12.5 nickel-clad copper braid	21.9	72.0
Weight of lightweight tubular (LWB) braided cable shielding		
AmberStrand® 100%	3.7	12.1
AmberStrand® 75% / NiCu 25%	4.9	16.1
ArmorLite™ 100%	4.4	14.4
ArmorLite™ 75% / NiCu 25%	5.4	17.7
Raychem INSTALITE	13.4	44.0
Weight of side-entry self-wrapping braided cable shielding		
MasterWrap™	6.2	20.3
Federal Mogul ROUNDIT® EMI FMJ	18.0	59
Federal Mogul ROUNDIT® EMI C27 XWS	23.5	77

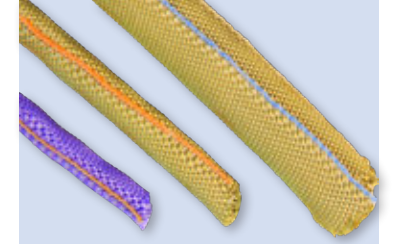


Mechanical and Environmental Performance Summary

Vibration	No evidence of wear or visible defect	DO-160G Cat S and H
Abrasion	No evidence of wear, visible defect or electrical degradation	EN-3475-511:2002
High Temperature Exposure	168 hours at 200°C; no visual or electrical degradation	EN 6059-302 part 302
Rapid Change of Temperature	10 hour hot and cold cycling; no evidence of wear or visible defect	EN 6059-308 part 308
Vertical Flammability	Pass	14 CFR part 25.853
Fluid Immersion Testing	No visual or electrical degradation	DO-160G
Bending Properties	25000 cycles; no breakage, no plating delamination	EN 6059-402
Salt Fog 500 Hours	No evidence of base metal on braid	ASTM B117-03 NaCl 5%

MasterWrap is compatible with most aerospace industry fluids. Consult factory for specifics. DuPont™ Nomex® is a registered trademark of E.I. duPont de Nemours and Company.

**ALSO AVAILABLE:
 MASTERWRAP™ (NOMEX®)**



The ideal solution for mechanical abrasion protection of wire bundle harnessing. Available color selections allow for easy identification and labeling of wire circuitry.

WHAT YOU NEED TO KNOW ABOUT EMI/RFI SHIELDING PERFORMANCE

	NiCu	Armorlite™	Amberstrand®	MasterWrap™
TRANSFER IMPEDANCE (Per IEC 62153-4) • (Max values for 1/2 inch diameter shields)				
FREQUENCY				
10 KHz	5 mΩ/m	50 mΩ/m	60 mΩ/m	40 mΩ/m
100 KHz	5 mΩ/m	50 mΩ/m	60 mΩ/m	40 mΩ/m
1 MHz	12 mΩ/m	50 mΩ/m	60 mΩ/m	40 mΩ/m
10 MHz	80 mΩ/m	50 mΩ/m	80 mΩ/m	40 mΩ/m
100 MHz	130 mΩ/m	30 mΩ/m	110 mΩ/m	80 mΩ/m
SHIELDING ATTENUATION (Per IEC 62153-4) • (Min values for 1/2 inch diameter shields)				
FREQUENCY				
1 GHz	38 dB	55 dB	48 dB	40 dB
3 GHz	40 dB	60 dB	55 dB	35 dB
5 GHz	44 dB	60 dB	60 dB	45 dB
8 GHz	40 dB	50 dB	60 dB	40 dB
WEIGHT	70.9 g/m	14.4 g/m	12.1 g/m	20.3 g/m

This table is a useful summary of MasterWrap™ shielding performance compared to NiCu and lightweight braid. Transfer impedance and shielding attenuation data is supplied for 1/2" diameter test samples. At high frequencies, both LWB and MasterWrap™ provide comparable and even superior performance to nickel-copper due to reduced windowing and superior optical coverage with significant reduction in weight. Further improvements in high-frequency shielding attenuation can be achieved using conductive tape wraps and/or via hybrid blends of LWB and NiCu.



TURBOFLEX CABLE WITH DURALECTRIC High-Performance Jacketing

Duralectric® is high-performance elastomeric material for use as wire insulation, cable jacketing, conduit jacketing, cable/conduit overmolding, and molded boots. Perfectly suited for immersion, chemical or caustic fluid exposure, temperature extremes, UV radiation and more.

NOTABLE ATTRIBUTES

- Service temperature range: -65°C to 225°C
- Duralectric K (Kelvin) range: -110° to 225°C
- Fire-resistant, Low Smoke-Zero Halogen (LSZH)
- Mil-aero and industrial fluid-resistant
- Accelerated UV/sunlight resistant, 53 year equivalent exposure
- Ozone resistant IAW ASTM D518
- Moldable and extrudable

DURALECTRIC® APPLICATION SHOWCASE



Bulk jacketed Duralectric® cable for harsh-environment power applications



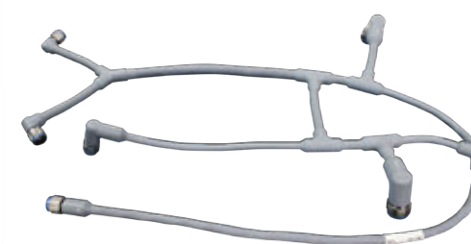
Duralectric® Autoshrink™ employed in environmental boots and sleeves



Duralectric jacketing employed as conduit covering in topside naval applications



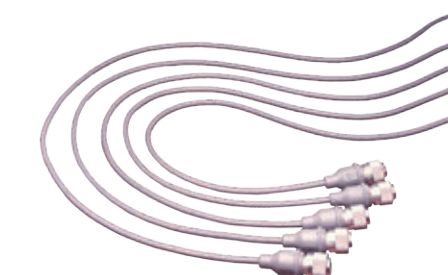
Ultra flexible rope lay construction



Aerospace overmolded cable assembly with rugged Duralectric® jacketing



Shipboard application with Duralectric® jacketing and overmolding



Duralectric® jacketing employed in environmental commercial application



Available in a broad range of gages, 16 AWG to 450 MCM



Many sizes In-stock and available for immediate, same-day shipment. No minimums!



TurboFlex® with Duralectric® jacketing ideally suited for equipment grounding



Turboflex® power pylon cable assembly with Duralectric® jacketing

turboflex THE ULTRA FLEXIBLE RUGGED POWER CABLE

TurboFlex™ power distribution cables are constructed from highly flexible conductors and high-performance insulation to produce cables ideally suited for applications where flexibility, durability, and weight reduction are required. Amazingly durable and flexible—especially in cold weather—the 16 AWG to 450 MCM TurboFlex cable features high strand count rope lay inner conductors made with tin-, nickel- and silver-plated copper. TurboFlex is jacketed with Glenair's unique Duralectric™ compound that provides outstanding flexibility and resistance to environmental and chemical exposure. Duralectric is also low smoke, zero halogen.

Long life and performance are critical in power distribution applications. TurboFlex, with its flexible conductors and durable jacket delivers both.



◀ Duralectric™ is the high-performance TurboFlex™ jacketing material perfectly suited for immersion, chemical or caustic fluid exposure, temperature extremes, UV radiation and more—available in a broad range of colors including safety orange



DURAELECTRIC AutoShrink™

The fast and easy cold-action shrink tubing solution from Glenair

Designed for rugged weathering, UV and ozone-resistant performance, Glenair AutoShrink is the one-piece easy-action solution for Turboflex™ cable and lug termination, splice insulation, and Duraelectric® jacketing repair. Universal design AutoShrink tubing delivers reliable and durable sealing as well as mechanical protection for cable end terminations in harsh military and industrial applications. Built from Glenair Duraelectric material, AutoShrink is fully hydrophobic and resistant to caustic chemicals and solvents. Easy-action spiral hold-out and large cold shrink ratio makes for fast installation and durable, split-resistant performance.



Fast and easy repair of Duraelectric-jacketed cables

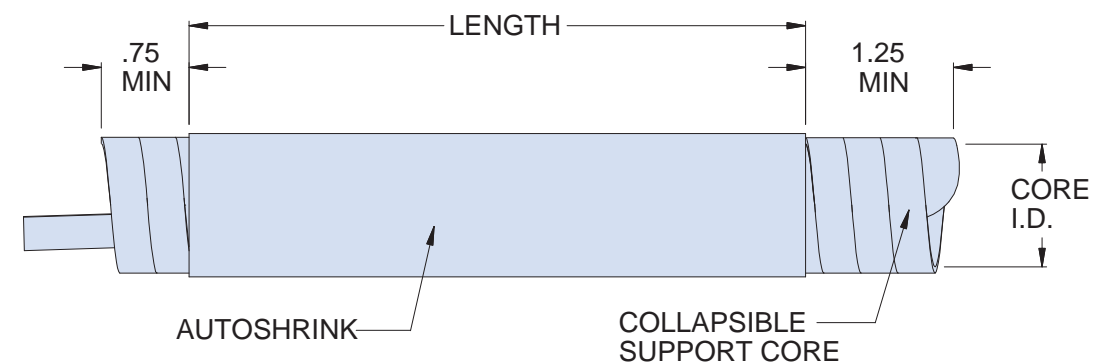
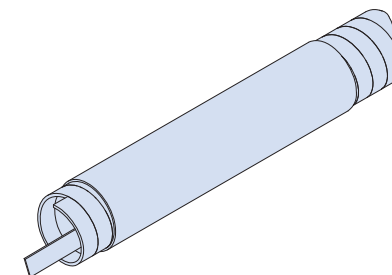
Utilize for termination of lugs on new installations

Broad range of colors for safety marking and cable identification

- **Fast and easy installation**
- **Ideal for repair of cables and conduit with Duraelectric® jacketing**
- **Reliable IP68 sealing**
- **3000 VAC rated**
- **Multiple color options**
- **Service temperature range: -65°C to 225°C**
- **Fire-resistant, Low Smoke-Zero Halogen (LSZH)**
- **Mil-aero and industrial fluid-resistant**
- **Accelerated UV/sunlight resistant, 53 year equivalent exposure**
- **Ozone resistant IAW ASTM D518**

DURAELECTRIC AutoShrink™

Fast cold-action shrink tubing



How To Order				
Sample Part Number	777-004	-01	-6	-0
Product Code-Basic No.	AutoShrink			
Size Code	See Table I			
Length	in Inches. 3" min., 12" max.			
Color Code	See Table II			

Note: 779-005 Adhesive (sold separately) may be specified for applications that require extraordinary environmental sealing performance



Sneak Peek: AutoShrink Boots

Fast, easy-to-install environmental sealing for cable-to-connector terminations. No heat gun needed! Designed for use with Duraelectric cable jacketing. Consult the factory for available sizes, styles, and colors.

Table I - Size, Dimensions, Wire Bundle Range						
Dash No.	Tube I.D. after unrestricted shrinkage (ref)		As Supplied Core I.D.		Ref. Wire Bundle Range min / max	
	In.	mm	In.	mm	In.	mm
01	0.250	6.4	0.80	20.3	0.35 / 0.65	8.9 / 16.5
02	0.375	9.5	1.18	30.0	0.55 / 1.00	14.0 / 25.4
03	0.625	15.9	2.00	50.8	0.85 / 1.65	21.6 / 41.9
04	0.750	19.1	2.34	59.4	1.00 / 2.00	25.4 / 50.8
05	0.937	23.8	2.75	69.9	1.25 / 2.50	31.8 / 63.5
06	1.437	36.5	4.00	101.6	2.00 / 3.85	50.8 / 97.8

Table II - AutoShrink Color Option		
Code	Color	Reference
0	Black	FED-STD-595C; #17038
1	Desert Tan	FED-STD-595C; #33446
2	Red	FED-STD-595C; #11120
3	Orange	FED-STD-595C; #12300
4	Yellow	FED-STD-595C; #13591
5	Green	FED-STD-595C; #14193
6	Blue	FED-STD-595C; #15125
7	Purple	FED-STD-595C; #17142
8	Gray	FED-STD-595C; #26270
9	White	FED-STD-595C; #17875

NOTES

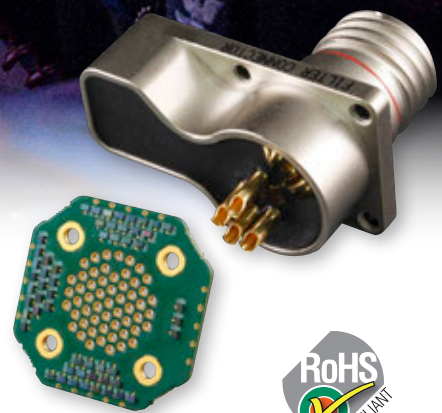
Length in expanded form may be less than length after unrestricted shrinkage.
Material: Duraelectric per GPS67-E1
Extruded wall thickness: .062



SERIES 240

EMI/EMP Filter Connectors

Glenair manufactures a full range of filter connectors for use in EMC/EMP management of electronic systems and interconnect cabling. All connectors are designed in accordance with applicable connector specifications, and are designed to mate with plugs with the same insert configuration and opposite contact gender. Planar filter arrays and TVS diodes may be integrated into both standard catalog as well as build-to-order configurations. Glenair's state-of-the-art diode burn-in process tests leaded and surface mount diodes with leakage current monitored throughout the entire test procedure ensuring field reliability.



- Planar, multilayer ceramic capacitive filters, with and without transient voltage suppression diodes
- C and Pi electrical configurations
- PC tail, crimp or solder cup termination
- 35 – 240,000 pF capacitance
- Fast and reliable diode burn-in and test services
- Turnkey in-house manufacturing of all filter connector elements and processes

Table I: Capacitor Array Code / Capacitance Range

Class	Pi - Circuit (pF)	C - Circuit (pF)
X	160,000 - 240,000	80,000 - 120,000
Y	80,000 - 120,000	40,000 - 60,000
Z	60,000 - 90,000	30,000 - 45,000
A	38,000 - 56,000	19,000 - 28,000
B	32,000 - 45,000	16,000 - 22,500
C	18,000 - 33,000	9,000 - 16,500
D	8,000 - 12,000	4,000 - 6,000
E	3,300 - 5,000	1,650 - 2,500
F	800 - 1,300	400 - 650
G	400 - 600	200 - 300
J	70-120	35-60



ARINC 600 size 2 filter connector. Glenair also manufactures narrow-profile size 1 and double-wide size 3. All configurations are environmentally sealed for rugged airframe applications.

SERIES 240 EMI/EMP Filter connectors Fast, reliable in-house manufacturing

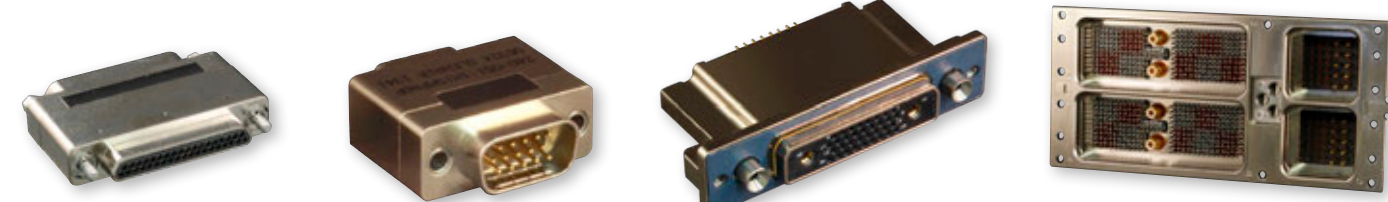


UNIQUE AND SPECIAL PURPOSE EMI/EMP FILTER CONNECTORS



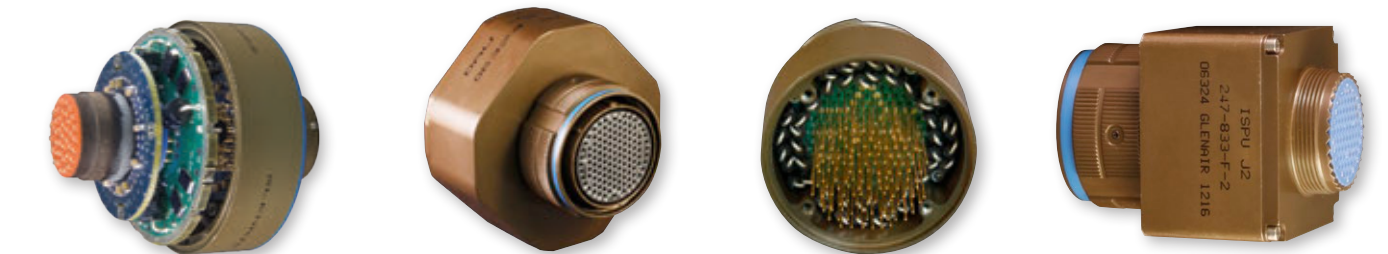
Extended-shell PC-tail cylindrical with threaded standoff Special-purpose filter connector cable adapter Series 80 Mighty Mouse PC-tail filter receptacle MIL-STD-1760 filtered umbilical connector Filter plug with crimp contacts

RECTANGULAR PACKAGING



MIL-DTL-83513 type micro-D filter connector MIL-DTL-24308 type D-sub filter connector Series 79 Micro-Crimp filter connector ARINC 600 rack and panel filter connector

EMP TRANSIENT VOLTAGE SUPPRESSION DIODE-EQUIPPED



EMP Diode-Equipped Connector with Oversized Shell MIL-DTL-38999 series III type EMP connector Reduced-package-size EMI/EMP cylindrical MIL-DTL-38999 series III type EMP with rectangular housing

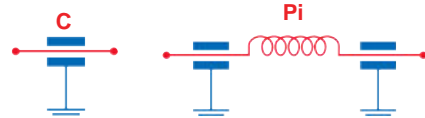
THE INDUSTRY'S MOST COMPREHENSIVE AND COMPLIANT FILTER SERVICE

Requirement Compliance:
MIL-STD-449D: RF Spectrum
MIL-STD-461E: EMI Susceptibility
MIL-STD-1310G: Shipboard EMC
MIL-STD-1512: Electroexplosive Subsystems
MIL-STD-1541A: EMC for Space Systems
MIL-STD-1795A: Aerospace Lightning Protection
MIL-STD-1857: Grounding, Bonding and Shielding
MIL-STD-1542B: EMC and Grounding for Space Systems
EN 61000-4-2, 3, 4, 5, 6, 8: EM, RF and Power
RTCA/DO-160 Sec 22: Pin/Cable Level and Waveform

Connector Series:	
38999	83513
Series I, II, III, IV	5015
26482	Sr. 80 Mighty Mouse
83723	Sr. 79 Micro-Crimp
28840	Sr. ITS Reverse-Bayonet
24308	Sr. 28 HiPer-D
ARINC 600	Sr. 970 PowerTrip

Line Types:	
CAN BUS	TTL
ARINC 429	Analog Sensors
RS 232	Thermocouple Wires
RS 422	USB
RS 485	Ethernet

Filter Types
C Single capacitor with low self inductance
Pi Dual capacitors with a single inductive element positioned between.





ETHERNET-READY

Octobyte™

The faster ruggedized 4/8 pole interconnect system for Ethernet data applications

Glenair series ITH connectors with Ethernet-ready Octobyte™ contacts are available for harsh-environment subsea / naval applications that depend on sealed environmental (IP67) connector performance. Octobyte contacts, packaged in ruggedized ITH reverse-bayonet connectors, deliver both dedicated Ethernet datalink as well as mixed serial databus and power for high-speed data applications

Octobyte™ contacts are vibration resistant and designed to work with Ethernet cables from CAT 5 to CAT 7A, MVB-WTB, and RG58 Coax. Reverse-bayonet ITH series connectors with Octobyte™ contacts are easy and fast to assemble and deliver reliable locking performance in severe vibration and shock applications.



Tested for compliance IAW EN50173-1 standards for CAT5E and CAT7. Proven performance in numerous rail applications (consult factory for references)

OCTOBYTE™
The faster ruggedized Ethernet interconnect solution



OCTOBYTE CONTACTS FOR ETHERNET CAT 5 • CAT 6 • CAT 7 • COAX • MVB-WBT

How To Order Octobyte contacts	
Sample Part Number	Q 0 8 P -A B1 -XXX -7A
Product Series	Octobyte contacts
Contact Size	0 = contact size 0
Number of Contacts	8 = 8 poles 4 = 4 poles CX = Coax
Contact Gender	P = Male S = Female
Cable O.D. Range/ Coax Cable Type	A = O.D. 6-7 B = O.D. 7-8 C = O.D. 8-9 RG58 = 50 Ohm RG59U = 75 Ohm [Coax only]
Plating	B1 = gold plating
Alternative Color (Cat 7A only)	G14 = Black G14GN = Green G14GY = Grey G14R = Red G14Y = Yellow Omit for standard
Ethernet	7A = Cat 7A AD = Ethernet MVB - WBT Contacts Omit for Cat 5



SERIES ITH CONNECTORS FOR OCTOBYTE CONTACTS

Reverse bayonet-lock connectors

Rugged environmental performance – the perfect Octobyte packaging solution



Dozens of contact arrangements available including hybrid Octobyte, power, and signal

- Rugged MIL-DTL-5015 type design with fast reverse bayonet coupling
- Rigid dielectric inserts with contact retention clips
- Positive lock technology provides reliable vibration and shock resistance
- Proven performance in even the most rugged applications
- Conforms to the European VG 95234 standard, French (NFF 61030) and British (BS 6853) electrical standards and EEC compliance directives

Ethernet-ready Octobyte solutions for rail and transit applications are available as discrete contacts, packaged in rugged reverse-bayonet ITH series connectors, or as turnkey inside-the-box or environmental cable assemblies, tested and ready for immediate use.



Available flop-lid protective cover

RadGrip rubber coupling nut covers available in a wide range of colors including safety red

Hydrostatic Test Lab

GLENDALE, CALIFORNIA

Sneak peek inside Glenair's hydrostatic test lab for high-pressure subsea electrical and fiber optic interconnects



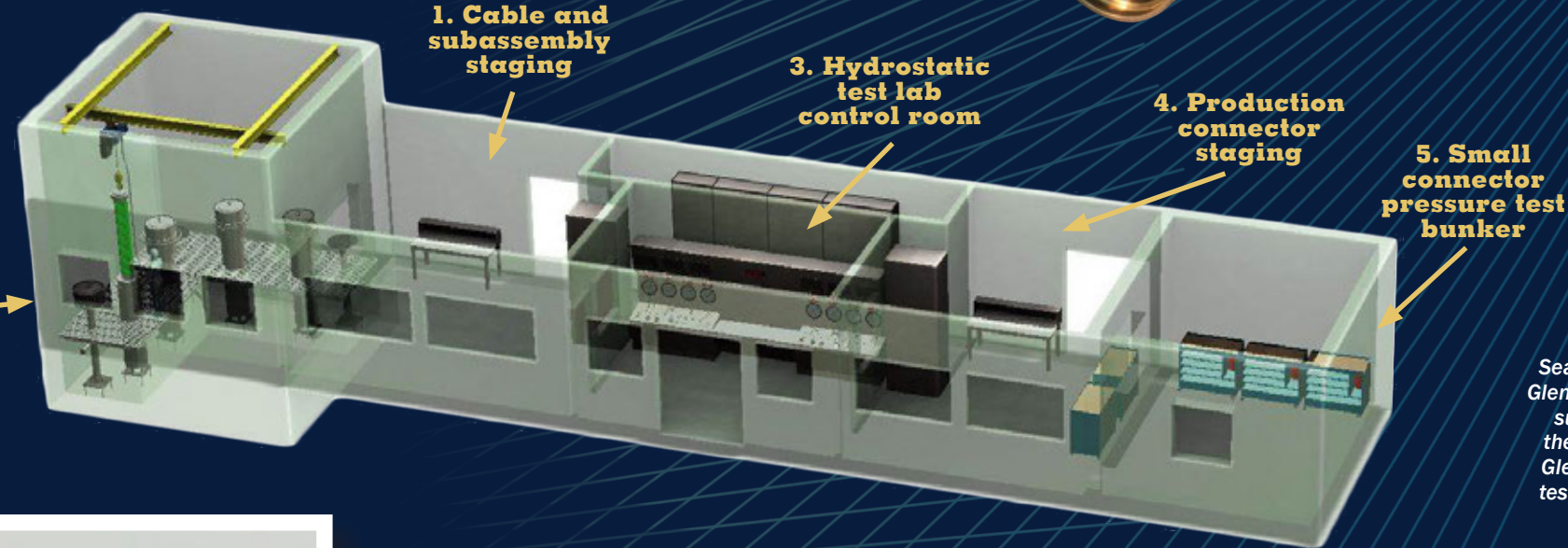
DISCRETE CONNECTOR TESTING: All Glenair subsea interconnects are subjected to 100% inspection and test



CONTROL ROOM: The modular consoles in the control room provide for up to 8 pressure circuits, operating in Manual mode or Automated. Each circuit is capable of a maximum of 16.5K psi. Monitors display: Automated Test Profiles, Data Acquisition, remote viewing of Test rooms and more. System is network connected for access to Profiles and distribution of test reports.



2. Large cable and subassembly pressure test bunker



SeaKing™ and SuperG55™ QUALIFICATION TESTING: Both Glenair Series 70 SeaKing and SuperG55 rugged dry-mate subsea connectors have been tested and qualified to their 10K psi pressure rating—open-face and mated—in Glenair's state-of-the-art hydrostatic test lab. Additional testing included mating cycles, salt spray, and electrical continuity.

LARGE PRESSURE VESSELS: Built to accommodate complete cable assemblies, mated connectors, and customer-supplied subassemblies



TECHNICAL STAFF: Knowledgeable and trained subsea specialists perform both in-house product qualification testing, as well as customer subassemblies



Glenair Hydrostatic Test Lab Technical Specifications and Pressure Test Standards	
Pressure test profiles	Automated or manual
Maximum test pressure	16.5K psi
Data acquisition types	Pressure, time, temperature, and electrical performance
Performance monitoring under pressure	I/R, continuity, insertion loss, and backreflection (optical)
Industry profiles	All major oil & gas standards
Custom profiles	Yes, including customer-supplied subassemblies
Capacity (large pressure vessels)	Working volume = 12" diameter x 72" depth; Test specimen weight up to 1500 lbs.



MISSION-CRITICAL INTERCONNECT SOLUTIONS

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