MISSION-CRITICAL
INTERCONNECT SOLUTIONS

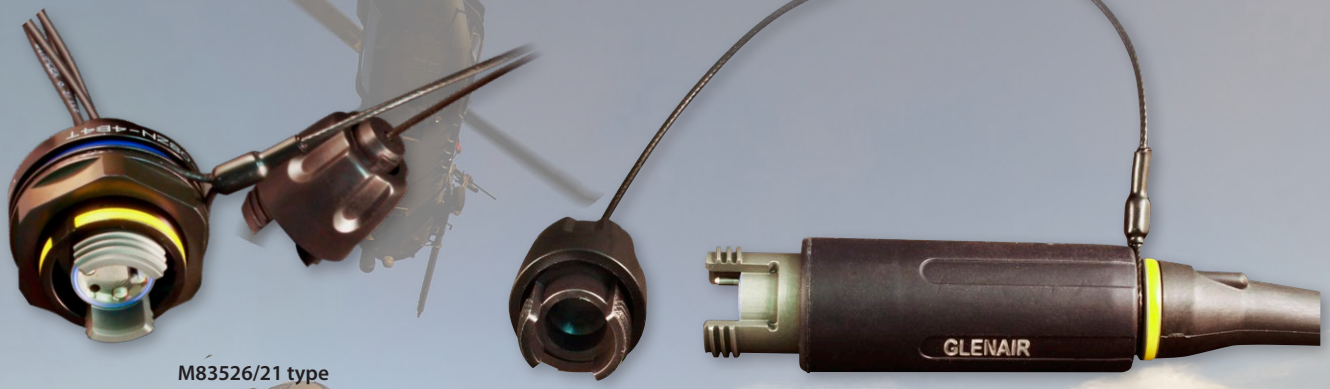
Glenair®

EXPANDED-BEAM FIBER OPTIC ASSEMBLIES · SERIES 185-002

Eye-Beam® GMA

IAW MIL-DTL-83526/20 and /21 · HMA Type Intermateable

JANUARY 2019



M83526/21 type
Panel mount Configuration

M83526/20 type
Hermaphroditic Cable Plug Configuration

Available cable reels and field-deployment technologies including man-packable units

QUALITY ASSURANCE

Glenair is ISO 9001 and AS9100 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. Glenair is qualified to hundreds of rigorously controlled mil-spec product and process certifications administered by the US government.

EYE-BEAM® GMA SERIES 185-002

HMA-type ball lens expanded beam connectors and cables

Featuring the industry's best performance—from insertion loss and return loss to mating durability

Ideally suited for use in harsh application environments such as geophysical exploration, military communications, industrial data transmission, and video broadcasts, Eye-Beam® GMA expanded beam connectors and cables are built in accordance with MIL-DTL-83526/20 and /21 and are fully intermateable with industry standard HMA type solutions. Sealed expanded beam interconnect technology resists water, mud, dust, oil and other chemicals contaminating the optical path and deteriorating system performance. The hermaphroditic design of the GMA interconnect eliminates the need for in-line adapters, and the environmentally resistant packaging reduces field maintenance and repair costs.

Eye-Beam GMA connectors are sold as parts of complete assemblies. Individual connectors require specialized termination, assembly, and cleaning processes. Customers are advised to consult with Glenair's fiber optic application engineering team before purchasing.

- **Field-deployable system for both indoor and outdoor applications**
- **Beam expansion dramatically reduces loss due to contamination**
- **Large ball lens facilitates easy cleaning**
- **Fully intermateable with all MIL-DTL-83526 /20 and /21 compliant connectors**
- **2 and 4-channel insert arrangements**
- **Singlemode and multimode versions, plus broad support for a wide range of standard and tactical military cables**

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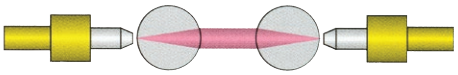
MIL-DTL-83526 /20 & /21 compliant hermaphroditic expanded beam connectors

EXPANDED BEAM TECHNOLOGY



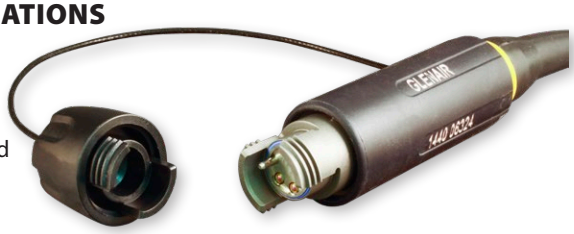
Expanded Beam connectors utilize a sealed lens to expand the emitting beam of light from the fiber media. The expanded beam is then refocused back into the fiber of the mating half. These sealed assemblies are ideally suited for environmental applications where optical connectors are subjected to repeated mating/unmating cycles. Easy to clean, and insensitive to contamination.

Field-deployable GMA connector and cable technology may be deployed in a broad range of applications, from tactical communications to oil & gas industry exploration, satellite communications, and more. Multichannel fiber optic cable—including ruggedized simplex and mil-tactical solutions—are fully supported.

SERIES 185-002 EYE-BEAM® GMA MATERIALS/FINISHES

Plug	
Front housing, shell, and coupling nut	Aluminum Alloy / hard anodize
Insert body	Copper-nickel-zinc alloy
Guide pin	Stainless steel / passivate
Strain relief boot, facial seal, and grip sleeve	Fluorosilicone
Dust cap	Thermoplastic
Lanyard	Stainless steel / coated
Receptacle	
Front housing	Aluminum alloy / hard anodize
Insert body	Copper-nickel-zinc alloy
Guide pin	Stainless steel / passivate
Shell, jam nut and back nut	Aluminum Alloy / Zinc-Nickel black
Facial seal and panel seal	Fluorosilicone
Dust cap	Thermoplastic
Lanyard	Stainless steel / coated

SERIES 185-002 EYE-BEAM® GMA PERFORMANCE SPECIFICATIONS



Insertion Loss	Multimode: ≤1.5 dB typical at 850/1300nm Singlemode: ≤2.0 dB typical at 1310/1550nm
Return Loss	Singlemode: Better than 31 dB typical mated Better than 34 dB typical unmated
Operating Temperature	-55°C to +85°C
Storage Temperature	-57°C to +85°C
Mating Durability	3000 mating cycles minimum
Cable Retention	1500N (cable dependent)
Bump	4000 bumps at 40g acceleration
Impact	8 drops from 0.9m per TIA/EIA-455-2, Method C, Service Class: Severe
Drop (Free Fall)	500 falls onto concrete from 1.2m
Vibration - Sinusoidal	10g Peak per TIA/EIA-455-11, Test Condition III
Vibration - Random	9g RMS per TIA/EIA-455-11, Test Condition VI-C, for 1.5 hours
Physical Shock (Half-sine Pulse)	50g Peak, 5 shocks per axis (30 shocks total) per TIA-455-14, Test Condition A
Water Immersion	Depth of 15m for 24 hours per TIA-455-74

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Dimensions in Inches (millimeters) are for reference only and subject to change without notice.

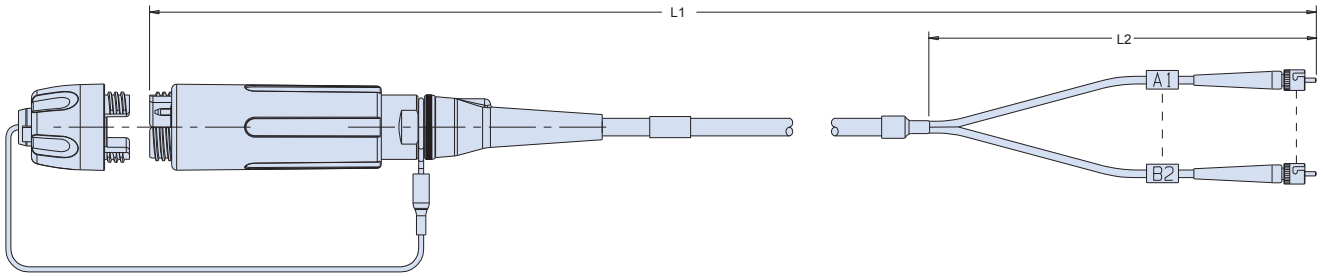
MIL-DTL-83526 /20 & /21 compliant hermaphroditic expanded beam connectors

Cable harnesses and assemblies

FA03936 GMA IN LINE PLUG CABLE ASSEMBLY

Reference Part Number*							
Sample Part Number	**FA03936**	**-60**	**-1**	**-3**	**-1**	**-4**	**-36-12**
Basic number	GMA Fiber Optic cable						
GMA Connector Type	**60** = Plug, hermaphroditic, in-line						
Fiber Type	**1** = SM 9/125 **2** = MM 50/125 **3** = MM 62.5/125						
Wavelength	**1** = MM 850 nm **2** = MM 1300 nm **3** = SM 1310 nm **4** = SM 1550 nm						
Pigtail Connector Type	**0** = ST M83522/16 style **1** = ST connector **2** = FC connector **3** = SC connector **4** = SC duplex **5** = SMA connector (906) **6** = LC connector **7** = LC duplex **8** = SMA connector (905) **9** = Customer specified						
Number of Fibers	**2** = 2 channel **4** = 4 channel						
Length (L1, L2)	in inches						

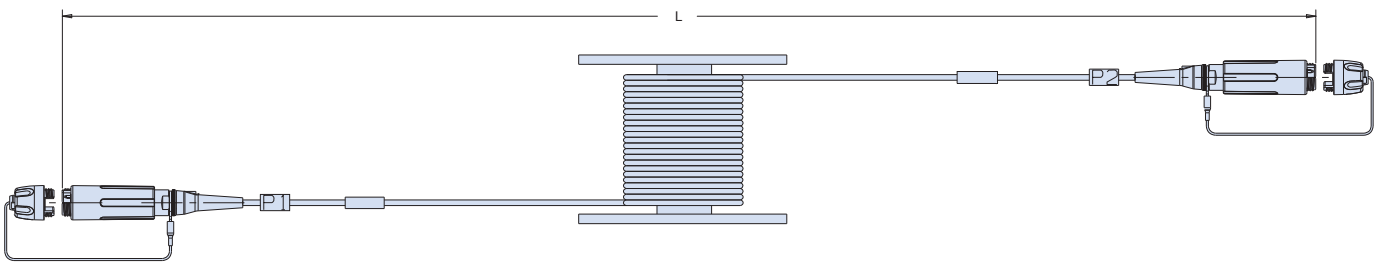
* Use this part number for reference only. A unique Glenair part number will be assigned to your cable order



FA03939 GMA IN LINE PLUG-TO-PLUG CABLE ASSEMBLY

Reference Part Number*							
Sample Part Number	**FA03939**	**-60**	**-1**	**-3**	**-4**	**-100**	**-3**
Basic number	GMA Fiber Optic cable						
GMA Connector Type	**60** = Plug, hermaphroditic, in-line						
Fiber Type	**1** = SM 9/125 **2** = MM 50/125 **3** = MM 62.5/125						
Wavelength	**1** = MM 850 nm **2** = MM 1300 nm **3** = SM 1310 nm **4** = SM 1550 nm						
Number of Fibers	**2** = 2 channel **4** = 4 channel						
Length (L)	in feet						
Reel Type	**1** = Metal reel **2** = Metal reel with castors **3** = Wooden reel **4** = Plastic reel **5** = Manpack reel **6** = Customer specified (omit for no reel)						

* Use this part number for reference only. A unique Glenair part number will be assigned to your cable order



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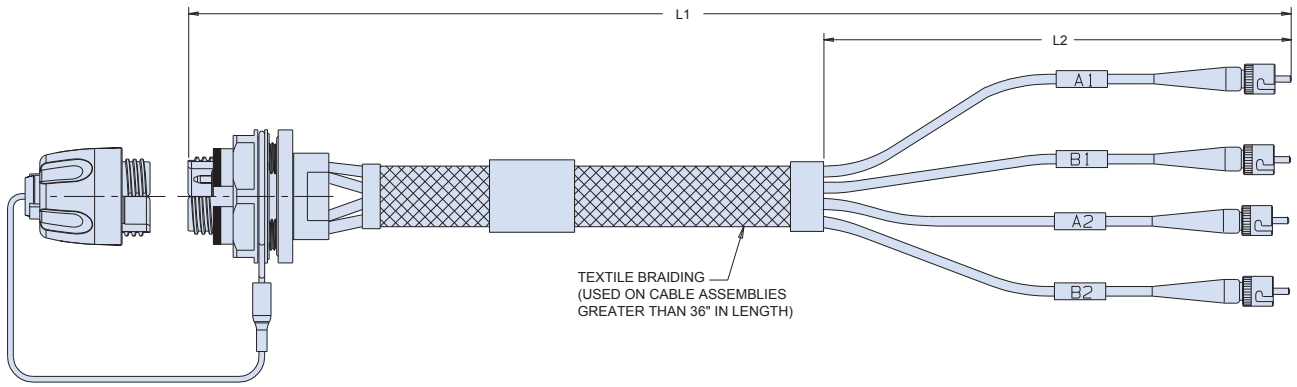
MIL-DTL-83526 /20 & /21 compliant hermaphroditic expanded beam connectors

Cable harnesses and assemblies

FA03937 GMA JAM NUT MOUNT OR WALL MOUNT RECEPTACLE CABLE HARNESS

Reference Part Number*							
Sample Part Number	**FA03937**	**-80**	**-1**	**-3**	**-1**	**-4**	**-36-12**
Basic number	GMA Fiber Optic cable						
GMA Connector Type	**70** = Wall mount receptacle (low profile) **80** = Jam nut mount receptacle (low profile)						
Fiber Type	**1** = SM 9/125 **2** = MM 50/125 **3** = MM 62.5/125						
Wavelength	**1** = MM 850 nm **2** = MM 1300 nm **3** = SM 1310 nm **4** = SM 1550 nm						
Pigtail Connector Type	**0** = ST M83522/16 style **1** = ST connector **2** = FC connector **3** = SC connector **4** = SC duplex **5** = SMA connector (906) **6** = LC connector **7** = LC duplex **8** = SMA connector (905) **9** = Customer specified						
Number of Fibers	**2** = 2 channel **4** = 4 channel						
Length (L1, L2)	in inches						

***** Use this part number for reference only. A unique Glenair part number will be assigned to your cable order



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MIL-DTL-83526 /20 & /21 compliant hermaphroditic expanded beam connectors

NOTE: Eye-Beam GMA connectors are sold as parts of complete assemblies. Individual connectors require specialized termination, assembly, and cleaning processes. Customers are advised to consult with Glenair's fiber optic application engineering team before purchasing.

How To Order							
Sample Part Number	**185-002**	**-60**	**G**	**-4**	**B**	**90**	**L**
Basic number	GMA Fiber Optic connector series						
Connector Type	**60** = Plug, hermaphroditic, in-line **70** = Receptacle, wall mount, low profile **71** = Receptacle, wall mount, extended backend **80** = Receptacle, jam nut mount, low profile **81** = Receptacle, jam nut mount, extended backend						
Material/Finish	Plug: **G** = Al Alloy / hard anodize Receptacle: **ZR** = Al Alloy / Zinc-Nickel black						
Number of Channels	**2** = 2 channels **4** = 4 channels						
Operating Wavelength	**A** = Multimode dual wavelength, 850 / 1300 nm. **B** = Singlemode, 1310 nm. **C** = Singlemode, 1550 nm. **D** = Singlemode dual wavelength, 1310 / 1550 nm.						
Cable Diameter	See Table II						
Termini Option	**L** = Less termini, order termini separately **T** = Termini included in same quantity as number of channels (order connectors less termini (option **L**) for best / fastest availability)						

NOTES

Dimensions in Inches (millimeters) and are subject to change without notice.

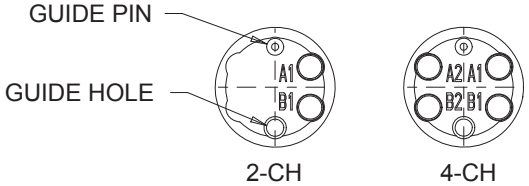
GMA connectors can be ordered with or without termini, see P/N development. Termini can be ordered separately, see Glenair dwg. 181-101

Consult factory for additional Connector Types, Materials/Finishes, and Cable Diameters

Table II: Cable Diameters

Dash No.	Ø "A" Max Cable Dia. for Receptacle, Low Profile	Ø "B" Max Cable Dia. for Receptacle, Extended Backend	Ø "C" Max Cable Dia. for Plug
10	.039 (1.0) buffered fiber		
20	.082 (2.1) simplex cable		
30		2X .118 (3.0)	
40		4X .118 (3.0)	
50		.126 (3.2)	.126 (3.2)
60		.165 (4.2)	.165 (4.2)
70		.197 (5.0)	.197 (5.0)
80		.216 (5.5)	.216 (5.5)
90		.236 (6.0)	.236 (6.0)
Consult factory for other cable sizes			

185-002 INSERT ARRANGEMENTS (Number of Channels)



CONNECTOR MATING FACE

CONNECTOR MATING FACE
(There is a rotational relationship between D Flat and the connector mating face on jam nut receptacles)

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MIL-DTL-83526 /20 & /21 compliant hermaphroditic expanded beam connectors

Terminus and in-line plug

181-101 TERMINUS FOR GMA CONNECTORS

How To Order GMA Terminus		
Sample Part Number	**181-101**	**-1253**
Basic number	Terminus for GMA connector	
Dash Number	See Table I	

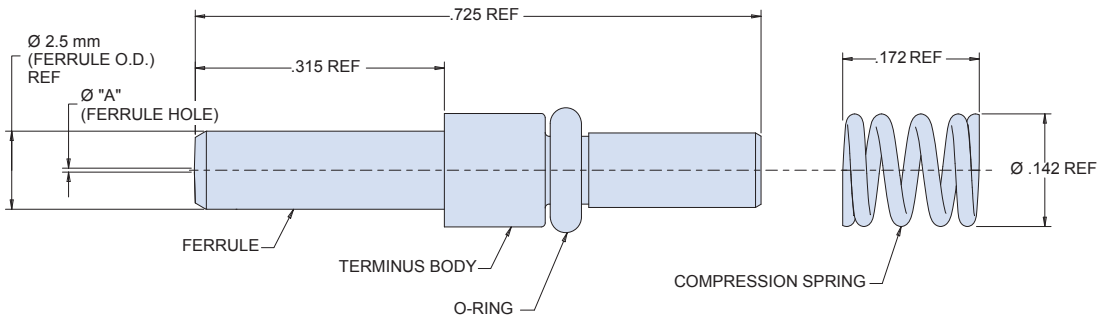


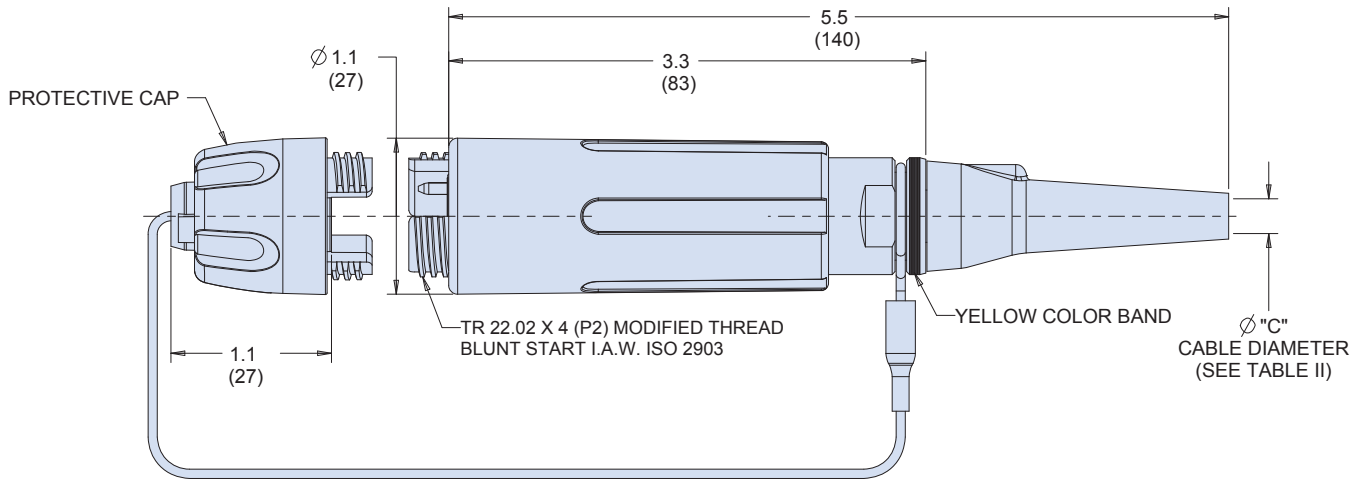
Table I		
Dash No.	**Ø A (microns)**	**Fiber Size Core/Cladding (microns)**
-1253	125.3	9/125 (singlemode)
-1260	126.0	50/125 and 62.5/125 (multimode)
Consult factory for additional sizes		

NOTES

Material/Finish:
- Ferrule: Zirconia ceramic
- Terminus body: Stainless steel / passivate
- Compression spring: Stainless steel/passivate
- O-ring: Nitrile rubber

Consult factory for appropriate termination and assembly tools / procedures

185-002-60 HERMAPHRODITIC IN-LINE PLUG



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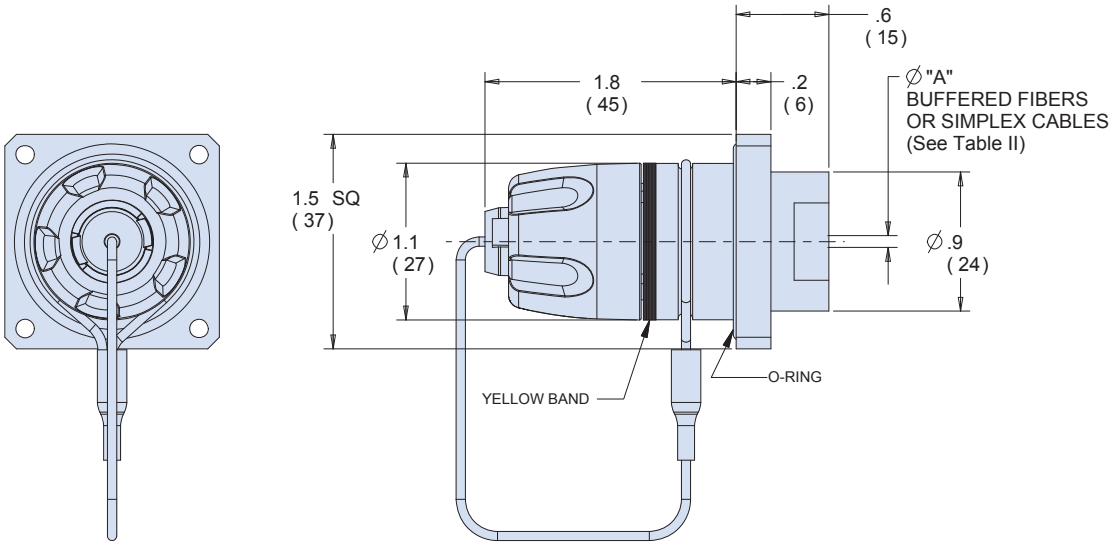
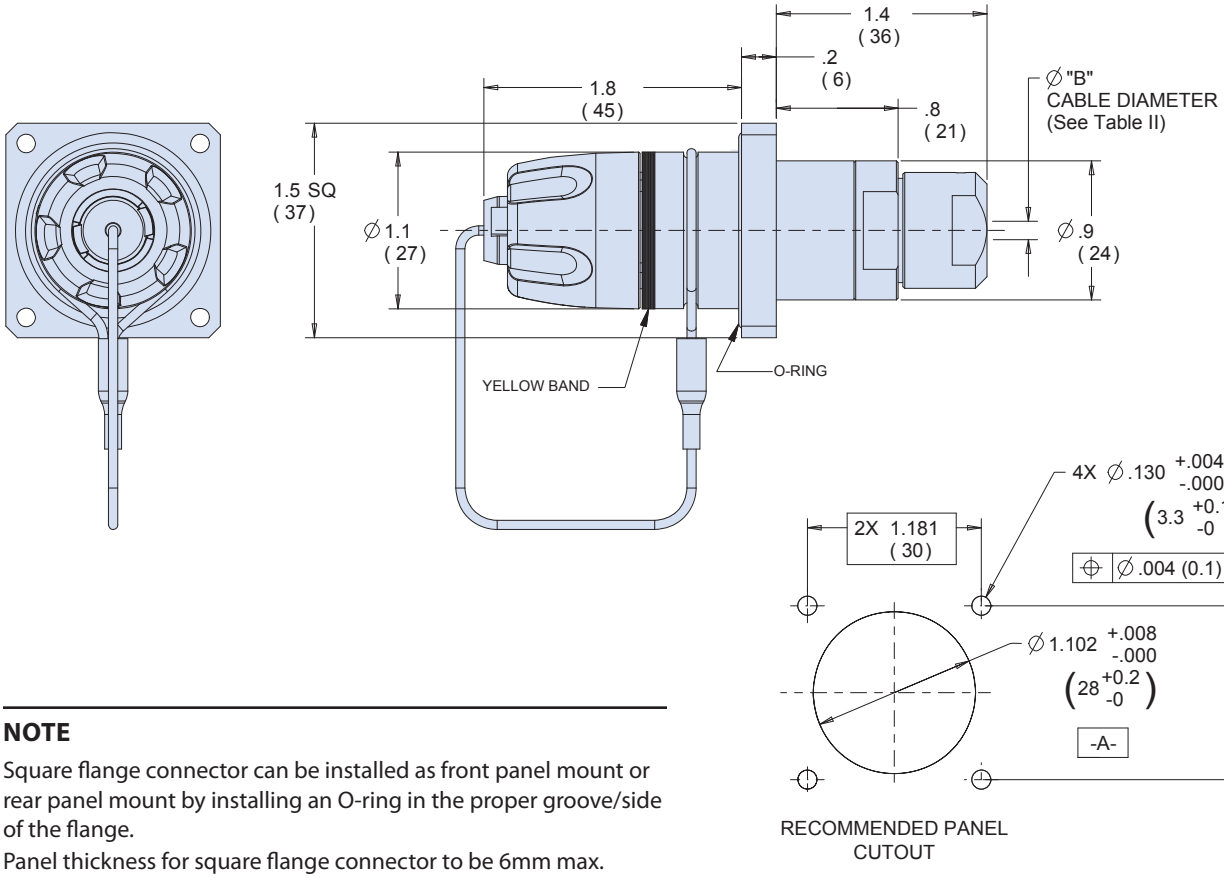
MIL-DTL-83526 /20 & /21 compliant hermaphroditic expanded beam connectors

Wall mount receptacles

185-002-70 LOW-PROFILE WALL MOUNT RECEPTACLE



185-002-71 WALL MOUNT RECEPTACLE WITH EXTENDED BACKEND



RECOMMENDED PANEL CUTOUT

NOTE

Square flange connector can be installed as front panel mount or rear panel mount by installing an O-ring in the proper groove/side of the flange.

Panel thickness for square flange connector to be 6mm max.

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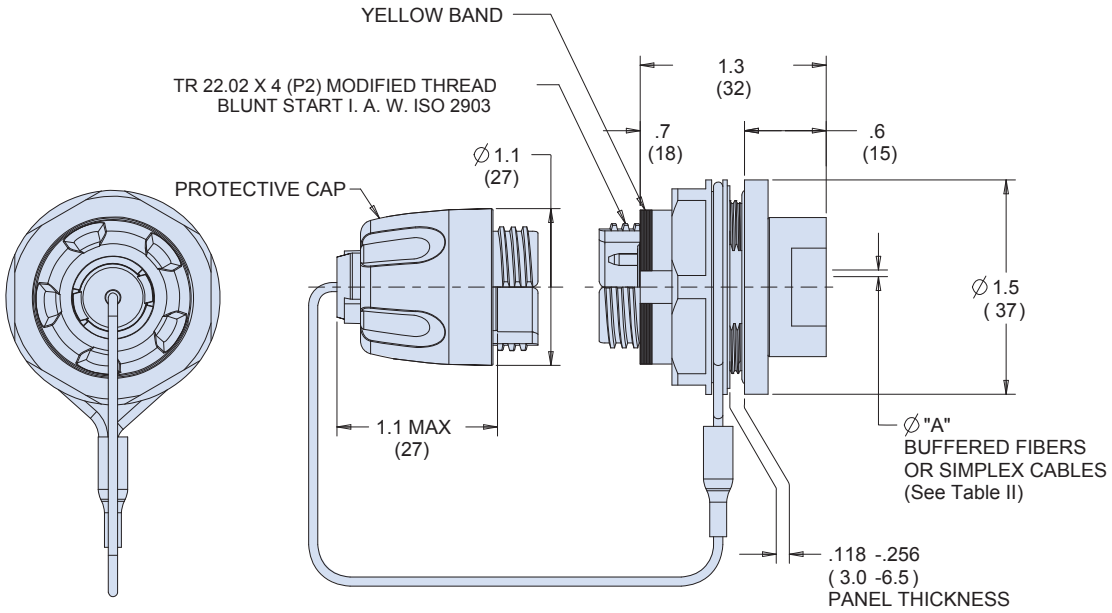
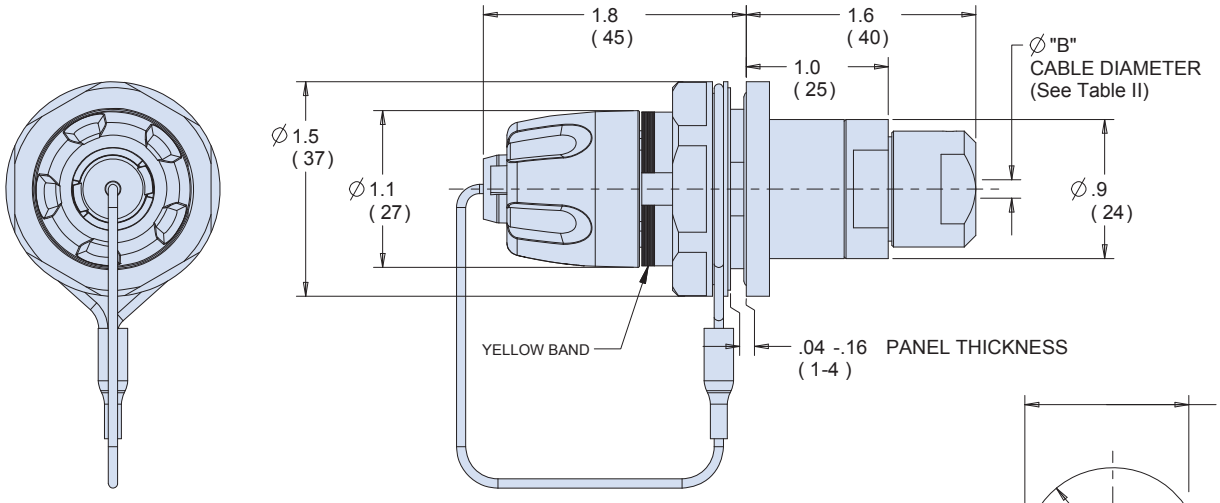
MIL-DTL-83526 /20 & /21 compliant hermaphroditic expanded beam connectors

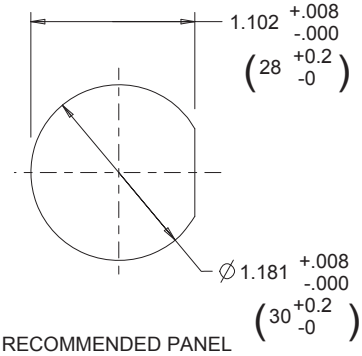
Jam nut mount receptacles

185-002-80 LOW-PROFILE JAM NUT MOUNT RECEPTACLE



185-002-81 JAM NUT MOUNT RECEPTACLE WITH EXTENDED BACKEND





RECOMMENDED PANEL
CUTOUT (as viewed from front of panel)

NOTE

There is a rotational relationship between D Flat and the connector mating face on jam nut receptacles

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Fiber Optic CONNECTORS

Glenair signature high-performance fiber optic connectors, cables, and assemblies

High-performance fiber optic interconnect systems: Rugged, harsh-environment, high-bandwidth aerospace-grade connectors, termini, toolkits, and cable assemblies

Environmental point-to-point connectors and cable assemblies for rugged applications

Inside-the-box fiber optic datalink pigtail assemblies

- **Fiber Optic backbone systems are expandable for future equipment needs, without recabling**
- **Tight tolerance fiber optic connectors**
- **Weight-saving composite, aluminum and stainless steel shells available**
- **Qualified size #23, #18, #16, and #12 precision ceramic termini**
- **Singlemode and multimode fiber, from 9/125 to 1000 microns**
- **Ultra-low insertion loss values, <.50dB typical**

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Fiber Optic Data Transmission Connectors, Cables, and Assemblies

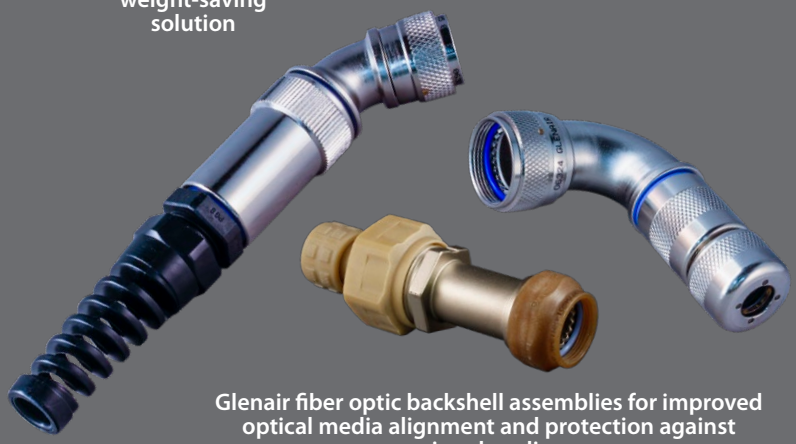
Butt-joint and expanded beam

GLENAIR SIGNATURE BUTT-JOINT AND EXPANDED BEAM FIBER OPTIC INTERCONNECT SOLUTIONS

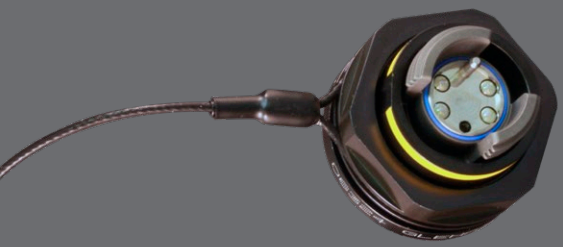
Glenair High Density (GHD) fiber optic higher-density alternative to D38999 type

Mighty Mouse fiber optic: Size #23, #20HD, and #16 size- and weight-saving solution

Glenair Front Release (GFR) innovative drop-in termini solution for individual connector cavity fiber media



Glenair fiber optic backshell assemblies for improved optical media alignment and protection against micro-bending



Eye-Beam® GMA (HMA type intermateable) IAW M83526/21 panel mount configuration

EYE-BEAM® GMA

Eye-Beam® GMA (HMA type intermateable) IAW M83526/20 hermaphroditic cable plug configuration

EYE-BEAM® GLT

Innovative Eye-Beam® GLT grin-lens expanded-beam termini can be integrated into virtually any circular or rectangular connector package. Factory terminated lens pin termini and lens socket termini on cable jumpers allow for easy fusion splicing in the field.

MISSION-CRITICAL

INTERCONNECT SOLUTIONS

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HIGH-PERFORMANCE

FIBER OPTIC

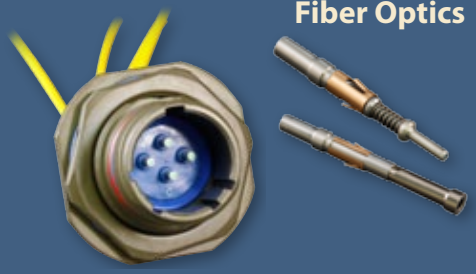
INTERCONNECT SOLUTIONS

AUGUST 2012

FIBER OPTIC
INTERCONNECT SOLUTIONS

MIL-DTL-38999 Type Fiber Optic Connection System

Eye-Beam™ Expanded Beam Fiber Optics



MIL-PRF-28876 Fiber Optic Connection System

GFOCA M83526 Compliant Fiber Optic Connection System

Glenair High Density (GHD) Fiber Optic Connection System

Copper-to-Fiber Media Converters/ Active Components

Glenair Front Release (GFR) Fiber Optic Connection System

Series 80 Mighty Mouse Fiber Optic Connection System

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Glenair Fiber Optic Systems Overview and Selection Guide A

MIL-DTL-38999 Series III Type Fiber Optic Connection System B

Glenair High Density (GHD) Fiber Optic Connection System C

Series 80 Mighty Mouse Fiber Optic Connection System D

Glenair Eye-Beam™ Fiber Optic Connection System E

Electrical to Fiber Optic Media Converters and Active Cables F

Glenair Front Release (GFR) Fiber Optic Connection System G

MIL-PRF-64266 (NGCON) Fiber Optic Connection System H

MIL-DTL-83526 Type GFOCA Hermaphroditic Fiber Optic Connection System I

MIL-PRF-28876 Fiber Optic Connection System J

Fiber Optic Cable and Conduit K

Fiber Optic Termination, Test and Maintenance Toolkits L

Appendix: Introduction to Fiber Optic Terms and Technology
Glenair Materials and Finishes M

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Fiber optic interconnect technologies deliver high data rate and high bandwidth performance in land, sea, air, space and C4ISR applications. Precision-engineered fiber optic contacts, or termini, are the key to delivering low data loss and reliable, repeatable performance over long distances in mission-critical applications. But the advantages of a connection system that can transmit the equivalent of 24,000 telephone calls simultaneously through fibers thinner than a human hair—and over longer distances than would ever be possible with copper media—go beyond their mind-boggling data transmission rate:

FIVE REASONS TO UPGRADE TO FIBER OPTICS

1 Reduced Size and Weight

- *Compared to copper, optical fiber is relatively small in size and light in weight—a major advantage in interconnect systems servicing airborne avionics, and in-flight entertainment systems. As a practical matter, optical fiber is simply easier to install—especially in retrofit programs—because the smaller cable diameters can fit comfortably within the footprint or layout of existing electrical conduits and harnesses.*
- *This reduction in media size makes it possible to run multiple backup cables for critical electronic systems or devices. The ability to provide complete redundancy for all critical cabling is a major factor driving the use of fiber optics in mission-critical applications such as commercial and military aircraft—particularly for applications with long cable runs.*

2 EMI Immunity

- *Optical fiber is frequently applied in high-reliability applications due to its electromagnetic immunity. Since fiber optic media uses light to transmit signals, it is not subject to electromagnetic interference, radio frequency interference or voltage surges, and so provides greater transmission reliability—particularly in C4ISR applications and communication systems that depend on error-free performance.*

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3 Huge Bandwidth Over Long-Distances

- *Fiber can transmit a mind-boggling quantity of data with extremely good transmission quality over long distances: Up to 150 times the data carrying capacity of bulkier copper cable! And since most high-speed data protocols transmit digitally, optical media reduces translation errors and bottlenecks—particularly over longer cable run distances such as are found in Navy ships and ground-based shelter and vehicle applications.*

4 Spark/Arc Immunity

- *The total electrical isolation of fiber also makes it a safer, spark-free media for use in hazardous environments, such as aircraft fuel cells or other applications where volatile gasses might be present. As only light, not electricity, is being transmitted, there is no risk of a spark or short-circuit from a damaged cable. For this same reason there is no shock hazard or risk to users performing routine maintenance to interconnect cabling. As a result, fiber optic media is routinely specified for use in Class I, Division I (Ex) environments such as are found on Navy ships, commercial tankers and other enclosed environments where the risk of a spark/arc event is considered a severe safety hazard.*

5 Enhanced Security

- *Light pulses, unlike electrical signals, are almost impossible to intercept or monitor. Fiber optic media therefore enjoys total immunity from wiretapping. This characteristic is particularly valuable to the military services, banks and operators of secure networks. In addition to enhanced transmission security, fiber media itself is undetectable to metal or electromagnetic flux detection equipment.*

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MIL-DTL-38999 type fiber optic interconnection systems are the recognized standard for all military and commercial aerospace applications that depend on high levels of connector reliability, environmental and mechanical performance and low dB insertion loss. Designed specifically for air and space, the Glenair MIL-DTL-38999 type fiber optic connection system has been successfully deployed in applications ranging from the F-35 Joint Strike Fighter and the venerable F-22 to dozens of other fixed wing and rotary aircraft applications.

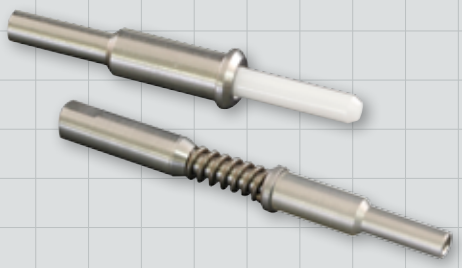
A

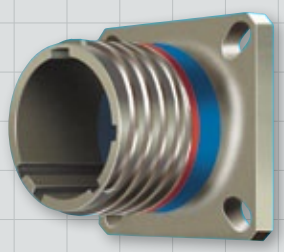
MIL-DTL-38999 TYPE

FIBER OPTIC CONNECTION SYSTEM

Commercial and Military Aerospace

- *Qualified size 16 MIL-PRF-29504 pin-socket precision ceramic termini*
- *MIL-DTL-38999 type tight tolerance fiber optic connectors*
- *Aluminum, composite thermoplastic and stainless steel shells available*
- *Singlemode and multimode for all popular fiber sizes*
- *Ultra-low insertion loss values*





B

Turn to Section B for the complete line of Glenair MIL-DTL-38999 type and MIL-PRF-29504 qualified connection system products, including tight-tolerance connectors, single- and multimode termini, backshells and adapters, turnkey cable assemblies, test probes, protective covers and more.

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The Glenair High Density (GHD) system is the choice for military and commercial air and space applications that demand outstanding optical and environmental performance, but require reduced size and weight compared to standard MIL-DTL-38999 and other mil-spec designs. Glenair has achieved nearly double the density of M28876 and D38999 with an innovative front-release terminus design and M85045/16 cable accommodation. The GHD system offers many other advantages including keying for APC and far easier termination and maintenance.

GLENAIR HIGH DENSITY

FIBER OPTIC CONNECTION SYSTEM

HD Air and Space

- *Size 18 front-release genderless termini accommodate 900 µ to 2.0 mm jacketed fiber*
- *Single keying for APC polish available*
- *Nearly double the density of D38999*
- *Precision ceramic alignment sleeves captivated in a removable assembly (ASR) for easy cleaning*

C Turn to Section C for Glenair High Density (GHD) keyed- and non-keyed front-release fiber optic termini, plus plug and receptacle connectors in jam nut mount, flange, and in-line configurations.

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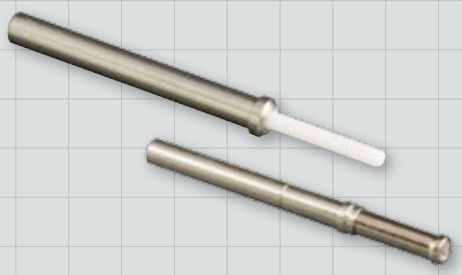
The perfect marriage of high-bandwidth fiber optics and ultra-miniature packaging has arrived. The Series 80 Mighty Mouse—the new mil-aero industry standard reduced size and weight connector—is now available with three different sizes of fiber optic termini, 16, 20HD, and #23. Single- and multi-mode versions are available. A shell size six, four channel Mighty Mouse 801 series plug for use with size 23 optical termini weighs in at just 5 grams.

SERIES 80 MIGHTY MOUSE

FIBER OPTIC CONNECTION SYSTEM

Lightweight Space, Air, and Ground

- *Three pin-socket rear release termini sizes: #23, #20HD, and #16 for use in any Series 80 connector*
- *The smallest mil-aero caliber fiber optic connection system available*
- *Singlemode and multimode*
- *Precision ceramic ferrules*
- *0.5 dB typical attenuation*
- *1 to 130 channels*



D

Turn to Section D for product details and ordering information for this innovative fiber optic solution. Only the Series 80 Mighty Mouse offers mil-aero environmental, optical and mechanical performance in this revolutionarily small package.

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The Glenair Eye-Beam™ system utilizes innovative free floating expanded beam lenses, precision ceramic alignment sleeves and custom designed terminus bodies to ensure optimal optical performance in harsh environmental conditions. Supplied as point-to-point jumpers or factory terminated pigtails, Eye-Beam™ assemblies can be integrated into virtually any circular or rectangular connector package in high-performance tactical fiber optic or hybrid connection systems.

GLENAIR EYE-BEAM™

FIBER OPTIC CONNECTION SYSTEM

High-Performance Expanded Beam

- *High-performance, low dB loss GRIN lens-eqiuipped pin-socket termini*
- *Terminated jumpers easy to integrate into any circular or rectangular connector package*
- *Innovative expanded beam lens terminus expands signal 27X from a standard 9.3 micron fiber core*
- *Ultra-high precision ceramic sleeves and custom designed terminus bodies ensure axial alignment*
- *Suitable for use in hybrid electrical/optical interconnects*

E

Turn to Section E for Eye-Beam™ point-to-point jumpers in numerous contact formats for use with most high-performance tactical fiber optic connections systems: MIL-DTL-38999, MIL-PRF-28876, GFOCA, and Series 80 Mighty Mouse.

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Glenair Media Converters address the need to convert signals between electrical and optical domains in fiber optic systems with reduced weight, small form factor components. The technologies include a Gigabit Ethernet (1000BASE-T) copper twisted pair to optical fiber (1000BASE-SX or LX) ruggedized media converter, as well as a DVI signal (R, G, B, and clock) copper twisted pair to optical fiber solution, and size 8 optoelectronic insert transmitters and receivers. All Glenair media converters deliver turnkey copper to fiber media conversion in a reliable, easy-to-install format for airframe, military, and other high-performance applications.

MEDIA CONVERTERS

COPPER TO FIBER OPTIC

- *Ruggedized Gigabit Ethernet and DVI media converters meet military standards for shock, vibration, and immersion*
- *-40° to +85° operating temperature range*
- *Gigabit Ethernet and DVI media converters feature MIL-STD-1560 layouts for electrical and fiber optic connectors*
- *Optoelectronic inserts (patent pending) are ARINC 801 compliant to 4.5 GB/sec.*
- *Turnkey, small form-factor harsh environment solution*

Active Components

F

Turn to Section F for Gigabit Ethernet (1000BASE-T) copper to optical fiber (1000BASE-SX or LX), and DVI signal to optical fiber, and size 8 optoelectronic media converters.

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The Glenair Front Release (GFR) fiber optic connection system features Glenair's uniquely designed front-release fiber optic termini. With integrated retention clips and o-ring seals that place retention and environmental sealing directly on the terminus, Glenair is able to rapidly fabricate unique fiber optic connector shell packages. The GFR system allows interconnect designers to integrate fiber into a wide range of connector packages—such as M24308 D-Subs—without costly tooling or engineering.

GLENAIR FRONT RELEASE

FIBER OPTIC CONNECTION SYSTEM

Fast Integration Into Unique Connector Designs

- *Precision size 16 pin-socket front release termini with integrated retention clip and environmental o-ring seals*
- *Singlemode and multimode for all popular fiber sizes*
- *Typical insertion loss less than 0.5 dB*
- *Ready for use in both cylindrical and rectangular connectors*
- *Connector shells available in aluminum, stainless steel, and composite materials*
- *No upper limit on the number of fiber cavities*

G

Turn to Section G for the complete Glenair Front Release connection system, including front-release termini, Micro-D, and D-Subminiature connectors.

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The Glenair Next Generation MIL-PRF-64266 (NGCON) fiber optic connection system is a high-performance solution for air, sea, and space applications. Developed with the NGCON design consortium, the system combines proven technology from standard MIL-PRF-28876 and MIL-DTL-38999 Series III designs with new innovations including rear-release genderless contacts, high-density packaging, and removable alignment sleeve retainers (ASR).

NEXT GENERATION (NGCON)
MIL-PRF-64266 FIBER OPTIC CONNECTION SYSTEM

Sea and Air

- *Rear-release precision genderless termini with integrated retention clip and environmental sealing*
- *Singlemode and multimode for all popular fiber sizes*
- *2 channel to 36 channel insert arrangements available*
- *Aluminum alloy or stainless steel shells*
- *Conforms to MIL-PRF-64266 (NGCON)*

H

Turn to Section H for the Glenair Next Generation MIL-PRF-64266 type fiber optic connection system: Genderless rear-release termini, and plug and receptacle connectors are available.

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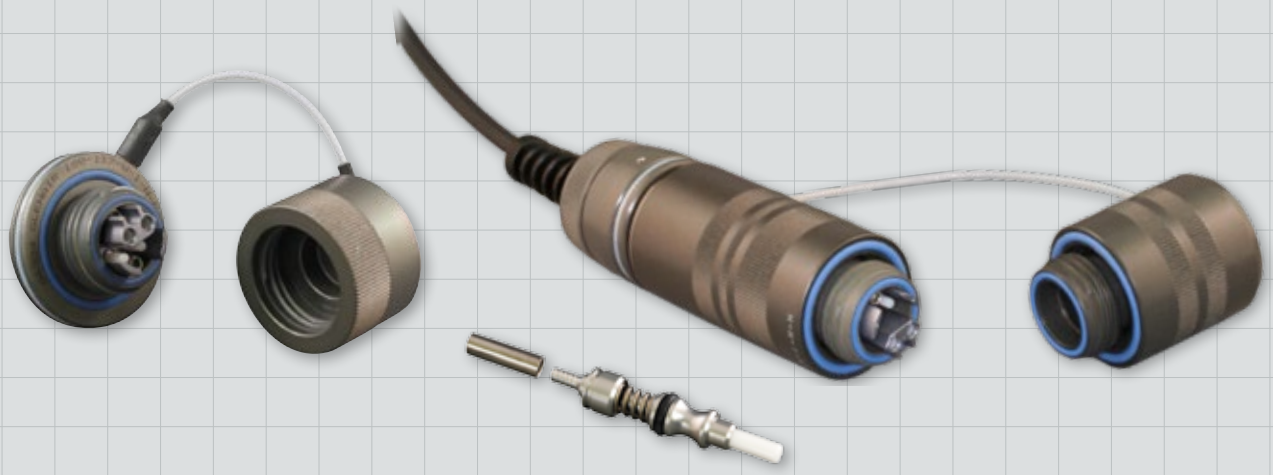
The GFOCA hermaphroditic field deployable connection system is genderless, ruggedized, corrosion-resistant and environmentally sealed. Utilizing low insertion loss butt-joint termini and a ruggedized coupling mechanism for reliable, repeatable mating, the GFOCA system is used by the Army for long-run battlefield communications, and is also well suited to dockside naval communications, down-hole drilling and other harsh environment applications. All products are designed to meet or exceed MIL-DTL-83526 connector and MIL-PRF29504/16 termini requirements.

GFOCA HERMAPHRODITIC

MIL-DTL-83526 TYPE FIBER OPTIC CONNECTION SYSTEM

- *Low insertion loss genderless termini*
- *2.5 mm dia ceramic ferrules and alignment sleeves*
- *4 channel singlemode and multimode configurations*
- *Designed to meet the requirements of MIL-PRF-29504/16 and MIL-DTL-83526 military specifications*
- *Discrete components or complete cable-on-reel solutions available*

Ground Tactical



I

Turn to Section I for GFOCA Hermaphroditic 4-channel plug and receptacle connectors, cable-on-reel solutions, and M29504/16 type genderless singlemode and multimode termini.

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MIL-PRF-28876 QPL fiber optic connection systems are designed for use in dockside and shipboard applications, such as are found on Navy ships, submarines and ship-to-shore communication systems. These environmentally sealed fiber optic components deliver long-term and reliable performance in even the harshest application environments. MIL-PRF-28876 QPL fiber optic components and cable assemblies have been successfully deployed on systems for U.S. Navy and Allied Naval forces.

A

MIL-PRF-28876 QPL

FIBER OPTIC CONNECTION SYSTEM

Dockside and Shipboard

- *Size 16 pin-socket qualified M29504/14 and /15 front-release termini*
- *MIL-PRF-28876 qualified plug and receptacle connectors and dust covers*
- *Singlemode and multimode with low insertion loss performance*
- *All popular shell sizes and insert arrangements available*
- *Corrosion-resistant and environmentally sealed*
- *500 cycles mating durability*
- *Withstands 500 hrs. min. salt spray*
- *2.0 mm dia ceramic ferrules and alignment sleeves*

J

Turn to Section J for the complete line of Glenair Qualified MIL-PRF-28876 connectors and protective dust covers, Size 16 single- and multimode M29504/14 and /15 termini, plus specialized backshells, adapters, and panel gaskets.

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FIBER OPTIC CABLES/CONDUIT

Media and Media Protection

- *Simplex fiber optic cable—graded index, stepped index, and singlemode*
- *Lightweight and flexible polymer-core and metal-core fiber optic media routing and physical protection systems*

K

Turn to Section K for a full range of bulk extruded fiber optic cable, including graded index, stepped index and single mode cables.

TERMINATION/TEST TOOLKITS

Tools for cleaning and inspection

- *Termination, cleaning and inspection kits*
- *Glenair test probe inspection system*
- *BandMaster™ ATS shield termination system*

L

Turn to Section L for turnkey solutions to every high-performance fiber optic termination, inspection, test and trouble-shooting requirement. Glenair builds and/or supplies all the tools needed for maximum up-time and efficiency. We also offer comprehesive training.

M

F/O TECHNOLOGY OVERVIEW

Turn to Section M for a basic introduction to fiber optic terms and technology. We discuss basic fiber optic operation, cable construction, connector and termini design and more.

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BUILD-TO-PRINT FIBER OPTIC

CABLE HARNESS DESIGNER'S GUIDE

In addition to our wide range of catalog (ASAP) Fiber Optic Cable Assemblies, Glenair offers turnkey, build-to-print fiber optic harnesses and box assemblies. To get started, fill out this designer's guide, then contact your local Glenair Sales office or the Factory at 818-247-6000. Glenair offers the fastest turnaround because we make and stock all the component parts, and have one of the largest and most experienced assembly facilities in the business. Ask for a tour!

Originator: _____

Phone Number: _____

Title of Assembly _____

Project/Program _____

Application Specifications

Working Environment

- ☐ Shipboard
- ☐ Airframe
- ☐ Avionics
- ☐ Secure Communications
- ☐ Ground Support/Soldier System
- ☐ Armored Vehicle
- ☐ Rail/Mass Transit
- ☐ Space
- ☐ Missile Defense
- ☐ Telecommunications
- ☐ Industrial
- ☐ Downhole or Surface Use
- ☐ Other

Cable Installation

- ☐ Outdoor
- ☐ Indoor
- ☐ Internal-to-Equipment

Temperature Requirements

Operating: - °C=_____ +°C=_____

Storage: - °C=_____ +°C=_____

Optical Fiber Requirements

Singlemode

Number of fibers _____

Fiber Size

- ☐ 9/125 µm
- ☐ Other

Test wavelength

- ☐ 1310 nm
- ☐ 1550 nm

Acceptable optical dB insertion loss

- ☐ Less than .5 dB
- ☐ Less than 1.0 dB

Acceptable optical return loss (backreflection)

- ☐ Not applicable
- _____ dB

Multimode

Number of fibers _____

Fiber Size

- ☐ 50/125 µm
- ☐ 62.5/125 µm
- ☐ 100/140 µm
- ☐ Other

Test wavelength

- ☐ 850 nm
- ☐ 1300 nm

Acceptable optical dB insertion loss

- ☐ Less than .5 dB
- ☐ Less than 1.0 dB

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Cable Harness Construction

Assembly Length Requirements

- ☐ Less than 10 Meters
- ☐ 10 to 150 Meters
- ☐ More than 150 Meters

Cable Type

- ☐ Buffered
- ☐ Simplex
- ☐ Distribution
- ☐ Breakout

Basic Harness/Assembly Description

- ☐ Open Wire Harness
- ☐ Repairable/Jacketed
- ☐ Overmolded (MIL-M-24041 Materials)
- ☐ Metal/Fabric Overbraided
- ☐ Conduit

Alternative Wire Protection Media

- ☐ High Flexibility Convoluted Tubing
- ☐ EMI/EMP Metal-Core Conduit
- ☐ Molded Shrink Boots
- ☐ Junction Boxes and Cable Bays

Strain relief

- ☐ Not Applicable
- ☐ Light Duty
- ☐ Medium Duty
- ☐ Heavy Duty
- ☐ Gorilla Proof

Level of Environmental Protection

- ☐ Not Applicable
- ☐ Moisture Resistance
- ☐ Full Water Immersion
- ☐ Chemical/Caustic Fluid Resistance
- ☐ Extreme Corrosion Resistance
- ☐ Intense Atomic Radiation

Special Considerations

- ☐ RoHS Compliant Materials
- ☐ Extreme Temperature Tolerance
- ☐ UL94-VO Flammability
- ☐ UV Resistance
- ☐ Field Repairability
- ☐ Crush/Abrasion Resistance
- ☐ Weight Reduction
- ☐ Size or Shape Restraints as Specified:

_____

_____

_____

_____

List the non-Glenair connectors used in this project, including connector interface designators, if known:

_____

_____

_____

_____

List jacket/sheath or other wire/fiber protection materials such as conduit, including material type and brand:

_____

_____

_____

_____

Fiber Optic Termination Assembly

Connector

☐ Jam Nut or ☐ Square Flange or ☐ Plug

☐ Pin ☐ Skt ☐ Genderless ☐ Contact Qty____

MIL-DTL-38999 Series III Type _____

Glenair High Density (GHD) _____

Series 80 Mighty Mouse _____

Eye-Beam™ _____

Glenair Front Release (GFR) _____

MIL-PRF-64266 (NGCON) Type _____

GFOCA _____

MIL-PRF-28876 _____

Termini Part No. _____

Dust Cover: ☐ Yes ☐ No

Fiber Optic Breakout Assembly

A Connector

☐ Jam Nut or ☐ Square Flange or ☐ Plug

☐ Pin ☐ Skt ☐ Genderless ☐ Contact Qty____

MIL-DTL-38999 Series III Type _____

GHD _____

Series 80 Mighty Mouse _____

Eye-Beam™ _____

Glenair Front Release (GFR) _____

MIL-PRF-64266 (NGCON) Type _____

GFOCA _____

MIL-PRF-28876 _____

Termini Part No. _____

Dust Cover: ☐ Yes ☐ No

B Connector

ST Connector _____

FC Connector _____

SC Connector _____

SMA Connector _____

LC Connector _____

Other _____

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FIBER OPTIC

MIL-DTL-38999 TYPE

FIBER OPTIC CONNECTION SYSTEM

MIL-DTL-38999 type fiber optic interconnection systems are the recognized standard for all military and commercial aerospace applications that depend on high levels of connector reliability, environmental and mechanical performance and low dB insertion loss. Designed specifically for air and space, the Glenair MIL-DTL-38999 type fiber optic connection system has been successfully deployed in applications ranging from the F-35 Joint Strike Fighter and the venerable F-22 to dozens of other fixed wing and rotary aircraft applications.

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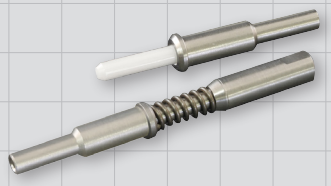
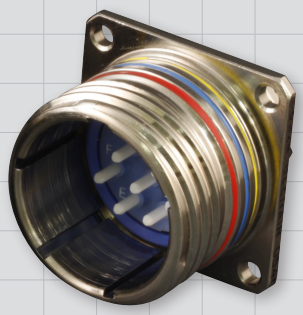
MIL-DTL-38999 Series III type fiber optic termini, connectors, backshells and adapters, protective covers and cable sets

Glenair's complete line of MIL-DTL-38999 Series III Type fiber optic products includes qualified size 16 MIL-PRF-29504 precision ceramic termini, plus large core and jewel size 16 termini and size 20 termini. Tight-tolerance fiber optic connectors, backshells and accessories are available in metal and composite versions.





Product No.	Description	Page No.
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Notes

Metric dimensions appear in parentheses in diagrams and tables, based on 1 inch = 25.4 mm, for reference only.
Unless otherwise specified, the following other dimensional tolerances apply:
.xx = ± .03 (0.8) • .xxx = ± .015 (0.4) • Angles = ± 5°

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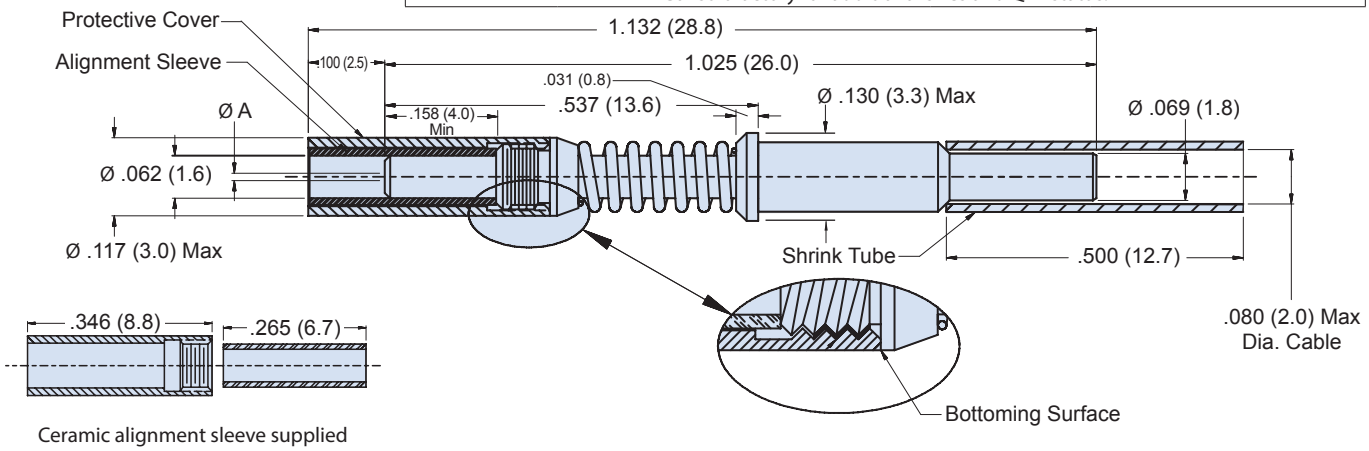
M29504/05
181-001
Size 16 MIL-DTL-38999 Series III Type Fiber Optic Socket Terminus

Ultra low dB loss QPL'd socket terminus for MIL-DTL-38999 Series III

Part Number	Fiber Size Core/Cladding/Coating (Microns)	Ø A (Microns)	Ref. M29504/05-XXXX
181-001-125	9/125 (Singlemode)	125.5	M29504/05-4237
181-001-126S	9/125 (Singlemode)	126.0	M29504/05-4238
181-001-126	50/125 & 62.5/125	126.0	M29504/05-4239
181-001-127	50/125 & 62.5/125	127.0	M29504/05-4046
181-001-142	100/140	142.0	M29504/05-4049
181-001-144	100/140	144.0	N/A
181-001-145	100/140	145.0	M29504/05-4050
181-001-156	62.5/125/155 (Polyimide)	156.0	M29504/05-4240
181-001-157	62.5/125/155 (Polyimide)	157.0	M29504/05-4241
181-001-173	100/140/172 (Polyimide)	173.0	M29504/05-4088
181-001-175	100/140/172 (Polyimide)	175.0	M29504/05-4242
181-001-231	200/230	231.0	N/A
181-001-236	200/230	236.0	M29504/05-4243
181-001-286	200/280	286.0	M29504/05-4244
181-001-448	400/440	448.0	M29504/05-4245
181-001-533	486/500	533.0	N/A
Consult factory for additional sizes and QPL status.			



Ceramic alignment sleeve supplied with terminus. Add K to the end of part number development to supply with optional stainless steel alignment sleeve *e.g. 181-001-126**K***.

Table II: Accessories

Part Number	Description
181-001-S	Ceramic Alignment Sleeve
181-001-K	Stainless Steel Alignment Sleeve
181-001-C	Protective cover

Material and Finish

Ferrule: Zirconia Ceramic
Alignment Sleeve: Zirconia Ceramic or Stainless Steel/Passivate.
Terminus Assembly: Stainless Steel/Passivate
Spacer, Spring, and Cover: Stainless Steel/Passivate • Shrink Tube: Kynar

Notes

Alignment Sleeve & Protective Cover can also be ordered separately (Table II).
See assembly procedure GAP-015 for complete termination instructions.
Recommended Insertion/Extraction tool: P/N M81969/14-03 or equivalent

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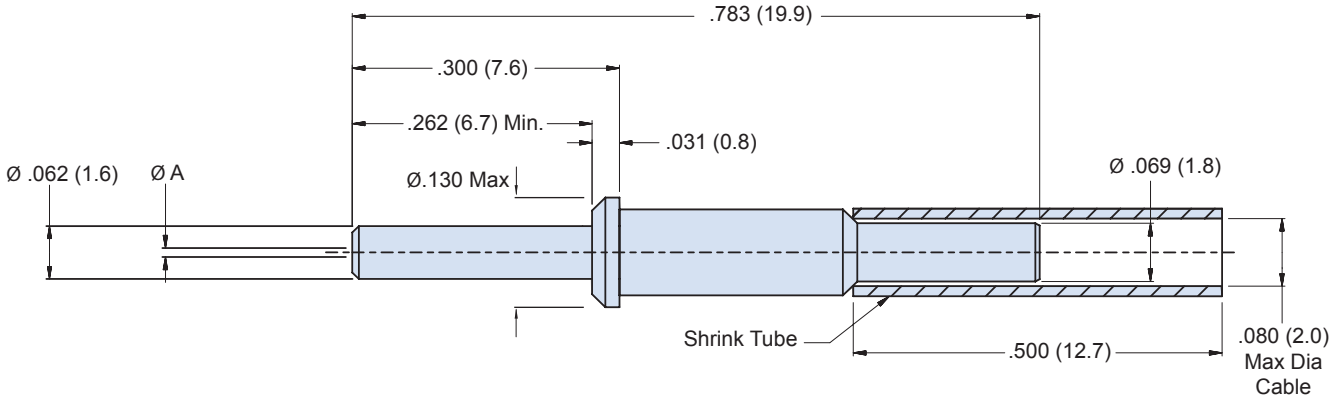
D38999 Series III

QPL

Ultra low dB loss QPL'd pin terminus for MIL-DTL-38999 Series III

Part Number	Fiber Size Core/Cladding/Coating	Ø A (Microns)	Ref. M29504/04-XXXX
181-002-125	9/125 (Singlemode)	125.5	M29504/04-4208
181-002-126S	9/125 (Singlemode)	126.0	M29504/04-4209
181-002-126	50/125 & 62.5/125	126.0	M29504/04-4210
181-002-127	50/125 & 62.5/125	127.0	M29504/04-4040
181-002-142	100/140	142.0	M29504/04-4043
181-002-144	100/140	144.0	N/A
181-002-145	100/140	145.0	M29504/04-4044
181-002-156	62.5/125/155 (Polyimide)	156.0	M29504/04-4211
181-002-157	62.5/125/155 (Polyimide)	157.0	M29504/04-4212
181-002-173	100/140/172 (Polyimide)	173.0	M29504/04-4087
181-002-175	100/140/172 (Polyimide)	175.0	M29504/04-4213
181-002-231	200/230	231.0	N/A
181-002-236	200/230	236.0	M29504/04-4214
181-002-286	200/280	286.0	M29504/04-4215
181-002-448	400/440	448.0	M29504/04-4216
181-002-533	486/500	533.0	N/A
Consult factory for additional sizes and QPL status.			



Material and Finish

Ferrule: Zirconia Ceramic
Terminus Assembly: Stainless Steel/Passivate
Shrink Tube: Kynar

Notes

See Glenair assembly procedure GAP-015 for complete termination instructions.
Recommended Insertion/Extraction tool: P/N M81969/14-03 or equivalent

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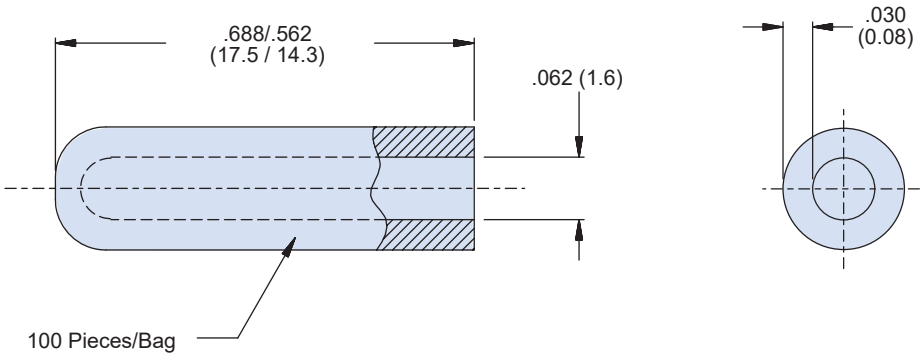
187-019 • 187-029
Pin and Socket Dust Caps
for Size 16 Terminus with .0625 DIA Ferrules

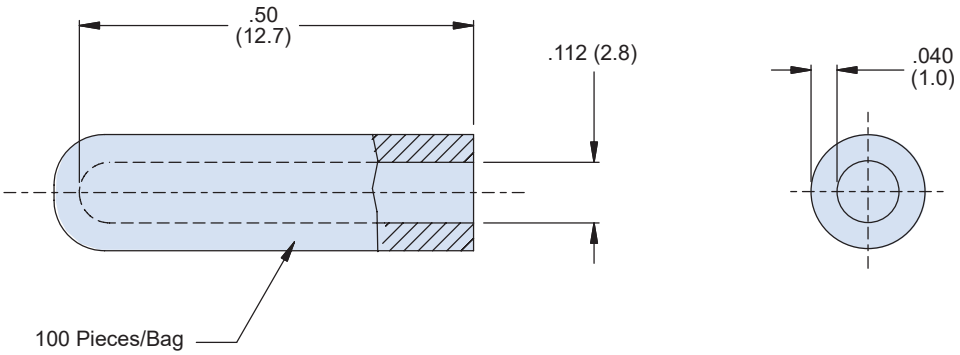
Size 16 pin terminus vinyl dust caps

187-019 Vinyl Dust Cap for Size 16 Terminus with .0625 Ferrules



Size 16 socket terminus vinyl dust caps

187-029 Vinyl Dust Cap for Socket Terminus with Cover



Notes
Installs over metal protective cover/hood on terminus

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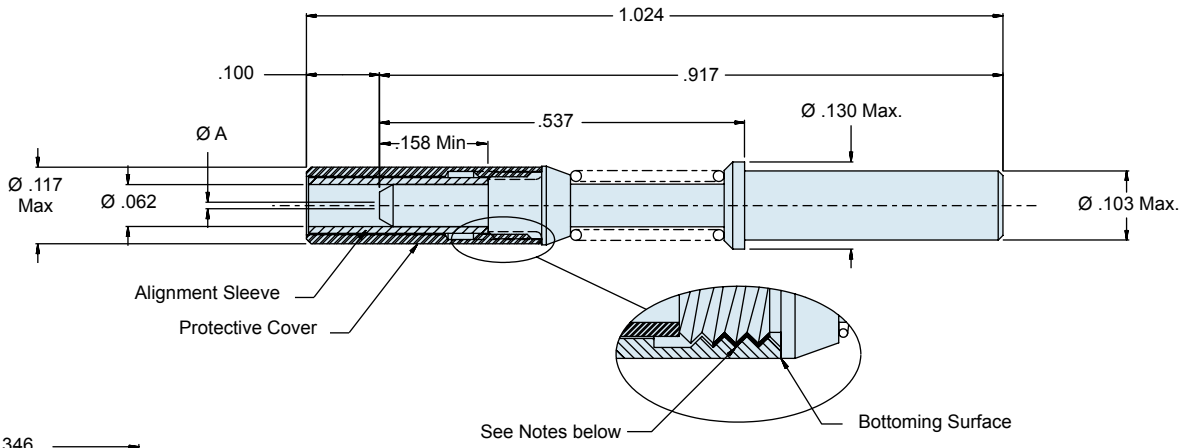
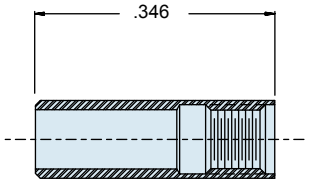
D38999 Series III

Large core fiber optic MIL-DTL-38999 type size 16 socket terminus

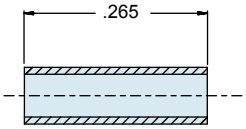
Part Number	Fiber Size Core/Cladding (Microns)	ØA (Microns)
181-035-600	600 Micron	610.0
181-035-1000	1000 Micron (Plastic)	1117.0
Ceramic alignment sleeve supplied with terminus. Add K to the end of part number development to supply with optional stainless steel alignment sleeve *e.g. 181-035-1000**K***.		

Accessories	
Part Number	Terminus Accessory
181-001-S	Ceramic Alignment Sleeve
181-001-K	Stainless Steel Alignment Sleeve
181-001-C	Protective Cover





Protective Cover



Alignment Sleeve

Material and Finish

Ferrule: Stainless Steel/Passivate
Alignment Sleeve: Zirconia Ceramic or Stainless Steel/Passivate
Terminus Assembly: Stainless Steel/Passivate
Spacer, Spring, and Cover: Stainless Steel/Passivate

Notes

Alignment sleeve and protective cover can also be ordered separately (see Accessories table)
Threaded Protective cover must be retained using Threadlocker "Loctite 222" prior to insertion and fully seated against terminus body as shown.
Contact Glenair for termination/assembly procedures.
Recommended Insertion/Extraction Tool: P/N M81969/14-03 or equivalent

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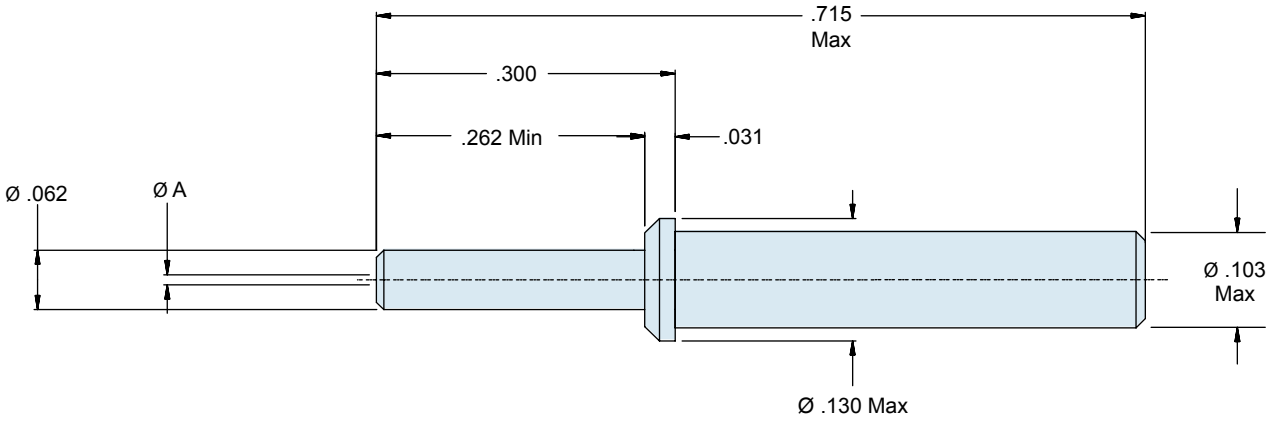
181-036
Large Core Optical Fiber Pin Terminus
MIL-DTL-38999 Series III Type

D38999 Series III

B

Large core fiber optic MIL-DTL-38999 type size 16 pin terminus

Part Number	Fiber Size Core/Cladding	Ø A (Microns)
181-036-600	600 Micron	610.0
181-036-1000	1000 Micron (Plastic)	1117.0



Material and Finish
Ferrule and Terminus Body: Stainless Steel/Passivate

Notes
Contact Glenair for termination/assembly procedures.
Recommended Insertion/Extraction Tool: P/N M81969/14-03 or equivalent

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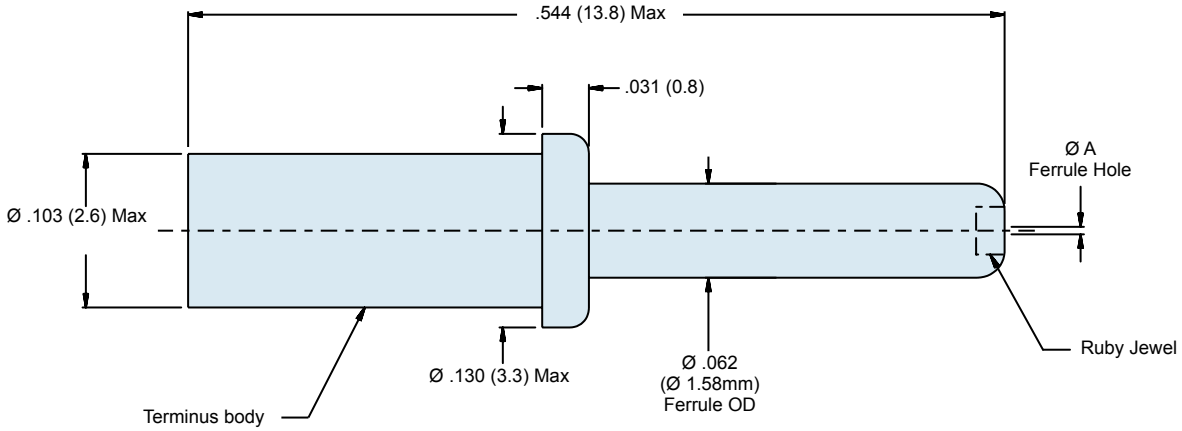
D38999 Series III

MIL-DTL-38999 type fiber optic jewel pin terminus

Part Number	Ferrule Hole Ø A (Microns)	Typical Fiber Size Core/Cladding/Coating (Microns)
181-052-125	125.0	9/125 (Singlemode)
181-052-127	127.0	50/125, 62.5/125
181-052-142	142.0	100/140
181-052-157	157.0	62.5/125/155
181-052-175	175.0	100/140/172
181-052-236	236.0	200/230
Add ***L*** to the end of part number development to supply less epoxy preforms *e.g. 181-052-127**L***. Omit to include preforms.		

Terminus Accessories	
Part Number	Terminus Accessory
189-070-6	Reducing Sleeve, Ø1.90mm Max Cable Jacket
181-052-E	Epoxy Preforms



Material and Finish

Terminus Body: Stainless steel/passivate
Jewel, Ruby: Synthetic ruby or sapphire

Notes

Recommended insertion/extraction tool: M81969/14-03 or equivalent

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181-053
Size 16 Fiber Optic Jewel Socket Terminus
MIL-DTL-38999 Series III Type

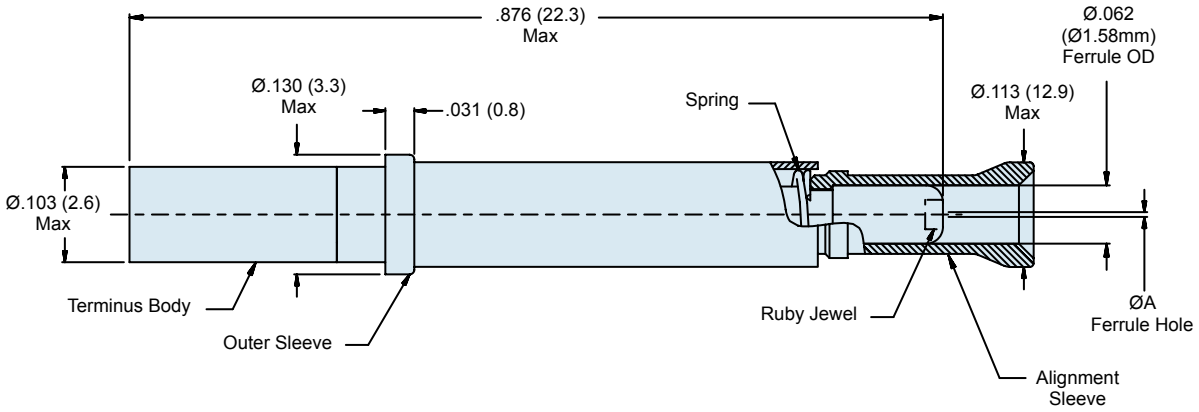
D38999 Series III

B

Fiber optic jewel socket terminus for MIL-DTL-38999 type connectors

Part Number	Ferrule Hole Ø A (Microns)	Typical Fiber Size Core/Cladding/Coating (Microns)
181-053-125	125.0	9/125 (Singlemode)
181-053-127	127.0	50/125, 62.5/125
181-053-142	142.0	100/140
181-053-157	157.0	62.5/125/155
181-053-175	175.0	100/140/172
181-053-236	236.0	200/230
Add L to the end of part number development to supply less epoxy preforms *e.g. 181-053-127**L***. Omit to include preforms.		

Terminus Accessories	
Part Number	Terminus Accessory
189-070-6	Reducing Sleeve Ø1.90mm Max Cable Jacket
189-075	Alignment Sleeve
182-031	Alignment Sleeve Installation Tool
182-032	Alignment Sleeve Extraction Tool
181-053-E	Epoxy Preforms



Material and Finish

Terminus Body: Stainless Steel/Passivate
Jewel/Ruby: Synthetic Ruby or Sapphire
Alignment Sleeve: Stainless Steel/Passivate
Outer Sleeve: Stainless Steel/Passivate
Spring: Stainless Steel/Passivate.

Notes

Alignment Sleeve, Outer Sleeve, and Spring packaged loose with assembly.
Recommended insertion/extraction tool: M81969/14-03 or equivalent.

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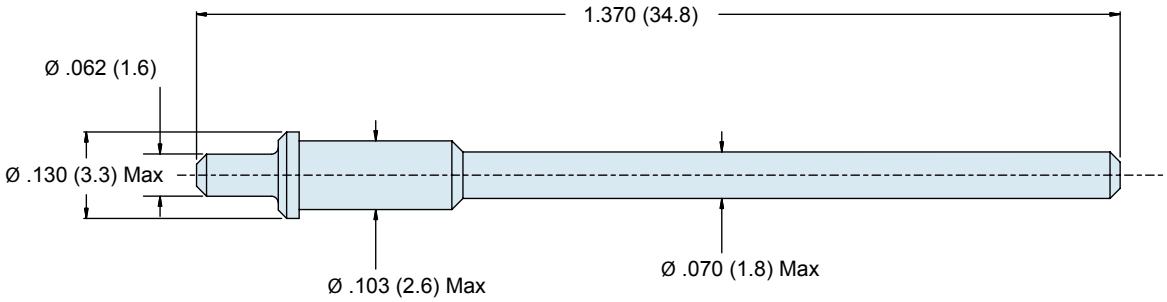
D38999
Series III

Dummy terminus for MIL-DTL-38999 connectors

Part Number	Description
181-048-16	Dummy Terminus, size 16



Material and Finish/Notes

Terminus: High Grade Engineering Thermoplastic
Recommended insertion/extraction tool: P/N: M81969/14-03 or equivalent

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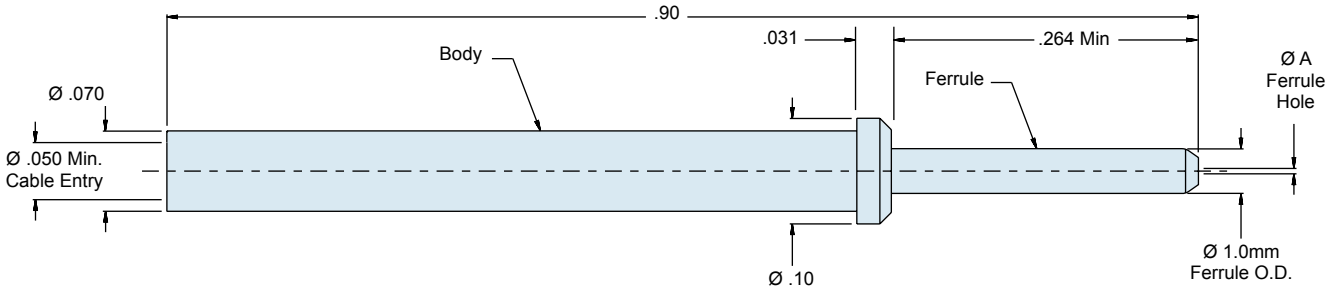
181-065
Size 20 Pin Terminus
MIL-DTL-38999 Series III Type

D38999
Series III

B

MIL-DTL-38999 Series III Type size 20 pin terminus

Part Number	Fiber Size Core/Cladding (Microns)	ØA (Microns)	Typ. Fiber Type
181-065-1255	9/125	125.5	Singlemode
181-065-126	50/125 62.5/125	126.0	Multimode



Material and Finish
Ferrule: Zirconia Ceramic
Body: Copper-Nickel-Zinc Alloy

Notes
Consult factory for appropriate termination and assembly tools/procedures.

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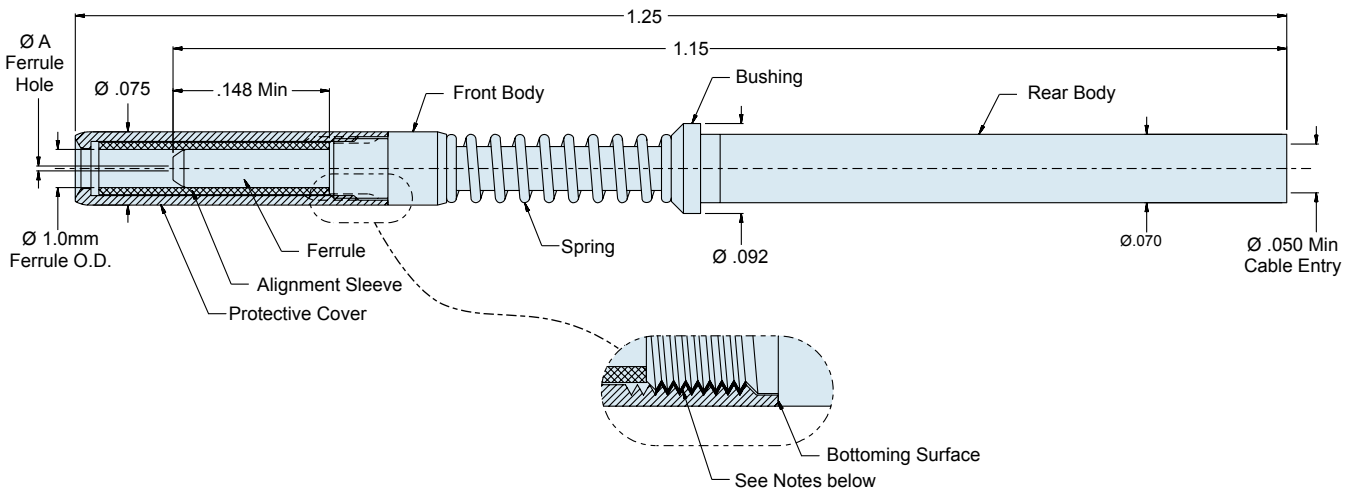
D38999 Series III

MIL-DTL-38999 type size 20 socket terminus

Part Number	Fiber Size Core/Cladding	Ø A (Microns)	Typ. Fiber Type
181-066-1255	9/125	125.5	Singlemode
181-066-126	50/125 & 62.5/125	126.0	Multimode

Terminus Accessories	
Part Number	Terminus Accessory
181-066-S	Ceramic Alignment Sleeve
181-066-C	Protective Cover



Material and Finish

Ferrule: Zirconia Ceramic
Alignment Sleeve: Zirconia Ceramic
Body (Front and Rear): Copper-Nickel-Zinc Alloy
Protective Cover: Copper-Nickel-Zinc Alloy
Bushing: Copper-Nickel-Zinc Alloy
Spring: Stainless Steel/Passivate

Notes

Protective cover must be retained using Threadlocker "Loctite 222" prior to insertion and fully seated against terminus body as shown.
Consult factory for appropriate termination and assembly tools/procedures

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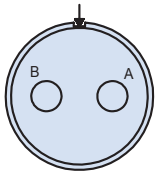
180-091
MIL-DTL-38999 Series III Type
Fiber Optic Connection System
Contact Arrangements

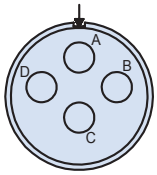
D38999
Series III

B

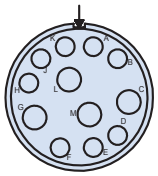
MIL-DTL-38999 type advanced fiber optic connectors



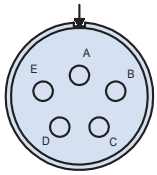
Shell Size 11
Arrangement 2



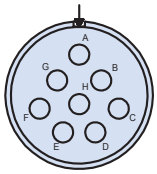
Shell Size 13
Arrangement 4



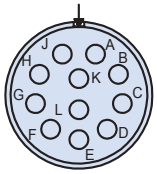
Shell Size 15
Arrangement 97



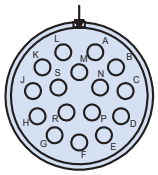
Shell Size 15
Arrangement 5



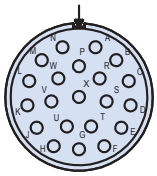
Shell Size 17
Arrangement 8



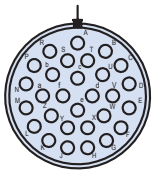
Shell Size 19
Arrangement 11



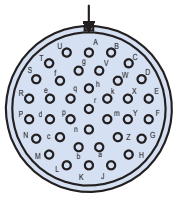
Shell Size 21
Arrangement 16



Shell Size 23
Arrangment 21



Shell Size 25
Arrangement 29



Shell Size 25
Arrangement 37

Mating face of pin insert shown

Contact Arrangements per MIL-STD-1560

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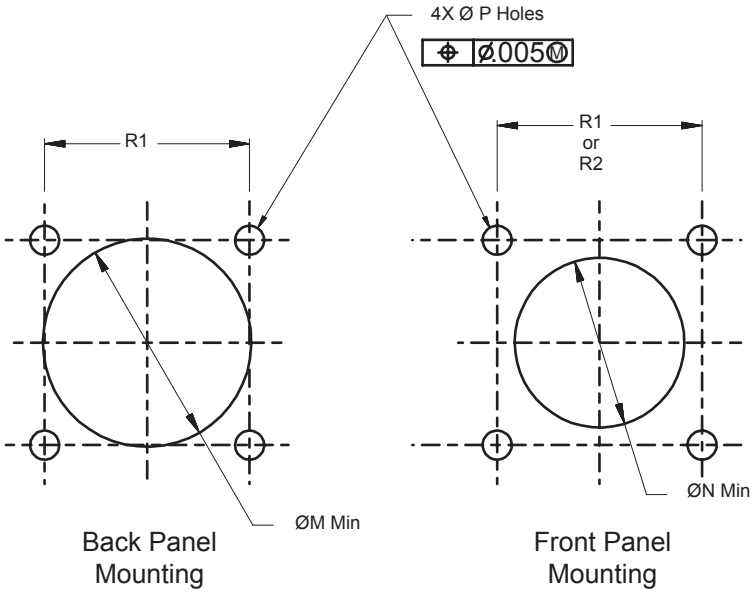
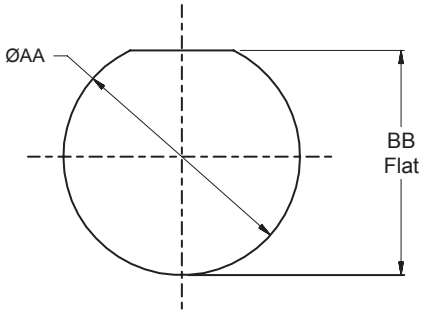
Table I								
Shell Size Code	Shell Size	Ø AA	BB Flat	Ø M Min	ØN Min	Ø P Holes	R1 BSC	R2 BSC
B	11	.835 (21.2) .825 (21.0)	.771 (19.6) .761 (19.3)	.796 (20.2)	.625 (15.9)	.133 (3.4) .123 (3.1)	.812 (20.6)	.719 (18.3)
C	13	1.020 (25.9) 1.010 (25.7)	.955 (24.3) .945 (24.0)	.922 (23.4)	750 (19.1)	.133 (3.4) .123 (3.1)	.906 (23.0)	.812 (20.6)
D	15	1.145 (29.1) 1.135 (28.8)	1.085 (27.6) 1.075 (27.3)	1.047 (26.6)	.906 (23.0)	.133 (3.4) .123 (3.1)	.969 (24.6)	.906 (23.0)
E	17	1.270 (32.3) 1.260 (32.0)	1.210 (30.7) 1.200 (30.5)	1.219 (31.0)	1.016 (25.8)	.133 (3.4) .123 (3.1)	1.062 (27.0)	.969 (24.6)
F	19	1.395 (35.4) 1.385 (35.2)	1.335 (33.9) 1.325 (33.7)	1.297 (32.9)	1.141 (29.0)	.133 (3.4) .123 (3.1)	1.156 (29.4)	1.062 (27.0)
G	21	1.520 (38.6) 1.510 (38.4)	1.460 (37.1) 1.450 (36.8)	1.422 (36.1)	1.266 (32.2)	.133 (3.4) .123 (3.1)	1.250 (31.8)	1.156 (29.4)
H	23	1.645 (41.8) 1.635 (41.5)	1.585 (40.3) 1.575 (40.0)	1.547 (39.3)	1.375 (34.9)	.159 (4.0) .149 (3.8)	1.375 (34.9)	1.250 (31.8)
J	25	1.770 (45.0) 1.760 (44.7)	1.710 (43.4) 1.700 (43.2)	1.672 (42.5)	1.484 (37.7)	.155 (3.9) .145 (3.7)	1.500 (38.1)	1.375 (34.9)



Recommended Panel Cutout
Wall Mount Receptacle



Recommended Panel Cutout
Jam Nut Receptacle

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180-091 (05) In-Line Receptacle
Advanced Fiber Optic Connector
MIL-DTL-38999 Series III Type

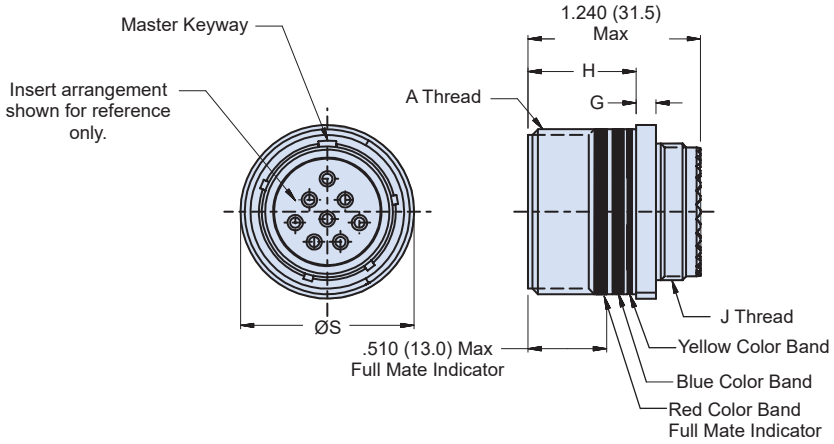
D38999 Series III

B

MIL-DTL-38999 type advanced fiber optic receptacle connector

How To Order

Product Series	Material/Finish (Table II)	Shell Size (Table I)			Insert Designation P = Pin S = Socket	
180	- 091	XW	05	- 17 - 8	P	N
	Basic No.	05 = In-Line Receptacle		Insert Arrangement (See Page B-12)		Alternate Key Position per MIL-DTL-38999 A, B, C, D, or E N = Normal



05 - IN-LINE RECEPTACLE

Material and Finish

Shell: See Table II
Insulator: High Grade Rigid Dielectric
Seals: Fluorosilicone
Retention Clip: Copper Alloy

Notes

Insert arrangement in accordance with MIL-STD-1560, See Page B-12.
Blue Color Band indicates rear release retention system.
For appropriate Glenair Terminus part numbers, see Glenair Drawing 181-001 and 181-002.

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Table I						
Shell Size Code	Shell Size	A Thread	G	H	Ø S	J Thread
B	11	.7500-.1P-.3L-TS-2A	.144 (3.7) .083 (2.1)	.823 (20.9) .768 (19.5)	.840 (21.3)	M15 x 1.0-6g 0.100R
C	13	.8750-.1P-.3L-TS-2A	.144 (3.7) .083 (2.1)	.823 (20.9) .768 (19.5)	.963 (24.5)	M18 x 1.0-6g 0.100R
D	15	1.0000-.1P-.3L-TS-2A	.144 (3.7) .083 (2.1)	.823 (20.9) .768 (19.5)	1.090 (27.7)	M22 x 1.0-6g 0.100R
E	17	1.1875-.1P-.3L-TS-2A	.144 (3.7) .083 (2.1)	.823 (20.9) .768 (19.5)	1.275 (32.4)	M25 x 1.0-6g 0.100R
F	19	1.2500-.1P-.3L-TS-2A	.144 (3.7) .083 (2.1)	.823 (20.9) .768 (19.5)	1.337 (34.0)	M28 x 1.0-6g 0.100R
G	21	1.3750-.1P-.3L-TS-2A	.171 (65.2) .083 (39.8)	.791 (20.0) .736 (18.7)	1.463 (37.2)	M31 x 1.0-6g 0.100R
H	23	1.5000-.1P-.3L-TS-2A	.171 (65.2) .083 (39.8)	.791 (20.0) .736 (18.7)	1.587 (40.3)	M34 x 1.0-6g 0.100R
J	25	1.6250-.1P-.3L-TS-2A	.171 (65.2) .083 (39.8)	.791 (20.0) .736 (18.7)	1.713 (43.5)	M37 x 1.0-6g 0.100R

Material and Finish		
Code	Material	Finish Description
M	Aluminum Alloy	Electroless Nickel
MT		Nickel - PTFE, Grey
NF		Cadmium, Olive Drab
ZN		Zinc-Nickel, Olive Drab
ZNU		Zinc-Nickel, Black
ZR		Zinc-Nickel, Black (RoHS)
XM	Composite	Electroless Nickel
XMT		Nickel - PTFE, Grey
XW		Cadmium, Olive Drab
XZN		Zinc-Nickel, Black
MS	Stainless Steel	Electroless Nickel
ZL		Electro-Deposited Nickel
Z1		Passivate
AB	Marine Bronze	None (Clean Only)

Refer to Appendix for material/finish details

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180-091 (06) Plug
Advanced Fiber Optic Connector
MIL-DTL-38999 Series III Type

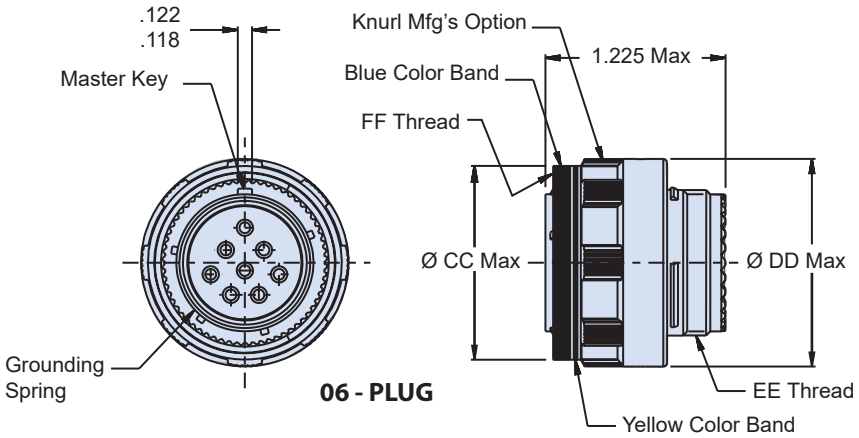
D38999 Series III

B

MIL-DTL-38999 type advanced fiber optic plug connector

How To Order

Product Series	Material/Finish (Table II)	Shell Size (Table I)			Insert Designation P = Pin S = Socket	
180	- 091	XW	06	- 17 - 8	P	N
Basic No.		06 = Plug Connector		Insert Arrangement (See Page B-12)		Alternate Key Position per MIL-DTL-38999 A, B, C, D, or E N = Normal



06 - PLUG

Material and Finish

Barrel, Coupling Nut: See Table II
Coupling Nut (for Composite): High Grade Engineering Thermoplastic/Unplated
Insulator: High Grade Rigid Dielectric
Seals: Fluorosilicone
Ground Spring: Copper Alloy/Nickel

Notes

Insert arrangement in accordance with MIL-STD-1560, See Page B-12.
Blue Color Band indicates rear release retention system.
For appropriate Glenair Terminus part numbers see Glenair Drawing 181-001 and 181-002.

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Table I					
Shell Size Code	Shell Size	FF Thread	Ø CC Max	Ø DD Max	EE Thread
B	11	.7500-.1P-.3L-TS-2B	.929 (23.6)	.984 (25.0)	M15 x 1.0-6g 0.100R
C	13	.8750-.1P-.3L-TS-2B	1.110 (28.2)	1.157 (29.4)	M18 x 1.0-6g 0.100R
D	15	1.0000-.1P-.3L-TS-2B	1.232 (31.3)	1.280 (32.5)	M22 x 1.0-6g 0.100R
E	17	1.1875-.1P-.3L-TS-2B	1.358 (34.5)	1.406 (35.7)	M25 x 1.0-6g 0.100R
F	19	1.2500-.1P-.3L-TS-2B	1.469 (37.3)	1.516 (38.5)	M28 x 1.0-6g 0.100R
G	21	1.3750-.1P-.3L-TS-2B	1.594 (40.5)	1.642 (41.7)	M31 x 1.0-6g 0.100R
H	23	1.5000-.1P-.3L-TS-2B	1.720 (43.7)	1.768 (44.9)	M34 x 1.0-6g 0.100R
J	25	1.6250-.1P-.3L-TS-2B	1.843 (46.8)	1.890 (48.0)	M37 x 1.0-6g 0.100R

Code	Material	Finish Description
M	Aluminum Alloy	Electroless Nickel
MT		Nickel - PTFE, Grey
NF		Cadmium, Olive Drab
ZN		Zinc-Nickel, Olive Drab
ZNU		Zinc-Nickel, Black
ZR		Zinc-Nickel, Black (RoHS)
XM	Composite	Electroless Nickel
XMT		Nickel - PTFE, Grey
XW		Cadmium, Olive Drab
XZN		Zinc-Nickel, Black
MS	Stainless Steel	Electroless Nickel
ZL		Electro-Deposited Nickel
Z1		Passivate
AB	Marine Bronze	None (Clean Only)

Refer to Appendix for material/finish details

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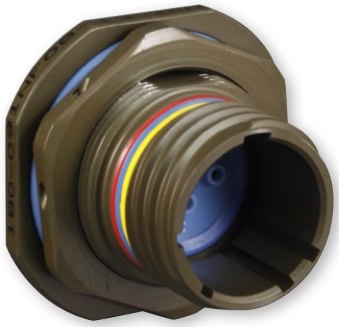
180-091 (08) Jam Nut Mount Receptacle
Advanced Fiber Optic Connector
MIL-DTL-38999 Series III Type

D38999 Series III

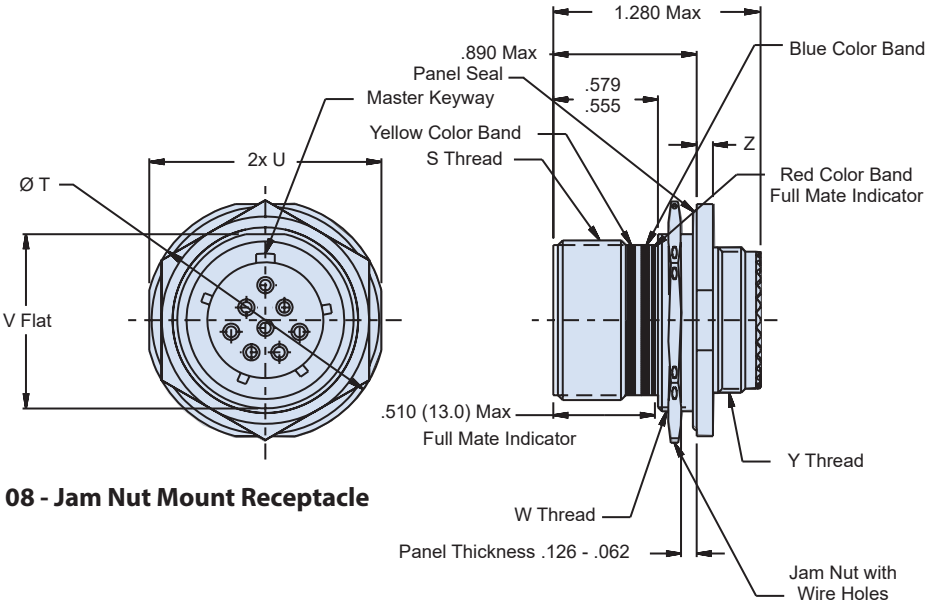
B

MIL-DTL-38999 type advanced fiber optic receptacle connector



How To Order

Product Series	Material/Finish (Table II)	Shell Size (Table I)		Insert Designation P = Pin S = Socket		Alternate Key Position per MIL-DTL-38999 A, B, C, D, or E N = Normal
180	- 091	XW	08 - 17 - 8	P	N	
Basic No.		08 = Jam Nut Receptacle	Insert Arrangement (See Page B-12)			



08 - Jam Nut Mount Receptacle

Material and Finish

Shell, Jam Nut: See Table II
Jam Nut (for Composite): Al Alloy, plated same as shell
Insulator: High Grade Rigid Dielectric
Seals: Fluorosilicone

Notes

Insert arrangement in accordance with MIL-STD-1560, See Page B-12.
Blue Color Band indicates rear release retention system.
For appropriate Glenair Terminus part numbers, see Glenair Drawing 181-001 and 181-002.
For recommended panel cutout, See Page B-13

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Table I								
Shell Size Code	Shell Size	S Thread	ØT	U	V	W Thread	Y Thread	Z
A	9	.6250-.1P-.3L-TS-2A	1.200 (30.5) 1.777 (45.1)	1.079 (27.4) 1.047 (26.6)	.655 (16.6) .645 (16.4)	M17 x 1.0-6g 0.100R	M12 x 1.0-6g 0.100R	.121 (3.1) .083 (2.1)
B	11	.7500-.1P-.3L-TS-2A	1.386 (25.4) 1.362 (34.6)	1.268 (32.2) 1.236 (31.4)	.755 (19.2) .745 (18.9)	M20 x 1.0-6g 0.100R	M15 x 1.0-6g 0.100R	.121 (3.1) .083 (2.1)
C	13	.8750-.1P-.3L-TS-2A	1.512 (38.4) 1.488 (37.8)	1.390 (35.3) 1.358 (34.5)	.942 (23.9) .932 (23.7)	M25 x 1.0-6g 0.100R	M18 x 1.0-6g 0.100R	.121 (3.1) .083 (2.1)
D	15	1.0000-.1P-.3L-TS-2A	1.638 (41.6) 1.614 (41.0)	1.516 (38.5) 1.484 (37.7)	1.066 (27.1) 1.056 (26.8)	M28 x 1.0-6g 0.100R	M22 x 1.0-6g 0.100R	.121 (3.1) .083 (2.1)
E	17	1.1875-.1P-.3L-TS-2A	1.764 (44.8) 1.740 (44.2)	1.642 (41.7) 1.610 (40.9)	1.191 (30.3) 1.181 (30.0)	M32 x 1.0-6g 0.100R	M25 x 1.0-6g 0.100R	.121 (3.1) .083 (2.1)
F	19	1.2500-.1P-.3L-TS-2A	1.949 (49.5) 1.925 (48.9)	1.827 (46.4) 1.795 (45.6)	1.316 (33.4) 1.306 (33.2)	M35 x 1.0-6g 0.100R	M28 x 1.0-6g 0.100R	.154 (3.9) .114 (2.9)
G	21	1.3750-.1P-.3L-TS-2A	2.075 (52.7) 2.051 (52.1)	1.953 (49.6) 1.921 (48.8)	1.441 (36.6) 1.431 (36.3)	M38 x 1.0-6g 0.100R	M31 x 1.0-6g 0.100R	.154 (3.9) .114 (2.9)
H	23	1.5000-.1P-.3L-TS-2A	2.201 (55.9) 2.177 (55.3)	2.079 (52.8) 2.047 (52.0)	1.566 (39.8) 1.556 (39.5)	M41 x 1.0-6g 0.100R	M34 x 1.0-6g 0.100R	.154 (3.9) .114 (2.9)
J	25	1.6250-.1P-.3L-TS-2A	2.323 (59.0) 2.299 (58.4)	2.205 (56.0) 2.173 (55.2)	1.691 (43.0) 1.681 (42.7)	M44 x 1.0-6g 0.100R	M37 x 1.0-6g 0.100R	.154 (3.9) .114 (2.9)

Code	Material	Finish Description
M	Aluminum Alloy	Electroless Nickel
MT		Nickel - PTFE, Grey
NF		Cadmium, Olive Drab
ZN		Zinc-Nickel, Olive Drab
ZNU		Zinc-Nickel, Black
ZR		Zinc-Nickel, Black (RoHS)
XM	Composite	Electroless Nickel
XMT		Nickel - PTFE, Grey
XW		Cadmium, Olive Drab
XZN		Zinc-Nickel, Black
MS	Stainless Steel	Electroless Nickel
ZL		Electro-Deposited Nickel
Z1		Passivate
AB	Marine Bronze	None (Clean Only)

Refer to Appendix for material/finish details

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180-091 (H7) Square Flange Wall Mount Receptacle
Advanced Fiber Optic Connector
MIL-DTL-38999 Series III Type with Round Holes (Standard)

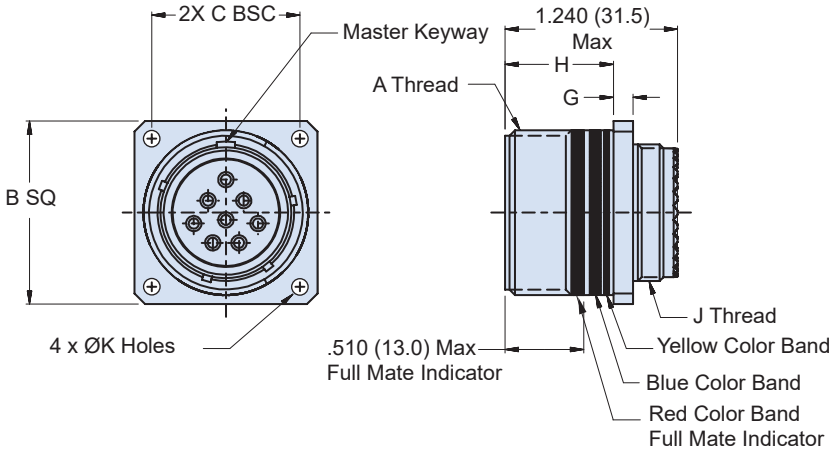
D38999 Series III

B

MIL-DTL-38999 type advanced fiber optic receptacle connector

How To Order

Product Series	Material/Finish (Table II)	Shell Size (Table I)		Insert Designation P = Pin S = Socket	
180 -	091	XW	H7 - 17 -	8	P	N
Basic No.	H7 = Wall Mount Receptacle with Round Holes (Standard			Insert Arrangement (See Page B-12)	Alternate Key Position per MIL-DTL-38999 A, B, C, D, or E N = Normal



H7 - SQUARE FLANGE WALL MOUNT RECEPTACLE WITH ROUND HOLES (STANDARD)

Material and Finish

Shell: See Table II
Insulator: High Grade Rigid Dielectric
Seals: Fluorosilicone

Notes

Insert arrangement in accordance with MIL-STD-1560, See Page B-12.
Blue Color Band indicates rear release retention system.
For appropriate Glenair Terminus part numbers, see Glenair Drawing 181-001 and 181-002.
For recommended panel cutout, See Page B-13

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Table I								
Shell Size Code	Shell Size	A Thread	B SQ	C BSC	G	H	J Thread	Ø K Holes
B	11	.7500-.1P-.3L-TS-2A	1.043 (26.5) 1.019 (25.9)	.812 (20.6)	.144 (3.7) .083 (2.1)	.823 (20.9) .768 (19.5)	M15 x 1.0-6g 0.100R	.136 (3.5) .120 (3.0)
C	13	.8750-.1P-.3L-TS-2A	1.138 (28.9) 1.114 (28.3)	.906 (23.0)	.144 (3.7) .083 (2.1)	.823 (20.9) .768 (19.5)	M18 x 1.0-6g 0.100R	.136 (3.5) .120 (3.0)
D	15	1.0000-.1P-.3L-TS-2A	1.232 (31.3) 1.208 (30.7)	.969 (24.6)	.144 (3.7) .083 (2.1)	.823 (20.9) .768 (19.5)	M22 x 1.0-6g 0.100R	.136 (3.5) .120 (3.0)
E	17	1.1875-.1P-.3L-TS-2A	1.323 (33.6) 1.299 (33.0)	1.062 (27.0)	.144 (3.7) .083 (2.1)	.823 (20.9) .768 (19.5)	M25 x 1.0-6g 0.100R	.136 (3.5) .120 (3.0)
F	19	1.2500-.1P-.3L-TS-2A	1.449 (36.8) 1.425 (36.2)	1.156 (29.4)	.144 (3.7) .083 (2.1)	.823 (20.9) .768 (19.5)	M28 x 1.0-6g 0.100R	.136 (3.5) .120 (3.0)
G	21	1.3750-.1P-.3L-TS-2A	1.575 (40.0) 1.551 (39.4)	1.250 (31.8)	.171 (65.2) .083 (39.8)	.791 (20.0) .736 (18.7)	M31 x 1.0-6g 0.100R	.136 (3.5) .120 (3.0)
H	23	1.5000-.1P-.3L-TS-2A	1.701 (43.2) 1.677 (42.6)	1.375 (34.9)	.171 (65.2) .083 (39.8)	.791 (20.0) .736 (18.7)	M34 x 1.0-6g 0.100R	.162 (4.1) .146 (3.7)
J	25	1.6250-.1P-.3L-TS-2A	1.823 (46.3) 1.799 (45.7)	1.500 (38.1)	.171 (65.2) .083 (39.8)	.791 (20.0) .736 (18.7)	M37 x 1.0-6g 0.100R	.162 (4.1) .146 (3.7)

Code	Material	Finish Description
M	Aluminum Alloy	Electroless Nickel
MT		Nickel - PTFE, Grey
NF		Cadmium, Olive Drab
ZN		Zinc-Nickel, Olive Drab
ZNU		Zinc-Nickel, Black
ZR		Zinc-Nickel, Black (RoHS)
XM	Composite	Electroless Nickel
XMT		Nickel - PTFE, Grey
XW		Cadmium, Olive Drab
XZN		Zinc-Nickel, Black
MS	Stainless Steel	Electroless Nickel
ZL		Electro-Deposited Nickel
Z1		Passivate
AB	Marine Bronze	None (Clean Only)

Refer to Appendix for material/finish details

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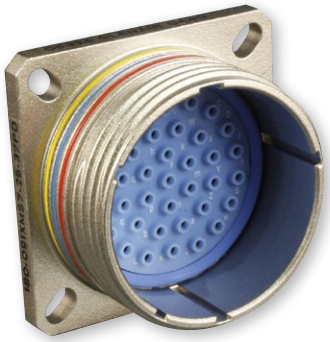
180-091 (S7) Square Flange Wall Mount Receptacle
Advanced Fiber Optic Connector
MIL-DTL-38999 Series III Type with Slotted Holes

D38999 Series III

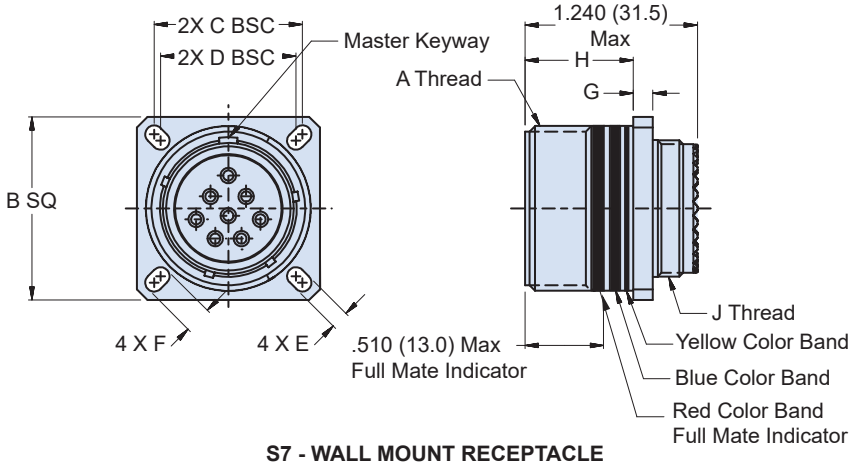
B

MIL-DTL-38999 type advanced fiber optic receptacle connector



How To Order

Product Series	Material/Finish (Table II)	Shell Size (Table I)		Insert Designation P = Pin S = Socket		
180 -	091	XW	S7 -	17 -	8	P	N
Basic No.		S7 = Wall Mount Receptacle with Slotted Holes		Insert Arrangement (See Page B-12)		Alternate Key Position per MIL-DTL-38999 A, B, C, D, or E N = Normal



S7 - WALL MOUNT RECEPTACLE
WITH SQUARE FLANGE AND SLOTTED HOLES

Notes

1. Insert arrangement in accordance with MIL-STD-1560, See Page B-12.
2. Blue Color Band indicates rear release retention system.
3. For appropriate Glenair Terminus part numbers, see Glenair Drawing 181-001 and 181-002.
4. For recommended panel cutout, See Page B-13
5. S7 wall mount receptacle can be front panel mounted using cut out dimensions R1 or R2 on page C-11. Dimension R2 is for use with S7 wall mount receptacle only.

Material and Finish

Shell: See Table II
Insulator: High Grade Rigid Dielectric
Seals: Fluorosilicone

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Table I										
Shell Size Code	Shell Size	A Thread	B SQ	C BSC	D BSC	E	F	G	H	J Thread
A	9	.6250-.1P-.3L-TS-2A	.949 (24.1) .929 (23.6)	.719 (18.3)	.594 (15.1)	.136 (3.5) .120 (3.0)	.216 (5.5)	.144 (3.7) .083 (2.1)	.823 (20.9) .768 (19.5)	M12 x 1.0-6g 0.100R
B	11	.7500-.1P-.3L-TS-2A	1.043 (26.5) 1.019 (25.9)	.812 (20.6)	.719 (18.3)	.136 (3.5) .120 (3.0)	.202 (5.1) .186 (4.7)	.144 (3.7) .083 (2.1)	.823 (20.9) .768 (19.5)	M15 x 1.0-6g 0.100R
C	13	.8750-.1P-.3L-TS-2A	1.138 (28.9) 1.114 (28.3)	.906 (23.0)	.812 (20.6)	.136 (3.5) .120 (3.0)	.202 (5.1) .186 (4.7)	.144 (3.7) .083 (2.1)	.823 (20.9) .768 (19.5)	M18 x 1.0-6g 0.100R
D	15	1.0000-.1P-.3L-TS-2A	1.232 (31.3) 1.208 (30.7)	.969 (24.6)	.906 (23.0)	.136 (3.5) .120 (3.0)	.181 (4.6) .165 (4.2)	.144 (3.7) .083 (2.1)	.823 (20.9) .768 (19.5)	M22 x 1.0-6g 0.100R
E	17	1.1875-.1P-.3L-TS-2A	1.323 (33.6) 1.299 (33.0)	1.062 (27.0)	.969 (24.6)	.136 (3.5) .120 (3.0)	.202 (5.1) .186 (4.7)	.144 (3.7) .083 (2.1)	.823 (20.9) .768 (19.5)	M25 x 1.0-6g 0.100R
F	19	1.2500-.1P-.3L-TS-2A	1.449 (36.8) 1.425 (36.2)	1.156 (29.4)	1.062 (27.0)	.136 (3.5) .120 (3.0)	.202 (5.1) .186 (4.7)	.144 (3.7) .083 (2.1)	.823 (20.9) .768 (19.5)	M28 x 1.0-6g 0.100R
G	21	1.3750-.1P-.3L-TS-2A	1.575 (40.0) 1.551 (39.4)	1.250 (31.8)	1.156 (29.4)	.136 (3.5) .120 (3.0)	.202 (5.1) .186 (4.7)	.171 (65.2) .083 (39.8)	.791 (20.0) .736 (18.7)	M31 x 1.0-6g 0.100R
H	23	1.5000-.1P-.3L-TS-2A	1.701 (43.2) 1.677 (42.6)	1.375 (34.9)	1.250 (31.8)	.162 (4.1) .146 (3.7)	.250 (6.4) .234 (5.9)	.171 (65.2) .083 (39.8)	.791 (20.0) .736 (18.7)	M34 x 1.0-6g 0.100R
J	25	1.6250-.1P-.3L-TS-2A	1.823 (46.3) 1.799 (45.7)	1.500 (38.1)	1.375 (34.9)	.162 (4.1) .146 (3.7)	.250 (6.4) .234 (5.9)	.171 (65.2) .083 (39.8)	.791 (20.0) .736 (18.7)	M37 x 1.0-6g 0.100R

Code	Material	Finish Description
M	Aluminum Alloy	Electroless Nickel
MT		Nickel - PTFE, Grey
NF		Cadmium, Olive Drab
ZN		Zinc-Nickel, Olive Drab
ZNU		Zinc-Nickel, Black
ZR		Zinc-Nickel, Black (RoHS)
XM	Composite	Electroless Nickel
XMT		Nickel - PTFE, Grey
XW		Cadmium, Olive Drab
XZN		Zinc-Nickel, Black
MS	Stainless Steel	Electroless Nickel
ZL		Electro-Deposited Nickel
Z1		Passivate
AB	Marine Bronze	None (Clean Only)

Refer to Appendix for material/finish details

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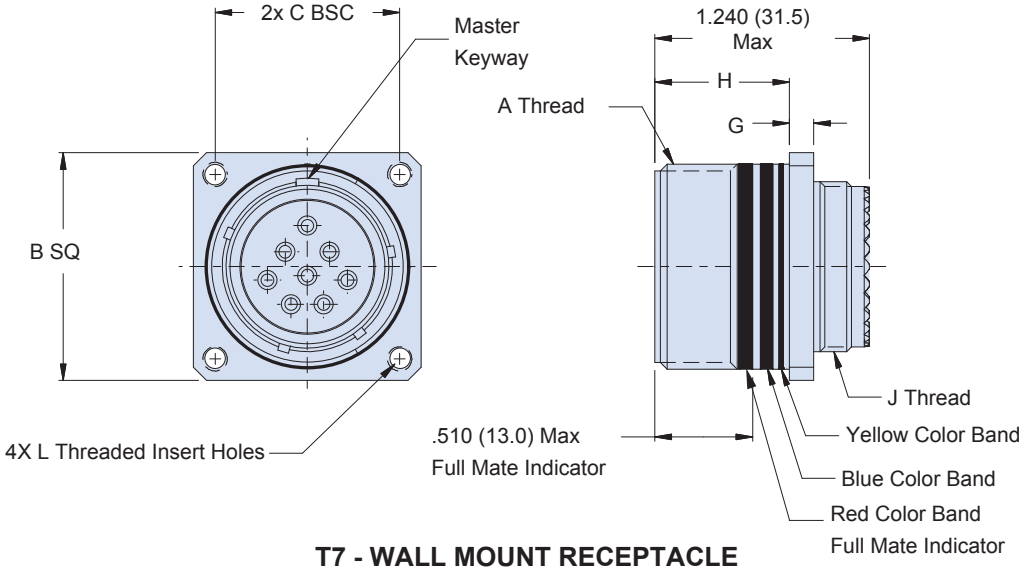
180-091 (T7) Square Flange Wall Mount Receptacle
Advanced Fiber Optic Connector
MIL-DTL-38999 Series III Type with Threaded Insert Holes

D38999 Series III

B

MIL-DTL-38999 type advanced fiber optic receptacle connector

How To Order 180-091						
Sample Part Number	**180-091**	**XW**	**T7**	**-17-8**	**P**	**N**
Series / Basic Part No.	D38999 Series III Type					
Material/Finish	See Material/Finish Table					
Connector Style	**T7** = Wall Mount Receptacle with Threaded insert holes					
Shell Size/Insert Arr.	IAW MIL-DTL-38999 Series III, Per MIL-STD-1560					
Insert Designation	**P** = Pin **S** = Socket					
Alternate Key Position	**A**, **B**, **C**, **D**, **E**, **N** = Normal; Per MIL-DTL-38999					



T7 - WALL MOUNT RECEPTACLE
SQUARE FLANGE WITH THREADED INSERT HOLES

MATERIAL AND FINISH

Shell: See Material and Finish Table
Insulator: High Grade Rigid Dielectric
Seals: Fluorosilicone

NOTES

Insert arrangement in accordance with MIL-STD-1560, See Page B-12
For recommended panel cutout, See Page B-13

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Dimensions								
Shell Size Code	Shell Size	A Thread	B SQ	C BSC	G	H	J Thread	L Threaded Insert Holes
B	11	.7500-.1P-.3L-TS-2A	1.043 (26.5) 1.019 (25.9)	.812 (20.6)	.144 (3.7) .083 (2.1)	.823 (20.9) .768 (19.5)	M15 x 1.0-6g 0.100R	.112-40 UNC-2B
C	13	.8750-.1P-.3L-TS-2A	1.138 (28.9) 1.114 (28.3)	.906 (23.0)	.144 (3.7) .083 (2.1)	.823 (20.9) .768 (19.5)	M18 x 1.0-6g 0.100R	.112-40 UNC-2B
D	15	1.0000-.1P-.3L-TS-2A	1.232 (31.3) 1.208 (30.7)	.969 (24.6)	.144 (3.7) .083 (2.1)	.823 (20.9) .768 (19.5)	M22 x 1.0-6g 0.100R	.112-40 UNC-2B
E	17	1.1875-.1P-.3L-TS-2A	1.323 (33.6) 1.299 (33.0)	1.062 (27.0)	.144 (3.7) .083 (2.1)	.823 (20.9) .768 (19.5)	M25 x 1.0-6g 0.100R	.112-40 UNC-2B
F	19	1.2500-.1P-.3L-TS-2A	1.449 (36.8) 1.425 (36.2)	1.156 (29.4)	.144 (3.7) .083 (2.1)	.823 (20.9) .768 (19.5)	M28 x 1.0-6g 0.100R	.112-40 UNC-2B
G	21	1.3750-.1P-.3L-TS-2A	1.575 (40.0) 1.551 (39.4)	1.250 (31.8)	.171 (65.2) .083 (39.8)	.791 (20.0) .736 (18.7)	M31 x 1.0-6g 0.100R	.112-40 UNC-2B
H	23	1.5000-.1P-.3L-TS-2A	1.701 (43.2) 1.677 (42.6)	1.375 (34.9)	.171 (65.2) .083 (39.8)	.791 (20.0) .736 (18.7)	M34 x 1.0-6g 0.100R	.138-32 UNC-2B
J	25	1.6250-.1P-.3L-TS-2A	1.823 (46.3) 1.799 (45.7)	1.500 (38.1)	.171 (65.2) .083 (39.8)	.791 (20.0) .736 (18.7)	M37 x 1.0-6g 0.100R	.138-32 UNC-2B

Code	Material	Finish Description
M	Aluminum Alloy	Electroless Nickel
MT		Nickel - PTFE, Grey
NF		Cadmium, Olive Drab
ZN		Zinc-Nickel, Olive Drab
ZNU		Zinc-Nickel, Black
ZR		Zinc-Nickel, Black (RoHS)
XM	Composite	Electroless Nickel
XMT		Nickel - PTFE, Grey
XW		Cadmium, Olive Drab
XZN		Zinc-Nickel, Black
MS	Stainless Steel	Electroless Nickel
ZL		Electro-Deposited Nickel
Z1		Passivate
AB	Marine Bronze	None (Clean Only)

Refer to Appendix for material/finish details

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660-023 and -024 • 660-049 and -050 MIL-DTL-38999 Series III Type Metal and Composite Protective Covers

Plug and Receptacle

MIL-DTL-38999 Series III Type metal and composite protective covers

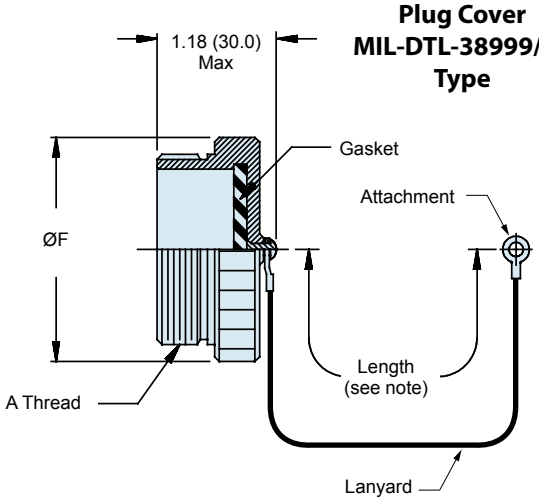
B

How To Order

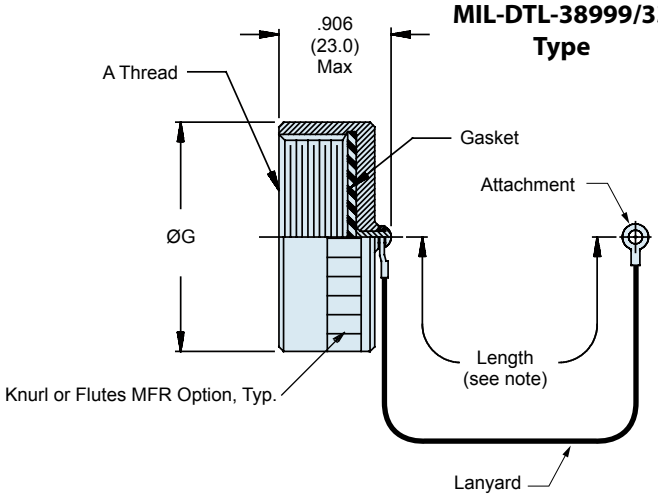
Product Series	Material/Finish (Table II)		Shell Size (Table I)	Lanyard (Table III)	Attachment Length (Inches)		Attachment Dash No. (Table IV, V, VI, or VII) omit for "SK" slip knot attachment
660	-	023	M	17	H	5	- 01

Cover Type
- *-023 = metal plug cover*
- *-024 = metal receptacle cover*
- *-049 = composite plug cover*
- *-050 = composite receptacle cover*

-023 and -049 Plug Cover MIL-DTL-38999/32 Type



-024 and -050 Receptacle Cover MIL-DTL-38999/33 Type



Material and Finish

Cover: See Table II • Gasket: Silicone • Hardware, Rivet: Stainless Steel/Passivate

Notes

Length tolerance for Sash Chain (S) is ± 1 link, for all other attachments ± .25.

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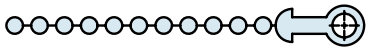
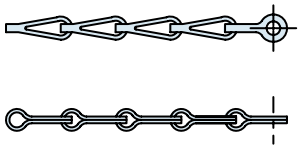
Available Lanyard Types (shown with optional eyelet attachment, see table III for lanyard style)		
		
Bead Chain (Type D)	Sash Chain (Type S)	Rope (Types F, G, H, K, R, T, U)

Table I			
Shell Size	A Thread	Ø F Max	Ø G Max
09	.6250 - 0.1P-0.3L-TS	0.906 (23.0)	.906 (23.0)
11	.7500 - 0.1P-0.3L-TS	1.024 (26.0)	1.102 (28.0)
13	.8750 - 0.1P-0.3L-TS	1.220 (31.0)	1.220 (31.0)
15	1.0000 - 0.1P-0.3L-TS	1.300 (33.0)	1.260 (32.0)
17	1.1875 - 0.1P-0.3L-TS	1.457 (37.0)	1.457 (37.0)
19	1.2500 - 0.1P-0.3L-TS	1.575 (40.0)	1.535 (39.0)
21	1.3750 - 0.1P-0.3L-TS	1.732 (44.0)	1.654 (42.0)
23	1.5000 - 0.1P-0.3L-TS	1.811 (46.0)	1.772 (45.0)
25	1.6250 - 0.1P-0.3L-TS	1.969 (50.0)	1.929 (49.0)

Table II: Material/Finish		
Code	Material	Finish Description
C	Aluminum Alloy	Anodize, Black
G		Anodize, Hardcoat
M		Electroless Nickel
MT		Nickel-PTFE, Grey
NF		Cadmium, Olive Drab
ZN		Zinc-Nickel, Olive Drab
ZNU		Zinc-Nickel, Black
Z1	Stainless Steel	Passivate
ZL		Electrodeposited Nickel
XM	Composite	Electroless Nickel
XW		Cadmium, Olive Drab
XB		No Plating, Black

Refer to Appendix for material/finish details

Table III: Lanyard Codes	
Code	Description
D	Bead Chain, CRES, Passivated
F	Wire Rope, Nylon Jacket
G	Nylon Rope, Black
H	Wire Rope, Fluoropolymer Jacket
K	Nylon Rope, Olive Drab
N	No Lanyard
R	Wire Rope, PVC Jacket
S	#8 Sash Chain, CRES, Passivated
SK	Nylon Rope (Black) w/Slip Knot
T	Wire Rope, No Jacket
U	Wire Rope, Polyurethane Jacket

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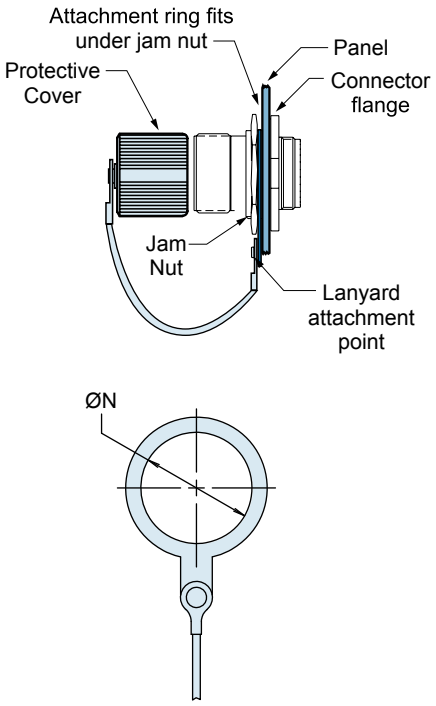
660-023 and -024 • 660-049 and -050
MIL-DTL-38999 Series III Type
Metal and Composite Protective Covers
Attachment Options

Attaching a Cover to a Jam Nut Receptacle With a Solid Ring (Style A)



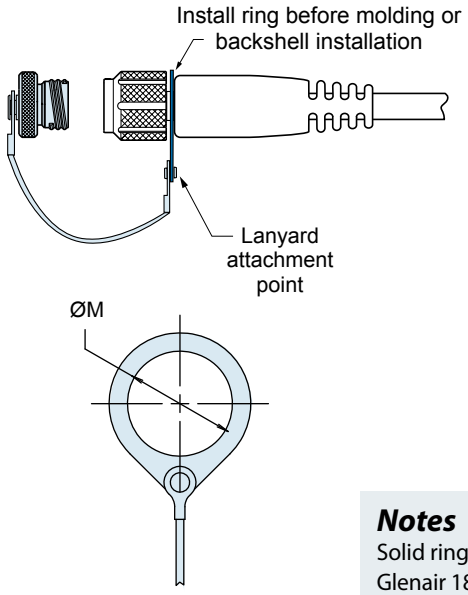
Solid Ring - Style A

Table IV: Solid Ring Style A		
Dash No.	**Ø N ± .015**	**180-091 Shell Size**
106	.896 (22.8)	11
107	1.016 (25.9)	13
108	1.141 (29.0)	15
109	1.266 (32.3)	17
110	1.391 (35.3)	19
111	1.521 (38.6)	21
112	1.641 (41.7)	23
113	1.766 (45.0)	25

Notes

Solid ring style A dash numbers and shell sizes shown are for Glenair 180-091 fiber optic connectors only. Consult factory for additional sizes.

Attaching a Cover to a Cable Assembly With a Solid Ring (Style B)



Solid Ring - Style B

Table V: Solid Ring Style B		
Dash No.	**Ø M ± .015**	**180-091 Shell Size**
10	.593 (15.1)	11
12	.718 (18.2)	13
15	.890 (22.6)	15
17	1.015 (25.9)	17
19	1.140 (29.0)	19
21	1.265 (32.3)	21
22	1.343 (34.0)	23
24	1.484 (37.6)	25

Notes

Solid ring style B dash numbers and shell sizes shown are for Glenair 180-091 fiber optic connectors only. Consult factory for additional sizes.

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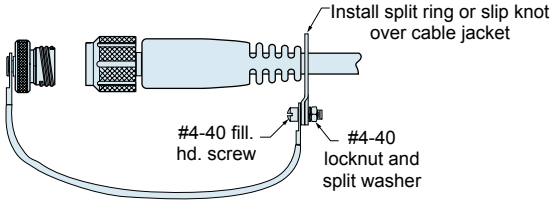
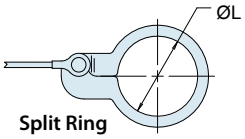
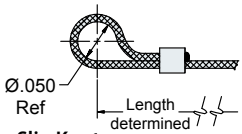
Attaching a Cover to a Cable Using a Split Ring or Slip Knot





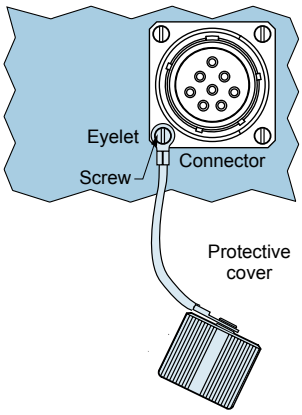
Split Ring Style C

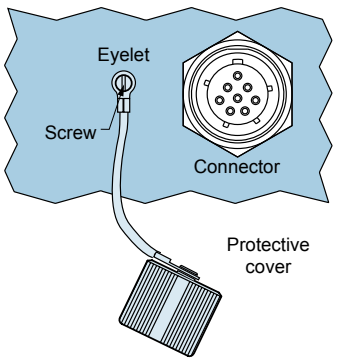


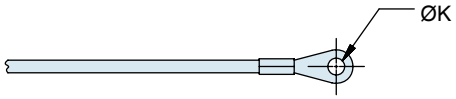
Slip Knot (Type SK)

Table VII: Split Ring Style C			
Dash No.	Ø L ± .015	Dash No.	Ø L ± .015
50	.425 (10.8)	74	1.625 (41.4)
52	.485 (12.3)	76	1.750 (44.5)
54	.640 (16.3)	78	1.875 (47.8)
56	.750 (19.1)	80	1.980 (50.3)
58	.890 (22.6)	82	2.060 (52.3)
60	1.015 (25.9)	84	2.235 (56.9)
62	1.095 (27.9)	86	2.310 (58.7)
64	1.130 (28.7)	88	2.475 (63.0)
66	1.250 (31.8)	90	2.655 (67.6)
68	1.350 (34.3)	92	2.810 (71.4)
70	1.375 (35.1)	94	3.045 (77.5)
72	1.485 (37.8)		

Attaching a Receptacle Cover to a Panel With a Screw







Eyelet - Style D

Table VI: Eyelet Style D		
Dash No.	Ø K ± .015	180-091 Shell Size
01	.140 (3.56)	
02	.182 (4.62)	
03	.191 (4.85)	
04	.197 (5.00)	
05	.167 (4.24)	
06	.125 (31.8)	11 thru 21
07	.218 (5.53)	
09	.156 (3.96)	23 thru 25
00	No Eyelet	

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189-016
Backshell with Banding Strain Relief
Environmental Resistant
for MIL-DTL-38999 Series III Fiber Optic Connectors

D38999 Series III

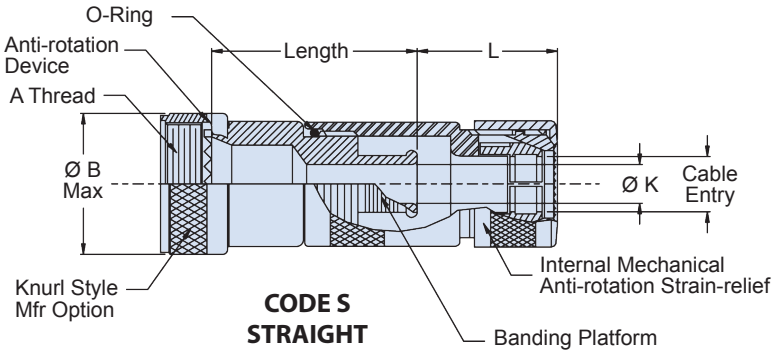
B

MIL-DTL-38999 Series III backshell with strain relief

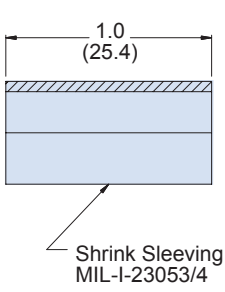
How To Order

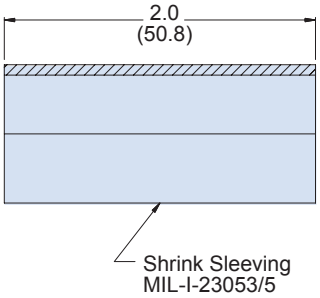
Product Series	Angular Function *N, M, or S*	Material/Finish *(Table II)*	Dash No. *(Table III)*	Band Strap *(Optional)*
189	H	S	016	M	17	07 - 3	B

- **Connector Designator,** *H = MIL-DTL-38999, Series III*
- **Basic No.**
- **Shell Size** *(Table I)*
- **Length In 1/2 Inch Increments** *(Example: 3 = 1.5 Inches)*



CODE S STRAIGHT





Material and Finish

Adapter, Coupling Nut: See Table II
Clamp Components: Ryton R4XT-Black, Ultem 1000-Natural
Anti-Rotation Device: Torlon 42031-Natural

Notes

Glenair 600 Series Backshell assembly tools are recommended for assembly and installation.
Standard minimum length: 1.5 inches, for shorter length consult factory.
For Shield termination see Glenair drawings 600-050 & 600-052.
Consult factory for larger cable size.
MIL-I-23053/4 & /5 Shrink Sleeving to be packaged loose in a plastic bag.
MIL-I-23053/4 Shrink Sleeving to be heat shrunk over rear of Adapter before MIL-I-23053/5 Shrink Sleeving.
For assembly instruction, see GAP-064

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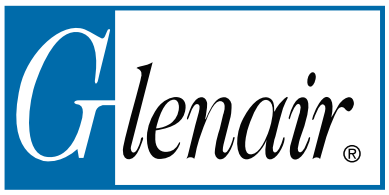

Table I													
Shell Size	A Thread	ØB Max		C Max		D Max		E Max		F Max		Max Dash No.
11	M15 x 1 - 6H	0.890	(22.6)	.861	(21.9)	1.111	(28.2)	1.563	(39.7)	1.875	(47.6)	05
13	M18 x 1 - 6H	1.020	(25.9)	.911	(23.1)	1.161	(29.5)	1.938	(49.2)	2.250	(57.2)	05
15	M22 x 1 - 6H	1.150	(29.2)	.965	(24.5)	1.215	(30.9)	1.938	(49.2)	2.250	(57.2)	07
17	M25 x 1 - 6H	1.230	(31.2)	1.014	(25.8)	1.264	(32.1)	2.063	(52.4)	2.375	(60.3)	07
19	M28 x 1 - 6H	1.360	(34.5)	1.064	(27.0)	1.314	(33.4)	2.063	(52.4)	2.375	(60.3)	09
21	M31 x 1 - 6H	1.480	(37.6)	1.118	(28.4)	1.368	(34.7)	2.563	(65.1)	2.875	(73.0)	11
23	M34 x 1 - 6H	1.600	(40.6)	1.172	(29.8)	1.422	(36.1)	2.313	(58.8)	2.688	(68.3)	11
25	M37 x 1 - 6H	1.730	(43.9)	1.221	(31.0)	1.471	(37.4)	2.250	(57.2)	2.563	(65.1)	13

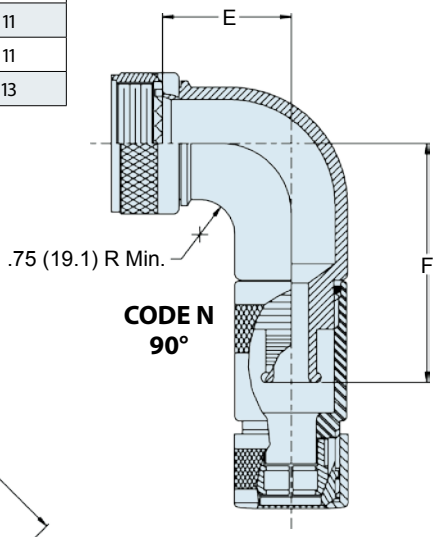

Table II: Material and Finish		
Code	Material	Finish Description
M	Aluminum Alloy	Electroless Nickel
NF		Cadmium Plate, Olive Drab, Over Nickel

Refer to Appendix for material/finish details

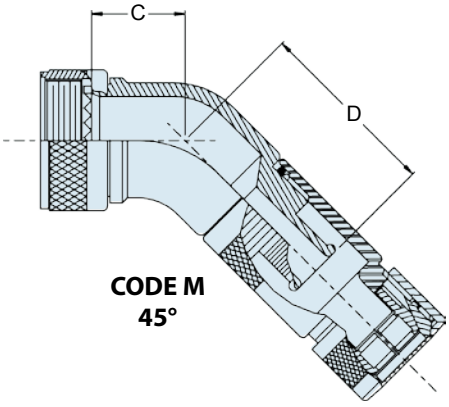

Table III													
Dash No.	Clamp Size	Cable Dia Max		Ø K ±005		L Max		MIL-I-23053 Shrink Sleeve	MIL-I-23053 Shrink Sleeve	Cable Entry Dia			
										Min		Max	
05	12	.280	(7.11)	.312	(7.92)	1.110	(28.2)	/4-203-0	/5-107-0	.233	(5.92)	.375	(9.53)
07	16	.395	(10.0)	.438	(11.1)	1.210	(30.7)	/4-204-0	/5-108-0	.358	(9.10)	.500	(12.7)
09	20	.510	(13.0)	.562	(14.3)	1.210	(30.7)	/4-204-0	/5-109-0	.482	(12.2)	.625	(15.9)
11	24	.621	(15.8)	.688	(17.5)	1.210	(30.7)	/4-205-0	/5-109-0	.545	(13.8)	.750	(19.1)
13	28	.736	(18.7)	.812	(20.6)	1.360	(34.5)	/4-205-0	/5-110-0	.670	(17.0)	.875	(22.2)
15	32	.851	(21.6)	.938	(23.8)	1.510	(38.4)	/4-206-0	/5-110-0	.795	(20.2)	1.000	(25.4)
17	36	.966	(24.5)	1.062	(27.0)	1.510	(38.4)	/4-206-0	/5-111-0	.889	(22.6)	1.125	(28.6)
19	40	1.091	(27.7)	1.188	(30.2)	1.510	(38.4)	/4-206-0	/5-111-0	1.104	(28.0)	1.250	(31.8)

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189-037
Environmental Backshell with Banding Strain Relief
for MIL-DTL-38999 Series III Fiber Optic Connectors

D38999 Series III

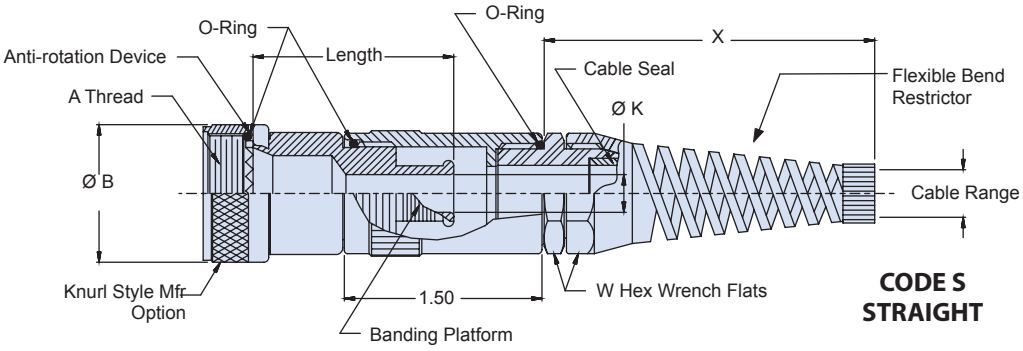
B

MIL-DTL-38999 Series III backshell with strain relief and flexible bend restrictor

How To Order

Product Series	Angular Function *N, M, or S*	Material/ Finish *(Table II)*		Dash No. *(Table III)*			
189	H	S	037	M	17	07	- 3

- **Connector Designator,** *H = MIL-DTL-38999, Series III*
- **Basic No.**
- **Shell Size** *(Table I)*
- **Length In 1/2 Inch Increments** "*S*" **Straight backshell only** *(Example: 3 = 1.5 Inches)*



Material and Finish

Adapter, Coupling Nut: See Table II
Strain Relief Components: Nylon 6/6 (Flame-resistant/zero Halogen)
Anti-Rotation Device: Torlon 42031-Natural
O-Rings: Fluorosilicone

Notes

Glenair 600 Series Backshell assembly tools are recommended for assembly and installation.
Standard minimum length: 1.5 inches, for shorter length consult factory.
MIL-I-23053/4 & /5 Shrink Sleeving to be packaged loose in a plastic bag.
MIL-I-23053/4 Shrink Sleeving to be heat shrunk over rear of Adapter before MIL-I-23053/5 Shrink Sleeving.
For assembly instruction see GAP-065

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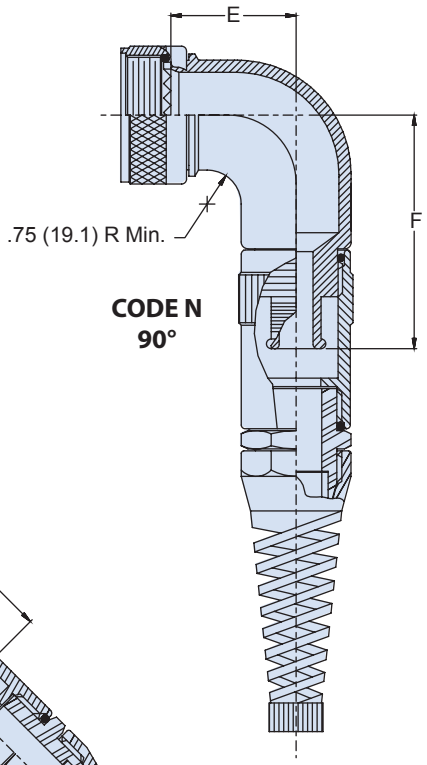
189-037
Environmental Backshell with Banding Strain Relief
for MIL-DTL-38999 Series III Fiber Optic Connectors

Table I													
Shell Size	A Thread Iso Metric	ØB Max		C Max		D Max		E Max		F Max	
11	M15 X 1 - 6H	1.06	(26.9)	.861	(21.9)	1.111	(28.2)	1.563	(39.7)	1.875	(47.6)
13	M18 X 1 - 6H	1.17	(29.7)	.911	(23.1)	1.161	(29.5)	1.938	(49.2)	2.250	(57.2)
15	M22 X 1 - 6H	1.29	(32.8)	.965	(24.5)	1.215	(30.9)	1.938	(49.2)	2.250	(57.2)
17	M25 X 1 - 6H	1.42	(36.1)	1.014	(25.8)	1.264	(32.1)	2.063	(52.4)	2.375	(60.3)
19	M28 X 1 - 6H	1.54	(39.1)	1.064	(27.0)	1.314	(33.4)	2.063	(52.4)	2.375	(60.3)
21	M31X 1 - 6H	1.67	(42.4)	1.118	(28.4)	1.368	(34.7)	2.563	(65.1)	2.875	(73.0)
23	M34 X 1 - 6H	2.01	(51.1)	1.172	(29.8)	1.422	(36.1)	2.313	(58.8)	2.688	(68.3)
25	M37 X 1 - 6H	2.12	(53.8)	1.221	(31.0)	1.471	(37.4)	2.250	(57.2)	2.563	(65.1)



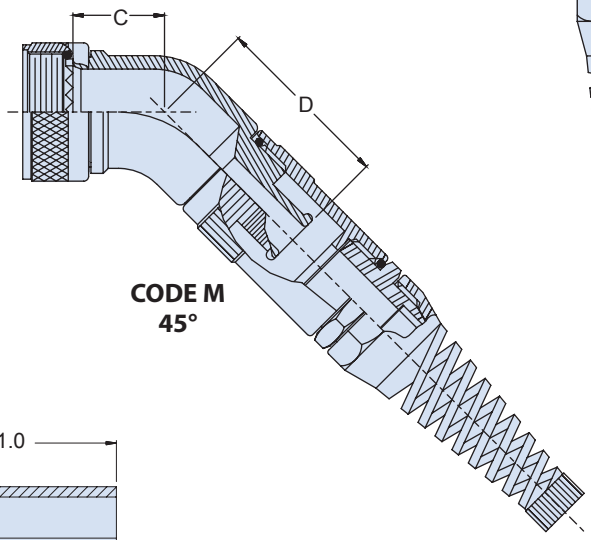


Table II: Material and Finish		
Code	Material	Finish Description
M	Aluminum Alloy	Electroless Nickel
NF		Cadmium Plate, Olive Drab, Over Nickel

Refer to Appendix for material/finish details

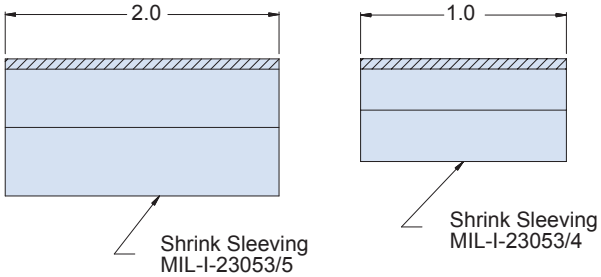


Table III						
Dash No.	Cable Dia Range	Ø K ±005	W Hex	X	MIL-I-23053 Shrink Sleeve	MIL-I-23053 Shrink Sleeve
05	.200/.285	.312 (8.0)	.750 (19.1)	2.32 (58.9)	/4-203-0	/5-107-0
07	.285/.390	.438 (11.1)	.870 (22.1)	2.80 (71.1)	/4-204-0	/5-108-0
09	.390/.550	.562 (14.3)	1.06 (26.9)	3.66 (93.0)	/4-204-0	/5-109-0
11	.550/.670	.688 (17.5)	1.30 (33.0)	4.37 (111.0)	/4-205-0	/5-109-0

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377-014
Composite Backshell
for Fiber Optic MIL-DTL-38999 Series III & IV Connectors

D38999 Series III

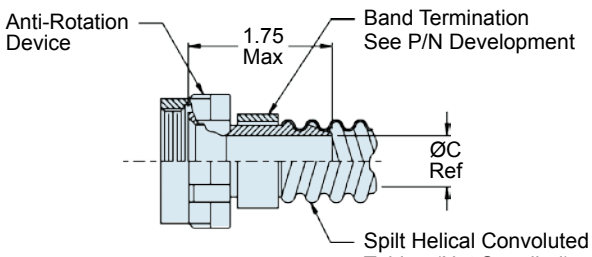
B

MIL-DTL-38999 series III & IV backshell

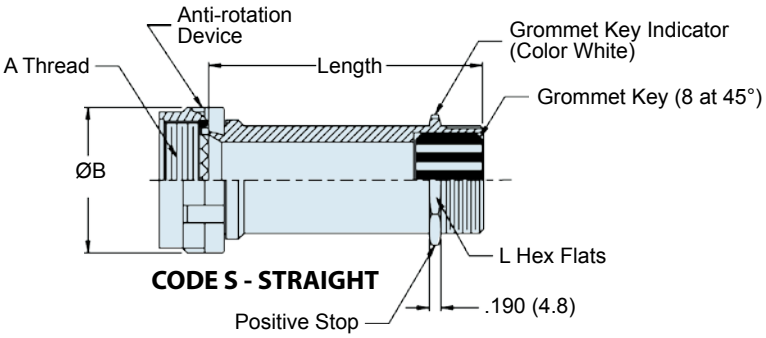
How To Order

Product Series	Angular Function	Material/ Finish	Optional Entry Size	
	S = Straight W = 90° Solid Elbow T = 45° Solid Elbow	(Table III)	(Table II) Omit for Std. Table I	
377	H	S	014	XM	11	06	4	G
	Connector Designator, MIL-DTL-38999, Series III&IV		Basic No.	Shell Size (Table I)		Length In 1/2 Inch Increments (Example: 4 = 2 Inches)		

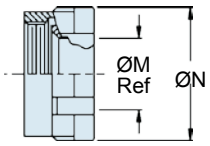
Code G - *Gland Nut;*
Code T - *Tubing Adapter, Glenair Types **E**, **F**, **P**, & **T***
Code K - *Tubing Adapter with Nut, Glenair Peek*
Code TB - *Tubing Adapter Supplied with Band, Glenair Types **E**, **F**, **P**, & **T***
Code TN - *Tubing Adapter with Nut, Glenair Types **E**, **F**, **P**, & **T***
(Omit for Std.Shrink Boot Adapter)



CODE T - TUBING ADAPTER



CODE S - STRAIGHT



CODE G GLAND NUT

Material and Finish

Adapters, Elbows, Coupling Nut, Nut: Hi-grade engineering thermoplastic/see table III
Grommet, O-Ring: Fluorosilicone
Anti-Rotation Device: Corrosion resistant material

Notes

Glenair 600 Series Backshell assembly tools are recommended for assembly and installation.
Standard minimum length: 1.5 inches, for shorter length consult factory.
For Sealing Plugs, see Glenair drawing 687-142.

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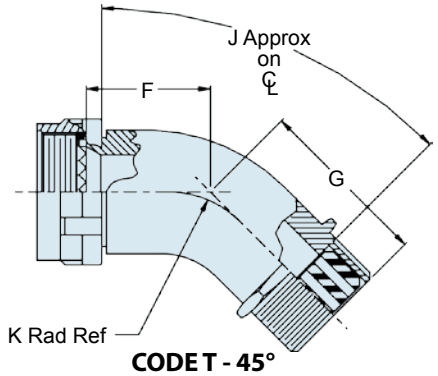
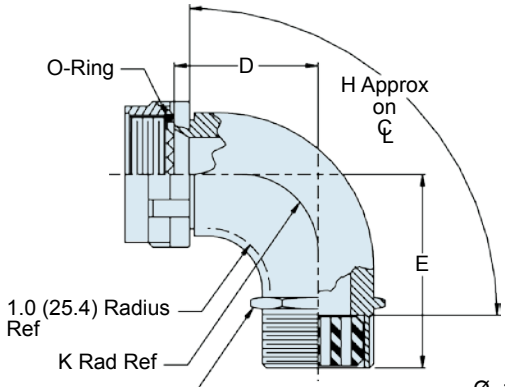
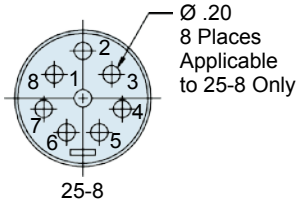
377-014
Composite Backshell
for Fiber Optic MIL-DTL-38999 Series III & IV Connectors

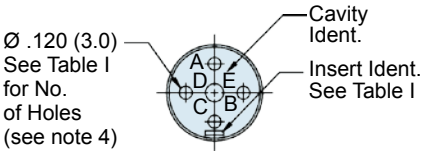


CODE T - 45°

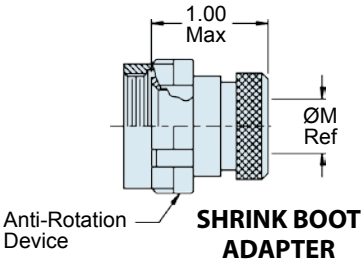


CODE W - 90°

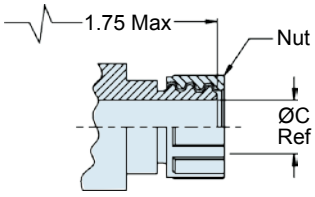




HOLE PATTERN



SHRINK BOOT ADAPTER



CODE K - PEEK TUBING ADAPTER WITH NUT

CODE TN - PLASTIC TUBING ADAPTER WITH NUT

Table I

Shell Size	A Thread	ØB Max	Std. Conduit Size Ref.	D Max	E Max	F Max	G Max	H Approx	J Approx	K Ref	L Hex	ØM Ref	ØN Max	Insert Arrangement	No. Of Holes
11	M15 X 1 - 6H	1.00	3/8	1.78	1.93	1.33	1.56	2.23	2.09	1.20	.938	.32	1.38	11-2	2
13	M18 X 1 - 6H	1.12	7/16	1.84	1.98	1.39	1.62	2.28	2.21	1.26	.938	.54	1.38	13-4	4
15	M22 X 1 - 6H	1.25	1/2	1.90	2.08	1.45	1.68	2.45	2.33	1.32	.938	.54	1.38	15-5	5
17	M25 X 1 - 6H	1.38	5/8	1.97	2.14	1.51	1.74	2.47	2.44	1.38	1.250	.76	1.56	17-8	8
19	M28 X 1 - 6H	1.50	3/4	2.11	2.18	1.54	1.77	2.54	2.50	1.43	1.250	.76	1.56	19-11	11
21	M31 X 1 - 6H	1.62	7/8	2.07	2.25	1.61	1.84	2.64	2.64	1.49	1.500	1.00	1.81	21-16	16
23	M34 X 1 - 6H	1.75	1	2.14	2.31	1.67	1.89	2.76	2.75	1.55	1.500	1.00	1.81	23-21	21
25	M37 X 1 - 6H	1.88	1	2.19	2.19	1.73	1.96	2.84	2.87	1.62	1.812	1.27	2.12	25-29	29
25-8	M37 X 1 - 6H	1.88	1 1/4	2.19	2.19	1.73	1.96	2.84	2.87	1.62	1.812	1.27	2.12	25-8	8
25-37	M37 X 1 - 6H	1.88	1 1/4	2.19	2.19	1.73	1.96	2.84	2.87	1.62	1.812	1.27	2.12	25-37	37

Table II

Entry Size	ØC Ref Code T & TN	ØC Ref Code K	Optional Conduit Size Ref.
03	.188	.188	9/32
04	.236	-	5/32
05	.250	.265	3/8
06	.338	.330	7/16
07	.398	.390	1/2
08	.523	.515	5/8
10	.648	.640	3/4
11	.648	.640	3/4
13	.778	.765	7/8
15	.875	.089	1
17	1.078	1.125	1 1/4

Table III: Material and Finish

Code	Material	Finish Description
-	Composite	Dash (-) For No Plating, Amber Color
XB		No Plating - Black Color
XM		Electroless Nickel
XW		Cadmium Olive Drab Over Electroless Nickel
XMT		Nickel-PTFE, Grey

Refer to Appendix for material/finish details

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377-040
Composite Strain-Relief Backshell
for Fiber Optic MIL-DTL-38999 Series III Connectors

D38999 Series III

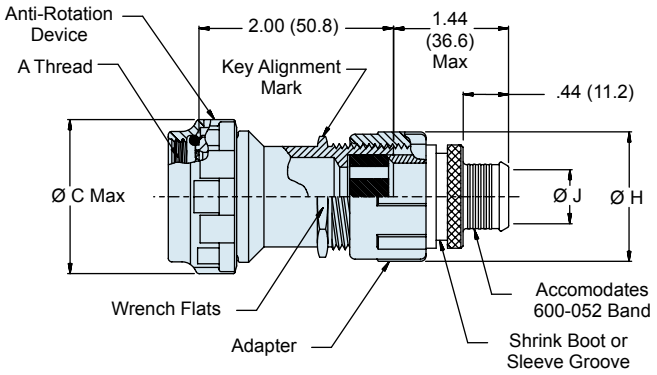
B

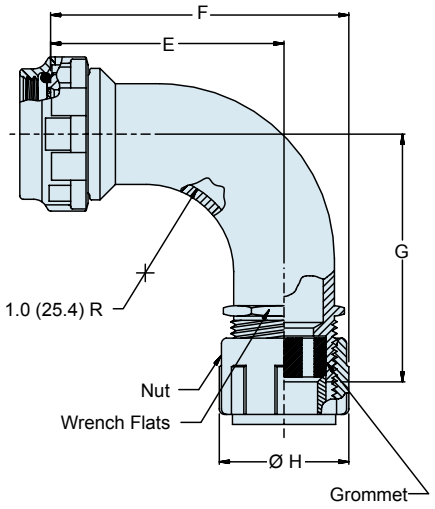
Composite MIL-DTL-38999 series III strain-relief backshell

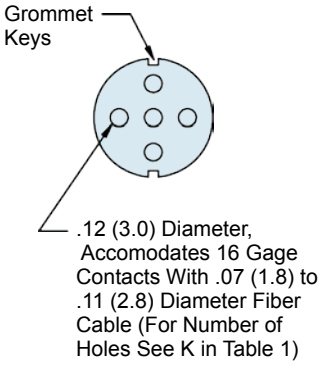
How To Order

Product Series	Angular Function	Material/ Finish	Strain Relief Style
	S = Straight *W* = 90° Elbow	*(Table II)*	*A* = Adapter *N* = Nut

377	H	S	040	XO	19	A
	Connector Designator *H* = MIL-DTL-38999 Series III & IV *U* = MIL-C-26900		Basic No.		Shell Size *(Table I)*	







Material and Finish

Adapters, Elbow: Hi-grade engineering thermoplastic/see table II
Coupling Nut & Gland Nut: Thermoplastic/unplated
Grommet, O-Ring: Silicone
Anti-Rotation Device: Corrosion resistant material

Notes

Glenair 600 Series Backshell assembly tools are recommended for assembly and installation.

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Table I												
Connector Designator H				Connector Designator U				E ±.06 (1.5)	F ±.09 (2.3)	G ±.06 (1.5)	Ø H Max	Ø J Ref
Shell Size	A Thread	Ø C	K (# of Holes) *	Shell Size	A Thread	Ø C	K (# Of Holes) *					
11	M15 X 1 - 6H	.98 (24.9)	2	-	-	-	-	1.70 (43.2)	2.39 (60.7)	1.90 (48.3)	1.41 (35.8)	.27 (6.9)
13	M18 X 1 - 6H	1.16 (29.4)	4	11	5/8-28 UN	1.16 (29.4)	2	1.78 (45.2)	2.47 (62.7)	1.96 (49.8)	1.41 (35.8)	.33 (8.4)
15	M22 X 1 - 6H	1.28 (32.5)	5	13	3/4-28 UNS	1.28 (32.5)	4	1.82 (46.2)	2.51 (63.8)	2.02 (51.3)	1.41 (35.8)	.39 (9.9)
17	M25 X 1 - 6H	1.41 (35.7)	8	15	7/8-28 UN	1.41 (35.7)	5	1.89 (48.0)	2.70 (68.6)	2.09 (53.1)	1.64 (41.7)	.51 (13.0)
19	M28 X 1 - 6H	1.52 (38.5)	11	17	1-28 UN	1.52 (38.5)	8	1.93 (49.0)	2.74 (69.6)	2.13 (54.1)	1.64 (41.7)	.64 (16.3)
21	M31 X 1 - 6H	1.64 (41.7)	16	19	1-1/8-28 UN	1.64 (41.7)	11	2.00 (50.8)	2.94 (74.7)	2.19 (55.6)	1.89 (48.0)	.77 (19.6)
23	M34 X 1 - 6H	1.77 (44.9)	21	21	1-1/4-28 UN	1.77 (44.9)	16	2.08 (52.8)	3.02 (76.7)	2.25 (57.2)	1.89 (48.0)	.84 (21.3)
25	M37 X 1 - 6H	1.89 (48.0)	29	23	1-3/8-28 UN	1.89 (48.0)	21	2.14 (54.4)	3.20 (81.3)	2.32 (58.9)	2.16 (54.9)	.84 (21.3)
-	-	-	-	25	1-1/2-28 UN	2.02 (51.2)	29	2.22 (56.4)	3.28 (83.3)	2.39 (60.7)	2.16 (54.9)	.89 (22.6)

*Use Glenair 687-142 seal plug in vacant holes

Table II: Material and Finish		
Code	Material	Finish Description
XB	Composite	No Plating - Black Color
XO		No Plating - Amber Color
XM		Electroless Nickel
XW		Cadmium Olive Drab over Electroless Nickel

Refer to Appendix for material/finish details

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377-041
Composite FiberCon® Conduit Adapter
for Fiber Optic MIL-DTL-38999 Series III Connectors

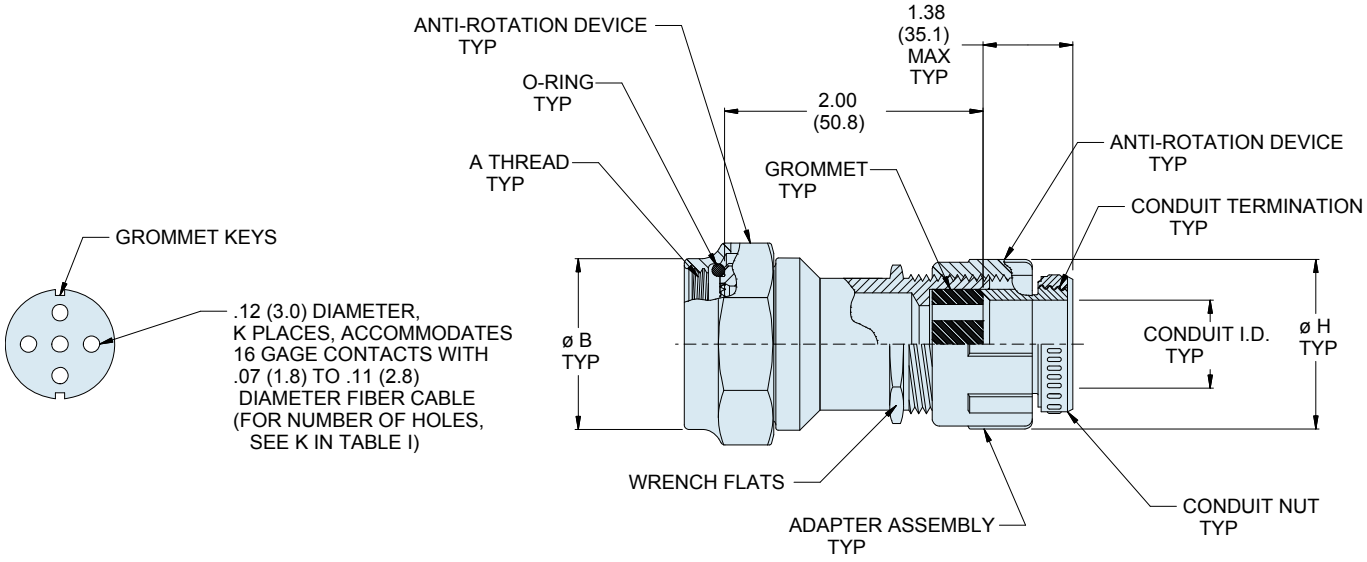
D38999 Series III

B

MIL-DTL-38999 Series III conduit adapter

How To Order

Product Series	Angular Function		Material/ Finish	Add Letter K for Transition to Accommodate Peek Conduit Material.		
	S = Straight		(Table II)	(Omit for Standard Fluoropolymer Conduit Material)		
377	H	S	041	XM	19	K
Connector Designator H = MIL-DTL-38999, Series III			Basic No.		Shell Size (Table I)	



Material and Plating

Adapters, Elbow, Ferrules: Hi-grade engineering thermoplastic/see table II
Coupling Nut & Gland Nut: Hi-grade engineering thermoplastic/unplated
Grommet, O-Ring: Fluorosilicone
Anti-Rotation Device: Corrosion resistant material

Notes

Glenair 600 Series Backshell assembly tools are recommended for assembly and installation.
Conduit I.D. accommodates Glenair Series 74, Type A Convoluted Tubing, in accordance with MIL-T-81914.
For Sealing Plugs, see Glenair drawing 687-142.

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377-041
Composite FiberCon® Conduit Adapter
for Fiber Optic MIL-DTL-38999 Series III Connectors

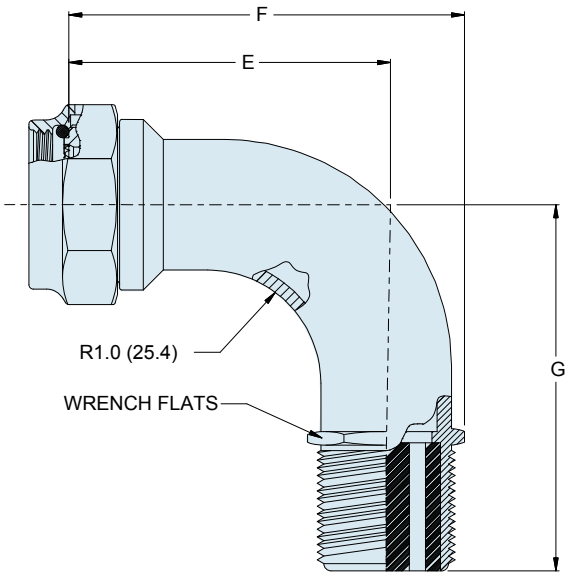

Table I								
Shell Size	**A Thread**	**Ø B Max**	**E ±.06 (1.5)**	**F ±.09 (2.3)**	**G ±.06 (1.5)**	**Ø H Max**	**Ø J Ref**	**K (# Of Holes)**
11	M15 X 1 - 6H	.770 (19.6)	1.70 (43.2)	2.39 (60.7)	1.90 (48.3)	1.41 (35.8)	.25 (6.4)	2
13	M18 X 1 - 6H	.890 (22.6)	1.78 (45.2)	2.47 (62.7)	1.96 (49.8)	1.41 (35.8)	.31 (7.9)	4
15	M22 X 1 - 6H	1.03 (26.2)	1.82 (46.2)	2.51 (63.8)	2.02 (51.3)	1.41 (35.8)	.31 (7.9)	5
17	M25 X 1 - 6H	1.15 (29.2)	1.89 (48.0)	2.70 (68.6)	2.09 (53.1)	1.64 (41.7)	.44 (11.2)	8
19	M28 X 1 - 6H	1.28 (32.5)	1.93 (49.0)	2.74 (69.6)	2.13 (54.1)	1.64 (41.7)	.50 (12.7)	11
21	M31 X 1 - 6H	1.41 (35.8)	2.00 (50.8)	2.94 (74.7)	2.19 (55.6)	1.89 (48.0)	.50 (12.7)	16
23	M34 X 1 - 6H	1.53 (38.9)	2.08 (52.8)	3.02 (76.7)	2.25 (57.2)	1.89 (48.0)	.63 (16.0)	21
25	M37 X 1 - 6H	1.66 (42.2)	2.14 (54.4)	3.20 (81.3)	2.32 (58.9)	2.16 (54.9)	.75 (19.1)	29

Table II: Material and Finish		
Code	**Material**	**Finish Description**
XB	**Composite**	No Plating - Black Color
XO		No Plating - Amber Color
XM		Electroless Nickel
XW		Cadmium Olive Drab over Electroless Nickel

Refer to Appendix for material/finish details

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189-038
Composite Connector Backshell Adapter
for Helical Convoluted Tubing to be used with MIL-DTL-38999 Series III & IV Fiber Optic Connectors

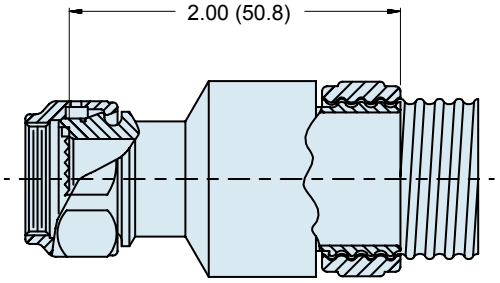
D38999 Series III

B

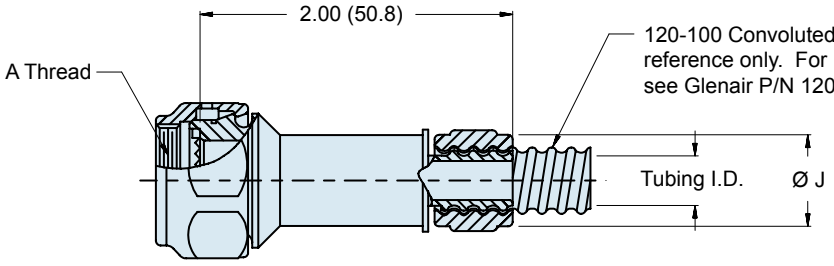
Composite MIL-DTL-38999 backshell adapter

How To Order

Product Series	Angular Function		Material/Finish	Tubing Size Dash. No.			
	S = Straight T = 45° Elbow W = 90° Elbow		(Table III)	(Table I)			D = With Black Dacron Overbraid (Omit for None)
189	H	S	038	XW	17	16	K - D
Connector Designator: H = MIL-DTL-38999 Series III & IV		Basic Number		Shell Size (Table II)		K = PEEK (Omit for PFA, ETFE, or FEP)	



ONE PIECE SET UP



S - STRAIGHT

Material and Finish

Adapter, Elbow: High Grade Engineering Thermoplastic/see Table III
Coupling and Compression Nuts: High Grade Engineering Thermoplastic
O-Ring: Fluorosilicone or Silicone
Anti-rotation Device: Corrosion resistant material

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189-038
Composite Connector Backshell Adapter
for Helical Convoluted Tubing to be used with MIL-DTL-38999 Series III & IV Fiber Optic Connectors

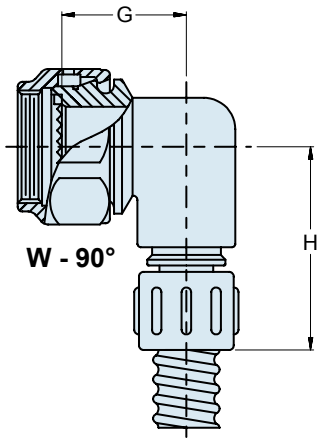
Glenair®

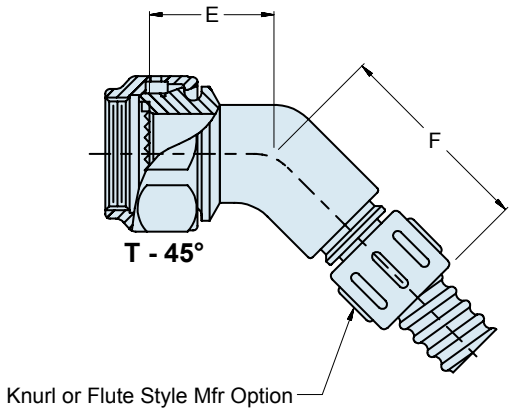
Table I: Tubing Size		
Dash No.	Conduit I.D.	Ø J Max
06	.188 (4.8)	.790 (20.1)
09	.281 (7.1)	.985 (25.0)
10	.312 (7.9)	.985 (25.0)
12	.375 (9.5)	1.035 (26.3)
14	.437 (11.1)	1.100 (27.9)
16	.500 (12.7)	1.160 (29.5)
20	.625 (15.9)	1.285 (32.6)
24	.750 (19.1)	1.480 (37.6)
28	.875 (22.2)	1.670 (42.4)
32	1.000 (25.4)	1.720 (43.7)
40	1.250 (31.8)	2.100 (53.3)
48	1.500 (38.1)	2.420 (61.5)

Table II						
Shell Size	A Thread ISO Metric	E ±.060 (1.5)	F ±.090 (2.3)	G ±.060 (1.5)	H +090 (2.3)	Max Entry Max Tubing Size
11	M15 x 1 - 6H	.750 (19.1)	.950 (24.1)	.750 (19.1)	1.160 (29.5)	12
13	M18 x 1 - 6H	.750 (19.1)	1.020 (25.9)	.810 (20.6)	1.220 (31.0)	16
15	M22 x 1 - 6H	.760 (19.3)	1.050 (26.7)	.880 (22.4)	1.290 (32.8)	20
17	M25 x 1 - 6H	.780 (19.8)	1.070 (27.2)	.940 (23.9)	1.350 (34.3)	24
19	M28 x 1 - 6H	.790 (20.1)	1.080 (27.4)	.970 (24.6)	1.380 (35.1)	28
21	M31 x 1 - 6H	.820 (20.8)	1.110 (28.2)	1.060 (26.9)	1.470 (37.3)	32
23	M34 x 1 - 6H	.860 (21.8)	1.150 (29.2)	1.130 (28.7)	1.540 (39.1)	32
25	M37 x 1 - 6H	.890 (22.6)	1.180 (30.0)	1.190 (30.2)	1.730 (43.9)	40

Table III: Material and Finish		
Code	Material	Finish Description
XM	Composite	Electroless Nickel
XW		Cadmium Plate/Olive Drab over Electroless Nickel
XO		No Plating–Amber Color

Refer to Appendix for material/finish details





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712-416 • PEEK Only
Composite Straight Backshell Adapter
for MIL-DTL-38999 Series III and IV Fiber Optic Connectors

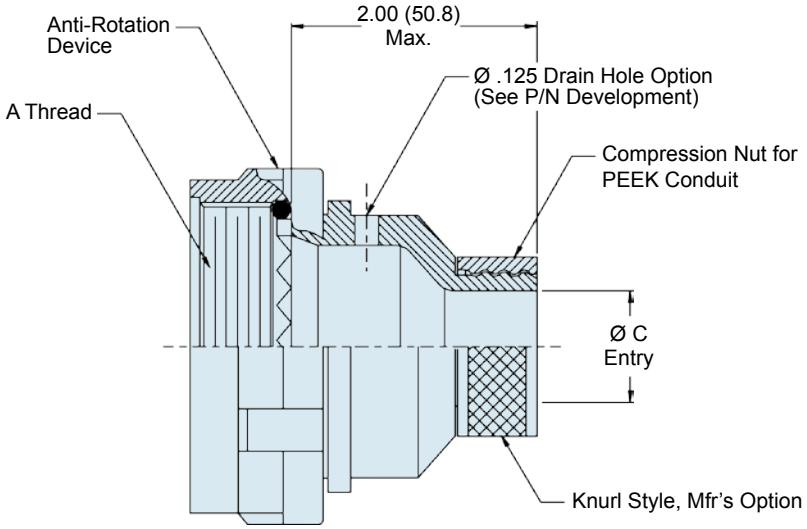
D38999 Series III

B

MIL-DTL-38999 Series III & IV backshell adapter

How To Order

Product Series	Configuration		Material/ Finish (Table I)	Conduit Size (Table III)			
712	H	S	416	XO	17	16	D
Conn. Designator H = MIL-DTL-38999 Series III and IV			Basic No.	Shell Size (Table II)			D = Drain Hole (Omit for None)



Material and Finish

Adapter and Compression Nut: High-Grade Engineering Thermoplastic
Coupling Nut: High Grade Engineering Thermoplastic/Unplated
O-Ring: Fluorosilicone or Silicone
Anti-Rotation Device: Corrosion Resistant Material

Notes

Glenair 600 Series Backshell Assembly Tools are recommended for assembly and installation. Unless otherwise specified, the Backshell Body to be supplied finished per Table I - all other components to be supplied without plating.

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Table III: Material and Finish		
Code	**Material**	**Finish Description**
XM	Composite	Electroless Nickel
XW		Cadmium Plate/Olive Drab over Electroless Nickel
XO		No Plating–Amber Color

Refer to Appendix for material/finish details

Table II		
Shell Size	**A Thread**	**B Max**
11	M15 x 1 - 6H	.980 (24.0)
13	M18 x 1 - 6H	1.16 (28.4)
15	M22 x 1 - 6H	1.28 (32.5)
17	M25 x 1 - 6H	1.41 (35.8)
19	M28 x 1 - 6H	1.52 (38.6)
21	M31 x 1 - 6H	1.64 (41.7)
23	M34 x 1 - 6H	1.77 (43.4)
25	M37 x 1 - 6H	1.89 (48.0)

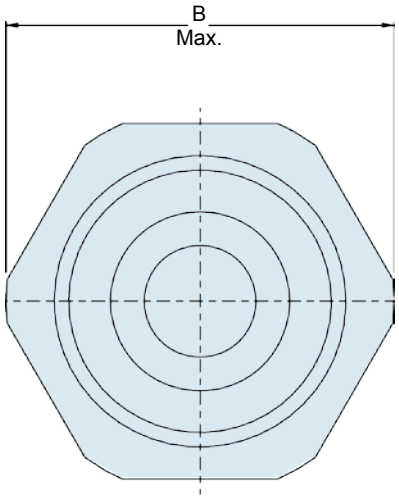

Table III: "Peek" Conduit Size		
Dash No.	**Fractional Size**	**Ø C Dim. Entry**
06	3/16	.100 (2.5)
09	9/32	.171 (4.2)
10	5/16	.200 (5.8)
12	3/8	.265 (6.7)
16	1/2	.390 (9.6)
20	5/8	.515 (12.6)
24	3/4	.640 (15.7)
28	7/8	.765 (18.7)
32	1	.890 (21.8)

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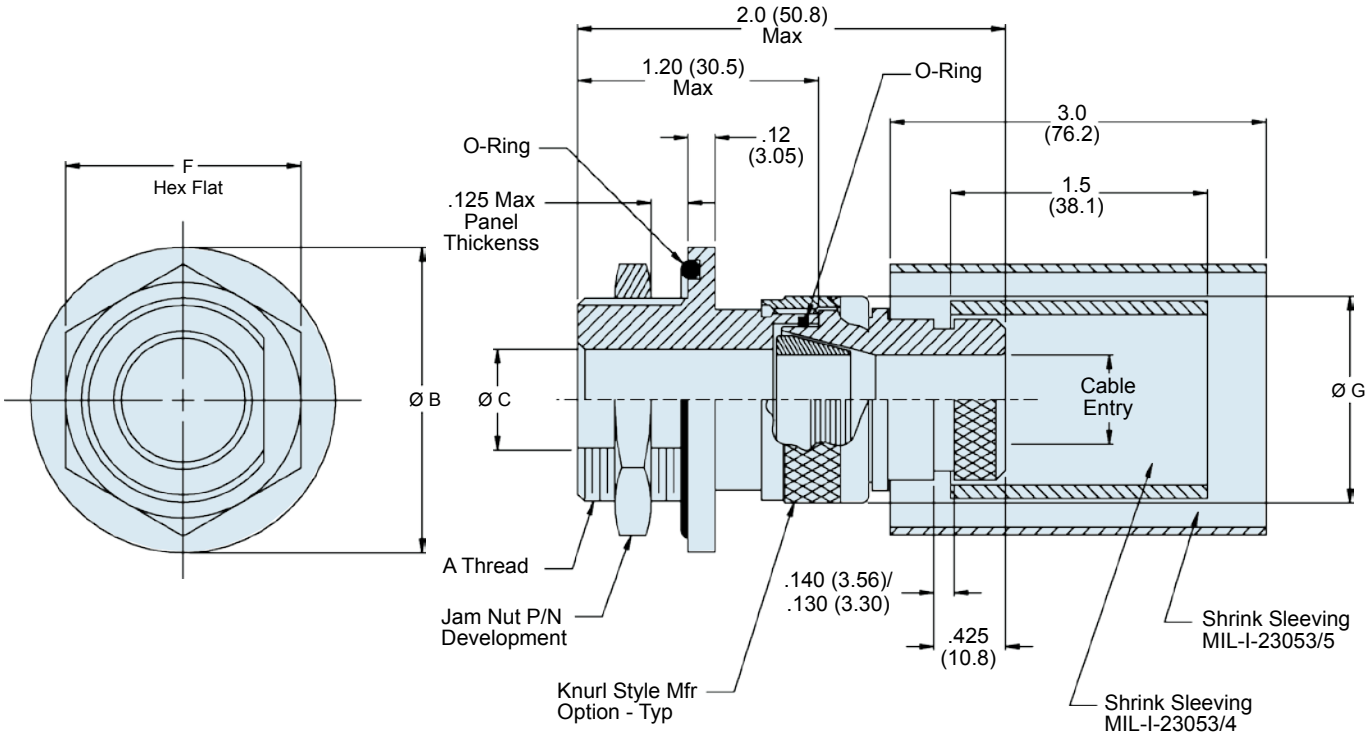
630-015
Fiber Optic Cable Bulkhead Adapter
with Kevlar Braid Sock and Shrink Sleeving

B

Cable bulkhead adapter

How To Order

Product Series	Material/Finish *(Table II)*	Supplied with 447-822*** Shield Nut Instead of Jam Nut *(Omit Letter T for Part with Jam Nut)*	
630 -	015	NF	01	T
	Basic No.	Dash No *(Table I)*	



Material and Finish

Adapters, Jam Nut, Ferrule, Coupling Nut: Al Alloy/see Table II
O-Rings: Silicone
Shrink Sleeving: Polyolefin

Notes

Glenair 600 Series Backshell Assembly Tools are recommended for assembly and installation.
MIL-I-23053/4 & /5 Shrink Sleeving to be packaged loose in a plastic bag.

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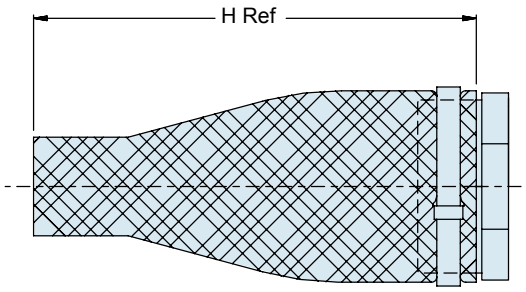
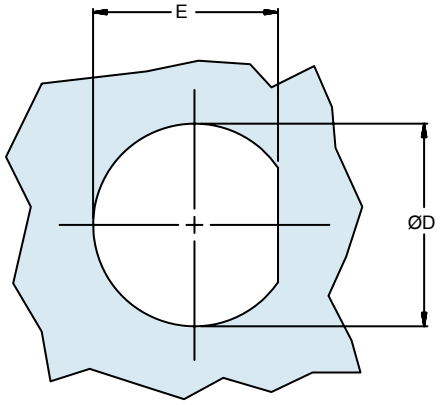
630-015
Fiber Optic Cable Bulkhead Adapter
with Kevlar Braid Sock and Shrink Sleeving



447-822*** Assembly
Style T (See P/N Development)



Recommended Panel Cut-Out

Table I: Shell Size

Shell Size	A Thread Class 2A	ØB Max	ØC +.010 -.000	ØD +.010 -.000	E +.010 -.000	F	ØG Max	H Ref	Max. Cable Entry	MIL-I-23053 Shrink Sleeve	MIL-I-23053 Shrink Sleeve	Braid Sock 103-005-005 Ref
01	3/4-20 UNEF	1.140 (29.0)	.340 (8.64)	.755 (19.2)	.691 (17.6)	.938 (23.8)	1.004 (25.5)	6.0	.335	/4-204-0	/5-109-0	A10
02	3/4-20 UNEF	1.140 (29.0)	.460 (11.7)	.755 (19.2)	.691 (17.6)	.938 (23.8)	1.132 (28.8)	6.0	.455	/4-204-0	/5-109-0	A10
03	7/8-20 UNEF	1.280 (32.5)	.630 (16.0)	.880 (22.4)	.816 (20.7)	1.062 (27.0)	1.343 (34.1)	6.0	.625	/4-205-0	/5-110-0	A10
04	1 1/16-18 UNEF	1.490 (37.8)	.755 (19.2)	1.067 (27.1)	1.004 (25.5)	1.250 (31.8)	1.468 (37.3)	6.0	.750	/4-206-0	/5-110-0	A14
05	1 3/16-18 UNEF	1.640 (41.7)	.880 (22.4)	1.192 (30.3)	1.130 (28.7)	1.375 (35.0)	1.593 (40.5)	6.0	.875	/4-206-0	/5-111-0	A16
06	1 5/16-18 UNEF	1.930 (49.0)	1.005 (25.7)	1.317 (33.5)	1.254 (31.9)	1.625 (41.3)	1.656 (42.1)	6.0	1.000	/4-305-0	/5-111-0	A18

Table II: Material and Finish

Code	Material	Finish Description
M	Aluminum Alloy	Electroless Nickel
NF		Cad/O.D. over Electroless Nickel (1000 Hr. Salt Spray)
XMT	Composite	Nickel PTFE, Grey
Z1	Stainless Steel	Passivate

Refer to Appendix for material/finish details

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Glenair ASAP Fiber Optic Cable Sets
Rugged Overmolded
D38999 Series III to D38999 Series III

D38999 Series III

ASAP fiber optic cable sets

Product Features

- Harsh Environment Polyurethane Overmolding (Viton® and Neoprene Available)
- Singlemode or Multimode Fiber Media
- D38999 Series III Connectors in Aluminum, Composite or Stainless Steel
- Plug, Jam-Nut Receptacle, In-Line and Wall-Mount Receptacle Configurations
- Military Standard Dust Caps and Connector Accessories
- MIL-PRF-29504 Approved Termini
- Multichannel Capability: From 2 to 37 Channels
- Custom Lengths Available
- Robust, Flexible and Crush Resistant

The World's Only Short Lead-Time Source for Harsh Environment Overmolded F/O Cable Assemblies

Overmolded Cable Assemblies

Glenair's overmolded cable assemblies are specifically designed to protect fiber optic and hybrid fiber/copper cables from the effects of moisture, heat, caustic chemicals and mechanical stress conditions. Glenair has been manufacturing these unique overmolded designs in fiber since 1984, and has produced tens of thousands of cables with zero real-time failures. Overmolding (as opposed to shrink boots or other sealing materials) brings added strength and environmental protection to critical interconnect systems. The overmolding process effectively isolates the transmission media from contaminating elements and protects the media from abrasion damage.

Glenair's ASAP Overmolded Fiber Optic Assemblies are available with our full line of composite thermoplastic and metal alloy connectors. Polyurethane is the applied standard overmolding. For other overmolding material types such as Viton® or Neoprene, please consult the factory. The turnkey assembly includes custom extruded cable, Glenair Backshell, MIL-DTL-38999 Style Connectors, MIL-PRF-29504 Termini, Mil-Spec Dust-Caps and customer specified marking and labeling. Please specify minor customizations on your purchase order.

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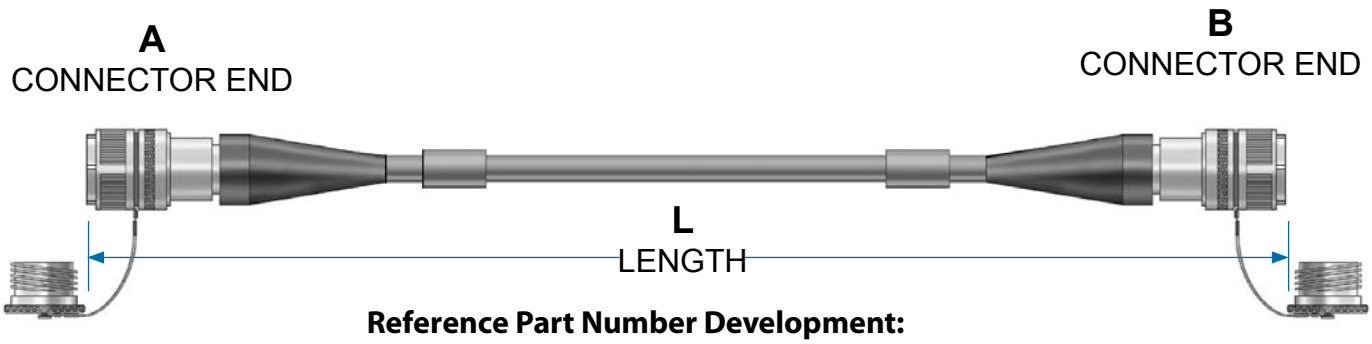
ASAP fiber optic cable sets



Reference Part Number Development:

FO1000	P	05	P	06	J	04	-	62	-	100	L

Basic Part Number

A Terminus Type

P = Pin Terminus
S = Socket Terminus

A Connector Type

05 = D38999 Style In-Line Receptacle
06 = D38999/26 Style Plug
08 = D38999/24 Style Jam-Nut Receptacle
H7 = D38999/20 Style Wall Mount Receptacle (Std.)
S7 = D38999/20 Style Wall Mount Receptacle (Slotted)
T7 = D38999/20 Style Wall Mount Receptacle (Tapped)

B Terminus Type

P = Pin Terminus
S = Socket Terminus

B Connector Type

05 = D38999 Style In-Line Receptacle
06 = D38999/26 Style Plug
08 = D38999/24 Style Jam-Nut Receptacle
H7 = D38999/20 Style Wall Mount Receptacle (Std.)
S7 = D38999/20 Style Wall Mount Receptacle (Slotted)
T7 = D38999/20 Style Wall Mount Receptacle (Tapped)

D38999 Series III Connector Class

F = Aluminum, Electroless Nickel Plating
J = Composite, Olive Drab Cadmium Plating
K = Stainless Steel, Passivated
M = Composite, Electroless Nickel Plating
W = Aluminum, Olive Drab Cadmium Plating

Number of Fibers*

02 = 2 Fibers (Shell Size 11)
04 = 4 Fibers (Shell Size 13)
05 = 5 Fibers (Shell Size 15)
08 = 8 Fibers (Shell Size 17)
11 = 11 Fibers (Shell Size 19)
16 = 16 Fibers (Shell Size 21)
21 = 21 Fibers (Shell Size 23)
29 = 29 Fibers (Shell Size 25)
37 = 37 Fiber (Shell Size 25)

Fiber Size

09 = 9.3/125 Singlemode
50 = 50/125 Multimode
62 = 62.5/125 Multimode
10 = 100/140 Multimode
20 = 200/230 Multimode

Length in Feet

Protective Covers

L = Less Covers
Omit for with Covers

Standard Cable Make-Up:
2mm Jacketed Fiber, Polyurethane Jacketing and Overmolding, Kevlar Reinforcement, Nominal Temperature Range -40° to +85°C.
Please Reference Special Marking, Labels Or Other Identification Specifications on Your Purchase Order

*See Page B-12 for Insert Arrangements.

Please Consult Factory for Alternative Overmolding Materials Such As Viton® or Neoprene.
Part Numbering is for Reference Purposes Only. A Unique Glenair Part Number Will Be Assigned to Your Cable Order.

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Glenair ASAP Fiber Optic Cable Sets
Plastic and Metal-Core Conduit Assembly
D38999 Series III to D38999 Series III

D38999 Series III

ASAP fiber optic cable sets

Product Features

- FEP (High-Temperature PTFE Fluoropolymer), PEEK (Halogen Free, Lightweight) and Metal-Core (EMI and Crush Proof) Versions
- Nine Standard Material Packages
- Shielded and Un-Shielded Designs
- Single and Multimode Fiber Media
- D38999 Series III Connectors in Aluminum, Composite or Stainless Steel
- Plug, Jam-Nut Receptacle, In-Line and Wall-Mount Receptacle Configurations
- Military Standard Dust Caps
- MIL-PRF-29504 Qualified Termini
- Multichannel Capability: From 2 to 37 Channels

Flexible, Lightweight, Crush Resistant—Everything You've Always Wanted in a Fiber Optic Cable

Standard Conduit Packaging

The turnkey assembly includes fiber optic wiring, MIL-DTL-38999 Style Connectors, MIL-PRF-29504 Termini, Mil-Spec Dust-Caps, Conduit Adapter, customer specified marking and labeling and your choice of conduit materials and jacketing, including the following configurations:

TABLE I: CONDUIT MATERIALS PACKAGING

Code	Conduit Materials Package Description
A	FEP Fluoropolymer Convoluted Tubing Only; Standard Wall Thickness, Standard Convolutes
B	PEEK Convoluted Tubing Only; Halogen Free, Light Weight
C	FEP Convoluted Tubing with Black Dacron Outer Braided Covering
D	PEEK Convoluted Tubing with Black Dacron Outer Braided Covering
E	FEP Convoluted Tubing with Neoprene Jacket and Black Dacron Outer Braided Covering
F	PEEK Convoluted Tubing with Neoprene Jacket and Black Dacron Outer Braided Covering
G	FEP Convoluted Tubing with Tin Copper Shielding, Neoprene Jacket and Black Dacron Outer Braided Covering
H	PEEK Convoluted Tubing with Tin Copper Shielding, Neoprene Jacket and Black Dacron Outer Braided Covering
J	Brass Metal-Core Conduit, Bronze Braid and Neoprene Jacket

Consult Factory for Other Available Material Types

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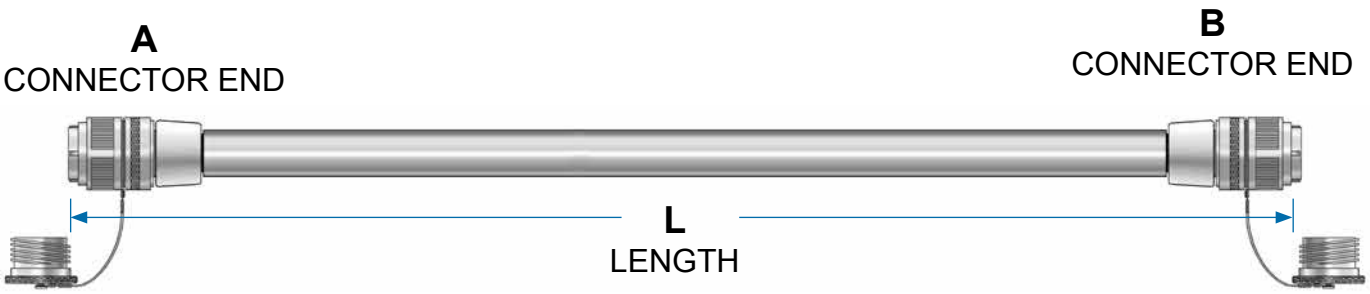
ASAP fiber optic cable sets



Reference Part Number Development:

FO1001 | P | 06 | P | 06 | J | 04 - 62 - 100 | G | L

Basic Part Number

A Terminus Type

P = Pin Terminus
S = Socket Terminus

A Connector Type

05 = D38999 Style In-Line Receptacle
06 = D38999/26 Style Plug
08 = D38999/24 Style Jam-Nut Receptacle
H7 = D38999/20 Style Wall Mount Receptacle (Std.)
S7 = D38999/20 Style Wall Mount Receptacle (Slotted)
T7 = D38999/20 Style Wall Mount Receptacle (Tapped)

B Terminus Type

P = Pin Terminus
S = Socket Terminus

B Connector Type

05 = D38999 Style In-Line Receptacle
06 = D38999/26 Style Plug
08 = D38999/24 Style Jam-Nut Receptacle
H7 = D38999/20 Style Wall Mount Receptacle (Std.)
S7 = D38999/20 Style Wall Mount Receptacle (Slotted)
T7 = D38999/20 Style Wall Mount Receptacle (Tapped)

D38999 Series III Connector Class

F = Aluminum, Electroless Nickel Plating
J = Composite, Olive Drab Cadmium Plating
K = Stainless Steel, Passivated
M = Composite, Electroless Nickel Plating
W = Aluminum, Olive Drab Cadmium Plating

Number of Fibers*

02 = 2 Fibers (Shell Size 11)
04 = 4 Fibers (Shell Size 13)
05 = 5 Fibers (Shell Size 15)
08 = 8 Fibers (Shell Size 17)
11 = 11 Fibers (Shell Size 19)
16 = 16 Fibers (Shell Size 21)
21 = 21 Fibers (Shell Size 23)
29 = 29 Fibers (Shell Size 25)
37 = 37 Fiber (Shell Size 25)

Fiber Size

09 = 9.3/125 Singlemode
50 = 50/125 Multimode
62 = 62.5/125 Multimode
10 = 100/140 Multimode
20 = 200/230 Multimode

Length in Feet

Conduit Materials Package (Table I)

Protective Covers

L = Less Covers
Omit for with Covers

See Table I for Standard Conduit Materials Packages. Please Reference Special Marking, Labels Or OtherIdentification Specifications on Your Purchase Order

*See Page B-12 for Insert Arrangements.

Part Numbering is for Reference Purposes Only. A Unique Glenair Part Number Will Be Assigned to Your Cable Order.

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Glenair ASAP Fiber Optic Cable Sets
Field Repairable Banding Backshell Assembly
D38999 Series III to D38999 Series III

D38999 Series III

ASAP fiber optic cable sets

Product Features

- MIL-DTL-38999 Series III Connectors in Aluminum, Composite or Stainless Steel
- Glenair Banding Backshells with Flex-Nut Strain-Relief in Aluminum, Composite or Stainless Steel
- Plug, Jam-Nut Receptacle, In-Line and Wall-Mount Receptacle Configurations
- Single and Multimode Fiber Media
- Simple, Fast Kevlar Strength-Member Termination
- Military Standard Dust Caps
- MIL-PRF-29504 Qualified Termini
- Multichannel Capability: From 2 to 37 Channels
- Custom Lengths Available
- 100% Tested

The Ideal Solution for Combined Environmental Resistance, Field Repairability and Kevlar® Termination

Reinforced Cable/Backshell Assemblies

Reinforced, extruded cable is an ideal packaging option for rugged application environments, and Glenair can extrude fiber optic cable for most high-performance applications. But while the cable is the backbone of this packaging solution, Glenair's ruggedized backshell is the component which gives the assembly its real functionality. The backshell allows for the convenient termination of cable shielding and/or the Kevlar® strength member. Unlike other backshell designs, Glenair's assembly uses a simple, easy to use banding technology to terminate cable shielding and the Kevlar material used in fiber cable extrusions. The Glenair Band-Master™ATS technology is fully tested and proven to meet pull strength requirements and is the quickest and most reliable way to terminate these materials. The Glenair backshell also provides additional strain-relief and environmental protection of the cable to connector transition with it's unique Flex-Nut style fitting. And unlike overmolded solutions, the reinforced extruded cable/backshell package allows maintenance technicians to open the cable for field service.

Backshells are selected for functionality (strain-relief, shield termination, and so on) and for material compatibility with the chosen connector. The turnkey assembly includes custom extruded cable, Glenair Backshell, MIL-DTL-38999 Style Connectors, MIL-PRF-29504 Termini, Mil-Spec Dust-Caps and customer specified marking and labeling.

*See Section L For Band-Master™ATS Tooling Information

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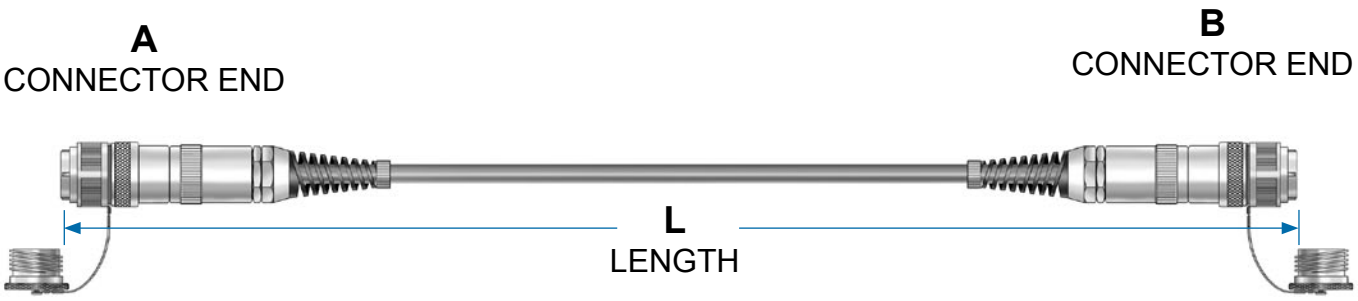
ASAP fiber optic cable sets



Reference Part Number Development:

FO1002 | P | 06 | P | 06 | J | 04 - 62 - 100 | L

Basic Part Number

A Terminus Type

P = Pin Terminus
S = Socket Terminus

A Connector Type

05 = D38999 Style In-Line Receptacle
06 = D38999/26 Style Plug
08 = D38999/24 Style Jam-Nut Receptacle
H7 = D38999/20 Style Wall Mount Receptacle (Std.)
S7 = D38999/20 Style Wall Mount Receptacle (Slotted)
T7 = D38999/20 Style Wall Mount Receptacle (Tapped)

B Terminus Type

P = Pin Terminus
S = Socket Terminus

B Connector Type

05 = D38999 Style In-Line Receptacle
06 = D38999/26 Style Plug
08 = D38999/24 Style Jam-Nut Receptacle
H7 = D38999/20 Style Wall Mount Receptacle (Std.)
S7 = D38999/20 Style Wall Mount Receptacle (Slotted)
T7 = D38999/20 Style Wall Mount Receptacle (Tapped)

D38999 Series III Connector Class

F = Aluminum, Electroless Nickel Plating
J = Composite, Olive Drab Cadmium Plating
K = Stainless Steel, Passivated
M = Composite, Electroless Nickel Plating
W = Aluminum, Olive Drab Cadmium Plating

Number of Fibers*

02 = 2 Fibers (Shell Size 11)
04 = 4 Fibers (Shell Size 13)
05 = 5 Fibers (Shell Size 15)
08 = 8 Fibers (Shell Size 17)
11 = 11 Fibers (Shell Size 19)
16 = 16 Fibers (Shell Size 21)
21 = 21 Fibers (Shell Size 23)
29 = 29 Fibers (Shell Size 25)
37 = 37 Fiber (Shell Size 25)

Fiber Size

09 = 9.3/125 Singlemode
50 = 50/125 Multimode
62 = 62.5/125 Multimode
10 = 100/140 Multimode
20 = 200/230 Multimode

Length in Feet

Protective Covers

L = Less Covers
Omit for with Covers

See Table I for Standard Conduit Materials Packages. Please Reference Special Marking, Labels Or OtherIdentification Specifications on Your Purchase Order

*See Page B-12 for Insert Arrangements.

Part Numbering is for Reference Purposes Only. A Unique Glenair Part Number Will Be Assigned to Your Cable Order.

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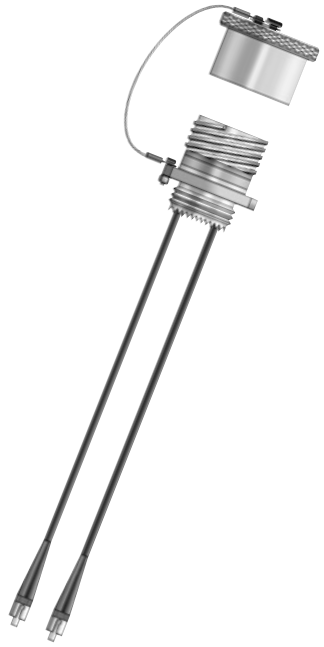
Glenair ASAP Fiber Optic Cable Sets
Inside-the-Box Receptacle/Pigtail Assembly
D38999 Series III to ST, FC, SC, LC & SMA

D38999 Series III

ASAP fiber optic cable sets



Product Features

- Jam-Nut and Wall Mount D38999 Series III Type Fiber Optic Receptacle Connectors in Aluminum, Composite or Stainless Steel
- ST, FC, SC, LC and SMA to D38999 Series III Configurations
- Single and Multimode Fiber Media
- Military Standard Dust Caps
- MIL-PRF-29504 Approved Termini
- Multichannel Capability: From 2 to 37 Channels
- Custom Lengths Available

Glenair Terminated and Optically Tested Receptacle/Pigtail Assemblies Are Ready When You Are

Inside-the-Box

The packaging and layout of a fiber optic interconnect assembly can vary widely depending on the application environment. Fiber optics deployed in military avionics, for example, may take the form of a Mil-Spec receptacle and simplex pigtail connector assembly when fiber is used to interconnect the optical transmitter/receiver inside an equipment enclosure to the outside world. When fiber leads are used within equipment enclosures or other protected environments, the interconnect assembly generally looks something like the assembly featured here: A wall mount or jam nut mount receptacle connector (“A”) with simplex fiber leads ("B"). The receptacle connector is used to penetrate the enclosure and mate to the external environmental plug connector. The simplex leads within the protected enclosure commonly route to the transceiver optical device, and are terminated to common commercial connectors such as ST, FC, SC, LC (or other) connectors at the "B" end. Glenair *ASAP* Receptacle/Pigtail Fiber Optic Assemblies are ideal for applications of this type, and are available with accelerated lead-times. The turnkey assembly includes fiber optic wiring, MIL-DTL-38999 Style Connector, MIL-PRF-29504 Termini, Mil-Spec Dust-Caps and customer specified marking and labeling.

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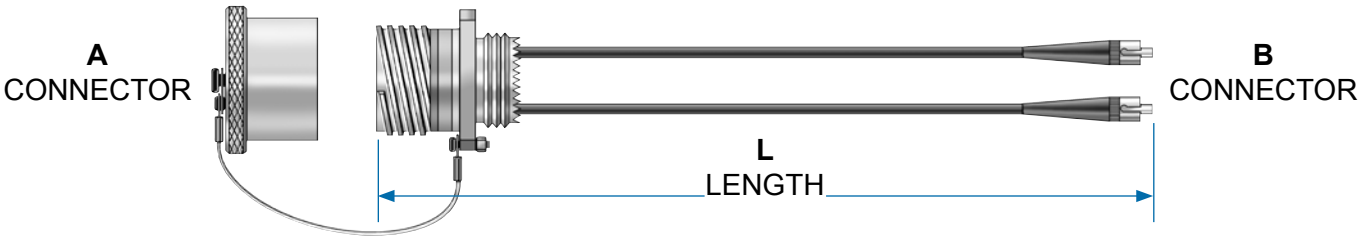
ASAP fiber optic cable sets



Reference Part Number Development:

FO1003 | P | - | 08 | - | 1 | W | 02 | 62 | 48 | L

Basic part Number

Terminus Type

P = Pin Terminus
S = Socket Terminus

A Connector Type

06 = D38999/26 Style Plug
08 = D38999/24 Style Jam-Nut Receptacle
H7 = D38999/20 Style Wall Mount Receptacle (Std.)
S7 = D38999/20 Style Wall Mount Receptacle (Slotted)
T7 = D38999/20 Style Wall Mount Receptacle (Tapped)

B Connector Type

0 = ST M83522 Style
1 = ST Connector
2 = FC Connector
3 = SC Connector
4 = SC Duplex
5 = SMA Connector (906 Type)
6 = SMA Connector (905 Type)
7 = LC Connector
8 = LC Duplex
9 = Customer Specified

D38999 Series III Connector Class

F = Aluminum, Electroless Nickel Plating
J = Composite, Olive Drab Cadmium Plating
K = Stainless Steel, Passivated
M = Composite, Electroless Nickel Plating
W = Aluminum, Olive Drab Cadmium Plating

Number of Fibers*

02 = 2 Fibers (Shell Size 11)
04 = 4 Fibers (Shell Size 13)
05 = 5 Fibers (Shell Size 15)
08 = 8 Fibers (Shell Size 17)
11 = 11 Fibers (Shell Size 19)
16 = 16 Fibers (Shell Size 21)
21 = 21 Fibers (Shell Size 23)
29 = 29 Fibers (Shell Size 25)
37 = 37 Fiber (Shell Size 25)

Fiber Size

09 = 9.3/125 Singlemode
50 = 50/125 Multimode
62 = 62.5/125 Multimode
10 = 100/140 Multimode
20 = 200/230 Multimode

Length in Inches

6 Inch Minimum

Protective Covers

L = Less Covers
Omit for with Covers

Please Reference Special Marking,
Labels Or Other Identification Specifications on Your Purchase Order.
Unless Indicated, "B"
Connector Identification Will Follow
"A" Connector Pin Designations.

*See Page B-12 for Insert Arrangements
Part Numbering is for Reference Purposes Only. A Unique Glenair Part Number Will Be Assigned to Your Cable Order.

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Glenair ASAP Fiber Optic Cable Sets
Inside-the-Box Receptacle/Pigtail Assembly
with FiberCon® Backshell
D38999 Series III to ST, FC, SC, LC & SMA

D38999 Series III

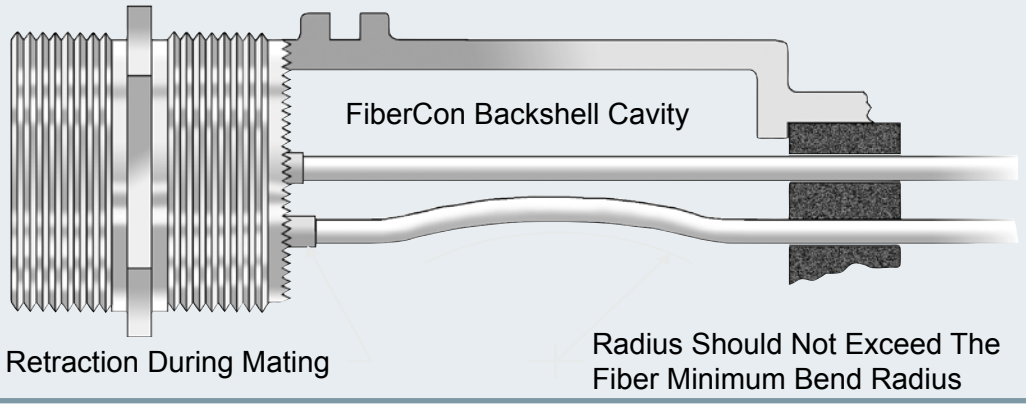
ASAP fiber optic cable sets

Product Features

- Jam-Nut and Wall Mount D38999 Series III Type Fiber Optic Receptacle Connectors in Aluminum, Composite or Stainless Steel
- ST, FC, SC, LC and SMA to D38999 Series III Configurations
- Grommet Sealing and Micro-Alignment Backshells in Aluminum, Composite and Stainless Steel
- Singlemode and Multimode Fiber Media
- Military Standard Dust Caps
- MIL-PRF-29504 Approved Termini
- Multichannel Capability: From 2 to 37 Channels
- Custom Lengths Available

Because Sometimes Strain-Relief and Exact Fiber Alignment are a Requirement—Even *Inside* the Box

Termini Retraction and Its Effect On Micro-Bending



The Glenair FiberCon® Backshell Assembly

Glenair can supply receptacle/pigtail assemblies with a FiberCon® Backshell that protects fiber terminations and insures exact alignment of the fiber optic termini. The grommeted backshell design prevents micro-bending of the fibers while providing optimum strain relief to the overall cable. The unique design is available only from Glenair and is available as a component part of this ASAP cable assembly. The turnkey assembly includes fiber optic wiring, Glenair Backshell, MIL-DTL-38999 Style Connector, MIL-PRF-29504 Termini, Mil-Spec Dust-Caps and customer specified marking and labeling.

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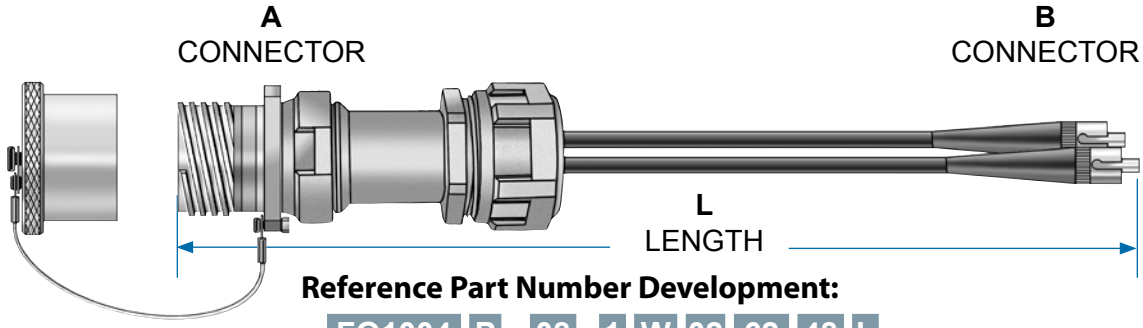
ASAP fiber optic cable sets



Reference Part Number Development:

FO1004	P	-	08	-	1	W	02	62	48	L

Basic part Number

Terminus Type

P = Pin Terminus
S = Socket Terminus

A Connector Type

06 = D38999/26 Style Plug
08 = D38999/24 Style Jam-Nut Receptacle
H7 = D38999/20 Style Wall Mount Receptacle (Std.)
S7 = D38999/20 Style Wall Mount Receptacle (Slotted)
T7 = D38999/20 Style Wall Mount Receptacle (Tapped)

B Connector Type

0 = ST M83522 Style
1 = ST Connector
2 = FC Connector
3 = SC Connector
4 = SC Duplex
5 = SMA Connector (906 Type)
6 = SMA Connector (905 Type)
7 = LC Connector
8 = LC Duplex
9 = Customer Specified

D38999 Series III Connector Class

F = Aluminum, Electroless Nickel Plating
J = Composite, Olive Drab Cadmium Plating
K = Stainless Steel, Passivated
M = Composite, Electroless Nickel Plating
W = Aluminum, Olive Drab Cadmium Plating

Number of Fibers*

02 = 2 Fibers (Shell Size 11)
04 = 4 Fibers (Shell Size 13)
05 = 5 Fibers (Shell Size 15)
08 = 8 Fibers (Shell Size 17)
11 = 11 Fibers (Shell Size 19)
16 = 16 Fibers (Shell Size 21)
21 = 21 Fibers (Shell Size 23)
29 = 29 Fibers (Shell Size 25)
37 = 37 Fiber (Shell Size 25)

Fiber Size

09 = 9.3/125 Singlemode
50 = 50/125 Multimode
62 = 62.5/125 Multimode
10 = 100/140 Multimode
20 = 200/230 Multimode

Length in Inches

6 Inch Minimum

Protective Covers

L = Less Covers
Omit for with Covers

Please Reference Special Marking,
Labels Or Other Identification Specifications on Your Purchase Order.
Unless Indicated, "B"
Connector Identification Will Follow
"A" Connector Pin Designations.

*See Page B-10 for Insert Arrangements
Part Numbering is for Reference Purposes Only. A Unique Glenair Part Number Will Be Assigned to Your Cable Order.

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Glenair ASAP Fiber Optic Cable Sets
Inside-the-Box Receptacle/Pigtail Assembly
with Low-Profile Backshell and Conduit
D38999 Series III to ST, FC, SC, LC & SMA

D38999 Series III

ASAP fiber optic cable sets

Product Features

- Jam-Nut and Wall Mount D38999 Series III Type Fiber Optic Receptacle Connectors in Aluminum, Composite or Stainless Steel
- ST, FC, SC, LC and SMA to D38999 Series III Configurations
- High-Temperature and Halogen Free Protective Convoluted Tubing Options
- Single and Multimode Fiber Media
- Military Standard Dust Caps
- MIL-PRF-29504 Approved Termini
- Multichannel Capability: From 2 to 37 Channels
- Custom Overall and Break-out Lengths Available

The Perfect Amount of Mechanical Protection for Fiber Media in Non-Environmental Applications

Protective Conduit

The use of a short length of conduit and a low-profile connector/conduit adapter is recommended in applications where a heat or abrasion source within the box may damage the fiber media. In most cases, analysis of the available space is critical to insure the additional interconnect hardware does not interfere with the electronics package inside the box. The packaging of a pigtail assembly with a protective length of conduit is appropriate for all types of equipment—such as radar units, cameras, shipboard consoles, antennas and so on—in which the routing of the fiber cable within the equipment enclosure may expose the media to damage. This Glenair *ASAP* Fiber Optic Pigtail Assembly is well suited whenever the prevention of damage to the fiber media inside the box is a design requirement. The turnkey assembly includes fiber optic wiring, Glenair Conduit Adapter, High-Temperature Convoluted Tubing and Shrink Boot, MIL-DTL-38999 Style Connector, MIL-PRF-29504 Termini, Mil-Spec Dust-Caps and customer specified marking and labeling.

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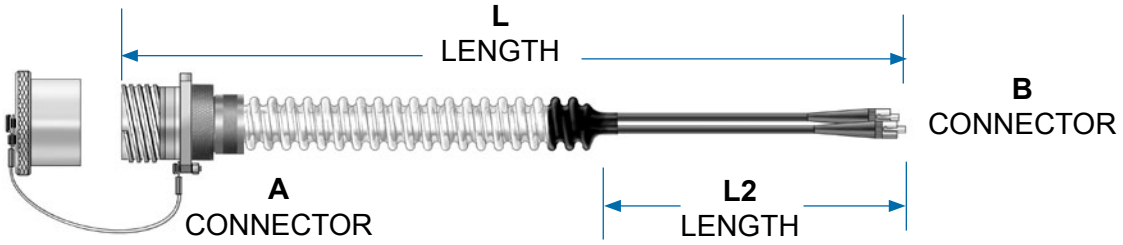
ASAP fiber optic cable sets



Reference Part Number Development:

FO1005 | P | - | 08 | - | 1 | W | 02 | 62 | 6 | 12 | L

Basic part Number

Terminus Type
P = Pin Terminus
S = Socket Terminus

A Connector Type
06 = D38999/26 Style Plug
08 = D38999/24 Style Jam-Nut Receptacle
H7 = D38999/20 Style Wall Mount Receptacle (Std.)
S7 = D38999/20 Style Wall Mount Receptacle (Slotted)
T7 = D38999/20 Style Wall Mount Receptacle (Tapped)

B Connector Type
0 = ST M83522 Style
1 = ST Connector
2 = FC Connector
3 = SC Connector
4 = SC Duplex
5 = SMA Connector (906 Type)
6 = SMA Connector (905 Type)
7 = LC Connector
8 = LC Duplex
9 = Customer Specified

D38999 Series III Connector Class
F = Aluminum, Electroless Nickel Plating
J = Composite, Olive Drab Cadmium Plating
K = Stainless Steel, Passivated
M = Composite, Electroless Nickel Plating
W = Aluminum, Olive Drab Cadmium Plating

Number of Fibers*
02 = 2 Fibers (Shell Size 11)
04 = 4 Fibers (Shell Size 13)
05 = 5 Fibers (Shell Size 15)
08 = 8 Fibers (Shell Size 17)
11 = 11 Fibers (Shell Size 19)
16 = 16 Fibers (Shell Size 21)
21 = 21 Fibers (Shell Size 23)
29 = 29 Fibers (Shell Size 25)
37 = 37 Fiber (Shell Size 25)

Fiber Size
09 = 9.3/125 Singlemode
50 = 50/125 Multimode
62 = 62.5/125 Multimode
10 = 100/140 Multimode
20 = 200/230 Multimode

"L" Length in Feet
6 Inch Minimum

"L2" Length in Inches

Protective Covers
L = Less Covers
Omit for with Covers

Please Reference Special Marking,
Labels Or Other Identification Specifications on Your Purchase Order.
Unless Indicated, "B"
Connector Identification Will Follow
"A" Connector Pin Designations.

*See Page B-12 for Insert Arrangements
Part Numbering is for Reference Purposes Only. A Unique Glenair Part Number Will Be Assigned to Your Cable Order.

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180-071 (-3) Wall Mount Receptacle
Single Channel Fiber Optic Connector
Environmental Resistant
for Glenair 181-002 Rear Release Pin Termini

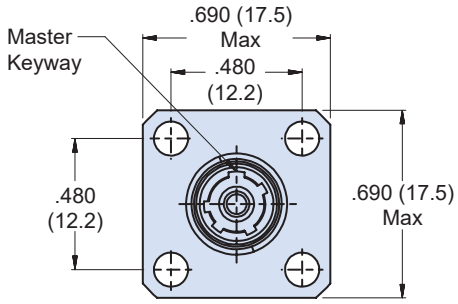
D38999 Series III

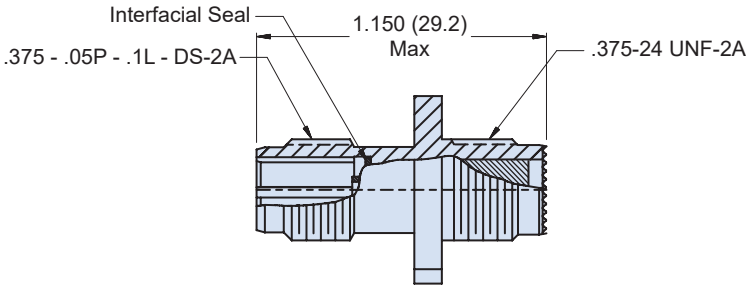
B

Single channel fiber optic square flange wall mount receptacle connector

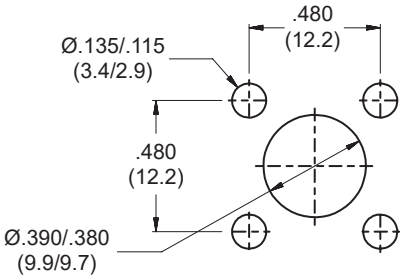
How To Order

Product Series	Material/Finish (Table II)		Alternate Key Position 1, 2, 3, 4, & 5 (Table I)	
180	- 071	- C	3	1
	Basic No.		3 = Wall Mount Receptacle	





-3 Wall Mount Receptacle Assembly



RECOMMENDED PANEL CUT WALL MOUNT RECEPTACLE

Material and Finish
Shell: See Table II.
Interfacial Seal, Rear Grommet: Fluorosilicone.
Retention Clip: Copper Alloy

Notes
Operating Temperature Range: -55°C to +125°C.
See Glenair drawing 181-002 for fiber optic pin terminus.

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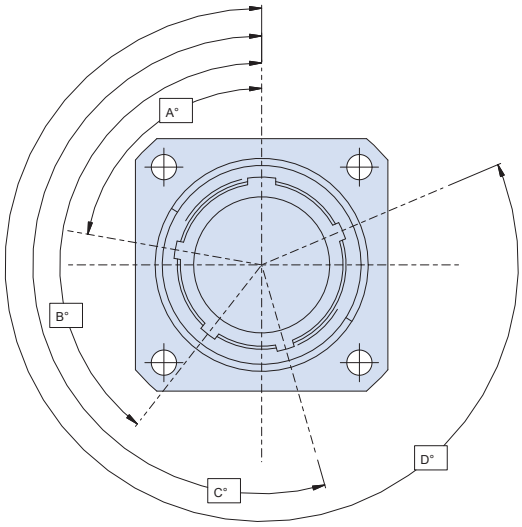

As Viewed from Front of Connector

Table I: Keyway Polarizations				
Pos	A°	B°	C°	D°
1	95	141	208	300
2	80	141	208	300
3	95	141	223	300
4	80	141	223	300
5	95	141	208	275

Table II: Material and Finish		
Code	Material	Finish
C	Aluminum Alloy	Anodize, Black
M		Electroless Nickel
NF		Cadmium, Olive Drab, over Electroless Nickel
ZN		Zinc-Nickel, Olive Drab, over Electroless Nickel
Z1	Stainless Steel	Passivate

Refer to Appendix for material/finish details

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180-071 (-4) Jam Nut Mount Receptacle
Single Channel Fiber Optic Connector
Environment Resistant
for Glenair 181-002 Rear Release Pin Termini

D38999 Series III

B

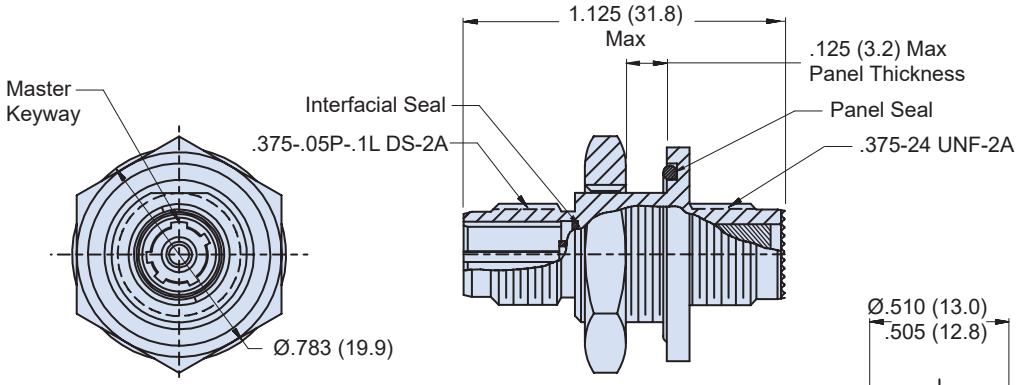
Single channel fiber optic jam nut mount receptacle connector

How To Order

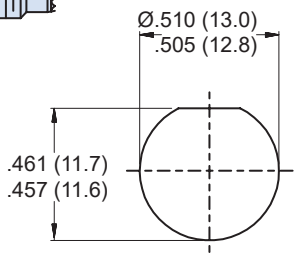
Product Series	Material/Finish (Table II)		Alternate Key Position 1, 2, 3, 4, & 5 (Table I)	
180	- 071	- C	4	1

Basic No.

4 = Jam Nut Receptacle



- 4
JAM NUT MOUNT
RECEPTACLE ASSEMBLY



RECOMMENDED
PANEL CUTOUT
JAM NUT MOUNT
RECEPTACLE

Material and Finish
Shell, Jam Nut: See Table II.
Panel Seal, Interfacial Seal: Fluorosilicone
Retention Clip: Copper Alloy

Notes
Operating Temperature Range: -55°C to +125°C
See Glenair drawing 181-002 for fiber optic pin terminus.

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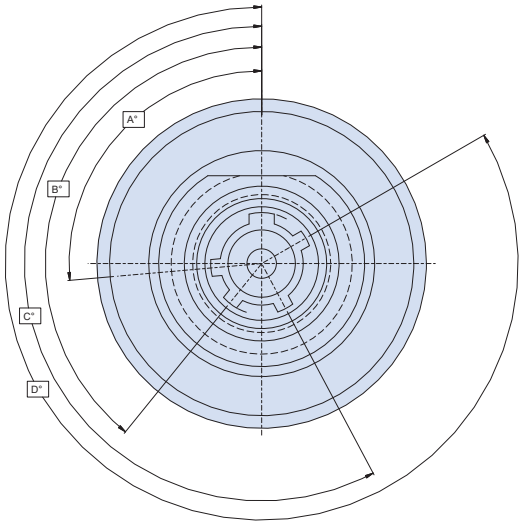

As Viewed from Front of Connector

Table I: Keyway Polarizations				
Pos	A°	B°	C°	D°
1	95	141	208	300
2	80	141	208	300
3	95	141	223	300
4	80	141	223	300
5	95	141	208	275

Table II: Material and Finish		
Code	Material	Finish
C	Aluminum Alloy	Anodize, Black
M		Electroless Nickel
NF		Cadmium, Olive Drab, over Electroless Nickel
ZN		Zinc-Nickel, Olive Drab, over Electroless Nickel
Z1	Stainless Steel	Passivate

Refer to Appendix for material/finish details

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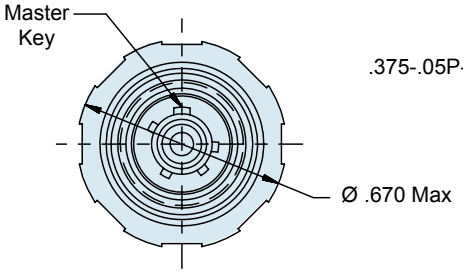
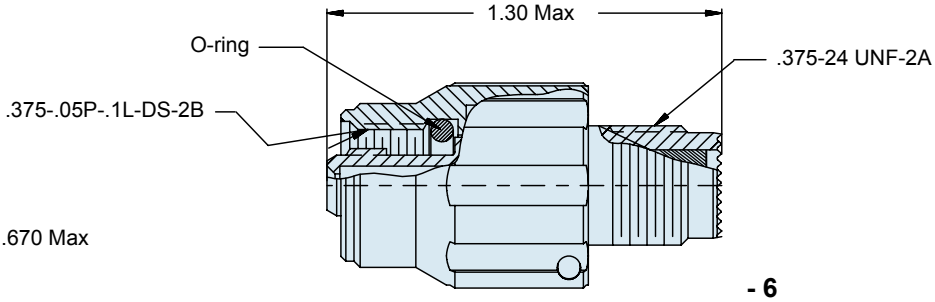
180-071 (-6) Plug
Single Channel Fiber Optic Connector
Environmental Resistant
for Glenair 181-001 Rear Release Socket Termini

Single channel fiber optic plug connector

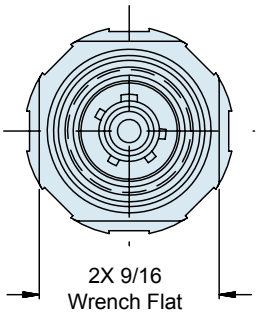
How To Order

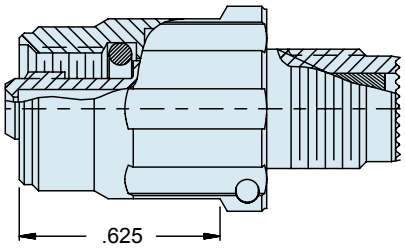
Product Series	Material/Finish (See Table II)		Alternate Key Position 1, 2, 3, 4 & 5 (Table I)		
180	- 071	- C	6	1	- F
	Basic No.		6 = Plug	Coupling Nut with Wrench Flats Omit for None (Standard)	





- 6 PLUG ASSEMBLY





- 6 PLUG ASSEMBLY WITH OPTIONAL WRENCH FLATS

Material and Finish

Barrel, Coupling Nut: See Table II
O-Ring, Rear Grommet: Fluorosilicone
Retention Clip: Copper Alloy

Notes

Operating temperature range -55°C to +125°C.
See Glenair drawing 181-001 for fiber optic socket terminus.

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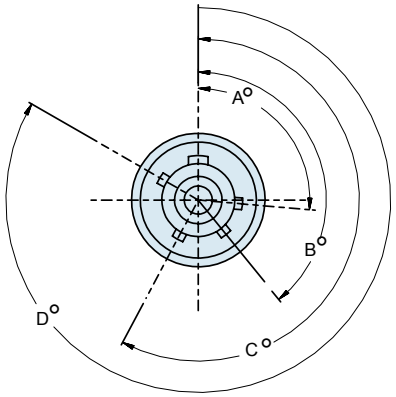

As Viewed from Front of Plug Connector
See Table I

Table I: Key Polarizations				
Pos	A°	B°	C°	D°
1	95	141	208	300
2	80	141	208	300
3	95	141	223	300
4	80	141	223	300
5	95	141	208	275

Table II: Material and Finish		
Code	Material	Finish
C	Aluminum Alloy	Anodize, Black
M		Electroless Nickel
NF		Cadmium, Olive Drab, over Electroless Nickel
ZN		Zinc-Nickel, Olive Drab, over Electroless Nickel
Z1	Stainless Steel	Passivate

Refer to Appendix for material/finish details

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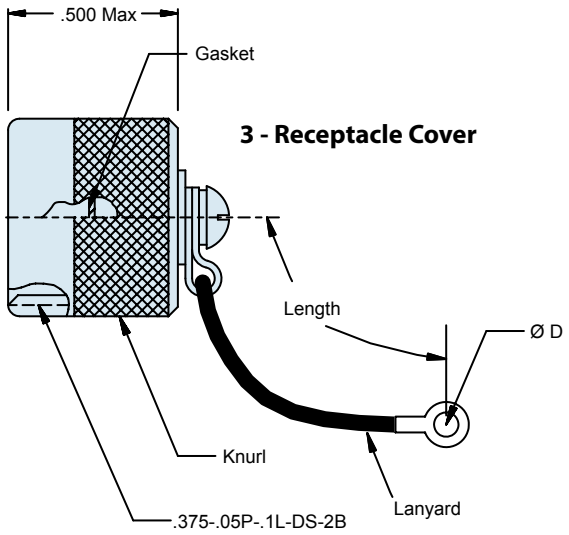
189-047
Plug and Receptacle Protective Covers
for Single Channel 180-071 Series Fiber Optic Connectors

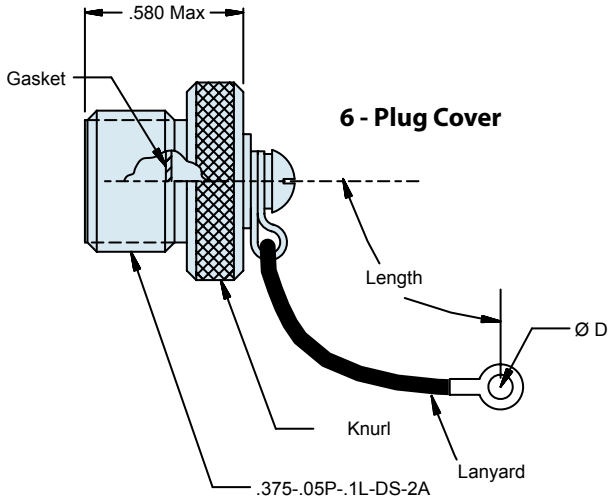
Plug and receptacle protective covers for single channel fiber optic connectors

B

How To Order

Product Series	Material/Finish (Table III)	6 = Plug 3 = Receptacle	Attachment Length (Inches)				
189	- 047	- M	- H	6	03	- 4	1
Basic No.		Lanyard Type (Table I)		Attachment Type (Table II)			Polarization (Table IV - Applies to Plug only)





Material and Finish
Cover: See Table III
Gasket: Fluorosilicone

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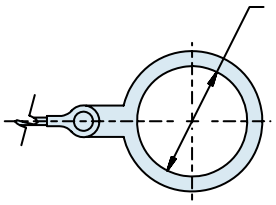
Table I: Lanyard Codes	
Code	**Description**
D	Bead Chain, CRES, Passivated
F	Wire Rope, Nylon Jacket
G	Nylon Rope, Black
H	Wire Rope, Fluoropolymer Jacket
N	No Lanyard
R	Wire Rope, PVC Jacket
S	#8 Sash Chain, CRES, Passivated
T	Wire Rope, No Jacket
U	Wire Rope, Polyurethane Jacket

Table III: Material and Finish		
Code	**Material**	**Finish**
C	Aluminum Alloy	Anodize, Black
M		Electroless Nickel
NF		Cadmium, Olive Drab, over Electroless Nickel
ZN		Zinc-Nickel, Olive Drab, over Electroless Nickel
Z1	Stainless Steel	Passivate

Refer to Appendix for material/finish details



Solid Ring
Dash No. 07 thru 12

Table II: Attachment Type		
Dash No.	**Ø D**	
01	.125 (3.2)	Eyelet
02	.140 (3.6)	
03	.167 (4.2)	
04	.182 (4.6)	
05	.191 (4.9)	
06	.197 (5.0)	
07	.391 (9.9)	Solid Ring
08	.516 (13.1)	
09	.583 (14.8)	
10	.766 (19.5)	
11	.896 (22.2)	
12	1.016 (25.8)	

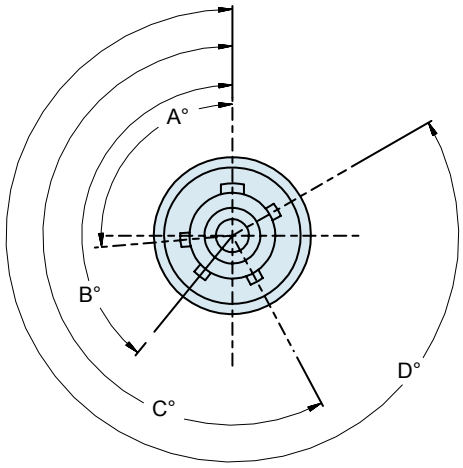


Table IV: Keyway Polarizations (Plug Cover Only				
Pos	**A°**	**B°**	**C°**	**D°**
1	95	141	208	300
2	80	141	208	300
3	95	141	223	300
4	80	141	223	300
5	95	141	208	275

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189-055
Single Channel Fiber Optic Connector Backshell
Environmental Resistant
for 180-071 Series Single Channel Fiber Optic Connectors

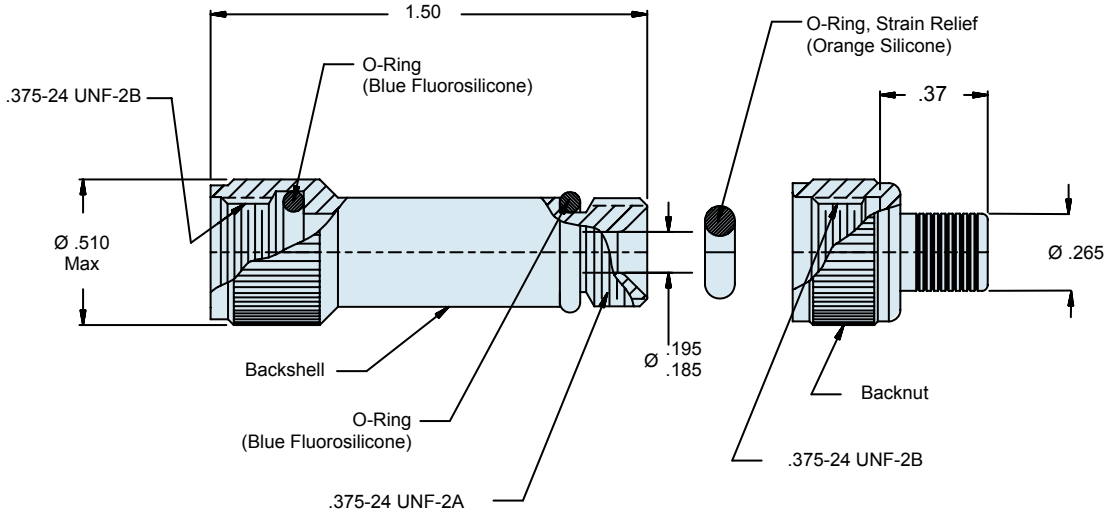
Single channel fiber optic connector backshell with direct coupling

How To Order

Product Series		Material/Finish (Table I)
189	- 055	C
	Basic No.	

Table I: Material and Finish		
Code	Material	Finish Description
C	Aluminum Alloy	Anodize, Black
M		Electroless Nickel
NF		Cadmium, Olive Drab
ZN		Zinc-Nickel, Olive Drab
Z1	Stainless Steel	Passivate

Refer to Appendix for material/finish details



Material and Finish
Backshell and Back Nut: See Table I
O-Ring: Fluorosilicone
Strain Relief O-Ring: Silicone

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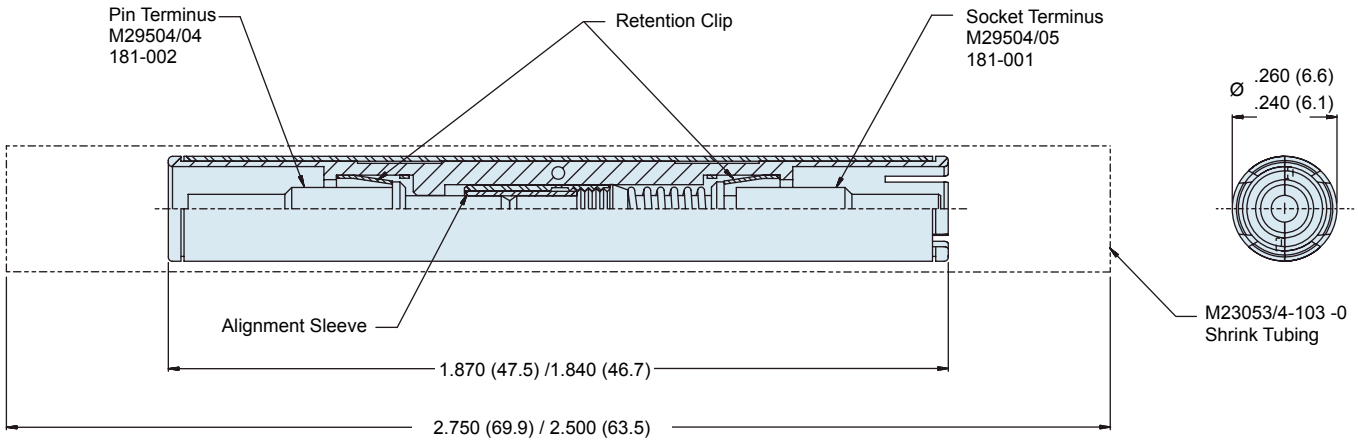
Fiber optic splice

Part Number	Description
180-076	Fiber Optic Splice



Material and Finish

Insert: High-Grade Engineering Thermoplastic
Retention Clip: Copper Alloy
Splice Housing: Stainless Steel/Passivate
Shrink Tubing: Polyolefin

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180-052
2 Channel Fiber Optic Receptacle Connector
for M29504/05 Socket Terminus

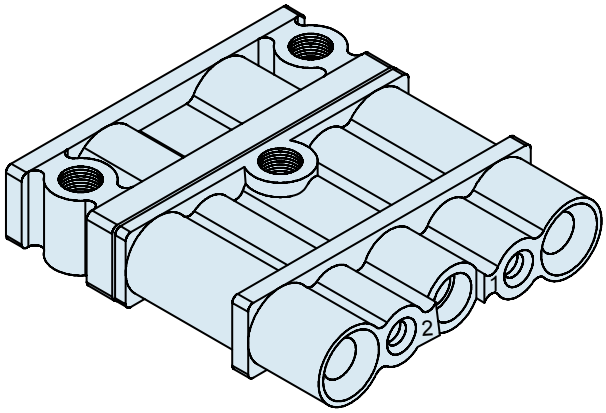
D38999 Series III

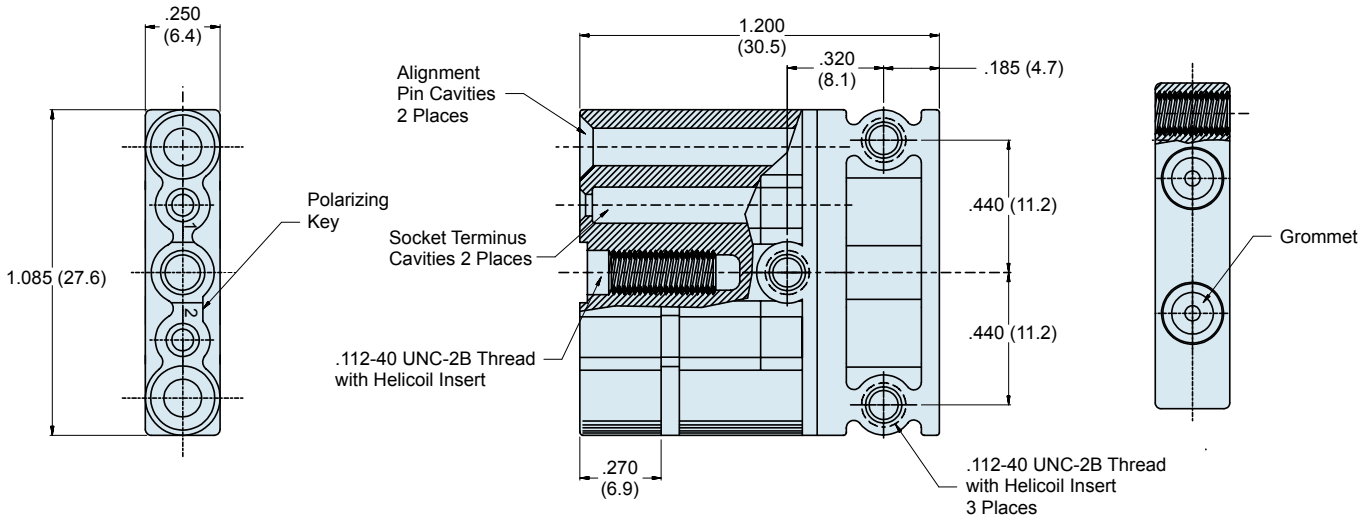
B

2 Channel fiber optic receptacle connector

How To Order

Product Series		
180	-	052
		Basic No.





Material and Finish

Connector Housing: High Grade Engineering Thermoplastic
Grommet: Fluorosilicone
Helicoil Insert: Stainless Steel

Notes

Connector designed to accept Glenair Part Number 181-001 or MIL-PRF-29504/5 Style Fiber Optic Termini. Termini not supplied.
Recommended Insertion/Removal Tool: P/N M81969/14-03 or equivalent.

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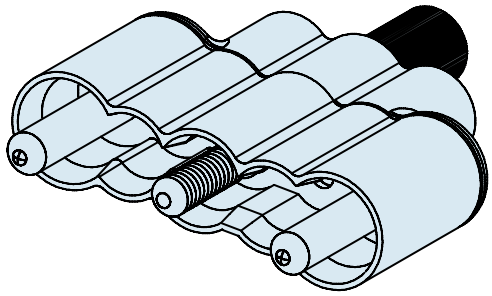
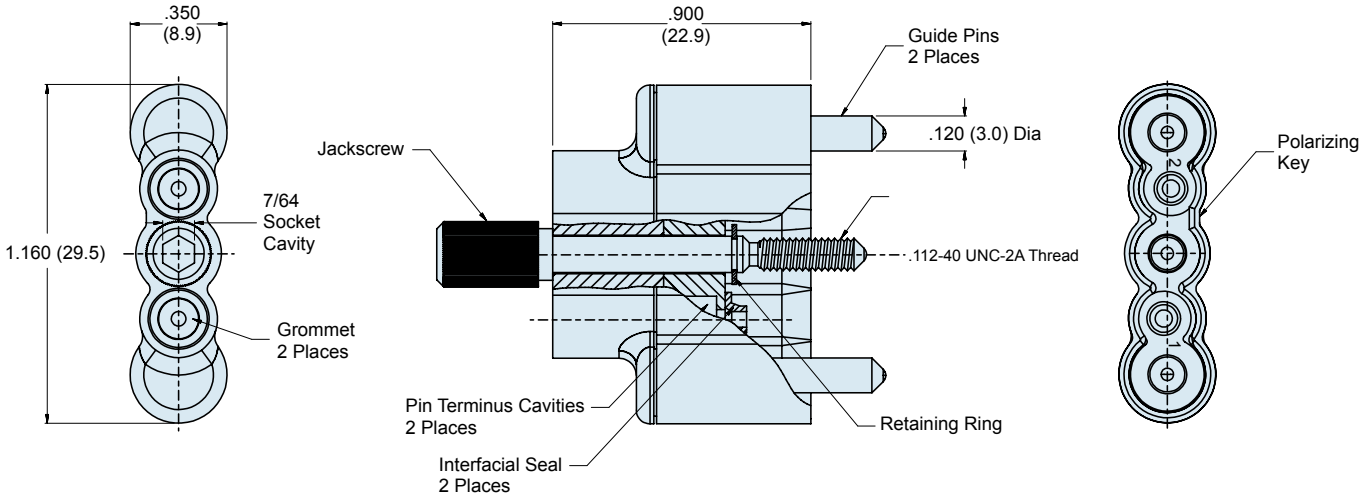
2 Channel fiber optic plug connector

How To Order

Product Series		
180	-	053
		Basic No.





Material and Finish

Connector Housing: High Grade Engineering Thermoplastic
Grommet, Interfacial Seal: Fluorosilicone
Jackscrew, Guide Pin, Retaining Ring: Stainless Steel.

Notes

Connector designed to accept Glenair Part Number 181-002 or MIL-PRF-29504/4 Style Fiber Optic Termini (not supplied).
Recommended Insertion/Removal Tool: P/N M81969/14-03 or equivalent.

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FIBER OPTIC

GLENAIR HIGH DENSITY

FIBER OPTIC CONNECTION SYSTEM

The Glenair High Density Fiber Optic Connection System is designed for applications that require reduced size and weight as well as outstanding optical and environmental performance. The System offers insertion loss values less than .5dB (typical loss for Glenair termini is .3 dB). Dense cavity spacing is acheived with an innovative Front Release terminus design and accomodation for M85045/16 cable.

Glenair®

GLENAIR, INC. • 1211 Air Way • Glendale, CA 91201-2497 • Tel: 818-247-6000 • Email: sales@glenair.com • www.glenair.com

Glenair High Density (GHD) Fiber Optic Connection System: Same Optical and Environmental Performance as D38999, at Nearly Double the Density

The Glenair High Density Fiber Optic Connection System is designed for applications that require reduced size and weight as well as outstanding optical and environmental performance. The System accommodates a broad range of singlemode and multimode fiber media, and offers insertion loss values less than .5dB (typical loss for Glenair termini is .3 dB). Dense cavity spacing is achieved with an innovative Size 18 genderless Front Release terminus design that provides nearly double the density of standard M28876 and D38999 fiber optic connector series. The GHD system is also available with APC Angle Polish to reduce unwanted backreflection.

Product No.	Description	Page No.
Fiber Optic Termini		
181-056	Non-keyed Front Release Terminus , Size 18 Genderless Pin	C-2
181-047	Keyed Front Release Terminus for APC Polish, Size 18 Genderless Pin	C-3
181-058	Dummy Terminus, Front Release, Size 18	C-4
Fiber Optic Connectors		
180-122 (05)	In-Line Receptacle Connector	C-6
180-122 (H7)	Square Flange Receptacle Connector with Round Holes (standard)	C-8
180-122 (S7)	Square Flange Receptacle Connector with Slotted Holes	C-10
180-122 (08)	Jam Nut Mount Receptacle Connector	C-12
180-122 (06)	Plug Connector with Alignment Sleeve Retainer (ASR)	C-14
180-122ASR	Alignment Sleeve Retainer (ASR)	C-15

Catalog Notes

Metric dimensions appear in parentheses in diagrams and tables, based on 1 inch = 25.4 mm, for reference only.
Unless otherwise specified, the following other dimensional tolerances apply:

.xx = ± .03 (0.8) • .xxx = ± .015 (0.4) • Angles = ± 5°

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181-056
GHD • Glenair High Density Fiber Optic Genderless Terminus
Size 18 Non-Keyed Terminus

Glenair High Density

GHD Size 18 non-keyed front release genderless terminus

The Glenair High Density Fiber Optic Connection System is designed for applications that require reduced size and weight as well as outstanding optical and environmental performance. The System offers insertion loss values less than .5dB (typical loss for Glenair termini is .3 dB). Dense cavity spacing is acheived with an innovative front release terminus design and accomodation for M85045/16 cable. The genderless Size 18 GHD terminus delivers nearly double the density of M28876 and D38999 with superior optical performance.

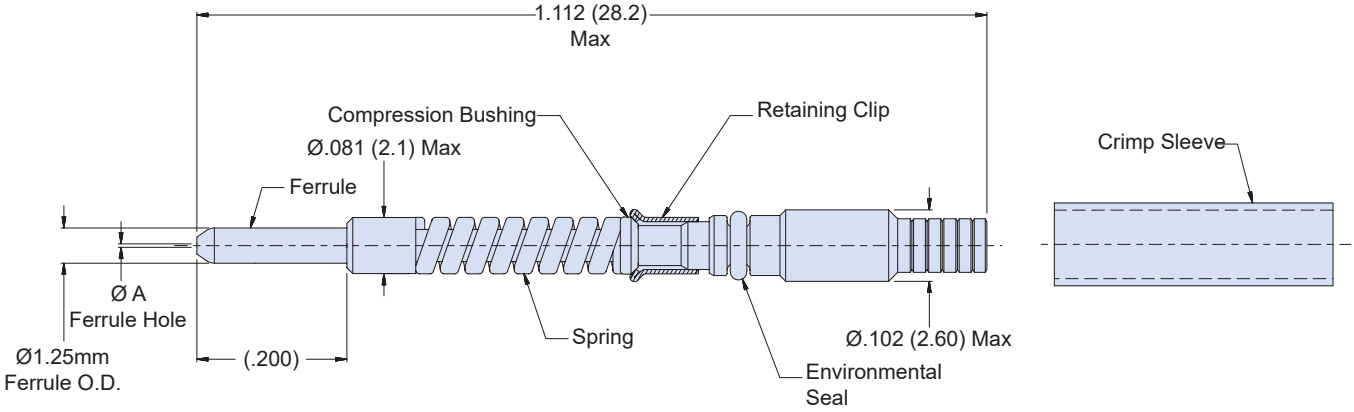

Table I: Dash Number		
Assembly Dash Number	Ø A Microns	Fiber Type
181-056-1255C	125.5	SM
181-056-1260C	126.0	SM & MM
181-056-1420C	142.0	MM
Consult factory for additional sizes SM = Singlemode MM = Multimode		

Table II: Accessories	
Part Number	Description
265-002	Crimp Sleeve, Ø2.2mm Max Jacket

Material and Finish

Ferrule: Zirconia Ceramic
Terminus Assembly: Stainless Steel/Passivate
Retaining Clip: Spring Alloy
Spring: Stainless Steel/Passivate
Seal: Fluorosilicone
Crimp Sleeve: Brass Alloy/Nickel

Notes

Crimp Sleeve is supplied with Terminus Assembly, and may be ordered separately (see Table II).
For terminus less crimp sleeve, omit **C** from end of part number (e.g. ***181-056-1260***)
See Glenair assembly procedure GAP-032 for termination and assembly tools/procedures.

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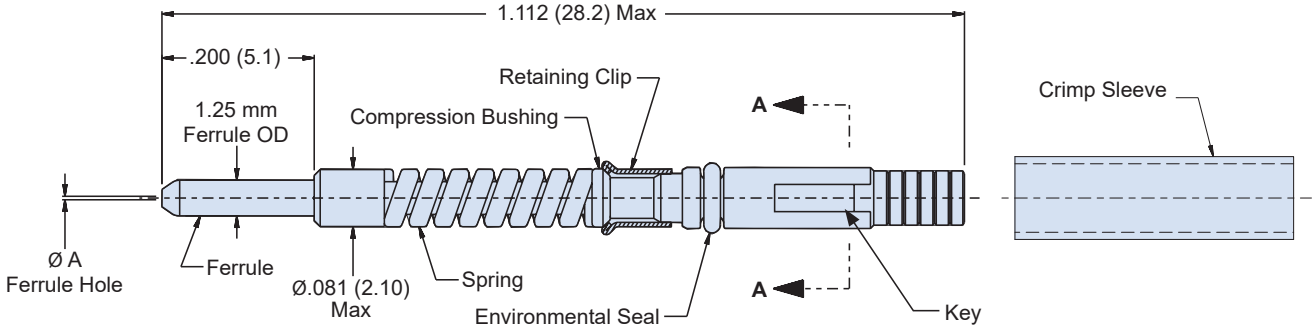
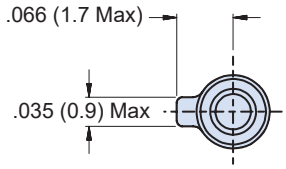
GHD Size 18 keyed front release genderless terminus for APC polish

The Glenair High Density Fiber Optic Connection System is designed for applications that require reduced size and weight as well as outstanding optical and environmental performance. The System offers insertion loss values less than .5dB (typical loss for Glenair termini is .3 dB). Dense cavity spacing is acheived with an innovative front release terminus design and accomodation for M85045/16 cable. The 181-047 version is equipped with a single keying feature for APC polish.





View A-A

Table I: Dash Number		
Assembly Dash Number	Ø A Microns	Fiber Type
181-047-1255C	125.5	SM
181-047-1260C	126.0	SM & MM
181-047-1420C	142.0	MM
Consult factory for additional sizes SM = Singlemode MM = Multimode		

Table II: Accessories	
Part Number	Description
265-002	Crimp Sleeve, Ø2.2mm Max Jacket

Material and Finish

Ferrule: Zirconia Ceramic
Terminus Assembly: Stainless Steel/ Passivate
Retaining Clip: Spring Alloy
Spring: Stainless Steel/ Passivate
O-Ring: Fluorosilicone
Crimp Sleeve: Brass Alloy/Nickel

Notes

Crimp Sleeve is supplied with Terminus Assembly, and may be ordered separately (see Table II).
For terminus less crimp sleeve, omit **C** from end of part number (e.g. ***181-047-1255***)
See Glenair assembly procedure GAP-032 for termination and assembly tools/procedures..

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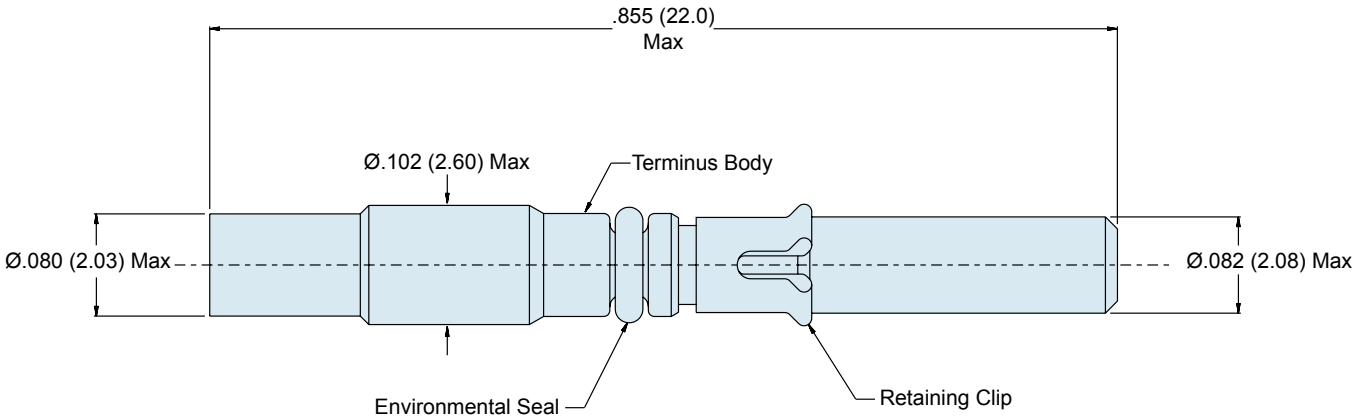
181-058
GHD • Glenair High Density
Size 18 Dummy Terminus

Glenair High Density

GHD Size 18 dummy terminus

Part Number	Description
181-058	Dummy Terminus, size 18

C



Material and Finish

Terminus Body: Stainless Steel/Passivate
Retaining Clip: Spring Alloy
Environmental Seal: Fluorosilicone
See GAP-032 for assembly tools/procedures.

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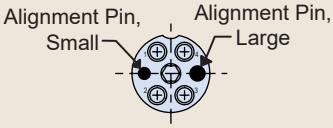
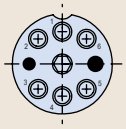
GHD materials and finishes, and insert arrangements

Table I: Material and Finish		
Code	**Material**	**Finish Description**
M	Aluminum Alloy	Electroless Nickel
MT		Nickel - PTFE, Grey
NF		Cadmium, Olive Drab
ZNU		Zinc-Nickel, Black
ZR		Zinc-Nickel, Black (RoHS)
XM	Composite	Electroless Nickel
XMT		Nickel - PTFE, Grey
XW		Cadmium, Olive Drab
XZN		Zinc-Nickel, Black
ZL	Stainless Steel	Electro-Deposited Nickel
Z1		Passivate

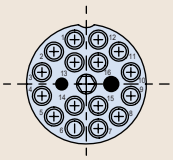
Table II: Insert arrangements



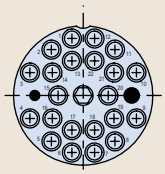
Shell Size 11
Arrangement 4



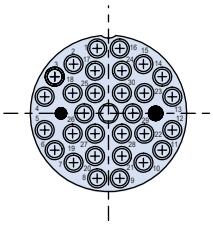
Shell Size 13
Arrangement 6



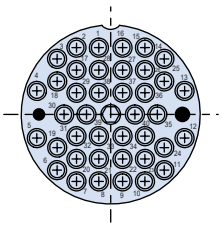
Shell Size 15
Arrangement 16



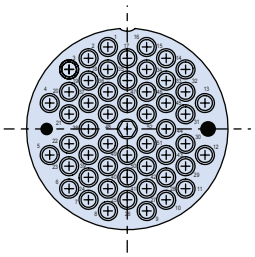
-Shell Size 17
Arrangement 22



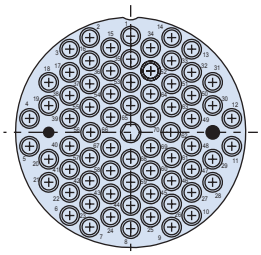
Shell Size 19
Arrangement 30



Shell Size 21
Arrangement 40



Shell Size 23
Arrangement 52



Shell Size 25
Arrangement 70

Plug face marking with removable alignment sleeve retainer (ASR) shown. Receptacle face - opposite.
ASR includes two guide pins and a threaded center jackscrew.

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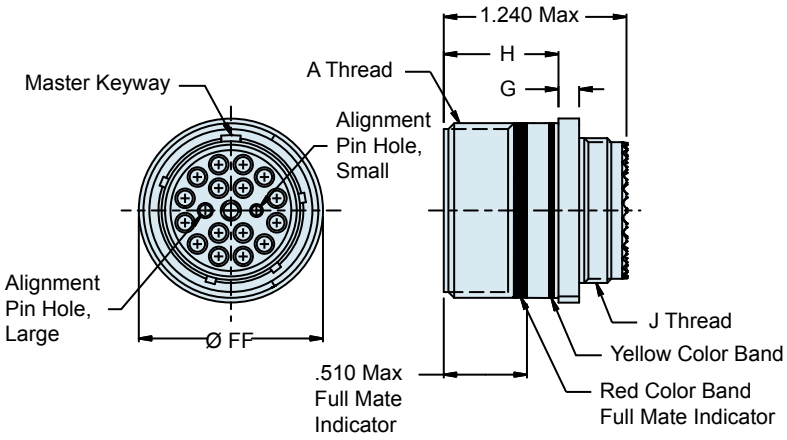
180-122 (05)
GHD • Glenair High Density Fiber Optic Connection System
D38999 Style In-Line Receptacle Connector

GHD In-line receptacle connector

How To Order

Product Series	Material and Finish (Table I, page C-5)	Shell Size (Table II, page C-5)	Alternate Key Position per MIL-DTL-38999 A, B, C, D, or E N = Normal
180	122 NF	05	15	16	N

- 180 - 122 NF: Basic No.
- 05: 05 = In-Line Receptacle
- 15 - 16: Insert Arrangement (Table II, Page C-5)



05 - In-Line Receptacle

Material and Finish

Shell: See Table I, Page C-5.
Insert: High grade rigid dielectric, or Al Alloy/anodized - MFR's option

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Table II: Shell Size						
Shell Size Code	Shell Size	A Thread	G	H	J Thread	Ø FF
B	11	.7500 -.1P -.3L-TS-2A	.144 (3.7) .083 (2.1)	.823 (20.9) .768 (19.5)	M15 X 1.0-6g 0.100R	.840 (21.3)
C	13	.8750 -.1P - .3L-TS-2A	.144 (3.7) .083 (2.1)	.823 (20.9) .768 (19.5)	M18 X 1.0-6g 0.100R	.963 (24.5)
D	15	1.0000 -.1P -.3L-TS-2A	.144 (3.7) .083 (2.1)	.823 (20.9) .768 (19.5)	M22 X 1.0-6g 0.100R	1.090 (27.7)
E	17	1.1875 -.1P - .3L-TS-2A	.144 (3.7) .083 (2.1)	.823 (20.9) .768 (19.5)	M25 X 1.0-6g 0.100R	1.275 (32.4)
F	19	1.2500 -.1P -.3L-TS-2A	.144 (3.7) .083 (2.1)	.823 (20.9) .768 (19.5)	M28 X 1.0-6g 0.100R	1.337 (34.0)
G	21	1.3750 -.1P - .3L-TS-2A	.171 (4.3) .083 (2.1)	.791 (20.1) .736 (18.7)	M31 X 1.0-6g 0.100R	1.463 (37.2)
H	23	1.5000 -.1P -.3L-TS-2A	.171 (4.3) .083 (2.1)	.791 (20.1) .736 (18.7)	M34 X 1.0-6g 0.100R	1.587 (40.3)
J	25	1.6250 -.1P - .3L-TS-2A	.171 (4.3) .083 (2.1)	.791 (20.1) .736 (18.7)	M37 X 1.0-6g 0.100R	1.713 (43.5)

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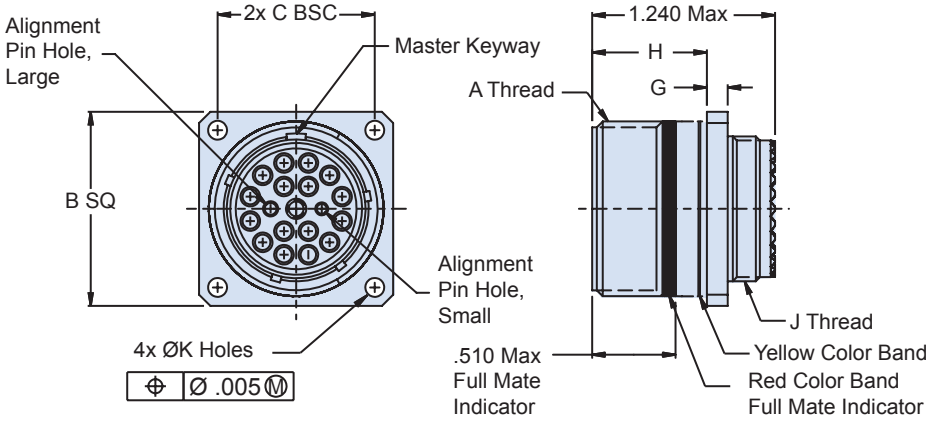
180-122 (H7)
GHD • Glenair High Density
Fiber Optic Connection System
D38999 Style Square Flange Receptacle with Round Holes (Standard)

GHD Square flange receptacle with standard (round) holes

How To Order

Product Series	Material and Finish (Table I, page C-5)	Shell Size (Table II, page C-5)		Alternate Key Position per MIL-DTL-38999 A, B, C, D, or E N = Normal
180	- 122	NF	H7 - 15 - 16	N

- **Basic No.**
- **H7 = Wall Mount Receptacle with Round Holes (Standard)**
- **Insert Arrangement** *(Table II, Page C-5)*



H7 - Wall Mount Receptacle with Round Holes (Standard)

Material and Finish

Shell: See Table I, Page C-5
Insert: High grade rigid dielectric, or Al Alloy/Anodized - MFR's option

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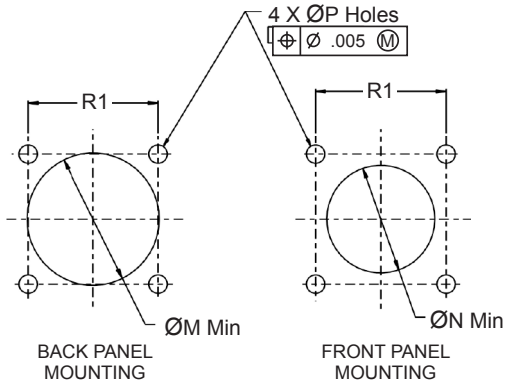
Table II: Shell Size								
Shell Size Code	Shell Size	A Thread	B SQ	C BSC	G	H	J Thread	Ø K Holes
B	11	.7500 -.1P -.3L-TS-2A	1.043 (26.5) 1.019 (25.9)	.812 (20.6)	.144 (3.7) .083 (2.1)	.823 (20.9) .768 (19.5)	M15 X 1.0-6g 0.100R	.136 (3.5) .120 (3.0)
C	13	.8750 -.1P - .3L-TS-2A	1.138 (28.9) 1.114 (28.3)	.906 (23.0)	.144 (3.7) .083 (2.1)	.823 (20.9) .768 (19.5)	M18 X 1.0-6g 0.100R	.136 (3.5) .120 (3.0)
D	15	1.0000 -.1P -.3L-TS-2A	1.232 (31.3) 1.208 (30.7)	.969 (24.6)	.144 (3.7) .083 (2.1)	.823 (20.9) .768 (19.5)	M22 X 1.0-6g 0.100R	.136 (3.5) .120 (3.0)
E	17	1.1875 -.1P - .3L-TS-2A	1.323 (33.6) 1.299 (33.0)	1.062 (27.0)	.144 (3.7) .083 (2.1)	.823 (20.9) .768 (19.5)	M25 X 1.0-6g 0.100R	.136 (3.5) .120 (3.0)
F	19	1.2500 -.1P -.3L-TS-2A	1.449 (36.8) 1.425 (36.2)	1.156 (29.4)	.144 (3.7) .083 (2.1)	.823 (20.9) .768 (19.5)	M28 X 1.0-6g 0.100R	.136 (3.5) .120 (3.0)
G	21	1.3750 -.1P - .3L-TS-2A	1.575 (40.0) 1.551 (39.4)	1.250 (31.8)	.171 (4.3) .083 (2.1)	.791 (20.1) .736 (18.7)	M31 X 1.0-6g 0.100R	.136 (3.5) .120 (3.0)
H	23	1.5000 -.1P -.3L-TS-2A	1.701 (43.2) 1.677 (42.6)	1.375 (34.9)	.171 (4.3) .083 (2.1)	.791 (20.1) .736 (18.7)	M34 X 1.0-6g 0.100R	.162 (4.1) .146 (3.7)
J	25	1.6250 -.1P - .3L-TS-2A	1.823 (46.3) 1.799 (45.7)	1.500 (38.1)	.171 (4.3) .083 (2.1)	.791 (20.1) .736 (18.7)	M37 X 1.0-6g 0.100R	.162 (4.1) .146 (3.7)



RECOMMENDED PANEL CUTOUT
WALL MOUNT RECEPTACLES
(See Table III)

Table III: Mounting Holes For Wall Mount Receptacles					
Shell Size Code	Shell Size	Ø M Min	Ø N Min	Ø P Holes	R1 BSC
B	11	.796 (20.2)	.625 (15.9)	.133 (3.4) .123 (3.1)	.812 (20.6)
C	13	.922 (23.4)	.750 (19.1)	.133 (3.4) .123 (3.1)	.906 (23.0)
D	15	1.047 (26.6)	.906 (23.0)	.133 (3.4) .123 (3.1)	.969 (24.6)
E	17	1.219 (31.0)	1.016 (25.8)	.133 (3.4) .123 (3.1)	1.062 (27.0)
F	19	1.297 (32.9)	1.141 (29.0)	.133 (3.4) .123 (3.1)	1.156 (29.4)
G	21	1.422 (36.1)	1.266 (32.2)	.133 (3.4) .123 (3.1)	1.250 (31.8)
H	23	1.547 (39.3)	1.375 (34.9)	.159 (4.0) .149 (3.8)	1.375 (34.9)
J	25	1.672 (42.5)	1.484 (37.7)	.155 (3.9) .145 (3.7)	1.500 (38.1)

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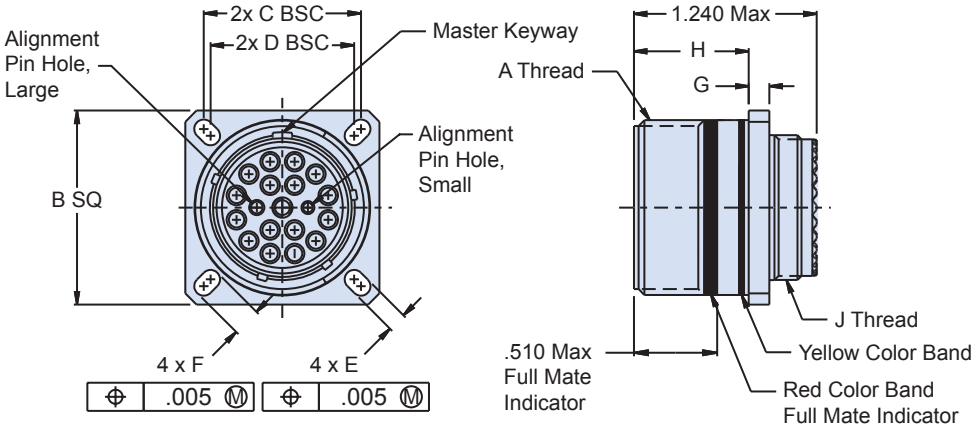
180-122 (S7)
GHD • Glenair High Density Fiber Optic Connection System
D38999 Style Square Flange Receptacle with Slotted Holes

GHD Square flange receptacle with slotted holes

How To Order

Product Series	Material and Finish (Table I, page C-5)	Shell Size (Table II, page C-5)		Alternate Key Position per MIL-DTL-38999 A, B, C, D, or E N = Normal
180	- 122	NF	S7 - 15 - 16	N

- **Basic No.**
- **S7** = Wall Mount Receptacle with Slotted Holes
- **Insert Arrangement** (Table II, Page C-5)



S7 - Wall Mount Receptacle with Slotted Holes

Material and Finish

Shell: See Table I, Page C-5
Insert: High grade rigid dielectric, or AL Alloy/Anodize - MFR's option

Notes

S7 wall mount receptacle can be front panel mounted using cut out dimensions R1 or R2 on page C-11. Dimension R2 is for use with S7 wall mount receptacle only.

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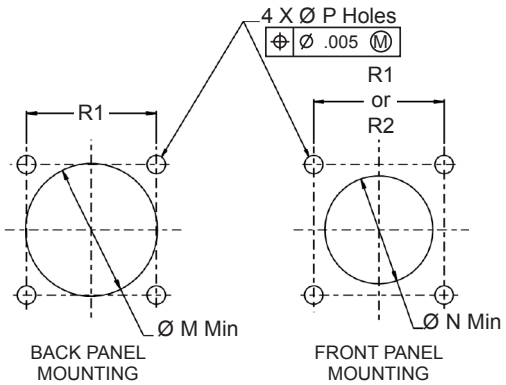
Table II: Shell Size										
Shell Size Code	Shell Size	A Thread	B SQ	C BSC	D BSC	E	F	G	H	J Thread
B	11	.7500 -.1P -.3L-TS-2A	1.043 (26.5) 1.019 (25.9)	.812 (20.6)	.719 (18.3)	.136 (3.5) .120 (3.0)	.202 (5.1) .186 (4.7)	.144 (3.7) .083 (2.1)	.823 (20.9) .768 (19.5)	M15 X 1.0-6g 0.100R
C	13	.8750 -.1P - .3L-TS-2A	1.138 (28.9) 1.114 (28.3)	.906 (23.0)	.812 (20.6)	.136 (3.5) .120 (3.0)	.202 (5.1) .186 (4.7)	.144 (3.7) .083 (2.1)	.823 (20.9) .768 (19.5)	M18 X 1.0-6g 0.100R
D	15	1.0000 -.1P -.3L-TS-2A	1.232 (31.3) 1.208 (30.7)	.969 (24.6)	.906 (23.0)	.136 (3.5) .120 (3.0)	.202 (5.1) .186 (4.7)	.144 (3.7) .083 (2.1)	.823 (20.9) .768 (19.5)	M22 X 1.0-6g 0.100R
E	17	1.1875 -.1P - .3L-TS-2A	1.323 (33.6) 1.299 (33.0)	1.062 (27.0)	.969 (24.6)	.136 (3.5) .120 (3.0)	.202 (5.1) .186 (4.7)	.144 (3.7) .083 (2.1)	.823 (20.9) .768 (19.5)	M25 X 1.0-6g 0.100R
F	19	1.2500 -.1P -.3L-TS-2A	1.449 (36.8) 1.425 (36.2)	1.156 (29.4)	1.062 (27.0)	.136 (3.5) .120 (3.0)	.202 (5.1) .186 (4.7)	.144 (3.7) .083 (2.1)	.823 (20.9) .768 (19.5)	M28 X 1.0-6g 0.100R
G	21	1.3750 -.1P - .3L-TS-2A	1.575 (40.0) 1.551 (39.4)	1.250 (31.8)	1.156 (29.4)	.136 (3.5) .120 (3.0)	.202 (5.1) .186 (4.7)	.171 (4.3) .083 (2.1)	.791 (20.1) .736 (18.7)	M31 X 1.0-6g 0.100R
H	23	1.5000 -.1P -.3L-TS-2A	1.701 (43.2) 1.677 (42.6)	1.375 (34.9)	1.250 (31.8)	.162 (4.1) .146 (3.7)	.250 (6.4) .234 (5.9)	.171 (4.3) .083 (2.1)	.791 (20.1) .736 (18.7)	M34 X 1.0-6g 0.100R
J	25	1.6250 -.1P - .3L-TS-2A	1.823 (46.3) 1.799 (45.7)	1.500 (38.1)	1.375 (34.9)	.162 (4.1) .146 (3.7)	.250 (6.4) .234 (5.9)	.171 (4.3) .083 (2.1)	.791 (20.1) .736 (18.7)	M37 X 1.0-6g 0.100R



RECOMMENDED PANEL CUTOUT
WALL MOUNT RECEPTACLES
(See Table III)

Table III: Mounting Holes For Wall Mount Receptacles						
Shell Size Code	Shell Size	Ø M Min	Ø N Min	Ø P Holes	R1 BSC	R2 BSC
B	11	.796 (20.2)	.625 (15.9)	.133 (3.4) .123 (3.1)	.812 (20.6)	.719 (18.3)
C	13	.922 (23.4)	.750 (19.1)	.133 (3.4) .123 (3.1)	.906 (23.0)	.812 (20.6)
D	15	1.047 (26.6)	.906 (23.0)	.133 (3.4) .123 (3.1)	.969 (24.6)	.906 (23.0)
E	17	1.219 (31.0)	1.016 (25.8)	.133 (3.4) .123 (3.1)	1.062 (27.0)	.969 (24.6)
F	19	1.297 (32.9)	1.141 (29.0)	.133 (3.4) .123 (3.1)	1.156 (29.4)	1.062 (27.0)
G	21	1.422 (36.1)	1.266 (32.2)	.133 (3.4) .123 (3.1)	1.250 (31.8)	1.156 (29.4)
H	23	1.547 (39.3)	1.375 (34.9)	.159 (4.0) .149 (3.8)	1.375 (34.9)	1.250 (31.8)
J	25	1.672 (42.5)	1.484 (37.7)	.155 (3.9) .145 (3.7)	1.500 (38.1)	1.375 (34.9)

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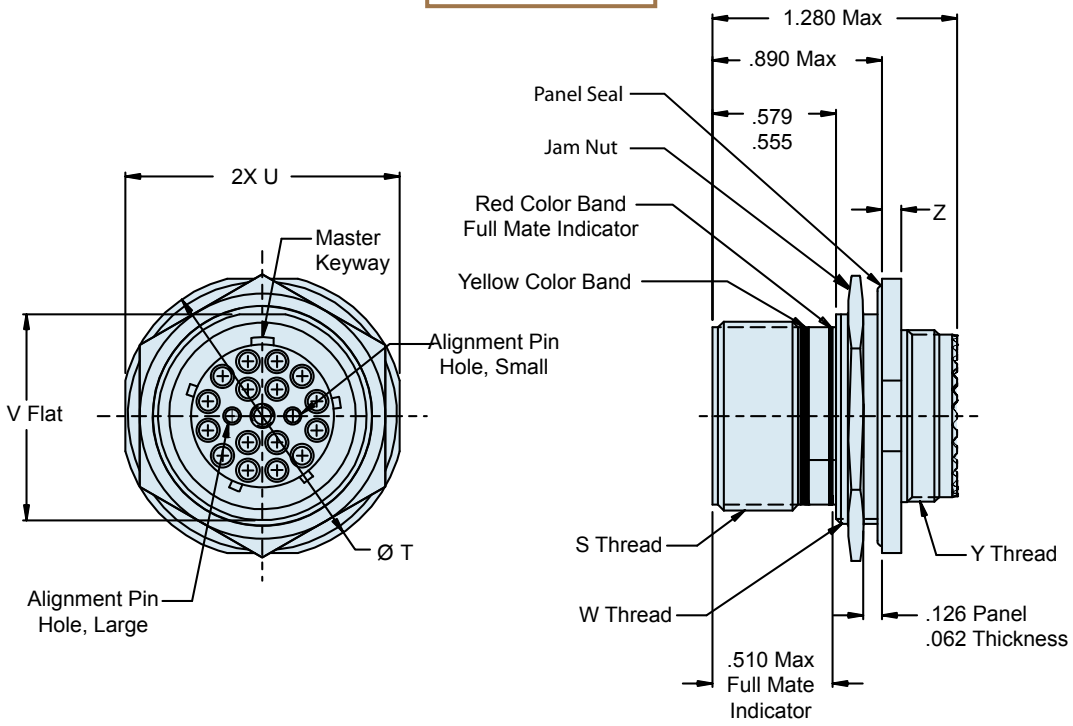
180-122 (08)
GHD • Glenair High Density Fiber Optic Connection System
D38999 Style Jam Nut Mount Receptacle Connector

GHD Jam nut mount receptacle connector

How To Order

Product Series	Material and Finish (Table I, page C-5)	Shell Size (Table II, page C-5)	Alternate Key Position per MIL-DTL-38999 A, B, C, D, or E N = Normal
180 -	122	NF	08 - 15 - 16 N
	Basic No.	08 = Jam Nut Receptacle (Available only in Aluminum or Stainless Steel)	Insert Arrangement (Table II, Page C-5)



08 - JAM NUT MOUNT RECEPTACLE

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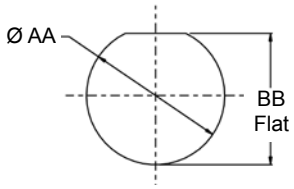
Table II: Shell Size										
Shell Size Code	Shell Size	S Thread	Ø T	U	V	W Thread	Y Thread	Z	Ø AA Min	BB Flat
B	11	.7500-.1P-.3L-TS-2A	1.386 (35.2) 1.362 (34.6)	1.268 (32.2) 1.236 (31.4)	.755 (19.2) .745 (18.9)	M20 x 1.0-6g 0.100R	M15 x 1.0-6g 0.100R	.121 (3.1) .083 (2.1)	.835 (21.2) .825 (20.9)	.771 (19.6) .761 (19.3)
C	13	.8750-.1P-.3L-TS-2A	1.512 (38.4) 1.488 (37.8)	1.390 (35.3) 1.358 (34.5)	.942 (23.9) .932 (23.7)	M25 x 1.0-6g 0.100R	M18 x 1.0-6g 0.100R	.121 (3.1) .083 (2.1)	1.020 (25.9) 1.010 (25.7)	.955 (24.3) .945 (24.0)
D	15	1.0000-.1P-.3L-TS-2A	1.638 (41.6) 1.614 (41.0)	1.516 (38.5) 1.484 (37.7)	1.066 (27.1) 1.056 (26.8)	M28 x 1.0-6g 0.100R	M22 x 1.0-6g 0.100R	.121 (3.1) .083 (2.1)	1.145 (29.1) 1.135 (28.8)	1.085 (27.6) 1.075 (27.3)
E	17	1.1875-.1P-.3L-TS-2A	1.764 (44.8) 1.740 (44.2)	1.642 (41.7) 1.610 (40.9)	1.191 (30.3) 1.181 (30.0)	M32 x 1.0-6g 0.100R*	M25 x 1.0-6g 0.100R	.121 (3.1) .083 (2.1)	1.270 (32.3) 1.260 (32.0)	1.210 (30.7) 1.200 (30.5)
F	19	1.2500-.1P-.3L-TS-2A	1.949 (49.5) 1.925 (48.9)	1.827 (46.4) 1.795 (45.6)	1.316 (33.4) 1.306 (33.2)	M35 x 1.0-6g 0.100R	M28 x 1.0-6g 0.100R	.154 (3.9) .114 (2.9)	1.395 (35.4) 1.385 (35.2)	1.335 (33.9) 1.325 (33.7)
G	21	1.3750-.1P-.3L-TS-2A	2.075 (52.7) 2.051 (52.1)	1.953 (49.6) 1.921 (48.8)	1.441 (36.6) 1.431 (36.3)	M38 x 1.0-6g 0.100R	M31 x 1.0-6g 0.100R	.154 (3.9) .114 (2.9)	1.520 (38.6) 1.510 (38.4)	1.460 (37.1) 1.450 (36.8)
H	23	1.5000-.1P-.3L-TS-2A	2.201 (55.9) 2.177 (55.3)	2.079 (52.8) 2.047 (52.0)	1.566 (39.8) 1.556 (39.5)	M41 x 1.0-6g 0.100R	M34 x 1.0-6g 0.100R	.154 (3.9) .114 (2.9)	1.645 (41.8) 1.635 (41.5)	1.585 (40.3) 1.575 (40.0)
J	25	1.6250-.1P-.3L-TS-2A	2.323 (59.0) 2.299 (58.4)	2.205 (56.0) 2.173 (55.2)	1.691 (43.0) 1.681 (42.7)	M44 x 1.0-6g 0.100R	M37 x 1.0-6g 0.100R	.154 (3.9) .114 (2.9)	1.770 (45.0) 1.760 (44.7)	1.710 (43.4) 1.700 (43.2)

* Modified major diameter 31.80 - 31.95 (1.252 - 1.257).



RECOMMENDED PANEL CUT-OUT
JAM NUT MOUNT RECEPTACLE
(See Table II)

Material and Finish

Shell, Jam nut: See Table I, Page C-5.
Insert: High grade rigid dielectric, or Al Alloy/Anodize - MFR's option
Jam Nut (for composite): Al Alloy and plated same as connector shell.
Panel Seal: Fluorosilicone

Notes

Jam Nut for composite Jam Nut Mount Receptacle is Aluminum and plated same as connector shell.

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180-122 (06)
GHD • Glenair High Density Fiber Optic Connection System
D38999 Style Plug Connector with Alignment Sleeve Retainer (ASR)

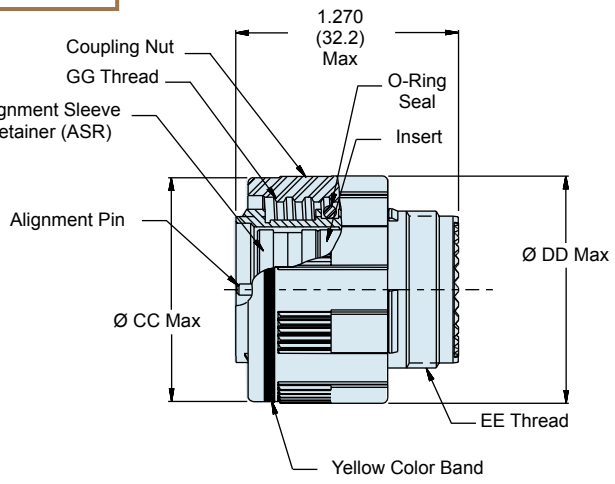
Glenair High Density

GHD Plug connector with removable alignment sleeve retainer (ASR)

D38999 Style Plug Connector

How To Order

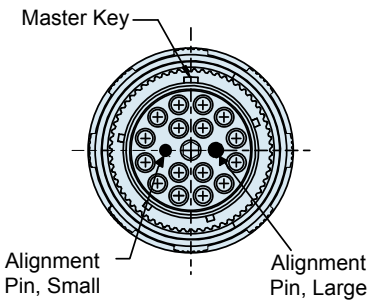
Product Series	Material and Finish *(Table I, page C-5)*	Shell Size *(Table II, page C-5)*		Alternate Key Position per MIL-DTL-38999 *A, B, C, D, or E* *N = Normal*		
180 -	122	NF	06 - 15 - 16	N	C	C = Conductive O-Ring Included *(Omit for Standard O-Ring)*
	Basic No.	06 = Plug with Alignment Sleeve Retainer (ASR)		Insert Arrangement *(Table II, Page C-5)*		



06 - PLUG WITH ASR

Table II: Shell Size

Shell Size Code	Shell Size	GG Thread	Ø CC Max	Ø DD Max	EE Thread
B	11	.7500-.1P-.3L-TS-2B	.929 (23.6)	.984 (25.0)	M15 X 1.0-6g 0.100R
C	13	.8750-.1P-.3L-TS-2B	1.110 (28.2)	1.157 (29.4)	M18 X 1.0-6g 0.100R
D	15	1.0000-.1P-.3L-TS-2B	1.232 (31.3)	1.280 (32.5)	M22 X 1.0-6g 0.100R
E	17	1.1875-.1P-.3L-TS-2B	1.358 (34.5)	1.406 (35.7)	M25 X 1.0-6g 0.100R
F	19	1.2500-.1P-.3L-TS-2B	1.469 (37.3)	1.516 (38.5)	M28 X 1.0-6g 0.100R
G	21	1.3750-.1P-.3L-TS-2B	1.594 (40.5)	1.642 (41.7)	M31 X 1.0-6g 0.100R
H	23	1.5000-.1P-.3L-TS-2B	1.720 (18.3)	1.768 (44.9)	M34 X 1.0-6g 0.100R
J	25	1.6250-.1P-.3L-TS-2B	1.843 (46.8)	1.890 (48.0)	M37 X 1.0-6g 0.100R



Material and Finish

Barrel, Coupling Nut: See Table I, page C-5.
Coupling Nut (for composite): High grade engineering thermoplastic/unplated.
Insert: High grade rigid dielectric, or Al Alloy/Anodize - MFR's option.
Alignment Sleeve Retainer: Al Alloy/anodize.
Seal: Fluorosilicone.

Notes

Consult factory for optional RFI spring.
Alignment Sleeve Retainer is supplied with plug connector, and maybe ordered seperately.
See Glenair drawing 180-122ASR.

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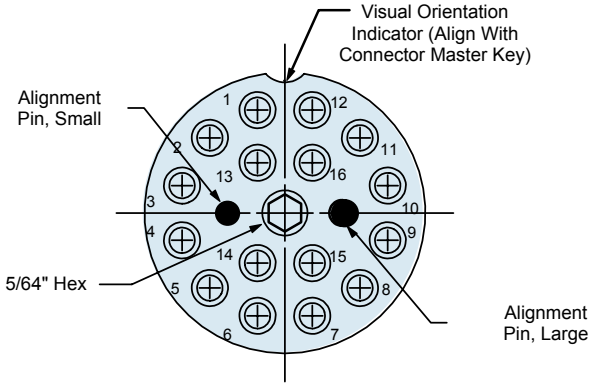
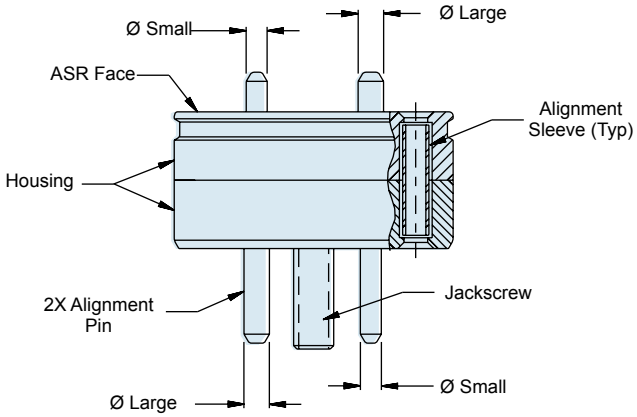
GHD alignment sleeve retainer (ASR)

Alignment Sleeve Retainer (ASR)

How To Order

Product Series	Material and Finish *(Table I, page C-5)*	Shell Size *(Table II, page C-5)*		
180	- 122	ASR	- 15	- 16
	Basic No.	**Alignment Sleeve Retainer**		**Insert Arrangement** *(Table II, Page C-5)*





Material and Finish

Housing: Al Alloy/Anodize
Alignment Pin and Jackscrew: Stainless Steel/Passivate
Alignment Sleeve: Zirconia Ceramic

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FIBER OPTIC

MIGHTY MOUSE

FIBER OPTIC CONNECTION SYSTEM

The Series 80 Connector was originally developed as a smaller and lighter alternative to D38999 connectors for aerospace applications such as Attack Helicopters and Unmanned Aerial Vehicles. Today, the Series 80 Mighty Mouse serves in thousands of safety-critical defense, medical, industrial and geo-physical applications. Now, Glenair offers Mighty Mouse Fiber Optic termini in size #16, #20HD, and #23 for use in any threaded-coupling Mighty Mouse connector.

Glenair®

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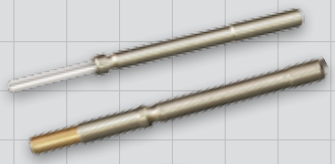
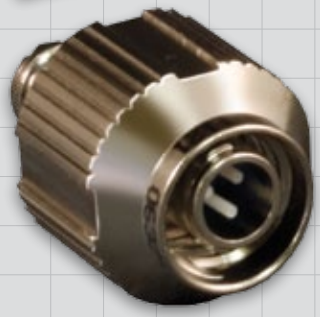
Series 80 Mighty Mouse fiber optic connectors and termini

The perfect marriage of high-bandwidth fiber optics and ultra-miniature packaging has arrived. The Series 80 Mighty Mouse—the new mil-aero industry standard reduced size and weight connector—is now available with three different sizes of fiber optic termini, #16, #20HD and #23. Available single- and multi-mode versions are designed for use with 125.5 and 126.0 micron fiber. A shell size 6, four channel Mighty Mouse 801 series plug tooled for use with size #23 optical termini weighs in at just 5 grams.





Product No.	Description	Page No.
Fiber Optic Termini		
181-063 • 181-064	Series 80 Mighty Mouse Size #23 Fiber Optic Termini	D-2
181-084 • 181-085	Series 80 Mighty Mouse Size #20HD Fiber Optic Termini	D-4
181-057 • 181-075	Series 80 Mighty Mouse Size #16 Fiber Optic Termini	D-6
Fiber Optic Connectors		
801-007 • 801-008	Series 801 MIghty Mouse Plug Connectors	D-8
801-009 • 801-010	Series 801 MIghty Mouse Receptacle Connectors	D-10
809-190 • 809-191	Series 801 Mighty Mouse Protective Covers	D-14
802-008 • 802-009	Series 802 MIghty Mouse Plug Connectors	D-16
802-010• 802-011	Series 802 MIghty Mouse Receptacle Connectors	D-18
660-087 • 660-088	Series 802 Mighty Mouse Protective Covers	D-22
805-001 • 805-002	Series 805 MIghty Mouse Plug Connectors	D-24
805-003 • 805-004	Series 805 MIghty Mouse Receptacle Connectors	D-26
667-261 • 667-262	Series 805 Mighty Mouse Protective Covers	D-30
Mighty Mouse Backshell		
189M*052	Convoluted Tubing Backshell for Mighty Mouse Fiber Optic Connectors	D-33

Catalog Notes For all parts in this catalog:
All parts will be identified with manufacturer's name and part number, space permitting.
Metric dimensions appear in parentheses in diagrams and tables, based on 1 inch = 25.4 mm, for reference only.
Unless otherwise specified, the following other dimensional tolerances apply:
.xx = ± .03 (0.8) • .xxx = ± .015 (0.4) • Angles = ± 5°

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Series 80 Mighty Mouse
Size #23 Fiber Optic Termini

Series 801 Plug with
181-063 pin termini

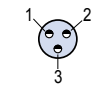
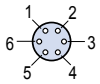
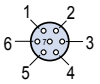
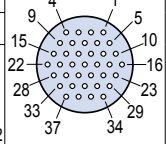
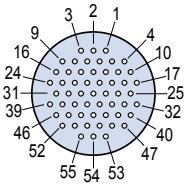
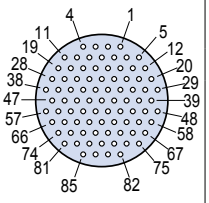
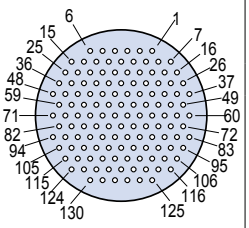
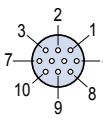
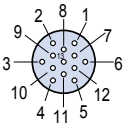
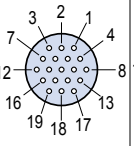
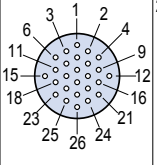
Series 801 Receptacle with
181-064 socket termini

- Single and Multi Mode
- Snap-in, Rear Release
- 0.5 dB Typical Attenuation
- 3 to 130 Channels

Reduce size and weight with Series 80 Mighty Mouse fiber optic connectors

New size #23 fiber optic termini can be used in any standard Mighty Mouse connector but perform best in our Series 801, 804 and 805 systems. Available for single mode or multi mode fiber, these termini have low insertion loss and are intended for high-reliability aerospace applications. Series 80 connectors offer substantial reductions in size and weight compared to our D38999 type fiber optic connectors. Complete how to order instructions are included on the following pages. When ordering termini (sold seperately), please refer to the insert arrangement tables for count and size.

Series 80 Insert Arrangements for use with #23 Fiber Optic termini

5-3	6-4	6-6	6-7	13-37	16-55	17-85	21-130
							
7-10	8-13	9-19	10-26				
							

See Series 80 Mighty Mouse catalog for connector ordering information. Order connectors less contacts and order fiber optic termini separately. Cavity numbers are mating face view of pin connectors.

The Series 801 plug is less than half the size of our D38999 Series III type connector.

Series 801
Shell size 6, 4 channel
5 Grams
(less contacts)

D38999 Series III
Shell size 13, 4 channel
21 Grams
(less contacts)

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Mighty Mouse

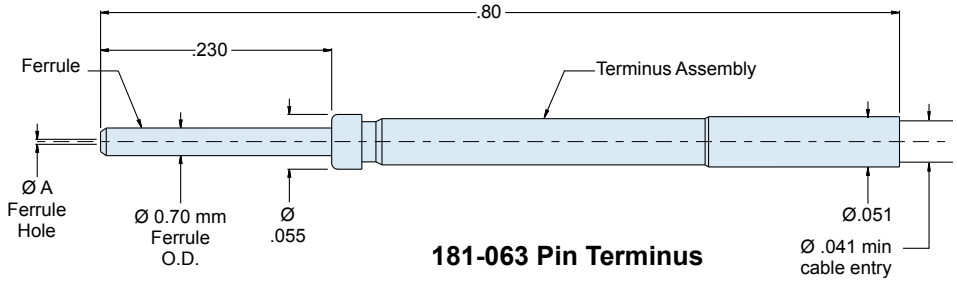
Size #23 fiber optic termini

181-063 Pin Terminus

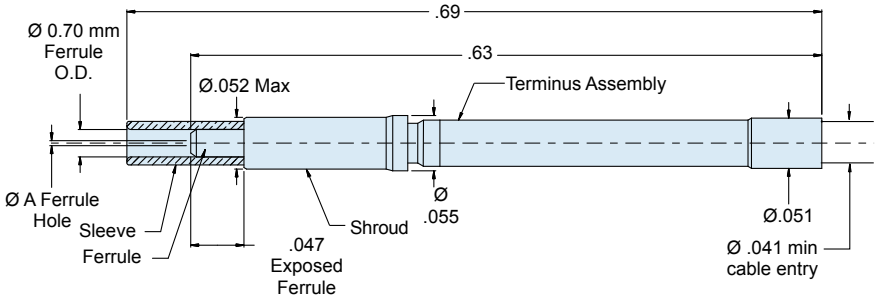
181-064 Socket Terminus

Size #23 fiber optic termini are compatible with all Series 80 Mighty Mouse threaded connectors with size #23 cavities. Typical insertion loss 0.5 dB. Fits 50/125 and 62.5/125 multi mode and 9/125 single mode fiber.

Termini Type	Optical Fiber Type	Part Number	ØA Ferrule Hole*	Fiber Size Core/Cladding
Pin	Single Mode	181-063-1255	125.5 microns	9/125
	Multi Mode	181-063-126	126.0 microns	50/125, 62.5/125
Socket	Single Mode	181-064-1255	125.5 microns	9/125
	Multi Mode	181-064-126	126.0 microns	50/125, 62.5/125
*Consult factory for additional sizes				



181-063 Pin Terminus



181-064 Socket Terminus

Materials and Finishes

181-063:
Ferrule: zirconia ceramic
Terminus assembly: copper-nickel-zinc
181-064:
Ferrule, terminus assembly: copper-nickel-zinc
Spring (not shown): stainless steel/ passivate
Sleeve: phosphor bronze

Insertion/extraction Tool

Standard size #23 plastic tool
Glenair Part Number 809-088

Application Notes

1. Alignment sleeve is supplied with terminus assembly and may be ordered separately (see Table II).
2. For grommet sealing plug, see Glenair part number 809-155

Consult factory for termination and assembly procedures/tools.

Table II: Accessories	
181-064-K	Alignment Sleeve

Table I: Performance Specifications	
Optical Insertion Loss	0.5 dB typical
Operating Temperature	-65°C to +150°C/Connector -65°C to +200°C/Termini*
Temperature (Thermal) Shock	TIA/EIA-455-71, Schedule C, 10 cycles -55°C to +85°C (Per MIL-DTL-83526C)
Mechanical Shock	TIA/EIA-455-11, Test Condition III at 9 Gs, 0.06 PSD and Test Condition VI, Test Letter C for 1.5 hours per axis (three axes) (Per MIL-DTL-83526C)
Mating Durability	TIA/EIA-455-21, 500 cycles (Per MIL-PRF-29504B)
*Depending on cable and epoxy used.	

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Series 80 Mighty Mouse
Size #20HD Fiber Optic Termini

Series 801 Receptacle with 181-084 pin termini

Series 801 Plug with 181-085 socket termini

- Single Mode and Multi Mode
- Snap-in, Rear Release
- Precision Ceramic Ferrules
- 0.5 dB Typical Attenuation
- 3 to 69 Channels

Reduce size and weight with Series 80 Mighty Mouse fiber optic connectors

New size #20HD fiber optic termini can be used in any standard Mighty Mouse connector but perform best in our Series 801, 804 and 805 systems. Available for single mode or multi mode fiber, these termini have low insertion loss and are intended for high-reliability aerospace applications. Series 80 connectors offer substantial reductions in size and weight compared to our D38999 type fiber optic connectors. Complete how to order instructions are included on the following pages. When ordering termini (sold seperately), please refer to the insert arrangement tables for count and size.

Series 80 Insert Arrangements for use with size #20HD Fiber Optic termini

6-23 3 ch.	7-25 5 ch.	8-28 8 ch.	9-210 10 ch.	13-220 20 ch.	16-235 35 ch.	17-241 41 ch.	21-269 69 ch.

See Series 80 Mighty Mouse catalog for connector ordering information. Order connectors less contacts and order fiber optic termini separately. Cavity numbers are mating face view of pin connectors.

The Series 801 plug (aluminum) is less than half the size of our D38999 Series III type connector.

Series 801
Shell size 8,
8 Channel
8 Grams
(less contacts)

D38999 Series III
Shell size 17,
8 Channel
40 Grams
(less contacts)

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Mighty Mouse

Size #20HD fiber optic termini

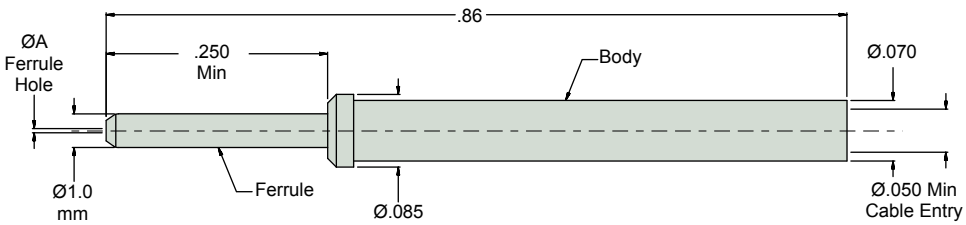
181-084 Pin Terminus

181-085 Socket Terminus

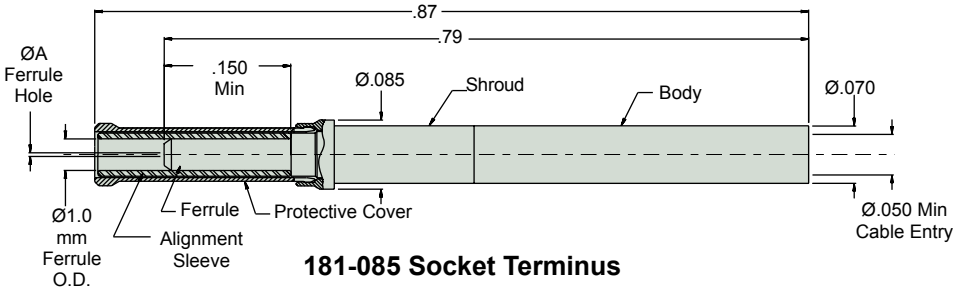
Size #20HD fiber optic termini are compatible with all Series 80 Mighty Mouse threaded coupling connectors with size #20HD cavities. These snap-in, rear-release termini feature precision ceramic ferrules and sleeves for accurate fiber alignment. Typical insertion loss 0.5 dB. Fits 50/125 and 62.5/125 multi mode and 9/125 single mode fiber.

Termini Type	Optical Fiber Type	Part Number	ØA Ferrule Hole*	Fiber Size Core/Cladding
Pin	Single Mode	181-084-1255	125.5 microns	9/125
	Multi Mode	181-084-126	126.0 microns	50/125, 62.5/125
Socket	Single Mode	181-085-1255	125.5 microns	9/125
	Multi Mode	181-085-126	126.0 microns	50/125, 62.5/125

*Consult factory for additional sizes



181-084 Pin Terminus



181-085 Socket Terminus

Materials and Finishes

181-084 :
Ferrule: zirconia ceramic
Body: copper-nickel-zinc alloy
181-085:
Ferrule, alignment sleeve: zirconia ceramic
Body, shroud: copper-nickel-zinc alloy
Spring (not shown): stainless steel/ passivate
Protective cover: spring alloy/nickel

Insertion/extraction Tool

Standard size #20HD plastic tool
Glenair Part Number 859-017
Military Part Number M81969/39-01

Application Notes

1. Alignment sleeve and protective cover are supplied with socket terminus assembly, and may be ordered separately (see accessories table).
2. For grommet sealing plug, see Glenair part number 859-012

Consult factory for termination and assembly procedures/tools.

Table II: Accessories	
181-085-S	Ceramic Alignment Sleeve
181-085-C	Protective Cover

Table I: Performance Specifications	
Optical Insertion Loss	0.5 dB typical
Operating Temperature	-65°C to +150°C/Connector -65°C to +200°C/Termini*
Temperature (Thermal) Shock	-55°C to +85°C, 10 cycles, per TIA/EIA-455-71, Test Schedule C. 0.5 dB max IL before test. 0.5 dB max CIT during and after test.
Temperature Cycling	-55°C to +85°C, 5 cycles, per TIA/EIA-455-3, Test Condition A. 0.5 dB max IL before test. 0.5 dB max CIT during and after test.
Mating Durability	500 cycles, per TIA/EIA-455-21. 0.5 dB max IL before test. 0.5 dB max CIT during and after test.
Vibration - Random	49.5 G RMS, 24-2000 Hz, 8 hours per Axis (longitudinal and perpendicular) at Ambient Temperature, per EIA-364-28, Test Condition V. 0.5 dB max IL before test. 0.5 dB max CIT after test. Discontinuity of 0.5 dB max for 50 microseconds.
Mechanical Shock (Half-sine Pulse)	300 G Peak, 6 Shocks per Axis, per TIA-455-14, Test Condition D. 0.5 dB max IL before test. 0.5 dB max CIT after test. Discontinuity of 0.5 dB max for 50 microseconds.
*Depending on cable and epoxy used.	

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Series 80 Mighty Mouse
Size #16 Fiber Optic Termini

Series 801 Plug with 181-057 pin terminus

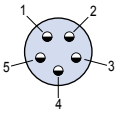
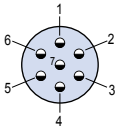
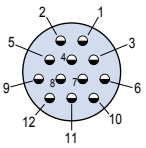
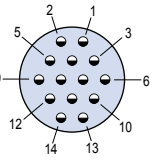
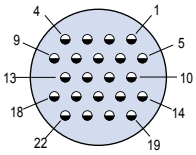
Series 801 receptacle with 181-075 socket terminus

- Single Mode and Multi Mode
- Snap-in, Rear Release
- Precision Ceramic Ferrules
- 0.5 dB Typical Attenuation
- 1 to 22 Channels

Reduce size and weight with Series 80 Mighty Mouse fiber optic connectors

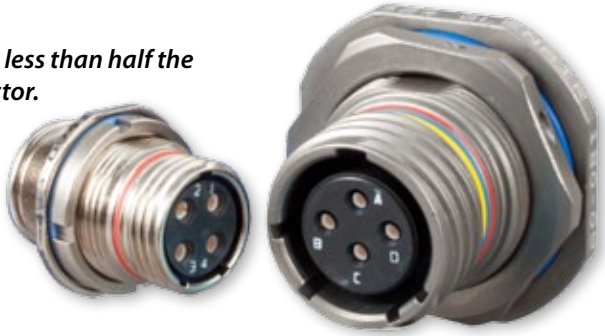
New size #16 fiber optic termini can be used in any standard Mighty Mouse connector but perform best in our Series 801, 804 and 805 systems. Available for single mode or multi mode fiber, these termini have low insertion loss and are intended for high-reliability aerospace applications. Series 80 connectors offer substantial reductions in size and weight compared to our D38999 type fiber optic connectors. Complete how to order instructions are included on the following pages. When ordering termini (sold seperately), please refer to the insert arrangement tables for count and size.

Series 80 Insert Arrangements for use with #16 Fiber Optic termini

							
6-1 1 ch.	**8-2 2 ch.**	**9-4 4 ch.**	**10-5 5 ch.**	**13-7 7 ch.**	**16-12 12 ch.**	**17-14 14 ch.**	**21-22 22 ch.**

See Series 80 Mighty Mouse catalog for connector ordering information. Order connectors less contacts and order fiber optic termini separately. Cavity numbers are mating face view of pin connectors.

The Series 801 9-4 receptacle is less than half the size of our D38999 type connector.



Series 801
6 Grams
(less contacts)

D38999 Series III
27 Grams
(less contacts)

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Mighty Mouse

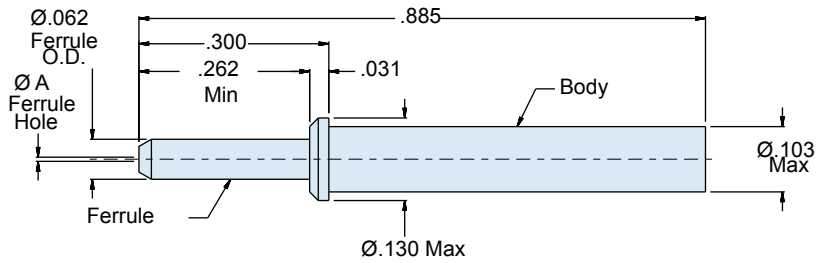
Size #16 fiber optic termini

181-057 Pin Terminus

181-075 Socket Terminus

Size #16 fiber optic termini are compatible with all Series 80 Mighty Mouse threaded coupling connectors with size #16 cavities. These snap-in, rear-release termini feature precision ceramic ferrules and sleeves for accurate fiber alignment. Typical insertion loss 0.5 dB. Fits 50/125 and 62.5/125 multi mode and 9/125 single mode fiber.

Termini Type	Optical Fiber Type	Part Number	A Ferrule I.D.
Pin	Single Mode	181-057-125	125.5 microns
	Multi Mode	181-057-126	126.0 microns
Socket	Single Mode	181-075-125	125.5 microns
	Multi Mode	181-075-126	126.0 microns
*Consult factory for additional sizes			



181-057 Pin Terminus

Materials and Finishes

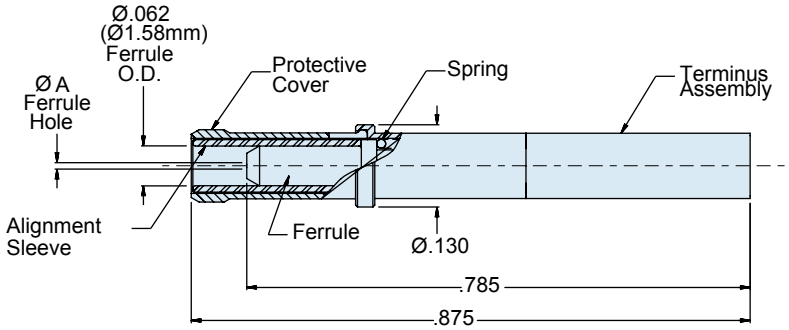
181-057 :
Ferrule: zirconia ceramic
Body: stainless steel, passivated
181-075:
Ferrule, alignment sleeve: zirconia ceramic
Terminus assembly: stainless steel/ passivate
Spring: stainless steel/passivate
Protective cover: spring alloy/nickel

Insertion/extraction Tool

Standard size #16 plastic tool

Glenair Part Number **809-131**
Military Part Number M81969/14-03

Consult factory for termination and assembly procedures/tools.



181-075 Socket Terminus

Table II: Accessories	
181-001-S	Ceramic Alignment Sleeve
181-075-C	Protective Cover

Table I: Performance Specifications	
Optical Insertion Loss	0.5 dB typical
Operating Temperature	-65°C to +150°C/Connector -65°C to +200°C/Termini*
Mating Durability	TIA/EIA-455-21, 500 cycles (Per MIL-PRF-29504B)
*Depending on cable and epoxy used.	

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Series 801 Mighty Mouse Double-Start ACME Threads
Plug Connector Ordering Information
801-007 and 801-008

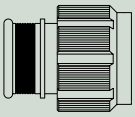
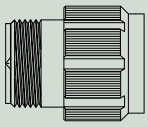
Series 801 Plug Connector

Glenair's Series 801 Mighty Mouse connector features a double-start modified stub ACME mating thread for improved protection against cross-mating and thread damage. Connector shells are machined aluminum or stainless steel, and are designed to accommodate (depending on insert arrangement) Glenair size #16, #20HD, or #23 fiber optic termini (termini sold separately.) Metal clips inside the connector body lock the termini into place. Termini are removable. Fluorosilicone seals and rear grommet protect the connector from water ingress. Choose hex or knurled coupling nut. Terminate cable shield directly to connector body with BAND-IT strap, or choose rear accessory thread to attach optional backshell. Available in shell sizes 5 through 21 in 30 insert arrangements.

D

How to Order

Sample Part Number

801-007	-16	M	7-10	A	A
Series	**Shell Style**	**Shell Material / Finish**	**Shell Size- Insert Arrangement**	**Contact Type**	**Shell Key Position**
 **801-007** Banding Platform  **801-008** Rear Accessory Thread	**-16** Plug with Anti-Decoupling Spring **-26** Self-Locking Plug with Ratchet Mechanism (the "*Clicker*")	**C** Aluminum / Black Anodize (Non-Conductive) RoHS Compliant **M** Aluminum / Electroless Nickel RoHS Compliant **NF** Aluminum / Cadmium with Olive Drab Chromate **ZN** Aluminum / Zinc-Nickel with Olive Drab Chromate **ZNU** Aluminum / Zinc-Nickel with Black Chromate **MT** Aluminum / Nickel-PTFE RoHS Compliant **Z1** Stainless Steel / Passivated RoHS Compliant	SEE ***INSERT ARRANGEMENTS*** PAGES D-2, D-4, D-6	***Connector supplied without termini. Please indicate pin or socket.*** **A** Pin connector, less termini **B** Socket connector, less termini	**A** Normal Alternate Key Positions: **B** **C** **D** **E** **F**

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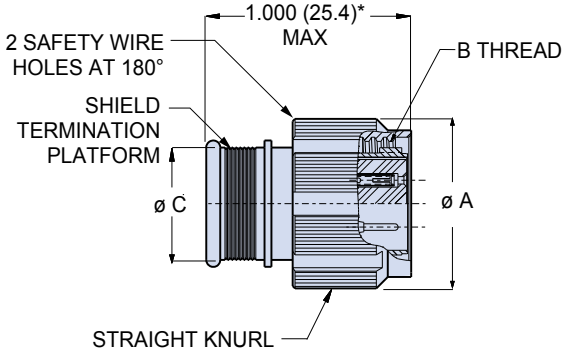
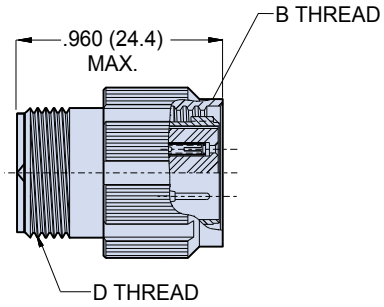
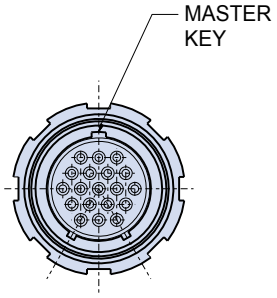
Series 801 Mighty Mouse Double-Start ACME Threads
Plug Connector Dimensions
801-007 and 801-008



Integral Band Platform
801-007



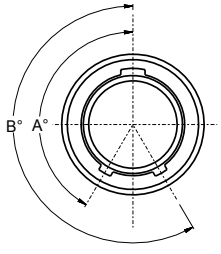
Accessory Thread
801-008



* For all size #8 arrangements, add .320" to overall length. For -26 add .127 (3.23)

Dimensions								
Shell Size	Style 16 Ø A		Style 26 Ø A		B Thread	Ø C		D Thread UNEF-2A
	In.	mm.	In.	mm.		In.	mm.	
5	.540	13.72	.640	16.26	.3125-.05P-1L-2B	.245	6.22	.250-32
6	.600	15.24	.700	17.78	.375-.05P-1L-2B	.290	7.37	.3125-32
7	.680	17.27	.780	19.81	.4375-.05P-1L-2B	.390	9.91	.4375-28
8	.750	19.05	.850	21.59	.5000-.05P-.1L-2B	.445	11.30	.5000-28
9	.810	20.57	.910	23.11	.5625-.05P-.1L-2B	.500	12.70	.5625-24
10	.880	22.35	.980	24.89	.6250-.05P-1L-2B	.560	14.22	.6250-24
13	1.050	26.67	1.150	29.21	.8125-.1P-.2L-2B	.650	16.51	.6875-24
16	1.240	31.50	1.340	34.04	1.000-.1P-.2L-2B	.805	20.45	.9375-20
17	1.300	33.02	1.400	35.56	1.062-.1P-.2L-2B	.850	21.59	.9375-20
21	1.550	39.37	1.650	41.91	1.3125-.1p-.2L-2B	1.110	28.19	1.1875-18

Plug Key Positions		
Position	A°	B°
A	150°	210°
B	75°	210°
C	95°	230°
D	140°	275°
E	75°	275°
F	95°	210°



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Series 801 Mighty Mouse Double-Start ACME Threads
Crimp Receptacle Connector Ordering Information
801-009 and 801-010

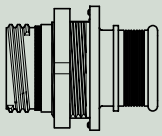
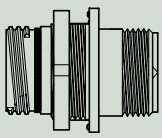
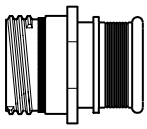
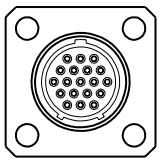
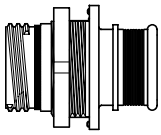
In-Line
Shell Style 01

Rear Panel Jam Nut Mount
Shell Style 07

Square Flange Mount
Shell Style 02

How to Order

Sample Part Number

801-010	-02	Z1	16-55	B	A
Series	**Shell Style**	**Shell Material / Finish**	**Shell Size- Insert Arrangement**	**Contact Type**	**Shell Key Position**
 **801-009** **Receptacle with Banding Platform**  **801-010** **Receptacle with Accessory Thread**	 **-01** **In-Line** For Free-Hanging Cables  **-02** **Square Flange** For Front or Rear Mounting  **-07** **Jam Nut** For Rear Panel Mounting	**C** Aluminum / Black Anodize (Non-Conductive) RoHS Compliant **M** Aluminum / Electroless Nickel RoHS Compliant **NF** Aluminum / Cadmium with Olive Drab Chromate **ZN** Aluminum / Zinc-Nickel with Olive Drab Chromate **ZNU** Aluminum / Zinc-Nickel with Black Chromate **MT** Aluminum / Nickel-PTFE RoHS Compliant **Z1** Stainless Steel / Passivated RoHS Compliant	SEE ***INSERT ARRANGEMENTS*** PAGES D-2, D-4, D-6	***Connector supplied without termini. Please indicate pin or socket.*** **A** Pin connector, less termini **B** Socket connector, less termini	**A** **Normal** Alternate Key Positions: **B** **C** **D** **E** **F**

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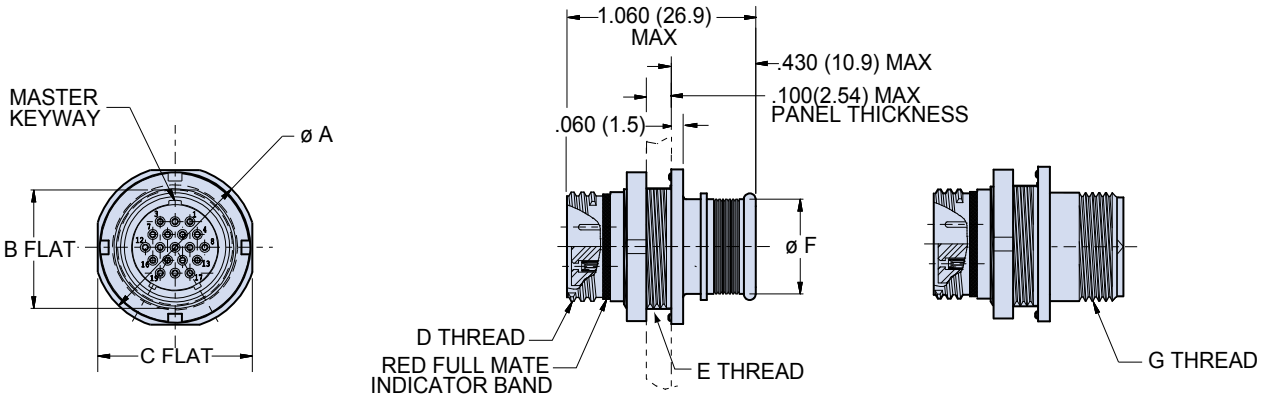
Series 801 Mighty Mouse Double-Start ACME Threads
Jam Nut Receptacle Connector Dimensions
801-009-07 and 801-010-07

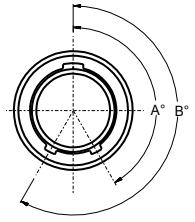


Integral Band Platform
801-009-07

Accessory Thread
801-010-07

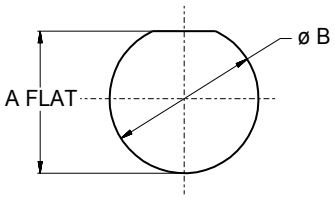
Dimensions											
Shell Size	Ø A		B Flat		C Flat		D Thread	E Thread UN-2A	Ø F		G Thread UN-2A
	In.	mm.	In.	mm.	In.	mm.			In.	mm.	
5	.575	14.61	.350	8.89	.545	13.84	.3125-.05P-.1L-2A	.375-28	.245	6.22	.250-32
6	.635	16.13	.410	10.41	.595	15.11	.375-.05P-.1L-2A	.4375-28	.290	7.37	.3125-32
7	.755	19.18	.536	13.61	.723	18.36	.4375-.05P-1L2A	.5625-32	.390	9.91	.4375-28
8	.755	19.18	.536	13.61	.723	18.36	.5000-.05P-.1L-2A	.5625-32	.445	11.30	.5000-28
9	.830	21.08	.596	15.14	.790	20.07	.5625-.05P-.1L-2A	.625-28	.500	12.70	.5625-24
10	.890	22.61	.658	16.71	.855	21.72	.6250-.05P-.1L-2A	.6875-28	.560	14.22	.6250-24
13	1.078	27.38	.845	21.46	1.044	26.52	.8125-.1P-.2L-2A	.875-28	.650	16.51	.6875-24
16	1.264	32.11	1.022	25.96	1.230	31.24	1.000-.1P-.2L-2A	1.0625-20	.805	20.45	.9375-20
17	1.325	33.66	1.096	27.84	1.290	32.77	1.062-.1P-.2L-2A	1.125-28	.850	21.59	.9375-20
21	1.625	41.28	1.345	34.16	1.577	40.06	1.3125-.1p-.2l-2a	1.375-28	1.110	28.19	1.1875-18

Key Positions



	A°	B°
A	150°	210°
B	75°	210°
C	95°	230°
D	140°	275°
e	75°	275°
f	95°	210°

Series 801 Jam Nut Panel Cutout



Shell Size	A Flat		Ø B	
	In. ± .002	mm. ± 0.05	In. ± .002	mm. ± 0.05
5	.356	9.04	.385	9.78
6	.416	10.57	.447	11.35
7	.542	13.77	.572	14.53
8	.542	13.77	.572	14.53
9	.602	15.29	.635	16.13
10	.666	16.92	.697	17.70
13	.851	21.62	.885	22.48
16	1.028	26.11	1.075	27.31
17	1.102	27.99	1.135	28.83
21	1.354	34.39	1.385	35.18

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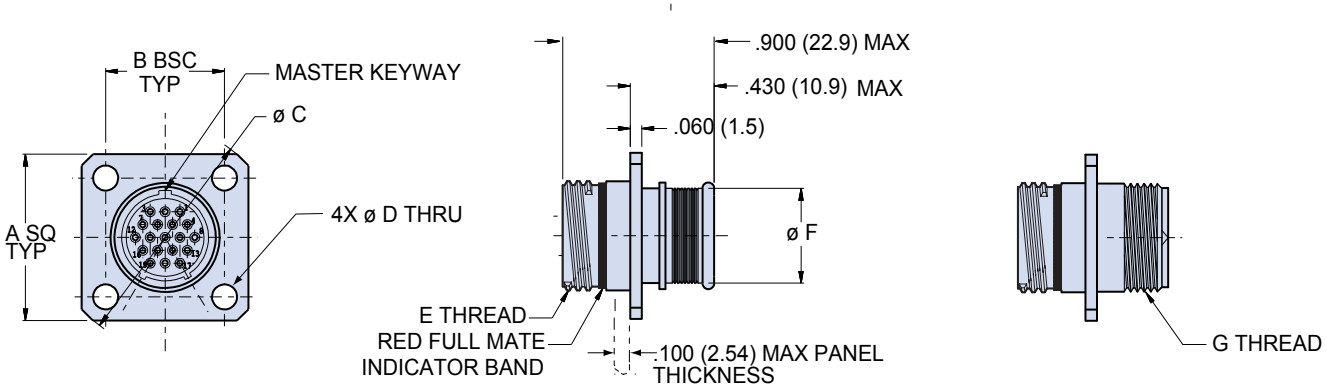
Series 801 Mighty Mouse Double-Start ACME Threads
Square Flange Receptacle Connector Dimensions
801-009-02 and 801-010-02

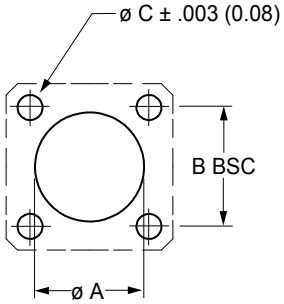


Integral Band Platform
801-009-02

Accessory Thread
801-010-02

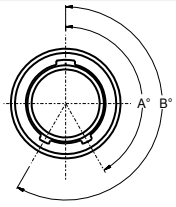
Dimensions												
Shell Size	A		B BSC		Ø C		Ø D		E Thread	Ø F		G Thread UNEF-2A
							In.	mm.				
	In.	mm.	In.	mm.	In.	mm.	+.003	+.08		In.	mm.	
5	.530	13.46	.363	9.22	.680	17.27	.093	2.36	.3125-.05P-.1L-2A	.245	6.22	.250-32
6	.590	14.99	.423	10.74	.750	19.05	.093	2.36	.375-.05P-.1L-2A	.290	7.37	.3125-32
7	.650	16.51	.483	12.27	.850	21.59	.093	2.36	.4375-.05P-1L-2A	.390	9.91	.4375-28
8	.712	18.08	.545	13.84	.938	23.83	.093	2.36	.5000-.05P-1L-2A	.445	11.30	.5000-28
9	.850	21.59	.607	15.42	1.125	28.58	.128	3.25	.5625-.05P-.1L-2A	.500	12.70	.5625-24
10	.890	22.61	.670	17.02	1.188	30.18	.128	2.25	.6250-.05P-1L-2A	.560	14.22	.6250-24
13	1.030	26.16	.812	20.62	1.375	34.93	.128	3.25	.8125-.1P-.2L-2A	.650	16.51	.6875-24
16	1.219	30.96	.981	24.92	1.625	41.28	.128	3.25	1.000-.1P-.2L-2A	.805	20.45	.9375-20
17	1.280	32.51	1.060	26.92	1.700	43.18	.128	3.25	1.062-.1P-.2L-2A	.850	21.59	.9375-20
21	1.430	36.32	1.205	30.61	1.938	49.23	.128	3.25	1.3125-.1p-.2l-2a	1.110	28.19	1.1875-18

Series 801 Panel Cutout



Shell Size	Ø A		Ø B		Ø C	
	In	mm.	In	mm.	In	mm.
5	.330	8.38	.363	9.22	.093	2.36
6	.390	9.91	.423	10.74	.093	2.36
7	.450	11.43	.483	12.27	.093	2.36
8	.510	12.95	.545	13.84	.093	2.36
9	.575	14.61	.607	15.42	.128	3.25
10	.640	16.26	.670	17.02	.128	3.25
13	.825	20.96	.812	20.65	.128	3.25
16	1.015	25.78	.981	24.92	.128	3.25
17	1.075	27.31	1.060	26.92	.128	3.25
21	1.325	33.66	1.205	30.61	.128	3.25

Key Positions



	A°	B°
A	150°	210°
B	75°	210°
C	95°	230°
D	140°	275°
E	75°	275°
F	95°	210°

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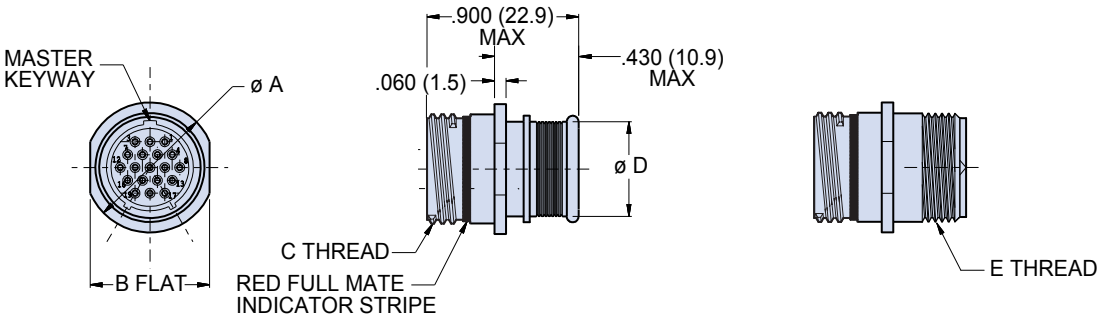
Series 801 Mighty Mouse Double-Start ACME Threads
In-Line Receptacle Connector Dimensions
801-009-01 and 801-010-01

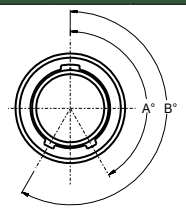


Integral Band Platform
801-009-01

Accessory Thread
801-010-01

Dimensions								
Shell Size	Ø A		B Flat		C Thread	Ø D		E Thread UNEF-2A
	In.	mm.	In.	mm.		In.	mm.	
5	.355	9.02	.325	8.13	.3125-.05P-.1L-2A	.245	6.22	.250-32
6	.415	10.54	.385	9.78	.375-.05P-.1L-2A	.290	7.37	.3125-32
7	.480	12.19	.445	11.30	.4375-.05P-1L2A	.390	9.91	.4375-28
8	.540	13.72	.510	12.95	.5000-.05P-1L2A	.445	11.30	.5000-28
9	.605	15.37	.575	14.61	.5625-.05P-.1L-2A	.500	12.70	.5625-24
10	.665	16.89	.635	16.13	.6250-.05P-1L2A	.560	14.22	.6250-24
13	.855	21.72	.825	20.96	.8125-.1P-.2L-2a	.650	16.51	.6875-24
16	1.040	26.42	1.010	25.65	1.000-.1P-.2L-2A	.805	20.44	.9375-20
17	1.110	28.19	1.070	27.18	1.062-.1P-.2L-2A	.850	21.59	.9375-20
21	1.405	35.69	1.385	35.18	1.3125-.1P-.2L-2A	1.110	28.19	1.1875-18

Key Positions



	A°	B°
A	150°	210°
B	75°	210°
C	95°	230°
D	140°	275°
E	75°	275°
F	95°	210°

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Series 801 Mighty Mouse Double-Start ACME Threads
Rubber Protective Cover Ordering Information
809-190 and 809-191

These *splashproof molded rubber covers* fit all Series 801 plugs and receptacles. Braided black nylon lanyard is available with metal rings, cable tie or slipknot for attachment to panel or to cable. -40º to +120º C operating temperature, fungus resistant per MIL-STD-810G Method 508.6.

Materials	
Cover	Neoprene rubber blend, black
Lanyard	.062" (1.57) diameter nylon cord, black
Cable Tie	6/6 nylon, black, SST locking tab
Ring	Stainless steel, black zinc-cobalt finish
Crimp Sleeve	Copper Alloy, black zinc-cobalt finish

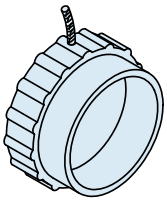
D

How to Order

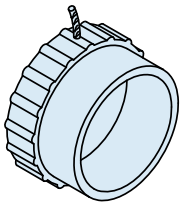
Sample Part Number

809-191	- 05	G	6	- SCS	C
Series	**Shell Size**	**Lanyard Type**	**Lanyard Length**	**Attachment Code**	**Conductive Rubber**

Series



809-190
Protective Cover for use with Series 801 Receptacles



809-191
Protective Cover for use with Series 801 Plugs

Shell Size

-05
-06
-07
-08
-09
-10
-13
-16
-17

Lanyard Type

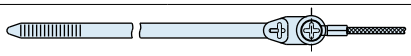
-G
Nylon Rope

(Omit for no lanyard)

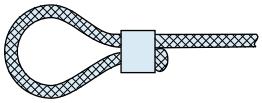
Lanyard Length

Length in Inches

Attachment Code



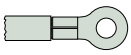
-WS
Nylon Cable Tie, 1.77 Inch (45mm) Maximum Wire Bundle Diameter



-SCS
Adjustable Slip Knot with Crimp Sleeve. The sleeve can be crimped with pliers for a permanent attachment.

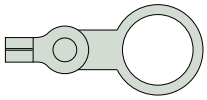
-00
Lanyard With No Attachment (Fused End)

Lug Terminals and Rings



Lug Terminal

-01 – .126 (3.20) I.D.
-02 – .145 (3.68) I.D.
-06 – .188 (4.78) I.D.
-07 – .197 (5.00) I.D.



Solid Ring

-08 – .385 (9.78) I.D.
-09 – .445 (11.30) I.D.
-10 – .516 (13.11) I.D.
-11 – .570 (14.48) I.D.
-12 – .583 (14.81) I.D.
-13 – .635 (16.13) I.D.
-14 – .695 (17.65) I.D.
-15 – .776 (19.71) I.D.
-16 – .885 (22.48) I.D.
-17 – .896 (25.76) I.D.
-18 – 1.015 (25.78) I.D.
-19 – 1.070 (27.18) I.D.
-20 – 1.135 (28.83) I.D.
-21 – 1.141 (28.98) I.D.

Conductive Rubber

Omit for Standard Neoprene

C
Conductive Rubber

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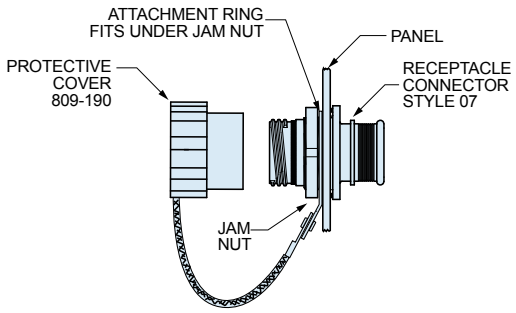
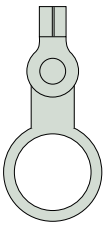
Series 801 Mighty Mouse Double-Start ACME Threads
Rubber Protective Cover Ordering Information
809-190 and 809-191

Attaching a 809-190 Receptacle Cover to a Rear Panel Mounted Jam Nut Receptacle

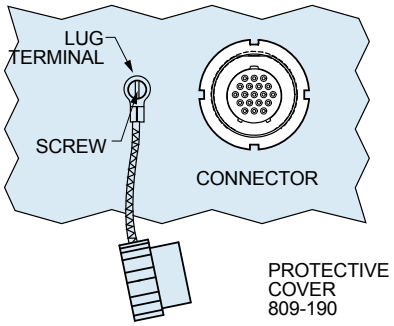


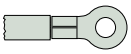


Solid Ring

Dia. Code	Shell Size	Ring I.D.		Ring O.D.	
		In.	mm.	In.	mm.
		± .010	±0.25	± .015	± 0.38
08	5	.385	9.78	.510	12.95
09	6	.445	11.30	.565	14.35
11	7, 8	.570	14.48	.685	17.40
13	9	.635	16.13	.760	19.30
14	10	.695	17.65	.820	20.82
16	13	.885	22.48	1.010	25.65
19	16	1.070	27.17	1.195	30.35
20	17	1.135	28.83	1.250	31.75

Attaching a Cover to a Panel With a Screw

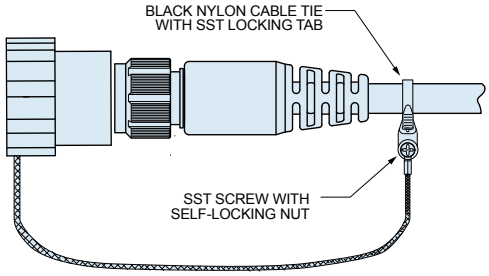




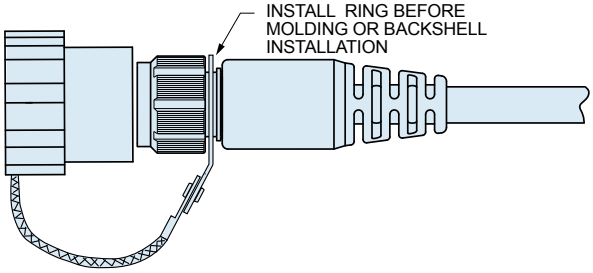
Lug Terminal for Attaching Receptacle Covers to a Panel with a Screw

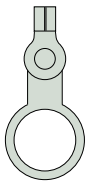
Dia. Code	Screw Size	Ring I.D.		Ring O.D.	
		In.	mm.	In.	mm.
		±.005	±0.13	Max.	Max.
01	#4, M3	.126	3.20	.31	7.9
02	#6	.145	3.68	.31	7.9
06	#8, M4	.188	4.78	.31	7.9
07	#10	.197	5.00	.31	7.9

Attaching a Cover to a Cable Assembly With Type WS Cable Tie



Attaching a Cover to a Cable Assembly With a Solid Ring

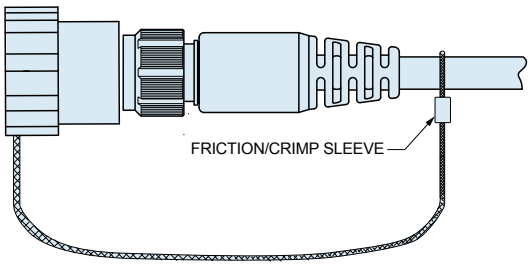




Large Ring

Dia. Code	Shell Size	Ring I.D.		Ring O.D.	
		In.	mm.	In.	mm.
		± .010	±0.25	± .015	± 0.38
08	5,6	.385	9.78	.510	12.95
09	7	.445	11.30	.565	14.35
11	8, 9	.570	14.48	.685	17.40
14	10, 13	.695	17.65	.820	20.82
19	16, 17	1.070	27.17	1.195	30.35

Attaching a Cover to a Cable Assembly With Type SCS Slip Knot



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Series 802 "Aqua Mouse" Submersible Plug Connector Ordering Information
802-008 and 802-009

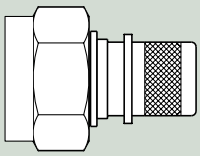
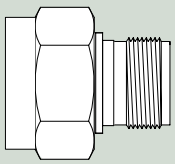
Series 802 Plug

Glenair's Series 802 Mighty Mouse connectors feature stainless steel or marine bronze shells with marine bronze coupling nuts to withstand corrosion in the most hostile environments, and are designed to accommodate (depending on insert arrangement) Glenair size #16, #20HD, or #23 fiber optic termini (termini sold separately.) Metal clips inside the connector body lock the termini into place. Termini are removable. Rated for 3500 PSI when mated, these connectors are suitable for the most demanding geophysical and underwater applications. Terminate cable shield directly to integral shield attachment platform with BAND-IT strap, or choose rear accessory thread to attach optional backshell. Available in shell sizes 1 through 21 in 30 insert arrangements.

D

How to Order Series 802 Plugs

Sample Part Number

802-009	-06	Z1	9-19	A	A
Series	**Shell Style**	**Shell Material / Finish**	**Shell Size- Insert Arrangement**	**Contact Type**	**Shell Key Position**
 **802-008** Plug with Banding/ Molding Platform  **802-009** Plug with Accessory Thread	**-06** Plug	**Z1** Stainless Steel Shell / Passivated, with Marine Bronze Coupling Nut **ZM** Stainless Steel Shell / Electroless Nickel Plated, with Marine Bronze Coupling Nut **AB** Marine Bronze Shell and Coupling Nut / Unplated	SEE ***INSERT ARRANGEMENTS*** PAGES D-2, D-4, D-6	***Connector supplied without termini. Please indicate pin or socket.*** **A** Pin connector, less termini **B** Socket connector, less termini	**A** Normal **B** Pos. B **C** Pos. C **D** Pos. D

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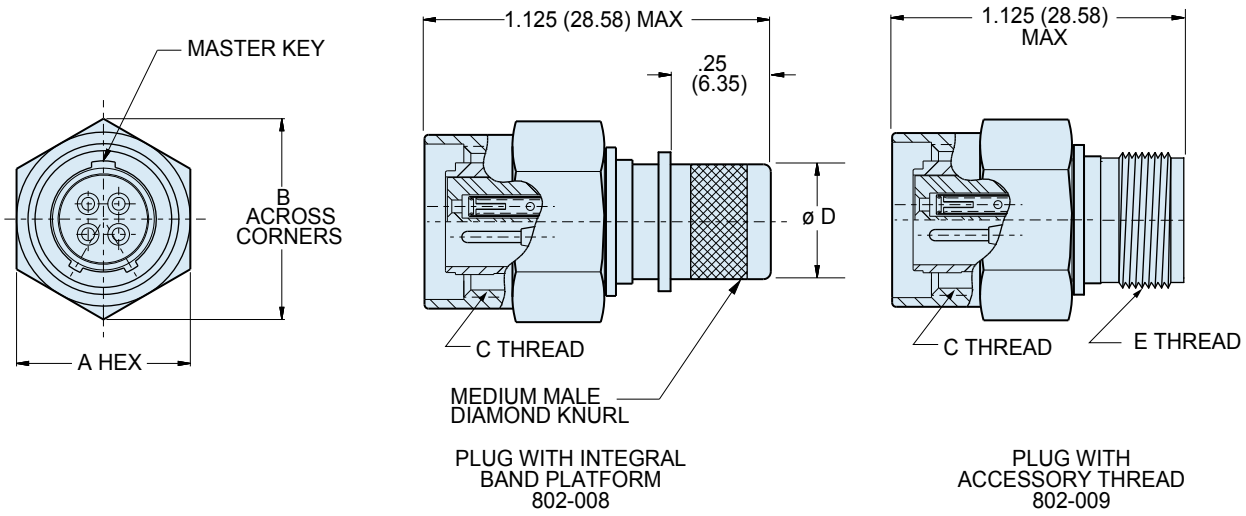
Series 802 "Aqua Mouse" Submersible Plug Connector Dimensions
802-008-06 and 802-009-06

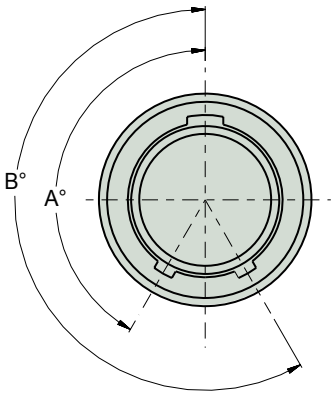


PLUG WITH INTEGRAL BAND PLATFORM 802-008

PLUG WITH ACCESSORY THREAD 802-009

Dimensions								
Shell Size	A Hex		B Max.		C	Ø D		E Threads Accessory
	In.	mm.	In.	mm.	Mating Threads	In.	mm.	
5	.500	12.70	.560	14.22	.438-28 UNEF	.232	5.90	.2500-32 UNEF-2A
6	.625	15.88	.720	18.29	.562-20 UN	.312	7.92	.3125-32 UNEF-2A
7	.688	17.48	.780	19.81	.625-20 UN	.375	9.53	.4375-28 UNEF-2A
8	.750	19.05	.860	21.84	.687-20 UN	.438	11.13	.5000-28 UNEF-2A
9	.812	20.62	.930	23.62	.750-20 UNEF	.500	12.70	.5625-24 UNEF-2A
10	.875	22.23	1.000	25.40	.812-20 UNEF	.562	14.27	.6250-24 UNEF-2A
12	.938	23.83	1.060	26.92	.875-20 UNEF	.656	16.66	.6875-24 UNEF-2A
14	1.125	28.58	1.250	31.75	1.062-20 UN	.812	20.62	.8750-20 UNEF-2A
15	1.188	30.18	1.320	33.53	1.125-20 UN	.885	22.40	.9375-20 UNEF-2A
21	1.562	39.67	1.700	43.18	1.437-20 UN	1.188	30.18	1.2500-18 UNEF-2A

Series 802 Plug Key Positions		
Key Position	Key Rotation	
	A°	B°
Normal (A)	150°	210°
B	75°	210°
C	95°	230°
D	140°	275°



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Series 802 "Aqua Mouse" Submersible Receptacle Ordering Information
802-010 and 802-011

Jam Nut, Rear Mount

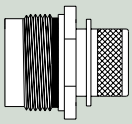
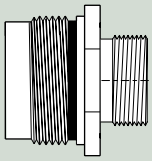
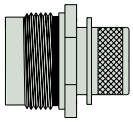
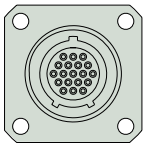
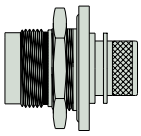
Square Flange

Three Shell Mounting Options: Jam nut with o-ring for rear panel mounting, square flange for front panel mounting, or in-line receptacles for free-hanging cables.
Two Shell Styles: Choose the integral band platform for direct attachment of a cable shield. Install a boot, or overmold a boot over the band platform. An accessory thread is available for attaching strain reliefs and backshells.

D

How to Order Series 802 Crimp Receptacles

Sample Part Number

802-011	-02	Z1	10-26	B	B
Series	**Shell Style**	**Shell Material / Finish**	**Shell Size- Insert Arrangement**	**Contact Type**	**Shell Key Position**
 **802-010** Receptacle with Banding Platform  **802-011** Receptacle with Accessory Thread	 **-01** In-Line  **-02** Square Flange  **-07** Jam Nut for Rear Panel Mounting	**Z1** Stainless Steel / Passivated **ZM** Stainless Steel / Electroless Nickel Plated **AB** Marine Bronze / Unplated	SEE ***INSERT ARRANGEMENTS*** PAGES D-2, D-4, D-6	***Connector supplied without termini. Please indicate pin or socket.*** **A** Pin connector, less termini **B** Socket connector, less termini	**A** Normal **B** Pos. B **C** Pos. C **D** Pos. D

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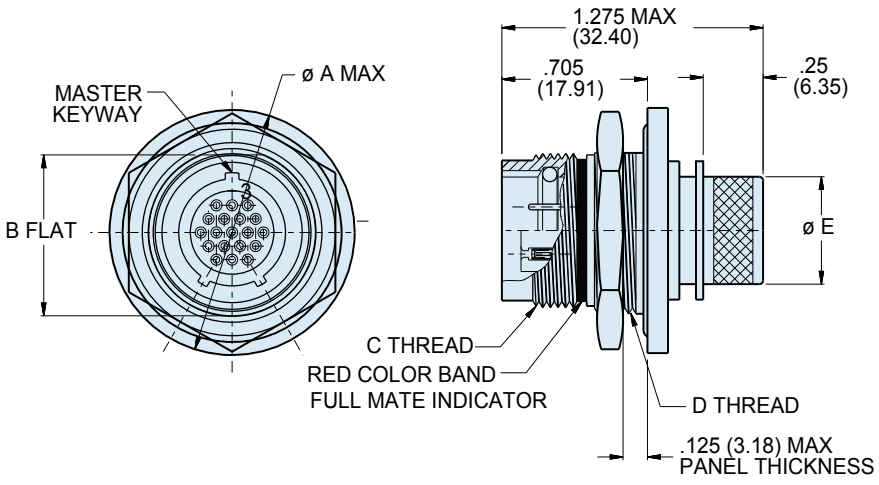
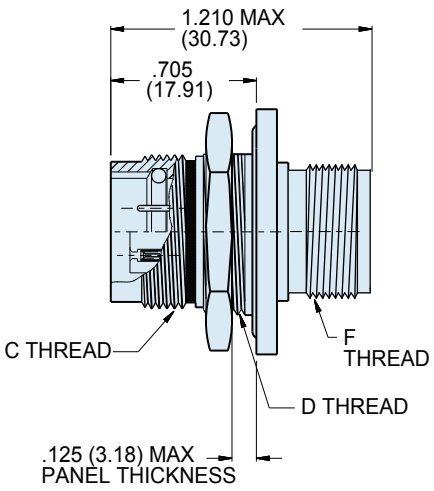
Series 802 "Aqua Mouse" Submersible Jam Nut Receptacle Connector Dimensions

802-010-07 and 802-011-07



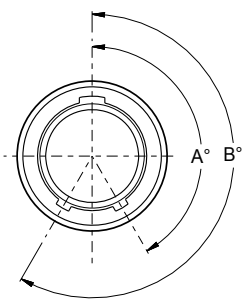
RECEPTACLE WITH INTEGRAL BAND PLATFORM 802-010

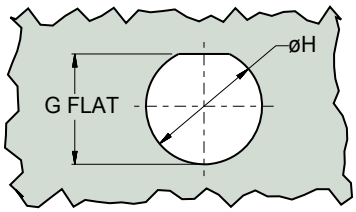


RECEPTALE WITH ACCESSORY THREAD 802-011

Dimensions													
Shell Size	A Max.		B Flat		C Mating Threads	D Jam Nut Threads	Ø E		F Accessory Threads	G Flat		Ø H	
	In.	mm.	In. ± .003	mm. ±0.08			In.	mm.		In. ± .003	mm. ±0.08	In.	mm.
5	.885	22.48	.466	11.84	.438-28 UNEF	.500-32 UN-2A	.232	5.90	.2500-32 UNEF-2A	.477	12.12	.510	12.95
6	1.010	25.65	.591	15.01	.562-20 UN	.625-28 UN-2A	.312	7.92	.3125-32 UNEF-2A	.602	15.29	.635	16.13
7	1.072	27.23	.653	16.59	.625-20 UN	.687-28 UN-2A	.375	9.53	.4375-28 UNEF-2A	.664	16.87	.697	17.70
8	1.135	28.83	.716	18.19	.687-20 UN	.750-28 UN-2A	.438	11.13	.5000-28 UNEF-2A	.727	18.47	.760	19.30
9	1.195	30.35	.778	19.76	.750-20 UNEF	.812-28 UN-2A	.500	12.70	.5625-24 UNEF-2A	.789	20.04	.822	20.88
10	1.260	32.00	.827	21.01	.812-20 UNEF	.875-28 UN-2A	.562	14.27	.6250-24 UNEF-2A	.838	21.29	.885	22.48
12	1.322	33.58	.890	22.61	.875-20 UNEF	.938-28 UN-2A	.656	16.66	.6875-24 UNEF-2A	.901	22.89	.948	24.08
14	1.510	38.25	1.077	27.36	1.062-20 UN	1.125-28 UN-2A	.812	20.62	.8750-20 UNEF-2A	1.088	27.64	1.135	28.83
15	1.572	39.93	1.140	28.96	1.125-20 UN	1.188-28 UN-2A	.885	22.40	.9375-20 UNEF-2A	1.151	29.24	1.198	30.43
21	1.940	49.28	1.464	37.19	1.4375-20 UN	1.500-28 UN-2A	1.188	30.18	1.2500-20 UNEF-2A	1.473	37.41	1.510	39.12

Series 802 Receptacle Key Positions		
Key Position	Key Rotation	
	A°	B°
Normal (A)	150°	210°
B	75°	210°
C	95°	230°
D	140°	275°





RECOMMENDED PANEL CUTOUT

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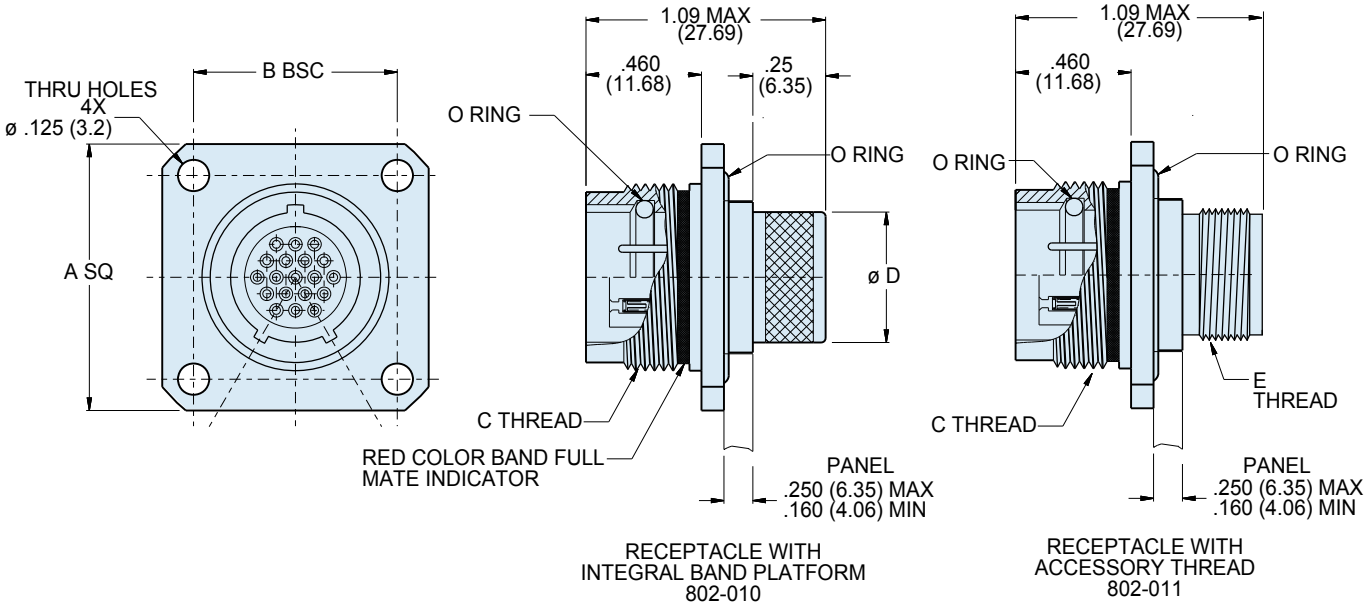
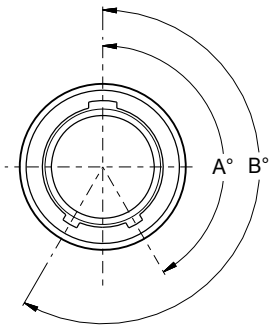
Series 802 "Aqua Mouse" Submersible Square Flange Receptacle Connector Dimensions
802-010-02 and 802-011-02



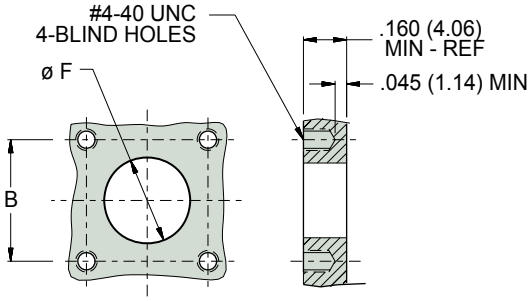
Dimensions										
Shell Size	A Square		B Bsc.		C Mating Threads	Ø D		E Accessory Threads	Ø F	
	In.	mm.	In.	mm.		In.	mm.		In.	mm.
5	.885	22.48	.500	12.70	.438-28 UNEF	.232	5.90	.2500-32 UNEF-2A	.327	8.31
6	1.010	25.65	.625	15.88	.562-20 UN	.312	7.92	.3125-32 UNEF-2A	.390	9.91
7	1.072	27.23	.688	17.48	.625-20 UN	.375	9.53	.4375-28 UNEF-2A	.515	13.08
8	1.135	28.83	.750	19.05	.687-20 UN	.438	11.13	.5000-28 UNEF-2A	.577	14.66
9	1.195	30.35	.812	20.62	.750-20 UNEF	.500	12.70	.5625-24 UNEF-2A	.640	16.26
10	1.260	32.00	.875	22.23	.812-20 UNEF	.562	14.27	.6250-24 UNEF-2A	.702	17.83
12	1.322	33.58	.938	23.83	.875-20 UNEF	.656	16.66	.6875-24 UNEF-2A	.765	19.43
14	1.510	38.25	1.125	28.58	1.062-20 UN	.812	20.62	.8750-20 UNEF-2A	.953	24.21
15	1.573	39.95	1.188	30.18	1.125-20 UN	.885	22.40	.9375-20 UNEF-2A	1.015	25.78
21	1.750	44.45	1.375	34.93	1.4375-20 UN	1.188	30.18	1.2500-20 UNEF-2A	1.312	33.32

Series 802 Receptacle Key Positions

Key Position	Key Rotation	
	A°	B°
Normal (A)	150°	210°
B	75°	210°
C	95°	230°
D	140°	275°



Series 802 Sq Flange Panel Cutout



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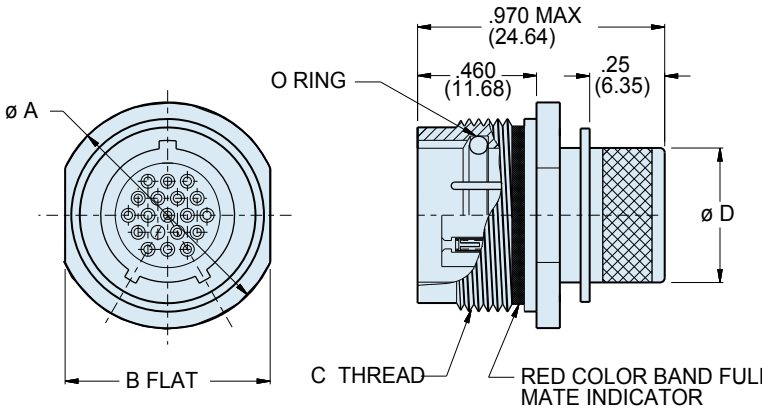
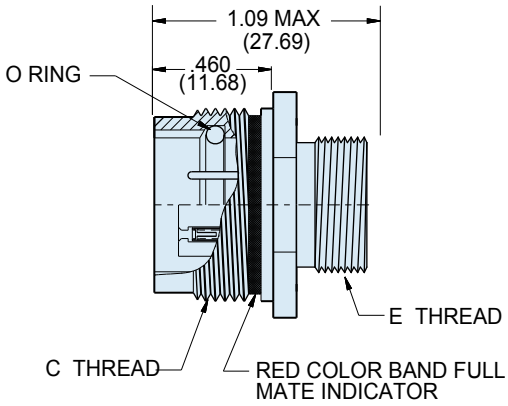
Series 802 "Aqua Mouse" Submersible In-Line Receptacle Connector Dimensions

802-010-01 and 802-011-01

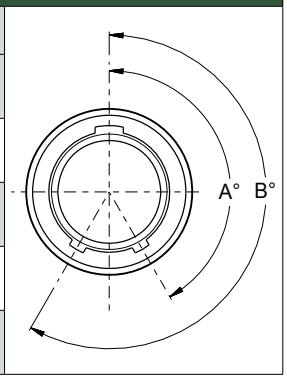


IN-LINE RECEPTABLE WITH
INTEGRAL BAND PLATFORM
802-010



IN-LINE RECEPTACLE WITH
ACCESSORY THREAD
802-011

Dimensions								
Shell Size	Ø A		B Flats		C Mating Threads	Ø D		E Accessory Threads
	In.	mm.	In.	mm.		In.	mm.	
5	.560	14.22	.500	12.70	.438-28 UNEF	.232	5.90	.2500-32 UNEF-2A
6	.720	18.29	.625	15.88	.562-20 UN	.312	7.92	.3125-32 UNEF-2A
7	.780	19.81	.688	17.48	.625-20 UN	.375	9.53	.4375-28 UNEF-2A
8	.860	21.84	.750	19.05	.687-20 UN	.438	11.13	.5000-28 UNEF-2A
9	.930	23.62	.812	20.62	.750-20 UNEF	.500	12.70	.5625-24 UNEF-2A
10	1.000	25.40	.875	22.23	.812-20 UNEF	.562	14.27	.6250-24 UNEF-2A
12	1.060	26.92	.938	23.83	.875-20 UNEF	.656	16.66	.6875-24 UNEF-2A
14	1.250	31.75	1.125	28.58	1.062-20 UN	.812	20.62	.8750-20 UNEF-2A
15	1.320	33.53	1.188	30.18	1.125-20 UN	.885	22.40	.9375-20 UNEF-2A
21	1.690	42.93	1.562	39.67	1.4375-20 UN	1.188	30.18	1.2500-20 UNEF-2A

Series 802 Receptacle Key Positions			
Key Position	Key Rotation		
	A°	B°	
Normal (A)	150°	210°	
B	75°	210°	
C	95°	230°	
D	140°	275°	

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Series 802 "Aqua Mouse" Submersible Protective Cover Ordering Information
660-087 and 660-088

Receptacle Cover

Protect Connectors From Damage – These covers prevent ingress of water and contamination. Stainless steel plug covers feature Viton® O-rings for 3500 PSI sealing. Receptacle covers have a Viton® gasket and are made from marine bronze to minimize galling.

Three Types of Attachment Rings – Choose small diameter eye fittings for panel attachment. Larger rings fit under the jam nut or over cable jackets. Split rings can be installed on fully assembled cables.

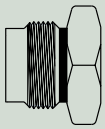
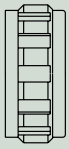
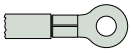
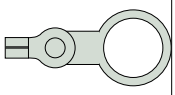
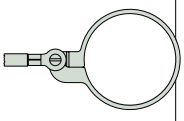
Polyurethane-Coated SST Wire Rope offers high strength, excellent abrasion resistance and good flexibility. Or, choose Teflon® jacket for high temperature exposure.

Braided Nylon Rope provides excellent flexibility and good abrasion resistance, and can be ordered with slip knot fittings for easy installation on any size cable.

D

How to Order Series 802 Protective Covers

Sample Part Number

660-087	– 9	U	04		– 6	
Series	**Shell Size**	**Attachment Type**	**Attachment Code**		**Attachment Length in Inches**	**Alternate Key Position**
 **660-087** Protective Cover for use with Series 802 Plugs  **660-088** Protective Cover for use with Series 802 Receptacles	**-5** **-6** **-7** **-8** **-9** **-10** **-12** **-14** **-15** **-21**	**G** Nylon Rope **H** SST Wire Rope, Teflon® Jacket **N** No Attachment **S** SST Sash Chain **SK** Nylon Rope With Slip Knot **T** SST Wire Rope, No Jacket **U** SST Wire Rope, Polyurethane Jacket "SST" = Stainless Steel	Omit for attachment Types **N** (No Attachment) and **SK** (Slip Knot)		Omit for attachment Type **N** (No Attachment) **Example** "-6" equals six inch length	**Omit for 660-088 receptacle covers** **Omit for plug connectors with standard "A" key position** **B** **C** **D**
			 Small Ring	**01** – .126 (3.20) I.D. **02** – .145 (3.68) I.D. **04** – .188 (4.78) I.D. **06** – .197 (5.00) I.D.		
			 Large Ring	**14** – .385 (9.78) I.D. **15** – .445 (11.30) I.D. **16** – .570 (14.48) I.D. **17** – .635 (16.13) I.D. **18** – .695 (17.65) I.D. **19** – .885 (22.48) I.D. **20** – 1.070 (27.17) I.D. **21** – 1.135 (28.83) I.D. **22** – 1.210 (30.73) I.D. **23** – 1.275 (32.39) I.D. **24** – 1.520 (38.61) I.D.		
			 Split Ring	**50** – .420 (10.67) I.D. **52** – .480 (12.19) I.D. **54** – .635 (16.13) I.D. **56** – .745 (18.92) I.D. **58** – .885 (22.48) I.D. **60** – 1.010 (25.65) I.D. **64** – 1.125 (28.58) I.D. **68** – 1.345 (34.16) I.D. **72** – 1.438 (36.53) I.D.		

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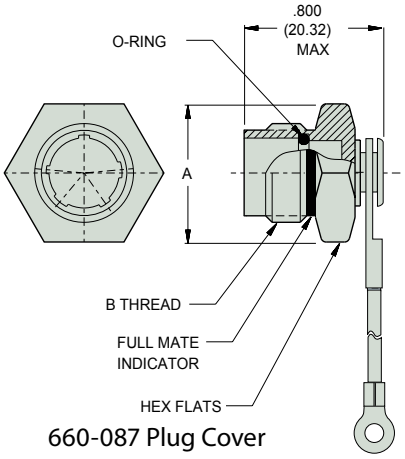
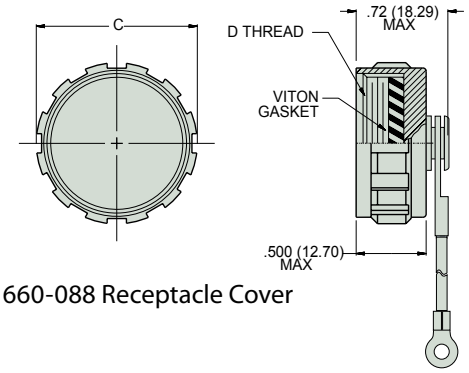
Series 802 "Aqua Mouse" Submersible Protective Cover Dimensions
660-087 and 660-088



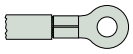
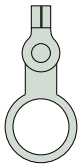
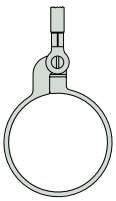
660-087 Plug Cover



660-088 Receptacle Cover

660-087 & -088 Dimensions						
Shell Size	A Hex		B	C Max.		D
	In.	mm.		In.	mm.	
5	.500	12.70	.438-28 UNEF-2A	.590	14.99	.438-28 UNEF-2B
6	.625	15.88	.562-20 UN-2A	.720	18.29	.562-20 UN-2B
7	.688	17.48	.625-20 UN-2A	.780	19.81	.625-20 UN-2B
8	.750	19.05	.687-20 UN-2A	.840	21.34	.687-20 UN-2B
9	.812	20.62	.750-20 UNEF-2A	.900	22.86	.750-20 UNEF-2B
10	.875	22.23	.812-20 UNEF-2A	.970	24.89	.812-20 UNEF-2B
12	.938	23.83	.875-20 UNEF-2A	1.030	26.16	.875-20 UNEF-2B
14	1.125	28.58	1.062-20 UN-2A	1.220	30.99	1.062-20 UN-2B
15	1.188	30.18	1.125-20 UN-2A	1.280	32.51	1.125-20 UN-2B
21	1.562	39.67	1.438-20 UN-2A	1.610	40.89	1.438-20 UN-2B

Materials and Finishes	
Plug Cover	316 stainless steel, passivated
Receptacle Cover	marine bronze, unplated
O-Ring	Viton rubber
Gasket	Viton rubber
Wire,Hardware	Stainless steel, passivated

Attachment Options						
 Small Ring for Attaching Receptacle Covers to a Panel with a Screw	Dia. Code	Screw Size		Ring I.D.		Ring O.D.
				In. ±.005	mm. ±0.13	In. Max.	mm. Max.
	01	#4, M3		.126	3.20	.31	7.9
	02	#6		.145	3.68	.31	7.9
	04	#8, M4		.188	4.78	.31	7.9
	06	#10		.197	5.00	.31	7.9
 Large Solid Ring for Attaching Receptacle Covers to a Jam Nut Receptacle	Dia. Code	Style 07 Jam Nut Shell Size	Style 00 Jam Nut Shell Size	Ring I.D. In. ±.005	Ring I.D. mm. ±0.13	Ring O.D. In. Max.	Ring O.D. mm. Max.
	14		5,6	.385	9.78	.510	12.95
	16	5	7,8	.570	14.48	.685	17.40
	17	6	9	.635	16.13	.760	19.30
	18	7	10	.695	17.65	.820	20.82
	19	8,9,10	12	.885	22.48	1.010	25.65
	20	12	14,15	1.070	27.17	1.195	30.35
	21	14		1.135	28.83	1.270	32.26
	22	15		1.210	30.73	1.312	33.32
	24	21	21	1.520	38.61	1.522	41.20
 Large Split Ring for Attaching Covers to Cables	Dia. Code	Max. Cable Dia.		Min. ID		Max. OD	
	50	.410		.420	10.67	.510	12.95
	52	.470		.480	12.19	.570	14.48
	54	.625		.635	16.13	.726	18.44
	56	.735		.745	18.92	.835	21.21
	58	.875		.885	22.48	.976	24.79
	60	1.000		1.010	25.65	1.101	27.97
	64	1.115		1.125	28.58	1.215	30.86
	68	1.335		1.345	34.16	1.435	36.45
	72	1.416		1.426	36.22	1.526	38.76
Slip Knot (SK) for Attaching Covers toCable	-55° to +100°C., black, very flexible, very good abrasion resistance, good resistance to fuels, .120" (3mm) diameter. Length includes .5" (13mm) diameter loop.						

Lanyard options	
Nylon Rope	-55° to +100°C., black, very flexible, very good abrasion resistance, good resistance to fuels, .120" (3mm) diameter
Polyurethane Coated Wire Rope	Black polyurethane over stainless steel rope, -55° to +125°C., very flexible, excellent abrasion resistance, excellent resistance to fuels, .080" (2mm) diameter
Teflon Jacketed Wire Rope	Translucent FEP jacket over stainless steel rope, -55° to +200°C., fair flexibility, good abrasion resistance, .100" diameter
Sash Chain	Stainless steel, #8 chain, .240" (6mm)

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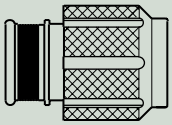
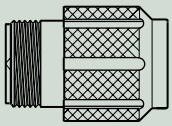
Series 805 Mighty Mouse Triple-Start Plug Connector Ordering Information
805-001 and 805-002

Glenair's Series 805 Mighty Mouse connectors feature a spring mechanism in the coupling nut that locks into radial teeth on the plug barrel. This features allows the Series 805 to stay mated even when under high vibration, without the need for safety wire or torque tools. Connector shells are machined aluminum or stainless steel, and are designed to accommodate (depending on insert arrangement) Glenair size #16, #20HD, or #23 fiber optic termini (termini sold separately.) Metal clips inside the connector body lock the termini into place. Termini are removable. Fluorosilicone seals and rear grommet protect the connector from water ingress. Choose hex or knurled coupling nut. Terminate cable shield directly to connector body with BAND-IT strap, or choose rear accessory thread to attach optional backshell. Available in shell sizes 1 through 21 in 30 insert arrangements.

How to Order

Sample Part Number

805-002	-16	M	8-4	A	A
Series	**Shell Style**	**Shell Material / Finish**	**Shell Size- Insert Arrangement**	**Contact Type**	**Shell Key Position**
 **805-001** Plug with Banding Platform  **805-002** Plug with Accessory Thread	**-16** Plug Connector with Ratcheting Anti-Decoupling Mechanism	**C** Aluminum / Black Anodize (Non-Conductive) RoHS Compliant **M** Aluminum / Electroless Nickel RoHS Compliant **NF** Aluminum / Cadmium with Olive Drab Chromate **ZN** Aluminum / Zinc-Nickel with Olive Drab Chromate **ZNU** Aluminum / Zinc-Nickel with Black Chromate **MT** Aluminum / Nickel-PTFE RoHS Compliant **Z1** Stainless Steel / Passivated RoHS Compliant	SEE ***INSERT ARRANGEMENTS*** PAGES D-2, D-4, D-6	***Connector supplied without termini. Please indicate pin or socket.*** **A** Pin connector, less termini **B** Socket connector, less termini	**A** Position A (Normal) **B** Position B **C** Position C **D** Position D

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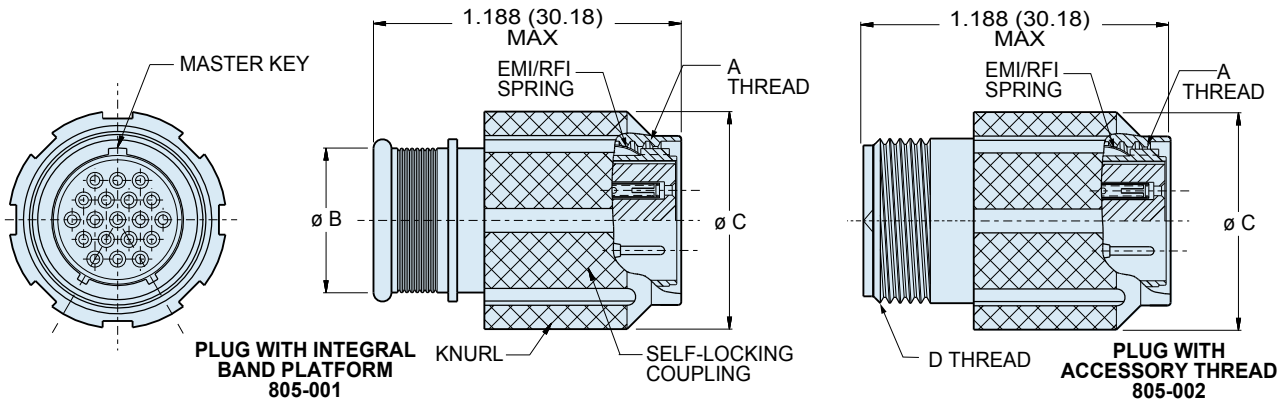
Series 805 Mighty Mouse Triple-Start Plug Connector Dimensions
805-001-16 and 805-002-16



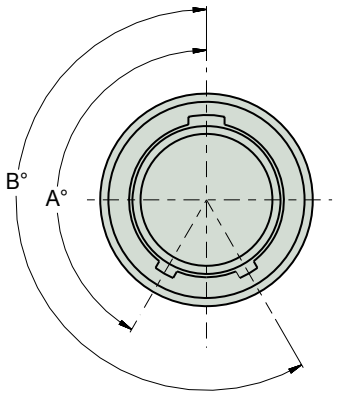
D

Dimensions						
Shell Size	A Threads	Ø B		Ø C		D Threads Accessory
		In.	mm.	In.	mm.	
8	.5000-.1P-.3L-TS-2B	.317	8.05	.691	17.55	.3750-32 UNEF-2A
9	.5625-.1P-.3L-TS-2B	.397	10.08	.787	19.99	.4375-28 UNEF-2A
10	.6250-.1P-.3L-TS-2B	.473	12.01	.826	20.98	.5000-28 UNEF-2A
11	.6875-.1P-.3L-TS-2B	.519	13.18	.916	23.27	.5625-24 UNEF-2A
12	.7500-.1P-.3L-TS-2B	.585	14.86	.982	24.94	.6250-24 UNEF-2A
15	.9375-.1P-.3L-TS-2B	.687	17.45	1.097	27.86	.7500-20 UNEF-2A
18	1.1250-.1P-.3L-TS-2B	.884	22.45	1.290	32.77	.9375-20 UNEF-2A
19	1.1875-.1P-.3L-TS-2B	.884	22.45	1.310	33.27	.9375-20 UNEF-2A
23	1.4375-.1P-.3L-TS-2B	1.135	28.83	1.562	39.67	1.1875-18 UNEF-2A

Performance Specifications	
DWV	#23 500 VAC Sea level, #20HD 750 VAC, #12 AND #16 1800 VAC
Insulation Resistance	5000 Megohms Minimum
Operating Temperature	-55° C. to +150° C.
Immersion, Mated	MIL-STD-810 Method 512. One Meter for One Hour.
EMI	65 dB Minimum from 1 GHz. to 10 GHz.

Materials and Finishes	
Connector Shell	Aluminum or Stainless Steel
Insulator	Liquid Crystal Polymer (LCP)
Seals	Fluorosilicone Rubber, Blue
Pin Contact	Copper Alloy, Gold over Nickel Plating
Socket Contact	Copper Alloy, Gold over Nickel Plating, with SST Hood
Contact Retainer Clip	Copper alloy, Unplated

Series 805 Key Positions



Key Position	Key Rotation	
	A	B
Normal (A)	150°	210°
B	75°	210°
C	95°	230°
D	140°	275°

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Series 805 Mighty Mouse Triple-Start Crimp Receptacle Ordering Information
805-003 and 805-004

Series 805 Triple-Start Jam Nut Connector

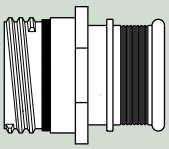
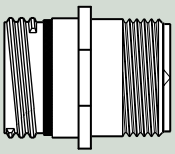
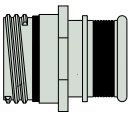
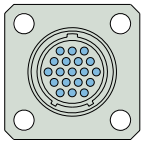
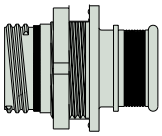
Three Shell Mounting Options
Jam nut with O-ring for rear panel mounting, square flange for front or rear panel mounting, or in-line receptacles for free-hanging cables.

Gold-Plated Crimp Contacts are held in place with beryllium copper retention clips. Contacts are removable.

Two Shell Styles: Choose ***integral band platform*** for direct attachment of a cable shield. Install a boot, or overmold a boot over the band platform. An ***accessory thread*** is available for attaching strain reliefs and backshells.

How to Order

Sample Part Number

805-004	-02	NF	9-10	B	A
Series	**Shell Style**	**Shell Material / Finish**	**Shell Size- Insert Arrangement**	**Contact Type**	**Shell Key Position**
 **805-003** Receptacle with Banding Platform  **805-004** Receptacle with Accessory Thread	 **-01** In-Line  **-02** Square Flange  **-07** Jam Nut for Rear Panel Mounting	**C** Aluminum / Black Anodize (Non-Conductive) RoHS Compliant **M** Aluminum / Electroless Nickel RoHS Compliant **NF** Aluminum / Cadmium with Olive Drab Chromate **ZN** Aluminum / Zinc-Nickel with Olive Drab Chromate **ZNU** Aluminum / Zinc-Nickel with Black Chromate **MT** Aluminum / Nickel-PTFE RoHS Compliant **Z1** Stainless Steel / Passivated RoHS Compliant	SEE ***INSERT ARRANGEMENTS*** PAGES D-2, D-4, D-6	***Connector supplied without termini. Please indicate pin or socket.*** **A** Pin connector, less termini **B** Socket connector, less termini	**A** Position A (Normal) **B** Position B **C** Position C **D** Position D

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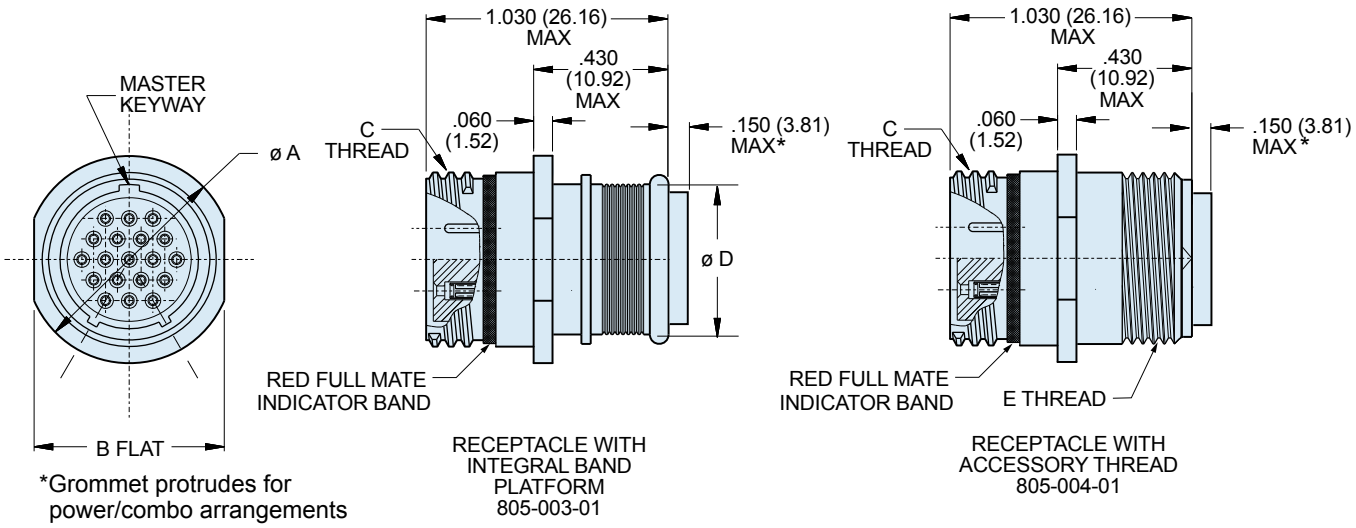
Series 805 Mighty Mouse Triple-Start In-Line Receptacle Dimensions

805-003-01 and 805-004-01

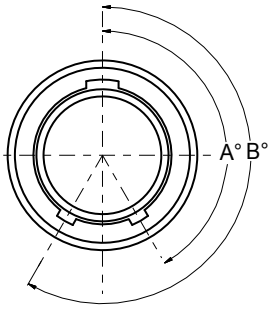


Dimensions								
Shell Size	Ø A		B		C Threads	Ø D		E Threads Accessory
	In.	mm.	In.	mm.		In.	mm.	
8	.540	13.72	.510	12.95	.5000-.1P-.3L-TS-2A	.316	8.05	.3750-32 UNEF-2A
9	.605	15.37	.575	14.61	.5625-.1P-.3L-TS-2A	.397	10.08	.4375-28 UNEF-2A
10	.668	16.96	.638	16.21	.6250-.1P-.3L-TS-2A	.472	12.01	.5000-28 UNEF-2A
11	.730	18.54	.700	17.78	.6875-.1P-.3L-TS-2A	.519	13.18	.5625-24 UNEF-2A
12	.793	20.14	.763	19.38	.7500-.1P-.3L-TS-2A	.585	14.86	.6250-24 UNEF-2A
15	.980	24.89	.950	24.13	.9375-.1P-.3L-TS-2A	.687	17.45	.7500-20 UNEF-2A
18	1.165	29.59	1.135	28.83	1.1250-.1P-.3L-TS-2A	.884	22.45	.9375-20 UNEF-2A
19	1.235	31.37	1.205	30.61	1.1875-.1P-.3L-TS-2A	.884	22.45	.9375-20 UNEF-2A
23	1.485	37.72	1.455	36.96	1.4375-.1P-.3L-TS-2A	1.134	28.80	1.1875-18 UNEF-2A

Performance Specifications	
DWV	#23 500 VAC Sea level, #20HD 750 VAC, #12 AND #16 1800 VAC
Insulation Resistance	5000 Megohms Minimum
Operating Temperature	-55° C. to +150° C.
Immersion, Mated	MIL-STD-810 Method 512. One Meter for One Hour.
EMI	65 dB Minimum from 1 GHz. to 10 GHz.

Materials and Finishes	
Connector Shell	Aluminum or Stainless Steel
Insulator	Liquid Crystal Polymer (LCP)
Seals	Fluorosilicone Rubber, Blue
Pin Contact	Copper Alloy, Gold over Nickel Plating
Socket Contact	Copper Alloy, Gold over Nickel Plating, with SST Hood
Contact Retainer Clip	Copper alloy, Unplated

Series 805 Key Positions



Key Position	Key Rotation	
	A	B
Normal (A)	150°	210°
B	75°	210°
C	95°	230°
D	140°	275°

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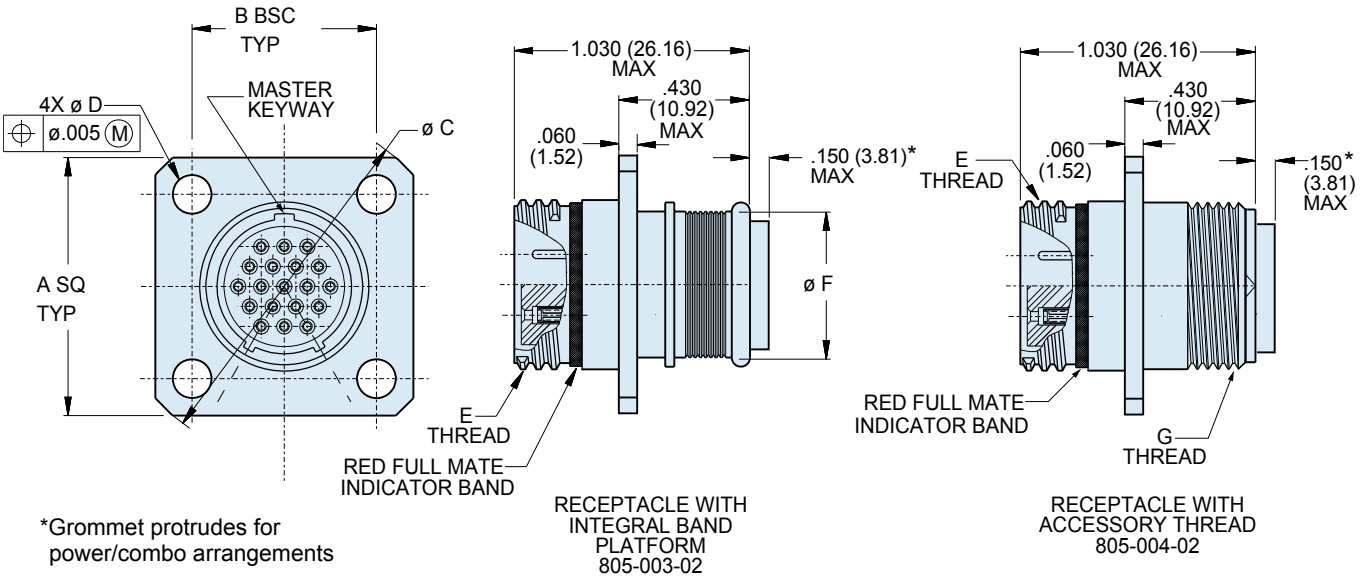
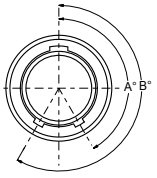
Series 805 Mighty Mouse Triple-Start Square Flange Receptacle Dimensions
805-003-02 and 805-004-02



Dimensions												
Shell Size	A		B		ØC		ØD		E Threads	Ø F		G Threads Accessory
							In. ± .003	mm. ± .08				
	In.	mm.	In.	mm.	In.	mm.				In.	mm.	
8	.850	21.59	.660	16.76	1.150	29.21	.094	2.39	.5000-.1P-.3L-TS-2A	.316	8.05	.3750-32 UNEF-2A
9	.913	23.19	.723	18.36	1.230	31.24	.094	2.39	.5625-.1P-.3L-TS-2A	.397	10.08	.4375-28 UNEF-2A
10	.975	24.77	.785	19.94	1.330	33.78	.094	2.39	.6250-.1P-.3L-TS-2A	.472	12.01	.5000-28 UNEF-2A
11	1.039	26.39	.848	21.54	1.410	35.81	.094	2.39	.6875-.1P-.3L-TS-2A	.519	13.18	.5625-24 UNEF-2A
12	1.099	27.91	.909	23.09	1.500	38.10	.094	2.39	.7500-.1P-.3L-TS-2A	.585	14.86	.6250-24 UNEF-2A
15	1.288	32.74	1.058	26.87	1.750	44.45	.128	3.25	.9375-.1P-.3L-TS-2A	.687	17.45	.7500-20 UNEF-2A
18	1.475	37.47	1.255	31.88	2.000	50.80	.128	3.25	1.1250-.1P-.3L-TS-2A	.884	22.45	.9375-20 UNEF-2A
19	1.537	71.06	1.327	33.71	2.094	53.19	.128	3.25	1.1875-.1P-.3L-TS-2A	.884	22.45	.9375-20 UNEF-2A
23	1.787	45.39	1.570	39.88	2.440	61.98	.128	3.25	1.4375-.1P-.3L-TS-2A	1.134	28.80	1.1875-18 UNEF-2A

Performance Specifications	
DWV	#23 500 VAC Sea level, #20HD 750 VAC, #12 AND #16 1800 VAC
Insulation Resistance	5000 Megohms Minimum
Operating Temperature	-55° C. to +150° C.
Immersion, Mated	MIL-STD-810 Method 512. One Meter for One Hour.
EMI	65 dB Minimum from 1 GHz. to 10 GHz.
Materials and Finishes	
Connector Shell	Aluminum or Stainless Steel
Insulator	Liquid Crystal Polymer (LCP)
Seals	Fluorosilicone Rubber, Blue
Contact	Copper Alloy, Gold over Nickel Plating
Contact Retainer Clip	Copper alloy, Unplated

Series 805 Key Positions



Key Position	Key Rotation	
	A	B
Normal (A)	150°	210°
B	75°	210°
C	95°	230°
D	140°	275°

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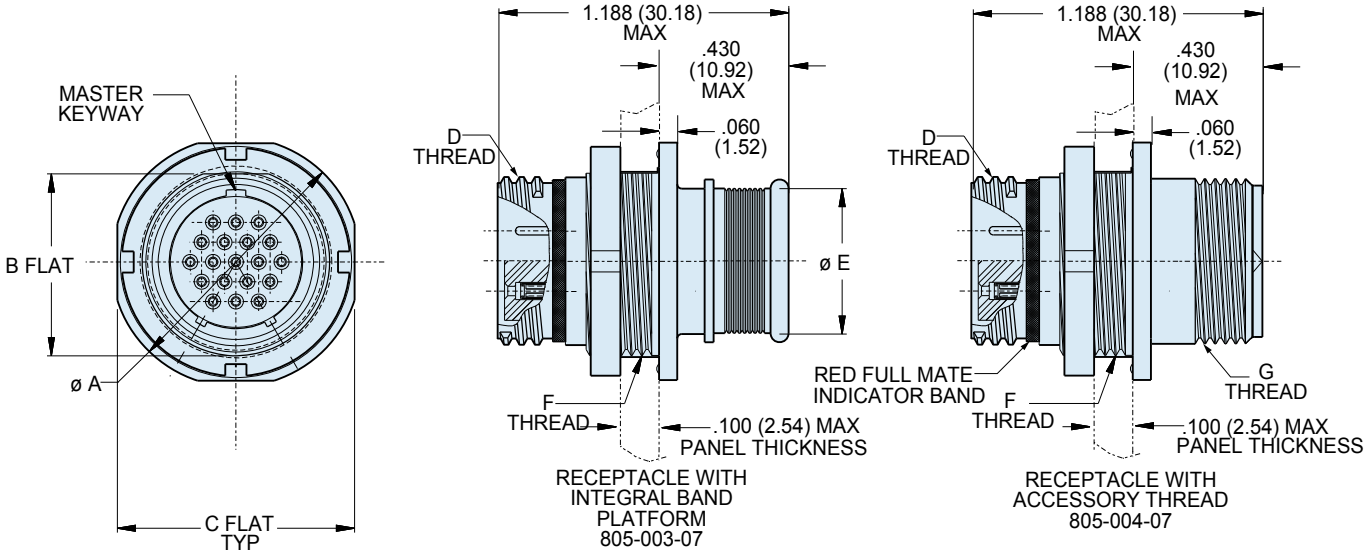
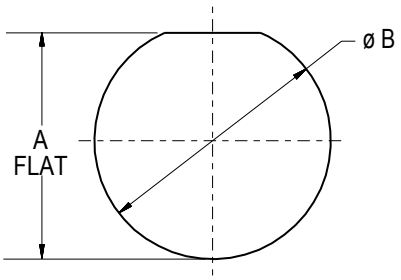
Series 805 Mighty Mouse Triple-Start Jam Nut Receptacle Dimensions

805-003-07 and 805-004-07



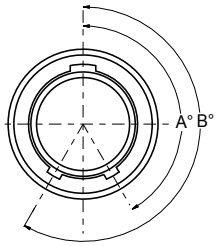
Dimensions											
Shell Size	Ø A		B		C		D Threads	Ø E		F Threads	G Threads Accessory
	In.	mm.	In.	mm.	In.	mm.		In.	mm.		
8	.760	19.30	.535	13.59	.730	18.54	.5000-.1P-.3L-TS-2A	.317	8.05	.5625-28 UNEF-2A	.3750-32 UNEF-2A
9	.880	22.35	.661	16.79	.850	21.59	.5625-.1P-.3L-TS-2A	.397	10.08	.6875-28 UN-2A	.4375-28 UNEF-2A
10	.880	22.35	.661	16.79	.850	21.59	.6250-.1P-.3L-TS-2A	.473	12.01	.6875-28 UN-2A	.5000-28 UNEF-2A
11	.955	24.26	.721	18.31	.925	23.50	.6875-.1P-.3L-TS-2A	.519	13.18	.7500-28 UN-2A	.5625-24 UNEF-2A
12	1.060	26.92	.784	19.91	1.035	26.29	.7500-.1P-.3L-TS-2A	.585	14.86	.8125-28 UN-2A	.6250-24 UNEF-2A
15	1.203	30.56	.970	24.64	1.173	29.79	.9375-.1P-.3L-TS-2A	.687	17.45	1.0000-28 UN-2A	.7500-20 UNEF-2A
18	1.389	35.28	1.147	29.13	1.359	34.52	1.1250-.1P-.3L-TS-2A	.884	22.45	1.1875-28 UN-2A	.9375-20 UNEF-2A
19	1.450	36.83	1.221	31.01	1.420	36.07	1.1875-.1P-.3L-TS-2A	.884	22.45	1.2500-28 UN-2A	.9375-20 UNEF-2A
23	1.705	43.31	1.470	37.34	1.675	42.55	1.4375-.1P-.3L-TS-2A	1.134	28.80	1.500-25 UN-2A	1.1875-18 UNEF-2A

Panel Cutout For Jam Nut Receptacle



Shell Size	A Flat		Ø B	
	In. ± .002	mm. ± 0.05	In. ± .005	mm. ± 0.13
8	.543	13.79	.572	14.53
9	.669	16.99	.698	17.73
10	.669	16.99	.698	17.73
11	.729	18.51	.760	19.30
12	.792	20.17	.822	20.88
15	.978	24.84	1.010	25.65
18	1.155	29.34	1.198	30.43
19	1.231	31.27	1.260	32.00
23	1.480	37.59	1.510	38.35

Series 805 Key Positions



Key Position	Key Rotation	
	A	B
Normal (A)	150°	210°
B	75°	210°
C	95°	230°
D	140°	275°

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Series 805 Mighty Mouse Triple-Start Protective Cover Ordering Information
667-261 and 667-262

Plug Cover

Receptacle Cover

Protect Connectors From Damage
Machined aluminum or stainless steel protective covers have fluorosilicone gasket for a watertight fit.

Stainless Steel Fittings and Rings
Choose small diameter eye fittings for panel attachment. Larger rings fit under the jam nut or over cable jackets. Split rings can be installed on fully assembled cables.

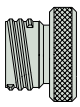
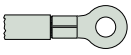
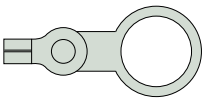
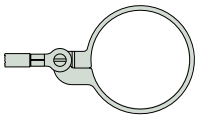
Polyurethane-Coated SST Wire Rope offers high strength, excellent abrasion resistance and good flexibility. Or, choose Teflon® jacket for high temperature exposure.

Braided Nylon Rope provides excellent flexibility and good abrasion resistance, and can be ordered with slip knot fittings for easy installation on any size cable.

D

How to Order

Sample Part Number

667-262	-M	-G	9	04		-6
Series	**Shell Material / Finish**	**Attachment Type**	**Shell Size**	**Attachment Code**		**Attachment Length in Inches**
 **667-261** Protective Cover for use with Series 805 Plugs **667-262** Protective Cover for use with Series 805 Receptacles	**-C** Aluminum / Black Anodize (Non-Conductive) RoHS Compliant **-M** Aluminum / Electroless Nickel RoHS Compliant **-NF** Aluminum / Cadmium with Olive Drab Chromate **-ZN** Aluminum / Zinc-Nickel with Olive Drab Chromate **-ZNU** Aluminum / Zinc-Nickel with Black Chromate **-MT** Aluminum / Nickel-PTFE RoHS Compliant **-Z1** Stainless Steel / Passivated RoHS Compliant	**-G** Nylon Rope **-H** SST Wire Rope, Teflon® Jacket **-N** No Attachment **-S** SST Sash Chain **-SK** Nylon Rope With Slip Knot **-T** SST Wire Rope, No Jacket **-U** SST Wire Rope, Polyurethane Jacket "SST" = Stainless Steel	**8** **9** **10** **11** **12** **15** **18** **19** **23**	Omit for attachment Types **N** (No Attachment) and **SK** (Slip Knot)		Omit for attachment Type **N** (No Attachment) **Example** "-6" equals six inch length
				 Small Ring	**01** – .126 (3.20) I.D. **02** – .145 (3.68) I.D. **04** – .188 (4.78) I.D. **06** – .197 (5.00) I.D.	
				 Large Ring	**14** – .385 (9.78) I.D. **16** – .570 (14.48) I.D. **17** – .635 (16.13) I.D. **18** – .695 (17.65) I.D. **24** – .766 (19.46) I.D. **19** – .885 (22.48) I.D. **20** – 1.070 (27.17) I.D. **22** – 1.210 (30.73) I.D. **23** – 1.275 (32.39) I.D. **25** – 1.530 (38.86) I.D.	
				 Split Ring	**50** – .420 (10.67) I.D. **52** – .480 (12.19) I.D. **54** – .635 (16.13) I.D. **56** – .745 (18.92) I.D. **58** – .885 (22.48) I.D. **60** – 1.010 (25.65) I.D. **64** – 1.125 (28.58) I.D. **68** – 1.345 (34.16) I.D.	

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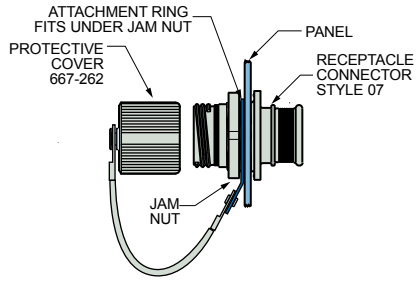
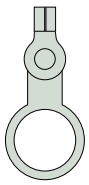
Series 805 Mighty Mouse Triple-Start
Protective Cover Dimensions
667-262

Attaching a 667-262 Receptacle Cover to a Rear Panel Mounted Jam Nut Receptacle

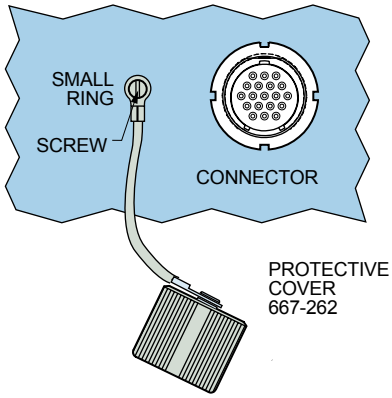


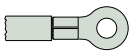


Solid Ring

Dia. Code	Shell Size	Ring I.D.		Ring O.D.	
		In.	mm.	In.	mm.
		± .010	±0.25	± .015	± 0.38
16	8	.570	14.48	.685	17.40
18	9, 10	.695	17.65	.820	20.82
24	11	.766	19.46	1.140	28.96
19	12	.885	22.48	1.010	25.65
20	15	1.070	27.17	1.195	30.35
22	18	1.210	30.73	1.312	33.32
23	19	1.275	32.39	1.375	34.93
25	23	1.530	38.86	1.781	45.24

Attaching a 667-262 Receptacle Cover to a Panel With a Screw

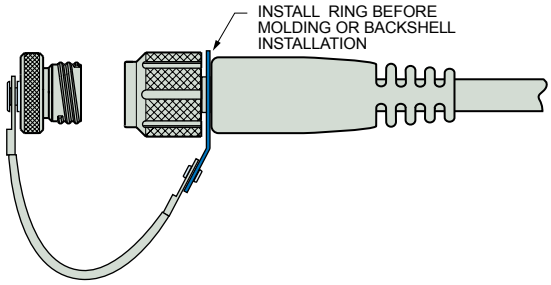


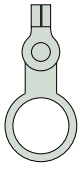


Small Ring for Attaching Receptacle Covers to a Panel with a Screw

Dia. Code	Screw Size	Ring I.D.		Ring O.D.	
		In.	mm.	In.	mm.
		±.005	±0.13	Max.	Max.
01	#4, M3	.126	3.20	.31	7.9
02	#6	.145	3.68	.31	7.9
04	#8, M4	.188	4.78	.31	7.9
06	#10	.197	5.00	.31	7.9

Attaching a Cover to a Cable Assembly With a Solid Ring

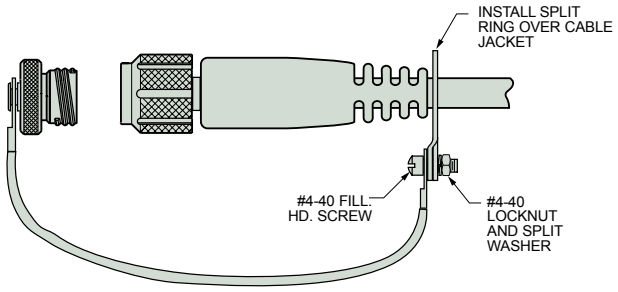


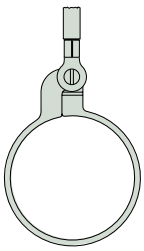


Solid Ring

Dia. Code	Shell Size	Ring I.D.		Ring O.D.	
		In.	mm.	In.	mm.
		± .010	±0.25	± .015	± 0.38
14	8	.385	9.78	.510	12.95
16	9, 10, 11	.570	14.48	.685	17.40
17	12	.635	16.13	.760	19.30
19	15	.885	22.48	1.010	25.65
20	18, 19	1.070	27.17	1.195	30.35
22	23	1.210	30.73	1.312	33.32

Attaching a Cover to a Cable Using a Split Ring or Slip Knot





Large Split Ring for Attaching Covers to Cables

Dia. Code	Max. Cable Dia. (in.)	Ring Diameter			
		Min. ID		Max. OD	
		In.	mm.	In.	mm.
50	.410	.420	10.67	.580	14.73
52	.470	.480	12.19	.640	16.26
54	.625	.635	16.13	.796	20.22
56	.735	.745	18.92	.905	22.99
58	.875	.885	22.48	1.046	26.57
60	1.000	1.010	25.65	1.171	29.74
64	1.115	1.125	28.58	1.285	32.64
68	1.335	1.345	34.16	1.505	38.23

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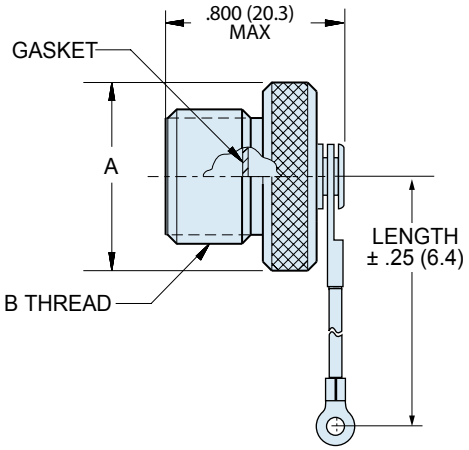
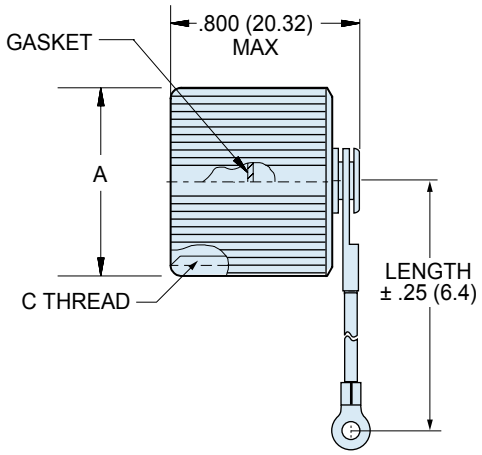
Series 805 Mighty Mouse Triple-Start Protective Cover Dimensions
667-261 and 667-262



667-261 Plug Cover



667-262 Receptacle Cover

Dimensions				
Shell Size	A Max.		B	C
	In.	mm.		
8	.653	16.59	.5000-.1P-.3L-TS-2A	.5000-.1P-.3L-TS-2B
9	.715	18.16	.5625-.1P-.3L-TS-2A	.5625-.1P-.3L-TS-2B
10	.778	19.76	.6250-.1P-.3L-TS-2A	.6250-.1P-.3L-TS-2B
11	.841	21.36	.6875-.1P-.3L-TS-2A	.6875-.1P-.3L-TS-2B
12	.903	22.94	.7500-.1P-.3L-TS-2A	.7500-.1P-.3L-TS-2B
15	1.091	27.71	.9375-.1P-.3L-TS-2A	.9375-.1P-.3L-TS-2B
18	1.278	32.46	1.1250-.1P-.3L-TS-2A	1.1250-.1P-.3L-TS-2B
19	1.340	34.04	1.1870-.1P-.3L-TS-2A	1.1870-.1P-.3L-TS-2B
23	1.600	40.64	1.4375-.1P-.3L-TS-2A	1.4375-.1P-.3L-TS-2B

Materials and Finishes	
Cover	Aluminum alloy or stainless steel
Gasket	Fluorosilicone rubber
Wire,Hardware	Stainless steel, passivated

Lanyard options	
Nylon Rope	-55° to +100°C., black, very flexible, very good abrasion resistance, good resistance to fuels, .120" (3mm) diameter
Polyurethane Coated Wire Rope	Black polyurethane over stainless steel rope, -55° to +125°C., very flexible, excellent abrasion resistance, excellent resistance to fuels, .080" (2mm) diameter
Teflon Jacketed Wire Rope	Translucent FEP jacket over stainless steel rope, -55° to +200°C., fair flexibility, good abrasion resistance, .100" diameter
Sash Chain	Stainless steel, #8 chain, .240" (6mm)
Sash Chain for attaching covers to cable	55° to +100°C., black, very flexible, very good abrasion resistance, good resistance to fuels, .120" (3mm) diameter. Length includes .5" (13mm) diameter loop.

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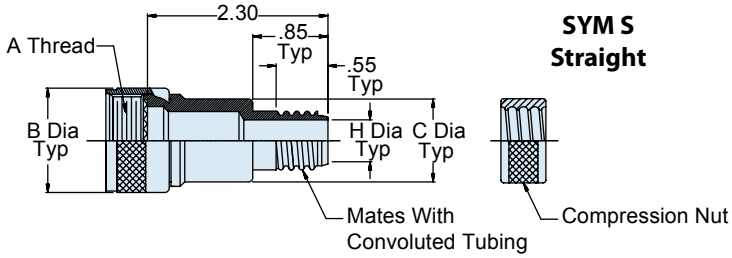
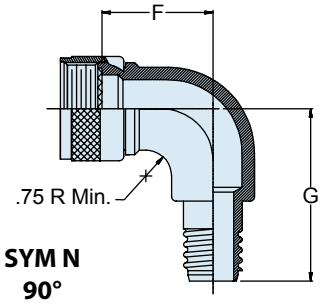
Series 80 Convoluted Tubing Backshell

How to Order

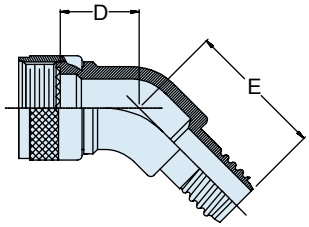
Product Series	Angular Function S = Straight N = 90° M = 45°		Finish Sym. (Table II)	Conduit Size (Table III)		
189	M	S	052	NF	12	12	K
	Conn. Designator		Basic No.	Size Code (Table I)		K = Peek Tubing See 120-108 (Omit for E, F, P, or T) See 120-100



SYM S
Straight



SYM N
90°



SYM M
45°

Table I: Shell Size							
Shell Size	A Thread Class 2B	B Max	C	D Max	E Max	F Max	G Max
12	.6875-24 UNEF	.91 (23.1)	.620 (15.7)	.910 (23.1)	1.250 (31.8)	1.985 (50.4)	2.395 (60.8)
14	.9375-20 UNEF	1.25 (31.8)	.875 (22.2)	1.020 (25.9)	1.370 (34.8)	2.115 (53.7)	2.465 (62.6)

Table II: Finish	
SYM	Finish
M	Electroless Nickel
NF	Cadmium/Olive Drab over Electroless Nickel (500 Hr. Salt Spray)

Table III: PEEK Conduit Size		
Frac. Size	Dash No.	H Max
3/8	12	.320 (8.1)
1/2	16	.425 (10.8)
5/8	20	.550 (14.0)
3/4	24	.680 (17.3)

Material and Finish

Adapter, Coupling Nut and Compression Nut: AL Alloy/see Table II
O-Ring: Fluorosilicone
Detent Spring: Torlon

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FIBER OPTIC

EYE-BEAM® GLT

EXPANDED BEAM FIBER OPTIC CONNECTION SYSTEM

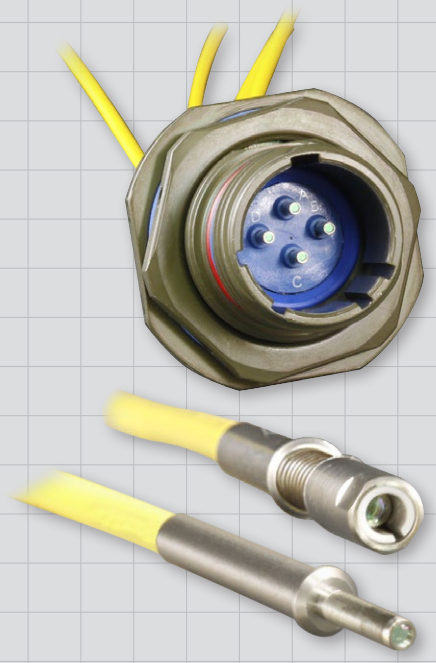
Glenair Eye-Beam® GLT expanded-beam grin-lens termini utilize an innovative free floating lens and ultra high precision ceramic alignment sleeves as well as custom designed terminus bodies to ensure perfect alignment of optical signals and optimal optical performance. Eye-Beam® GLT termini can be integrated into virtually any circular or rectangular connector package.

Glenair®

GLENAIR, INC. • 1211 Air Way • Glendale, CA 91201-2497 • Tel: 818-247-6000 • Email: sales@glenair.com • www.glenair.com

The revolutionary new expanded beam fiber optic connection system from Glenair

Eye-Beam® GLT is supplied as a factory terminated point-to-point jumper. Jumpers are supplied in numerous contact formats for use with most high performance, tactical fiber optic connection systems: MIL-DTL-38999, MIL-PRF-28876, GFOCA, and Series 80 Mighty Mouse, and are suitable for use in hybrid electrical/optical interconnect applications.



Product No.	Description	Page No.
Glenair Eye-Beam® GLT Expanded Beam Fiber Optic System		
	Glenair Eye-Beam® GLT Fiber Optic System Overview	E-2
FA1000	Glenair Eye-Beam® GLT Fiber Optic Jumpers	E-3

E

Catalog Notes

Metric dimensions appear in parentheses in diagrams and tables, based on 1 inch = 25.4 mm, for reference only.
Unless otherwise specified, the following other dimensional tolerances apply:
.xx = ± .03 (0.8) • .xxx = ± .015 (0.4) • Angles = ± 5°

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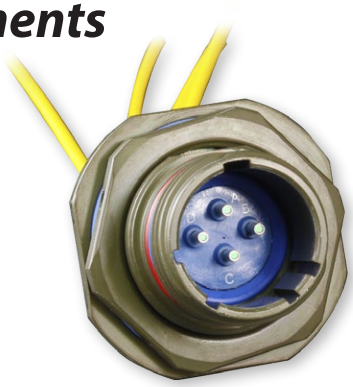
Eye-Beam® GLT Expanded Beam Fiber Optic Connection System

Eye-Beam® GLT Expanded Beam fiber optic termini integrated into ruggedized reverse-bayonet power connectors

- All the benefits of an expanded beam connection system built into a versatile F/O terminus
- Factory-terminated F/O Eye-Beam® GLT termini easily integrated into any connector package
- Innovative expanded beam lens terminus expands signal 27X from a standard 9.3 micron fiber core
- Revolutionary design delivers low dB loss (1.5 dB multimode, 2.0 dB singlemode untuned) performance while reducing maintenance, inspection and test costs
- Ultra-high precision ceramic sleeves and custom designed terminus bodies ensure axial alignment

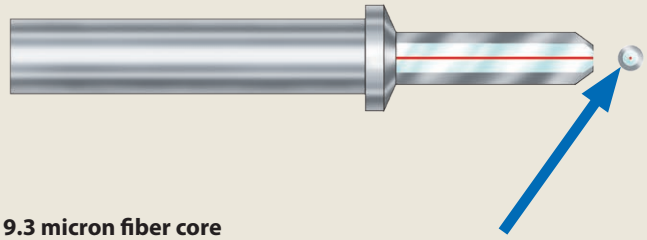
Innovative expanded beam termini deliver optimal performance in harsh environments



Eye-Beam® GLT Expanded Beam fiber optic termini can be integrated into virtually any circular or rectangular connector package. Factory terminated lens pin termini and lens socket termini on cable jumpers allow for easy fusion splicing in the field.

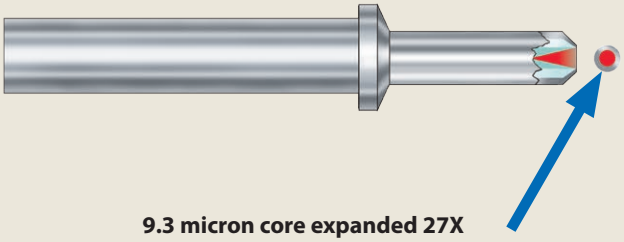
Comparison of standard butt-joint fiber optic terminus to Eye-Beam® GLT expanded beam fiber optic terminus

Butt-Joint Fiber Optic Terminus



9.3 micron fiber core
Fiber surfaces exposed and susceptible to damage
Must be cleaned prior to mating

Eye-Beam® GLT Expanded Beam Fiber Optic Terminus



9.3 micron core expanded 27X
Fiber surfaces protected from contamination
Lens surface easy to clean

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Eye-Beam® GLT Expanded Beam Fiber Optic Connection System

How To Order factory terminated Eye-Beam® GLT jumpers

1. Eye-Beam® GLT system part numbers begin with the FA1000 Basic Part Number
2. Select fiber size (Consult factory for additional options)
3. Select operating wavelength
4. Select jumper cable configuration. Jumpers are supplied standard with 36 inches of fiber cable. Specific lengths available in part number breakdown as shown below.

Basic Part Number

Operating Wavelength
85 = 850nm
13 = 1300/1310nm
15 = 1550nm

End B *(See Table II)*

Temperature Rating:
A = -40°C to +85°C
B = -55°C to +125°C
C = Customer Specified*

FA1000 - 50 - 85 A 1 - XXXX A

Fiber Size
09 = 9.3/125 Singlemode
50 = 50/125 Multimode
62 = 62.5/125 Multimode

End A *(See Table I)*

Length in Inches
Ex: -0040 = 40 inches
(Omit for Standard 36 Inches)

Table I: Eye-Beam® GLT Termini

Designator	Description	Connector Series
A	M29504/04 Style Pin (181-070)	MIL-DTL-38999 Series III
	Mighty Mouse Size 16 Pin (181-070)	Series 80 Mighty Mouse
B	M29504/05 Style Socket (181-071)	MIL-DTL-38999 Series III
C	M29504/14 Style Pin (181-095)	MIL-PRF-28876
D	M29504/15 Style Socket (181-096)	MIL-PRF-28876
F	Mighty Mouse Size 16 Socket (181-083)	Series 80 Mighty Mouse
G	GFR Pin (181-082)	Glenair GFR System
H	GFR Socket (181-081)	Glenair GFR System
J	GFOCA Termini (181-067)	GFOCA (hermaphroditic)

Table II: Eye-Beam® GLT Termini and Commercial Connectors

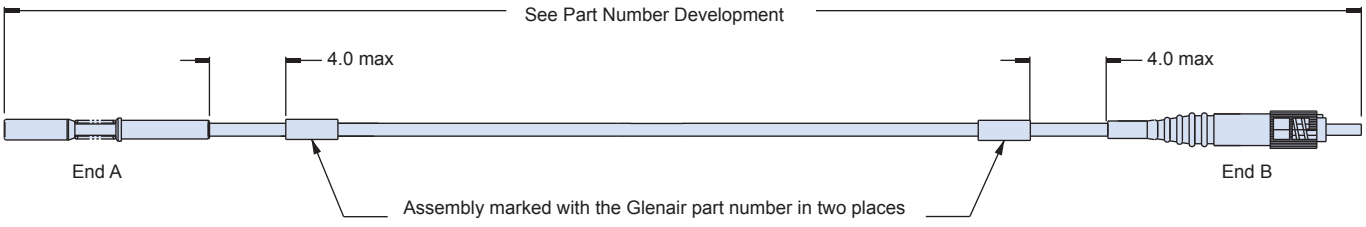
A	M29504/04 Style Pin (181-070)
	Mighty Mouse Size 16 Pin (181-070)
B	M29504/05 Style Socket (181-071)
C	M29504/14 Style Pin (181-095)
D	M29504/15 Style Socket (181-096)
F	Mighty Mouse Size 16 Socket (181-083)
G	GFR Pin (181-082)
H	GFR Socket (181-081)
J	GFOCA Termini (181-067)
1	LC Connector
2	LC APC Connector
3	FC Connector
4	FC APC Connector
5	ST Connector
6	SC Connector
7	SMA 905 Connector
8	SMA 906 Connector
9	Customer Specified*

Standard Tolerance for Cable Jumpers

Length	Tolerance
5 in, up to 2 ft	+1/-0 in
Over 2 ft, up to 10 ft	+3/-0 in
Over 10 ft, up to 50 ft	+6/-0 in
Over 50 ft, up to 100 ft	+1/-0 ft
Over 100 ft	+2/-0 ft

Notes

Optical performance: Insertion loss to be less than 2.0 dB when measured at 1310 nm or 1550 nm wavelength for singlemode, or when measured at 850 nm or 1300 nm for multimode.
* For customer-specific requirements, Glenair will assign a unique part number for the cable assembly



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SERIES 050

MEDIA CONVERTERS

FOR AVIONICS, NAVAL, AND GROUND TACTICAL EQUIPMENT

The conversion of signals between electrical and optical domains is a necessary step in all fiber optic interconnection systems. Typically, large form-factor transceivers, housed in equipment consoles, are utilized to accomplish this function. But the need for reduced weight and small form factor active components, particularly in airframe and other high-performance applications, has led Glenair to develop a revolutionary new active component product series. The technologies offered in this catalog include a Gigabit Ethernet (1000BASE-T) copper twisted pair to optical fiber (1000BASE-SX or LX) ruggedized media converter, as well as a DVI signal (R, G, B, and clock) copper twisted pair to optical fiber solution. Both technologies deliver turnkey copper to fiber media conversion in a reliable, easy-to-install format. Glenair is also able to offer integration of active components into custom packaging and cable assemblies per customer and application requirements. Please contact the factory for more information on custom solutions.

Glenair®

GLENAIR, INC. • 1211 Air Way • Glendale, CA 91201-2497 • Tel: 818-247-6000 • Email: sales@glenair.com • www.glenair.com

Small form-factor copper to fiber media converters reduce weight and complexity in fiber optic interconnect systems

1000BASE-T fo 100BASE-SX/LX Media Converter

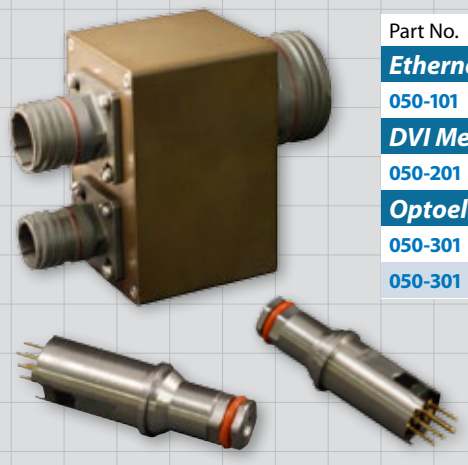
The Glenair Gigabit fiber optic/electric media converter converts 1000BASE-T data from twisted pair copper cable to 1000BASE-SX/LX serial data transmitted over a pair of optical fibers. The purpose of the device is to allow both longer distance and more reliable communication in ruggedized military and other 1000BASE-T networks. The device extends network link distances between switches, routers, and other Gigabit Ethernet peripherals. The 850nm VCSEL version enables link distances of up to 550 meters over multimode fiber. The 1310nm Fabry-Perot version enables link distances of up to 10 Kilometers over singlemode fiber. The turnkey conversion from copper to fiber optic cables also allows for an exponentially smaller diameter cable, as well as expanded bandwidth, reduced weight, improved network security and virtual immunity from EMI, RFI, and EMP.

DVI Copper to Fiber Media Converter

The Glenair Digital Visual Interface (DVI) Copper to Fiber Optic Media Converter lengthens DVI link distance in harsh environments. The purpose of the device is to allow both longer distance and more reliable communication on optical fibers in ruggedized military systems using DVI protocol between graphics cards and remote display clusters. The turnkey conversion from copper to fiber optic cables also allows for an exponentially smaller diameter cable, as well as expanded bandwidth, reduced weight, improved network security and virtual immunity from EMI, RFI, and EMP.

Optoelectronic Inserts

The Size 8 Cavity Optoelectronic Inserts transmit and receive differential CML electrical signals over Multimode fiber optic cable. Replacing copper cables with fiber optics enables longer distance communications, higher bandwidth, reduced weight, increased immunity to EMI, RFI, and EMP, and improved link security.



Part No.	Description	Page No.
Ethernet Media Converter		
050-101	1000Base-T to 1000Base-SX/LX Media Converter	F-2
DVI Media Conveter		
050-201	DVI Copper to Fiber Media Converter	F-6
Optoelectronic Inserts		
050-301	Size #8 Cavity Optoelectronic Insert Transmitter	F-10
050-301	Size #8 Cavity Optoelectronic Insert Receiver	F-12

Catalog Notes For all parts in this catalog:

All parts will be identified with manufacturer's name and part number, space permitting.

Metric dimensions appear in parentheses in diagrams and tables, based on 1 inch = 25.4 mm, for reference only.

Unless otherwise specified, the following other dimensional tolerances apply:

.xx = ± .03 (0.8) • .xxx = ± .015 (0.4) • Angles = ± 5°

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050-101
GigaBit Ethernet Copper to Fiber Media Converter
1000BASE-T to 1000BASE-SX/LX Media Converter

1000BASE-T to 1000BASE-SX/LX media converter

The Glenair Gigabit Ethernet Media Converter is mechanically hardened to resist weapon-grade shock and vibration benchmarks and is environmentally sealed to IP68 when connectors are in their mated condition. The device is equipped with a gigabit physical layer transceiver to convert electrical data to a standardized serial format and an optical transceiver for electrical to F/O conversion.

The copper port is equipped with automatic correction for MDI/MDI-X crossover, auto-negotiation, pause, digital baseline wander correction, digital adaptive equalizing, echo canceller, and crosstalk canceller. The fiber optic transceiver is equipped with a laser driver, and a 850nm VCSEL or 1310nm FP laser for the transmitter function. The laser driver features a temperature compensation circuit designed to maximize the transmitter's optical power over the full operating temperature range. The receiver section of the fiber optic transceiver is equipped with a photo detector, a transimpedance amplifier, and a limiting amplifier.

KEY FEATURES

- IEEE 802.3-2005 Gigabit Ethernet standard compliant
- -40°C to +85°C operating temperature range
- Ideal for military and other harsh environment applications.
- Meets MIL-STD-810 Mechanical Shock and Vibration
- Meets Mil-STD-1344 immersion resistance
- Up to 550 Meters for VCSEL 850nm version with Multimode fiber
- Up to 10 Kilometers for 1310nm laser version with Singlemode fiber
- Single power supply operation from 5V to 36V, with optional 3.3V version.
- MIL-STD-1560 standard layouts for both electrical and fiber optic connectors
- Available options for fiber receptacle compatible with: 1.25mm, 1.57mm, 2mm, and 2.5mm ferrules sizes. Expanded beam contacts also available.
- Alternate options for electrical and optical connectors available.

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1000BASE-T to 1000BASE-SX/LX media converters—ratings and specifications

Absolute Maximum Rating					
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Unit**
Storage Temperature	T_s	-55		+100	°C
Operating Voltage	V_{cc}	-0.4		+40	V

Operating Conditions					
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Unit**
Operating Temperature	T_{op}	-40		+85	°C
Supply Voltages	V_{cc}	3.14 4.75	3.3	3.46 36	V

Optical Transmitter					
Parameter	**Sym**	**Min**	**Typ**	**Max**	**Unit**
Optical Output Power 850nm VCSEL 1310nm Fabry-Perot	P_{out}	-9 -5	-6 -3	-3 -1	dBm
Optical Wavelength 850nm VCSEL 1310nm Fabry-Perot	λ_{Out}	830 1285	850 1310	860 1345	nm
Spectral Width 850nm VCSEL 1310nm Fabry-Perot	$\Delta\lambda$			0.85 4	nm

Optical Receiver					
Parameter	**Sym**	**Min**	**Typ**	**Max**	**Unit**
Receiver Input Sensitivity 850nm VCSEL 1310nm Fabry-Perot	P_{in}	-20 -22			dBm
Optical Wavelength 850nm VCSEL 1310nm Fabry-Perot	λ_{In}	830 1270	850 1310	860 1355	nm

Copper Link Distances		
Protocol	**Cable Type**	**Distance**
Gigabit Ethernet, 1000BASE-T	TIA/EIA-568-B Cat 5E	100 Meters

Optical Link Distances		
Protocol	**Fiber Type**	**Distance**
Gigabit Ethernet, 1000BASE-SX, 850nm VCSEL	62.5/125µm, 200MHZ*Km 50/125µm, 500MHZ*Km	275 Meters 550 Meters
Gigabit Ethernet, 1000BASE-LX, 1310nm FP	9/125 µm	10 Kilometers

Power Supply Current @ 85 C Max. Operating Condition			
Parameter	**Symbol**	**Max**	**Unit**
Supply Voltage 3.3 V 5 V 12 V 24 V 28 V 36 V	I_{cc}	 700 630 230 110 95 85	mA

Military Specification Compliance			
Feature	**Standard**	**Condition**	**Notes**
Mechanical Shock	MIL-STD-810	40g	6-9ms
Mechanical Vibration	MIL-STD-810	30g RMS	18ms
ESD	MIL-STD-883	Class II	2200v
Mating Durability	MIL-STD-38999/20	500 Cycles	<0.5 db change
Flame Resistance	MIL-STD-1344	Method 1012	30 Seconds
Damp Heat	MIL-STD-1344	10 Cycles	24 Hours

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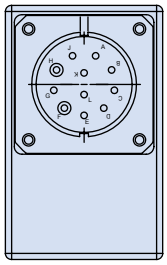
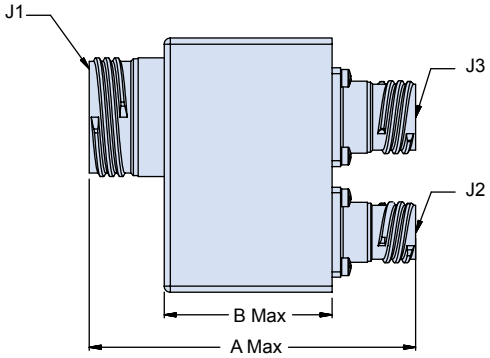
050-101
GigaBit Ethernet Copper to Fiber Media Converter
1000BASE-T to 1000BASE-SX/LX Media Converter
How-to-Order

1000BASE-T to 1000BASE-SX/LX media converters

How To Order

Product Series		Signal Protocol (Table I)	Plating Code (Table II)	
050	- 101	- LX10	NF	- 01
	Ethernet Media Converter			Dash Number (Tables III and IV)





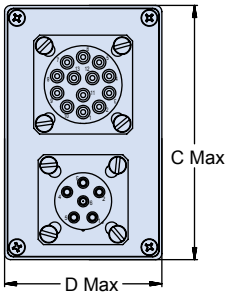


Table I: Signal Protocol		
Code	Name	Medium
-SXMM	1000BASE-SX	Multi-Mode Fiber
-LX10	1000BASE-LX10	Single-Mode Fiber

Table II: Material And Finish		
SYM	Material	Finish Description
M*	Aluminum	Electroless Nickel
MT		Nickel - PTFE
NF		Cadmium, Olive Drab
ZN		Zinc-Nickel, Olive Drab
ZNU		Zinc-Nickel, Black

Table IV: Dimensions				
Dash No.	A Max	B Max	C Max	D Max
-01	3.430 (87.12)	1.780 (45.21)	2.680 (68.10)	1.670 (42.42)

Material and Finish
Connectors: See indicated data sheets (Table III)
Enclosures: See Table II
Printed Circuit Board: .062±.006 thick glass epoxy, natural color, laminate NEMA grade FR-4.1 ounce copper. This is a 6 layer board.

Assembly Notes
All connector cavities without defined contacts to be populated with appropriate sealing plug. MS27488 Type sealing plugs are recommended.

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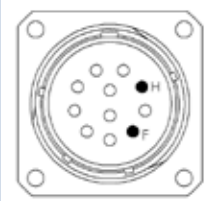
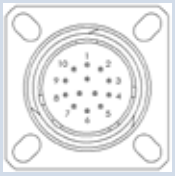
Table III: Mating Connectors and Pin Outs

Dash No.		J1: Optical Connector	Mating Connector
-01			
	Connector Part Number	233-105-00NF19-11SN (D38999/20WF11SN Type)	233-105-G6NF19-11PN (D38999/26WF11PN Type)
	Contact Part Numbers and Locations	181-001-125 • (M29504/5-4237) Pin Number: H — Description: Transmit Pin Number: F — Description: Receive	181-002-126 • (M29504/4-4208) Pin Number: H — Description: Transmit Pin Number: F — Description: Receive
		J2: Power Connector	Mating Connector
	Connector Part Number	233-105-00NF09-35PN (D38999/20WA35PN Type)	233-105-00NF09-35SN (D38999/20WA35SN Type)
	Contact Part Numbers and Locations	850-002-22-360 • (M39029/58-360) Pin Number: 1-4 — Description: Case Ground Pin Number: 5 — Description: VEE Pin Number: 6 — Description: VCC	850-002-22-348 • (M39029/58-348) Pin Number: 1-4 — Description: Case Ground Pin Number: 5 — Description: VEE Pin Number: 6 — Description: VCC
		J3: Data Connector	Mating Connector
	Connector Part Number	233-105-G6NF11-35PN (D38999/26WB35PN Type)	233-105-G6NF11-35SN (D38999/26WB35SN Type)
	Contact Part Numbers and Locations	850-002-22-360 • (M39029/58-360) Pin Number: 1, 6, 11, 12, 13 — Description: NC Pin Number: 2 — Description: MDA+ Pin Number: 3 — Description: MDA- Pin Number: 4 — Description: MDB+ Pin Number: 5 — Description: MDB- Pin Number: 7 — Description: MDC- Pin Number: 8 — Description: MDC+ Pin Number: 9 — Description: MDD- Pin Number: 10 — Description: MDD+	850-002-22-348 • (M39029/56-348) Pin Number: 1, 6, 11, 12, 13 — Description: NC Pin Number: 2 — Description: MDA+ Pin Number: 3 — Description: MDA- Pin Number: 4 — Description: MDB+ Pin Number: 5 — Description: MDB- Pin Number: 7 — Description: MDC- Pin Number: 8 — Description: MDC+ Pin Number: 9 — Description: MDD- Pin Number: 10 — Description: MDD+

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Digital Visual Interface (DVI) copper to fiber media converter for High Definition Video

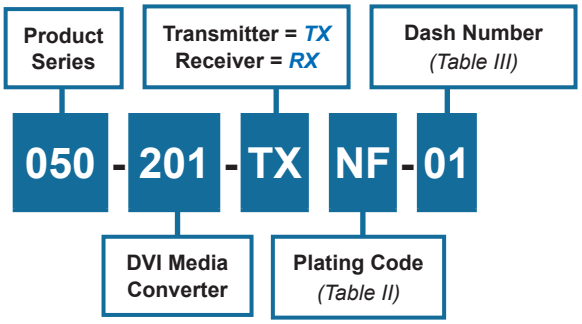
DVI Copper to Fiber Media Converter

The Glenair Digital Visual Interface (DVI) Copper to Fiber Optic Media Converter lengthens DVI link distance in harsh environments. It allows both longer distance and more reliable communication on optical fibers in ruggedized military systems using DVI protocol between graphics cards and remote displays.

KEY FEATURES

- -40°C to +85°C operating temperature range
- Meets MIL-STD-810 Mechanical Shock and Vibration
- Meets MIL-STD-1344 immersion resistance
- Fiber link distance of up to 320meters with 50/125 um Multimode fiber (500 MHz km fiber)
- Fiber connector interface compatible with MIL-T-29504
- D38999 connector with quadrax electrical interface for RGB and Clock
- TMDS compatible electrical interface
- Operates from a single power supply 18V to 36V
- MIL-STD-1560 standard layouts for both electrical and fiber optic connectors
- Available options for fiber receptacle compatible with: 1.25mm, 1.57mm, 2mm, and 2.5mm ferrules sizes. Expanded beam contacts also available. Pin or socket contacts supported.
- Alternate options for electrical and optical connectors available.
- Custom packaging available.

How To Order



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050-201
DVI Copper to Fiber Media Converter

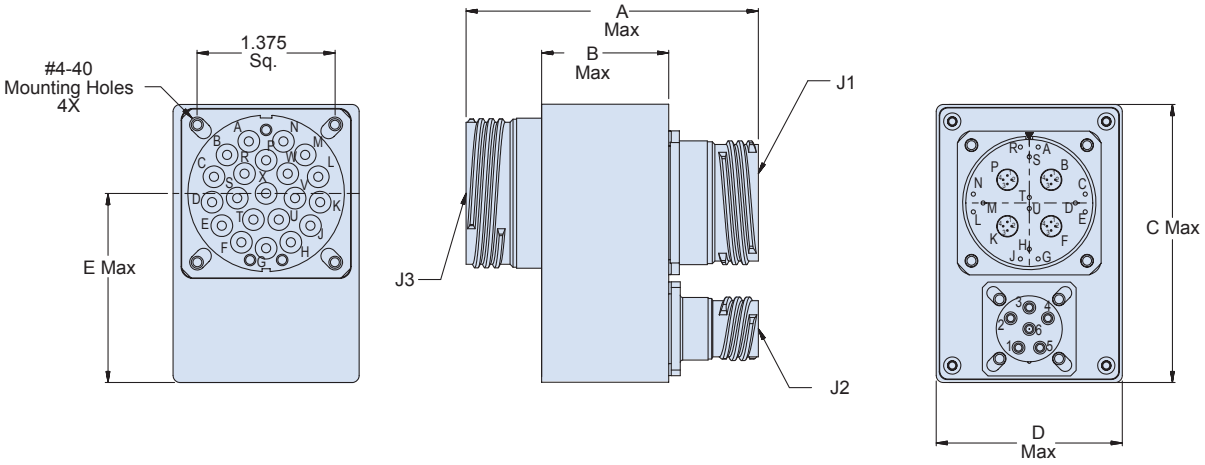
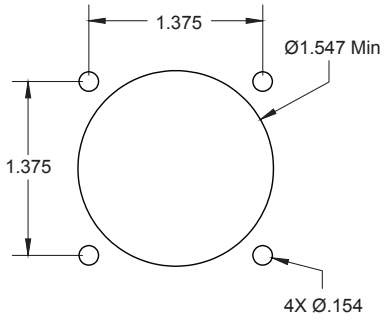


Table II: Material And Finish		
SYM	Material	Finish Description
M*	Aluminum	Electroless Nickel
MT		Nickel - PTFE
NF		Cadmium, Olive Drab
ZN		Zinc-Nickel, Olive Drab
ZNU		Zinc-Nickel, Black

Table III: Dimensions					
Dash No.	A Max	B Max	C Max	D Max	E Max
-01	3.8 (96.52)	2.00 (50.80)	2.78 (70.61)	2.00 (50.80)	1.890 (48.01)

Recommended Panel Cutout



Max Screw Length 3/8"
with .060 Thick Panel

Material and Finish

Connectors: See indicated data sheets (Table III)
Enclosures: See Table I
Printed Circuit Board: .062±.006 thick glass epoxy, natural color, laminate NEMA grade FR-4.1 ounce copper. This is a 6 layer board.
Interface connectors are designed to mate with any QPL manufacturer's MIL-DTL-38999 plug having the same insert arrangement and polarization; opposite contact gender. Mating connector information shown in Table II.

Assembly Notes

All connector cavities without defined contacts to be populated with appropriate sealing plug. MS27488 Type sealing plugs are recommended.

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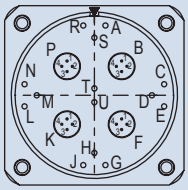
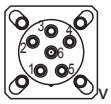
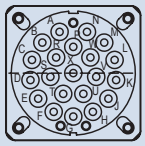
Table IV: J1 Data Connector/Contacts					
PIN	Channel	Function	Input / Output	+ / -	Mating Contact
B1	0	TMDS-Blue	Input	-	854-002-XX
B2	0	TMDS-Blue	Input	+	
B3	0	TMDS-Blue	Output	-	
B4	0	TMDS-Blue	Output	+	
F1	1	TMDS-Green	Input	-	854-002-XX
F2	1	TMDS-Green	Input	+	
F3	1	TMDS-Green	Output	-	
F4	1	TMDS-Green	Output	+	
K1	2	TMDS-Red	Input	-	854-002-XX
K2	2	TMDS-Red	Input	+	
K3	2	TMDS-Red	Output	-	
K4	2	TMDS-Red	Output	+	
P1	3	TMDS-Clock	Input	-	854-002-XX
P2	3	TMDS-Clock	Input	+	
P3	3	TMDS-Clock	Output	-	
P4	3	TMDS-Clock	Output	+	

Table II: Mating Connectors and Pin Outs: Dash No. -01		
	J1: Data Connector	Mating Connector
Connector Part Number	257-606*00-19Q-18PN (D38999/20WF18PN type)	257-606*G6-19Q-18SN (D38999/20WF18SN type)
	J2: Power Connector	Mating Connector
Connector Part Number	233-105-00*09-35PN (D38999/20WA35PN type)	233-105-G6*09-35SN (D38999/20WA35SN type)
	J3: Optical Connector	Mating Connector
Connector Part Number	180-091*H7-23-21SN (D38999/20WH21SN type)	180-091*06-23-21PN (D38999/26WH21PN type)

* - Depends on finish, see Table II

Table V: J2 Power Ports/Contacts			
PIN	Description	Contact Part No.	Mating Contact
1	Isolated Case Ground	850-002-22-360 (M39029/58-360)	850-002-22-348 (M39029/56-348)
2	Isolated Case Ground	850-002-22-360 (M39029/58-360)	850-002-22-348 (M39029/56-348)
3	Isolated Case Ground	850-002-22-360 (M39029/58-360)	850-002-22-348 (M39029/56-348)
4	Isolated Case Ground	850-002-22-360 (M39029/58-360)	850-002-22-348 (M39029/56-348)
5	VDC Return	850-002-22-360 (M39029/58-360)	850-002-22-348 (M39029/56-348)
6	18V-36V DC	850-002-22-360 (M39029/58-360)	850-002-22-348 (M39029/56-348)

Table VI: J3 Fiber Ports/Contacts					
PIN	DVI Data/ Clock	Color/ Clock	TX Output / RX Input	Contact Part No.	Mating Contact
J	0	Blue	Output-TX	181-001-125 (M29504/5-4237)	181-002-126 (M29504/4-4208)
L	0	Blue	Input-RX	181-001-125 (M29504/5-4237)	181-002-126 (M29504/4-4208)
N	1	Green	Output-TX	181-001-125 (M29504/5-4237)	181-002-126 (M29504/4-4208)
G	1	Green	Input-RX	181-001-125 (M29504/5-4237)	181-002-126 (M29504/4-4208)
X	2	Red	Output-TX	181-001-125 (M29504/5-4237)	181-002-126 (M29504/4-4208)
A	2	Red	Input-RX	181-001-125 (M29504/5-4237)	181-002-126 (M29504/4-4208)
E	3	Clock	Output-TX	181-001-125 (M29504/5-4237)	181-002-126 (M29504/4-4208)
C	3	Clock	Input-RX	181-001-125 (M29504/5-4237)	181-002-126 (M29504/4-4208)

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050-201
DVI Copper to Fiber Media Converter

DVI copper to fiber media converter—ratings and specifications

Absolute Maximum Rating				
Parameter	**Symbol**	**Min**	**Max**	**Unit**
Storage Temperature	Ts	-55	+100	°C
Supply Voltage	Vcc	-0.5	+40	V
Data Input Voltage	VI	-0.5	+3.3	V

Operating Conditions					
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Unit**
Operating Temperature	TA	-40		+85	°C
Supply Voltage	Vcc	+18	+28	+36	V
Power Supply Noise	NP			100	mV

Optical Transmitters—Operating Temperature (-40°C To +85°C), Supply Voltage Vcc = 18V To 36V					
Parameter	**Symbol**	**Minimum**	**Typical**	**Maximum**	**Unit**
Optical Output Power	PO	-6.0	-4	-1	dBm
Optical Output Wavelength	λOUT	830	850	860	nm
Spectral Width(RMS)	Δλ			.85	nm
Extinction Ratio	ER	9.0			dB

Optical Receivers—Operating Temperature (-40°C To +85°C), Supply Voltage Vcc = 18V To 36V					
Parameter	**Symbol**	**Minimum**	**Typical**	**Maximum**	**Unit**
Optical Input Power	PI	-19.0		0	dBm
Optical Input Wavelength	λIN	830	850	860	nm

Power Supply—Operating Temperature (-40°C To +85°C), Supply Voltage Vcc = 18V To 36V			
Parameter	**Symbol**	**Maximum**	**Unit**
Power Supply Current	ICC	200	mA

Military Specification Compliance			
Feature	**Standard**	**Condition**	**Notes**
ESD	MIL-STD-883	Class II	2200V
Shock	MIL-STD-810	40g	6-9ms
Vibration	MIL-STD-810	40g RMS	

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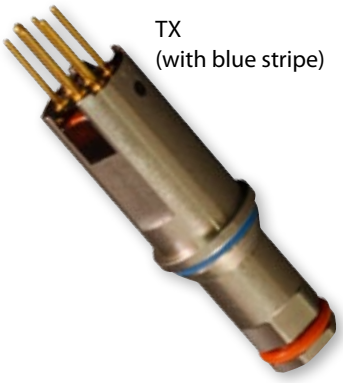
050-301
Optoelectronic Insert Transmitter, Size 8 Cavity
General Information

Size 8 cavity optoelectronic insert transmitter



TX
(with blue stripe)

Patent Pending

The Size 8 Cavity Optoelectronic (OE) Insert Transmitter consists of a laser driver and a 850nm VCSEL laser. The laser driver consists of a temperature compensation circuit designed to maintain the transmitter's optical power over the entire operating temperature range.

The transmitter converts differential CML electrical signals to fiber optics and transmits the light over Multimode fiber optic cable. The transmitter has a TX Disable pin to turn off transmitter output. The TX Fault pin is used to signal a fault condition.

The Size 8 Cavity Optoelectronic Insert Transmitter is environmentally hardened to resist mechanical shock and vibration and is sealed and water tight when connectors are mated.

The receptacle has a 1.25mm ceramic ferrule with 50/125um fiber interface able and 50/125um or 62.5/125um Multimode fibers. The transmitter's electrical interface is through 6 pin headers for soldering to a rigid or flexible printed circuit board.

F

Applications

Extend distances for Ethernet network switches, routers, Digital Video transmission, and sFPDP links .

Copper cables are replaced by fiber optic cables which enable longer distance communications, higher bandwidth, reduced weight, increased immunity to EMI, RFI, and EMP, and improve link security.

KEY FEATURES

- Front-release Size #8 OE converter designed for ARINC 600
- ARINC 664, 801, 803, 804, and 818 standard Compliant
- Data rates from 125Mbps to 3.8 Gbps
- Supports Fast and Gigabit Ethernet, AFDX, 1x/2x Fibre Channel, DVI, HDMI, SFPDP, Serial Rapid I/O (sRIO).
- Designed for harsh environment applications.
- Operating temperature range of -40°C to +85°C
- 100 ohms differential CML inputs with TX Fault and TX Disable
- Works with Multimode 50/125uM or 62.5/125 uM fiber
- Single 3.3v power supply
- ARINC 801 1.25mm ceramic fiber ferrule

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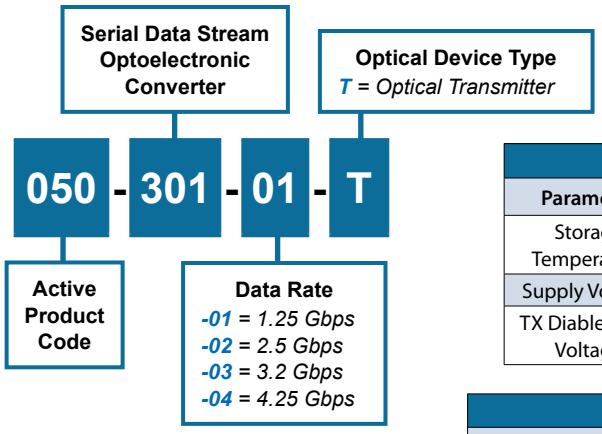
www.glenair.com

E-Mail: sales@glenair.com

050-301
Optoelectronic Insert Transmitter, Size 8 Cavity
Specifications

How To Order



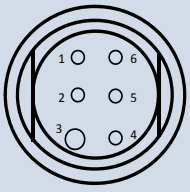
Absolute Maximum Rating					
Parameter	**Symbol**	**Minimum**	**Typical**	**Maximum**	**Unit**
Storage Temperature	T_S	-55		+100	°C
Supply Voltage	V_{CC}	-0.4		+4	V
TX Diable Input Voltage	V Disable	-0.4		V_{CC}	V

Operating Conditions					
Parameter	**Symbol**	**Minimum**	**Typical**	**Maximum**	**Unit**
Operating Temperature	T_{op}	-40		+85	°C
Supply Voltages	V_{CC}	3.14	3.3	3.46	V
Differential Input Voltage	V_{ID}	250		2200	mV_{P-P}
Power Supply Noise	$V_{CCRipple}$			0.15	V_{p-p}

Optical Transmitter					
Parameter	**Symbol**	**Minimum**	**Typical**	**Maximum**	**Unit**
Optical Output Power	P_{out}	-6.5		-1	dBm
Optical Wavelength	λ_{Out}	830	850	860	nm
Spectral Width	$\Delta\lambda_{rms}$			0.85	nm
Extinction Ratio	ER	6	12		dB
Total Jitter	TJ			55	ps

Power Supply Current V_{CC} = 3.14 to 3.46V					
Parameter	**Symbol**	**Minimum**	**Typical**	**Maximum**	**Unit**
Supply Current	I_{CC}			90	mA

Example Optical Link Distances		
Protocol	**Fiber Type**	**Distance**
Gigabit Ethernet	62.5/125µm, 200MHZ*Km 50/125µm, 500MHZ*Km	27.5 Meters 550 Meters



Electrical Pin Arrangement			
Pin Number	**Symbol**	**Description**	**Logic**
1	TX Disable	Transmit Disable (Input) Logic "1" Input→ Disable Transmitter Output	CMOS Internal 4.7KΩ pulldown
2	Vcc	Power Supply	
3	GND	Signal Ground	
4	TX Fault	Transmitter Fault Indicator (Output) Logic "1:" Output→ Transmitter Fault Condition	CMOS Open Drain
5	TX-	Transmitter Inverted Data (Input)	CML (Current Mode Logic)
6	TX+	Transmitter Non-Inverter Data (Input)	CML (current Mode Logic)

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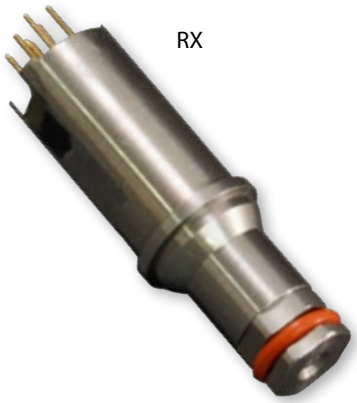
050-301
Optoelectronic Insert Receiver, Size 8 Cavity
General Information

Size 8 cavity optoelectronic insert receiver



Patent Pending

The Size 8 Cavity Optoelectronic Insert Receiver consists of a 850nm PIN Photo Detector, a Transimpedance Amplifier with automatic gain control circuit, and a Limiting Amplifier.

The Receiver converts Optical signals to differentia CML electrical signals. Differential output data signals are CML compatible. Receiver includes a CMOS compatible Loss of Signal Indicator (LOS) which is asserted high in case of invalid optical signal at the input of the receiver. Receiver differential CML outputs are squelched when LOS is asserted to prevent invalid data.

The Size 8 Cavity Optoelectronic insert Receiver is environmentally hardened to resist mechanical shock and vibration. It is sealed to be water tight when connectors are mated.

The receptacle has a 1.25mm ceramic fiber stub with 62.5/125um fiber interface able with 50/125um or 62.5/125 um Multimode fibers. The receiver's electrical interface is through 6 pin headers for soldering to a rigid or flexible printed circuit board.

F

Applications

Size 8 Cavity Optoelectronic Inserts allow long distance and reliable communication in harsh environments.

Extend distances for network switches, routers, Digital Video transmission, and sFPDP links .

Copper cables are replaced by fiber optic cables which enable longer distance communications, higher bandwidth, reduced weight, increased immunity to EMI, RFI, and EMP, and improve link security.

KEY FEATURES

- Front-release Size #8 OE converter designed for ARINC 600
- ARINC 664, 801, 803, 804, and 818 standard Compliant
- Data rates from 125Mbps to 4.25Gbps
- Supports Fast and Gigabit Ethernet, AFDX, 1x/2x Fibre Channel, DVI, HDMI, SFPDP, Serial Rapid I/O (sRIO).
- Designed for harsh environment applications.
- Operating temperature range of -40°C to +85°C
- 100 ohms differential CML Outputs with Loss Of Signal indicator (LOS)
- Link distance of up to 550 Meters with Multimode 50/125uM fiber
- Single 3.3v power supply
- ARINC 801 1.25mm ceramic fiber ferrule

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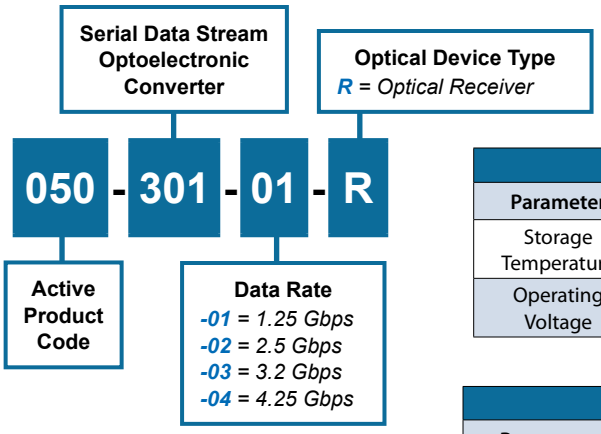
050-301
Optoelectronic Insert Receiver, Size 8 Cavity
Specifications

How To Order

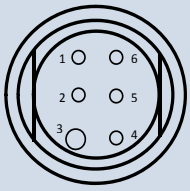


Absolute Maximum Rating					
Parameter	Symbol	Minimum	Typical	Maximum	Unit
Storage Temperature	T_S	-55		+100	°C
Operating Voltage	V_{CC}	-0.4		+4	V

Operating Conditions					
Parameter	Symbol	Minimum	Typical	Maximum	Unit
Operating Temperature	T_{op}	-40		+85	°C
Supply Voltages	V_{CC}	3.14	3.3	3.46	V
Power Supply Noise	VCC_{Ripple}			0.15	V

Optical Receiver					
Parameter	Symbol	Minimum	Typical	Maximum	Unit
Optical Sensitivity -01 = 1.25 Gbps -02 = 2.5 Gbps -03 = 3.2 Gbps -04 = 4.25 Gbps		 -17 -15 -15 -14			 dBm dBm dBm dBm
Optical Overload				0	dBm
Optical Wavelength	λ_{Out}	830		860	nm
Differential Output Swing (P-P)	Vdiff	600		1200	mV
LOS Assert Level	LOS_h	-22			dBm
LOS Hysteresis	LOS HYS	1.5	2.3		dB

Power Supply Current Vcc = 3.14 to 3.46V					
Parameter	Symbol	Minimum	Typical	Maximum	Unit
Supply Current	I_{CC}			70	mA



Electrical Pin Arrangement			
Pin Number	Symbol	Description	Logic
1	GND	Signal Ground	
2	Vcc	Power Supply	
3	GND	Signal Ground	
4	LOS	Los of Signal (Output) Loss of Valid Optical Signal→ Logic "1" Output	CMOS Open Drain
5	RX-	Receiver Inverted Data (Input)	CML (Current Mode Logic)
6	RX+	Receiver Non-Inverter Data (Input)	CML (current Mode Logic)

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FIBER OPTIC

GLENAIR FRONT RELEASE

FIBER OPTIC CONNECTION SYSTEM

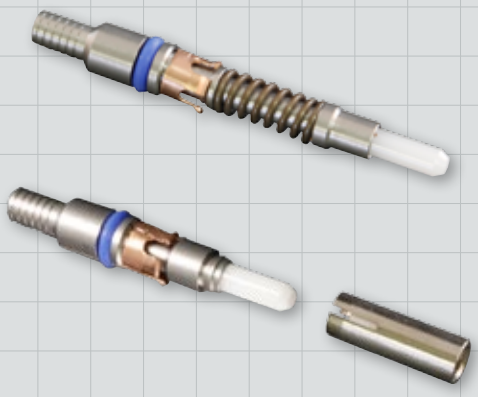
The unique design of the Glenair 181-011 and 181-012 series fiber optic termini allows for rapid integration of optical media in a broad range of cylindrical and rectangular connector packages and systems. By placing the retention and environmental sealing components directly on the termini, Glenair is able to fabricate unique fiber optic connector shell packages without costly tooling and engineering.

GLENAIR, INC. • 1211 Air Way • Glendale, CA 91201-2497 • Tel: 818-247-6000 • Email: sales@glenair.com • www.glenair.com

Rapid prototyping and production of fiber optic connectors in a wide range of custom packages

Glenair Front Release (GFR) fiber optic connection systems perform at insertion loss levels equivalent to other high-performance, tactical fiber optic systems such as MIL-DTL-38999 and MIL-PRF-28876. The GFR system has enabled Glenair to integrate optical media in Micro-D and D-Subminiature shells as well as in cylindrical bodies. Contact the factory for availability and application engineering assistance for both standard and custom fiber optic connection systems.

Product No.	Description	Page No.
GFR Fiber Optic Termini		
181-011	Front Release Socket Terminus, size 16	G-2
181-012	Front Release Pin Terminus, size 16	G-4
GFR Fiber Optic Connectors		
180-063	Micro-D GFR Receptacle Connector	G-6
180-064	Micro-D GFR Plug Connector	G-8
180-065	D-Subminiature GFR Receptacle Connector	G-10
180-066	D-Subminiature GFR Plug Connector	G-12



G

Catalog Notes

Metric dimensions appear in parentheses in diagrams and tables, based on 1 inch = 25.4 mm, for reference only.
Unless otherwise specified, the following other dimensional tolerances apply:

.xx = ± .03 (0.8) • .xxx = ± .015 (0.4) • Angles = ± 5°

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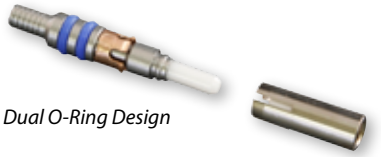
181-011
Glenair Front Release (GFR)
Fiber Optic Socket Terminus, Size 16

Size 16 Glenair front release (GFR) fiber optic socket terminus

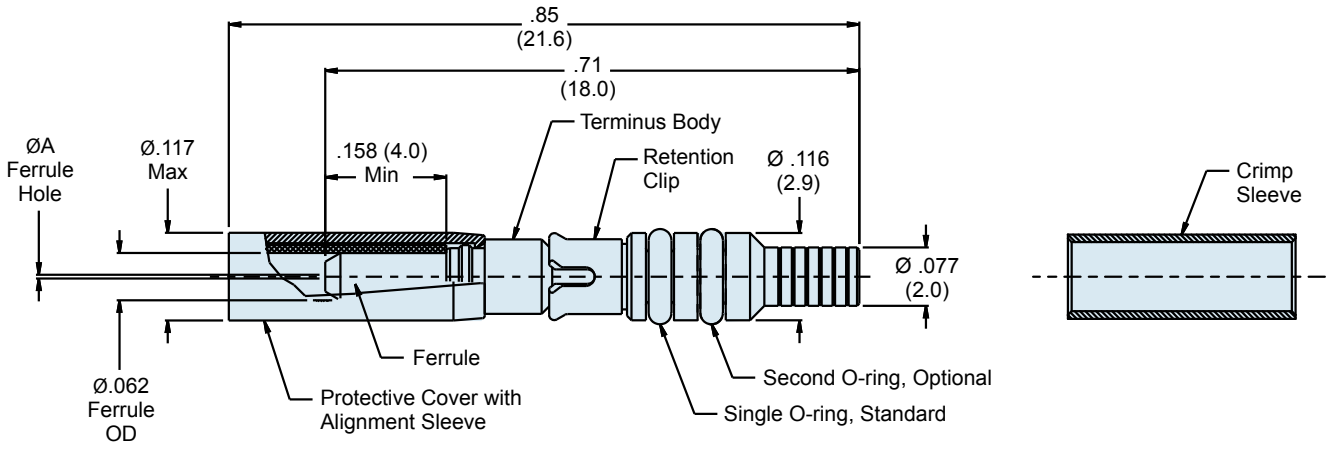
Single O-Ring Design (Standard)



Dual O-Ring Design

How To Order

Basic Number		Stainless Steel Alignment Sleeve, Optional (Omit For ceramic, Standard)	Second O-ring, Optional (Omit for single o-ring, standard.)
181-011	- 126	K	D
	Dash No. (See Table I)		



Material and Finish

Ferrule, Alignment Sleeve: Zirconia Ceramic
Protective Cover: Spring Alloy/Nickel
Terminus Body: Stainless Steel/Passivate
Retention Clip: Spring Alloy
O-Ring(s): Fluorosilicone
Crimp Sleeve: Brass Alloy/Nickel

Notes

Alignment sleeve assembly (protective cover and alignment sleeve) and crimp sleeve are supplied with assembly. Spares may be ordered separately (See Table II).
See Glenair GAP-031 and GAP-031B for termination and assembly tools/procedures.
See Glenair drawing 181-012 for mating pin terminus, and 181-051 for dummy terminus.

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Table I: Assembly Dash Number			
Assembly Dash Number	Ø A (Micron)	Typ. Fiber Type	Fiber Size Core/Cladding/Coating (Microns)
181-011-125	125.5	Single Mode	9/125
181-011-126S	126.0	Single Mode	9/125
181-011-126	126.0	Multi Mode	50/125, 62.5/125
181-011-142	142.0	Multi Mode	100/140
181-011-156	156.0	Multi Mode	62.5/125/155 (Polyimide)
181-011-173	173.0	Multi Mode	100/140/172 (Polyimide)
181-011-175	175.0	Multi Mode	100/140/172 (Polyimide)
181-011-231	231.0	Multi Mode	200/225
181-011-236	236.0	Multi Mode	200/230
181-011-286	286.0	Multi Mode	200/280
181-011-448	448.0	Multi Mode	400/440
Consult factory for additional sizes			

Table II: Tools and Accessories	
Part Number	Description
265-002	Crimp Sleeve, Ø 2.2mm Max Jacket
181-011-S	Protective Cover with Ceramic Sleeve
181-011-K	Protective Cover with Stainless Steel Sleeve
182-005S	Polishing Tool
182-012	Crimp Tool
182-013	Insertion Tool, Straight
182-014	Insertion Tool, 90 Degree
182-015	Removal Tool
182-016	Insertion/Removal Tool, Alignment Sleeve

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181-012
Glenair Front Release (GFR)
Fiber Optic Pin Terminus, Size 16

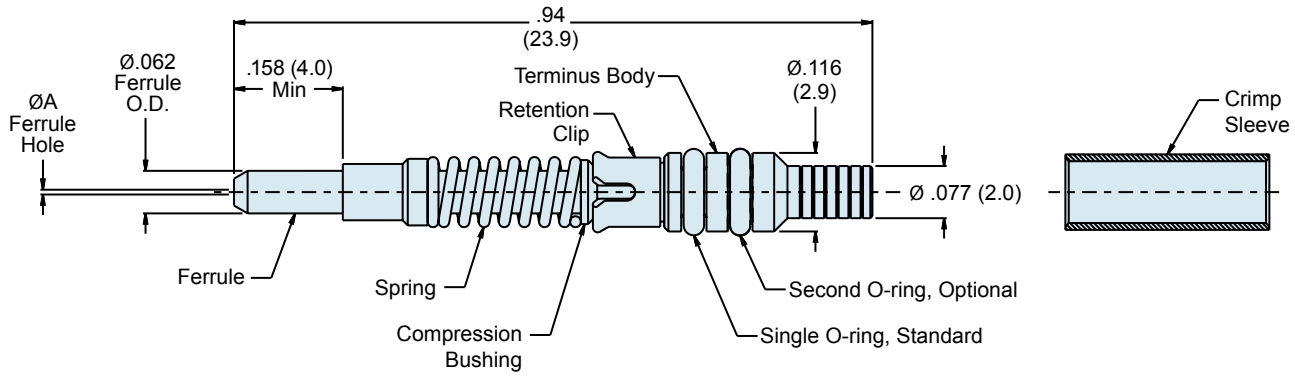
Size 16 Glenair front release (GFR) fiber optic pin terminus

Single O-Ring Design (Standard)

Dual O-Ring Design

How To Order

Basic Number	Dash No. (See Table I)	Second O-Ring, Optional (Omit For Single O-Ring, Standard)
181-012	- 126	D



G

Material and Finish

Ferrule: Zirconia Ceramic
Body: Stainless Steel/Passivate
Spring: Stainless Steel/Passivate
Bushing: Stainless Steel/Passivate
Retention Clip: Spring Alloy
O-Ring(s): Fluorosilicone
Crimp Sleeve: Brass Alloy/Nickel

Notes

Crimp sleeve supplied with assembly. Spares may be ordered separately (see Table II).
See Glenair GAP-031 and GAP-031B for termination and assembly tools/procedures.
See Glenair drawing 181-011 for mating socket terminus, and181-051 for dummy terminus

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Table I: Assembly Dash Number			
Assembly Dash Number	Ø A (Micron)	Typ. Fiber Type	Fiber Size Core/Cladding/Coating (Microns)
181-012-125	125.5	Single Mode	9/125
181-012-126S	126.0	Single Mode	9/125
181-012-126	126.0	Multi Mode	50/125, 62.5/125
181-012-142	142.0	Multi Mode	100/140
181-012-156	156.0	Multi Mode	62.5/125/155 (Polyimide)
181-012-173	173.0	Multi Mode	100/140/172 (Polyimide)
181-012-175	175.0	Multi Mode	100/140/172 (Polyimide)
181-012-231	231.0	Multi Mode	200/225
181-012-236	236.0	Multi Mode	200/230
181-012-286	286.0	Multi Mode	200/280
181-012-448	448.0	Multi Mode	400/440
Consult factory for additional sizes			

Table II: Tools and Accessories	
Part Number	Description
265-002	Crimp Sleeve, Ø 2.2mm Max Jacket
182-005P	Polishing Tool
182-012	Crimp Tool
182-013	Insertion Tool, Straight
182-014	Insertion Tool, 90 Degree
182-015	Removal Tool

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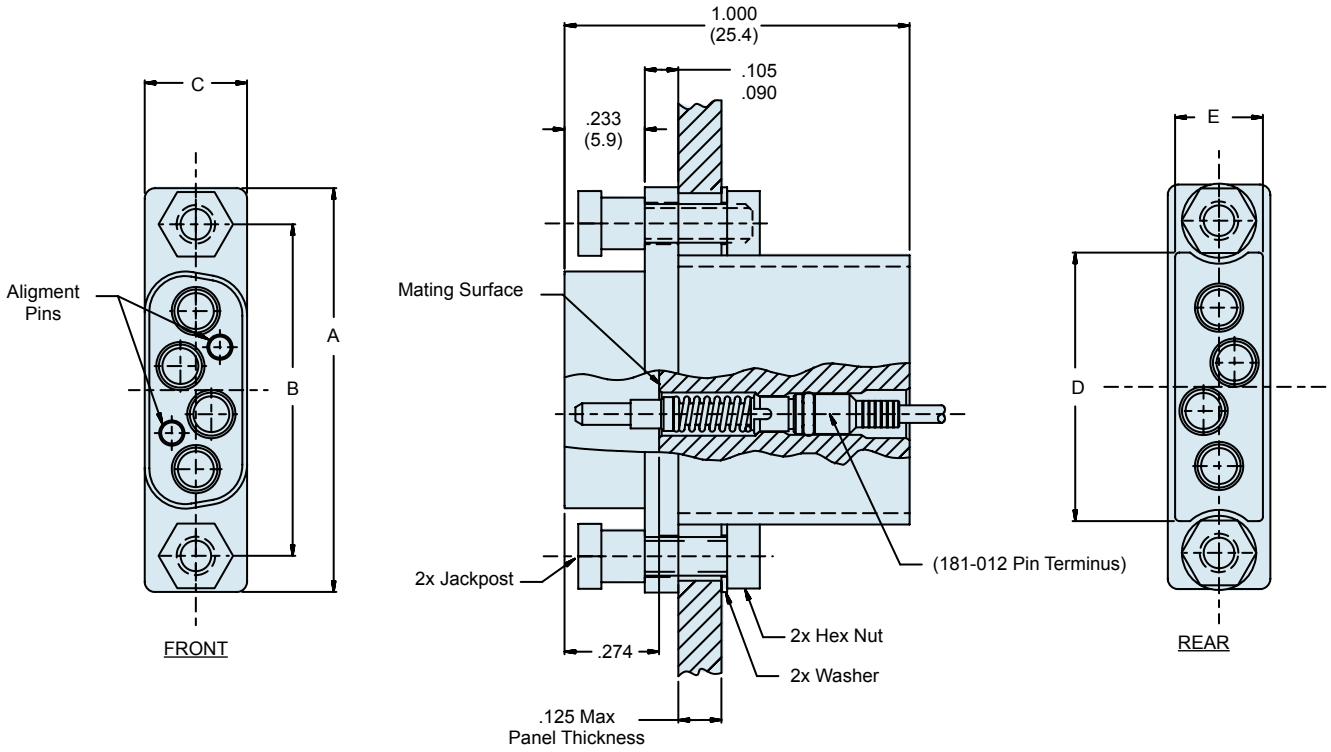
180-063
Micro-D Fiber Optic Receptacle Connector
for Glenair Front Release Pin Terminus 181-012

Micro-D GFR fiber optic receptacle connector

How To Order

Basic Number		No. F/O Pins (Table I)		
180-063	-	25	- 4	M
		Shell Size (See Table I)		Material/ Finish Code (See Table II)



Material and Finish
Shell: See Table II
Misc. Hardware: Stainless Steel/Passivate

Notes
Fiber Optic Pin Terminus to be ordered separately (see Glenair drawing 181-012).
Backshell to be ordered separately (consult Glenair for available backshell).
See Glenair drawing 180-064 for mating plug connector.

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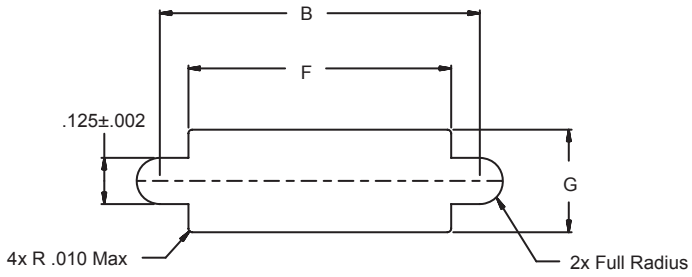
Table I: Shell Size								
Shell Size	A ±.010 (0.25)	B ±.003 (0.08)	C ±.010 (0.25)	D ±.010 (0.25)	E ±.002 (0.05)	F ±.005 (0.13)	G ±.005 (0.13)	Max F.O. Pin
9	.775 (19.7)	.565 (14.4)	.298 (7.6)	.380 (9.7)	.255 (6.5)	.410 (10.4)	.270 (6.9)	1
15	.925 (23.5)	.715 (18.2)	.298 (7.6)	.530 (13.5)	.255 (6.5)	.560 (14.2)	.270 (6.9)	2
21	1.075 (27.3)	.865 (22.0)	.298 (7.6)	.680 (17.3)	.255 (6.5)	.710 (18.0)	.270 (6.9)	3
25	1.175 (29.8)	.965 (24.5)	.298 (7.6)	.780 (19.8)	.255 (6.5)	.810 (20.6)	.270 (6.9)	4
31	1.325 (33.7)	1.115 (28.3)	.298 (7.6)	.930 (23.6)	.255 (6.5)	.960 (24.4)	.270 (6.9)	5
100	2.160 (54.9)	1.800 (45.7)	.384 (9.8)	1.425 (36.2)	.322 (8.2)	1.455 (37.0)	.340 (8.6)	8

Table II: Material/Finish		
Code	Material	Finish
C	Aluminum Alloy	Anodize, Black
M		Electroless Nickel
NF		Cadmium, Olive Drab, Over Electroless Nickel
ZN		Zinc-Nickel, Olive Drab, Over Electroless Nickel
Z1	Stainless Steel	Passivate



Recommended Panel Cutout

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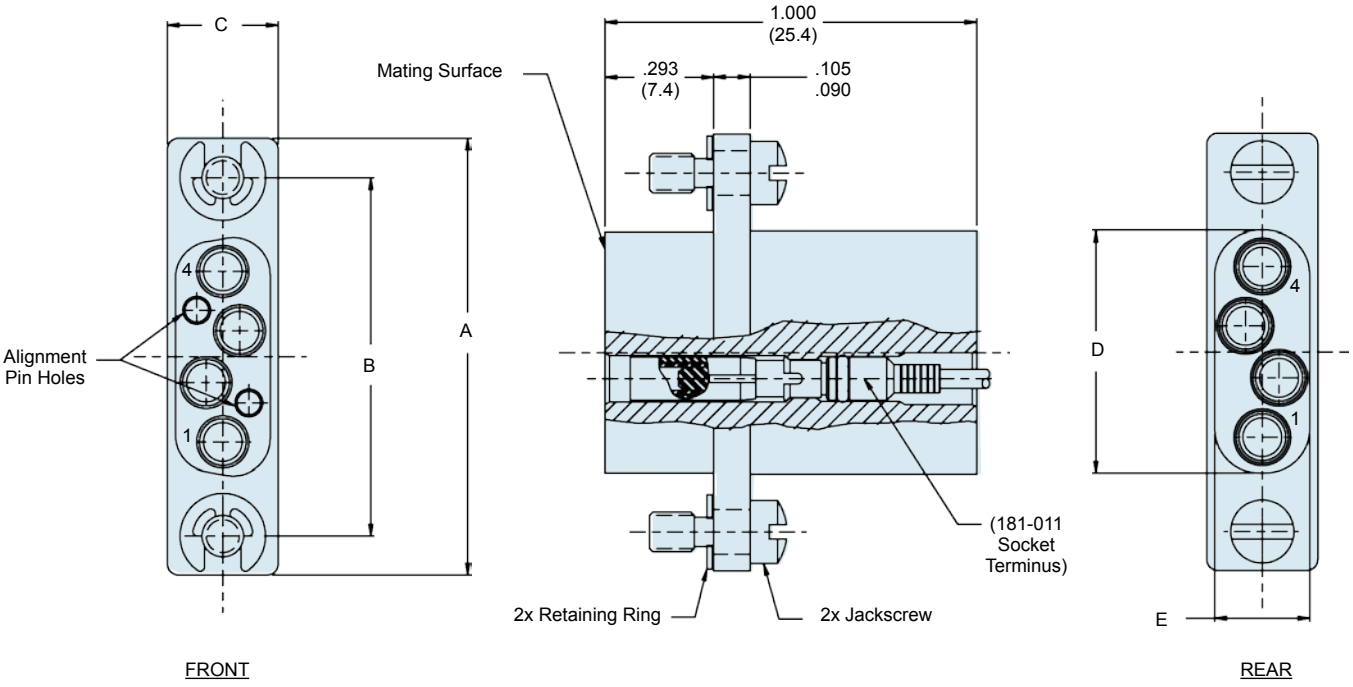
180-064
Micro-D Fiber Optic Plug Connector
for Glenair Front Release Socket Terminus 181-011

Micro-D GFR fiber optic plug connector

How To Order

Basic Number		No. F/O Pins *(Table I)*		
180-064	-	25	- 4	M
		Shell Size *(See Table I)*		**Material/ Finish Code** *(See Table II)*



Material and Finish
Shell: See Table II
Misc. Hardware: Stainless Steel/Passivate

Notes
Fiber Optic Socket Terminus to be ordered separately (see Glenair drawing 181-011).
Backshell to be ordered separately (see Table I).
For Mating Receptacle Connector, see Glenair drawing 180-063.

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Table I: Shell Size							
Shell Size	A ±.010 (0.25)	B ±.003 (0.08)	C ±.010 (0.25)	D ±.010 (0.25)	E ±.010 (0.25)	Max F.O. Pin	Recommended Backshell
9	.775 (19.7)	.565 (14.4)	.298 (7.6)	.380 (9.7)	.255 (6.5)	1	
15	.925 (23.5)	.715 (18.2)	.298 (7.6)	.530 (13.5)	.255 (6.5)	2	
21	1.075 (27.3)	.865 (22.0)	.298 (7.6)	.680 (17.3)	.255 (6.5)	3	
25	1.175 (29.8)	.965 (24.5)	.298 (7.6)	.654 (16.6)	.255 (6.5)	4	189-066
31	1.325 (33.7)	1.115 (28.3)	.298 (7.6)	.930 (23.6)	.255 (6.5)	5	
100	2.160 (54.9)	1.800 (45.7)	.384 (9.8)	1.425 (36.2)	.322 (8.2)	8	189-064

Table II: Material/Finish		
Code	Material	Finish
C	Aluminum Alloy	Anodize, Black
M		Electroless Nickel
NF		Cadmium, Olive Drab, Over Electroless Nickel
ZN		Zinc-Nickel, Olive Drab, Over Electroless Nickel
Z1	Stainless Steel	Passivate

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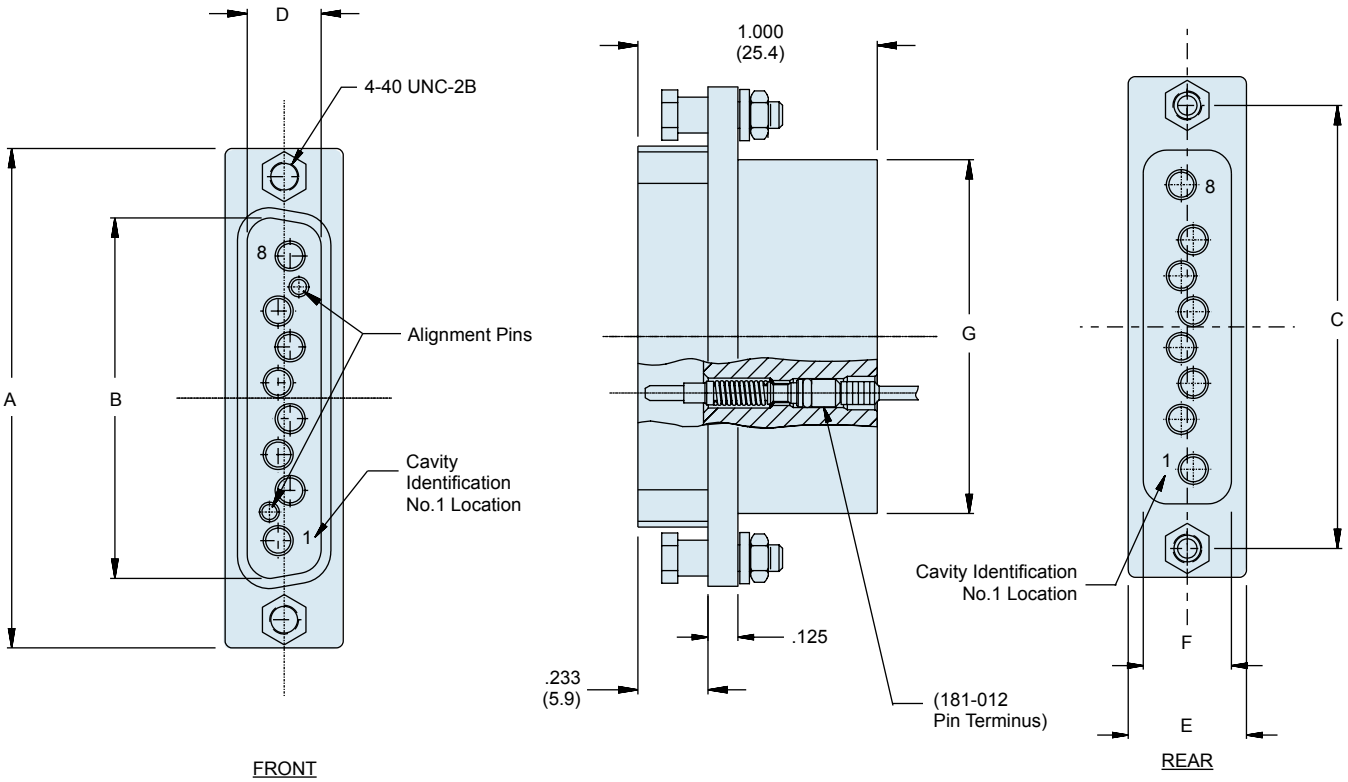
180-065
D-Subminiature Fiber Optic Receptacle
for Glenair Front Release Pin Terminus 181-012

D-subminiature GFR fiber optic receptacle

How To Order

Basic Number		No. F/O Pins (Table I)		
180-065	-	15	- 5	- M
		Shell Size (See Table I)		Material/ Finish Code (See Table II)

25-8 Shown



Material and Finish
Shell: See Table II
Misc. hardware: stainless steel/passivate

Notes
Fiber Optic Pin Terminus to be ordered separately (see Glenair drawing 181-012).
Backshell to be ordered separately (consult Glenair for available Backshell).
For mating plug connector, see Glenair drawing 180-066.

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Table I: Shell Size								
Shell Size	A ±.010 (0.25)	B ±.010 (0.25)	C ±.005 (0.13)	D ±.010 (0.25)	E ±.010 (0.25)	F ±.010 (0.25)	G ±.010 (0.25)	Max F.O. Pin
9	1.213 (30.8)	.666 (16.9)	.984 (25.0)	.330 (8.4)	.498 (12.6)	.369 (9.4)	.650 (16.5)	4
15	1.545 (39.2)	.994 (25.2)	1.312 (33.3)	.330 (8.4)	.498 (12.6)	.369 (9.4)	.932 (23.7)	5
25	2.090 (53.1)	1.535 (39.0)	1.852 (47.0)	.330 (8.4)	.498 (12.6)	.369 (9.4)	1.479 (37.6)	8
50	2.640 (67.1)	2.133 (54.2)	2.406 (61.1)	.490 (12.4)	.610 (15.5)	.500 (12.7)	2.000 (50.8)	12

Table II: Material/Finish		
Code	Material	Finish
C	Aluminum Alloy	Anodize, Black
M		Electroless Nickel
NF		Cadmium, Olive Drab, Over Electroless Nickel
ZN		Zinc-Nickel, Olive Drab, Over Electroless Nickel
Z1	Stainless Steel	Passivate

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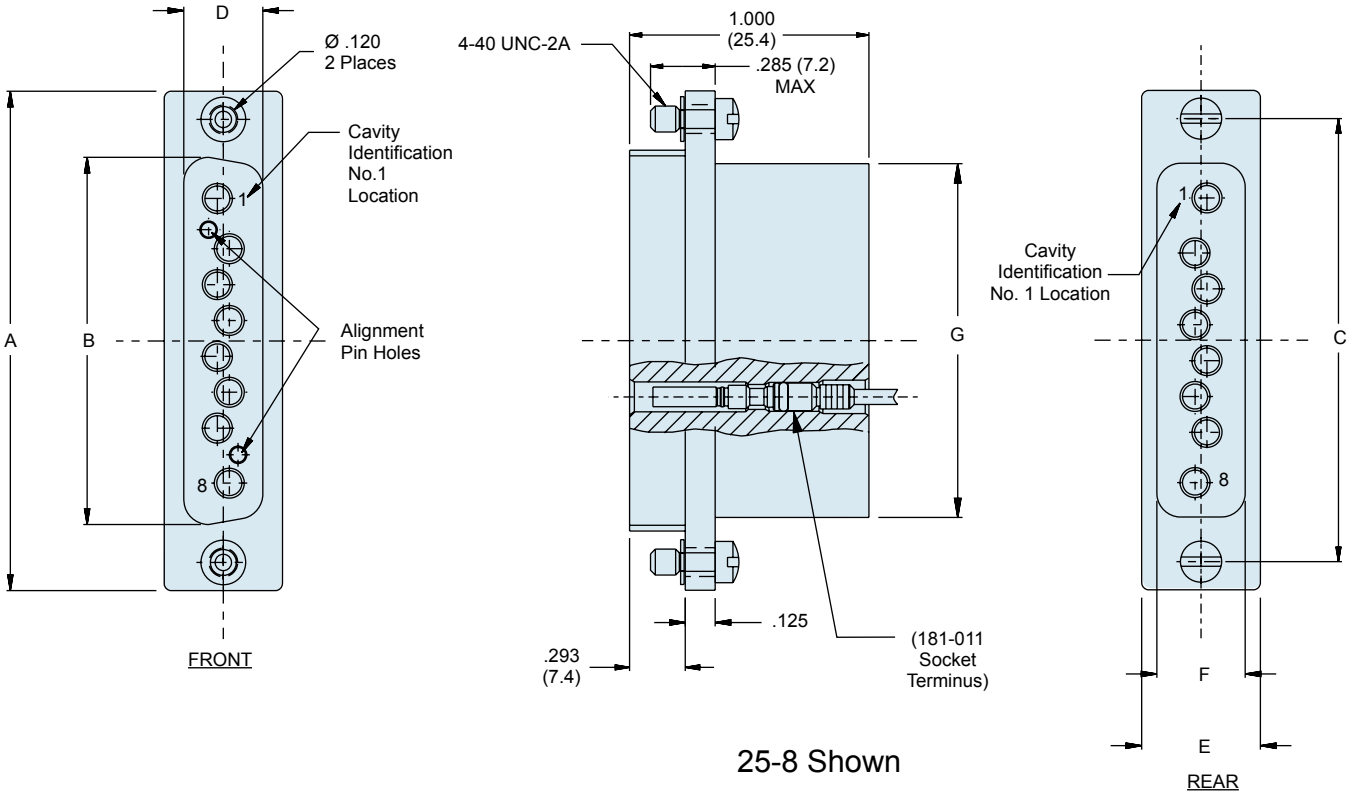
180-066
D-Subminiature Fiber Optic Plug Connector
for Glenair Front Release Socket Terminus 181-011

D-subminiature GFR fiber optic plug connector

How To Order

Basic Number		No. F/O Pins (Table I)		
180-066	-	15	- 5	- M
		Shell Size (See Table I)		Material/ Finish Code (See Table II)



25-8 Shown

Material and Finish

Shell: See Table II
Misc. Hardware: Stainless steel/passivate

Notes

Fiber Optic Socket Terminus to be ordered separately (see Glenair drawing 181-011).
Backshell to be ordered separately (consult Glenair for available backshell & jackscrew hardware).
For mating receptacle connector, see Glenair drawing 181-065.

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Table I: Shell Size								
Shell Size	A ±.010 (0.25)	B ±.010 (0.25)	C ±.005 (0.13)	D ±.010 (0.25)	E ±.010 (0.25)	F ±.010 (0.25)	G ±.010 (0.25)	Max F.O. Pin
9	1.213 (30.8)	.643 (16.3)	.984 (25.0)	.330 (8.4)	.498 (12.6)	.369 (9.4)	.650 (16.5)	4
15	1.545 (39.2)	.968 (24.6)	1.312 (33.3)	.330 (8.4)	.498 (12.6)	.369 (9.4)	.932 (23.7)	5
25	2.090 (53.1)	1.508 (38.3)	1.852 (47.0)	.330 (8.4)	.498 (12.6)	.369 (9.4)	1.479 (37.6)	8
50	2.640 (67.1)	2.062 (52.4)	2.406 (61.1)	.490 (12.4)	.610 (15.5)	.500 (12.7)	2.000 (50.8)	12

Table II: Material/Finish		
Code	Material	Finish
C	Aluminum Alloy	Anodize, Black
M		Electroless Nickel
NF		Cadmium, Olive Drab, Over Electroless Nickel
ZN		Zinc-Nickel, Olive Drab, Over Electroless Nickel
Z1	Stainless Steel	Passivate

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FIBER OPTIC

NEXT GENERATION (NGCON)

FIBER OPTIC CONNECTION SYSTEM

The Glenair Next Generation MIL-PRF-64266 (NGCON) Connector System combines proven technology from standard MIL-PRF-28876 and MIL-DTL-38999 Series III designs with new innovations including rear-release genderless contacts, high-density packaging, and removable alignment sleeve retainers (ASR). Glenair is an active member of the NGCON design consortium which is developing high-performance fiber optic interconnect solutions for air, sea and space military applications.

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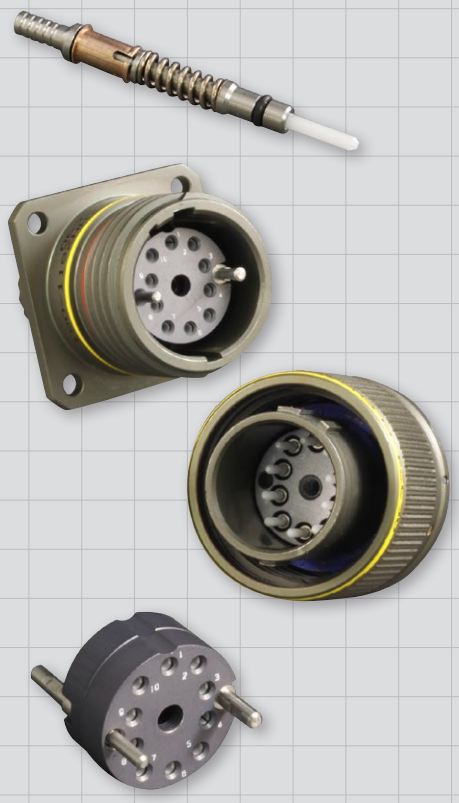
Genderless contacts, precision optics, and high-density packaging: the next-generation in air and sea fiber optics is just around the corner

The Glenair Next Generation MIL-PRF-64266 (NGCON) fiber optic connection system is a high-performance solution for air, sea, and space applications. Developed by the NGCON design consortium, the system combines proven technology from standard MIL-PRF-28876 and MIL-DTL-38999 Series III designs with new innovations including rear-release genderless contacts, high-density packaging, and a removable alignment sleeve retainer (ASR).



Product No.	Description	Page No.
NGCON Fiber Optic Termini		
181-043	Genderless Rear-Release Terminus	H-2
NGCON Fiber Optic Connectors		
180-118 (06)	Plug Connector	H-4
180-118 (H7)	Square Flange Wall Mount Receptacle	H-5
180-118 (08)	Jam Nut Mount Receptacle	H-6
180-118ASR	Alignment Sleeve Retainer (ASR)	H-7

- **Conforms to MIL-PRF-64266 (NGCON) military standard.**
- **Multimode and singlemode capable**
- **Removable alignment sleeve retainer (ASR) for easy maintenence**
- **Plug, wall mount receptacle and jam nut mount receptacle configurations**
- **Rear release precison genderless termini, designed in accordance with MIL-PRF-29504/18, /19, and /20.**
- **1.25 mm diameter ceramic ferrules and alignment sleeves**
- **Environmental o-ring sealing on terminus**
- **Various connector material/finish options available.**
- **M28876 Double-start ACME mating threads, D38999 Series III style rear accessory threads.**
- **Receptacles compatible with M28876 panel cutouts**
- **Anti-decoupling (ratchet) mechanism on plug connector.**
- **Keyed connectors and termini available for singlemode APC.**

H

Catalog Notes

Metric dimensions appear in parentheses in diagrams and tables, based on 1 inch = 25.4 mm, for reference only.
Unless otherwise specified, the following other dimensional tolerances apply:
.xx = ± .03 (0.8) • .xxx = ± .015 (0.4) • Angles = ± 5°

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181-043
MIL-PRF-29504/18 and /20 Type Termini
for MIL-PRF-62466 (NGCON) Fiber Optic Connectors

M64266 NGCON

MIL-PRF-29504/18 and /20 type NGCON genderless rear-release termini with integrated retention clip and environmental seal

Table I

Part Number Non-Keyed	Part Number Keyed	ØA (Micron)	Typical Fiber Type	Typical Fiber Size Core/Cladding/Coating (Micron)	Ref. M29504/18 Non-Keyed	Ref. M29504/20 Keyed
181-043-1250C	181-043K-1250C	125.0	SM	9/125	M29504/18-01Y	M29504/20-01Y
181-043-1255C	181-043K-1255C	125.5	SM	9/125	M29504/18-02Y	M29504/20-02Y
181-043-126SC	181-043K-126SC	126.0	SM/MM	9/125, 50/125, 62.5/125	M29504/18-03Y	M29504/20-03Y
181-043-126C	181-043K-126C	126.0	MM	50/125, 62.5/125	M29504/18-26Y	M29504/20-26Y
181-043-127C	181-043K-127C	127.0	MM	50/125, 62.5/125	M29504/18-27Y	M29504/20-27Y
181-043-142C	181-043K-142C	142.0	MM	100/140	M29504/18-42Y	M29504/20-42Y
181-043-145C	181-043K-145C	145.0	MM	100/140	M29504/18-45Y	M29504/20-45Y
181-043-156C	181-043K-156C	156.0	MM	62.5/125/155	M29504/18-56Y	M29504/20-56Y
181-043-157C	181-043K-157C	157.0	MM	62.5/125/155	M29504/18-57Y	M29504/20-57Y
181-043-173C	181-043K-173C	173.0	MM	100/140/172	M29504/18-73Y	M29504/20-73Y
181-043-175C	181-043K-175C	175.0	MM	100/140/172	M29504/18-75Y	M29504/20-75Y

Consult factory for additional sizes and QPL status.
SM = Singlemode • MM = Multimode

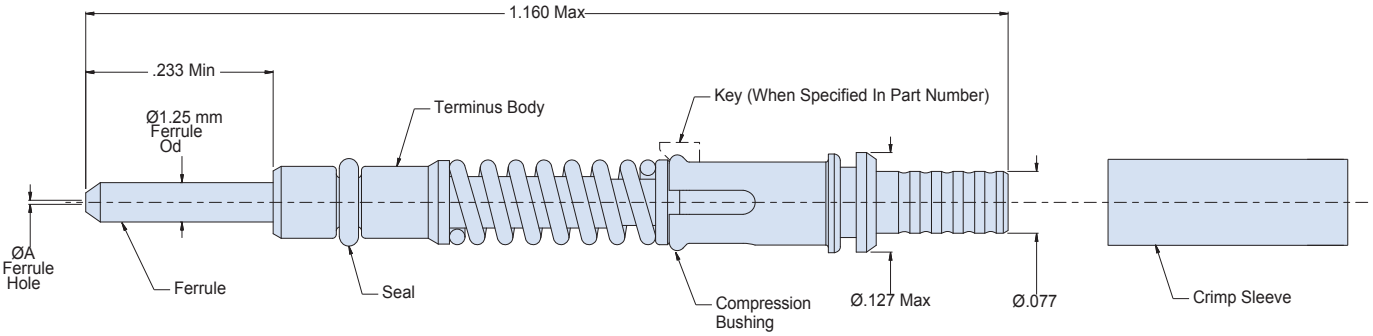

Table II: Accessories

Part No.	Description
181-043-C	Crimp Sleeve, Ø2.4mm Max Jacket
182-012	Crimp tool
182-013	Insertion tool, straight
182-014	Insertion tool, 90°
182-021	Hand polishing tool
182-025	Removal tool

Material and Finish
Ferrule: Zirconia Ceramic
Terminus Assembly: Stainless steel/passivate
Retention Clip: Spring alloy
Spring: Stainless steel/passivate
Seal: Elastomeric rubber
Crimp Sleeve: Stainless steel/passivate

Accessories
Consult factory for appropriate termination and assembly tools/procedures
Crimp sleeve is supplied with terminus assembly, and may be ordered separately (see Table II).

Notes
For dummy terminus, see Glenair drawing 181-078

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180-118
Next Generation MIL-PRF-64266 (NGCON) Type
Fiber Optic Connector Reference Tables

Table I: Material and Finish

Code	Material	Description
ME	Aluminum Alloy	Electroless Nickel
MT		Nickel-PTFE, Grey
ZN		Zinc-Nickel, Olive Drab
ZR		Zinc-Nickel, Black
Z1	Stainless Steel	Passivate

Table II

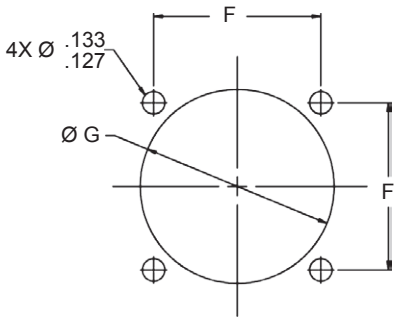
Shell Size	Shell Size Code (Ref)	Insert Arrangement	AA Thread	BB Thread
11	B	2 or 4	M15 x 1.0-6g 0.100R	.7500-.1P-.2L-DS
13	C	6	M18 x 1.0-6g 0.100R	.8750-.1P-.2L-DS
15	D	8 or 10	M22 x 1.0-6g 0.100R	1.0625-.1P-.2L-DS
23	H	18 or 36	M34 x 1.0-6g 0.100R	1.5000-.1P-.2L-DS

Table III: Dimension

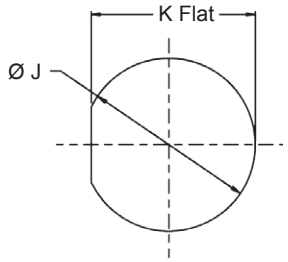
Shell Size	Shell Size Code (Ref)	Ø A Max	C ±.010	E ±.015	F	Ø G ±.005	ØJ ±.005	K ±.005	L Hex	M Hex Corners Max
11	B	1.028 (26.1)	1.264 (32.1)	1.023 (26.0)	.750 (19.1)	.812 (20.6)	.885 (22.5)	.848 (21.5)	1.075 1.045	1.290 (32.8)
13	C	1.141 (29.0)	1.389 (35.3)	1.138 (28.9)	.843 (21.4)	0.937 (23.8)	1.010 (25.7)	.973 (24.7)	1.205 1.171	1.435 (36.4)
15	D	1.263 (32.1)	1.577 (40.1)	1.258 (32.0)	.968 (24.6)	1.124 (28.5)	1.198 (30.4)	1.160 (29.5)	1.329 1.358	1.650 (41.9)
23	H	1.705 (43.3)	2.004 (50.9)	1.718 (43.6)	1.281 (32.5)	1.562 (39.7)	1.630 (41.4)	1.593 (40.5)	1.812 1.778	2.093 (53.2)

Table IV: Key Polarizations

Polarization	Shell Size 11	Shell Size 13, 15, & 23
1	55°	30°
2	80°	55°
3	105°	80°
4	130°	105°
5	230°	130°
6	255°	155°
7	280°	205°
8	305°	230°
9	-	255°
A	-	280°
B	-	305°
C	-	330°
Universal	See notes	

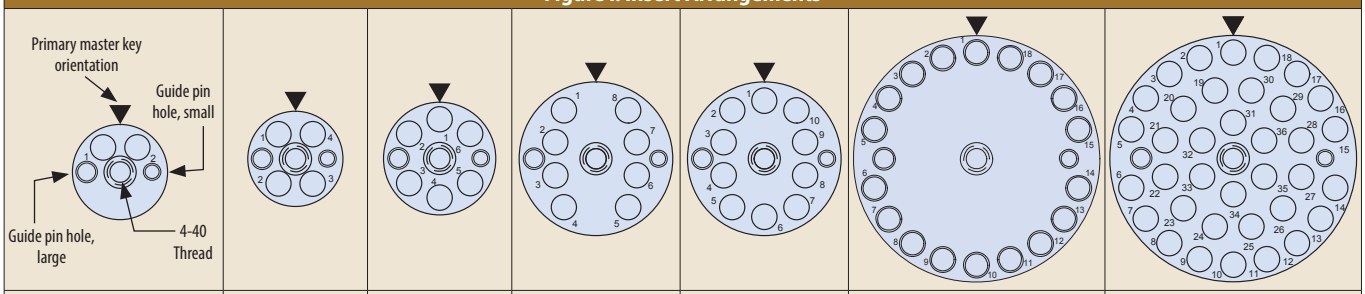


Recommended Panel Cut-Out for Wall Mount Receptacles



Recommended Panel Cut Out for Jam Nut Mount Receptacles as viewed from front of panel

Figure I: Insert Arrangements



Shell Size 11 Arrangement 2	Shell Size 11 Arrangement 4	Shell Size 13 Arrangement 6	Shell Size 15 Arrangement 8	Shell Size 15 Arrangement 10	Shell Size 23 Arrangement 18	Shell Size 23 Arrangement 36

Plug front face shown. Receptacle front face - opposite

H

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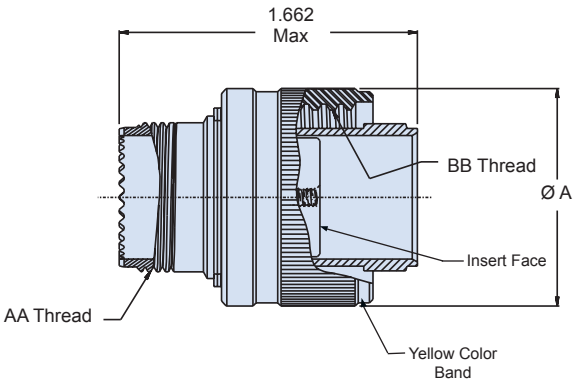
180-118 (06)
Next Generation MIL-PRF-64266/2 (NGCON) Type Fiber Optic Plug Connector

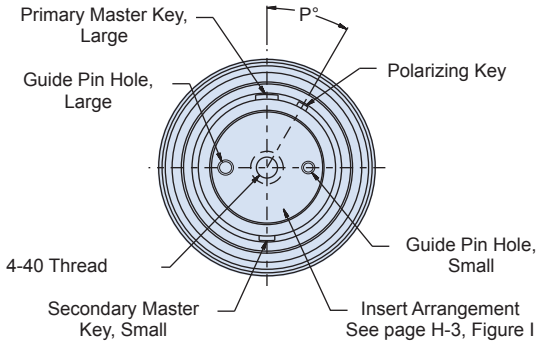
M64266 NGCON

MIL-PRF-64266/2 NGCON type fiber optic plug

How To Order

Product Series	Material/Finish (Table I)	Shell Size (Table II)				K = Keyed Cavities (APC) Omit for standard non-keyed cavities			Key Polarization Omit for Universal (see notes and Table IV)
180	- 118	ZR	06	- 15	- 8	K	P	1	
	Basic No.		06 - Plug		Insert Arrangement (See Figure 1)		Insert Type P = Without ASR (Standard for Plug) S = With ASR (Standard for Receptacle)		





06 - Plug

Standard Plug Configuration Supplied Without ASR
(Insert Type=P)

Material and Finish

Plug Barrel, Coupling Nut: See Table I
Insert: Al Alloy/Anodize, or High Grade Engineering Plastic - mfr's option
Peripheral Seal (not shown): Fluorosilicone/Silicone Blend
Misc. Hardware: Stainless Steel/Passivate

Notes

Plug connector universal key polarization only contains the primary and secondary master keys (no polarization key).
Alignment Sleeve Retainer (ASR, not shown) is supplied standard with insert type "S" only. One ASR is required for each mated pair of connectors.
ASR may be ordered seperately. See Glenair drawing 180-118ASR.
Connectors with keyed terminus cavities are intended for use with keyed termini for singlemode APC. Otherwise use standard non-keyed connector cavities and termini.

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180-118 (H7)
Next Generation MIL-PRF-64266/1 (NGCON) Type Fiber Optic Square Flange Wall Mount Receptacle

M64266 NGCON

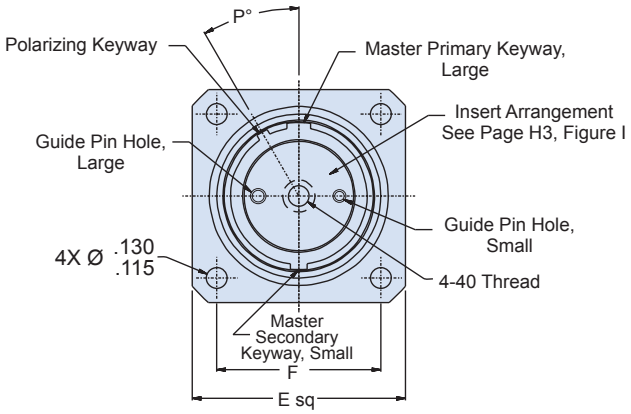
MIL-PRF-64266/1 NGCON type fiber optic square flange wall mount receptacle

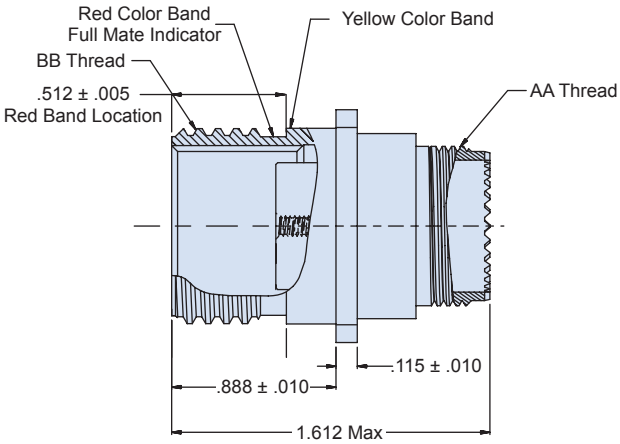
How To Order

Product Series	Material/Finish (Table I)	Shell Size (Table II)	K = Keyed Cavities (APC) Omit for standard non-keyed cavities					
180	118	ZR	H7	15	8	K	S	1

Key Polarization: Omit for Universal (see notes and Table IV)

- Basic No.
- H7 - Wall Mount Receptacle
- Insert Arrangement (See Figure 1)
- Insert Type: P = Without ASR (Standard for Plug); S = With ASR (Standard for Receptacle)





H7 - Wall Mount Receptacle

Standard receptacle configuration supplied with ASR, not shown (Insert type = S)

Material and Finish

Shell: See Table I
Insert: Al Alloy/Anodize, or high grade engineering thermoplastic- mfr's option
Alignment sleeve retainer (ASR): Al Alloy/Anodize
Alignment sleeves: Zirconia ceramic
Misc. hardware: Stainless steel/Passivate

Notes

Receptacle connector universal keyway polarization contains all polarizations (1 thru 9, A, B, and C).
Alignment Sleeve Retainer (ASR, not shown) is supplied with insert type "S" only. One ASR is required for each mated pair of connectors.
ASR may be ordered seperately. See Glenair drawing 180-118ASR.
Connectors with keyed terminus cavities are intended for use with keyed termini for singlemode APC. Otherwise use standard non-keyed connector cavities and termini.

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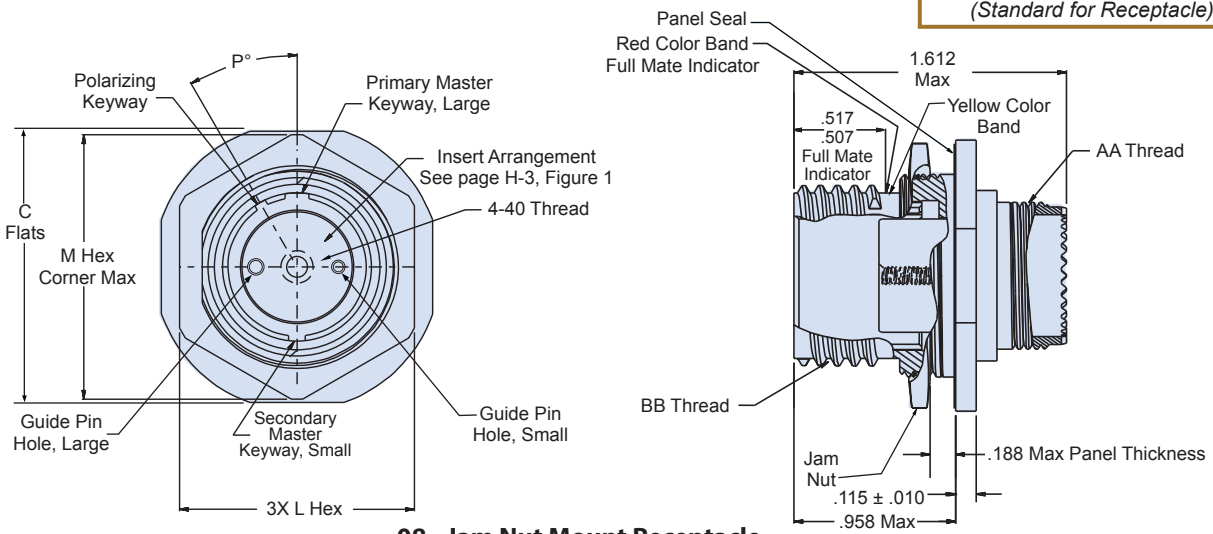
180-118 (08)
Next Generation MIL-PRF-64266/3 (NGCON) Type Fiber Optic Jam Nut Mount Receptacle

M64266 NGCON

MIL-PRF-64266/3 NGCON type fiber optic, jam nut mount receptacle

How To Order

Product Series	Material/Finish (Table I)	Shell Size (Table II)			K = Keyed Cavities (APC) Omit for standard non-keyed cavities		Key Polarization Omit for Universal (see notes and Table IV)
180 -	118	ZR	08 -	15 -	8	K	S	1
	Basic No.	08 - Jam Nut Mount Receptacle			Insert Arrangement (See Figure 1)		Insert Type P = Without ASR (Standard for Plug) S = With ASR (Standard for Receptacle)	



08 - Jam Nut Mount Receptacle

Standard receptacle configuration supplied with ASR, not shown (Insert Type = S)

Material and Finish

Shell, Jam Nut: see Table I
Insert: Al Alloy/ Anodize, or High Grade Engineering Plastic- mfr's option
Alignment sleeve retainer (ASR): Al Alloy/Anodize
Alignment sleeves: zirconia ceramic
Panel seal: Fluorosilicone
Misc. Hardware: Stainless Steel/Passivate

Notes

Receptacle connector universal keyway polarization contains all polarizations (1 thru 9, A, B, and C).
Alignment Sleeve Retainer (ASR, not shown) is supplied with insert type "S" only. One ASR is required for each mated pair of connectors.
ASR may be ordered seperately. See Glenair drawing 180-118ASR.
Connectors with keyed terminus cavities are intended for use with keyed termini for singlemode APC. Otherwise use standard non-keyed connector cavities and termini.

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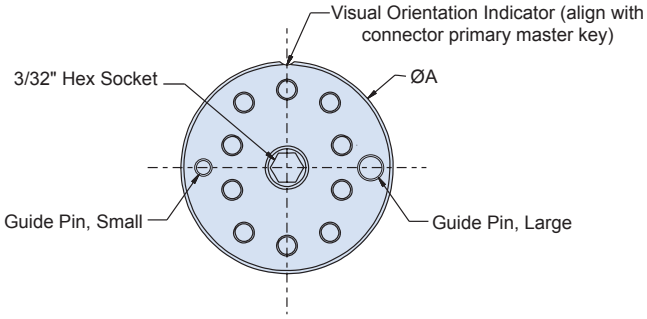
180-118ASR
Next Generation MIL-PRF-64266/9 (NGCON) Type Fiber Optic Alignment Sleeve Retainer (ASR)

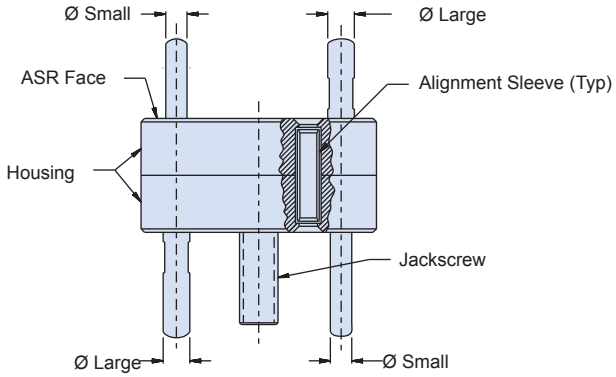
M64266 NGCON

MIL-PRF-64266/9 (NGCON) type alignment sleeve retainer (ASR)

How To Order

Product Series		Alignment Sleeve Retainer		Insert Arrangement (See page H-3, Figure I)			Material/Finish
180	- 118	ASR	- 15	- 10	R	A	A = Al Alloy / Anodize B = Composite C = Stainless Steel / Passivate
Basic No.			Shell Size (Table I)		ASR Type P = Plug R = Receptacle (Standard)		





Shell Size 15
Arrangement 10 Shown

Table I			
Shell Size	Shell Size Code (Ref)	Arrangement	ØA Max
11	B	2 or 4	.412 (10.5)
13	C	6	.488 (12.4)
15	D	8 or 10	.666 (16.9)
23	H	18 or 36	1.070 (27.2)

Material and Finish
Housing: Al Alloy/Anodize
Alignment Sleeve: Zirconia Ceramic
Guide Pins, Jackscrew: Stainless/Passivate

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FIBER OPTIC

GLENAIR GFOCA

FIBER OPTIC CONNECTION SYSTEM

Most commonly used by the army for long-run battlefield communications, the GFOCA Connection System is also well suited to dockside naval communications, down-hole drilling and other harsh environment applications. The hermaphroditic system utilizes low insertion loss butt-joint termini and a ruggedized coupling mechanism for reliable, repeatable mating. The genderless mating system is rated to 1000-2000 cycles depending on fiber media selection.

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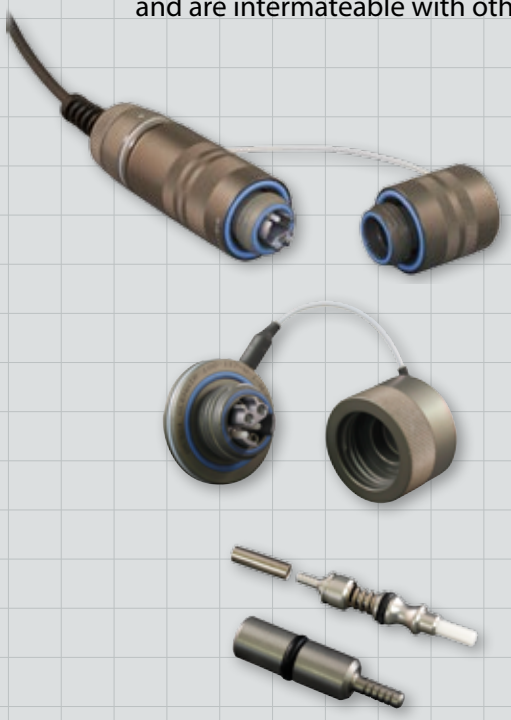
Glenair MIL-DTL-83526 Type (GFOCA) 4 Channel Fiber Optic Connection System

General Information

The Ultimate Harsh Environment, Field Deployable Fiber Optic Connection System

Most commonly used by the army for long-run battlefield photonic communications, the GFOCA Connection System is also well suited to dockside naval communications, down-hole drilling and other harsh environment applications. The hermaphroditic system uses low insertion loss butt-joint termini and a ruggedized coupling mechanism for reliable, repeatable mating. The genderless mating system is rated to 2000 cycles, depending on fiber media selection. Connectors utilize (GFOCA) MIL-PRF-29504/16 type (draft) termini and are intermateable with other manufacturers' fiber optic connector systems.



Product No.	Description	Page No.
MIL-PRF-29504/16 and /17 Type Fiber Optic Termini		
181-050	Pin Terminus, M29504/16 Type	I-2
181-059	Dummy Terminus, M29504/17 Type	I-3
MIL-DTL-83526/16 and /17 Type Fiber Optic Connectors		
180-145	MIL-DTL-83526/16 Type Plug Connector, Hermaphroditic, 4 Channel	I-4
180-146	MIL-DTL-83526/17 Type Jam Nut Receptacle, 4 Channel	I-6
180-147	Type Square Flange Receptacle, 4 Channel	I-8
180-148	Type Jam Nut Receptacle, 4 Ch, Internal Mount	I-10
180-149	Type Jam Nut Receptacle, 4 Channel, Internal Mount with Accessory Threads	I-12
180-150	Type Jam Nut Receptacle, 4 Channel, Panel Mount with Accessory Threads	I-14
180-153	Type Jam Nut Receptacle, 4 Channel, Internal Mount with Strain Relief	I-16
180-137	Type Plug Connector, Hermaphroditic, 90°, 4 Channel	I-18

Catalog Notes

Metric dimensions appear in parentheses in diagrams and tables, based on 1 inch = 25.4 mm, for reference only. Unless otherwise specified, the following other dimensional tolerances apply:

.xx = ± .03 (0.8) • .xxx = ± .015 (0.4) • Angles = ± 5°

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181-050
M29504/16 Type
Genderless GFOCA Fiber Optic Terminus

GFOCA

M29504/16 type genderless GFOCA fiber optic terminus

Part Number Development		
Part Number	**Ø A (Microns)**	**Fiber Type (Typical)**
181-050-1250C	125.0	SM
181-050-1255C	125.5	SM
181-050-1260C	126.0	SM and MM
181-050-1270C	127.0	MM
181-050-1420C	142.0	MM
181-050-2300C	230.0	MM
SM: Singlemode • MM: Multimode Consult Factory for Additional Sizes		

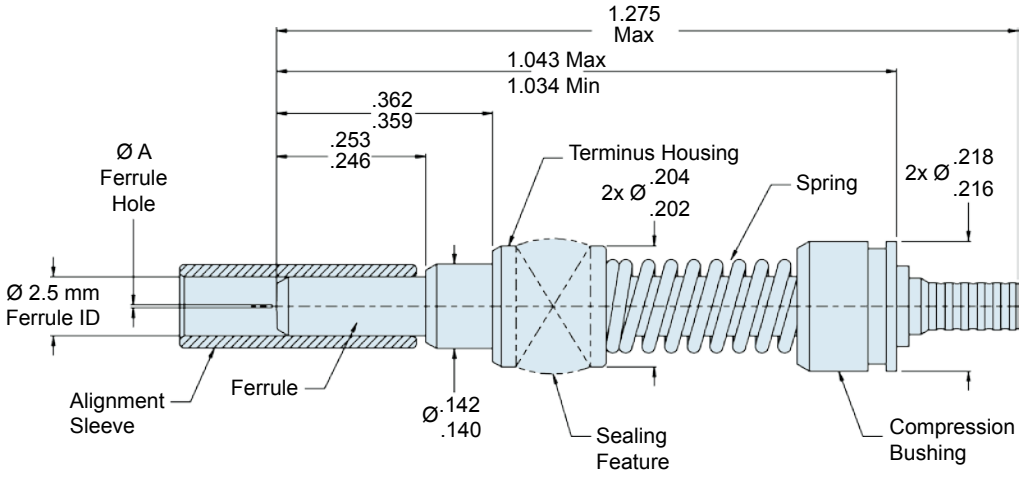

Table II: Terminus Accessories	
Part Number	**Description**
181-050-S	Alignment Sleeve Split, Ceramic
265-008	Crimp Sleeve

Material and Finish

Ferrule: Zirconia Ceramic
Terminus Housing: Stainless Steel/Passivate
Spring: Stainless Steel/Passivate
Compression Bushing: Stainless Steel/Passivate
Crimp Sleeve: Brass Alloy/Nickel (not shown)
Seal(s): Elastomeric Rubber

Notes

Terminus is designed to meet the general requirements of MIL-PRF-29504/16 (Draft)
Alignment Sleeve (not supplied with Terminus) may be ordered separately (See table II)
Crimp sleeve is supplied with terminus assembly, and may be ordered separately (See table II). For terminus less crimp sleeve, omit C from dash number

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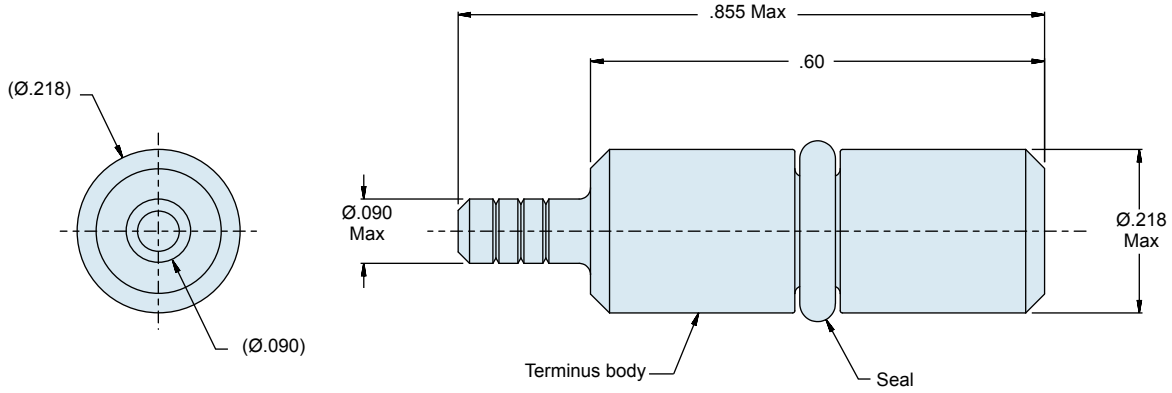
GFOCA

M29504/17 Type GFOCA fiber optic dummy terminus

Part Number	
181-059	GFOCA M29504/17 Type Dummy Terminus



Material and Finish

Terminus body: Stainless steel/passivate
Seal: Elastomeric Rubber

Notes

Terminus is designed to meet the general requirements of MIL-PRF-29504/17 (Draft)

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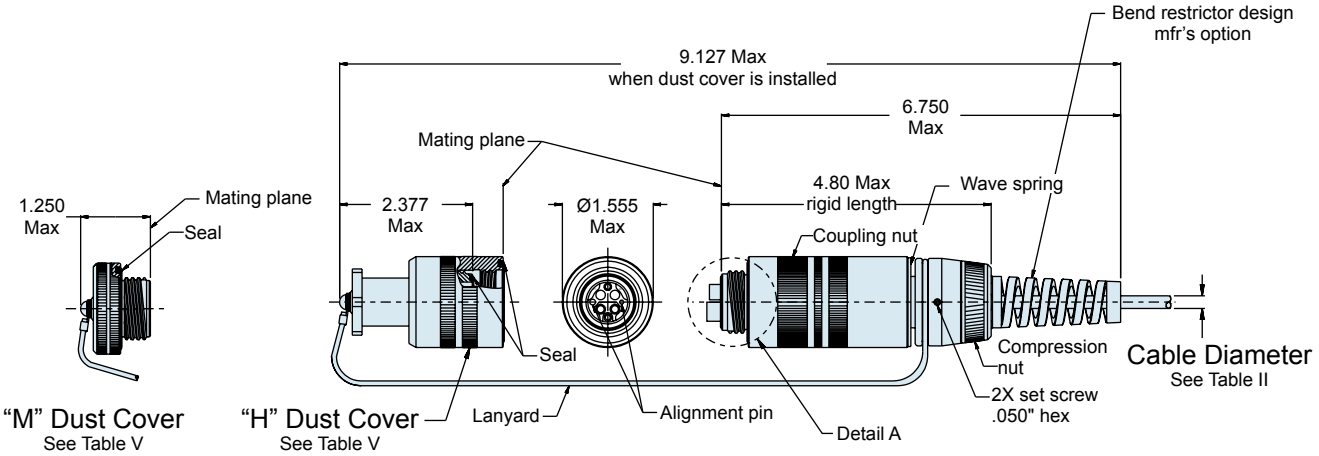
180-145
GFOCA Hermaphroditic Plug Connector
MIL-DTL-83526/16 Type, 4 Channel

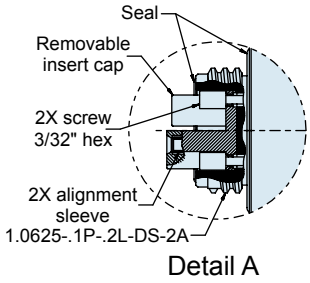
GFOCA

MIL-DTL-83526/16 type plug-to-plug hermaphroditic GFOCA connector, 4 channel

How To Order

Product Series		Material/Finish (Table I)		Alignment Sleeve Style (Table III)		Dust Cover Style (Table V)	
180	- 145	G2	- 01	N	1	H	1
	Basic No.		Cable Entry (Table II) (See notes)		Insert Cap Key Dash No.. (Table IV)		Seal Material (Table VI) (See notes)





Detail A

Material and Finish

External hardware: See Table I
Internal hardware: Al alloy/anodize
Misc. hardware: Stainless steel/passivate
Lanyard: Stainless steel/coated
Strain relief wedge: Copper alloy/nickel
Seals: See Table VI

Notes

Connector assembly is designed IAW the interface requirements of MIL-DTL-83526/16 (Draft).
Standard configuration is shown in sample part number.

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180-145
GFOCA Hermaphroditic Plug Connector
MIL-DTL-83526/16 Type, 4 Channel

Table I: Material/Finish		
Code	Material	Finish Description
G2	Aluminum alloy	Hard anodize, gray
ZN		Zinc-nickel, olive drab
ZR		Zinc-nickel, black

Refer to Appendix for material/finish details

Table II: Cable Diameter		
Dash No.	Cable Diameter	
	Inch	mm
01	.190-.315	4.83-8.00
02	.316-.379	8.03-9.63

Table III: Alignment Sleeve Style	
Code	Style
N	None
Consult factory for additional options	

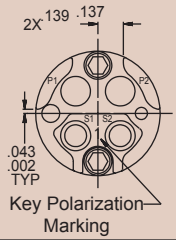
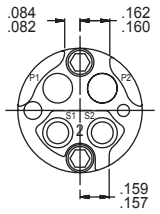
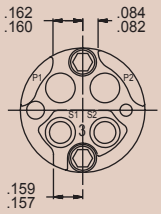
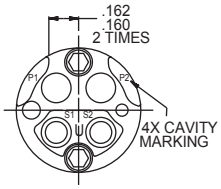
Table IV: Insert Cap Key Configurations				
Dash No:	1	2	3	4
Config.	Key 1	Key 2	Key 3	Key U (universal)
				

Table V: Dust Cover Style	
Code	Style
M	Male
H	Hermaphroditic
N	None

Table VI: Seal Material	
Dash No.	Seal material(s)
1	Primary seals: Fluorosilicone & Nitrile Secondary seals: Fluorosilicone, Urethane, & Nitrile
2	EPDM

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180-146
GFOCA Jam Nut Mount Receptacle
MIL-DTL-83526/17 Type, 4 Channel

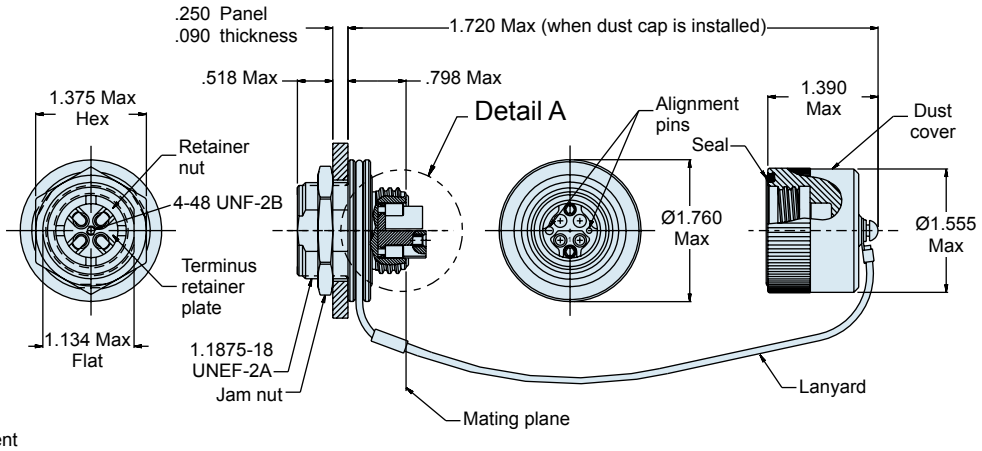
GFOCA

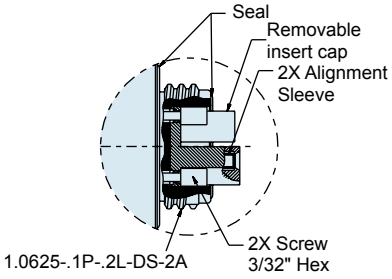
MIL-DTL-83526/17 type hermaphroditic GFOCA jam nut receptacle, 4 channel

How To Order

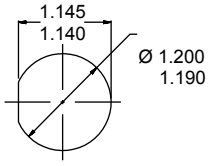
Product Series	Material/Finish (Table I)		Insert Cap Key Dash No.. (Table III)		Seal Material (Table V) (See notes)
180 -	146	ZR	- N	1 F	1

- 146: Basic No.
- N: Alignment Sleeve Style (Table II)
- F: Dust Cover Style (Table IV)





Detail A



Panel Cut-out
As viewed from
front of panel

Material and Finish

External hardware: See Table I
Internal hardware: Al alloy/anodize
Misc. hardware: Stainless steel/passivate
Lanyard: Stainless steel/coated
Strain relief wedge: Copper alloy/nickel
Seals: See Table V

Notes

Connector assembly is designed IAW the interface requirements of MIL-DTL-83526/17 (Draft).
Standard configuration is shown in sample part number.

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180-146
GFOCA Jam Nut Mount Receptacle
MIL-DTL-83526/17 Type, 4 Channel

Table I: Material/Finish		
Code	Material	Finish Description
G2	Aluminum alloy	Hard anodize, gray
ZN		Zinc-nickel, olive drab
ZR		Zinc-nickel, black

Refer to Appendix for material/finish details

Table II: Alignment Sleeve Style	
Code	Style
N	None
Consult factory for additional options	

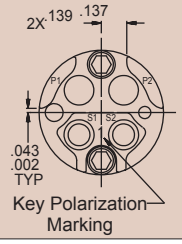
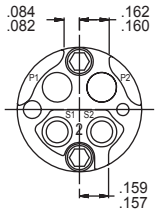
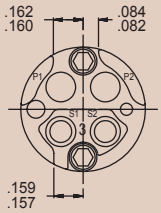
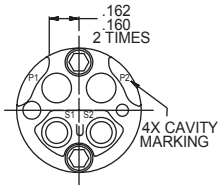
Table III: Insert Cap Key Configurations				
Dash No:	1	2	3	4
Config.	Key 1	Key 2	Key 3	Key U (universal)
				

Table IV: Dust Cover Style	
Code	Style
F	Female
H	Hermaphroditic
N	None

Table V: Seal Material	
Dash No.	Seal material(s)
1	Fluorosilicone / Fluorosilicone panel seal
2	Fluorosilicone / Conductive fluorosilicone panel seal
3	EPDM / EPDM panel seal
4	EPDM / Conductive EPDM panel seal

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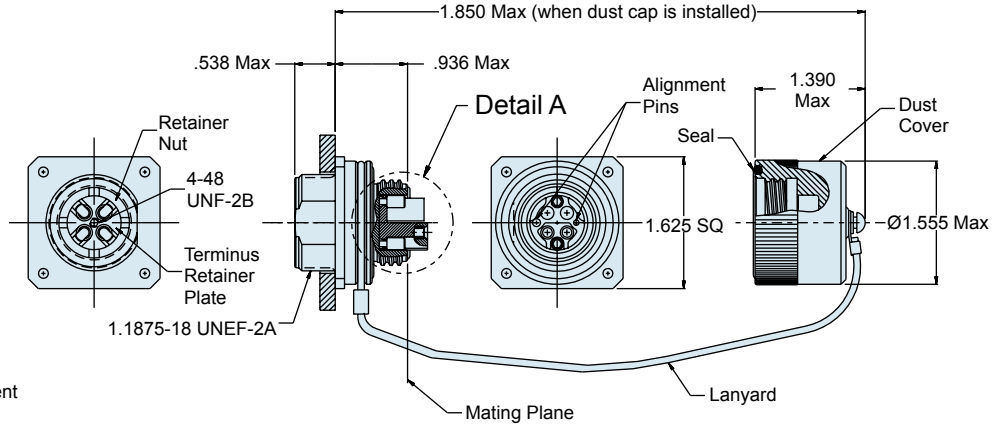
180-147
GFOCA Square Flange Mount Receptacle
MIL-DTL-83526 Type, 4 Channel

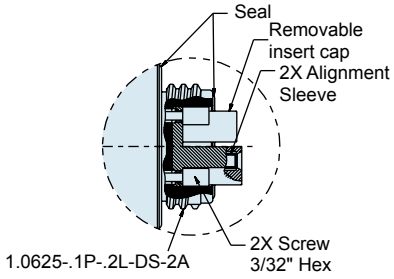
GFOCA

MIL-DTL-83526/18 type hermaphroditic GFOCA square flange receptacle, 4 channel

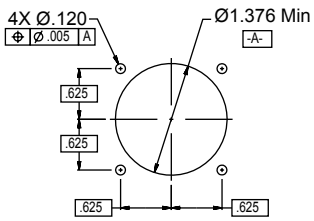
How To Order

Product Series	Material/Finish (Table I)		Insert Cap Key Dash No.. (Table III)		Seal Material (Table V) (See notes)
180 -	147	ZR -	N	1 F	1
	Basic No.		Alignment Sleeve Style (Table II)	Dust Cover Style (Table IV)	





Detail A



Panel Cut-Out

Material and Finish

External hardware: See Table I
Internal hardware: Al alloy/anodize
Insert Cap: Al alloy/anodize
Misc. hardware: Stainless steel/passivate
Lanyard: Stainless steel/coated
Seals: See Table V

Notes

Connector assembly is designed IAW the interface requirements of MIL-PRF-83526/17 (Draft).
Standard configuration is shown in sample part number.

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Table I: Material/Finish		
Code	Material	Finish Description
G2	Aluminum alloy	Hard anodize, gray
ZN		Zinc-nickel, olive drab
ZR		Zinc-nickel, black

Refer to Appendix for material/finish details

Table II: Alignment Sleeve Style	
Code	Style
N	None
Consult factory for additional options	

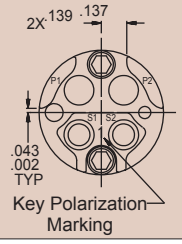
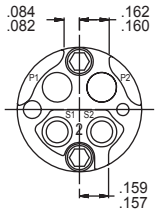
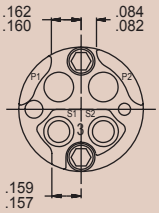
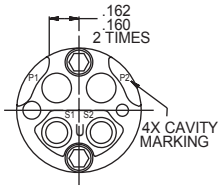
Table III: Insert Cap Key Configurations				
Dash No:	1	2	3	4
Config.	Key 1	Key 2	Key 3	Key U (universal)
				

Table IV: Dust Cover Style	
Code.	Style
F	Female
H	Hermaphroditic
N	None

Table V: Seal Material	
Dash No.	Seal material(s)
1	Fluorosilicone / Fluorosilicone panel seal
2	Fluorosilicone / Conductive fluorosilicone panel seal
3	EPDM / EPDM panel seal
4	EPDM / Conductive EPDM panel seal

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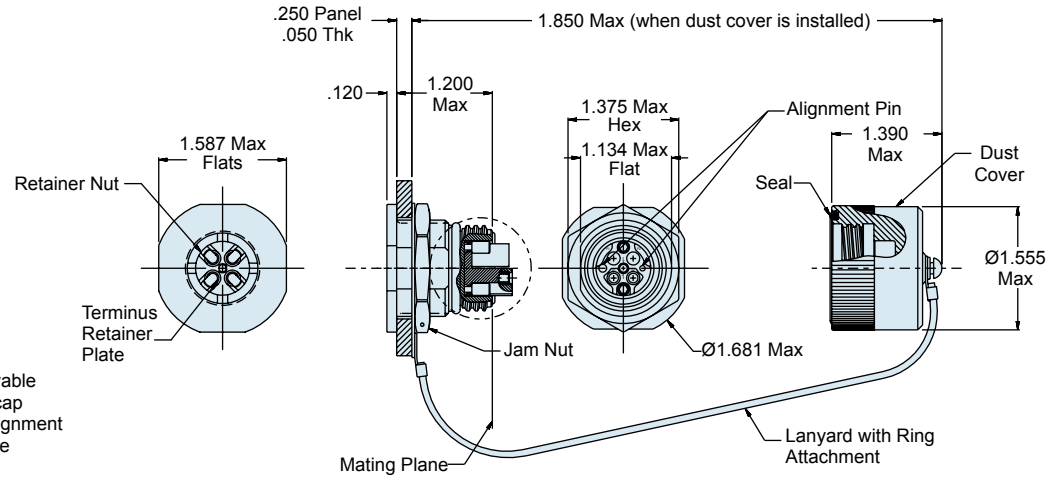
180-148
GFOCA Internal Mount Jam Nut Receptacle
MIL-DTL-83526 Type, 4 Channel

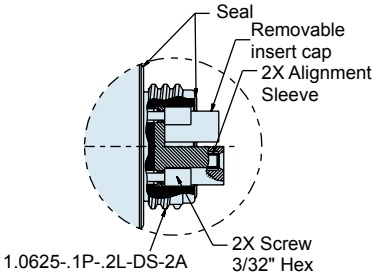
GFOCA

MIL-DTL-83526 type hermaphroditic GFOCA internal mount jam nut receptacle

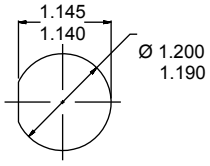
How To Order

Product Series	Material/Finish (Table I)		Insert Cap Key Dash No. (Table III)		Seal Material (Table V) (See notes)	
180	- 148	ZR	- N	1	F	1
	Basic No.		Alignment Sleeve Style (Table II)		Dust Cover Style (Table IV)	





Detail A



Panel Cut-out
As viewed from
front of panel

Material and Finish

External hardware: See Table I
Insert Cap: Al alloy/anodize
Misc. hardware: Stainless steel/passivate
Lanyard: Stainless steel/coated
Seals: See Table V

Notes

Connector assembly is designed IAW the interface requirements of MIL-PRF-83526/17 (Draft).
Standard configuration is shown in sample part number.

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180-148
GFOCA Internal Mount Jam Nut Receptacle
MIL-DTL-83526 Type, 4 Channel

Table I: Material/Finish		
Code	Material	Finish Description
G2	Aluminum alloy	Hard anodize, gray
ZN		Zinc-nickel, olive drab
ZR		Zinc-nickel, black

Refer to Appendix for material/finish details

Table II: Alignment Sleeve Style	
Code	Style
N	None
Consult factory for additional options	

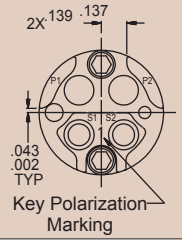
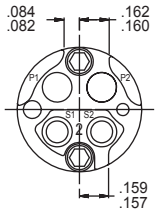
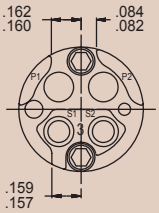
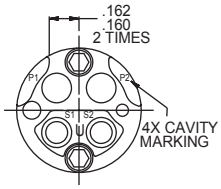
Table III: Insert Cap Key Configurations				
Dash No:	1	2	3	4
Config.	Key 1	Key 2	Key 3	Key U (universal)
				

Table IV: Dust Cover Style	
Code	Style
F	Female
H	Hermaphroditic
N	None

Table V: Seal Material	
Dash No.	Seal material(s)
1	Fluorosilicone / Fluorosilicone panel seal
2	Fluorosilicone / Conductive fluorosilicone panel seal
3	EPDM / EPDM panel seal
4	EPDM / Conductive EPDM panel seal

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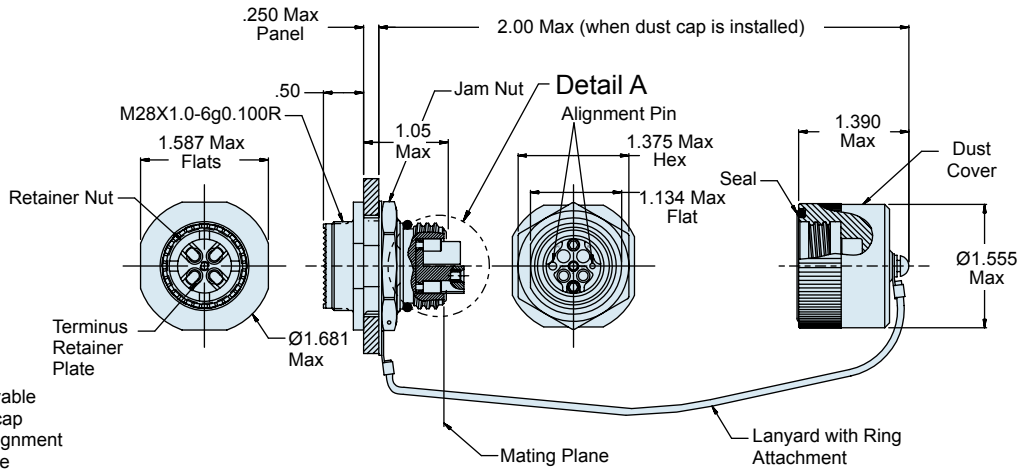
180-149
GFOCA Internal Mount Jam Nut Receptacle with Accessory Threads
MIL-DTL-83526 Type Type, 4 Channel

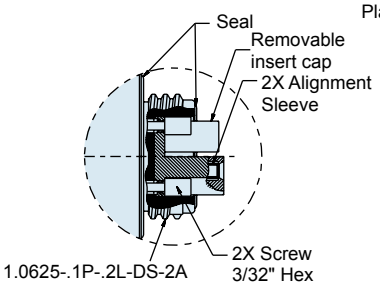
GFOCA

MIL-DTL-83526 type hermaphroditic GFOCA internal mount jam nut receptacle with accessory threads

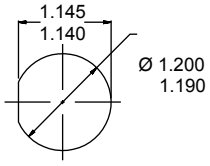
How To Order

Product Series		Material/Finish (Table I)		Insert Cap Key Dash No. (Table III)		Seal Material (Table V) (See notes)
180	- 149	ZR	- N	1	F	1
	Basic No.		Alignment Sleeve Style (Table II)		Dust Cover Style (Table IV)	





Detail A



Panel Cut-out
As viewed from front of panel

Material and Finish

External hardware: See Table I
Internal hardware: Al alloy/anodize
Misc. hardware: Stainless steel/passivate
Lanyard: Stainless steel/coated
Seals: See Table V

Notes

Connector assembly is designed IAW the interface requirements of MIL-PRF-83526/17 (Draft).
Standard configuration is shown in sample part number.
Accessory threads per shell size 19, D38999 Series III connector.

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180-149
GFOCA Internal Mount Jam Nut Receptacle with Accessory Threads
MIL-DTL-83526 Type, 4 Channel

Table I: Material/Finish		
Code	Material	Finish Description
G2	Aluminum alloy	Hard anodize, gray
ZN		Zinc-nickel, olive drab
ZR		Zinc-nickel, black

Refer to Appendix for material/finish details

Table II: Alignment Sleeve Style	
Code	Style
N	None
Consult factory for additional options	

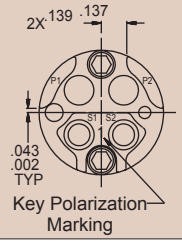
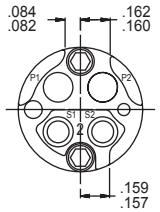
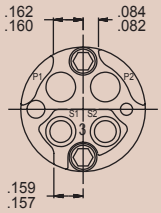
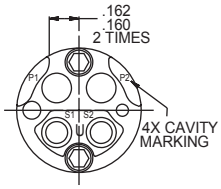
Table III: Insert Cap Key Configurations				
Dash No:	1	2	3	4
Config.	Key 1	Key 2	Key 3	Key U (universal)
				

Table IV: Dust Cover Style	
Code.	Style
F	Female
H	Hermaphroditic
N	None

Table V: Seal Material	
Dash No.	Seal material(s)
1	Fluorosilicone / Fluorosilicone panel seal
2	Fluorosilicone / Conductive fluorosilicone panel seal
3	EPDM / EPDM panel seal
4	EPDM / Conductive EPDM panel seal

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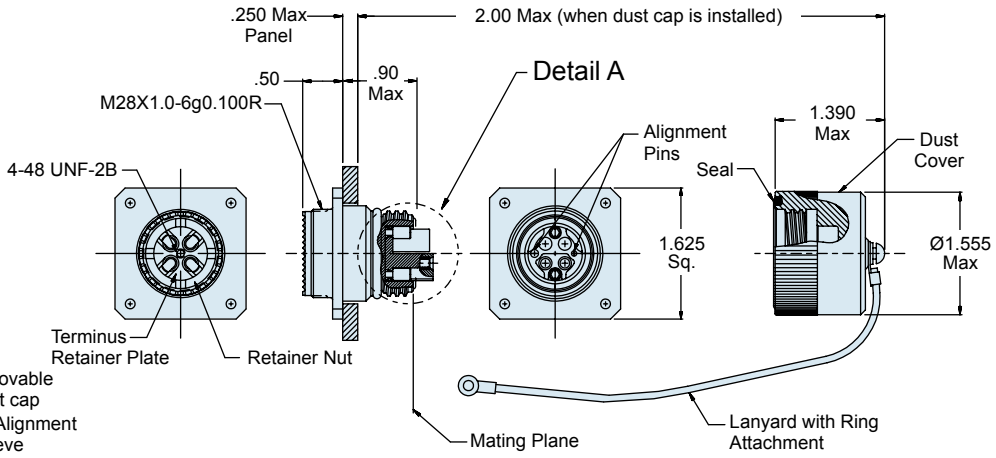
180-150
GFOCA Square Flange Mount Receptacle with Accessory Threads
MIL-DTL-83526 Type, 4 Channel

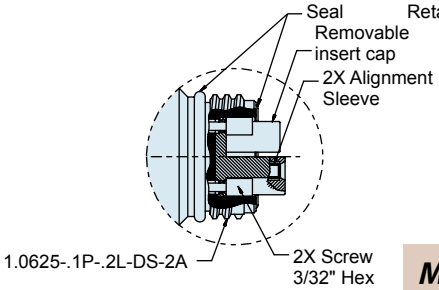
GFOCA

MIL-DTL-83526 type hermaphroditic GFOCA square flange mount receptacle with accessory threads

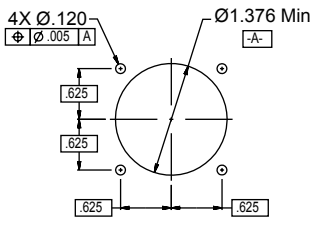
How To Order

Product Series		Material/Finish (Table I)		Insert Cap Key Dash No. (Table III)		Seal Material (Table V) (See notes)
180	- 150	ZR	- N	1	F	1
	Basic No.		Alignment Sleeve Style (Table II)		Dust Cover Style (Table IV)	





Detail A



Panel Cut-Out

Material and Finish

External hardware: See Table I
Internal hardware: Al alloy/anodize
Misc. hardware: Stainless steel/passivate
Lanyard: Stainless steel/coated
Seals: See Table V

Notes

Connector assembly is designed IAW the interface requirements of MIL-PRF-83526/17 (Draft).
Standard configuration is shown in sample part number.
Accessory threads per shell size 19, D38999 Series III connector.

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180-150
GFOCA Square Flange Mount Receptacle with Accessory Threads
MIL-DTL-83526 Type, 4 Channel

Table I: Material/Finish		
Code	Material	Finish Description
G2	Aluminum alloy	Hard anodize, gray
ZN		Zinc-nickel, olive drab
ZR		Zinc-nickel, black

Refer to Appendix for material/finish details

Table II: Alignment Sleeve Style	
Code	Style
N	None
Consult factory for additional options	

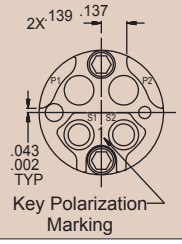
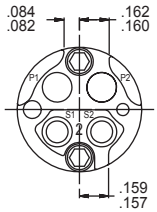
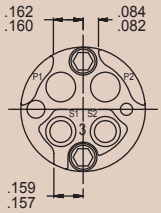
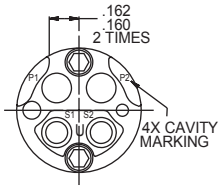
Table III: Insert Cap Key Configurations				
Dash No:	1	2	3	4
Config.	Key 1	Key 2	Key 3	Key U (universal)
				

Table IV: Dust Cover Style	
Code	Style
F	Female
H	Hermaphroditic
N	None

Table V: Seal Material	
Dash No.	Seal material(s)
1	Fluorosilicone / Fluorosilicone panel seal
2	Fluorosilicone / Conductive fluorosilicone panel seal
3	EPDM / EPDM panel seal
4	EPDM / Conductive EPDM panel seal

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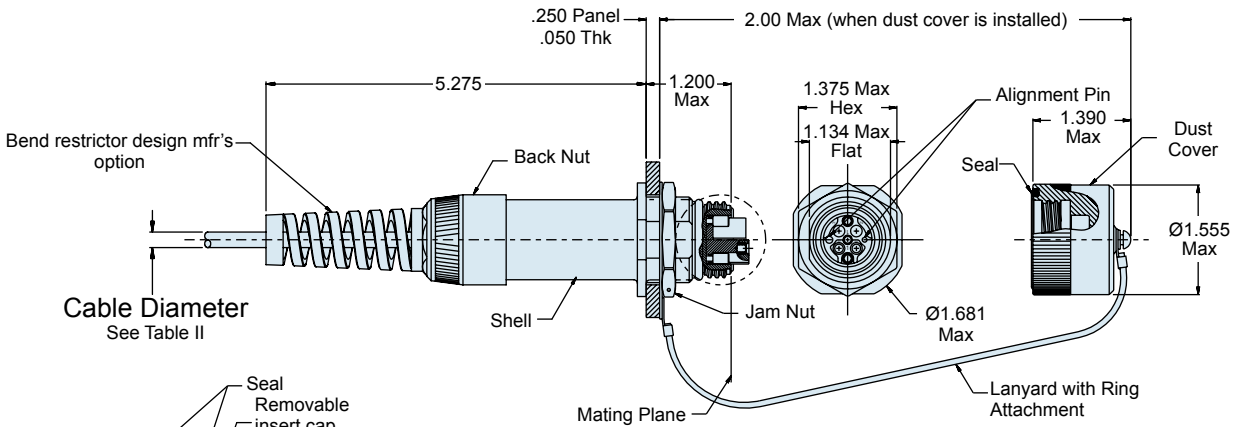
180-153
GFOCA Internal Mount Jam Nut Receptacle with Strain Relief
MIL-DTL-83526 Type, 4 Channel

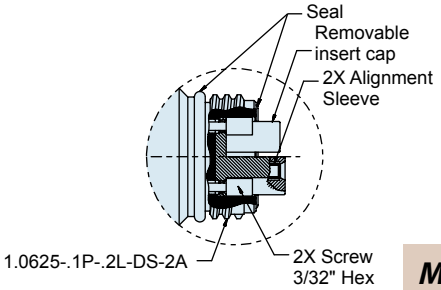
GFOCA

MIL-DTL-83526 type hermaphroditic GFOCA internal mount jam nut receptacle with strain relief

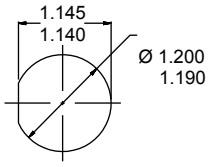
How To Order

Product Series		Material/Finish (Table I)		Alignment Sleeve Style (Table III)	Dust Cover Style (Table V)		
180	- 153	ZR	- 01	N	1	F	1
Basic No.		Cable Entry (Table II) (See notes)		Insert Cap Key Dash No. (Table IV)	Seal Material (Table VI) (See notes)		





Detail A



Panel Cut-out
As viewed from front of panel

Material and Finish

External hardware: See Table I
Internal hardware: Al alloy/anodize
Misc. hardware: Stainless steel/passivate
Lanyard: Stainless steel/coated
Strain relief wedge: Copper alloy/nickel
Seals: See Table VI

Notes

Connector assembly is designed IAW the interface requirements of MIL-PRF-83526/17 (Draft).
Standard configuration is shown in sample part number.

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180-153
GFOCA Internal Mount Jam Nut Receptacle with Strain Relief
MIL-DTL-83526 Type, 4 Channel

Table I: Material/Finish		
Code	Material	Finish Description
G2	Aluminum alloy	Hard anodize, gray
ZN		Zinc-nickel, olive drab
ZR		Zinc-nickel, black

Refer to Appendix for material/finish details

Table II: Cable Diameter		
Dash No.	Cable Diameter	
	Inch	mm
01	.190-.315	4.83-8.00
02	.316-.379	8.03-9.63

Table III: Alignment Sleeve Style	
Code	Style
N	None
Consult factory for additional options	

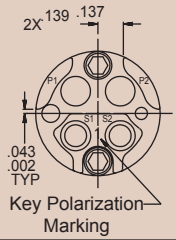
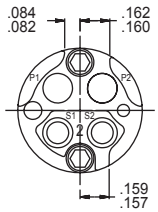
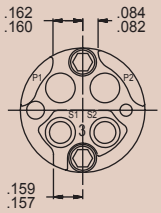
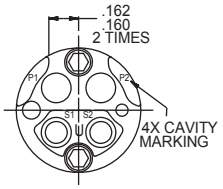
Table IV: Insert Cap Key Configurations				
Dash No:	1	2	3	4
Config.	Key 1	Key 2	Key 3	Key U (universal)
				

Table V: Dust Cover Style	
Code.	Style
F	Female
H	Hermaphroditic
N	None

Table VI: Seal Material	
Dash No.	Seal material(s)
1	Fluorosilicone / Fluorosilicone panel seal
2	Fluorosilicone / Conductive fluorosilicone panel seal
3	EPDM / EPDM panel seal
4	EPDM / Conductive EPDM panel seal

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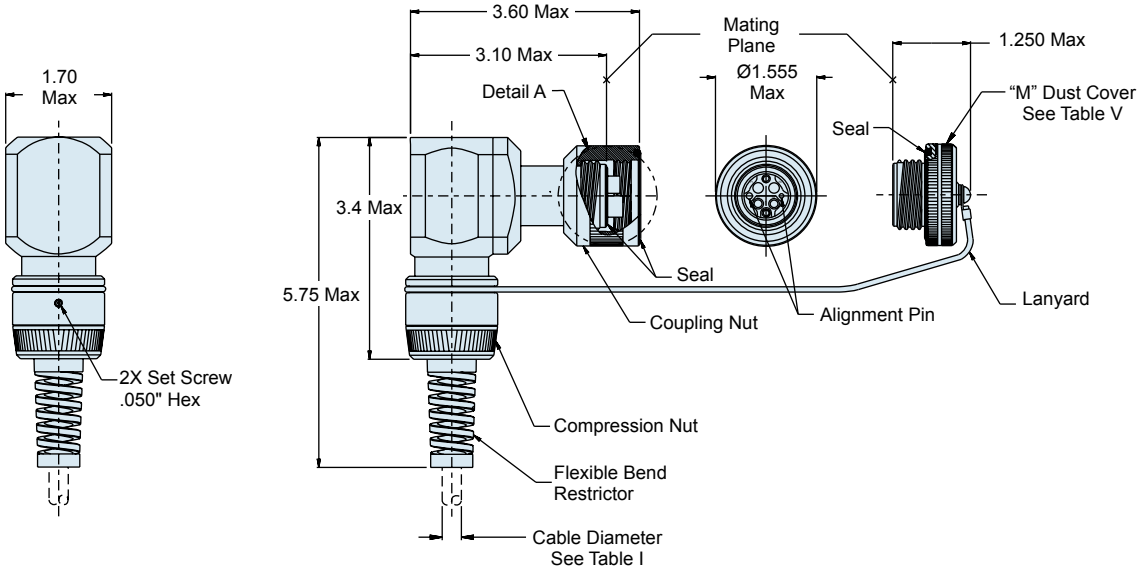
180-137
GFOCA 90° Hermaphroditic Plug Connector
MIL-DTL-83526 Type, 4 Channel

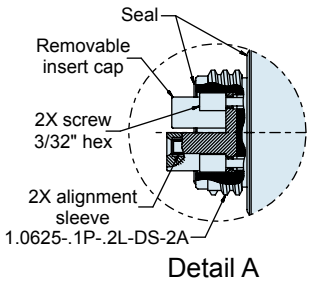
GFOCA

MIL-DTL-83526 type 90 degree hermaphroditic GFOCA plug connector, 4 channel

How To Order

Product Series		Material/Finish (Table I)		Alignment Sleeve Style (Table III)		Dust Cover Style (Table V)	
180	- 137	G2	- 01	N	1	M	1
Basic No.		Cable Entry (Table II) (See notes)		Insert Cap Key Dash No. (Table IV)		Seal Material (Table VI) (See notes)	





Detail A

Material and Finish

External hardware: See Table I
Misc. hardware: Stainless steel/passivate
Strain relief wedge: Copper alloy/nickel plated
Seals: See Table VI

Notes

Connector assembly is designed IAW the interface requirements of MIL-PRF-83526/16 (Draft).
Standard configuration is shown in sample part number.

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Table I: Material/Finish		
Code	Material	Finish Description
G2	Aluminum alloy	Hard anodize, gray
ZN		Zinc-nickel, olive drab
ZR		Zinc-nickel, black

Refer to Appendix for material/finish details

Table II: Cable Diameter		
Dash No.	Cable Diameter	
	Inch	mm
01	.190-.315	4.83-8.00
02	.316-.379	8.03-9.63

Table III: Alignment Sleeve Style	
Code.	Style
C	Captive Split
N	None

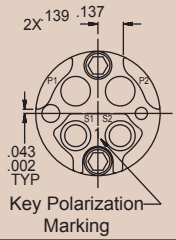
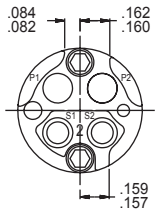
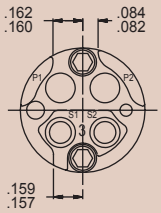
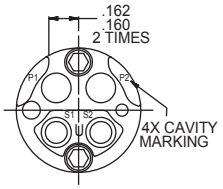
Table IV: Insert Cap Key Configurations				
Dash No:	1	2	3	4
Config.	Key 1	Key 2	Key 3	Key U (universal)
				

Table V: Dust Cover Style	
Code.	Style
M	Male
N	None

Table VI: Seal Material	
Dash No.	Seal material(s)
1	Fluorosilicone
2	EPDM

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FIBER OPTIC

MIL-PRF-28876

FIBER OPTIC CONNECTION SYSTEM

The use of fiber optics in shipboard and ship-to-shore data transmissions is growing rapidly, and the tight-tolerance MIL-PRF-28876 interconnect has become the universal standard for Navy shipboard applications. Glenair's qualified termini, connectors, backshells, and accessories deliver precise optical alignment, environmental protection and corrosion resistance.

Glenair®

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Qualified MIL-PRF-28876 connectors for shipboard use

Glenair's qualified MIL-PRF-29504/14 and /15 termini and MIL-PRF-28876 connectors, plus backshells and dust cap accessories are ready for deployment in shipboard, surface and submarine applications, as well as mission-critical combat communication systems such as mobile tactical shelters. They are specifically geared for upgrade and retrofit applications where extending system life-cycles and reducing cost of ownership are principal requirements.

Product No.	Description	Page No.
Fiber Optic Termini		
181-039	M29504/14 Fiber Optic Pin Terminus, Size 16	J-3
181-040	M29504/15 Fiber Optic Socket Terminus, Size 16	J-4
181-051	M29504/3 Fiber Optic Dummy Terminus, Size 16	J-5
Fiber Optic Connectors		
180-040	M28876 Square Flange Wall Mount Receptacle Connector	J-10
180-040	M28876 Jam Nut Mount Receptacle Connector	J-12
180-040	M28876 In-Line Receptacle Connector	J-14
180-040	M28876 Plug Connector	J-14
Panel Gaskets, Backshells , Adapters and Dust Covers		
M28840/24	MIL-Spec Wall Mount Gasket	J-17
930-006	Commercial Wall Mount Gasket	J-17
189-015	Environmental Banding Backshell	J-18
189-001	Fiber Optic Backshell with Split Clamp	J-20
189-007	Fiber-Con Backshell	J-22
189-009	Banding Backshell/Molding Adapter	J-24
189-014	PEEK Convoluted Tubing Backshell	J-26
660-072/073	Dust Covers	J-28

J

Catalog Notes

Metric dimensions appear in parentheses in diagrams and tables, based on 1 inch = 25.4 mm, for reference only.
Unless otherwise specified, the following other dimensional tolerances apply:

.xx = ± .03 (0.8) • .xxx = ± .015 (0.4) • Angles = ± 5°

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MIL-PRF-28876 QPL
Connector Performance Specifications

Test Description	Performance Requirements/Specifications
Optical Insertion Loss, Multimode	-0.3 dB Typical (62.5/125)
Optical Insertion Loss, Singlemode	-0.3 dB Typical (9/125)
Optical Back Reflection, Singlemode	Better than -40 dB - PC Polish Better than -50 dB - Enhanced PC Polish
Operating Temperature	-28°C to +65°C using MIL-Spec Qualified Epoxy and Cable, or -55°C to +125°C using alternative Epoxy and Cable (consult factory)
Temperature (Thermal) Shock	-40°C to +70°C, 5 Cycles, per TIA/EIA-455-71, Test Schedule C
Temperature Cycling	-28°C to +65°C, 5 Cycles, per TIA/EIA-455-3
Temperature/Humidity Cycling	-10°C to +65°C, 10 Cycles, 240 hours, 98% RH, per TIA/EIA-455-5, Test Method B
Temperature Life Aging	+110°C, 240 hours, Dry Air, per TIA/EIA-455-4
Mating Durability	500 cycles, per TIA/EIA-455-21
Vibration - Sinusoidal	10 g Peak, 5-500 Hz, 12 Cycles (3 hours) per Axis at Ambient Temperature, per TIA/EIA-455-11, Test Condition II
Vibration - Random	10.2 g RMS, 50-2000 Hz, 30 minutes per Axis at Ambient Temperature, per TIA/EIA-455-11, Test Condition VII-C
Mechanical Shock (High Impact)	Per MIL-S-901, Lightweight, Grade A, Class I (Hammer Shock)
Impact	8 Drops from 8 feet, per TIA/EIA-455-2, Test Method B
Crush Resistance	281 lbs, 7 Loading Cycles, per TIA/EIA-455-26
External Bending Moment	300 inch-lbs min for 1 minute
Cable Pull Out Force - Termini	22 lbs min for 1 minute, per TIA/EIA-455-6
Cable Pull Out Force - Connector	162 lbs min for 10 minutes, per TIA/EIA-455-6
Cable Seal Flexing	180° Flex, 200 Cycles, per TIA/EIA-455-1
Cable Twist	360°±180° Twist, 50 Cycles, 11 lbs min Tension, per TIA/EIA-455-36
Ozone Exposure	150 ppm for 2 hours at +70°C, per TIA/EIA-455-189
Fungus Resistance	28 days at +30°C, 95% RH, per TIA/EIA-455-56
Fluid Immersion	Turbine Fuel, Isopropyl Alcohol, Hydraulic Fluid, Lubricating Oil, Coolant, Tap Water, and Seawater, 24 hour immersion duration, per TIA/EIA-455-12
Water Pressure	Equivalent depth of 32 feet for 48 hours at +10°C to +35°C
Freezing Water	1 hour, per TIA/EIA-455-98, Test Method A, Procedure 1
Corrosion Resistance (Salt Spray)	500 hours at +35°C, per TIA/EIA-455-16, Test Condition I
Sand and Dust	12 hours, per TIA/EIA-455-35
Flammability	0.75 inch flame for 10 seconds mated, 1.50 inch flame for 60 seconds unmated, per EIA/ECA-364-81

* Performance Specifications/Requirements based on the use of MIL-PRF-24792 Epoxy and MIL-PRF-85045 Simplex and Breakout Shipboard Optical Fiber.

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M28876 QPL

Size 16 M29504/14 fiber optic pin terminus for MIL-PRF-28876 connectors

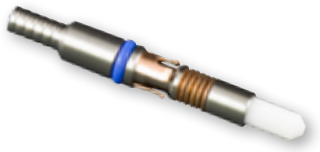

Table I: Part Number				
Mil-Spec Part Number	ØA (Microns)	Fiber Type	Fiber Size Core/Cladding (Microns)	Commercial Part Number
M29504/14-4140C	125.0	Single Mode	9/125	181-039-1250C
Not listed in Mil-Spec	125.5	Single Mode	9/125	181-039-1255C
M29504/14-4141C	126.0	Single Mode	9/125	181-039-1260C
M29504/14-4131C	126.0	Multi Mode	50/125, 62.5/125	181-039-1260C
M29504/14-4132C	127.0	Multi Mode	50/125, 62.5/125	181-039-1270C
M29504/14-4135C	142.0	Multi Mode	100/140	181-039-1420C
Consult factory for additional sizes and QPL status.				

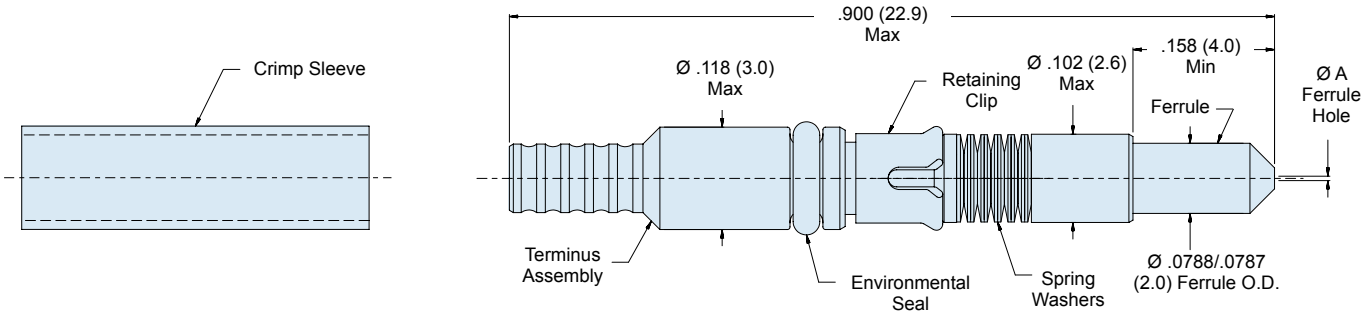

Table II: Tools and Accessories	
Part Number	Description
265-008	Crimp Sleeve Ø2.4mm Max Jacket (Mil-Spec Type)
182-012	Crimp Tool
182-013	Insertion Tool, Straight
182-014	Insertion Tool, 90°
182-015	Removal Tool
182-035	Hand Polishing Tool

Material and Finish

Ferrule: Zirconia Ceramic
Terminus Assembly: Stainless Steel/ Passivate
Retaining Clip, Spring Washers: Spring Alloy
Seal: Fluorosilicone
Crimp Sleeve: Brass Alloy/Nickel

Notes

- Crimp sleeve is supplied with terminus assembly and may be ordered separately (see Table II). For terminus less crimp sleeve, omit **C** from end of part number.
- See Glenair GAP-036 for termination procedure and assembly tools.
- Dummy terminus part number: 181-051 or M29504/3-4038.

J

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M29504/15
181-040
Size 16 Fiber Optic Socket Terminus
For MIL-PRF-28876 Connectors

M28876 QPL

Size 16 M29504/15 fiber optic socket terminus for MIL-PRF-28876 connectors

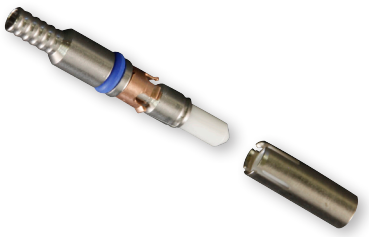
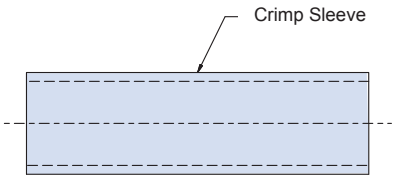


Table I: Part Number

Mil-Spec Part Number	ØA (Microns)	Fiber Type	Fiber Size Core/Cladding (Microns)	Commercial Part Number
M29504/15-4180C	125.0	Single Mode	9/125	181-040-1250C
Not listed in Mil-Spec	125.5	Single Mode	9/125	181-040-1255C
M29504/15-4181C	126.0	Single Mode	9/125	181-040-1260C
M29504/15-4171C	126.0	Multi Mode	50/125, 62.5/125	181-040-1260C
M29504/15-4172C	127.0	Multi Mode	50/125, 62.5/125	181-040-1270C
M29504/15-4175C	142.0	Multi Mode	100/140	181-040-1420C
Consult factory for additional sizes and QPL status.				



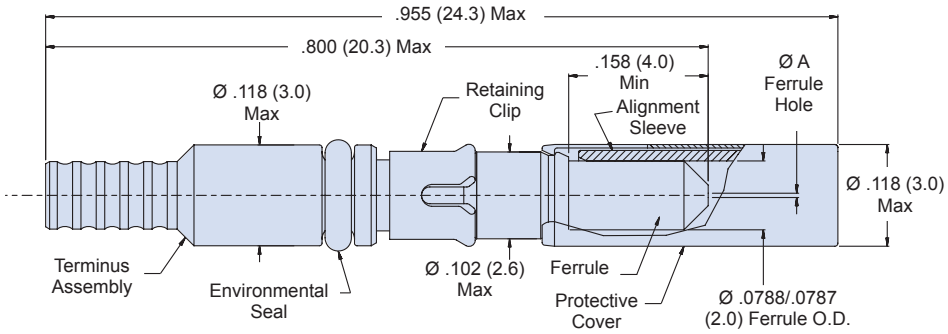


Table II: Tools and Accessories

Part Number	Description
265-008	Crimp Sleeve Ø 2.4mm Max Jacket (Mil-Spec Type)
265-010	Alignment Sleeve Assembly
182-012	Crimp Tool
182-013	Insertion Tool, Straight
182-014	Insertion Tool, 90°
182-015	Removal Tool
182-016	Alignment Sleeve Assembly Insertion/Removal Tool
182-035	Hand Polishing Tool

Material and Finish

Alignment Sleeve, Ferrule: Zirconia Ceramic
Protective cover: Spring Alloy / Nickel
Terminus Assembly: Stainless Steel / Passivate
Retaining Clip: Spring Alloy
Seal: Fluorosilicone
Crimp Sleeve: Brass Alloy / Nickel

Notes

- Crimp sleeve is supplied with terminus assembly and may be ordered separately (see Table II). For terminus less crimp sleeve omit **C** from end of part number.
- Alignment sleeve assembly is supplied with terminus assembly (packaged loose) and may be ordered separately (see Table II). For terminus less alignment sleeve assembly, add **N** to end of part number (e.g. 181-040-1260C**N**).
- See Glenair GAP-036 for termination procedure and assembly tools.
- Dummy Terminus: Part Number 181-051 or M29504/3-4038.

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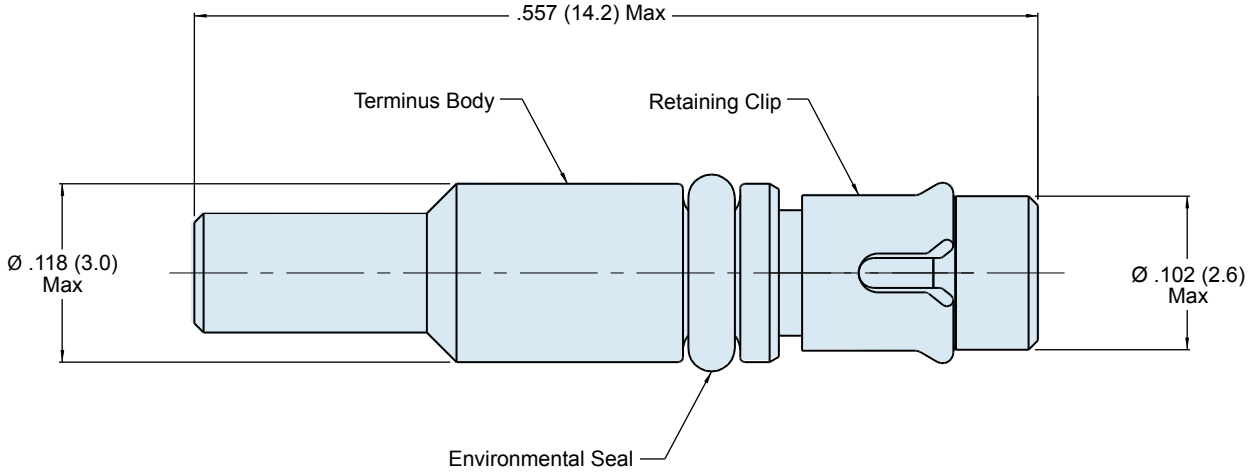
M28876 QPL

Size 16 M29504/3 fiber optic dummy terminus for MIL-PRF-28876 connectors

Table I: Part Number	
Mil-Spec Part Number	Commercial Part Number
M29504/3-4038	181-051

Table II: Tools and Accessories	
Part Number	Description
182-013	Insertion Tool, Straight
182-014	Insertion Tool, 90°
182-015	Removal Tool



Material and Finish

Terminus Body: Stainless Steel/Passivate
Retaining Clip: Spring Alloy
Seal: Fluorosilicone

Notes

See Glenair GAP-036 for assembly tools and procedures.

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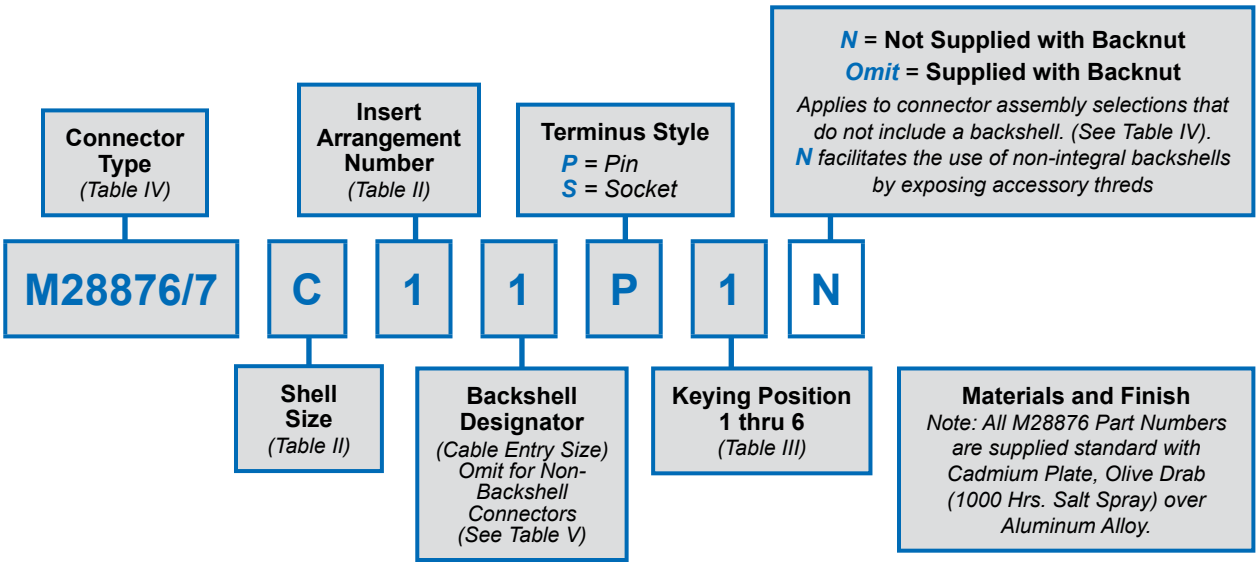
MIL-PRF-28876 QPL Fiber Optic Connectors
180-040
How to Order

M28876 QPL

Military QPL M28876/1 through /14 fiber optic connectors



Glenair commercial equivalent MIL-PRF-28876 type fiber optic connectors

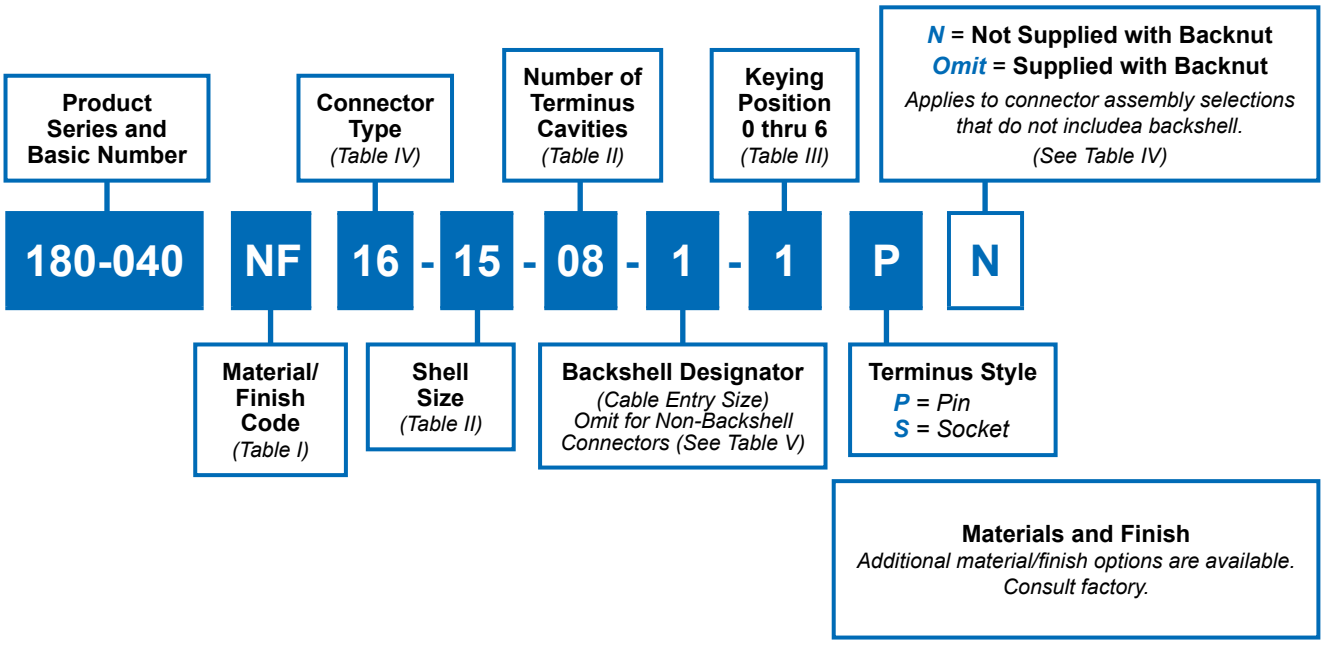


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Table I: Material and Finish (Commercial)		
Code	Material	Finish Description
M	Aluminum Alloy	Electroless Nickel
NF		Cadmium, Olive Drab
MT*		Nickel-PTFE, Grey
ZR		Zinc-Nickel, Black

Refer to Appendix for material/finish details

Table II: Shell Size and Insert Arrangement			
Mil-Spec		Commercial	
Shell Size	Insert Arrangement	Shell Size	Number of Cavities
A	1	11	02
B	1	13	04
C	2	15	06
	1		08
F	2	23	18
	1		31

Consult factory for QPL status

Table IV: Connector Type			
Connector Type	Backshell Type	MIL-Spec	Commercial
Wall Mount Receptacle	None	M28876/1	03
	Straight	M28876/2	13
	45°	M28876/3	23
	90°	M28876/4	33
In-Line Receptacle	Straight	M28876/5	15
Plug	None	M28876/6	06
	Straight	M28876/7	16
	45°	M28876/8	26
	90°	M28876/9	36
Jam Nut Receptacle	None	M28876/11	04
	Straight	M28876/12	14
	45°	M28876/13	24
	90°	M28876/14	34

Table V: Backshell Designator				
Backshell Designator	Max Allowable Cable Diameter by Shell Size			
	A (11)	B (13)	C (15)	F (23)
1	.250 (6.4)	.285 (7.2)	.500 (12.7)	.866 (22.0)
2	.346 (8.8)	.346 (8.8)	.250 (6.4)	1.000 (25.4)
3		.453 (11.5)	.375 (9.5)	.600 (15.2)

Material and Finish

A. M28876 part numbers supplied standard with Cad plate/olive drab over aluminum alloy. See Table I for commercial plating options.
B. Hardware: Aluminum alloy/chem film, stainless steel/passivate
C. Insert: Aluminum alloy/anodize
D. Seals: Fluorosilicone

Notes

Termini (Not Supplied with Connector):
M29504/14 - Pin terminus, MIL-Spec
M29504/15 - Socket Terminus, MIL-Spec
M29504/3 - Dummy Terminus, MIL-Spec
181-039 - Pin Terminus, MIL-Spec Style
181-040 - Socket terminus, MIL-Spec Style
181-051 - Dummy Terminus MIL-Spec Style
Backnut retained using thread-locking compound.
Consult factory for appropriate termination and assembly tools/ procedures.
Operating Temperature Range: -55° to +125°C.

Dimensions in Inches (millimeters) are subject to change without notice.

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Key Positions for MIL-PRF-28876 (180-040) fiber optic connectors

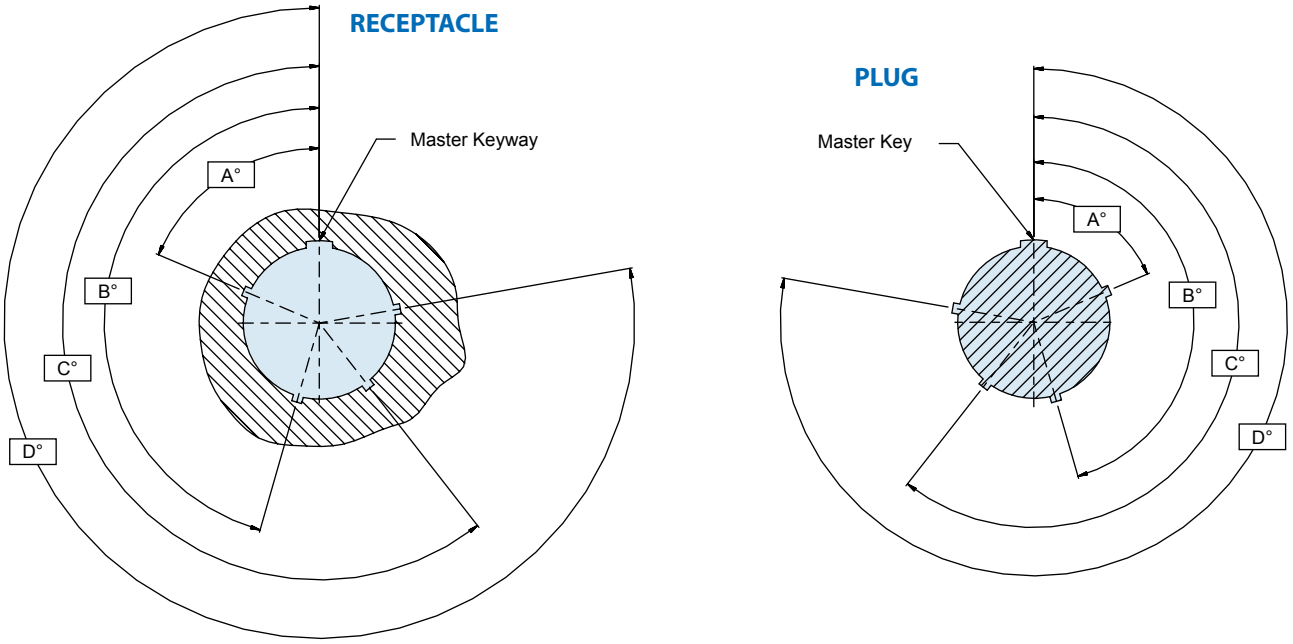

Table III: Keying Position

Shell Size	Key Position	A°	B°	C°	D°
11 and 13	0*	-	-	-	-
	1	95	141	208	236
	2	113	156	182	292
	3	90	145	195	252
	4	53	156	220	255
	5	119	146	176	298
	6	51	141	184	242
15 and 23	0*	-	-	-	-
	1	80	142	196	293
	2	135	170	200	310
	3	49	169	200	244
	4	66	140	200	257
	5	62	145	180	280
	6	79	153	197	272

*0 indicates universal keying arrangement and is available on commercial equivalent plug connector only.

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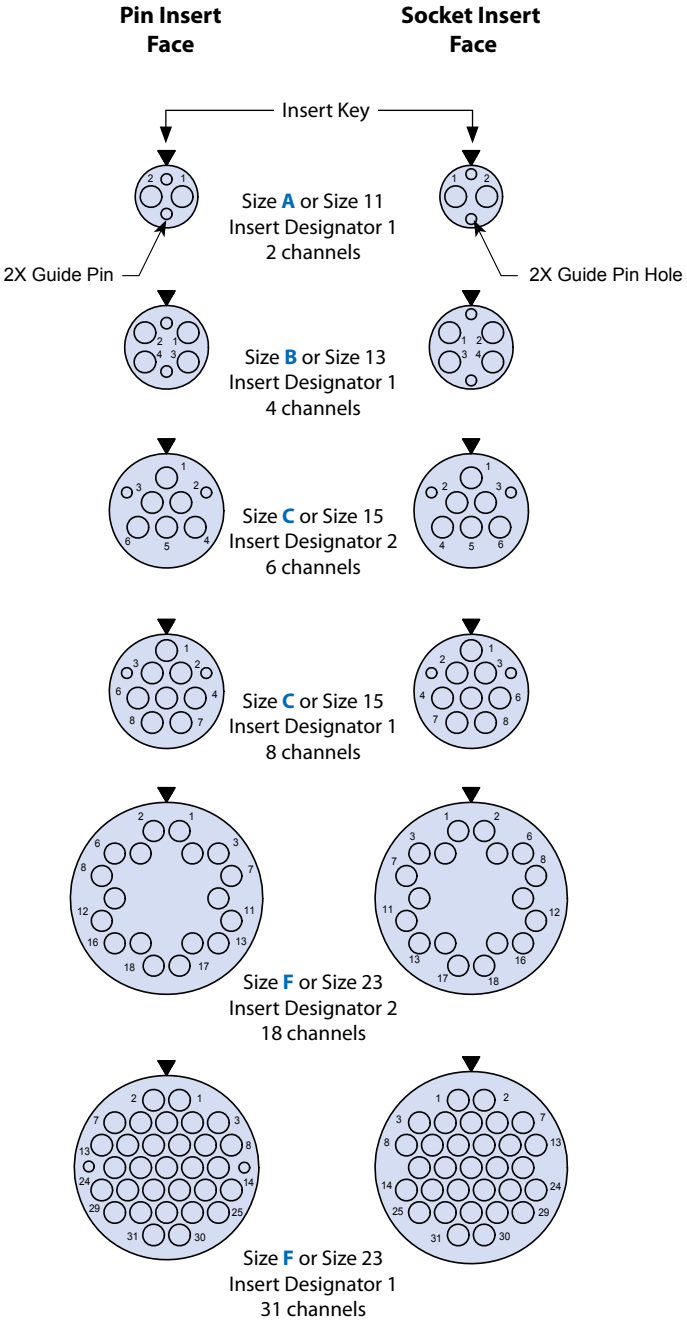
Insert arrangements for MIL-PRF-28876 (180-040) fiber optic connectors



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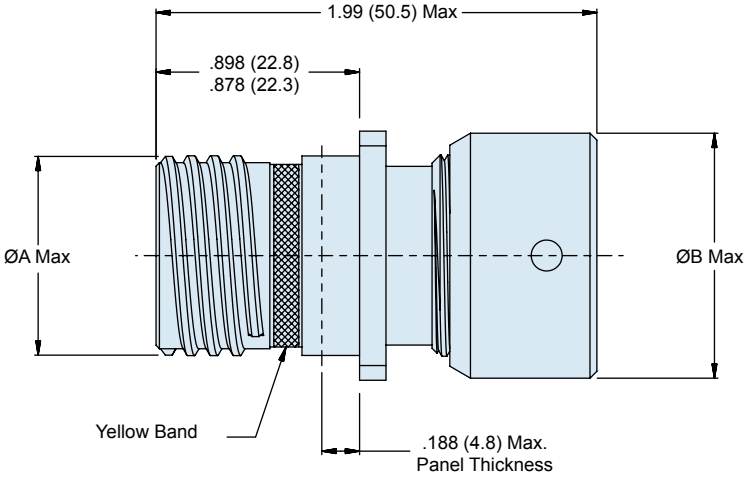
M28876 (/1, /2, /3, /4)
180-040 (-03, -13, -23, -33)
MIL-PRF-28876 Wall Mount Receptacle Connector
for use with MIL-PRF-29504/14 and /15 Termini

M28876 QPL

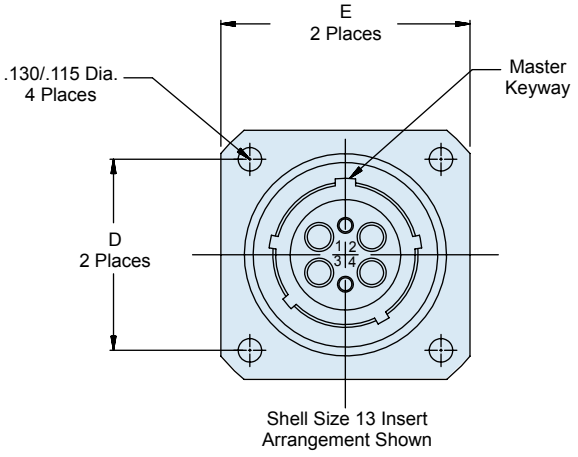
MIL-PRF-28876 QPL wall mount receptacle connector

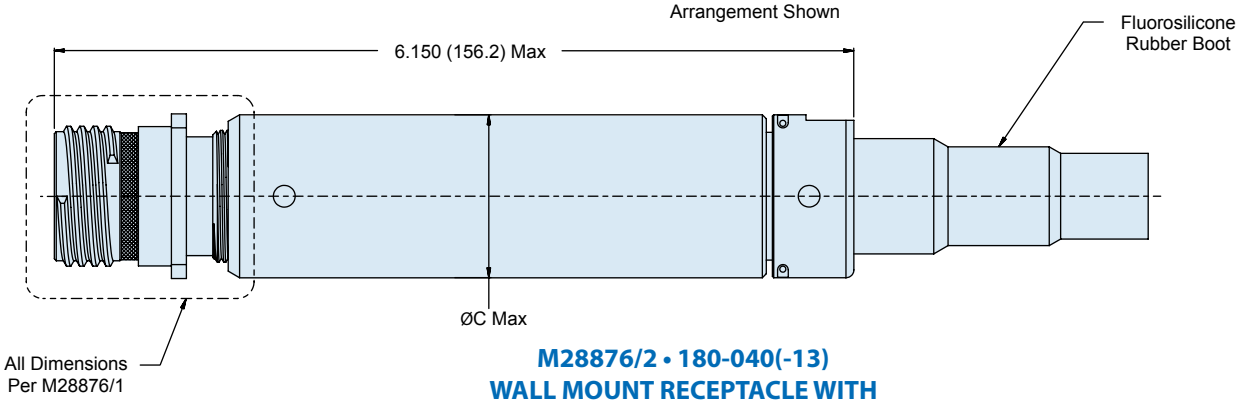
Receptacle without backshell

Receptacle with straight backshell



M28876/1 • 180-040(-03)
WALL MOUNT RECEPTACLE WITHOUT





M28876/2 • 180-040(-13)
WALL MOUNT RECEPTACLE WITH
STRAIGHT BACKSHELL

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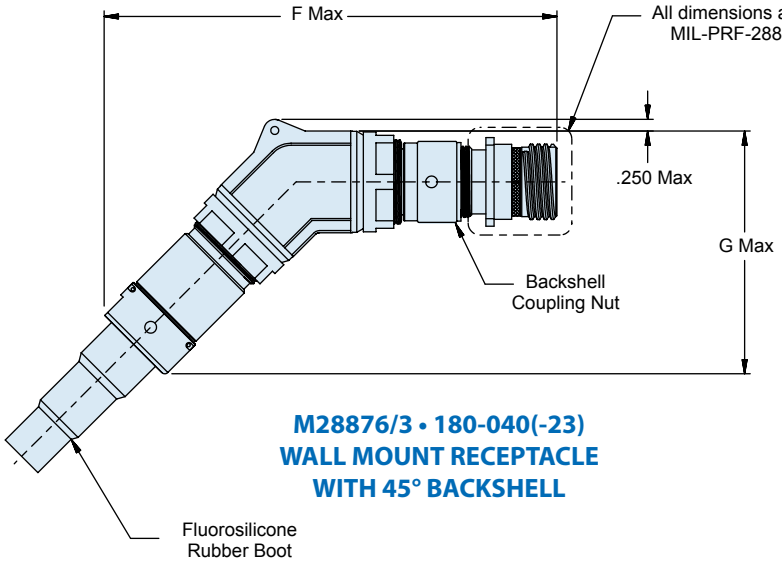
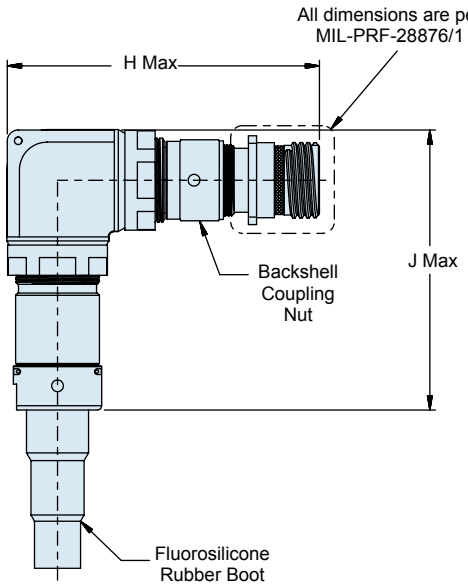
M28876 (/1, /2, /3, /4)
180-040 (-03, -13, -23, -33)
MIL-PRF-28876 Wall Mount Receptacle Connector
for use with MIL-PRF-29504/14 and /15 Termini

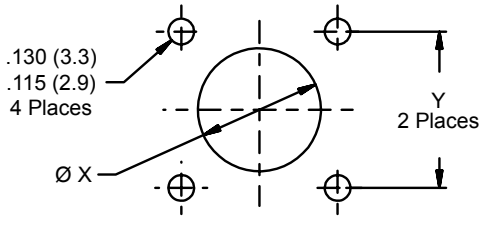
Table I									
Shell Size	ØA Max	ØB Max	ØC Max	D	E ±.020	F Max.	G Max.	H Max.	J Max.
11	0.750 (19.1)	0.960 (24.4)	0.960 (24.4)	0.750 (19.1)	1.022 (26.0)	6.150 (156.2)	3.540 (89.9)	4.250 (108.0)	4.250 (108.0)
13	0.875 (22.2)	1.085 (27.6)	1.085 (27.6)	0.843 (21.4)	1.137 (28.9)	6.220 (158.0)	3.580 (90.9)	4.250 (108.0)	4.250 (108.0)
15	1.062 (27.0)	1.255 (31.9)	1.257 (31.9)	0.968 (24.6)	1.257 (31.9)	6.500 (165.1)	3.850 (97.8)	4.500 (114.3)	4.500 (114.3)
23	1.500 (38.1)	1.695 (43.1)	1.763 (44.8)	1.281 (32.5)	1.718 (43.6)	7.500 (190.5)	5.000 (127.0)	5.000 (127.0)	5.000 (127.0)



M28876/3 • 180-040(-23)
WALL MOUNT RECEPTACLE
WITH 45° BACKSHELL



M28876/4 • 180-040(-33)
WALL MOUNT RECEPTACLE WITH
90° BACKSHELL



Recommended Panel Cutout
(Wall Mounting)

Table II		
Shell Size	Ø X ± .005 (0.13)	Y ± .005 (0.13)
11	.812 (20.6)	.750 (19.1)
13	.937 (23.8)	.843 (21.4)
15	1.124 (28.6)	.968 (24.6)
23	1.562 (39.7)	1.281 (32.5)

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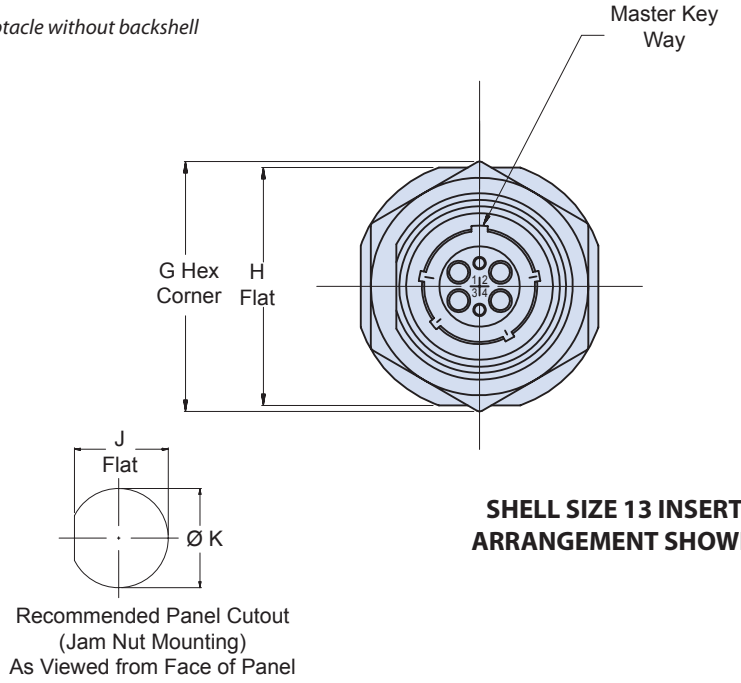
180-040 (-04, -14, -24, -34)
MIL-PRF-28876 Jam Nut Mount Receptacle Connector
for use with MIL-PRF-29504/14 and /15 Termini

M28876

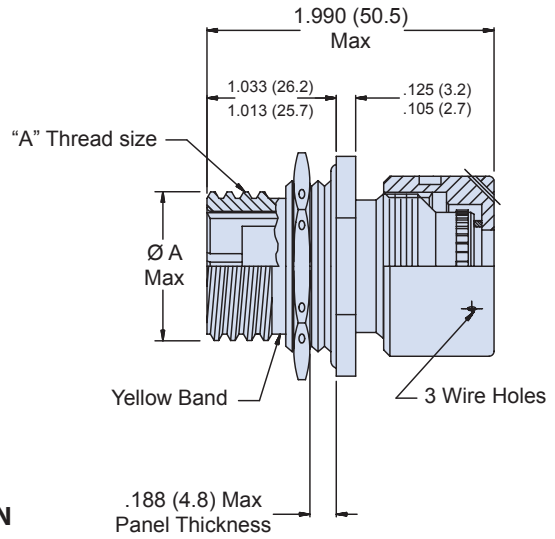
MIL-PRF-28876 QPL jam nut receptacle connector

Receptacle without backshell

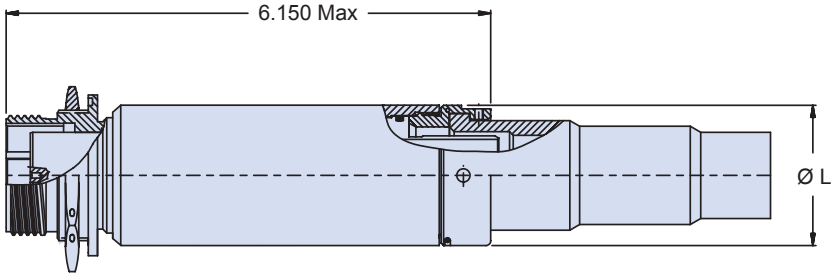
Table I							
Shell Size	G Max	H ± .010 (0.3)	J ± .005 (0.1)	Ø K ± .005 (0.1)	Ø C Max	Ø L Max	ØA Max
11	1.290 (32.8)	1.264 (32.1)	.848 (21.5)	.885 (22.5)	.960 (24.4)	.960 (24.4)	.750 (19.1)
13	1.435 (35.9)	1.389 (35.3)	.973 (24.7)	1.010 (25.7)	1.085 (27.6)	1.085 (27.6)	.875 (22.2)
15	1.650 (41.9)	1.577 (40.1)	1.160 (29.5)	1.198 (30.4)	1.255 (31.9)	1.255 (31.9)	1.062 (27.0)
23	2.093 (53.2)	2.004 (50.9)	1.593 (40.5)	1.635 (41.5)	1.695 (43.1)	1.763 (44.8)	1.500 (38.1)



SHELL SIZE 13 INSERT ARRANGEMENT SHOWN



04 - JAM NUT MOUNT RECEPTACLE WITHOUT BACKSHELL
M28876/11 • 180-040 (-04)



M28876/12 • 180-040 (-14) JAM NUT MOUNT RECEPTACLE WITH STRAIGTH BACKSHELL

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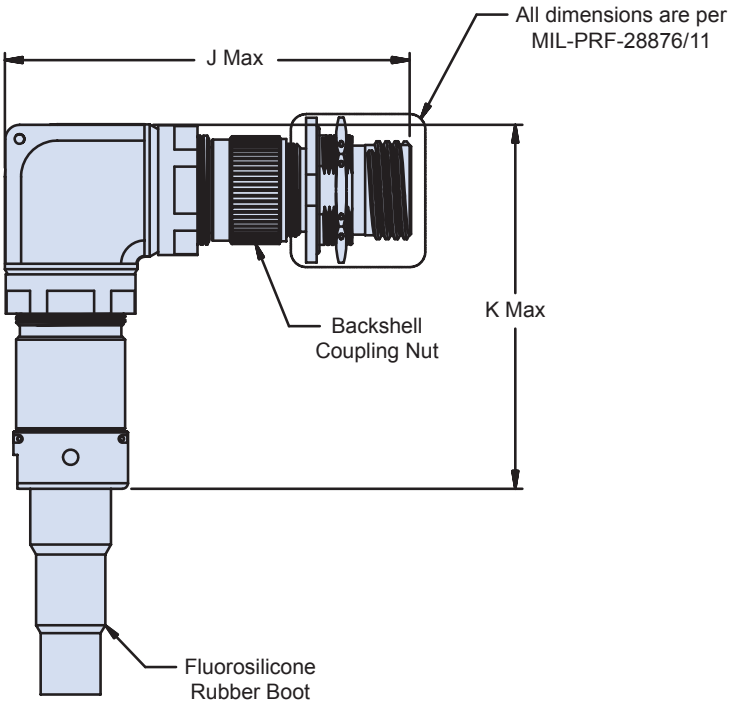
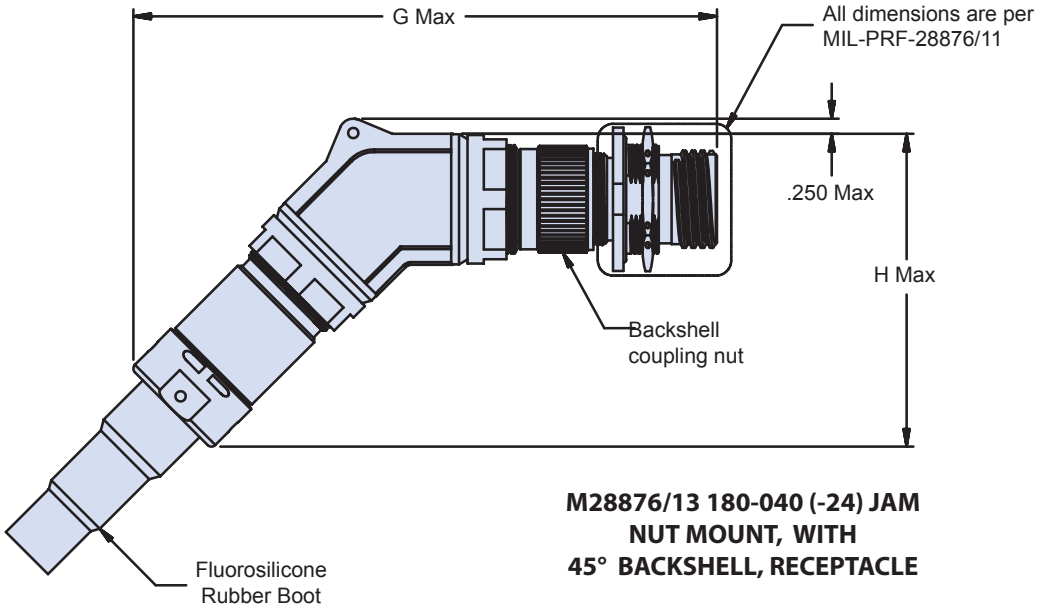


M28876/14 180-040 (-34) JAM NUT MOUNT, WITH 90° BACKSHELL, RECEPTACLE



M28876/13 180-040 (-24) JAM NUT MOUNT, WITH 45° BACKSHELL, RECEPTACLE

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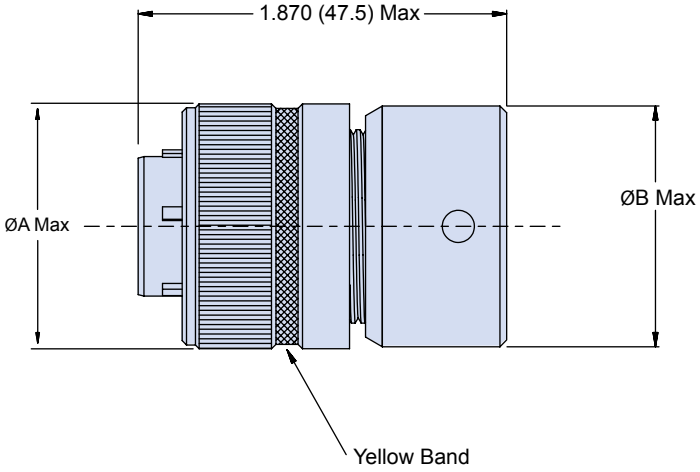
M28876 (/6, /7, /8, /9)
180-040 (-06, -16, -26, -36)
MIL-PRF-28876 Plug Connector
for use with MIL-PRF-29504/14 and /15 Termini

M28876 QPL

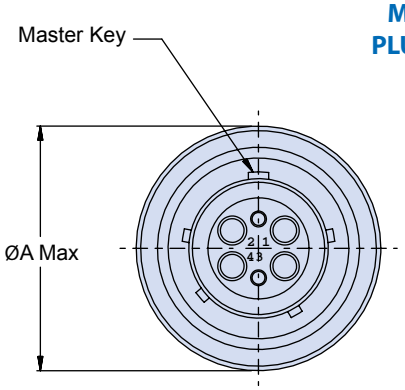
MIL-PRF-28876 QPL plug connector

Plug without backshell

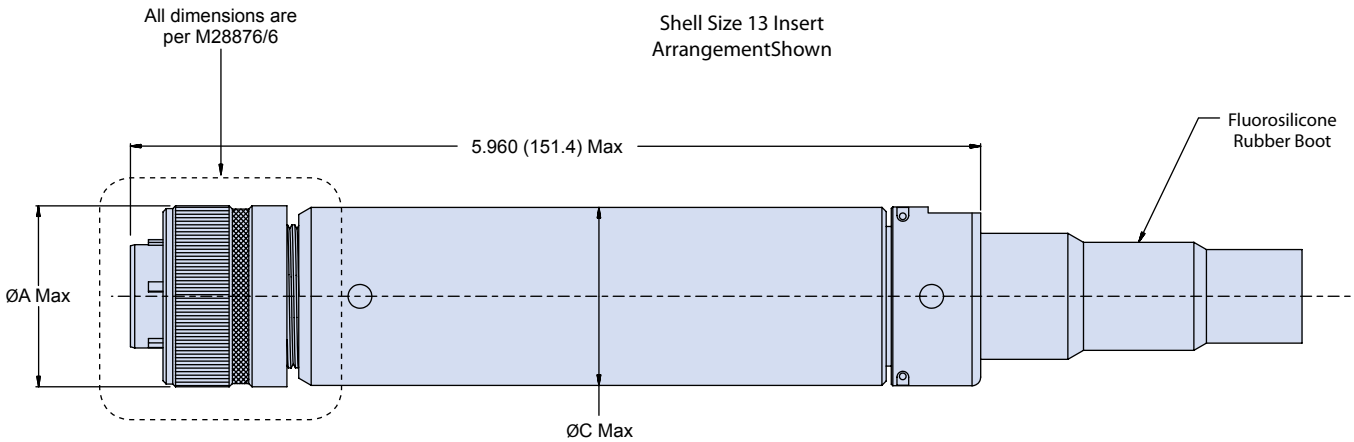


M28876/6 • 180-040 (-06)
PLUG WITHOUT BACKSHELL

Plug with straight backshell



Shell Size 13 Insert
ArrangementShown



M28876/7 • 180-040 (-16) PLUG WITH STRAIGHT BACKSHELL

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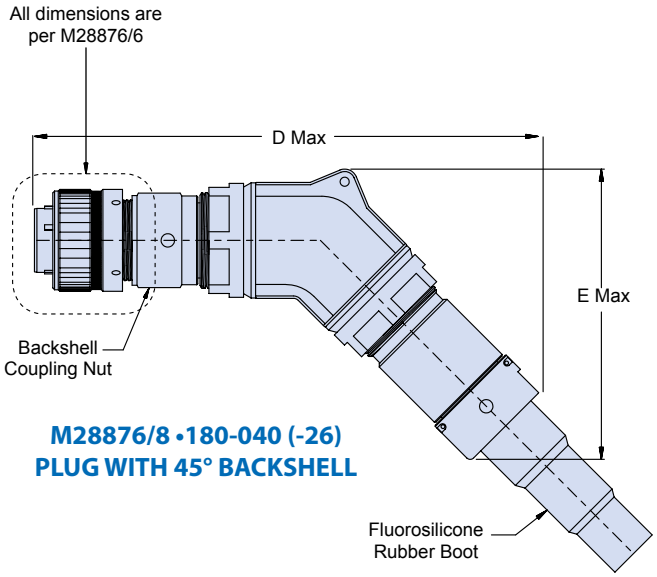
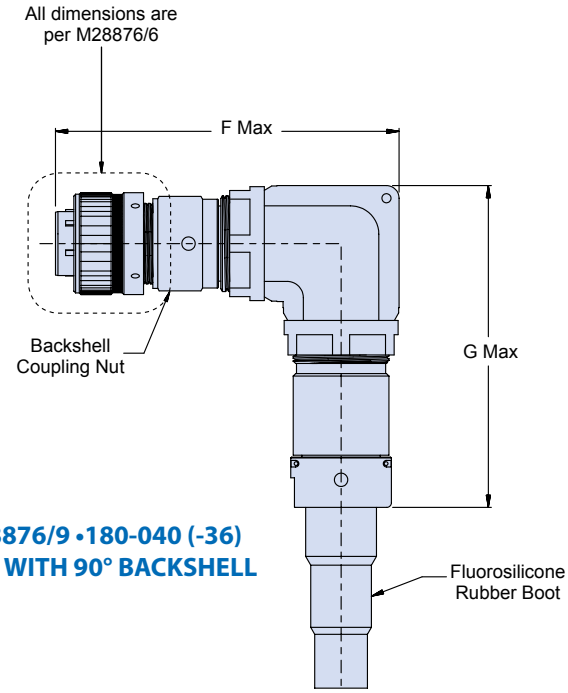
Table I							
Shell Size	ØA Max	ØB Max	ØC Max	D Max	E Max	F Max	G Max.
11	1.028 (26.1)	0.960 (24.4)	0.960 (24.4)	6.090 (154.7)	3.540 (89.9)	4.190 (106.4)	4.250 (108.0)
13	1.141 (29.0)	1.085 (27.6)	1.085 (27.6)	6.160 (156.5)	3.580 (90.9)	4.190 (106.4)	4.250 (108.0)
15	1.263 (32.1)	1.255 (31.9)	1.255 (31.9)	6.440 (163.6)	3.850 (97.8)	4.440 (112.8)	4.500 (114.3)
23	1.705 (43.3)	1.695 (43.1)	1.763 (44.8)	7.350 (186.7)	5.000 (127.0)	4.850 (123.2)	5.000 (127.0)



M28876/8 •180-040 (-26)
PLUG WITH 45° BACKSHELL



M28876/9 •180-040 (-36)
PLUG WITH 90° BACKSHELL

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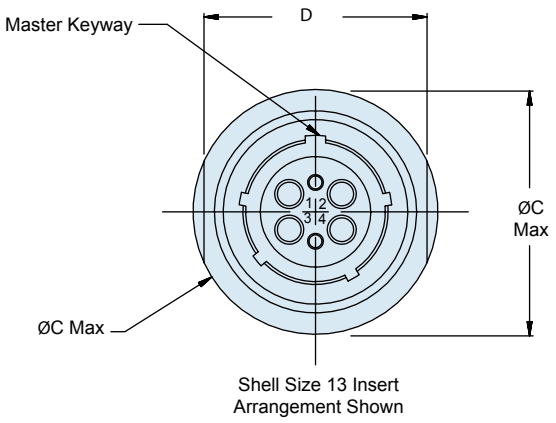
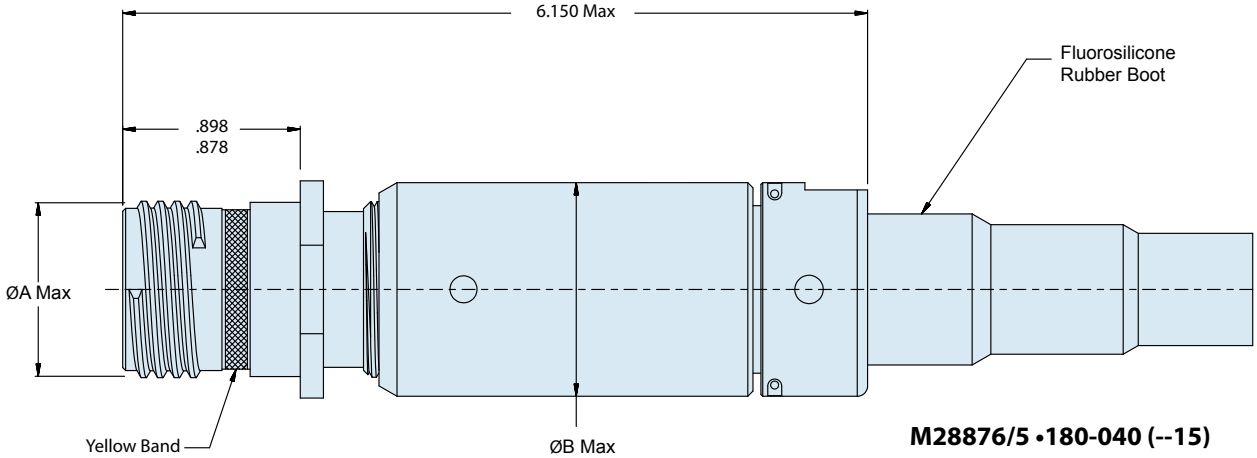
M28876/5
In-Line Receptacle
for use with MIL-PRF-29504/14 and /15 Termini

M28876 QPL

MIL-PRF-28876 QPL in-line receptacle connector

Table I				
Shell Size	ØA Max	ØB Max	ØC Max	D
11	0.750 (19.1)	0.960 (24.4)	0.963 (24.5)	0.768 (19.5)
13	0.875 (22.2)	1.085 (27.6)	1.088 (27.6)	0.893 (22.7)
15	1.062 (27.0)	1.255 (31.9)	1.275 (32.4)	1.080 (27.4)
23	1.500 (38.1)	1.763 (44.8)	1.719 (43.7)	1.518 (38.6)





M28876/5 •180-040 (--15)
IN-LINE RECEPTACLE WITH STRAIGHT BACKSHELL

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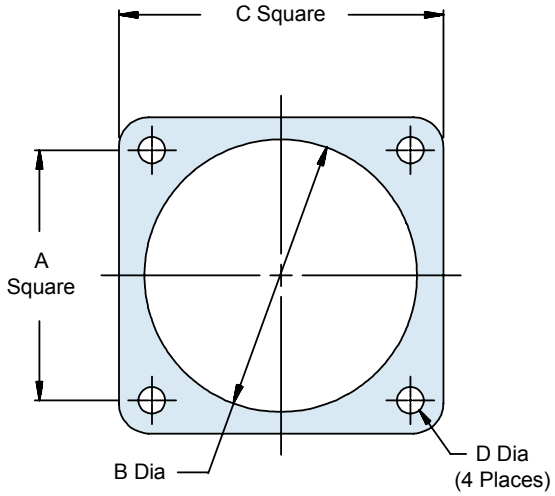
M28840 /24 and 930-006
Square Flange Wall Mount Receptacle Panel Gaskets
for use with MIL-PRF-28876 (/1, /2, /3, /4) and 180-040 (-03, -13, -23, -33) Commercial Connectors

MIL-PRF square flange wall mount receptacle panel gasket

Shell Size	A	B Dia.	C	D Dia.
A (11)	.760 (19.30) .740 (18.80)	.766 (19.46) .750 (19.05)	1.039 (26.39) 1.023 (25.98)	.130 (3.30) .110 (2.79)
B (13)	.853 (21.67) .833 (21.16)	.891 (22.63) .875 (22.22)	1.154 (29.31) 1.138 (28.90)	
C (15)	.978 (24.84) .958 (24.33)	1.078 (27.38) 1.062 (26.97)	1.274 (32.36) 1.258 (31.95)	
F (23)	1.291 (32.79) 1.271 (32.28)	1.516 (38.51) 1.500 (38.10)	1.734 (44.04) 1.718 (43.64)	

Military Designator	Shell Size	Material Designator *A - Fluorosilicone B - EMI*
M28840/24	B	A

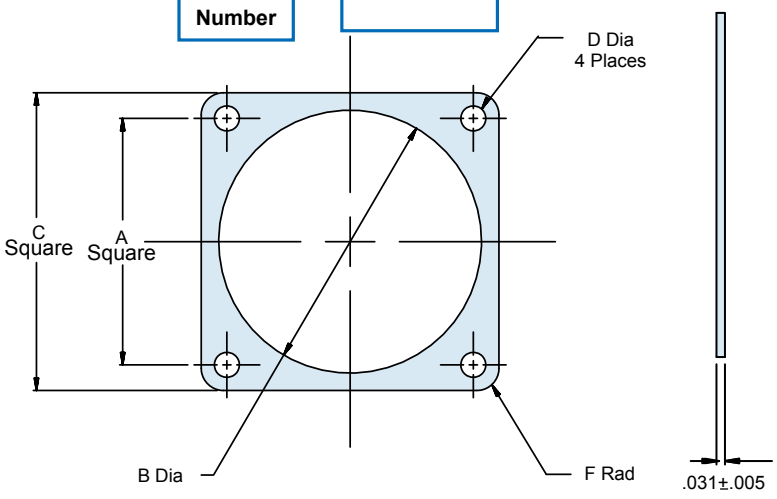


Commercial equivalent square flange wall mount receptacle panel gasket

Table I: Material	
Symbol	**Material Description**
F	Fluorosilicone
M	Silver Plated Glass Filled Silicone (EMI)
N	Neoprene

Shell Size	A ± .010	Ø B +.016 -.000	C +.016 -.000	Ø D ± .010	F Radius ± .010
11	.750	.750	1.023	.120	.141
13	.843	.875	1.138		
15	.968	1.062	1.258		
23	1.281	1.500	1.718		.188

Product Series	Material Symbol (Table I)		
930	- 006	F	13
	Basic Number		Shell Size



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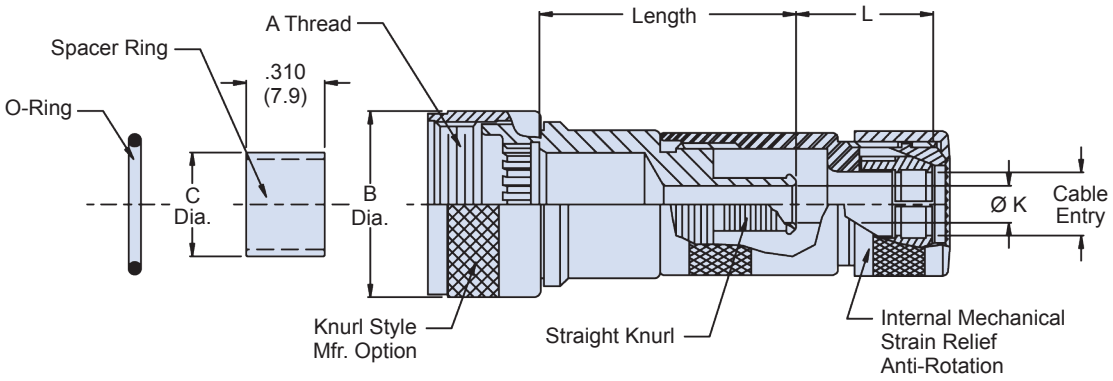
189-015
Environmental Banding Backshell
for Multichannel M85045 Shipboard Fiber Optic Cable
for Use with MIL-PRF-28876 or Glenair 180-040 Connectors

MIL-PRF-28876 and 189-015 banding backshell

How To Order

Product Series		Material/ Finish (Table II)	Dash No. (Table III)		Band 600-052 Supplied (Omit If Not Required)
189	- 015	NF	13	05 - 3	B
	Basic No.	Shell Size (Table I)		Length In 1/2 Inch Increments (Example: 3 = 1.5 Inches)	



Material and Plating

Adapter, Coupling Nut, Spacer Ring see Table II
Clamp Components: Ryton R 4XT-Black, Ultem 1000-Natural
Anti-Rotation Device: Torlon 42031-Natural
O-Ring: Fluorosilicone

Notes

Glenair 600 Series Backshell assembly tools are recommended for assembly and installation.
Standard minimum length: 1.5 inches, for shorter length consult factory.
Spacer Ring and O-Ring are packaged loose and must be installed with Connector at time of assembly. The spacer is utilized to retain the terminus Insert.
For Shield termination see Glenair drawing 600-050 & 600-052.
Consult factory for larger cable size.
MIL-I-32053/4 & /5 Shrink sleeve to be packaged loose in a plastic bag.
MIL-I-32053/4 Shrink Sleeving to be heat shrink over rear of Adapter before MIL-I-32053/5 Shrink Sleeving.
For assembly instructions, see GAP-064

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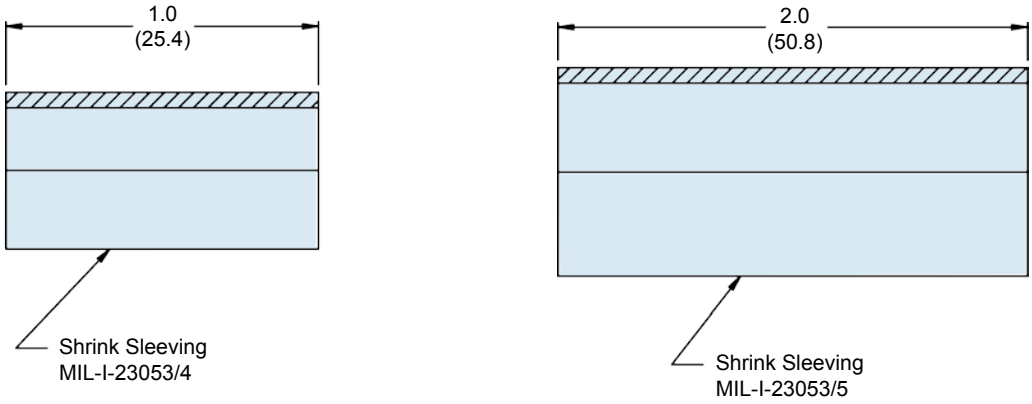

Table I

Shell Size	Designator (Ref)	A Thread Class 2B	B Max	C Max	Max Dash Number
11	A	3/4 -20 UNEF	1.028 (26.1)	.410 (10.4)	05
13	B	7/8 -20 UNEF	1.141 (29.0)	.532 (13.5)	05
15	C	1 -20 UNEF	1.263 (32.1)	.710 (18.0)	07
23	F	1-7/16 -18 UNEF	1.703 (43.3)	1.116 (28.3)	13

Table II: Material and Finish

Code	Material	Finish Description
M	Aluminum Alloy	Electroless Nickel
NF		Cadmium/Olive Drab Over Electroless Nickel (500 hour salt spray)

Refer to Appendix for material/finish details

J

Table III: Cable Entry And Shrink Sleeve Dash Number

Dash No.	Clamp Size	Cable Dia Max	K Dia ±.005 (0.1)	L Max	MIL-I-23053 Shrink Sleeve	MIL-I-23053 Shrink Sleeve	Cable Entry Dia	
							Minimum	Maximum
05	12	.280 (7.1)	.312 (7.9)	1.11 (28.2)	/4-203-0	/5-107-0	.233 (5.2)	.375 (9.5)
07	16	.395 (10.0)	.438 (11.1)	1.21 (30.7)	/4-204-0	/5-108-0	.358 (8.3)	.500 (12.7)
09	20	.510 (13.0)	.562 (14.3)	1.21 (30.7)	/4-204-0	/5-109-0	.482 (11.5)	.625 (15.9)
11	24	.621 (15.8)	.688 (17.5)	1.21 (30.7)	/4-205-0	/5-106-0	.545 (13.1)	.750 (19.1)
13	28	.736 (18.7)	.812 (20.6)	1.36 (34.5)	/4-205-0	/5-110-0	.670 (16.3)	.875 (22.2)

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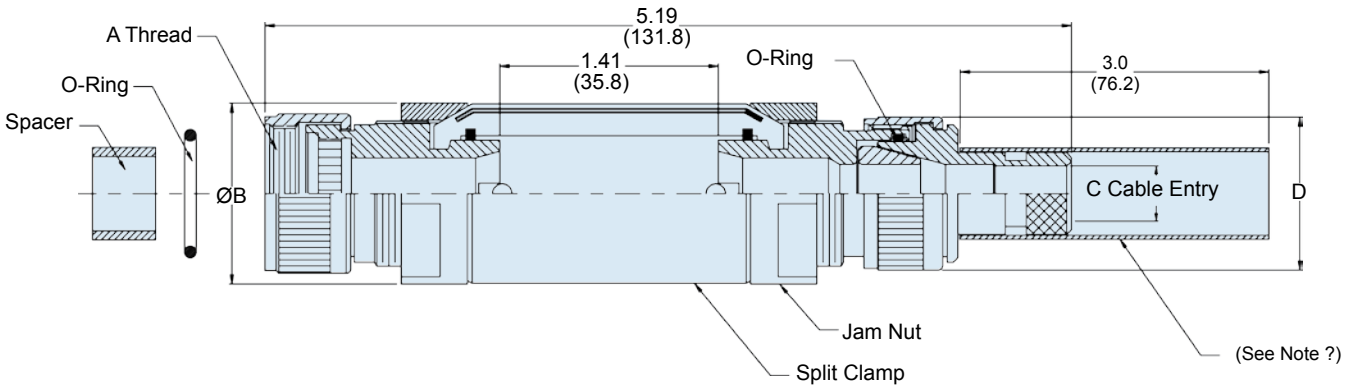
189-001
Fiber Optic Backshell With Split Clamp
MIL-PRF-28876 Environmental

MIL-PRF-28876 fiber optic backshell

How To Order

Product Series	Material/ Finish (Table I)	Angular Function S = Straight R = 90° P = 45°		
189 -	001	NF	13	S
	Basic No.		Shell Size (Table II)	



Material and Plating

Adapter, Jam Nut, Ferrule, Coupling Nut, Split Elbows & Spacer: see Table I
O-Rings: Fluorosilicone
Shrink Sleeving: Polyolefin
Spacer: see Table I

Notes

Glenair 600 Series Backshell assembly tools are recommended for assembly and installation; Assembly procedure see GAP014.
MIL-I-23053/4 Shrink Sleeving, O-Ring and Spacer to be packaged loose in a plastic bag. Assemble O-Ring and Spacer onto Connector as shown.

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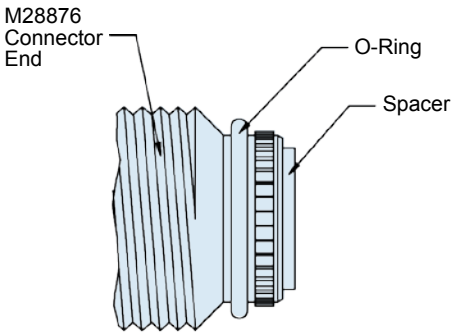

Table I: Material and Finish		
Code	**Material**	**Finish Description**
M	Aluminum Alloy	Electroless Nickel
NF		Cadmium/Olive Drab Over Electroless Nickel (500 hour salt spray)

Refer to Appendix for material/finish details

Table II				
Shell Size	**A Thread**	**B Max**	**C Max**	**D Max**
11	.750-20 UNEF	1.17 (29.7)	.340 (8.6)	1.00 (25.4)
13	.875-20 UNEF	1.17 (29.7)	.340 (8.6)	1.00 (25.4)
15	1.00 -20 UNEF	1.42 (36.0)	.460 (11.7)	1.13 (28.7)

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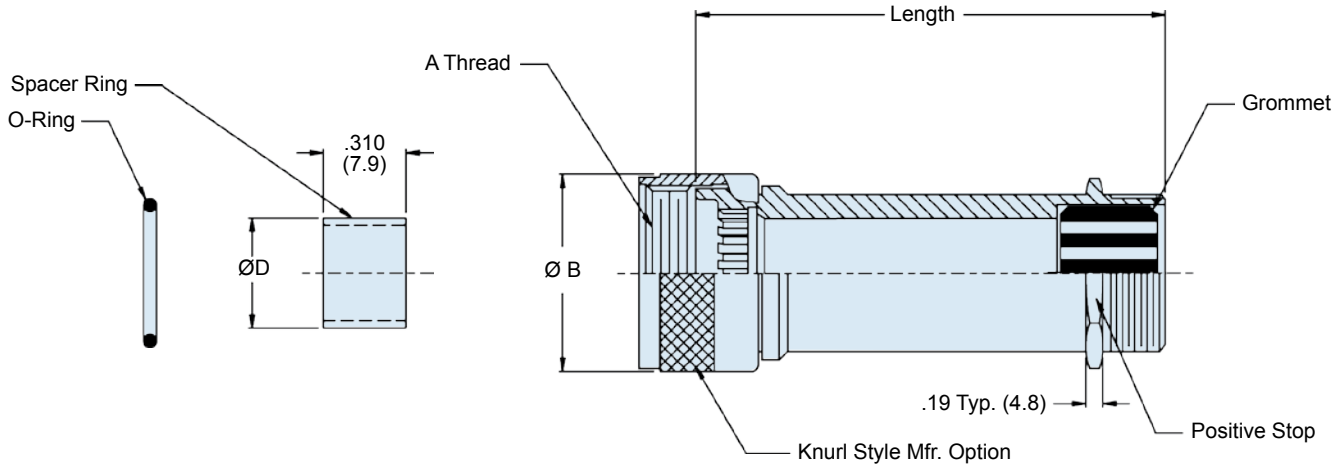
189-007
Fiber-Con Backshell
for MIL-PRF-28876 Connectors

MIL-PRF-28876 fiber-con backshell

How To Order

Product Series	Material/Finish (Table II)		Shell Size (Table I)		Length In 1/2 Inch Increments (Example: 4 = 2 Inches)
189	- 007	NF	13	T	4
	Basic No.			*SYM G* = *Gland Nut* *SYM T* = *Tubing Adapter* Omit for Standard Shrink Boot Adapter	



Material and Finish

Adapters, Coupling Nuts, Ferrule, Compression Nut, Spacer Ring: see table II
Grommet: Fluorosilicone
O-Ring: Fluorosilicone

Notes

Glenair 600 Series Backshell assembly tools are recommended for assembly and installation.
Spacer Ring and O-Ring are packaged loose and must be installed with Connector at time of assembly. The Spacer is utilized to retain the Terminus Insert.
Standard minimum order is 1.5 inch. Consult factory for shorter length.

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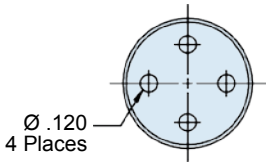
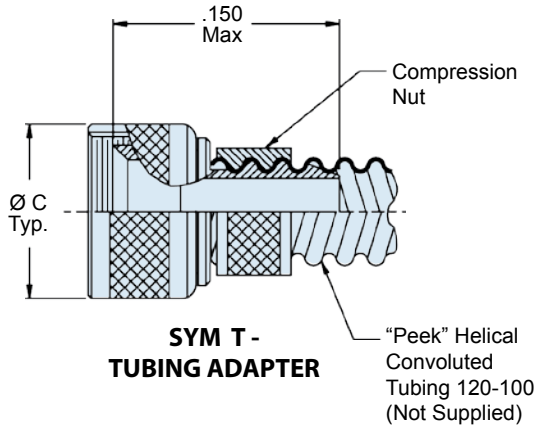
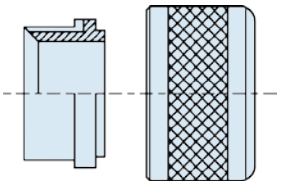


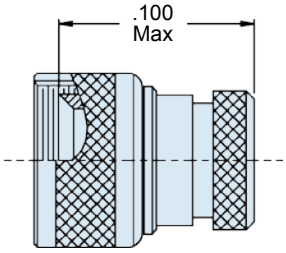
HOLE PATTERN
SHELL SIZE 13 SHOWN



SYM T -
TUBING ADAPTER



SYM G -
GLAND NUT



SHRINK BOOT
ADAPTER (STD)

Table I

Shell Size	Designator (Ref)	A Thread Class 2B	B Max	C Max	D Max	Conduit Size	No. Of Holes
11	A	3/4-20 UNEF	1.03 (26.2)	-	.41 (10.4)	12	2
13	B	7/8-20 UNEF	1.14 (29.0)	1.12 (28.4)	.53 (13.5)	16	4
15	C	1-20 UNEF	1.26 (32.0)	1.34 (34.0)	.71 (19.0)	24	8
23	F	17/16-18 UNEF	1.70 (43.2)	1.66 (42.2)	1.12 (28.4)	28	31

Table II: Material and Finish

Code		Finish Description
M	Aluminum Alloy	Electroless Nickel
NF		Cadmium/Olive Drab Over Electroless Nickel (500 hour salt spray)

Refer to Appendix for material/finish details

J

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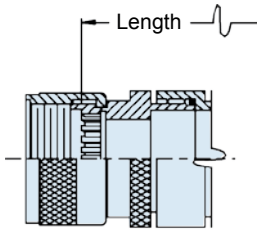
189-009
Banding Backshell / Molding Adapter
For MIL-PRF-28876 Connectors

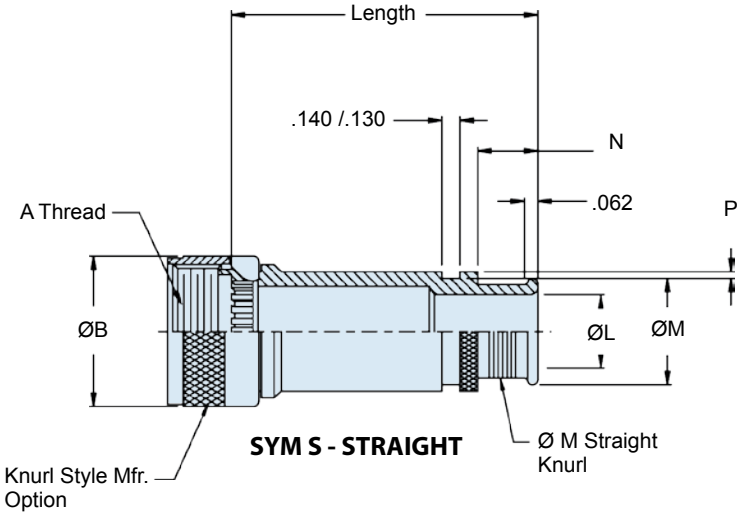
MIL-PRF-28876 banding backshell/molding adapter

How To Order

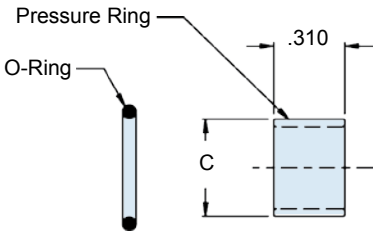
Product Series	Basic No.	Shell Size (Table I)	Length In 1/2 Inch Increments (Example: 04 = 2 Inches)			
189	S	009	NF	15	08	- 04
	Angular Function (H, J, or S)		Material/Finish (Table III)		Entry Size (Table II)	



STYLE 2, SYM S



SYM S - STRAIGHT



Material and Finish

Adapters, Elbows, Coupling Nut, Pressure Ring: see Table II
Clamp Components: Ryton R 4XT-Black, Ultem 1000-Natural
O-Ring: Fluorosilicone

Notes

Assembly to be identified with manufacturer's name and P/N, space permitting.
Standard minimum length for style 1: 1.5 inches, for Style 2: 2 inches.
Note: Length applies to SYM S, Straight only.
When cable diameter exceeds inside diameter of Connector Shell, Style 2 will be supplied.
Glenair 600 Series Backshell assembly tools are recommended for assembly and installation.
O-Ring and Pressure Ring to be packaged loose and must be installed with Connector at time of assembly.

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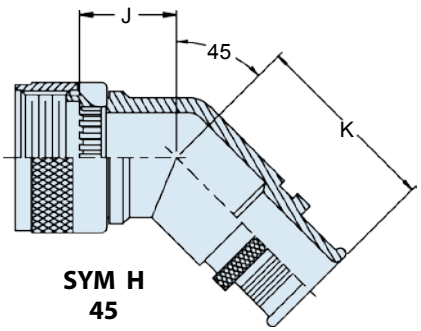
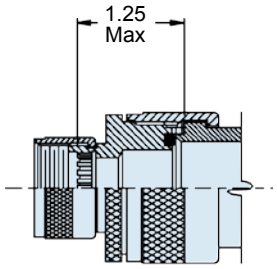
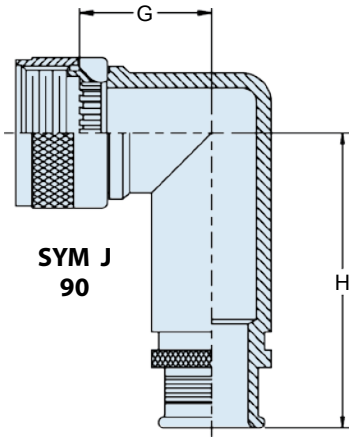
189-009
Banding Backshell / Molding Adapter
For MIL-PRF-28876 Connectors



SYM H
45



STYLE 2
45 & 90



SYM J
90

Table I									
Shell Size	Conn. Desig.	A Thread UNEF	ØB Max	ØC Max	G Max	H Max	J Max	K Max	Max Entry
11	A	.750-20	.960 (26.2)	.410 (10.4)	1.28 (32.5)	1.33 (33.8)	1.14 (29.0)	1.19 (30.2)	07
13	B	.875-20	1.09 (29.0)	.532 (13.5)	1.35 (34.3)	1.40 (35.6)	1.17 (29.7)	1.22 (30.1)	08
15	C	1.000-20	1.26 (32.0)	.710 (18.0)	1.43 (36.3)	1.47 (37.3)	1.20 (30.4)	1.25 (31.8)	10
23	F	1.437-18	1.70 (43.2)	1.12 (28.4)	1.64 (41.7)	1.68 (46.7)	1.29 (32.8)	1.33 (33.8)	13

Table II				
Dash No.	P	L Dia.	M Dia.	N
04	.044	.205	.325	.525
05	.044	.235	.355	.525
06	.044	.255	.375	.525
07	.044	.205	.450	.525
08	.044	.330	.580	.600
09	.044	.450	.660	.600
10	.044	.670	.790	.600
11	.044	.840	.960	.600
12	.069	1.080	1.080	.600
13	.069	1.200	1.200	.600

Table III: Material and Finish		
Code	Material	Finish Description
M	Aluminum Alloy	Electroless Nickel
NF		Cadmium/Olive Drab Over Electroless Nickel (500 hour salt spray)

Refer to Appendix for material/finish details

J

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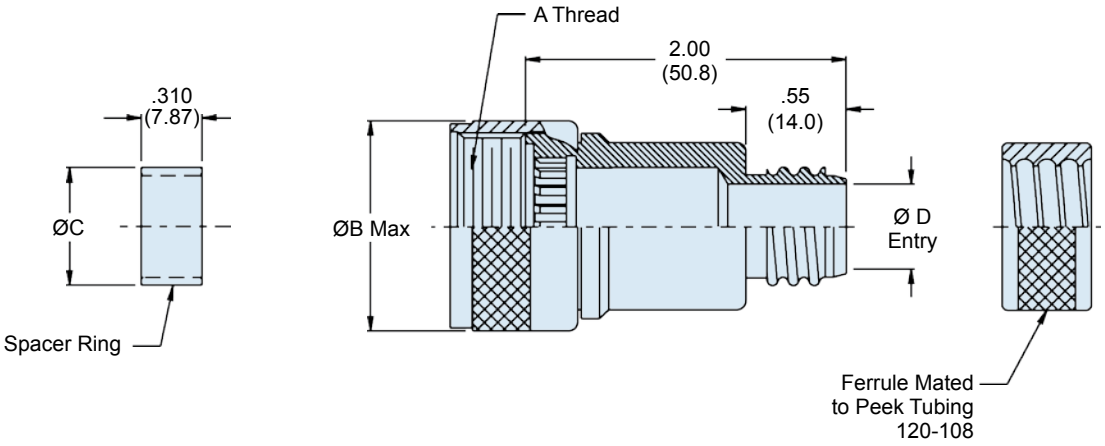
189-014
Backshell for PEEK Convoluted Tubing
to be used with MIL-PRF-28876 Fiber Optic Connectors

MIL-PRF-28876 backshell

How To Order

Product Series		Material/Finish *(Table II)*	
189	- 014	NF	11
	Basic No.		Shell Size *(Table I)*



Material and Finish
Adapter, Coupling Nut, Ferrule, and Spacer Ring: See Table II

Notes
Spacer Ring is packaged loose and must be installed with Connector at time of assembly to retain Terminus Insert.
For 45° or 90° Backshell option, see Glenair drawing 189-021.

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Table I: Shell Size Dash Number							
Shell Size	Designator (Ref)	A Thread Class 2B	ØB Max	ØC Max	Ø D Entry	"Peek" Conduit Size	
						Frac. Size	Dash No.
11	A	3/4-20 UNEF	.960 (24.4)	.410 (10.4)	.390 (9.91)	1/2	16
13	B	7/8-20 UNEF	1.09 (27.7)	.532 (13.5)	.390 (9.91)	1/2	16
15	C	1-20 UNEF	1.26 (32.0)	.710 (18.0)	.390 (9.91)	1/2	16
23	F	1 7/16-18 UNEF	1.70 (43.2)	1.12 (28.4)	.890 (22.6)	1	32

Table II: Material and Finish		
Code	Material	Finish Description
M	Aluminum Alloy	Electroless Nickel
NF		Cadmium/Olive Drab over Electroless Nickel (500 Hour Salt Spray)
Z1	Stainless Steel	Passivate

Refer to Appendix for material/finish details

J

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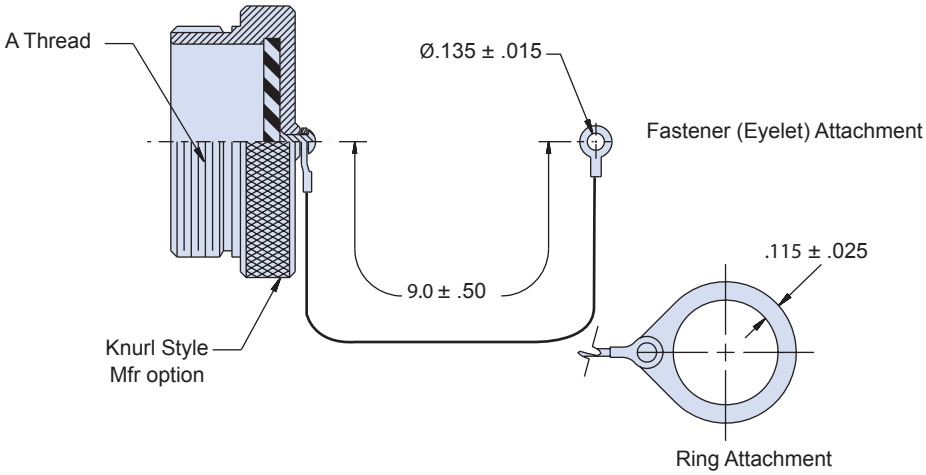
M28876/10 and M28876/15
660-072 and 660-073
MIL-PRF-28876 Dust Covers

M28876 QPL

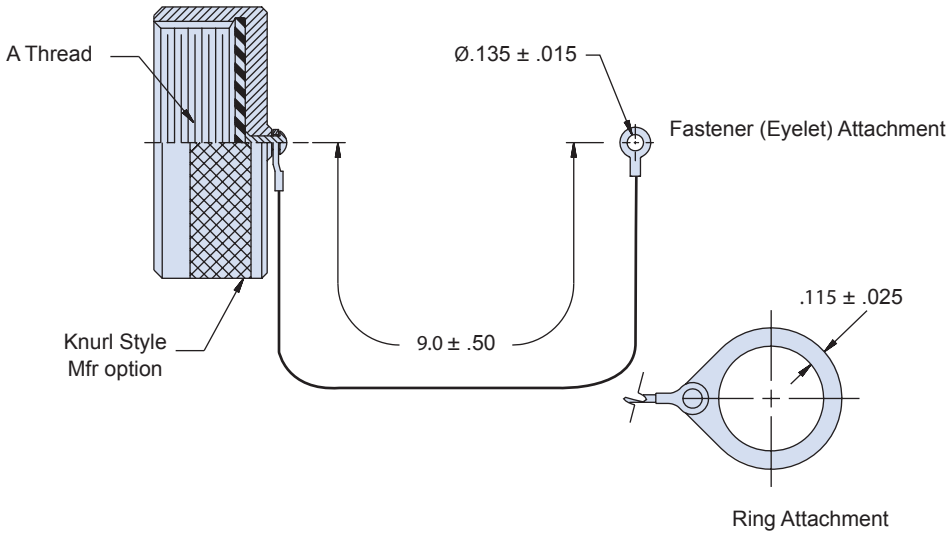
Plug and receptacle dust covers

Table I: Cover Type		
Connector	MIL-Spec Basic P/N	Glenair Commercial Basic P/N
Plug	M28876/10	660-072
Receptacle	M28876/15	660-073

M28876/10 • 660-072
Plug Cover



M28876/15 • 660-073
Receptacle Cover



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M28876/10 and M28876/15
660-072 and 660-073
MIL-PRF-28876 Dust Covers

How to order: Military QPL

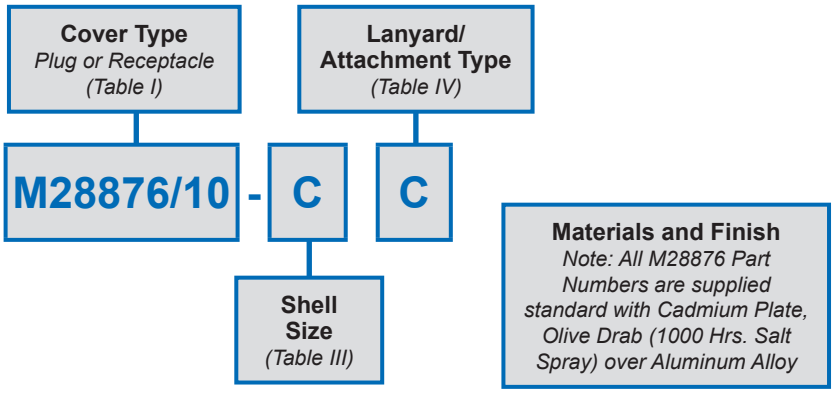

Table II: Material and Finish (Commercial)		
Code	Material	Finish Description
M	Aluminum Alloy	Electroless Nickel
NF		Cadmium, Olive Drab
MT		Nickel-PTFE, Grey
ZR		Zinc-Nickel, Black
Consult Factory for Additional Options		

Refer to Appendix for material/finish details

*MT plating available only with Glenair commercial equivalent part numbers

Table III: Shell Size	
Symbol	A Thread
A	.750-0.1P-0.2L-D.S.
B	.875-0.1P-0.2L-D.S.
C	1.062-0.1P-0.2L-D.S.
F	1.500-0.1P-0.2L-D.S.

How To Order: Glenair Commercial

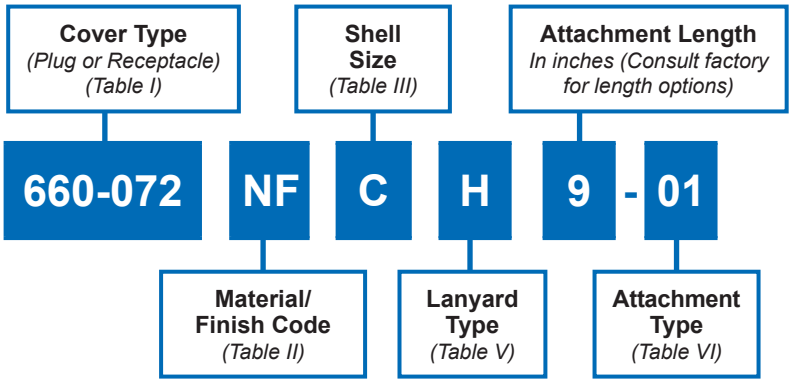

Table IV: Lanyard/Attachment (MIL-Spec)	
Symbol	Description
A	Chain (Sash) with Fastener (Eyelet) Attachment
B	Chain (Sash) with Ring Attachment
C	Wire Rope with Fastener (Eyelet) Attachment
D	Wire Rope with Ring Attachment
E	Without Chain (Sash) or Wire Rope

Table VI: Attachment Type (Commercial)			
Shell Size	Attachment Type	Connector Type	Code
A	Ring	Plug	13
		Recp	15
B	Ring	Plug	15
		Recp	17
C	Ring	Plug	17
		Recp	20
F	Ring	Plug	23
		Recp	27
All	Fastener (Eyelet)	All	01

Table V: Lanyard Type (Commercial)	
Symbol	Type
H	Wire Rope, Coated
S	Chain (Sash), Passivated
N	No Lanyard
Consult Factory for Additional Options	

J

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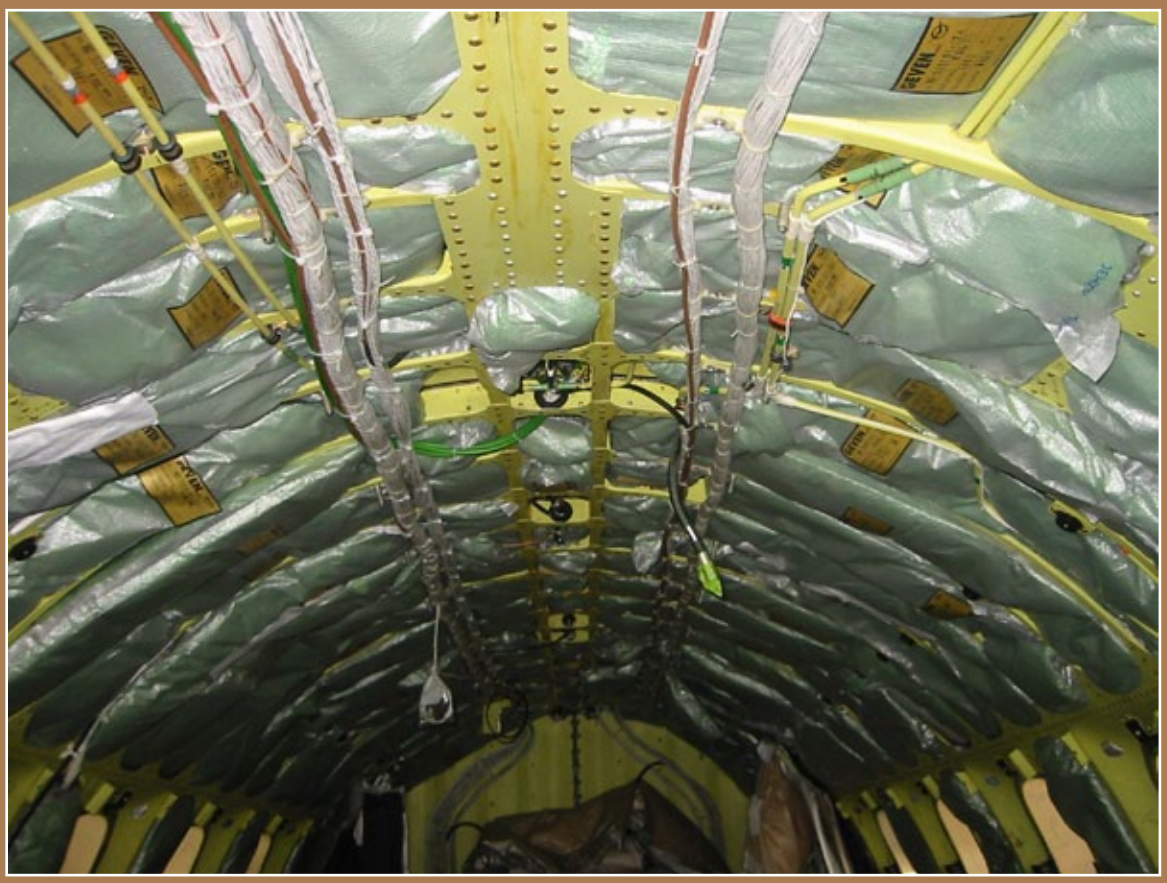
FIBER OPTIC

CABLES AND CONDUIT

FOR FIBER OPTIC CONNECTION SYSTEMS



Fiber Optic Cable Construction

Glenair's in-house fiber optic cable extrusion line provides the capability to extrude a variety of short-run specialty cables from simplex to hybrid constructions. Options include a selection of strength filaments such as Aramid yarn and extruded outer jacket materials. Our in-house extrusion line is geared to short-run, prototype projects and other applications which do not meet the large cable manufacturer's minimum length requirements

The Widest Range of Conduit Materials and Fittings in the Industry

Flexible, high-temperature convoluted tubing is an ideal material choice for the protection of fiber media. The material provides a durable, highly-flexible enclosure for fiber optic systems, with end-fittings and transitions to meet any installation configuration.

Glenair®

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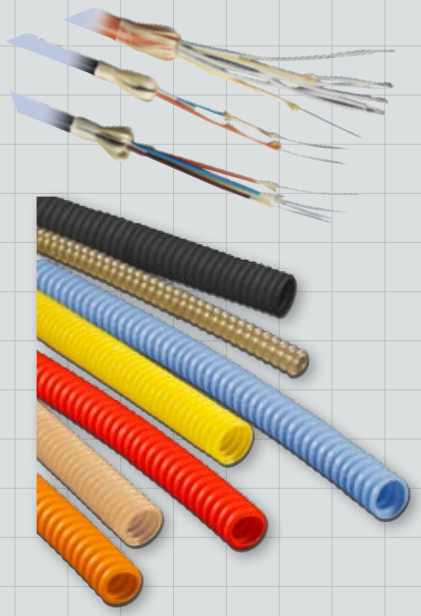
A Complete Range of Fiber Optic Cable and Cable Protection Products

Well designed fiber optic connection systems begin with high-reliability single and multimode cable. Glenair is able to fabricate and supply a targeted range of fiber media—all available without expensive minimum length requirements. The goal of of fiber media shop is to provide a fast-turn supply of specialty F/O media for use in our own cable assemblies, customer prototype projects and other short-run, limited bulk length applications.

Nobody can beat Glenair when it comes to providing fiber optic media with rugged and yet flexible media protection. We are absolute experts in this field and can suggest and supply everything from jacketed cable resistant to fuel exposure to crush-proof polymer-core conduit solutions. And because we make and stock all the component parts ourselves, we can offer lightning-fast turnaround on even highly specialized requirements.



Product No.	Description	Page No.
Bulk Extruded Fiber Optic Cable		
ABC 3586	Bulk Simplex Fiber Optic Cable, 9.3/125 Singlemode Stepped Index	K-2
ABC 3580	Bulk Simplex Fiber Optic Cable, 50/125 Graded Index	K-3
ABC 3569	Bulk Simplex Fiber Optic Cable, 62.5/125 Graded Index	K-4
ABC 3821	Bulk Simplex Fiber Optic Cable, 62.5/125 Graded Index (ETFE Jacket)	K-5
ABC 3571	Bulk Simplex Fiber Optic Cable, 100/140 Graded Index	K-6
MIL-T-81914 Convoluted Tubing		
120-100	Series 74 Helical Convoluted Tubing	K-7
120-103	Series 74 Helical Convoluted Tubing with Braid	K-8
120-108/120-132	Standard and Ultra Small Diameter PEEK Helical Convoluted Tubing	K-9

Catalog Notes

For all parts in this catalog:
All parts, packages, and spools will be identified with manufacturer's name and part number, space permitting.
Metric dimensions appear in parentheses in diagrams and tables, based on 1 inch = 25.4 mm, for reference only.
Unless otherwise specified, the following other dimensional tolerances apply:
.xx = ± .03 (0.8) • .xxx = ± .015 (0.4) • Angles = ± 5°

K

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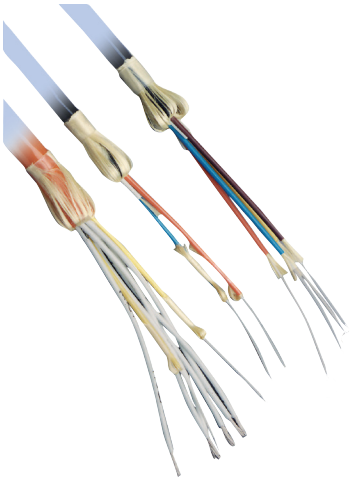
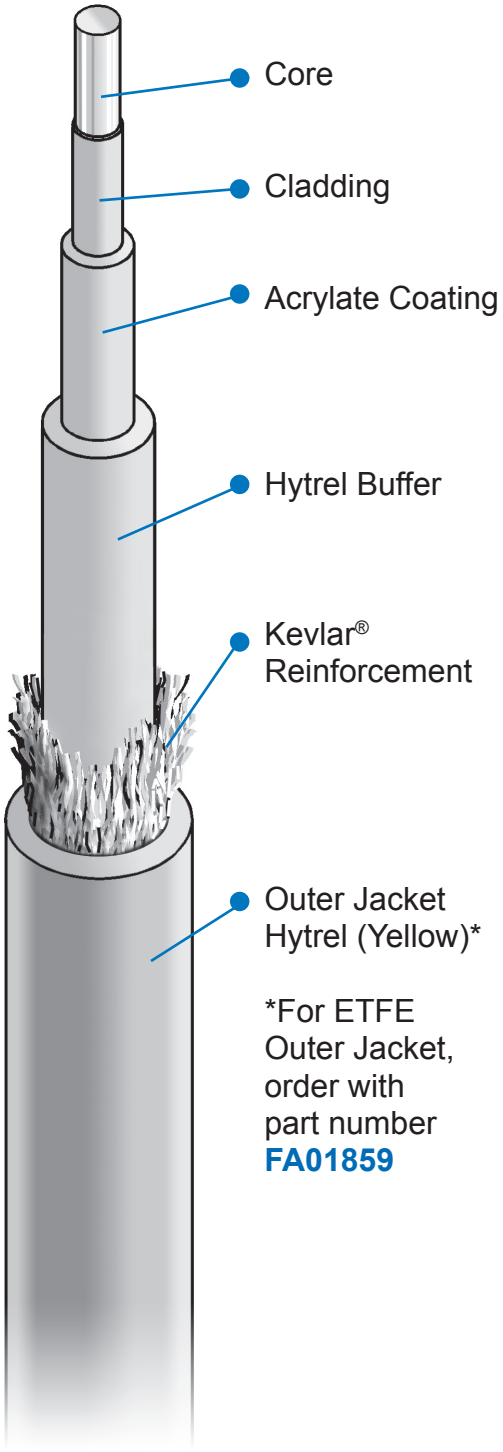
Glenair®

ABC 3586
Bulk Simplex Fiber Optic Cable
9.3/125 Singlemode Stepped Index

9.3/125 Singlemode graded index fiber optic cable





Cable Specifications	
Core/Mode Field Diameter	9.3 µm ± 3 µm
Cladding Diameter	125 µm ± 2 µm
Primary Buffer	500 µm ± 25 µm
Secondary Buffer	900 µm ± 50 µm
Jacket	.083 ± .007 Inch Diameter
Attenuation: @ 1310 nm @ 1550 nm	 3.0 dB/km 2.0 dB/km
Numerical Aperture	.110 + .020
Index Profile	Stepped
Proof Test	>100 KPSI
Operating Temperature	-40° C to +85° C

Consult Factory for price in feet or meters and for Standard Length Tolerance

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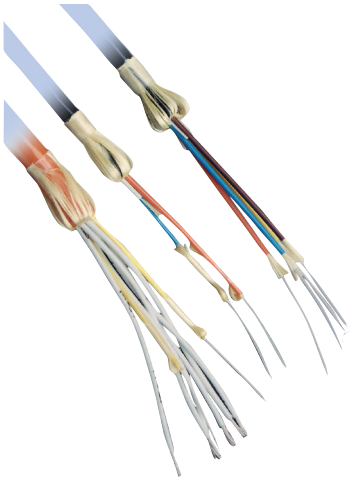
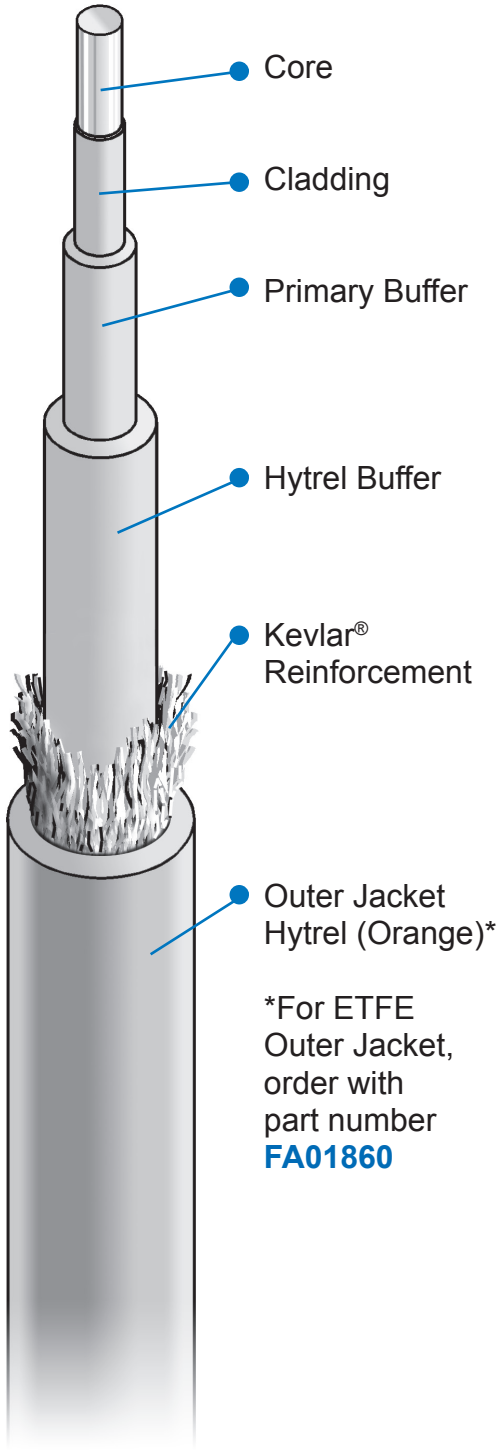
www.glenair.com E-Mail: sales@glenair.com

ABC 3580
Bulk Simplex Fiber Optic Cable
50/125 Graded Index

50/125 Multimode graded index fiber optic cable





Cable Specifications	
Core/Mode Field Diameter	50 µm ± 3 µm
Cladding Diameter	125 µm ± 3 µm
Primary Buffer	500 µm ± 25 µm
Secondary Buffer	900 µm ± 50 µm
Jacket	.083 ± .007 Inch Diameter
Attenuation: **@ 850 nm** **@ 1300 nm**	 4.0 dB/km 2.5 dB/km
Bandwidth: **@ 850 nm** **@ 1300 nm**	 400 Mhz/km Minimum 400 Mhz/km Minimum
Numerical Aperture	.200 Nominal
Index Profile	Graded
Proof Test	100 KPSI
Operating Temperature	-40° C to +85° C

Consult Factory for price in feet or meters and for Standard Length Tolerance

Glenair also carries 62.5 and 50 µm Multimode fiber that meet FAR25 flammability requirements. Consult factory for more information.

Kevlar® is a registered trademark of DuPont Company.

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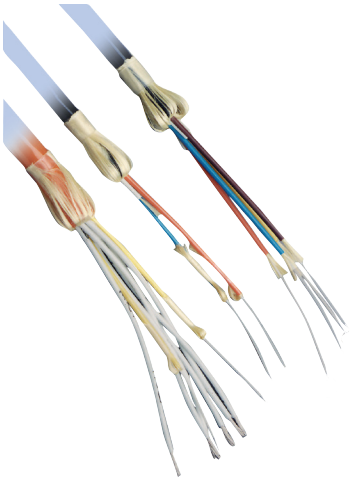
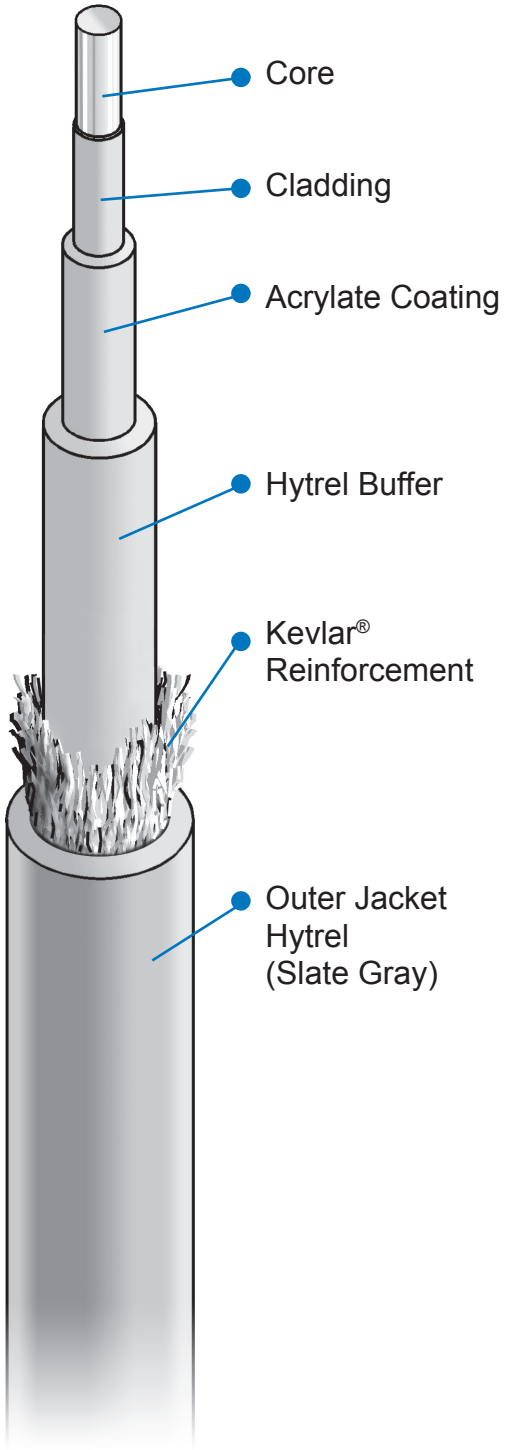
Glenair®

ABC 3569
Bulk Simplex Fiber Optic Cable
62.5/125 Graded Index

62.5/125 Multimode graded index fiber optic cable





Cable Specifications	
Core/Mode Field Diameter	62.5 µm ± 3 µm
Cladding Diameter	125 µm ± 3 µm
Primary Buffer	500 µm ± 25 µm
Secondary Buffer	900 µm ± 50 µm
Jacket	.083 ± .007 Inch Diameter
Attenuation: **@ 850 nm** **@ 1300 nm**	 4.0 dB/km 2.0 dB/km
Bandwidth: **@ 850 nm** **@ 1300 nm**	 160 Mhz/km Minimum 500 Mhz/km Minimum
Numerical Aperture	0.275 Nominal
Index Profile	Graded
Proof Test	>100 KPSI
Operating Temperature	-40° C to +85° C

Consult Factory for price in feet or meters and for Standard Length Tolerance

Glenair also carries 62.5 and 50 µm Multimode fiber that meet FAR25 flammability requirements. Consult factory for more information.

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K

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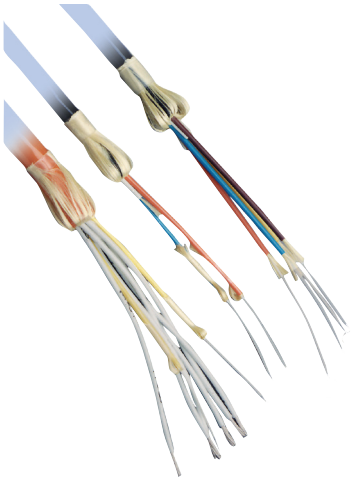
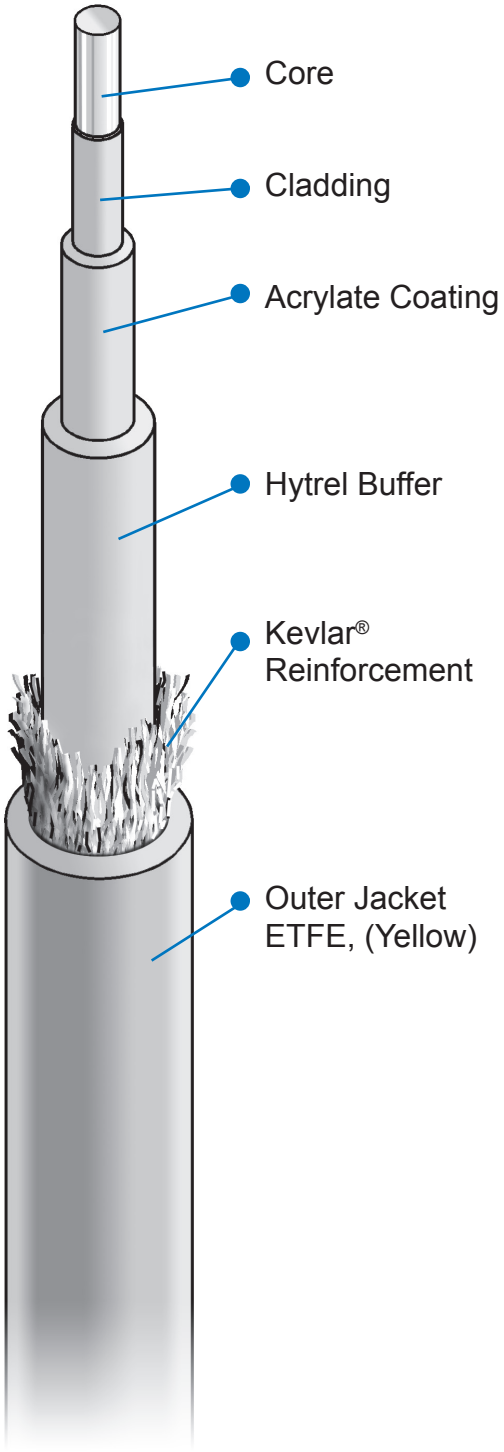
ABC 3821
Bulk Simplex Fiber Optic Cable
62.5/125 Graded Index (ETFE Jacket)

62.5/125 Multimode graded index fiber optic cable





Cable Specifications	
Core/Mode Field Diameter	62.5 µm ± 3 µm
Cladding Diameter	125 µm ± 3 µm
Primary Buffer	500 µm ± 25 µm
Secondary Buffer	900 µm ± 50 µm
Jacket	.083 ± .007 Inch Diameter
Attenuation: **@ 850 nm** **@ 1300 nm**	 4.0 dB/km 2.0 dB/km
Bandwidth: **@ 850 nm** **@ 1300 nm**	 160 Mhz/km Minimum 500 Mhz/km Minimum
Numerical Aperture	0.275 Nominal
Index Profile	Graded
Proof Test	>100 KPSI
Operating Temperature	-40° C to +85° C

Consult Factory for price in feet or meters and for Standard Length Tolerance

Glenair also carries 62.5 and 50 µm Multimode fiber that meet FAR25 flammability requirements. Consult factory for more information.

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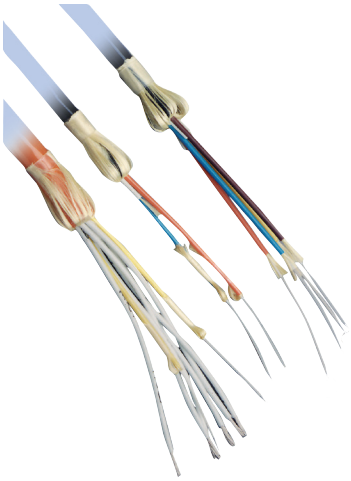
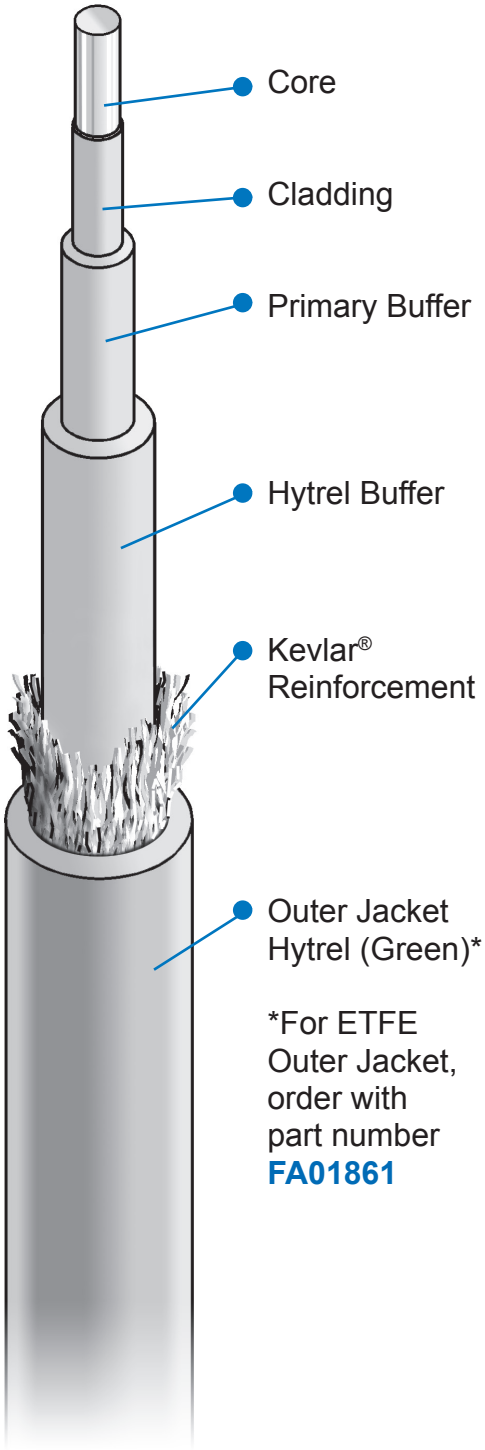
ABC 3571
Bulk Simplex Fiber Optic Cable
100/140 Graded Index

100/140 Multimode graded index fiber optic cable





Cable Specifications	
Core/Mode Field Diameter	100 µm ± 4 µm
Cladding Diameter	140 µm ± 3 µm
Primary Buffer	500 µm ± 25 µm
Secondary Buffer	900 µm ± 50 µm
Jacket	.083 ± .007 Inch Diameter
Attenuation: **@ 850 nm** **@ 1300 nm**	 6.0 dB/km 4.0 dB/km
Bandwidth: **@ 850 nm** **@ 1300 nm**	 100 Mhz/km Minimum 100 Mhz/km Minimum
Numerical Aperture	.290 + .015
Index Profile	Graded
Proof Test	>100 KPSI
Operating Temperature	-40° C to +85° C

Consult Factory for price in feet or meters and for Standard Length Tolerance

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K

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120-100
Helical Polymer-Core Convoluted Tubing
In Accordance With SAE AMS-81914

Glenair®

Outstanding mechanical wire protection and lubricity for non-environmental and non-EMI/RFI applications

How To Order

Product Series	Class:	Tubing Size	Material	
120 - Convoluted Tubing	*1 - Standard Wall* *2 - Thin Wall*	*(Table I)*	*K - PEEK* *E - ETFE* *F - FEP* *P - PFA* *T - PTFE*	*L - Lanyard* *Omit for none*

120	-	100	-	1	-	1	-	16	B	K	L

Basic No.	Convolution	Color
	1 - Standard *2 - Close*	*B - Black* *O - Orange* *Y - Yellow* *C - Clear* *BL - Blue*

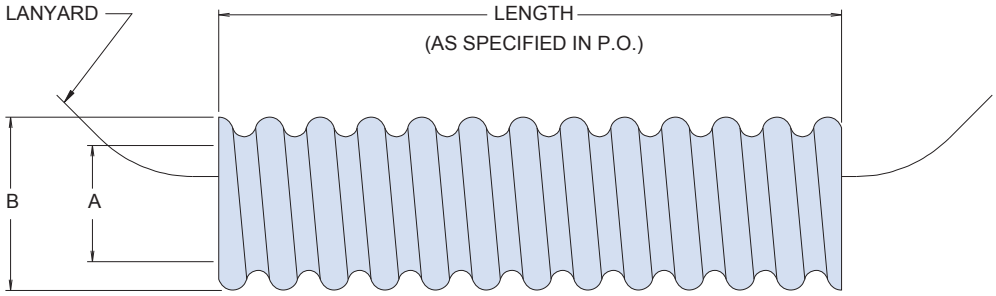
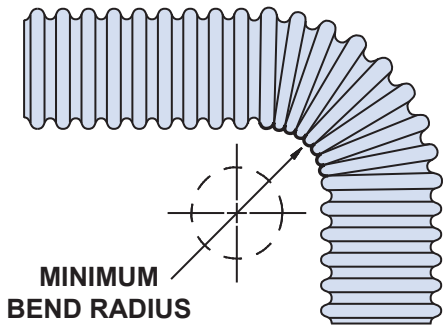


Table I: Tubing Size Order Number and Dimensions				
Tubing Size	Fractional Size Ref	A Inside Dia Min	B Dia Max	Min Bend Radius
06	3/16	.181 (4.6)	.320 (8.1)	.50 (12.7)
09	9/32	.273 (6.9)	.414 (10.5)	.75 (19.1)
10	5/16	.306 (7.8)	.450 (11.4)	.75 (19.1)
12	3/8	.359 (9.1)	.510 (13.0)	.88 (22.4)
14	7/16	.427 (10.8)	.571 (14.5)	1.00 (25.4)
16	1/2	.480 (12.2)	.650 (16.5)	1.25 (31.8)
20	5/8	.603 (15.3)	.770 (19.6)	1.50 (38.1)
24	3/4	.725 (18.4)	.930 (23.6)	1.75 (44.5)
28	7/8	.860 (21.8)	1.073 (27.3)	1.88 (47.8)
32	1	.970 (24.6)	1.226 (31.1)	2.25 (57.2)
40	1 1/4	1.205 (30.6)	1.539 (39.1)	2.75 (69.9)
48	1 1/2	1.437 (36.5)	1.832 (46.5)	3.25 (82.6)
56	1 3/4	1.688 (42.9)	2.156 (54.8)	3.63 (92.2)
64	2	1.937 (49.2)	2.332 (59.2)	4.25 (108.0)



K

Packaging

- Long-length orders of 120-100 conduit are subject to carrier weight and box size restrictions. For example, UPS air shipments are currently limited to 50 lbs. per box. Unless otherwise specified, Glenair standard practice is to ship optimal lengths of product based on weight, size, and individual carrier specifications.
- Consult factory for thin-wall, close convolution combination and for PEEK™ and PTFE min/max dimensions.

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120-103
Series 74 Helical Convoluted Tubing (MIL-T-81914)
Natural or Black PFA, FEP, PTFE, Tefzel® (ETFE) or PEEK
Type B - With External Black Dacron® Braid

MIL-T-89194 helical convoluted tubing with external black Dacron® braid

How To Order

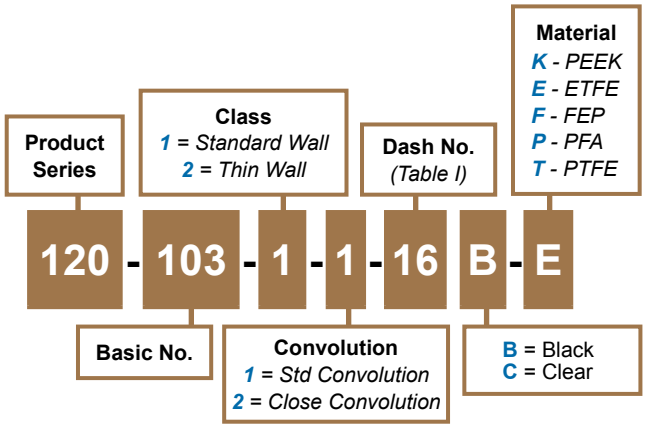
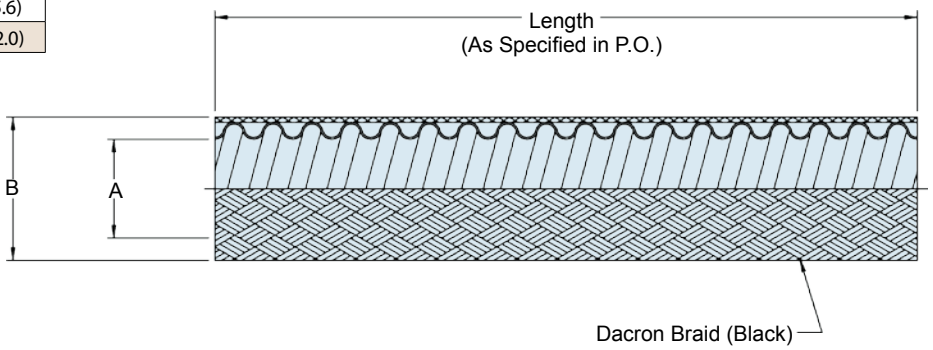


Table I				
Dash No.	Frac. Size	Ø A Inside Min	Ø A Inside Max	Ø B Max
06	3/16	.181	.188	.430 (10.9)
09	9/32	.273	.281	.474 (12.0)
10	5/16	.306	.312	.510 (10.2)
12	3/8	.359	.375	.571 (14.5)
14	7/16	.427	.437	.631 (16.0)
16	1/2	.480	.500	.710 (18.0)
20	5/8	.603	.625	.830 (21.1)
24	3/4	.725	.750	.990 (25.1)
28	7/8	.860	.875	1.133 (28.7)
32	1	.970	1.000	1.286 (32.8)
40	1 1/4	1.205	1.250	1.599 (40.6)
48	1 1/2	1.437	1.500	1.892 (48.0)
56	1 3/4	1.688	1.750	2.192 (55.6)
64	2	1.937	2.000	2.442 (62.0)



K

Material and Finish
Convoluted Tubing: See Table II
Dacron Braid: Black, per Federal Specification BT 285D

Notes
Packages and spools identified with manufacturer's name and part number.
Unless otherwise specified, Conduit will be shipped per standard package minimum length supplied will be 10 feet (3M).
Consult factory for PTFE sizes not shown.

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120-108 • 120-132
Standard and Ultra Small Diameter PEEK Helical Convoluted Tubing
for Fiber Optic Applications

Standard diameter low-smoke, zero-halogen tubing with outstanding crush resistance

How To Order

Product Series	Basic No.	Dash No. (Table I)		
120	- 108	- 16	B	

B = PEEK/Color Black
P = PEEK/Color Purple
R = PEEK/Color Red
(Omit for Natural)

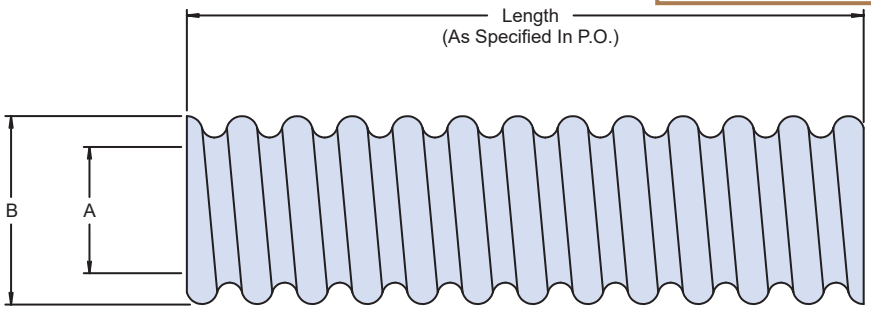


Table I

Tubing Size	Fractional Size Ref	A Inside Dia Min	A Inside Dia Nom	B Dia Max
06	3/16	.181 (4.6)	.187 (4.7)	.307 (7.8)
09	9/32	.273 (6.9)	.281 (7.1)	.405 (1.3)
10	5/16	.300 (7.6)	.312 (7.9)	.440 (11.2)
12	3/8	.364 (9.2)	.375 (9.5)	.500 (12.7)
16	1/2	.485 (12.3)	.500 (12.7)	.630 (16.0)
20	5/8	.608 (15.4)	.625 (15.9)	.750 (19.1)
24	3/4	.730 (18.5)	.750 (19.1)	.890 (22.6)

Table I (continued)

Tubing Size	Fractional Size Ref	A Inside Dia Min	A Inside Dia Nom	B Dia Max
28	7/8	.855 (21.7)	.875 (22.2)	1.060 (26.9)
32	1	.980 (24.9)	1.000 (25.4)	1.195 (3.4)
40	1 1/4	1.220 (31.0)	1.250 (31.8)	1.500 (38.1)
48	1 1/2	1.480 (37.6)	1.500 (38.1)	1.780 (45.2)
56*	1 3/4	1.735 (44.1)	1.750 (44.5)	2.020 (51.3)
64*	2	1.980 (5.3)	2.000 (5.8)	2.280 (57.9)

Packaging / Notes
- Unless otherwise specified, Conduit will be shipped per standard package. Length to be as follows: 3/16 to 3/4 I.D.; 80 ft. min. 1 to 2 I.D.; 40 ft. min.

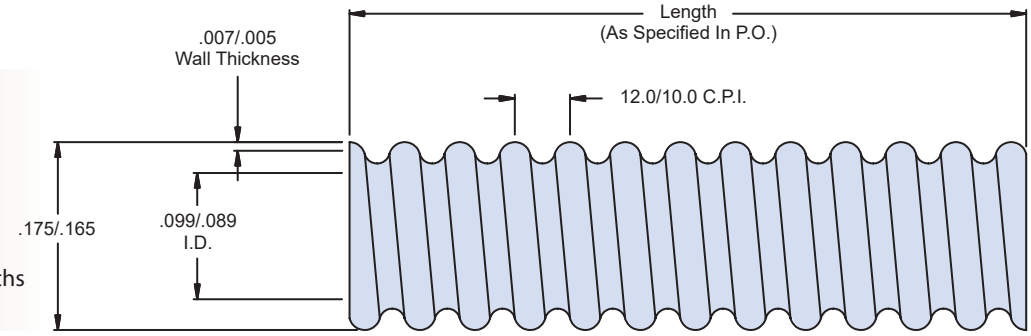
* Consult factory for availability

Special purpose, ultra-small diameter, low-smoke, zero-halogen tubing with outstanding crush resistance for fiber optic applications (one size only)

How To Order

Product Series	Basic No.		
120	- 132	B	

B = PEEK/Color Black
P = PEEK/Color Purple
R = PEEK/Color Red
(Omit for Natural)



Packaging / Notes
- Unless otherwise specified, Conduit will be shipped per standard package. Minimum length supplied will be 10 feet (3 m), with a maximum length of four lengths per package.

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Fiber Optic Termination, Inspection and Trouble-Shooting Equipment

The best fiber optic tooling in the industry—from bench tools to field kits. One-stop-shopping for fiber optic termination, inspection and trouble-shooting tools.

Product No.	Description	Page No.
Fiber Optic Preparation and Termination Equipment		
187-017 • 187-018	MIL-PRF-29504 /4 and /5 and GFR Termination Kits	L-4
	Glenair Fiber Optic Termination, Testing, Cleaning and Inspection Kits	L-4
	Polishing Pucks	L-5
	Terminus and Alignment Sleeve Insertion and Extraction Tools	L-8 – L-9
	Terminus Insertion and Extraction Tools and Crimping Tool	L-10 – L-11
Fiber Optic Inspection and Test Equipment		
GTK1000	Front Release Testing Kit	L-12
ABC 54705	Fiber Optic Test Probe	L-14
182-002	Polishing Tool for test probes	L-14
180-049/180-050/ 180-053	M29504 Feedthrough Probe Connectors	L-15
180-044	Plug and Receptacle Test Adapters, MIL-DTL-38999 Series III	L-16
180-072	Plug and Receptacle Test Adapters, MIL-DTL-38999 Series I	L-20
180-073	Plug and Receptacle Test Adapters, MIL-DTL-38999 Series III	L-24
180-102 (06)	Fiber Optic Probe Adapter, Plug	L-28
180-102 (07)	Fiber Optic Probe Adapter, Receptacle	L-29
FO1006	Patch Cord - Simplex	L-30
FO1007	Patch Cord - Duplex	L-31
Fiber Optic Cleaning and Troubleshooting Equipment		
GBS1000/GBS1001	Portable Video Bore Scope Inspection System	L-34
GCLT	Dry Action Cleaning Tools	L-36
187-021/187-024/ 187-045	Fiber Optic Cleaning Swabs	L-37
General-Purpose Tools		
600-058/600-061	Band-Master™ ATS Termination System Banding Tools	L-38
600-052/600-057 600-083/600-090	Band-Master™ ATS Termination System Bands	L-39

We are experts at building made-to-order termination, test and cleaning kits. This chapter presents just our core capabilities. Consult our website or call the factory for made-to-order toolkits, training and process documentation.

L

Catalog Notes

Metric dimensions appear in parentheses in diagrams and tables, based on 1 inch = 25.4 mm, for reference only. Unless otherwise specified, the following other dimensional tolerances apply:

.xx = ± .03 (0.8) • .xxx = ± .015 (0.4) • Angles = ± 5°

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U.S. CAGE Code 06324

Printed in U.S.A.

Fiber Optic Cable Preparation and Termination

Fiber optic cable preparation and termination instructions

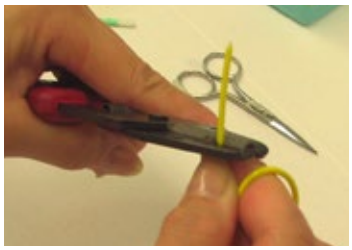
The Right Fiber Optic Tool for the Job

Fiber optic connectors are designed to be connected and disconnected many times without affecting the optical performance of the fiber circuit. Optimal performance can be achieved by following the correct process for termination of the fiber circuit—a task which requires the use of a wide range of specialized tooling. Glenair's extensive experience in building fiber optic interconnect cables has enabled us to select the right tools for each step in the termination and assembly process. Our Fiber Optic Termination and Test Probe Kits allow field technicians the convenience of completing final termination of precision termini on location for easy and efficient cable routing and installation. Each kit contains pin and socket polishing tools, jacket strippers, shears, scribes—literally all the tools and supplies required for ongoing termination and test of fiber optic systems. Polishing tools are also sold separately for factory use or as replacement parts in field termination kits.

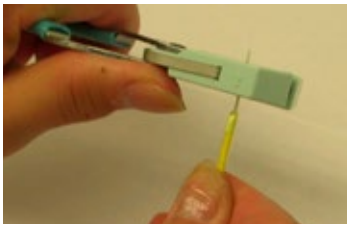
Glenair Fiber Optic Toolkits contains all of the tools you will need for fiber optic termination, plus a laminated card with termination instructions.

Typical Fiber Preparation

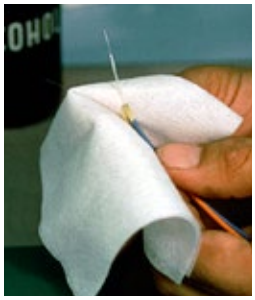
1. Measure and mark cable to desired length
2. Place jacket stripper on mark and squeeze gently until cutter closes



3. Using the tool, gently pull the cut section of jacketing off the cable
4. Mark Kevlar at specified length
5. Cut away excess Kevlar at measured mark with scissors
6. Slide clear heat shrink sleeve over buffer, using it to fold Kevlar back over cable jacket
7. After measuring, place buffer stripper on buffer jacket and squeeze gently until cutter closes



8. Strip buffer in several incremental steps to avoid damaging fiber
9. Clean fiber thoroughly using a lint-free, alcohol-soaked tissue



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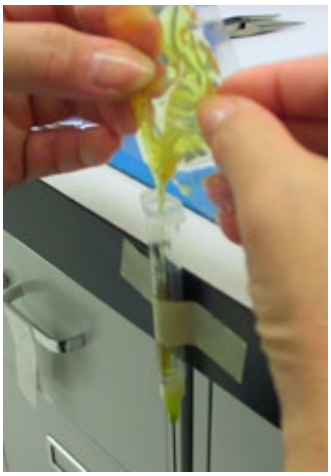
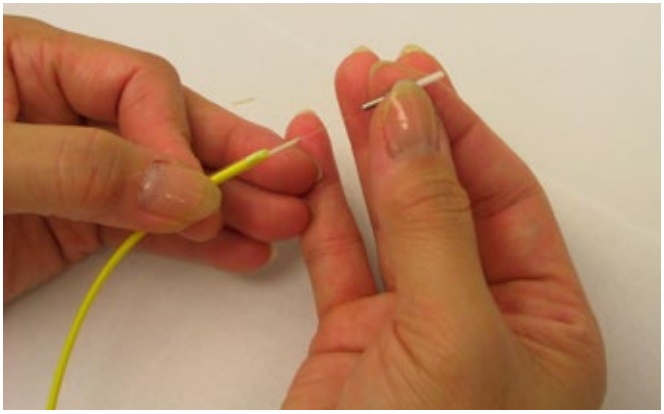
www.glenair.com L-2 E-Mail: sales@glenair.com

Typical Fiber Optic Cable Termination

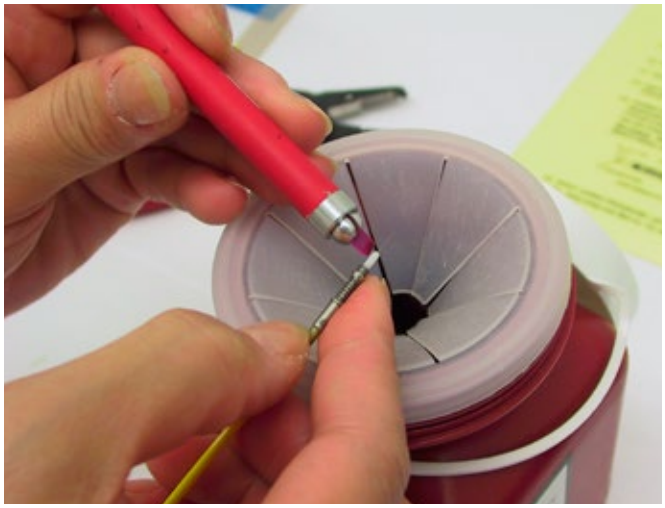
1. Remove the separating clip and mix the epoxy thoroughly.
2. Remove syringe plunger and install needle tip
3. Cut open bi-pack and squeeze epoxy into applicator
4. Install plunger into filled applicator and remove air from needle
5. Slowly inject epoxy thru applicator until epoxy appears at the ceramic tip



6. Using a twisting motion, gently insert fiber into the terminus until it bottoms



7. Gently slide clear sleeve over the Kevlar, evenly distributing the Kevlar over the rear body
8. Using a heat gun, shrink the sleeve over Kevlar, securing the cable to the contact assembly
9. Clean any excess epoxy from the rear body with alcohol soaked swab
10. Add a small bead of epoxy to the ferrule transition
11. Heat cure epoxy to appropriate cure temperature and clean with alcohol
12. Cleave excess fiber from termini end



Glenair: The Fiber Optic Experts

With our depth of experience engineering fiber optic interconnect solutions, Glenair has developed all of the tools you will need for accurate fiber optic cable preparation and termination.

Visit our website at www.glenair.com or our youtube channel at www.youtube.com/user/GlenairInc for complete, easy-to-follow instruction videos for every facet of fiber optic preparation, termination, cleaning and testing.

We are experts at building made-to-order termination, test and cleaning kits. This chapter presents just our core capabilities. Consult our website or call the factory for made-to-order toolkits, training and process documentation.

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Glenair Fiber Optic Kits for Termination, Inspection, Cleaning and Testing

187-017 for 181-001 & 181-002 (MIL-PRF-29504/4 and /5) Termini
187-018 for GFR 181-011 & 181-012 Termini

Fiber optic termination kit for field termination and repair of optical interconnects

- **Turn-Key Termination of MIL-PRF-29504/4 and /5 Fiber Termini or Glenair Front Release (GFR) 181-011 & 181-012 Termini**
- **Singlemode or Multimode**
- **110 Volt or 220 Volt**
- **Complete Kit With All Tools, Instruments and Consumables**
  - Power Meter
  - LED Source
  - 200X Microscope
  - Polishing Media
  - Curing Oven
  - Hand Tools
  - Epoxies, Wipes and Swabs

Our termination kit allows field technicians the convenience of on-site optical fiber termination. Each kit contains jacket strippers, polishing tools, hand tools, light source, power meter and microscope as well as a full complement of consumables including epoxy, polishing media, swabs and adhesives.

How To Order

Product Series		Voltage	
187	- 017	- 110	- MM

Basic No.
017 = *for use with MIL-PRF-29504/4 & /5 (181-001 & 181-002) termini*
018 = *for use with GFR 181-011 & 181-012 termini*

MM = **Multimode**
SM = **Singlemode**

Glenair: Your source for fiber optic kits

Glenair offers a full range of kits for fiber optic interconnect systems. Kits include components for all aspects of fiber optic system management including:

- **Termination**
- **Inspection**
- **Cleaning**
- **Testing**

Kits can be configured to your specifications with components designed for your specific fiber optic interconnect system. Contact the factory for details.

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Fiber optic Inspection and testing instructions

Patented optical test and measurement system

Traditional optical test harnesses are expensive and easily contaminated in normal use. Glenair's test probe, in conjunction with our precise-mating test adapter, offers a complete solution to optical test and measurement. The probe design offers precision alignment with the use of ceramic ferrules and alignment sleeves. The test probe system is designed to simulate the terminus endface mating pressure inherent to the specific connection system. The built-in insertion and removal tool on the test probe allows for quick probing from one channel to the next with repeatable performance. The probe also consists of a rubber strain-relief boot to protect the optical fiber from potential bend stress.

Specified by advanced military aircraft programs

The Glenair fiber optic test probe system has become a standard tool for the field testing of fiber optic media in front-line fighter jets and other advanced aircraft. With the upgrading of so many avionic systems to fiber optics, the need for fast and efficient troubleshooting equipment has become paramount. The traditionally heavy and expensive test harnesses of the past are now being replaced with Glenair's lightweight and easy-to-use fiber optic test probes and adapters.

Troubleshooting a shell size 25 MIL-DTL-38999 Series III Connector previously required an expensive test harness with 29 fiber optic terminations. Today, this test assembly has been replaced by Glenair with a single probe jumper and a re-usable connector adapter. The system is now being used in advanced military aircraft programs as well as in naval weapons systems, sonar, video, audio, and a wide range of other military and commercial applications.

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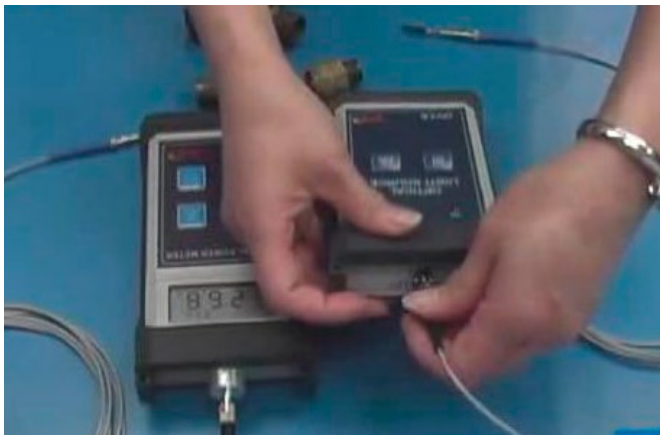
1. Attach test probe jumpers to light source and power meter



2. Insert probes into connector adapters
3. Mate connector adapters together and 'zero' power meter

4. Connect the jumper (link) to be tested to the zeroed assembly.

5. With the link in place, a new power reading may be taken

Glenair fiber optic inspection and testing video instruction

For more information on Glenair's patented Fiber Optic Test Probe and Connector Adapter System and complete video instruction, please visit our website at www.glenair.com or our youtube channel at www.youtube.com/user/GlenairInc.

We are experts at building made-to-order termination, test and cleaning kits. This chapter presents just our core capabilities. Consult our website or call the factory for made-to-order toolkits, training and process documentation.

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Insertion/extraction tool for size 16 M29504 04/05 rear-release fiber optic termini and size 16 Mighty Mouse termini

Part Number	Compatible Termini	
809-131	181-001	M29504/04 Socket
	181-002	M29504/04 Pin
	181-035	Large Core #16 Socket Terminus
	181-036	Large Core #16 Pin Terminus
	181-057	Mighty Mouse #16 Pin Terminus
	181-075	Mighty Mouse #16 Socket Terminus

Insertion/extraction tool for size 20 rear-release fiber optic termini

Part Number	Compatible Termini	
809-207	181-065	Size 20 Pin Terminus
	181-066	Size 20 Socket Terminus

Alignment sleeve insertion tool for D38999 type fiber optic jewel socket terminus

Part Number	Compatible Termini	
182-031	181-053	D38999 type fiber optic jewel socket terminus

Alignment sleeve extraction tool for D38999 type fiber optic jewel socket terminus

Part Number	Compatible Termini	
182-032	181-053	D38999 type fiber optic jewel socket terminus

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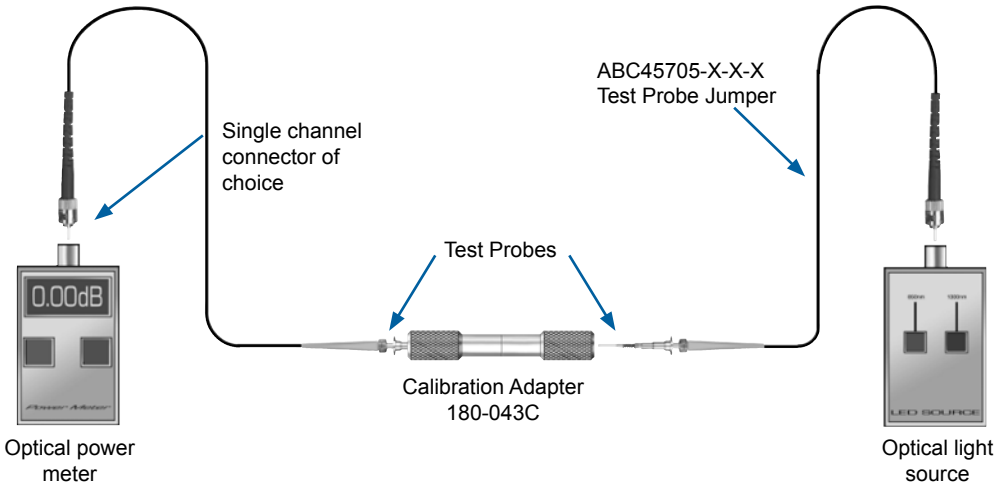
Effective use of Glenair fiber optic test equipment

Step 1: "Zeroing-out" optical power meter and light source

The first step in using the optical test probes is to install each end of the probe cable assembly to the optical power meter and light source. Next, insert each probe into the calibration adapter.

The test probe loss can now be recorded as a reference measurement or may be "zeroed-out."

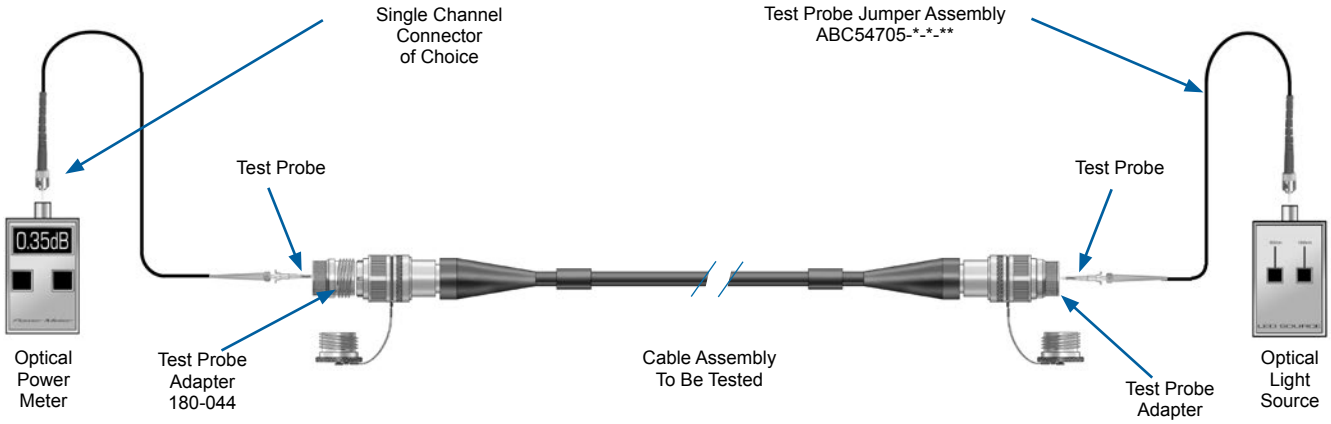


Step 2: Performing optical measurement

Now you are ready to perform optical measurements on the fiber optic cable harness. First, select the proper Glenair D38999 Series III Probe Adapter.

Now, mate or couple the adapters to each end of the cable harness. Next, insert each probe in the appropriate channel to be tested by pushing on the knurled area on the test probes. Read and record the optical performance.

To measure the next channel, remove the test probe by pushing on the large diameter of the test probe. The probe can now be removed and inserted into the next channel. Re-establishing or verification of reference can be performed at any time by following Step 1.



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ABC 54705
Replacement Fiber Optic Test Probe Jumper
Simplex

Fiber optic test probe for fast and easy optical analysis of installed fiber optic systems

Table I: Fiber Size	
Symbol	Size
A	100/140 µm
B	62.5/125 µm
C	50/125 µm
D	200/230 µm
E	Singlemode 9.3/125
F	Customer Defined
G	SM 5.8/125 M/F DIA. .21na
H	SM 7.5/125 M/F DIA. .17na

How To Order

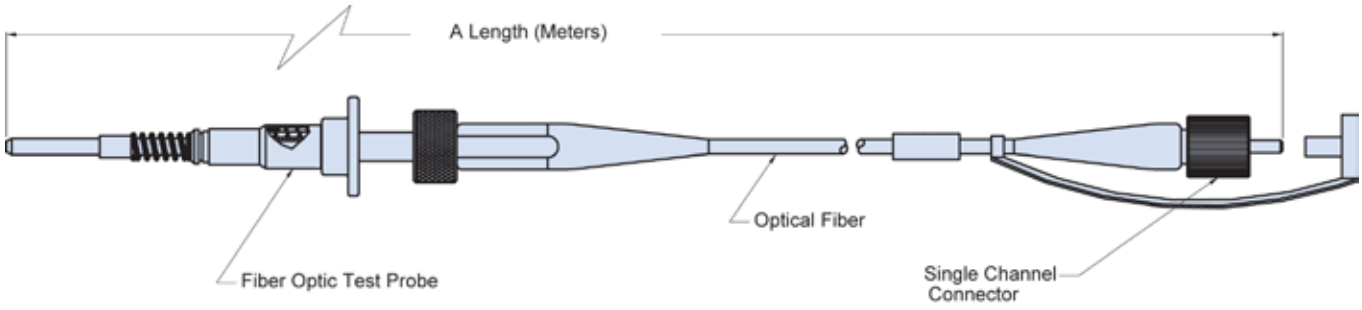
Basic No.	Fiber Size (Table I)	"A" Length (in meters)		
ABC 54705	- A	- A	- 3	C

Connector Type:
A = ST Connector
B = FC Connector
C = SC Connector
D = FC/APC Connector
E = Customer Defined
F = LC Connector
G = SC/APC Connector
H = M29504/04 Pin
J = M29504/05 Socket

F = Flat Polish
C = Concave Polish
(Probe end only. Omit for standard "PC" physical contact polish)

Optical insertion loss ≤ 1.0 dB @ 850 or 1300 nm wavelength. Glenair Fiber Optic Test Probe U.S. Patent Number 5,960,137.

Standard Tolerance	
Length	Tolerance
5 in, up to 2 ft	+1/-0 in
Over 2 ft, up to 10 ft	+3/-0 in
Over 10 ft, up to 50 ft	+6/-0 in
Over 50 ft, up to 100 ft	+1/-0 ft
Over 100 ft	+2/-0 ft



Fiber optic polishing tool for fiber optic test probes

How To Order

Product Series		W= Wet Polish Supplied with V-Grooves (Omit for Dry Polish)
182	- 002	W
	Basic No.	

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Feedthrough probe connectors for MIL-DTL-38999 (MIL-PRF-29504/4 and /5 termini) fiber optic connection system

U.S. PATENT 5,960,137

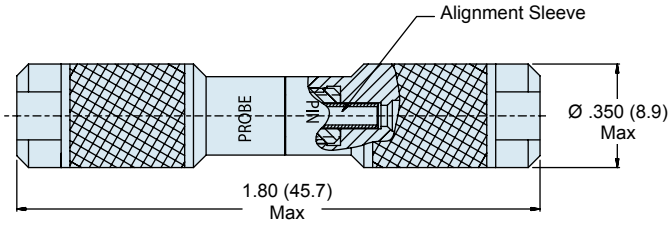
Product Series

180 - 049 C

Finish Symbol
C = Black Anodize
M = Electroless Nickel

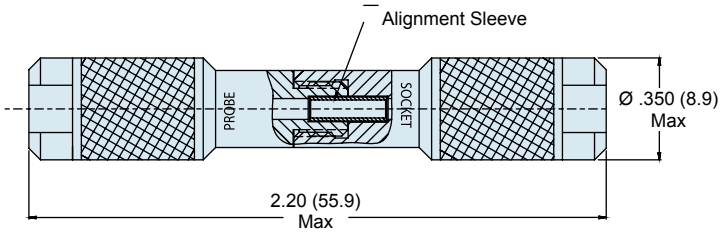
049 *= Probe-to-Pin connector*
050 *= Probe-to-Socket connector*
043 *= Probe-to-Probe connector*

-049 Probe-to-Pin Connector



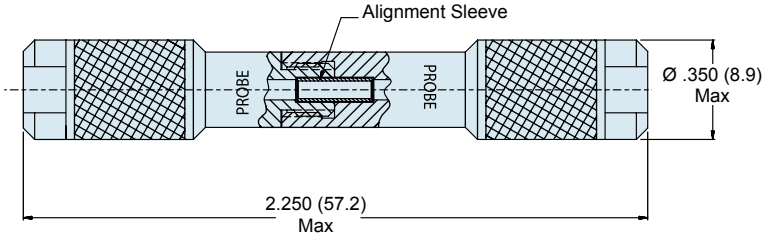
Pin Side Accepts
181-002 and M29504/04 Termini

-050 Probe-to-Socket Connector



Socket Side Accepts
181-001 and M29504/05 Termini

-043 Probe-to-Probe Connector



Material and Finish

Housing: Aluminum Alloy/see Part Number Development
Alignment Sleeve: Zirconia Ceramic
Retaining Clips: Copper Alloy

L

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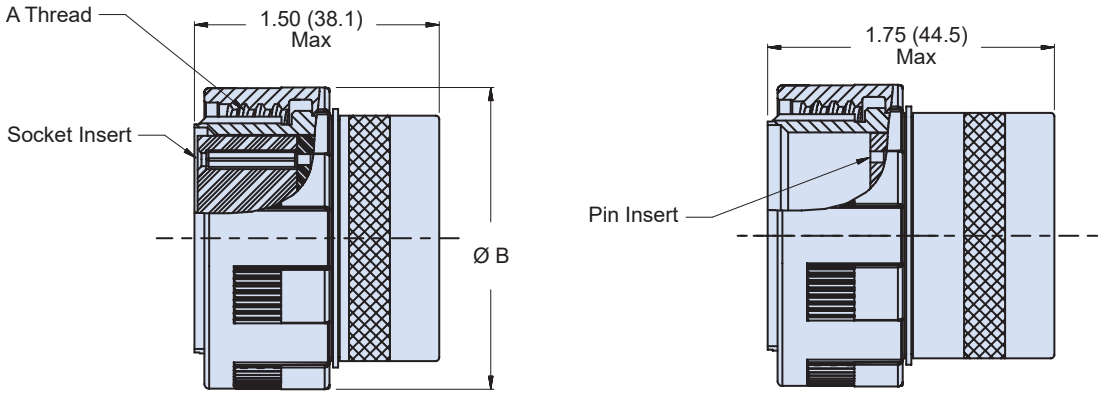
180-044 (06)
Fiber Optic Test Adapter, Plug
MIL-DTL-38999 Series III

MIL-DTL-38999 test adapter (plug)

How To Order

Product Series	Material/ Finish (Table II)	Shell Size (Table I)	Insert Type		Alternate Keying Position
			P = Pin		N, A, B, C, D & E Per MIL-DTL-38999, Series III
			S = Socket		Omit to receive universal single key (master) only. This option not recommended for larger shell sizes (19-25)
180 -	044	M	06 -	17 - 8	P	A
	Basic No.	06 = Plug Adapter		Insert Arrangement Per MIL-STD-1560 (Table I)		



06 Plug Adapter
U.S. PATENT NO. 5,960,137

Material and Finish

Barrel: See Table II
Insert, Coupling Nut: Hi-Grade Engineering Thermoplastic
Alignment Sleeve: Zirconia Ceramic
Retaining Ring: Stainless Steel
Retaining Clips: Copper Alloy
Lock Cap, Lock Nut: Al Alloy/Anodize

Notes

For fiber optic test probe (standard) jumper, see Glenair drawing ABC54705
For fiber optic test probe (low profile, probe-to-probe) jumper, see Glenair drawing FO01757.
Suggested for 25-37 insert arrangement.

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Table I: Shell Size and Insert Arrangements				
Shell Size	Shell Size Code (Ref)	Shell Size & Insert Arrangement	A Thread 0.1P-0.3L-TS-2	Ø B Max
11	B	11-2	.750 (19.1)	.984 (25.0)
13	C	13-4	.875 (22.2)	1.157 (29.4)
15	D	15-5	1.000 (25.4)	1.279 (32.5)
15	D	15-97	1.000 (25.4)	1.279 (32.5)
17	E	17-8	1.187 (30.1)	1.406 (35.7)
19	F	19-11	1.250 (31.8)	1.516 (38.5)
21	G	21-16	1.375 (34.9)	1.642 (41.7))
23	H	23-21	1.500 (38.1)	1.768 (44.9)
23	H	23-99	1.500 (38.1)	1.768 (44.9)
25	J	25-20	1.625 (41.3)	1.889 (48.0)
25	J	25-29	1.625 (41.3)	1.889 (48.0)
25	J	25-37	1.625 (41.3)	1.889 (48.0)
25	J	25-43	1.625 (41.3)	1.889 (48.0)

Table II: Material and Finish		
Code	Material	Finish
M	Aluminum Alloy	Electroless Nickel
NF		Cadmium/Olive Drab

L

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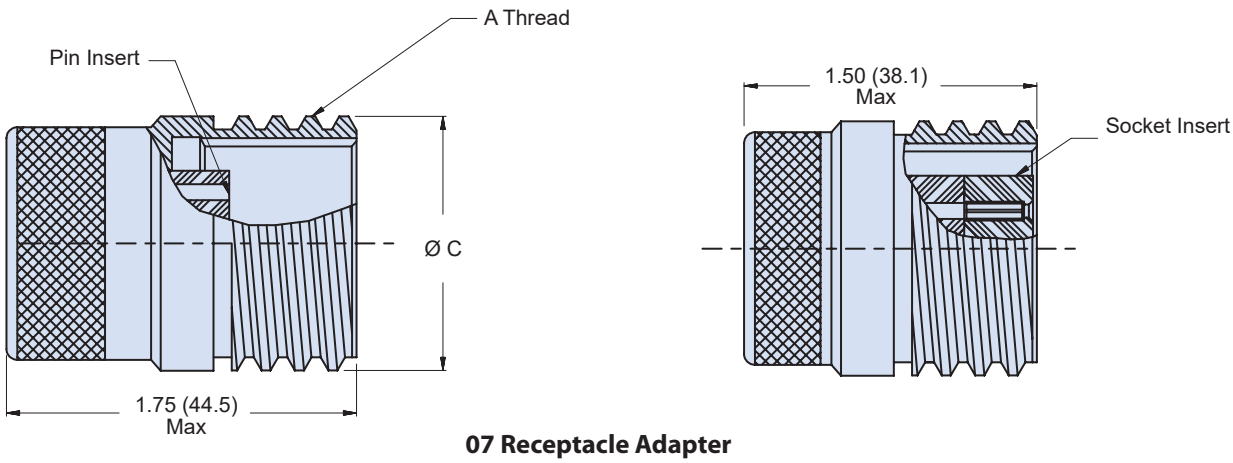
180-044 (07)
Fiber Optic Test Adapter, Receptacle
MIL-DTL-38999 Series III

MIL-DTL-38999 test adapter (receptacle)

How To Order

Product Series	Material/ Finish (Table II)	Shell Size (Table I)	Insert Type		Alternate Keying Position
180 -	044	M	07 -	17 - 8	S	A

- **Basic No.**
- **07** = Receptacle Adapter
- **Insert Arrangement** Per MIL-STD-1560 *(Table I)*
- **Insert Type** *P* = Pin, *S* = Socket
- **Alternate Keying Position** *A, B, C, D, & E Per MIL-DTL-38999, Series III*. *Omit to receive N normal key position (No universal key option available)*



07 Receptacle Adapter
U.S. PATENT NO. 5,960,137

Material and Finish
Shell: See Table II
Insert: Hi-Grade Engineering Thermoplastic
Alignment Sleeve: Zirconia Ceramic
Retaining Clips: Copper Alloy
Lock Cap, Lock Nut: Al Alloy/Anodize

Notes
For fiber optic test probe (standard) jumper, see Glenair drawing ABC54705
For fiber optic test probe (low profile, probe-to-probe) jumper, see Glenair drawing FO03187.
Suggested for 25-37 insert arrangement.

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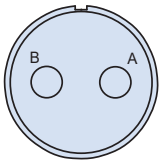
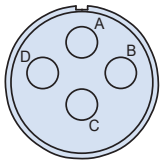
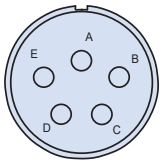
Insert Arrangements: Socket Rear Insert Shown

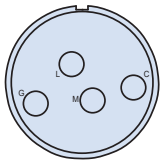


-2
Shell Size 11

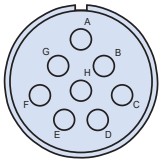


-4
Shell Size 13

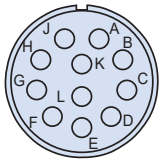




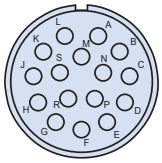
-5 -97
Shell Size 15



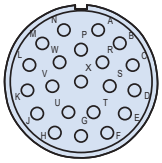
-8
Shell Size 17

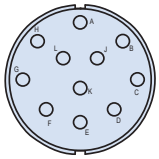


-11
Shell Size 19

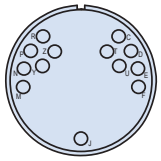


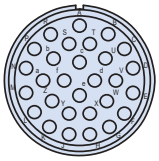
-16
Shell Size 21

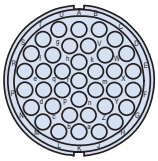


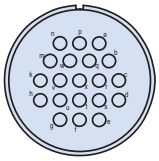


-21 -99
Shell Size 23









-20 -29 -37 -43
Shell Size 25

Table I: Shell Size and Insert Arrangements				
Shell Size	Shell Size Code (Ref)	Shell Size & Insert Arrangement	A Thread 0.1P-0.3L-TS-2	Ø C Max
11	B	11-2	.750 (19.1)	.750 (19.1)
13	C	13-4	.875 (22.2)	.875 (22.2)
15	D	15-5	1.000 (25.4)	1.000 (25.4)
15	D	15-97	1.000 (25.4)	1.000 (25.4)
17	E	17-8	1.187 (30.1)	1.188 (30.2)
19	F	19-11	1.250 (31.8)	1.250 (31.8)
21	G	21-16	1.375 (34.9)	1.375 (34.9)
23	H	23-21	1.500 (38.1)	1.500 (38.1)
23	H	23-99	1.500 (38.1)	1.500 (38.1)
25	J	25-20	1.625 (41.3)	1.625 (41.3)
25	J	25-29	1.625 (41.3)	1.625 (41.3)
25	J	25-37	1.625 (41.3)	1.625 (41.3)
25	J	25-43	1.625 (41.3)	1.625 (41.3)

Table II: Material and Finish		
Code	Material	Finish
M	Aluminum Alloy	Electroless Nickel
NF		Cadmium/Olive Drab

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180-072 (06)
Fiber Optic Test Adapter, Receptacle
MIL-DTL-38999 Series I

MIL-DTL-38999 test adapter (plug)

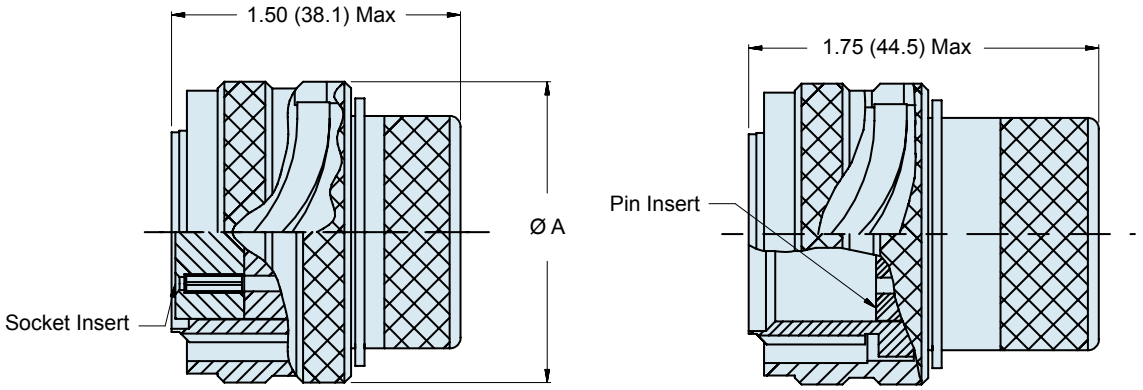
How To Order

Product Series	Material/ Finish (Table II)	Shell Size (Table I)	Insert Type		Alternate Key Position
180 - 072	NF	06 - 17 - 8	P	A	Per MIL-DTL-38999, Series I (Omit for normal)

Basic No.

06 = Plug Adapter

Insert Arrangement *Per MIL-STD-1560 (Table I)*



06 Plug Adapter
U.S. PATENT NO. 5,960,137

Material and Finish

Barrel: See Table II
Insert, Coupling Nut: Hi-Grade Engineering Thermoplastic
Alignment Sleeve: Zirconia Ceramic
Misc. Hardware: Stainless Steel
Retaining Clips: Copper Alloy
Lock Cap, Lock Nut: Al Alloy/Anodize

Notes

For fiber optic test probe jumper, see Glenair drawing ABC54705

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Table I: Shell Size and Insert Arrangements		
Shell Size & Insert Arrangement	Shell Size Code Ref.	Ø A Max
11-2	B	.964 (24.5)
13-4	C	1.141 (29.0)
15-5	D	1.266 (32.2)
15-97	D	1.266 (32.2)
17-8	E	1.391 (35.3
19-11	F	1.500 (38.8)
21-16	G	1.625 (41.3)
23-21	H	1.750 (44.5)
23-99	H	1.750 (44.5)
25-20	J	1.875 (47.6)
25-29	J	1.875 (47.6)
25-37A	J	1.875 (47.6)
25-37B	J	1.875 (47.6)

Table II: Material and Finish		
Code	Material	Finish
M	Aluminum Alloy	Electroless Nickel
NF		Cadmium/Olive Drab

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180-072 (07)
Fiber Optic Test Adapter, Receptacle
MIL-DTL-38999 Series I

MIL-DTL-38999 test adapter (receptacle)

How To Order

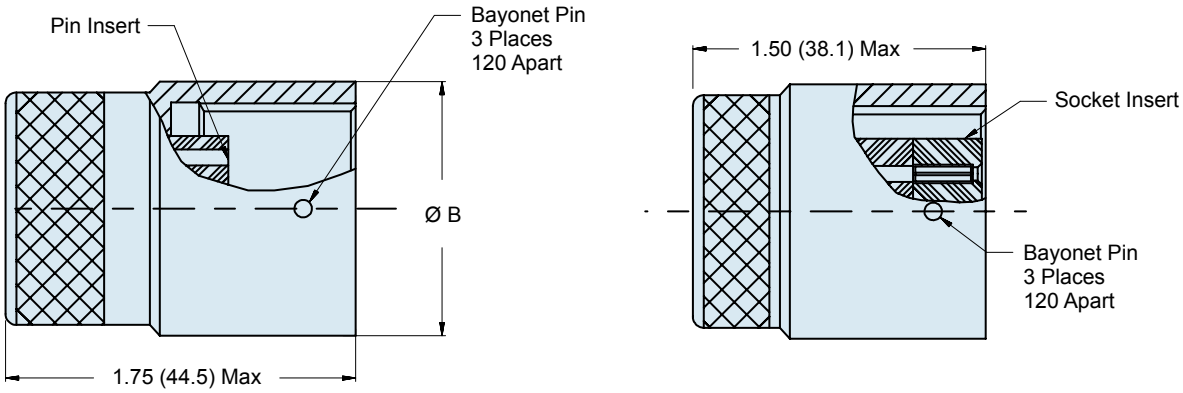
Product Series	Material/ Finish (Table II)	Shell Size (Table I)	Insert Type		Alternate Key Position
180 - 072	NF	07 - 17 - 8	P	A	Per MIL-DTL-38999, Series I (Omit for normal)

Basic No. 072

06 = Plug Adapter

Insert Arrangement Per MIL-STD-1560 (Table I)

P = Pin
S = Socket (with alignment sleeves)



07 Receptacle Adapter
U.S. PATENT NO. 5,960,137

Material and Finish
Shell: See Table II
Insert: Hi-Grade Engineering Thermoplastic
Alignment Sleeve: Zirconia Ceramic
Retaining Clips: Copper Alloy
Lock Cap, Lock Nut: Al Alloy/Anodize

Notes
For fiber optic test probe jumper, see Glenair drawing ABC54705

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Table I: Shell Size and Insert Arrangements		
Shell Size & Insert Arrangement	Shell Size Code Ref.	Ø B Max
11-2	B	.750 (19.1)
13-4	C	.875 (22.2)
15-5	D	1.000 (25.4)
15-97	D	1.000 (25.4)
17-8	E	1.187 (30.1)
19-11	F	1.250 (31.8)
21-16	G	1.375 (34.9)
23-21	H	1.500 (38.1)
23-99	H	1.500 (38.1)
25-20	J	1.625 (41.3)
25-29	J	1.625 (41.3)
25-37A	J	1.625 (41.3)
25-37B	J	1.625 (41.3)

Table II: Material and Finish		
Code	Material	Finish
M	Aluminum Alloy	Electroless Nickel
NF		Cadmium/Olive Drab

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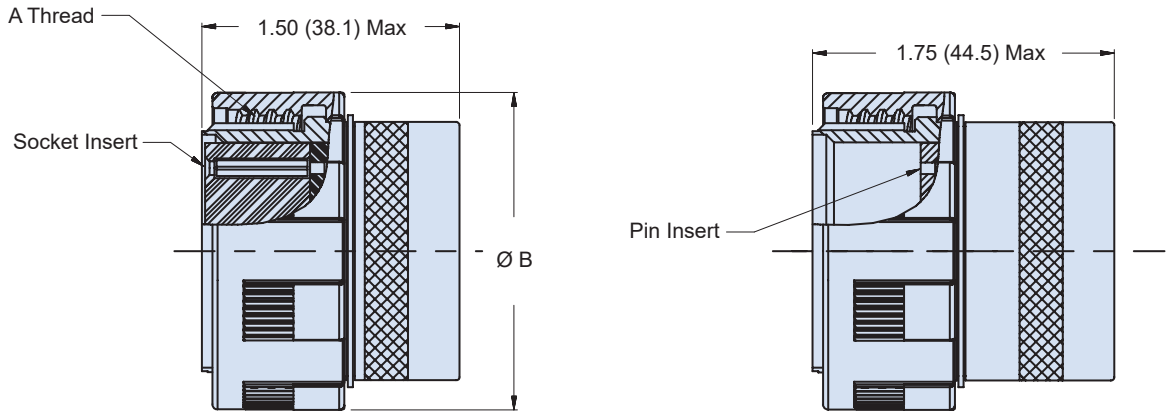
180-073 (06)
Fiber Optic Test Adapter, Plug
With Special Insert Arrangement MIL-DTL-38999 Series III

MIL-DTL-38999 test adapter (plug)

How To Order

Product Series		Material/ Finish (Table II)	Shell Size (Table I)		Insert Type	
180	- 073	M	06	- 25 - 24	P	A

- **Basic No.**
- **06** = Plug Adapter
- **Insert Arrangement** Per MIL STD-1560 *(Table I)*
- **Insert Type** — ***P*** = *Pin*; ***S*** = *Socket (with alignment sleeves*
- **Alternate Keying Positions** ***N***, ***A***, ***B***, ***C***, ***D*** & ***E*** — *Per MIL-DTL-38999,Series III Omit keying designator to receive universal single key (master) only. This option not recommended for larger shell sizes (19-25)*



06 Plug Adapter
U.S. PATENT NO. 5,960,137

Material and Finish

Barrel: See Table II
Insert, Coupling Nut: Hi-Grade Engineering Thermoplastic
Alignment Sleeve: Zirconia Ceramic
Misc. Hardware: Stainless Steel
Retaining Clips: Copper Alloy
Lock Nut: Al Alloy/Anodize

Notes

For fiber optic test probe jumper, see Glenair drawing ABC54705
For fiber optic test probe (low profile, probe-to-probe) jumper see Glenair drawing FO01757
25-37 insert cavity spacing too close to probe using one adapter. 2 adapters (25-37A and 25-37B) are required
Shell size 23 for insert 23-66 only is made of 300 series stainless steel
Cavity markings applied to rear insert face only

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180-073 (06)
Fiber Optic Test Adapter, Plug
With Special Insert Arrangement MIL-DTL-38999 Series III

FRONT FACE OF PIN AND SOCKET INSULATORS SHOWN, REAR SURFACE OPPOSITE

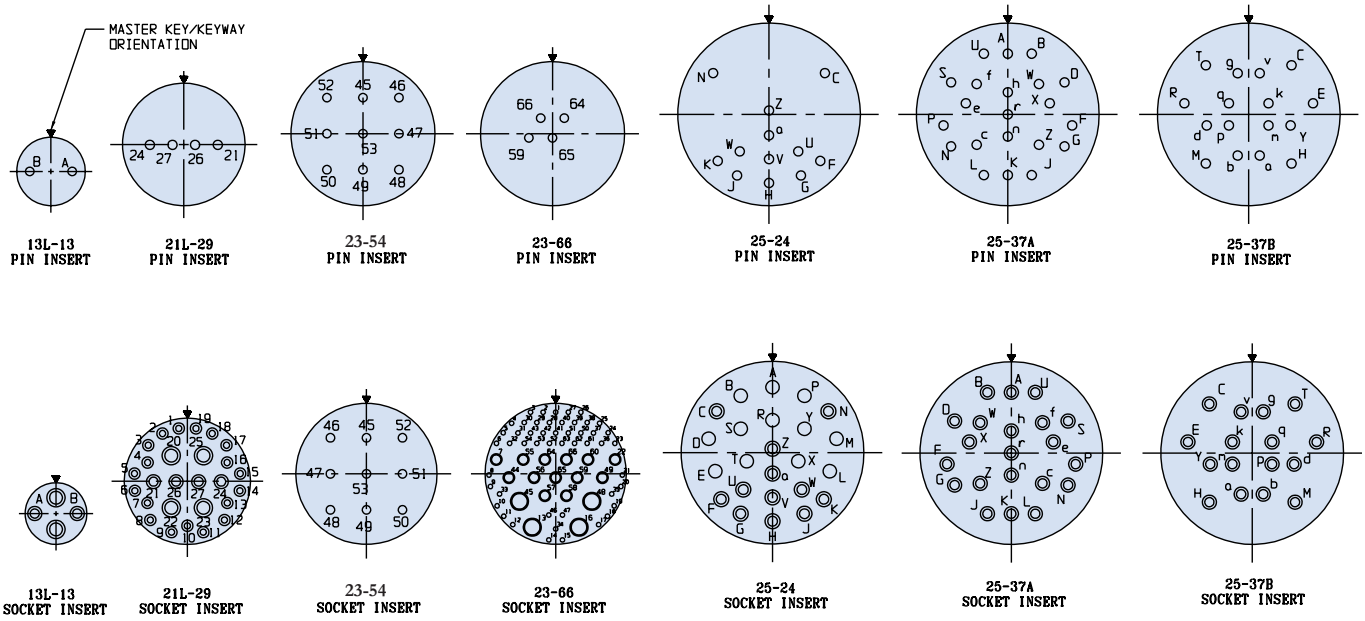

Table I: Shell Size and Insert Arrangements				
Shell Size	Shell Size Code (Ref)	Insert Arrangement Dash No.	A Thread 0.1P-0.3L-TS-2	Ø B Max
13	C	13L-13	.875 (22.2)	1.157 (29.4)
21	G	21L-29	1.375 (34.9)	1.642 (41.7)
23	H	23-54	1.500 (38.1)	1.768 (44.9)
23	H	23-66	1.500 (38.1)	1.768(44.9)
25	J	25-24	1.625 (41.3)	1.890 (48.0)
25	J	25-37A	1.625 (41.3)	1.890 (48.0)
25	J	25-37B	1.625 (41.3)	1.890 (48.0)

Table II: Finish		
Code	Material	Finish
M	Aluminum Alloy	Electroless Nickel
NF		Cadmium, Olive Drab
Z1	Stainless Steel	Passivate

L

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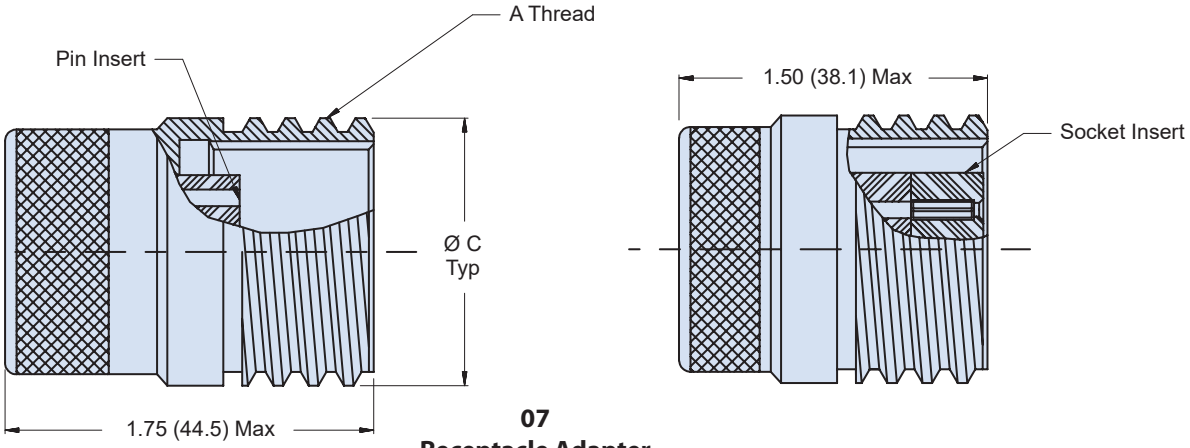
180-073 (07)
Fiber Optic Test Adapter, Receptacle
With Special Insert Arrangement MIL-DTL-38999 Series III

MIL-DTL-38999 test adapter (receptacle)

How To Order

Product Series	Material/ Finish (Table II)	Shell Size (Table I)	Insert Type				
180 -	073	M	07 -	25 -	24	P	A

- **Basic No.**: 073
- **06** = Plug Adapter
- **Insert Arrangement**: Per MIL STD-1560 (Table I)
- **Insert Type**: *P* = Pin; *S* = Socket (with alignment sleeves)
- **Alternate Keying Positions**: *N*, *A*, *B*, *C*, *D* & *E*. *Per MIL-DTL-38999, Series III Omit keying designator to receive universal single key (master) only. This option not recommended for larger shell sizes (19-25)*



07
Receptacle Adapter
U.S. PATENT NO. 5,960,137

Material and Finish

Shell: See Table II
Insert: Hi-Grade Engineering Thermoplastic
Alignment Sleeve: Zirconia Ceramic
Retaining Clips: Copper Alloy
Lock Nut: Al Alloy/Anodize

Notes

For fiber optic test probe jumper, see Glenair drawing ABC54705
For fiber optic test probe (low profile, probe-to-probe) jumper see Glenair drawing FO03187
25-37 insert cavity spacing too close to probe using one adapter. 2 adapters (25-37A and 25-37B) are required
Shell size 23 for insert 23-66 only is made of 300 series stainless steel
Cavity markings applied to rear insert face only

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180-073 (07)
Fiber Optic Test Adapter, Receptacle
With Special Insert Arrangement MIL-DTL-38999 Series III

FRONT FACE OF PIN AND SOCKET INSULATORS SHOWN, REAR SURFACE OPPOSITE

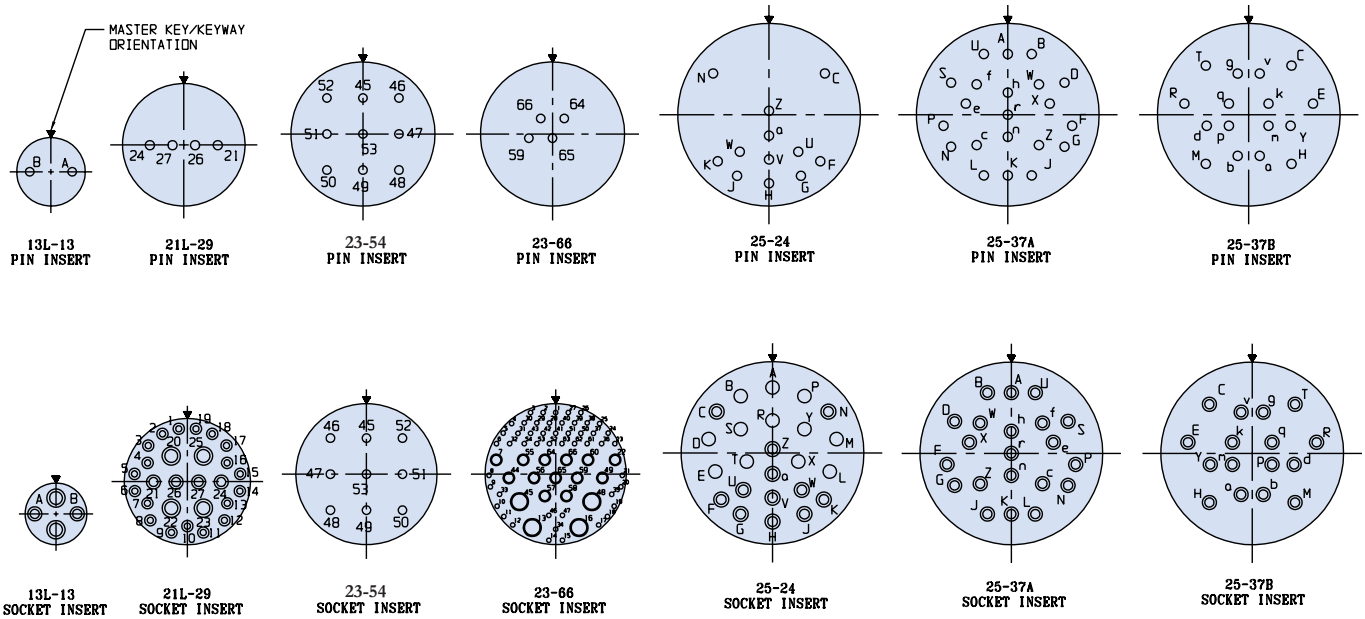

Table I: Shell Size and Insert Arrangements				
Shell Size	Shell Size Code (Ref)	Insert Arrangement Dash No.	A Thread 0.1P-0.3L-TS-2	Ø C Max
13	C	13L-13	.875 (22.2)	.875 (22.2)
21	G	21L-29	1.375 (34.9)	1.375 (34.9)
23	H	23-54	1.500 (38.1)	1.500 (38.1)
23	H	23-66	1.500 (38.1)	1.500 (38.1)
25	J	25-24	1.625 (41.3)	1.625 (41.3)
25	J	25-37A	1.625 (41.3)	1.625 (41.3)
25	J	25-37B	1.625 (41.3)	1.625 (41.3)

Table II: Finish		
Code	Material	Finish
M	Aluminum Alloy	Electroless Nickel
NF		Cadmium, Olive Drab
Z1	Stainless Steel	Passivate

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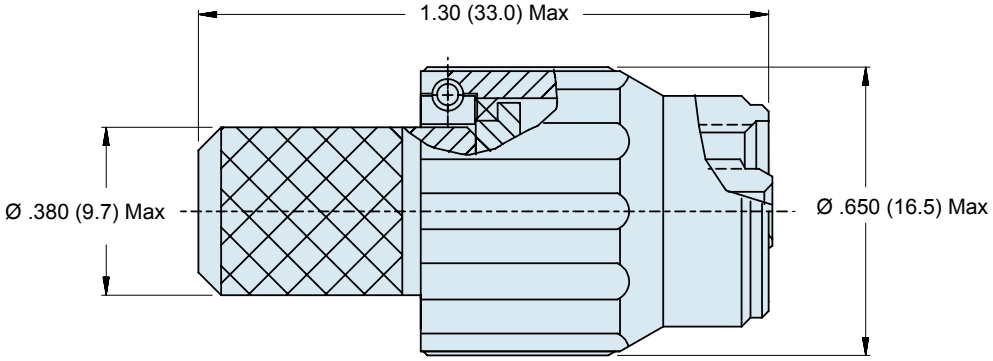
180-102 (06)
Fiber Optic Probe Adapter, Plug

Fiber optic plug probe adapter for use with 180-071 connectors

How To Order

Product Series		Material/Finish (Table I)	Alternate Key Position (1, 2, 3, 4, & 5)	
180	- 102	NF	06	- 1
	Basic No.		06 = Plug Adapter	



06 Plug Adapter
U.S. PATENT NO. 5,960,137

Table I: Finish		
Code	Material	Finish
C	Aluminum Alloy	Anodize, Black
M		Electroless Nickel
NF	Aluminum	Cadmium, Olive Drab

Material and Finish
Barrel, Coupling Nut, Rear body: See Table I
Retaining Clips: Copper Alloy
Misc. Hardware: Stainless Steel/Passivate
O-Ring: Fluorosilicone

Notes
For fiber optic test probe jumper, see Glenair drawing ABC54705

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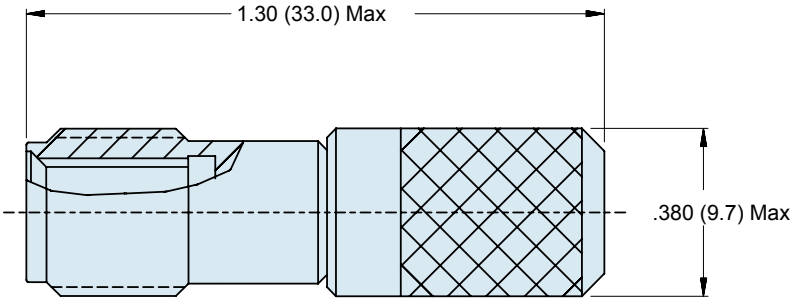
180-102 (07)
Fiber Optic Probe Adapter, Receptacle

Fiber optic receptacle probe adapter for use with 180-071 connectors

How To Order

Product Series		Material/Finish *(Table I)*	Alternate Key Position (1, 2, 3, 4, & 5)	
180	- 102	NF	07	- 1
Basic No.			07 = Receptacle Adapter	



07 Receptacle Adapter
U.S. PATENT NO. 5,960,137

Table I: Finish		
Code	Material	Finish
C	Aluminum Alloy	Anodize, Black
M		Electroless Nickel
NF	Aluminum	Cadmium, Olive Drab

Material and Finish
Shell, Rear body: See Table I
Retaining Clips: Copper Alloy
Misc. Hardware: Stainless Steel
Seal: Fluorosilicone

Notes
For fiber optic test probe jumper, see Glenair drawing ABC54705

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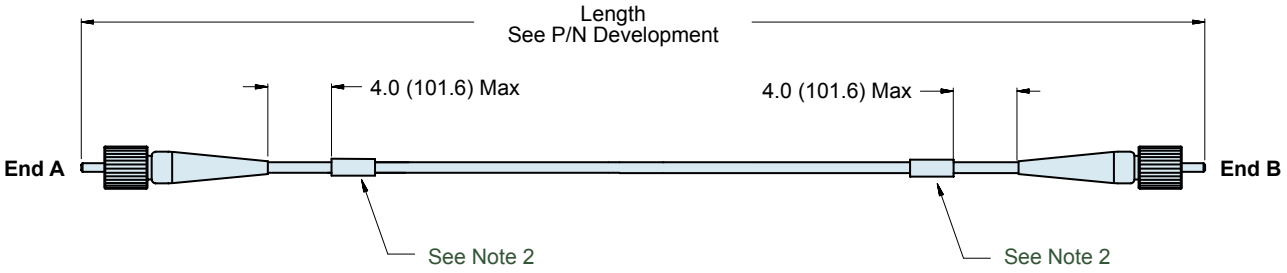
FO1006
Fiber Optic Patch Cord
Simplex



FO1006 - 1 - 1 - XXXX - 09 A

Basic Number

Connector/Terminus Type

End A

End B

0 – ST Connector, M83522/16 Style
1 – ST Connector
2 – FC Connector
3 – SC Connector
4 – Glenair Socket Terminus M29504/05 Style (181-001)
5 – Glenair Pin Terminus M29504/04 Style (181-002)
6 – SMA Connector (906)
7 – LC Connector
8 – SMA Connector (905)
9 – Customer Specified
10 – Glenair GHD Terminus (181-047)
11 – Glenair GFR Pin Terminus (181-012)
12 – Glenair GFR Socket Terminus (181-011)
13 – Glenair GHD Terminus, PC Only (181-056)
14 – Glenair Pin Terminus, M29504/14 Style (181-039)
15 – Glenair Socket Terminus, M29504/15 Style (181-040)

Temperature Rating
A – -40°C to +85°C
B – -55°C to +125°C
C – Customer Specified
(See Note 3)

Fiber Size
05 – 5.8/125 Singlemode
07 – 7.5/125 Singlemode
09 – 9.3/125 Singlemode
50 – 50/125 Multimode
62 – 62.5/125 Multimode
10 – 100/140 Multimode
20 – 200/230 Multimode
1K – 1000um Multimode
CS – Customer Specified Singlemode
CM – Customer Specified Multimode

Length (Inches)

Standard Tolerance	
Length	**Tolerance**
5 in to 2 ft.	+1 in -0
2 to 10 ft.	+3 in -0
10 to 50 ft.	+6 in -0
50 to 100 ft.	+1 ft -0
100 ft. and up	+2 ft -0

Application Notes

1. Optical performance: insertion loss to be less than 1.5 dB when measured at 850 nm wavelength for Multimode and 1310 nm wavelength for Singlemode.
2. Assy is marked with the Glenair PN in two places.
3. Temperature Rating:
   - "A" Temperature rating use TRA-BOND F113 Epoxy.
   - "B" Temperature rating use EPO-TEK 353ND Epoxy.
   - "C" Temperature rating as per customer specification.
4. Metric dimensions (mm) are indicated in parentheses.
5. For angle polish, add "A" to end of Connector/Terminus Type Number (otherwise omit). Type numbers, 4, 5, 6, 8, 11,12, 13, 14, and 15 do not allow angle polish.
6. For military qualified product, add "M" to end of Connector/Terminus Type number (otherwise omit). Type number 4, 5, 14, and 15 only.

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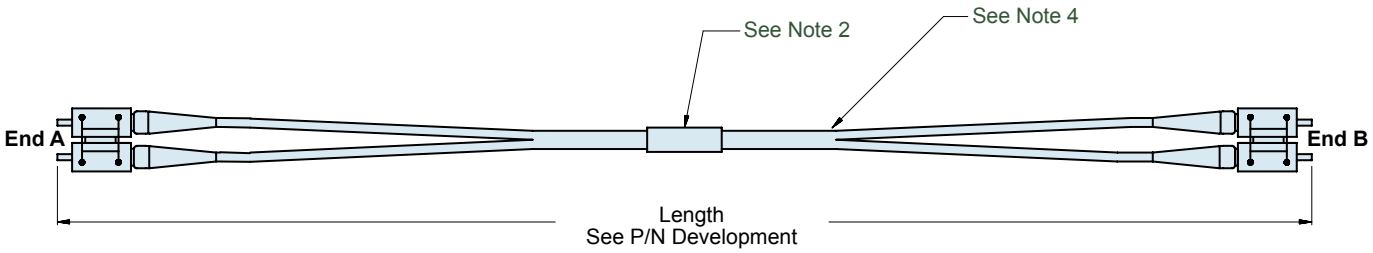
FO1007
Fiber Optic Patch Cord
Duplex



FO1007 - 1 - 1 - XXXX - 09 A X

Basic Number

Connector/Terminus Type (End A, End B)

0 = ST Connector, M83522/16 Style
1 = SC Connector
2 = LC Connector
3 = MT-RJ Male Connector
4 = MT-RJ Female Connector
5 = Glenair Pin Terminus M295040/4 Style (181-002)
6 = Glenair Socket Terminus M29504/05 Style (181-001)
7 = ST Connector
8 = FC Connector
9 = Customer Specified
10 = GHD Terminus, PC (181-047)
11 = Glenair GFR Pin Terminus (181-012)
12 = Glenair GFR Socket Terminus (181-011)
13 = Left Blank for Future Use
14 = Glenair Pin Terminus, M29504/14 Style (181-039)
15 = Glenair Socket Terminus, M29504/15 Style (181-040)

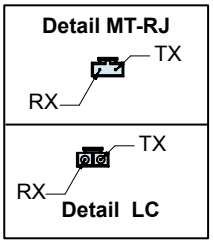
X = Cross Wired TX to RX and RX to TX (MTRJ Only; See Note 5)
Omit for Normal

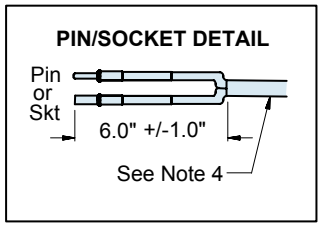
Temperature Rating
A = -40°C to +85°C
B = -55°C to +125°C
C = Customer Specified (See Note 3)

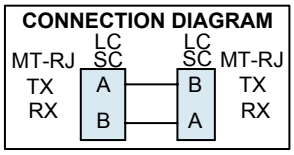
Fiber Size
05 = 5.8/125 Singlemode
07 = 7.5/125 Singlemode
09 = 9.3/125 Singlemode
50 = 50/125 Multimode
62 = 62.5/125 Multimode
10 = 100/140 Multimode
20 = 200/230 Multimode
1K = 1000um Multimode
CS = Customer Specified Singlemode
CM = Customer Specified Multimode

Length (Inches)

Standard Tolerance	
Length	**Tolerance**
5 in to 2 ft.	+1 in -0
2 to 10 ft.	+3 in -0
10 to 50 ft.	+6 in -0
50 to 100 ft.	+1 ft -0
100 ft. and up	+2 ft -0







Application Notes

1. Optical performance: insertion loss to be less than 1.5 dB when measured at 850 nm wavelength for Multimode and 1310 nm wavelength for Singlemode.
2. Assembly is marked with the Glenair P/N, located aprox. in the center.
3. "A" Temperature rating use TRA-BOND F113 Epoxy. "B" Temperature rating use EPO-TEK 353ND Epoxy. "C" Temperature rating as per customer specification.
4. When using simplex cable apply heat shrink as needed to combine both fibers leaving aprox. 6.0" on each end open.
5. MTRJ'S are connected per connections diagram unless cross wired is specified in P/N description.
6. Metric dimensions (mm) are indicated in parentheses.
7. For angle polish, add "A" to end of Connector/Terminus Type Number (otherwise omit).Type numbers, 4, 5, 11, 12, 14, and 15 do not allow angle polish.
8. For military qualified product, add "M" to end of Connector/ Terminus Type number (otherwise omit). Type number 4, 5, 14, and 15 only.

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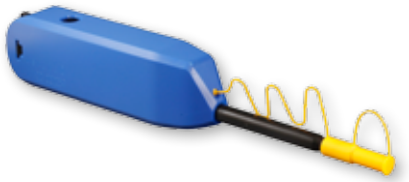
Fiber Optic Cleaning and Troubleshooting

Cleaning and troubleshooting instructions for critical fiber optic systems

Dirty termini can seriously degrade the performance of any fiber optic system. Glenair stocks a full range of cleaning tools and supplies, plus a portable video bore scope inspection kit that contains a miniature inspection camera, hand-held video monitor, termini adapters and cleaning swabs. Designed for use with Glenair test probe adapters, the special adapter tip accurately aligns the inspection camera for optimum viewing. This video inspection system is intended for initial inspection and cleaning of D38999 multi-channel fiber assemblies prior to inserting Glenair test probes for optical measurement.

Glenair Dry Action Cleaning Tools are easy-to-handle fiber optic terminus cleaning devices, highly effective at removing oil and dust contamination from pin and socket termini—either inside or outside connector shells. Traditional wet-swab cleaning methods add drying time and can even introduce new contaminants to the polished terminus endface. The Dry Action Cleaning Tool's novel dry cleaning strand gently sweeps and lifts away dust and residue from the terminus end-face without the problems associated with wet swab methods. The tool features a convenient single-unit configuration and an extendable tip for easy access to installed fiber optic termini—saving time and avoiding potential additional contamination.



Glenair Terminus Cleaning

Visit our website at www.glenair.com or our youtube channel at www.youtube.com/user/GlenairInc to see complete, easy to follow step-by-step video instructions to help you clean your fiber optic termini.

We are experts at building made-to-order termination, test and cleaning kits. This chapter presents just our core capabilities.
Consult our website or call the factory for made-to-order toolkits, training and process documentation.

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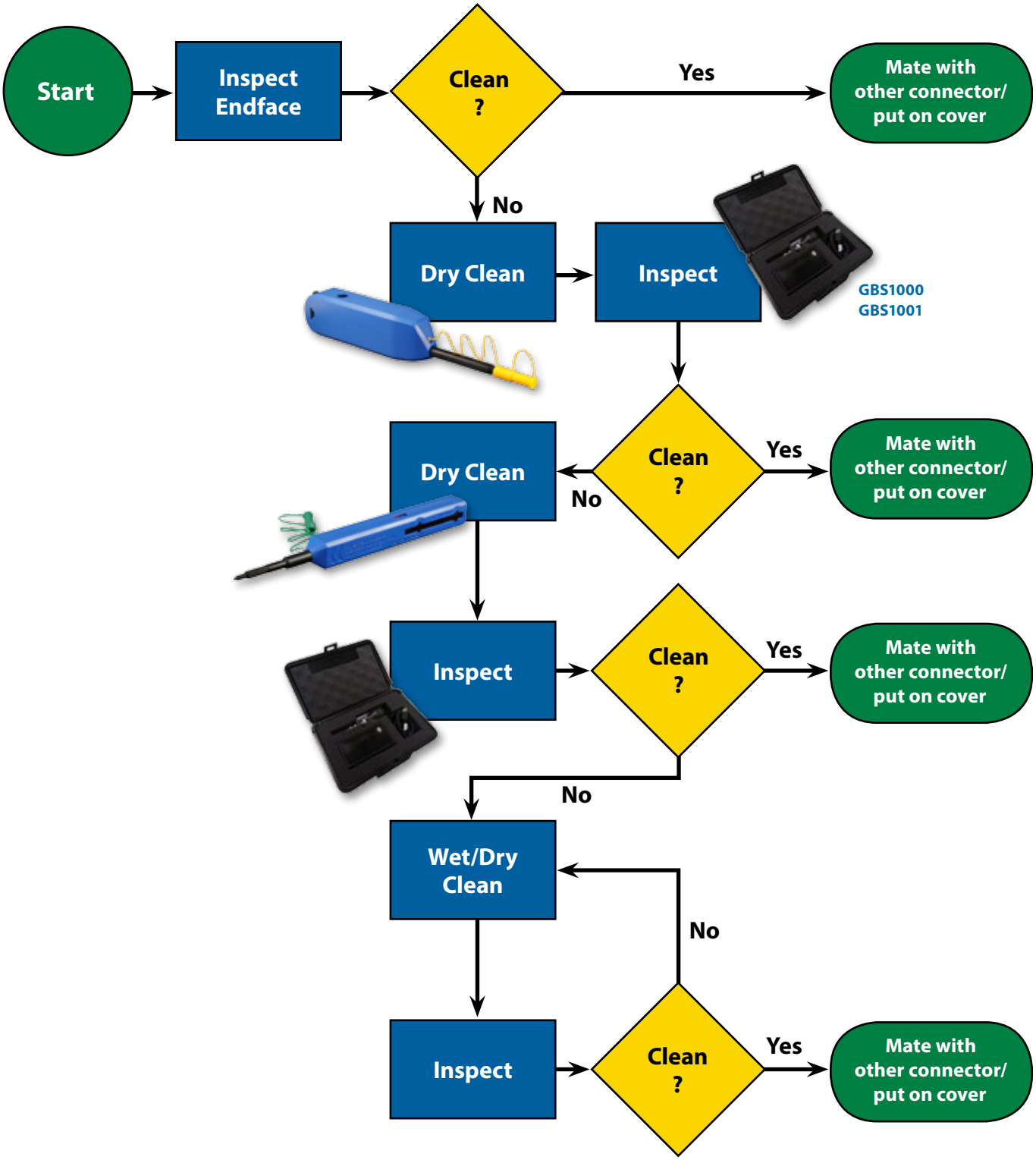
Fiber Optic Cleaning and Troubleshooting
Process Flow



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GBS1000 and GBS1001
Portable Fiber Optic
Video Bore Scope Inspection System

Fiber optic video bore scope inspection system for MIL-DTL-38999 and other small form-factor connectors such as SC, LC, ST and FC

- **Field/Bench Use System Includes Video Display Unit, Inspection Camera and Standard 2.5 mm & 1.25 mm Patchcord Inspection Tips**
- **Tips available Use with all Common F/O Connector Types: SC, LC, ST, and FC plus MIL-DTL-38999 and Small Form Factor Connectors**
- **200X and 400X Magnification**
- **Built-in NiMH Rechargeable Battery with Automatic Shut-off Function**
- **Rugged Watertight Case**

Glenair Video Inspection System Provides The Ultimate Solution to Field Maintenance of Fiber Optic Systems

Dirty or contaminated fiber optic termini can seriously degrade the performance of a fiber optic system. But inspecting individual contacts in complex connector devices such as bulkhead feed-throughs and multi-channel Mil-Spec connectors can be a difficult and time-consuming task. The Glenair video inspection system supplies everything you need to quickly and conveniently inspect and clean butt-jointed fiber optic contacts. Optional add-ons enable turnkey integration with computer desktops, digital cameras and powerful optical test software.

How To Order

GBS1000 - U

Basic Part Number Includes:
- *Handheld Inspection Monitor*
- *Inspection Probe (200x & 400x)*
- *4 tips*
- *Portable Ruggedized Carrying Case*
- *Glenair Swabs*

Optional Quick Capture
USB Module for Computer Inspection and Video Capture.

Comes with 4 tips:

GIT-018	*SC bulkhead*
GIT-011	*LC bulkhead*
GIT-003	*Universal 1.25mm patch cord*
GIT-002	*Universal 2.5mm patch cord*

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GBS1000 and GBS1001
Portable Fiber Optic
Video Bore Scope Inspection System

Glenair's handheld Bore Scope is a small, lightweight video microscope used to examine fiber optic end-faces. The GBS1000 displays a clear and concise live image with the ability to view fibers at either 200x or 400x magnifications.
The Quick Capture GBS1000-U USB Module can be added to the GBS1000. This valuable item allows the user to inspect and capture fiber end-faces on your PC. Works great with Fiber Chek software to inspect, test and capture images. To order separately, use part number GMP-002.
The dual magnification mode inherent in all Fiber Chek 2 platforms provides a large, easily centered image during handheld focusing. This greatly simplifies your ability to achieve a quality image. A high-magnification image is acquired, analyzed, and graded.
Fiber Chek 2 software can analyze several zones of the fiber end-face.

GBS1000 Specifications	
Dimensions	1.8" W x 1.7" H x 5.5" L
Weight	4.08 oz / 115.6 gms
Video Output	NTSC or PAL
Light Source	Blue LED 1000,000+ hour life
Lighting Technique	Coaxial
Attenuation Filter	2 mm thick Schott KG1
Camera type	.33" CCD

GBS1001 Specifications	
Weight	.11 Kg / .25 lb
Resolution	Better than 1.5 Microns
Cable	Integrated USB 2.0 coil cable 2.5' relaxed, 10.5' fully extended
Certification	CE
Warranty	1 year

GBS1001 Inspection Probe with USB Adapter and Fiber Chek 2 Software

How To Order

GBS1001

Basic Part Number Includes:
- *Inspection probe with USB adapter*
- *2 tips*
- *Fiber Chek 2 Software*

Comes with 2 tips
(installed on the probe):
GIT-003 Universal 1.25mm patch cord
GIT-002 Universal 2.5mm patch cord

The GBS1001 is the only inspection probe today with a high resolution, all digital sensor and USB2 video stream which delivers high-resolution uncompressed images directly to your personal computer.

Fiber Chek Software
Fiber Optic Analysis Program

Fiber Chek is an integrated hardware/software package engineered with the single purpose of critically and consistently grading fiber end-faces. Works hand in hand with the Quick Capture Analog Probe for visual inspection, taking pictures and testing fibers.

- Automatic debris and defect detection, including fine scratches
- Measures epoxy ring for out-of-tolerance conditions
- Inspection results, including image data, can be printed or archived
- Utilizes industry standards or user defined threshold settings

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Glenair®

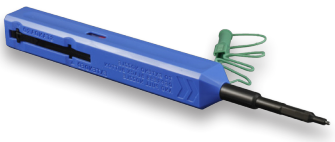
Fiber Optic Cleaning and Troubleshooting
Dry Action Cleaning Tools

Dry Action Cleaning Tools

Dry action cleaning tools provide an easy way to thoroughly clean termini in all Glenair fiber optic connection systems. The dry cleaning strand gently sweeps away dust and residue without the need for solvents. Dry action cleaning tools are easy to use, durable, and crush- and impact-resistant.

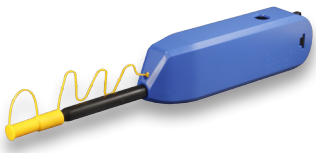
- **A simple push motion engages tool**
- **Audible click when tool is fully engaged**
- **Durable—over 525 engagements per tool**
- **Crush resistant to over 250N**
- **Impact resistant to survive drops over 1.5M**

Dry action cleaning tool for MIL-DTL-38999 system



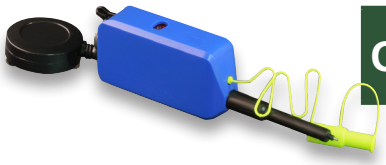
GCLT - H160

Dry action cleaning tool for GFOCA system



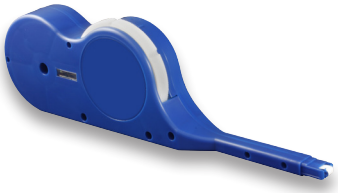
GCLT - HC250

Dry action cleaning tool for D38999 #20 and Mighty Mouse #20HD systems



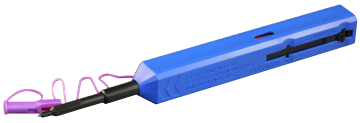
GCLT - H100

Dry action cleaning tool for MTP, MPO, MT (female and male) connectors



GCLT - MPO

Dry action cleaning tool for GHD, NGCON, and ARINC 801 systems



GCLT - H125

Dry action cleaning tool for 2.0 mm MIL-PRF-28876 system

GCLT - H200

Dry action cleaning tool for SC, ST, and FC connectors

GCLT - C250

Dry action cleaning tool for LC and MU connectors

GCLT - C125

Dry action cleaning tool for MT male connectors

GCLT - MTC - RE

RE = Refill Cartridge

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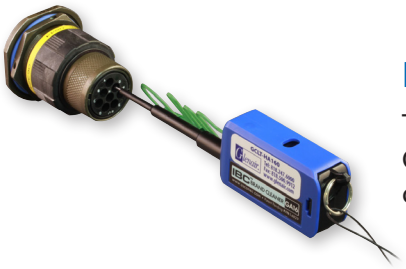
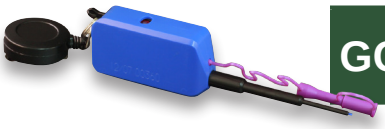


Dry Action Cleaning Tools for test adapters

These dry action cleaning tools are configured for use with clean-through Glenair test adapters for GHD, NGCON, ARINC 801 and D38999 fiber optic connection systems.

Dry action cleaning tool for GHD, NGCON, and ARINC 801 test adapters



GCLT - HA125

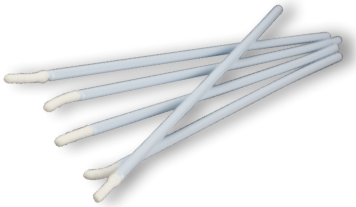
Dry action cleaning tool for MIL-DTL-38999 test adapters

GCLT - HA160

Cleaning Swabs

Precision swabs for cleaning 1.25mm, 2.00mm, 2.5mm and Glenair 181-001 termini. Designed to work with cleaning solution to remove contaminants.

Fiber optic cleaning swab for part 181-001 socket terminus - 50 swabs/bag



187 - 024

Fiber optic cleaning swabs 1.25 mm cletop - bag of 5 swabs

187 - 021

Fiber optic cleaning swab 2.00 mm and 2.50 mm cletop - 5 swabs/bag

187 - 045

L

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600-058 and 600-061
The *Band-Master*™ ATS Clamping System
Hand Banding Tools

Fast, Cost-Effective Shielding Termination

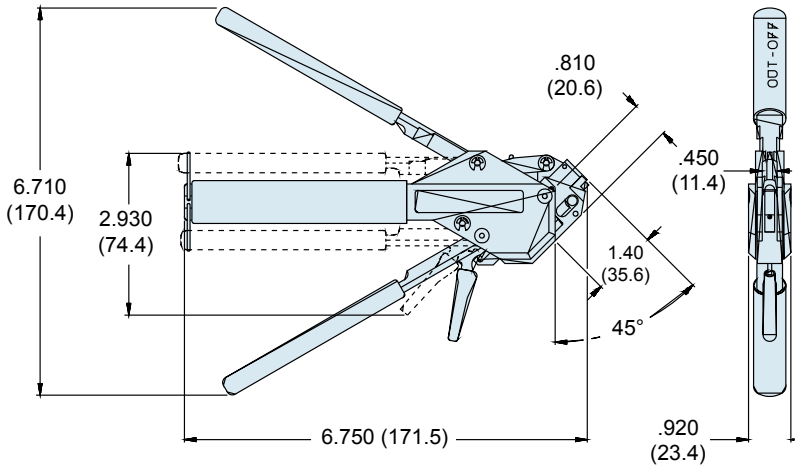
The Band-Master™ ATS clamping system provides quick, easy, cost-effective and highly reliable termination of braided metallic shielding or fabric braid. Two sizes of banding tools and bands (bands are also available in standard and extended lengths) allow complete flexibility in terminating EMI shielding and protective mechanical braiding to fiber optic and electrical harnesses. Glenair's complete line of Band-Master™ ATS products are in stock and ready for immediate shipment.

Manual Hand Tools

Hand Banding Tool 600-058

The 600-058 Hand Banding Tool weighs 1.18 lbs., and is designed for standard clamping bands 600-052 and 600-090 (see page 36) in a tension range from 100 to 180 lbs. Calibrate at 150 lbs. ± 5 lbs. for most shield terminations. Tool and band should never be lubricated.

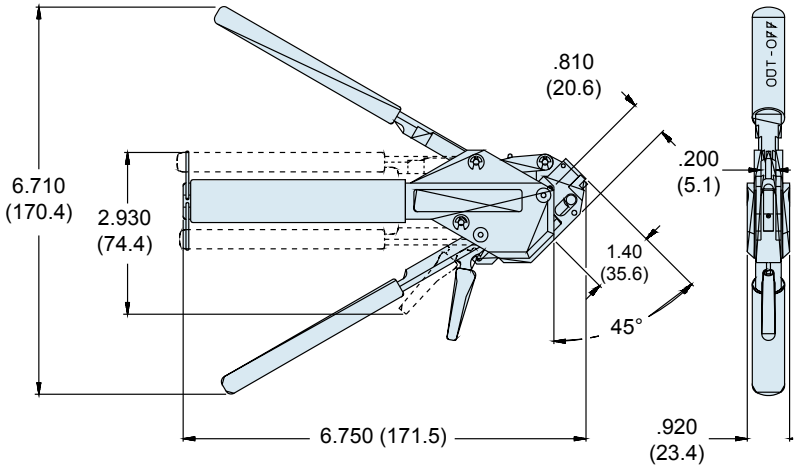
Reference: Band-Master™ ATS part number A40199.



Hand Micro Banding Tool 600-061

The 600-061 Hand Micro Banding Tool weighs 1.18 lbs., and is designed for micro clamping bands 600-057 and 600-083 (see page 36) in a tension range from 50 to 85 lbs. Calibrate at 75lbs +2 lbs. -7 lbs. for most shield terminations. Tool and band should never be lubricated.

Reference: Band-Master™ ATS part number A30199.



Metric Dimensions (mm) are indicated in parentheses.

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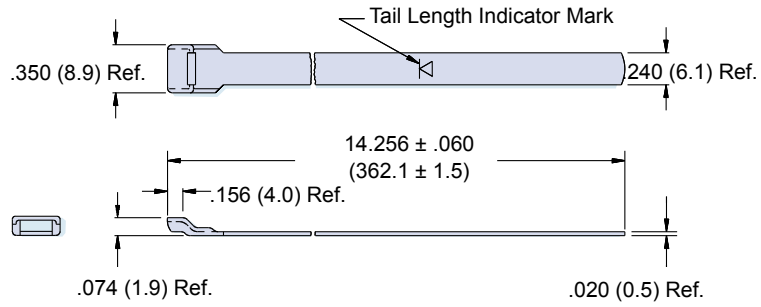
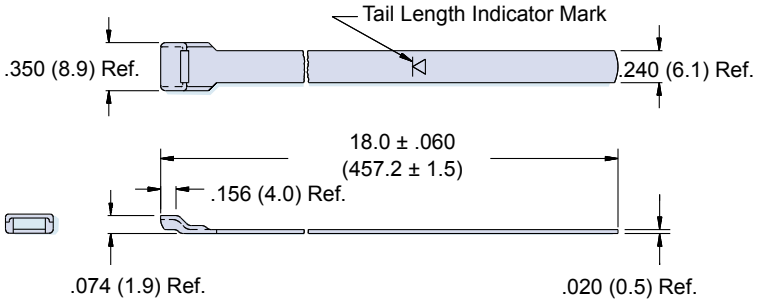
Standard Band 600-052 and Precoiled Standard Band 600-052-1



The 600-052 Standard Band is precision constructed of 300 Series SST/Passivate and designed for use with the 600-058 Hand Banding Tool or the 600-067 Pneumatic Banding Tool. Double-wrapped bands will accommodate diameters up to approximately 1.8 inches (45.7). Bands may be ordered flat (600-052) or precoiled (600-052-1). Bands come bagged and tagged in quantities from 1 to 100.

Reference: Band-Master™ ATS Part Number A10086

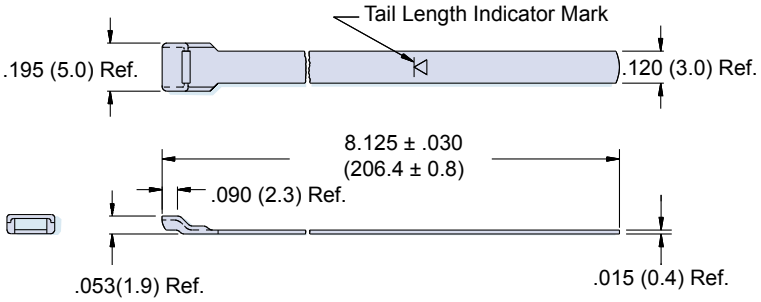
Extended-Length Standard Band 600-090 and Precoiled Extended-Length Standard Band 600-090-1



The 600-090 Extended Length Standard Band is precision constructed of 300 Series SST/Passivate, and designed for use with the 600-058 Hand Banding Tool or the 600-067 Pneumatic Banding Tool. Double-wrapped bands will accommodate diameters up to approximately 2.5 inches (63.5). Bands may be ordered flat (600-090), or precoiled (600-090-1). Bands come bagged and tagged in quantities from 1 to 100.

Reference: Band-Master™ ATS Part Number A11086

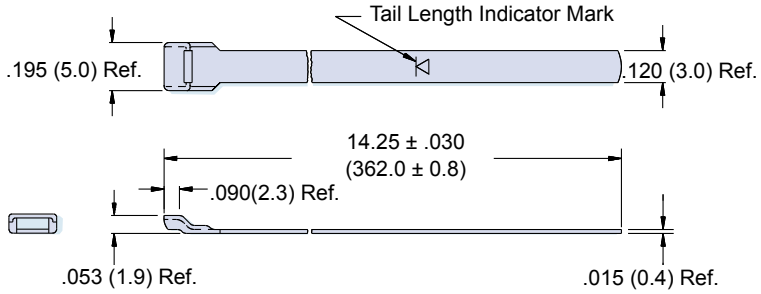
Micro-Band 600-057 Precoiled Micro-Band 600-057-1



The 600-057 Micro Band is precision constructed of 300 Series SST/Passivate, and designed for use with the 600-061 Hand Banding Tool or the 600-068 Pneumatic Banding Tool. Double-wrapped bands will accommodate diameters up to approximately .88 inches (22.4). Bands may be ordered flat (600-057), or precoiled (600-057-1). Bands come bagged and tagged in quantities from 1 to 100.

Reference: Band-Master™ ATS Part Number A31186

Extended Length Micro-Band 600-083 Precoiled Micro-Band 600-083-1



The 600-083 Extended Length Micro-Band is precision constructed of 300 Series SST/Passivate, and designed for use with the 600-061 Hand Banding Tool or the 600-068 Pneumatic Banding Tool. Double-wrapped bands will accommodate diameters up to approximately 1.88 inches (47.8). Bands may be ordered flat (600-083), or precoiled (600-083-1). Bands come bagged and tagged in quantities from 1 to 100.

Reference: Band-Master™ ATS Part Number A31089.

Metric dimensions (mm) are indicated in parentheses. Consult factory for diameters above 2.5 inches (63.5).

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Glenair®

The *Band-Master*™ ATS Clamping System
EMI Shield Termination Instructions

1. Prepare Cable Braid for termination process (Figure 1).
2. Push Braid forward over Adapter Retention Lip to the Adapter Incline Point (or .4" [10.2mm] minimum braid length). Milk Braid as required to remove slack and ensure a snug fit around the shield termination area (Figure 2).
3. Prepare the Band in the following manner:

   IMPORTANT: Due to Connector/ Adapter circumference, it may be necessary to prepare the Band around the Cable or Retention Area.

   A. Roll Band through the Buckle Slot twice. (Bands must be double-coiled.)

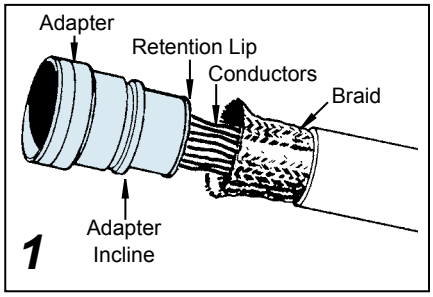
   B. Pull on Band until Mark (▷|) is within approximately .250 inch (6.4mm) of Buckle Slot (Figure 3). The Band may be tightened further if desired.

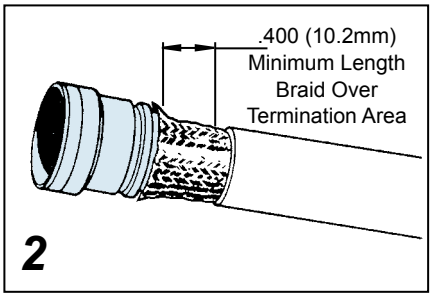
   NOTE: Prepared Band should have (▷|) Mark visible approximately where shown in Figure 3.

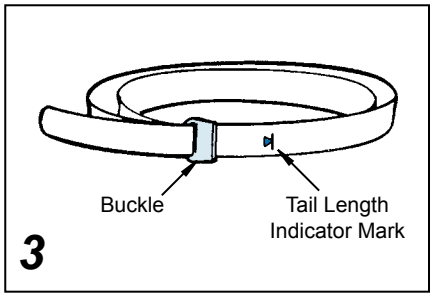
   Shield Termination ClampingProcess (Figures 4 thru 8)

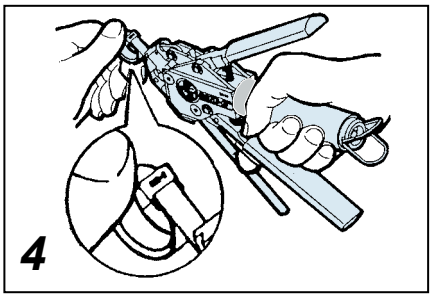
   NOTE: To free Tool Handles, move Holding Clips to center of Tool.

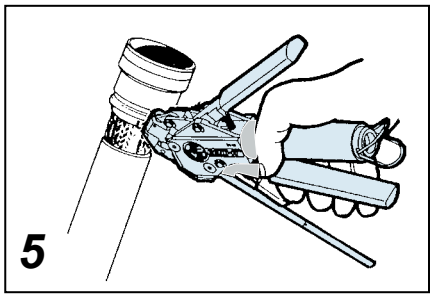
4. Squeeze Gripper Release Lever and insert Band into the front end opening of the Tool. (NOTE: Circular portion of looped band must always face downward.)
5. Aligning the Band and Tool with the Shield Termination Area, squeeze Black Pull-Up Handle repeatedly using short strokes until it locks against Tool Body. (This indicates the Band is compressed to the Tool Precalibrated Tension.)

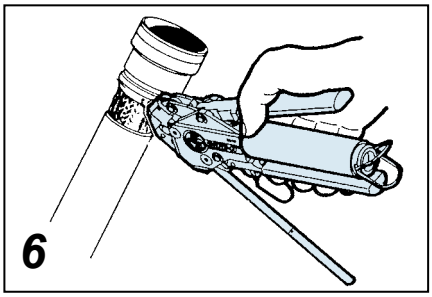


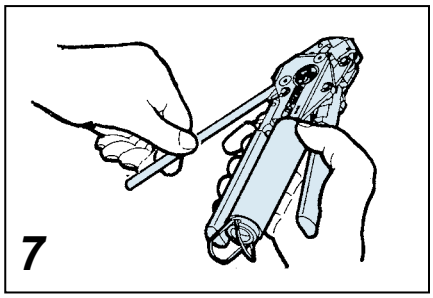


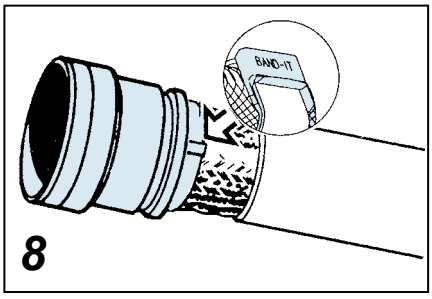












NOTE: If alignment of band and shield is unsatisfactory, tension on band can be relaxed by pushing on slotted release lever on top of tool. Make adjustments as necessary and again squeeze black pull-up handle.

6. Complete the Clamping Process by squeezing the Gray Cut-Off Handle.
7. Remove excess band from tool and dispose.
8. Inspect Shield Termination.

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Glenair Fiber Optic Custom Tooling Request

Please submit the following form, and a Glenair fiber optic specialist will contact you shortly to discuss in greater detail (required fields are indicated with an *).

Name* _____ _____
first last

Company Name _____

Company Address _____

_____

E-mail* _____ **Phone** _____

What market segment are you in?

- ❑ Mil-aero
- ❑ Aerospace
- ❑ Armored vehicle
- ❑ Naval and marine
- ❑ Rail industry

Which termination process is applicable to you?

- ❑ Terminating copper cables in a lab
- ❑ Terminating copper cables on-site
- ❑ Terminating fiber optic cables in a lab
- ❑ Terminating fiber optic cables on-site
- ❑ No termination activities

What kind of fiber do you plan to use?

- ❑ Single mode
- ❑ Multi mode
- ❑ Both

What kind of termini will be terminated?

- ❑ MIL-PRF-29504/4 and /5
- ❑ MIL-PRF-29504/14 and /15
- ❑ Commercial ST
- ❑ Commercial LC
- ❑ Commercial SC
- ❑ Other

If other, please describe: _____

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Glenair Fiber Optic Custom Tooling Request

Which process do you want to perform?

- ❑ Repair, termination, cleaning, inspection, and testing
- ❑ Cleaning and inspection
- ❑ Insertion loss test
- ❑ Cleaning, inspection, and testing
- ❑ Insertion and return loss
- ❑ Return loss test

Does the kit need to have battery power? ❑Yes ❑No

Do you want to perform end face inspection?

- ❑ Yes. Via video bore scope and storage of data
- ❑ Yes. Via visual front face inspection with no storage of data
- ❑ Yes. Via an interfermeter for symmetry measurements
- ❑ No end face inspection needed

Does a laptop need to be included in the testing kit? ❑Yes ❑No

What is the preferred case configuration?

- ❑ Hard-side case
- ❑ Back pack
- ❑ Other

If other, please describe: _____

What is the skill level of the operator?

- ❑ Highly trained
- ❑ Infrequent operator
- ❑ No formal training

Do you need a formal training?

- ❑ Yes, I would like to be trained in fiber optic termination
- ❑ No, I do not require additional training

Please mark the subjects Glenair need to take into account (Check all that apply)

- ❑ Repair, termination, cleaning, inspection, and testing
- ❑ Cleaning, inspection, and testing
- ❑ Training held on customer's premises
- ❑ Training held in U.S.A. (Glendale, CA)
- ❑ Training held in Europe (Bologna, Italy)
- ❑ Training held in UK (Mansfield)
- ❑ Other

If other, please describe: _____

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Fiber Optic Operation

Today, the use of fiber optic systems to carry digitized video, voice and data is universal. In business and industry, fiber optics have become the standard for terrestrial transmission of telecommunication information. In military and defense, the need to deliver ever larger amounts of information at faster speeds is the impetus behind a wide range of retrofit and new fiber optic programs. Although still in its infancy, fly-by-light flight control systems may someday replace fly-by-wire systems with cabling which is lighter, smaller and safer. Fiber optics, combined with satellite and other broadcast media, represents the "new world order" for both commercial telecommunications as well as specialized applications in avionics, robotics, weapon systems, sensors, and transportation.

Functionally, fiber optic systems are similar to the copper wire systems they are rapidly replacing. The principle difference is that fiber optics uses light pulses (photons) to transmit data down fiber lines, instead of electronic pulses to transmit data down copper lines. Other differences are best understood by taking a look at the flow of data from point to point in a fiber optic system.

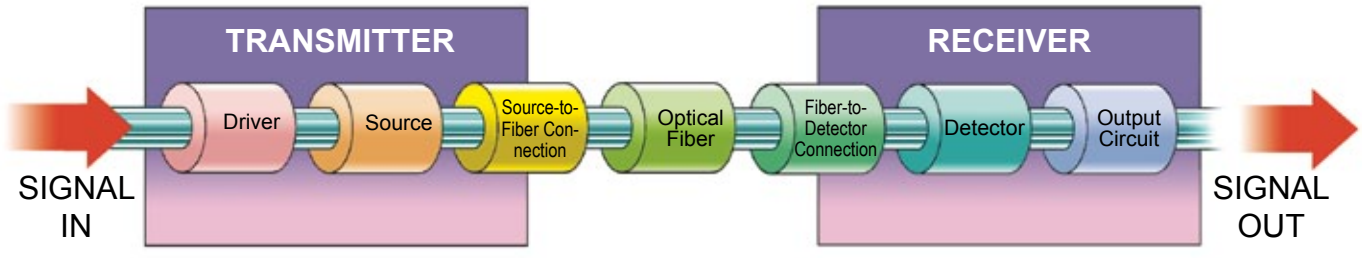
The "encoding" side of an optical communication system is called the transmitter. This is the place of origin for all data entering the fiber optic system. The transmitter essentially converts coded electrical signals into equivalently coded light pulses. A light-emitting diode (LED) or an injection-laser diode (ILD) is typically the source of the actual light pulses. Using a lens, the light pulses are funneled into the fiber optic connector (or terminus), and transmitted down the line.

Light pulses move easily down the fiber optic line because of the principle of "total internal reflection," which basically holds that whenever the angle of incidence exceeds a certain value, light will not emit through the reflective surface of the material, but will bounce back in. In the case of optical communications systems, this principle makes it possible to transmit light pulses down a twisting and turning fiber without losing the light out the sides of the strand.

At the opposite end of the line, the light pulses are channelled into the "decoding" element in the system, known as the optical receiver or detector. Again, the actual fiber to detector connection is accomplished with a specialized fiber optic connector/terminus. The purpose of an optical receiver is to detect the received light incident on it and to convert it to an electrical signal containing the information impressed on the light at the transmitting end. The information is then ready for input into electronic based devices, such as computers, navigation control systems, video monitors and so on.

Cable Construction

There are typically five elements that make up the construction of a fiber optic cable: the optic core, optic cladding, buffer, strength member and outer jacket. The optic core is the light-carrying element at the center of the optical fiber. It is commonly made from a combination of highly purified silica and germania. Surrounding the core is the optic cladding made of pure silica. The combination of these materials makes the principle of total internal



Basic Fiber Optic Link

M

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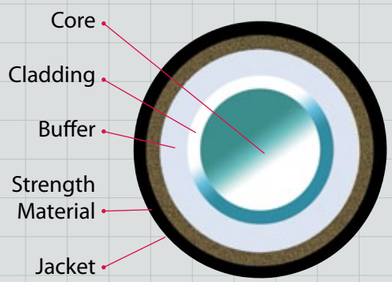
Fiber Optic Cable Cross Section



reflection possible, as the difference in materials used in the core and the cladding creates an extremely reflective surface at the point where they interface. Light pulses entering the fiber core reflect off the core/cladding interface and thus remain within the core as they move down the line.

Surrounding the cladding is a buffer material which acts as a shock absorber to protect the core and cladding from damage. A strength member, typically Aramid, surrounds the buffer adding critical tensile strength to the cable to prevent damage from pull forces during installation. The outer jacket protects against abrasion and environmental damage. The type of jacket used also defines the cable's duty and flammability rating.

Rays of light passing through a fiber do not travel randomly. Rather, they are channeled into modes—the thousands of possible paths a light ray may take as it travels down the fiber. A fiber can support as few as one mode and as many as tens of thousands. The number of modes in a fiber is significant because it helps determine the fiber's bandwidth. Multimode fiber has a much larger core than singlemode fiber, allowing hundreds of rays of light to propagate through the fiber simultaneously. Singlemode fiber has a much smaller core, allowing only one mode of light to propagate through the core. Paradoxically, the higher the number of modes, the lower the bandwidth of the cable. The reason is dispersion.

"Modal" dispersion is caused by the different path lengths followed by light rays as they bounce down the fiber (some rays follow a more direct route down the middle of the fiber, and so arrive at their destination well before those rays which waste their time bouncing back and forth against the sides). "Material" dispersion occurs when different wavelengths of light travel at different speeds. By reducing the number of possible modes, you reduce modal dispersion. By limiting the number of wavelengths of light, you reduce material dispersion.

Core Diameters and Their Effect on Modal Dispersion

Singlemode

Multimode

Singlemode fibers are manufactured with the smallest core size (approximately 8 - 10 um in diameter) and so they eliminate modal dispersion by forcing the light pulses to follow a single, direct path. The bandwidth of a singlemode fiber so far surpasses the capabilities of multimode fiber that its information-carrying capacity is essentially infinite. Singlemode fiber is thus the preferred medium for long distance and high bandwidth applications.

Multimode fiber is generally chosen for applications where bandwidth requirements fall below 600 MHz. Multimode fiber is also ideally suited for short distance applications such as interconnect assemblies used within a single premise or contained space. Because of its larger size, multimode fiber is easier to polish and clean than singlemode, a critical concern in interconnect applications which expose the polished ends of the fibers to debris during connector mating and unmating.

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Military Standards

The layout and configuration of a fiber optic system can vary widely based on the application environment. Commercial telecommunications systems, for example, typically feature extremely long backbone cables, spliced fiber interstices, and inexpensive ST type connectors at the many termination points in the system. The connectors used in such applications are typically commodity solutions geared to the low to moderate performance and reliability requirements of that industry. At the other end of the spectrum, fiber optics deployed in military avionics take the form of highly engineered interconnect harnesses and/or multi branch conduit systems. The connectors used in such applications accommodate multiple fiber optic cables and typically utilize precision contacts, or termini, as the primary mechanism for aligning and connecting the optical fibers.

In many such aerospace applications, fiber optics are being employed as replacements or upgrades to existing copper conductor cable harnesses servicing existing black-box flight deck equipment, weapon systems, surveillance cameras, sensors, and so on. In all applications of this caliber, the new fiber optic system must adhere to the same rigorous qualification standards and performance requirements that applied to the legacy electrical systems.

For this reason, the design, configuration and packaging of fiber optic interconnects has closely mirrored existing military standards, such as those covering interconnect mateability, accessory interface dimensions, material finishes, and so on. The design of fiber optic termini, special purpose backshells and other accessories is similarly controlled by existing packaging requirements and interconnect industry dimensional standards.

High-Reliability Connectors

Such connectors also have a bottoming surface design for reliable shell-to-shell bottoming. This

Glenair's High-reliability fiber optic connectors, such as our D38999 style products, are built to ensure precise optical alignment of optical fibers. Connector polarization keys, keyways and optical cavities are manufactured to tighter tolerances than required by general commercial specifications to reduce radial misalignment and insertion loss.

ensures the linear dimensional relationship of the contact termini are the same after each connector mating because the connector effectively seats at a predetermined location each and every time. This location, or datum surface, provides a reference location back to the terminus retention clip. The pin and socket location is dimensioned from this stable bottom to acheive a repeatable and reliable connection. Conductive surface plating ensures EMI/RFI penetration into the electronics equipment area is effectively cut off. Precision molded shells and insulators provide closely controlled dimensions with little variability from one part to the next.

Fiber Optic Interconnect Termini

Fiber optic connectors are designed to be connected and disconnected many times without affecting the optical performance of the fiber circuit. Connectors can be thought of as transition devices which make it possible to divide fiber optic networks into interconnected subsystems and to facilitate the attachment of individual branches of the system to a transmitter, receiver or another fiber. The MIL-DTL-38999 connector is currently the most commonly specified multi-pin cylindrical interconnect in both fiber and copper conductor aerospace applications. When used to connect multiple strands of fiber simultaneously, the D38999 connector functions as a container or shell for the precision termini which perform the actual marriage of the fiber strands.

Over the past two decades there have been dramatic tolerance improvements in terminus design to ensure precise, repeatable, axial and angular alignment between pin and socket termini within the connector shell. Ferrule design, critical to the performance of

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Fiber Optic Terminology:

Attenuation
Loss or decrease in power from one point to another in a fiber optic cable.

Bandwidth
The information carrying capacity of an optical fiber, expressed in MHz/km. The measure is dependent upon wavelength and type of light source.

Attenuation Limited Operation
The condition in a fiber optic link when operation is limited by the power of the received signal (rather than by bandwidth or by distortion). Attenuation is usually measured in decibels per kilometer (db/km) at a specific wavelength. The lower the number, the better the fiber.

Bandwidth Limited Operation
The condition prevailing when the system bandwidth, rather than the amplitude of the signal, limits performance. The condition is reached when modal dispersion distorts the shape of the waveform beyond specified limits.

Bend Radius
Radius a fiber or fiber optic cable can bend before breaking or suffering increased attenuation.

Decibel (dB)
Unit for measuring the relative strength of a signal. The same unit is utilized to measure insertion loss.

the termini, has traditionally relied on a machined stainless steel ferrule incorporating a precision micro-drilled hole. Glenair's fiber optic termini for D38999 Series III connectors are qualified to MIL-PRF-29504/4 and /5 requirements. Unique precision ceramic ferrules, with concentricity and diametric tolerances controlled within a micron (.00004 of an inch), meet the needs of high bandwidth and low allowable insertion loss applications. Glenair's ferrules are approximately 10 times more accurate than alternative designs, and have reduced insertion loss values from 1.5dB to less than .5dB.

Glenair custom single and multichannel fiber optic connectors utilize the latest composite thermoplastic materials technology and are designed for use with Glenair's family of fiber optic connector accessories.

Fiber Optic Backshells

Fiber optic strands are robust and reliable. But they may not be manhandled (clamped, bent, or crushed) with the same vigor one might employ when working with a fat copper conductor. For this reason, fiber optic connector and cable accessories are designed to reduce bending and to eliminate compression forces. Needless to say, conventional connector backshells such as cable clamps and strain reliefs which apply compression forces directly to the cable, are not appropriate for use in fiber optic assemblies. Likewise, accessory elbows, conduit transitions, and other fittings which subject fiber optic cables to abrupt changes in direction beyond the acceptable bend radius of the fiber are equally risky. In both cases, the dangers are either outright breakage of the fiber optic core or attenuation of the optical signal.

Glenair's composite thermoplastic fiber optic accessories—including elbows, transitions and end-bells—are designed with smooth 45° or 90° bends to insure the non-abrupt routing of the cable. Composite Qwik-Clamps and heat shrinkable boots provide strain relief without applying severe compression to the cable. Glenair's cable overmolding capability enables the integration of unique straight or angular shapes directly into the

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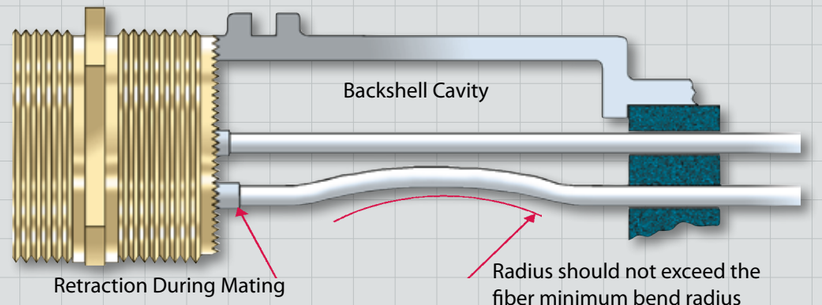
Termini Retraction and Its Effect On Micro-Bending



cable to insure the best possible fiber position and alignment.

Glenair's FiberCon® Backshells are specifically designed to meet the unique requirements of the media. For both single fiber leads as well as multichannel applications, FiberCon® provide full support and vibration dampening while allowing the fiber to "float" as required to eliminate micro-bending. Fiber optic terminations differ from electrical in one critical way: during connector mating the fiber optic spring-loaded socket or pin retracts from .040 to .080 inches. It is critical that the backshell design accommodates this movement within the shell cavity to prevent data loss due to micro bending which leads to localized light refraction. The unique rubber support grommet utilized in Glenair's design employs the same layout pattern as the connector shell—providing both necessary axial alignment, as well as strain relief and float.

Fiber Optic Costs and Benefits

When evaluating the costs and benefits of moving to fiber, it is important to adopt both a short and long term view. In the short term, it is arguably less expensive to simply continue using copper cabling to meet an incremental expansion of data communication needs. This avoids the expense of adding the transmitters, converters, repeaters, connectors, termini, receivers and so on needed for integrating optical fiber into an existing electronic system.

(Continued from Page M-4)

Fiber Optic Terminology:

Ferrule
A small alignment tube attached to the end of the fiber and used in connector termini. Generally made of stainless steel, ceramics, or zirconia, the ferrule is used to confine and align the stripped end of the fiber.

Fresnel Reflection Loss
Reflection losses incurred at the input and output points of optical fibers due to the difference in refractive index between core glass and immersion media.

Insertion Loss
Attenuation caused by the insertion of an optical component; in other words, a connector terminus or coupler in an optical transmission system.

Light
In the laser and optical communication fields, the portion of the electromagnetic spectrum that can be handled by the basic optical techniques used for the visible spectrum.

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(Continued from Page M-5)

Fiber Optic Terminology:

Misalignment Loss

The loss of power resulting from axial misalignment, lateral displacement, and end separation.

Optical Time Domain Reflectometer (OTDR)

Testing system for fiber strands in which an optical pulse is transmitted through the fiber and the resulting backscatter and reflections are used to estimate attenuation and identify defects and the sources of localized losses.

Source

The means used to convert an electrical information carrying signal to a corresponding optical signal for transmission by fiber. The source is usually a Light Emitting Diode (LED) or Laser.

Transceiver

An electronic device which has both transmit and receive capabilities.

Transducer

A device for converting energy from one form to another, such as optical energy to electrical energy.

Transmission Loss

Total loss encountered in transmission through a system.

Transmitter

An electronic package which converts an electrical signal to an optical signal.

Taking the long view, investing in the conversion to fiber optics often makes good sense, especially given the performance benefits—EMI immunity, security, weight reduction, bandwidth, etc.—as well as cost of-ownership factors such as reduced cable maintenance costs and ease of installation. The ability to more easily accommodate future bandwidth requirements as well as the ability to incorporate redundant fibers for improved safety and reliability further reduces the long-term cost-of ownership. Glenair has worked closely with engineers on a broad range of programs—from the F-22 to the RAH-66 Helicopter—to analyze system requirements and to design high-reliability fiber optic solutions that meet both short and long term cost requirements, and the life-cycle projections for the application.

Fiber Optic Connector and Cable Packaging

The packaging and layout of a fiber optic interconnect assembly can vary widely depending on the application environment. Fiber optics deployed in military avionics, for example, may take the form of a simplex pigtail connector assembly when fiber is used to interconnect the optical transmitter/receiver inside an equipment enclosure to the outside world via a panel mounted receptacle connector or feed through adapter (see picture, opposite page). Rugged, environmental applications, such as a weapon interconnect cable intersecting a fuel tank may require more ruggedized cable construction. Long-run, point-to-point fiber optic cabling in battlefield or secure bunker applications are typically cabled in spools with hermaphroditic connectors.

Specialized interconnect technologies, including unique backshells, conduit transitions, fiber alignment grommets and so on are regularly employed by Glenair to ensure the fiber optic media is protected from environmental and physical damage, and meets the installation and repairability requirements of the application. The following guide to fiber optic interconnect packaging provides an overview of the most common layouts used in high-reliability applications:

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Packaging Solutions for Inside the Box

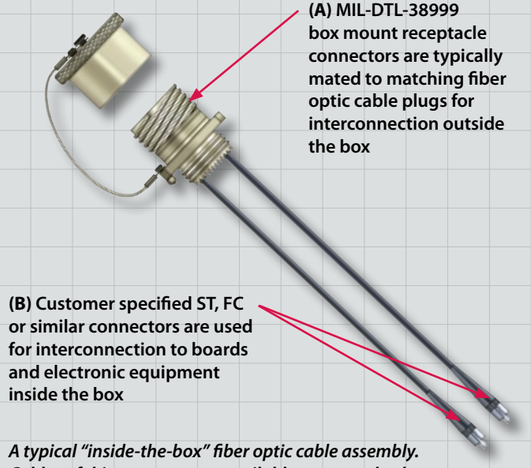
When fiber leads are used within equipment enclosures or other protected environments, the interconnect assembly generally looks something like the figure below: a wall mount or jam nut mount receptacle connector ("A") with simplex fiber leads. This receptacle connector is used to penetrate the enclosure and mate to the external environmental plug connector.

The simplex leads within the protected enclosure commonly route to the transceiver optical device, and are terminated to common commercial connectors such as ST, FC, SC, LC (or other) connectors at the "B" end.

Glenair can also supply pigtail assemblies of this type with a FiberCon® backshell and/or a protective length of conduit. This design approach ensures strict alignment of the fiber strands to the connector, optimum strain relief to the individual fibers as well as crush protection.

The use of a short length of conduit and a small end-bell fitting is recommended in applications where a heat or abrasion source within the box may damage the fiber media. In most cases, analysis of the available space is critical to ensure such interconnect hardware does not interfere with the electronics package inside the box. This basic packaging is appropriate for any equipment—such as a radar, camera, shipboard console, antenna and so on—with an internal fiber wire servicing an optical transmitter/receiver.

Glenair can supply the complete interconnect assembly, including the connector, termini, fiber, optional backshell fittings and conduit. Glenair's ASAP Fiber Optic Cable Sets are specifically designed for applications of this type.



A typical "inside-the-box" fiber optic cable assembly. Cables of this type are now available as a standard short-lead catalog product from Glenair.

Packaging Solutions for External Point to Point Applications

While inside-the-box applications may be conveniently terminated in the field during the installation of the electronic equipment, other fiber optic interconnect cables lend themselves to factory termination and assembly. This is due to the rugged nature of the environments in which they are used. When fiber optic cables need to withstand rough handling, caustic and corrosive fluids or other sources of physical or environmental stress, the interconnect package needs to be extremely tough, and the cables are generally factory-terminated with the appropriate protective materials. Factory assembly is also called for when there are no restrictions or impediments to providing a pre-built harness or assembly, such as unpredictable distances between bulkheads or other site-specific routing problems. Factory-terminated fiber optic cables are typically multichannel, with sometimes as many as 30 fiber optic channels. Examples include ship-to-shore phone/data cables, fuel cell cable harnesses, intra-car railway cables, and other harsh environmental applications.

The range of performance requirements for rugged, external cables includes strain-relief, environmental sealing, high tensile pull, crush resistance and chemical resistance. Electromagnetic shielding can also be a requirement in hybrid copper/fiber cables. Packaging generally takes three forms:
(1) Overmolded cable harnesses, (2) Metal-core or

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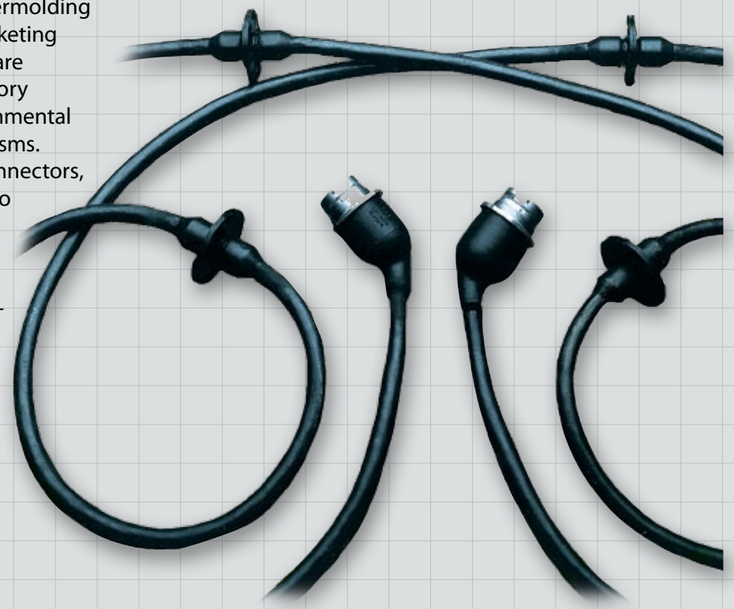
polymer-core conduit assemblies, and (3) Armored cable equipped with environmental and/or shield terminating backshells.

Overmolded Harnesses

Overmolded designs are specified when field repairability is not an anticipated requirement and harsh environmental and mechanical stress conditions warrant extra protection of the fiber media and terminations. Overmolding technology employs specialized tooling to construct ruggedized, sealed transitions between the cable and the connector and any transition hardware. Overmolding is ideally suited for complex multi-leg harnesses because the many transitions are otherwise difficult to seal with conventional shrink-boots. Overmolding typically uses environmentally resistant jacketing such as Polyurethane. Overmolded cables are extremely rugged and can protect the factory terminations from a broad range of environmental and mechanical stress generation mechanisms. Glenair can integrate its own fiber optic connectors, backshell accessories, termini and cable into such cables—providing a complete, turnkey system. Glenair also offers point-to-point overmolded cable sets with plug-to-plug, plug-to-receptacle and receptacle-to-receptacle connectors as a standard catalog offering. And because termini-retraction is a critical requirement of MIL-DTL-38999 type connectors, Glenair's unique fiber-optic backshells which facilitate termini retraction and eliminate micro-bending are a critical component in every overmolded cable.

Conduit Assemblies

Conduit is a perfect material for the protection of fiber optic media and for the construction of factory-terminated assemblies. As a wire protection material, conduit has a number of unique advantages over other packaging, such as armored cable and even overmolding. First and foremost, conduit systems offer greater flexibility than other ruggedized designs. This is critical in applications such as intra-car railway data transmission lines where the ability of the harness to flex and bend with the repetitive motion of the rail car is a critical requirement. Conduit is also known for its excellent pull strength, high crush resistance, and relative light weight. Perhaps most important, conduit fittings and transitions can more easily be opened for repair or to expand the number of fiber lines. Additionally, conduit assemblies make use of a wide range of existing fittings and transitions, including lightweight composite versions, to meet virtually any configuration and lay-up requirement.



Glenair high-temperature overmolded cable assemblies are ideally suited for fiber optic and hybrid fiber/copper applications in exposed, harsh environments. Overmolding of fiber is a unique Glenair strength, and has been utilized as a packaging solution in such diverse applications as fighter jet fuel-cell cables and roof-top telecommunication cabling.

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Conduit provides an ideal packaging media for fiber optic cables. The material is highly flexible and can be terminated at the factory with a wide range of shielding, jacketing and other specialized materials. Conduit may be opened for maintenance and repair or to expand the number of lines.

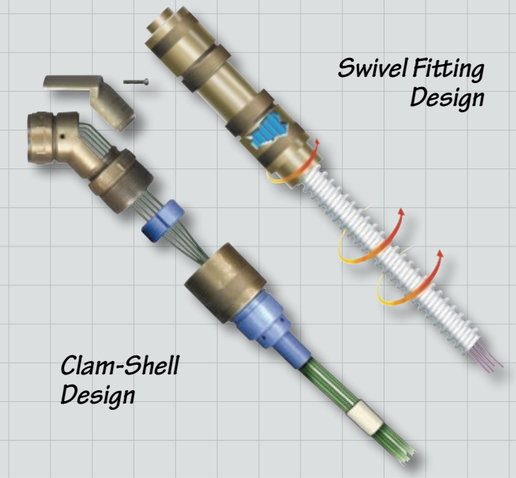
Glenair offers complete in-house capabilities for the construction of fiber optic conduit assemblies. In addition to helically molded polymer materials, we also offer a metal-core conduit product which provides unmatched crush-resistance and EMI protection (for hybrid copper/fiber applications). Both styles of tubing may be outfitted at the factory with braided shielding and external jacketing, or supplied as discrete components for customer assembly. Glenair manufactures all the necessary branched transitions and fittings for every connector and/or feed through configuration.

Reinforced Cable/Backshell Assemblies

Reinforced extruded cable provides a third packaging option for rugged application environments. Multichannel fiber optic cable is available in a broad range of designs. Depending on customer requirements for fiber type, strength members, jacketing material and other component-level options.

Glenair can extrude short-run fiber optic cable for most high-performance applications. The cable becomes the backbone of this packaging solution. A ruggedized, environmental backshell is an equally key component in the armored cable assembly. Such backshells allow for the termination of overall shielding, the provision of additional strain-relief and/or environmental protection of the cable to connector transition.

But the most important design consideration behind the use of such specialized backshells is the ability to provide some level of repairability to the assembly. Unlike overmolded solutions, the reinforced extruded cable/backshell package allows maintenance technicians to open the cable for field service. Backshells are selected for functionality (strain-relief, shield termination, and so on) and for compatibility with the chosen connector. Glenair is able to provide turnkey assemblies of this type as well as all the discrete components—from the extruded cable to the backshells, connectors, termini, dust-caps and other fiber optic interconnect accessories.



The fiber optic backshell pictured above on the left features a unique "clam shell" opening, as well as a tensioning device to prevent overtightening of the backshell clamp. The assembly pictured on the right features a unique swivel fitting to prevent cable torque from affecting fiber alignment. Both are suited for use with standard extruded cable or conduit.

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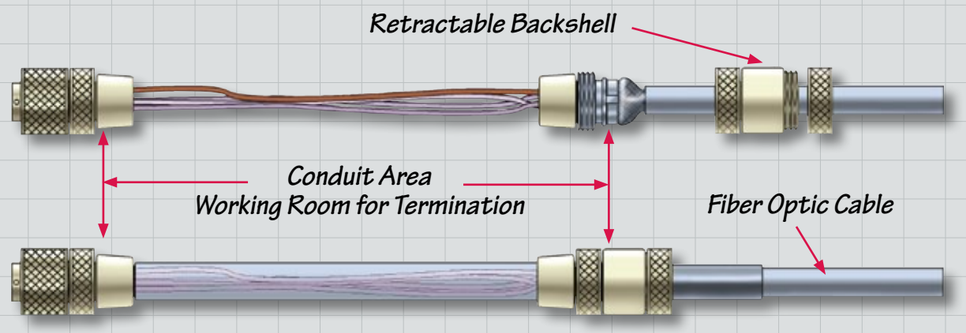
Packaging Solutions for Field Termination

The third major packaging category for fiber optic interconnect applications covers those situations in which a pre-assembled cable or harness cannot be used due to the difficulty of cable installation and routing. A classic example is found in shipboard installation, where the fiber optic cable often has to travel a great distance between the various equipment components in the system. A below-deck control room, for example, may rely on sensors or communications equipment located on the mast of the ship. Between these two elements lies a complicated maze of deck-plating, impenetrable bulkheads and kick-pipes.

Obviously, it would be impossible to install a factory-terminated assembly into this maze of holes and walls. So, long (trunk) cable runs are completed from point "A" to point "B" and the termination of the fiber optic connector is completed on site at each end of the cable. The challenge is to provide technicians with the ability to strip back an adequate length of the cable to complete the individual fiber line terminations as well as some subsequent way to protect the stripped- back cable from environmental damage.

One solution to the problem is to mount a junction box at each end of the system and bring the trunk cable into the box for subsequent termination of the contacts and protection of the media. Such junction boxes also aid in the routing and storage of the fiber leads. The boxes may be positioned in a centralized location to provide service to multiple pieces of electronic equipment. Additionally, long lengths of stripped cable can be sealed away in the box for subsequent repair and maintenance. Typical box configurations feature either convoluted tubing and environmental feed-through fittings, or in-line and box-mounted fiber optic connectors. Glenair is uniquely positioned to provide integrated fiber optic cable junction boxes of this type. Our line of CostSaver Composite Junction Boxes are specifically designed for use in harsh EMI and environmental applications where field termination of fiber media is a difficult and cumbersome operation.

Glenair's background in providing fiber optic interconnect solutions for the navy has led to the development of some completely unique solutions for the field termination of fiber. Glenair offers a unique backshell and conduit assembly that perfectly suits this requirement. As the illustration below depicts, the Glenair retractable backshell and conduit assembly provides all the working room necessary for easy field termination of fiber.



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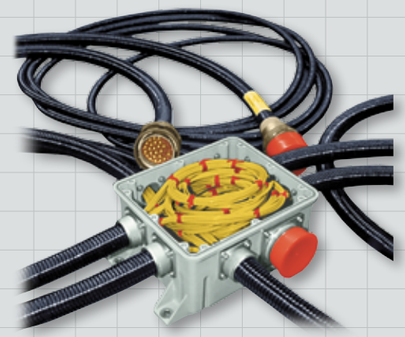
FIBER OPTIC
APPLICATION EXAMPLES



Interconnect Junction and Media Storage

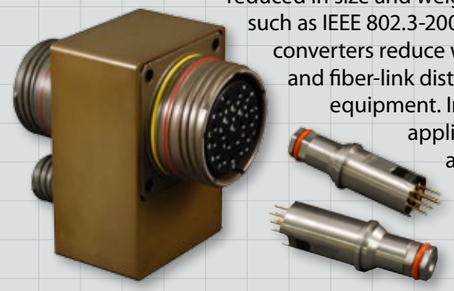
In this application, Glenair was able to provide a complete, turnkey interconnect assembly which included both the light-weight composite junction box, as well as the conduit, fittings, fiber optic connectors and termini. Termination and test of the fiber media and installation of all fittings was completed at the factory to ensure quality and to facilitate fast installation in the field. The box doubles as an environmentally controlled storage area for additional lengths of fiber-optic cable. In the event a termination is damaged, both the conduit and box may be opened to access the termini and the wire-loops for easy repair.

Fly-by-Light

Front-line aircraft are now integrating fiber optic media into their avionic and flight control systems. Glenair's CostSaver Composite Boxes are being used as interconnect junction boxes in fiber optic systems, and as instrument cases in high-speed fiber optic data systems. The innovative products, including composite MIL-DTL-38999 type Series III Connectors, MIL-PRF-29504 qualified termini, Glenair extruded fiber optic cable, as well as feed-through fittings and adapters are all chosen for their ability to reduce the size and weight of the interconnect package while improving the safety, reliability and performance of the flight control system.

Reduced Form Factor Copper to Fiber Media Conversion

The broad utilization of fiber optics in airframe applications, such as for in-flight entertainment and other complex electrical/optical interconnect systems, currently demands transmitter and receiver solutions that are reduced in size and weight. Designed for use in protocol-specific appliation environments such as IEEE 802.3-2005 GB Ethernet, these small form-factor copper-to-fiber media converters reduce weight and complexity while still meeting shock, vibration, and fiber-link distance requirements of traditional F/O transmitter/receiver equipment. In addition to 100BASE-T and DVI compliant converters, many IFE applications are able to utilize optoelectronic contacts in transmitter and receiver roles directly incorporated into ARINC 801 and other standard airframe connector packages. These ultra-lightweight transmitter/receivers are designed for the rigors of in-cabin use and multiple electrical to fiber optic junctions. The technology supports GB Ethernet, AFDX, Fibre Channel, DVI, HDMI and more.



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The Glenair Eye-Beam™ Fiber Optic Revolution

Fiber optic systems carrying digitized video, voice and data continue to multiply. High-speed fiber optic interconnect technologies enable specialized applications in avionics, robotics, weapon systems, sensors, space and other high performance environments. Precision-engineered fiber optic contacts, or termini, are the key to delivering low data loss and reliable, repeatable performance in fiber optic connection systems.

The advantages of a connection system that can transmit the equivalent of 24,000 telephone calls simultaneously through fibers thinner than a human hair go beyond this mind-boggling data transmission rate. Fiber optic systems save size and weight, are immune to EMI interference, are electrically isolated for spark-free performance, and transmit signals that are nearly impossible to intercept for enhanced security.

The challenge for many fiber optic applications is environmental. With data transmitting through a fiber core only 9.3 microns in diameter, a single speck of dust on a conventional butt-joint contact terminus could completely disrupt transmission. This might not be a problem in a controlled, sealed environment—but a military communication shelter rapidly deployed in a windy desert, or a metropolitan commuter train speeding down a gritty, snow-covered track present less than ideal environments for fiber optic operation.

The revolutionary Glenair Eye Beam™ Expanded Beam Fiber Optic Terminus addresses these environmental challenges and delivers enhanced performance to fiber optic interconnect systems. Join us as we explore the use of the Eye-Beam™ fiber optic termini in exciting and emerging fields.

The Eye-Beam™ Lens Terminus Advantage

The Glenair Eye-Beam™ fiber optic terminus is a graded index lens-equipped, expanded-beam optical transmission system. It delivers outstanding performance in challenging environments and eliminates maintenance cycles. The low insertion loss Eye-Beam™ offers comparable performance to standard butt joint termini in a package that's built to withstand rugged use and frequent mating/de-mating in field conditions.

The Glenair Eye-Beam™ contact utilizes an innovative free-floating expanded beam lens and ultra-high precision ceramic alignment sleeves as well as custom designed nickel alloy terminus bodies to ensure perfect axial alignment and optimal optical performance. Best of all, the Eye-Beam™ can be integrated into virtually any circular or rectangular connector package.

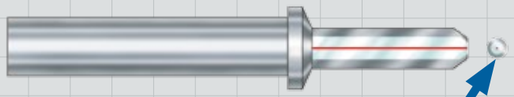
Tactical Field Deployment

Mobile Tactical Shelters are an integral part of Army and Marine battlefield communication systems. These mobile, rapidly deployable shelters provide a vital communication capability. Voice over IP (VoIP) technology allows voice, video and data to be consolidated into one fiber cable system, greatly simplifying deployment. The fiber optic interconnect system for these shelters must be reliable in extreme environments, and able to stand up to rapid mating and de-mating in the field.

Rapid "Daisy-Chaining" of Tactical Fiber Cables

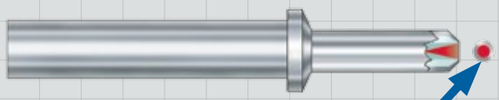
Tactical military applications rely on rapid, trouble-free deployment of interconnect cabling. Glenair GFOCA hermaphroditic expanded beam

Butt-Joint Fiber Optic Terminus



9.3 micron fiber core
Fiber surfaces exposed and susceptible to damage
Must be cleaned prior to mating

Eye-Beam™ Expanded Beam Fiber Optic Terminus



9.3 micron core expanded 27X
Fiber surfaces protected from contamination
Easy clean lens surface

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The Glenair Eye-Beam™ Fiber Optic Revolution

Fiber Optic Appendix

Main Photo: Command and control specialists work inside a Mobile Air Reporting Communications shelter at Camp Marmal, Afghanistan. The MARC is an air-deployable mobile tactical shelter that provides CRW Airmen with the ability to communicate with aircraft as well as schedule and track cargo movements worldwide. Inset Photos: Mobile tactical shelter specialists installing rooftop antennae, working inside a shelter, and checking communications equipment.

connectors and cables are the perfect solution for frequent mating and unmating of fiber optic cabling in harsh application environments. The sealed Eye-Beam™ expanded beam interface prevents contamination of the optical path, while the hermaphroditic coupling provides operational flexibility and cost savings. Glenair offers both discrete connectors as well custom cable assemblies and field-ready spooled cable sets.

Extreme Harsh Environments

Rail system interconnect design presents many challenges. Reducing weight is a critical issue in high-speed and Maglev rail systems. Shielding electromagnetic interference is also important, especially in sensitive electronic systems such as engine monitoring and diagnostic sensors. Basic mechanical protection of interconnect cables, conductors and contacts is a standard requirement especially when frequent mating and unmating is required, or when cables are routed through exposed intercar or undercar locations. To ensure rapid and accurate car linking and cabin reconfigurations, interconnects must be easy to couple and keyed to avoid mis-mating. Vibration, shock and connector decoupling problems are also common in rail applications, and require focused attention when selecting shell materials and mating technologies. As passenger and crew safety is paramount, interconnection systems must not compound flammability, smoke or toxicity risks.

Eye-Beam™ fiber optics in a ruggedized, reverse-bayonet connector package meet the environmental challenges of rail systems

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But make no mistake: the overriding challenge is environmental. Rail and transportation systems represent one of the most challenging environments for the long-term survivability and reliability of interconnect cables and assemblies. From high-speed rail transportation systems to heavy railway freight lines, the standard daily fare of the rail industry is one harsh environmental challenge after another.

Glenair Eye-Beam™ fiber optics in a ruggedized, reverse-bayonet connector package meet the environmental challenges of rail systems, standing up to shock, vibration, moisture, and temperature fluctuation while delivering the reliable high-speed data transmission advantages of fiber optics.

Fiber Optics for High Definition Broadcasting

Fiber optic systems are implemented in remote television broadcast systems for sporting events or on-location news reporting. In the television industry this is known as electronic field production, or EFP. Multi-camera video editing, advanced graphics and sound equipment must be reliable and portable, built into a truck or van—a "control room on wheels"—where space is at a premium.

On board the SIVision High-Definition mobile broadcasting unit—a "control room on wheels" for audio and video electronic field production.

A single fiber optic connection can simultaneously transport bidirectional digital and analog video, as well as two-way camera control, audio, data, sync, tally/call, prompter, and intercom signals between a high-definition camera and the mobile studio truck. A fiber optic system transmits signals digitally and optically, so broadcasters and producers are assured of the highest quality audio and video, free from interference or grounding problems.

Broadcast fiber optic interconnect systems must be quickly deployable for on-location news broadcasting, and able to stand up to the rigorous conditions presented on the sidelines of a football game or a weather report from the site of a tropical storm. Glenair Eye-Beam™ termini provide the space-saving and lightweight, yet rugged and durable connection that this exciting industry demands.

Eye-Beam™ Solutions and Future Applications

At Glenair, we are serious about the business of engineering the right solution for every application. We continue to design and enhance fiber optic solutions for standard military and commercial connectors, and develop new fiber optic technologies for exciting new applications like robotics and future soldier systems.

MIL-DTL-38999 Connectors

The MIL-DTL-38999 connector is currently the most commonly specified multi-pin cylindrical interconnect in fiber optic aerospace applications. When used to connect multiple strands of fiber simultaneously, the D38999 connector functions as a container or shell for the precision termini which perform the actual marriage of the fiber strands.

Glenair's unique alignment techniques maximize optical performance and provide reliable, repeatable interconnection of optical fibers. Ferrule design—critical to performance—has traditionally relied upon a machined stainless steel terminus incorporating a precision micro drilled hole. Glenair's unique precision ceramic ferrules,

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The Glenair Eye-Beam™ Fiber Optic Revolution

Fiber Optic Appendix

with concentricity and diametric tolerances controlled within one micron (.00004 of an inch), meet the needs of high bandwidth and low allowable insertion loss applications. In fact, Glenair's ferrules are approximately 10 times more accurate than alternative designs, and have reduced insertion loss values from 1.5dB to less than .5dB (typical loss for Glenair termini is .3 dB).

Glenair has engineered Eye-Beam™ D38999 connectors for use in applications such as high definition video camera equipment, high speed routers for long haul transmission, and military and commercial avionics applications.

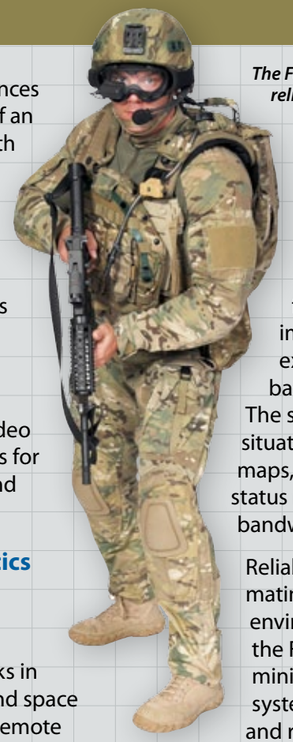
Eye-Beam™ Fiber Optics in Robotics

Robots are relied on in manufacturing and industry to do jobs in dangerous or dirty environments. They are also employed in increasingly complex tasks in bomb detection and disposal, earth and space exploration, laboratory research, and remote surgical systems. Glenair COTS (Commercial Off-The-Shelf) Eye-Beam™ fiber optic termini can provide reliable high-speed data transmission in the challenging environments that these robotic applications present.

GFOCA Hermaphroditic Fiber Optic Connection System

Hermaphroditic coupling eliminates the need for adapters and male and female mating halves. Hermaphroditic housings also allow for rapid deployment without the use of male and female mating halves or other adapters, creating low loss Singlemode, Multimode and Hybrid "daisy- chained" links in a variety of insert arrangements

The rugged and reliable Glenair GFOCA Connection System with Eye-Beam™ termini is used by the Army for long-run battlefield ground system communications, and is also well suited to dockside naval communications, down-hole drilling and other harsh environment applications.



The Future Force Warrior System depends on a highly reliable, low-data loss connection system that is lightweight and able to stand up to rigorous use in challenging environmental conditions.

Eye-Beam™ and the Future Force Warrior

Future Force Warrior is a United States military project developing a lightweight, fully integrated combat system, implementing nanotechnology, powered exoskeletons, and magnetorheological fluid-based body armor for the "Army After Next." The system provides the soldier with enhanced situational awareness, communication data, maps, tactical intelligence and physiological status monitoring through an integrated high-bandwidth wireless communication system

Reliable data transmission and ruggedized mating/de-mating in the most extreme environmental situations are crucial to the Future Force interconnect system. A miniaturized, GFOCA hermaphroditic cable system with Eye-Beam™ termini for lightweight and reliable data connection is the perfect solution to these challenges.

Retrofitting of existing cable assemblies

Glenair can retrofit your existing cable assemblies with Eye-Beam™ fiber optic termini in your connectors. There is no need to undergo expensive and time-consuming replacement of entire cable systems to take advantage of Eye-Beam™ high reliability and performance.

The Eye-Beam™ Revolution

Glenair continues to make substantial investments in equipment, tooling, research and the industry's best engineering talent to develop new fiber optic technologies. Glenair Eye-Beam™ fiber optic termini solve environmental challenges for today's demanding fiber optic systems, and we will continue to develop the right solutions for tomorrow's applications—especially in the area of expanded beam fiber optic technologies.

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Glenair Connector Material and Finish Options

This chart presents a selection of the broad range of base materials and plating options available for Glenair connectors. Innovation and qualification of material and finish types is a major Glenair strength.

Material and finishes and their specifications are provided for reference only. For detailed material and plating information, particularly relating to testing and performance, please consult factory.

Code	Material	Finish	Finish Specification	Hrs. Salt Spray	Electrical Conductivity	Operating Temp. Range	RoHS	Notes
AB	Marine Bronze	Unplated	AMS 4640 alloy, unplated	1000	Conductive	-65 to +200°C	✓	Marine and geo-physical applications
AL	Aluminum	AlumiPlate, Clear Chromate	MIL-DTL-83488, Class 2, Type II over electroless nickel	500	Conductive	-65 to +175°C	✓	Approved for MIL-DTL-38999L and MIL-DTL-83513G.
C	Aluminum	Anodize, Black	AMS-A-8625 Type II Class 2	336	Non-Conductive	-65 to +175°C	✓	Glenair's standard black anodize finish.
E	Aluminum	Chem Film	MIL-DTL-5541 Type 1 Class 3	168	Conductive	-65 to +175°C		Glenair's standard chem film finish.
G	Aluminum	Anodize, Hardcoat	AMS-A-8625, Type III, Class 1, .001" thick	336	Non-Conductive	-65 to +200°C	✓	Glenair's preferred hardcoat finish.
JF	Aluminum	Cadmium, Gold	SAE-AMS-QQ-P-416 Type II, Class 2 over electroless nickel	48	Conductive	-65 to +175°C		Glenair's preferred gold cadmium finish.
LF	Aluminum	Cadmium, Clear	SAE-AMS-QQ-P-416 Type II Class 2 over electroless nickel	48	Conductive	-65 to +175°C		Glenair's preferred clear cadmium finish.
M	Aluminum	Electroless Nickel	AMS-C-26074 Class 4 Grade B; ASTM-B-733, SC 2, Type IV	48	Conductive	-65 to +200°C	✓	Glenair's standard electroless nickel finish.
MA	Aluminum	Electroless Nickel	AMS-C-26074 Class 4 Grade A	96	Conductive	-65 to +200°C	✓	Standard matte electroless nickel for space applications.
ME	Aluminum	Electroless Nickel	AMS-C-26074 Class 4 Grade A	96	Conductive	-65 to +200°C	✓	Electroless nickel with enhanced corrosion resistance.
MT	Aluminum	Nickel-PTFE	SAE AMS2454	500	Conductive	-65 to +175°C	✓	Approved for MIL-DTL-38999L and MIL-DTL-83513G.
NC	Aluminum	Zinc-Cobalt, Olive Drab	ASTM B 840 Grade 6 Type D over electroless nickel	350	Conductive	-65 to +175°C		Glenair's standard olive drab zinc-cobalt finish.
NF	Aluminum	Cadmium, Olive Drab	SAE-AMS-QQ-P-416 Type II Class 2 over electroless nickel	500	Conductive	-65 to +175°C		Glenair's standard olive drab cadmium finish.
TP2	Titanium	Electrodeposited Nickel	SAE-AMS-QQ-N-290 Class 1 Grade F	96	Conductive	-65 to +200°C	✓	Glenair's preferred finish for titanium connectors.
UC	Aluminum	Zinc-Cobalt, Black	ASTM B 840 Grade 6 Type D over electroless nickel	240	Conductive	-65 to +175°C		Glenair's standard black zinc-cobalt finish.
UCR	Aluminum	Zinc-Cobalt, Black	ASTM B 840 Grade 6 Type D over electroless nickel	240	Conductive	-65 to +175°C	✓	RoHS version of UC.
UF	Aluminum	Cadmium, Black	SAE-AMS-QQ-P-416 Type II Class 2 over electroless nickel	500	Conductive	-65 to +175°C		Glenair's preferred black cadmium finish.
XAL	Composite	AlumiPlate	MIL-DTL-86448, Class 2, Type II over electroless nickel	2000	Conductive	-65 to +175°C	✓	Approved for MIL-DTL-38999L.
XB	Composite	Unplated Black		2000	Non-Conductive	-65 to +175°C	✓	Glenair's standard unplated composite.
XO	Composite	Unplated Amber		2000	Non-Conductive	-65 to +175°C	✓	Unplated composite, Amber color
XM	Composite	Electroless Nickel	AMS-C-26074 Class 4, Grade B	2000	Conductive	-65 to +200°C	✓	Glenair's standard electroless nickel finish over composite.
XMT	Composite	Nickel-PTFE	GMF-002 Type II Class 2	2000	Conductive	-65 to +200°C	✓	Approved for MIL-DTL-38999L.
XW	Composite	Cadmium, Olive Drab	SAE-AMS-QQ-P-416 Type II Class 3 over electroless nickel	2000	Conductive	-65 to +175°C		Glenair's standard olive drab cadmium finish over composite.
XZN	Composite	Zinc-Nickel, Black	ASTM B841 Grade 5 over electroless nickel	2000	Conductive	-65 to +175°C		Glenair's standard black zinc-nickel finish over composite.
Z1	Stainless Steel	Passivate	SAE AMS 2700	500	Conductive	-65 to +200°C	✓	Glenair's standard passivated stainless steel.
Z16	Aluminum	Electroless Nickel	AMS-C-26074 Class 4 Grade B	48	Conductive	-65 to +200°C	✓	Standard matte electroless nickel for space applications
Z2	Aluminum	Gold	MIL-DTL-45204 Class 1 over electroless nickel	48	Conductive	-65 to +200°C	✓	Glenair's standard gold plating for space programs.
ZC	Stainless Steel	Zinc-Cobalt, Black	ASTM-B840, Grade 6		Conductive	-65 to +175°C		Glenair's standard zinc-cobalt over stainless steel.
ZCR	Stainless Steel	Zinc-Cobalt, Black	ASTM-B840, Grade 6		Conductive	-65 to +175°C	✓	RoHS version of ZC.
ZL	Stainless Steel	Electrodeposited Nickel	SAE-AMS-QQ-N-290 Class 2 Grade F	500	Conductive	-65 to +200°C	✓	Glenair's preferred nickel-plated stainless steel.
ZM	Stainless Steel	Electroless Nickel	AMS-C-26074 Class 1 Grade A		Conductive	-65 to +200°C	✓	Used on hermetic connectors. Use ZM for other applications.
ZMT	Stainless Steel	Nickel-PTFE	SAE AMS2454	1000	Conductive	-65 to +175°C	✓	Glenair's new 1000 Hour Grey over stainless steel.
ZN	Aluminum	Zinc-Nickel, Olive Drab	ASTM B841 Grade 5 over electroless nickel	500	Conductive	-65 to +175°C		Glenair's standard olive drab zinc-nickel finish.
ZNU	Aluminum	Zinc-Nickel, Black	ASTM B841 Grade 5 over electroless nickel	500	Conductive	-65 to +175°C		Use ZR for new design
ZU	Stainless Steel	Cadmium, Black	SAE-AMS-QQ-P-416 Type II Class 2	500	Conductive	-65 to +175°C		Glenair's standard black cadmium over stainless steel.
ZW	Stainless Steel	Cadmium, Olive Drab	SAE-AMS-QQ-P-416 Type II Class 2 over electroless nickel	500	Conductive	-65 to +175°C		Glenair's standard olive drab cadmium over stainless steel.
ZR	Aluminum	Zinc-Nickel, Black	ASTM B841 Grade 5 over electroless nickel	500	Conductive	-65 to +175°C	✓	Glenair's RoHS compliant black zinc-nickel

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Glenair Connector Material and Finish Options

Fiber Optic Appendix

M

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Glenair Connector Plating Code and Mil-Spec Connector Finish Code Cross-Reference

MIL-DTL-38999 Series I and II Finish Code	Material, Finish	Recommended Glenair Material/Finish Code
A	Aluminum, Cadmium Plated, Clear Chromate	LF
B	Aluminum, Cadmium Plated, Olive Drab	NF
C	Aluminum, Anodize, Hardcoat	G
E	Stainless Steel, Passivated	Z1
F	Aluminum, Electroless Nickel Plated	M
N	Stainless Steel, Electrodeposited Nickel (Hermetic)	ZL
P	Aluminum, Pure Dense Aluminum (AlumiPlate℠)	AL
R	Aluminum, Electroless Nickel	ME
T	Aluminum, Nickel-PTFE	MT
U	Aluminum, Cadmium Plated, Clear Chromate	LF
X	Aluminum, Cadmium Plated, Olive Drab	NF
Z	Aluminum, Black Zinc-Nickel	ZR

MIL-DTL-38999 Series III and IV Class Code	Material, Finish	Recommended Glenair Material/Finish Code
C	Aluminum, Anodize, Hardcoat	G
F	Aluminum, Electroless Nickel	M
G	Aluminum, Electroless Nickel (Space Grade)	MA
H	Stainless Steel, Passivated (Space Grade)	Z1
J	Composite, Cadmium Plated, Olive Drab	XW
K	Stainless Steel, Passivated	Z1
L	Stainless Steel, Electrodeposited Nickel	ZL
M	Composite, Electroless Nickel Plated	XM
N	Stainless Steel, Electrodeposited Nickel (Hermetic)	ZL
P	Aluminum, Pure Dense Aluminum (AlumiPlate℠)	AL
R	Aluminum, Electroless Nickel	ME
S	Stainless Steel, Electrodeposited Nickel	ZL
T	Aluminum, Nickel-PTFE	MT
W	Aluminum, Cadmium Plated, Olive Drab	NF
X	Aluminum, Cadmium Plated, Olive Drab	NF
Y	Stainless Steel, Passivated	Z1
Z	Aluminum, Black Zinc-Nickel	ZR

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Glenair Connector Plating Code and Mil-Spec Connector Finish Code Cross-Reference

MIL-DTL-28840 Finish Code	Material, Finish	Recommended Glenair Material/Finish Code
A	Aluminum, Cadmium Olive Drab over Nickel	NF
B	Stainless Steel, Cadmium-Black over Nickel	ZU
L	Aluminum, Nickel PTFE	MT
S	Aluminum, Zinc Nickel, Non-Reflective	ZR

SAE AS5015 Class Code	Material, Finish	Recommended Glenair Material/Finish Code
A, B, C, D, E, DJ, F, P, R, W	Aluminum, Cadmium Plated, Olive Drab	NF
H, K	Stainless Steel, Electroless Nickel	ZM
L,U	Aluminum, Electroless Nickel	M

MIL-DTL-26482	Material, Finish	Recommended Glenair Material/Finish Code
Series I	Aluminum, Cadmium Plated, Olive Drab	NF
Series 2 Class L	Electroless Nickel	M
Series 2 Class W	Aluminum, Cadmium Plated, Olive Drab	NF

AS85049 Finish Code	Material, Finish	Recommended Glenair Material/Finish Code
A	Aluminum, Black Anodize	C
B	Stainless Steel, Cadmium Plated, Black	ZU
G	Aluminum, Electroless Nickel Plated (Space)	M
J	Composite, Cadmium Plated, Olive Drab	XW
L	Composite, Cadmium Plated, Olive Drab(1)	XX
M	Composite, Electroless Nickel Plated	XM
N	Aluminum, Electroless Nickel Plated	M
P	Aluminum, Cadmium Plated, Olive Drab(1)	NFP
W	Aluminum, Cadmium Plated, Olive Drab	NF
T	Composite, Unplated	XO
	(1) Selective plated with polysulfide barrier	

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Quick Picks: A Guide to Glenair's Most Popular Materials and Finishes

Electroless Nickel

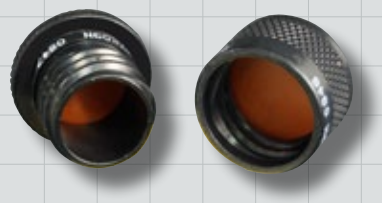
Cost $ $ $ $ $
Conductivity + + + + +
Corrosion Resistance ⧗ ⧗ ⧗ ⧗ ⧗

-65 to +200°C

Glenair Code M

RoHS Compliant

Aluminum plated with electroless nickel offers excellent conductivity, wear resistance, and adequate corrosion resistance. Typically specified on electrical connectors and accessories used in avionics boxes, exoatmospheric equipment, and missiles, electroless nickel is a good choice when exposure to marine or corrosive atmospheres is not a primary concern. The plating process is purely chemical, and once started, is autocatalytic (it runs by itself).



Black Zinc Nickel

Cost $ $ $ $ $
Conductivity + + + + +
Corrosion Resistance ⧗ ⧗ ⧗ ⧗ ⧗

-65 to +175°C

Glenair Code ZR

RoHS Compliant

RoHS-compliant black zinc-nickel is approved for MIL-DTL-38999, AS85049 and other major military specifications as a replacement for cadmium and hexavalent chromium platings. The non-reflective finish and good conductivity make the Glenair ZR finish a leading choice for cadmium-free tactical systems. Corrosion resistance is comparable to cadmium, and the ZR finish is backward-compatible with Cd-plated connectors and accessories.

Zinc-Cobalt

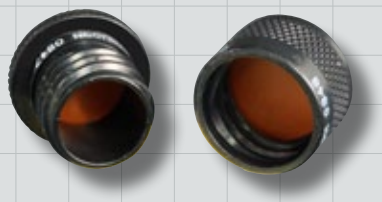
Cost $ $ $ $ $
Conductivity + + + + +
Corrosion Resistance ⧗ ⧗ ⧗ ⧗ ⧗

-65 to +175°C

Glenair Code UC, UCR, ZC, ZCR

RoHS Compliant

Zinc-cobalt with black trivalent chromate topcoat fills the need for a RoHS compliant conductive black finish for soldier systems, unmanned vehicles, robots and other tactical gear. This new addition to the Glenair lineup is likely to replace black zinc-nickel for new Future Combat System applications. Black zinc-cobalt plating is a standard finish on Glenair's ITS 5015 reverse bayonet power connectors.



Zinc-Nickel

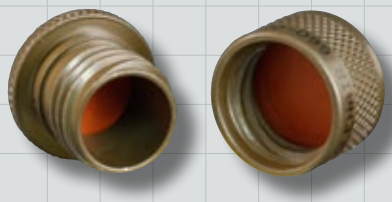
Cost $ $ $ $ $
Conductivity + + + + +
Corrosion Resistance ⧗ ⧗ ⧗ ⧗ ⧗

-65 to +175°C

Glenair Code ZN, ZNU

RoHS Not Compliant

Recently added to MIL-DTL-38999 and MIL-DTL-83513, zinc-nickel plated aluminum has become a cost-effective alternative to cadmium. Available with olive drab or black chromate conversion coatings, zinc-nickel plated aluminum is commonly found on soldier systems and military airframe applications.



Cadmium

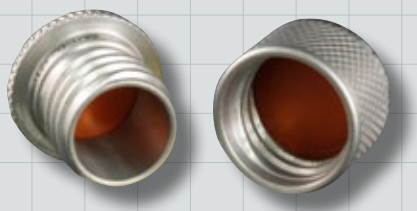
Cost $ $ $ $ $
Conductivity + + + + +
Corrosion Resistance ⧗ ⧗ ⧗ ⧗ ⧗

-65 to +175°C

Glenair Code NF, LF, JF

RoHS Not Compliant

Cadmium plated aluminum has been the unchallenged workhorse of the defense/aerospace industry. Offering up to 1000 hours of salt spray protection when deposited over electroless nickel, cadmium is highly conductive, and provides good lubricity and resistance to galling. As plated, cadmium has a silvery appearance. A subsequent chromic acid passivation bath creates a chromate topcoat over the cadmium, enhancing corrosion protection. Olive drab chromate is widely used, followed by gold chromate and clear chromate.



Stainless Steel

Cost $ $ $ $ $
Conductivity + + + + +
Corrosion Resistance ⧗ ⧗ ⧗ ⧗ ⧗

-65 to +200°C

Glenair Code Z1, ZL, ZW

RoHS Compliant

Stainless steel offers unbeatable strength and protection from environmental stress if durability and corrosion resistance are more important than cost and weight. Typically found on aircraft engines, landing gear, geophysical equipment, armored vehicles and marine applications, passivated stainless steel is widely specified in throughout the interconnect industry. Also offered with nickel and cadmium plating for improved conductivity, stainless steel is an obvious alternative to cadmium if cost and weight are not an issue.

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Quick Picks: A Guide to Glenair's Most Popular Materials and Finishes

Glenair®

Black Anodize

Cost $ $ $ $ $
Conductivity + + + + +
Corrosion Resistance ⧗ ⧗ ⧗ ⧗ ⧗

-65 to +175°C

Glenair Code C

RoHS Compliant

Black anodized aluminum is a popular finish for electrical connectors and accessories. Typically employed when conductivity is not required, black anodized aluminum offers a modicum of corrosion protection and is relatively inexpensive. Anodizing is an electrolytic process that creates aluminum oxide films by oxidizing the base metal. The resulting coating is much harder and denser than natural oxidation. The parts are immersed in a sulfuric acid solution at room temperature. After anodizing, the parts are dyed black.

Plated Composite

Cost $ $ $ $ $
Conductivity + + + + +
Corrosion Resistance ⧗ ⧗ ⧗ ⧗ ⧗

-65 to +200°C

Glenair Code XM, XW, XMT

RoHS Compliant

Plated composite connectors and accessories provide unsurpassed corrosion protection and excellent conductivity. Glass-reinforced thermoplastic is metallized and plated with electroless nickel (olive drab cadmium is another popular finish). Plated composite connectors and accessories have become the first choice for aerospace programs seeking to eliminate cadmium and reduce weight.

Unplated Composite

Cost $ $ $ $ $
Conductivity + + + + +
Corrosion Resistance ⧗ ⧗ ⧗ ⧗ ⧗

-65 to +175°C

Glenair Code XB, XO

RoHS Compliant

If conductivity and EMI shielding are not required, unplated composites provide the best solution to corrosion protection. Glenair's composite connector accessories are ideally suited for use in harsh environments where even stainless steel parts can be attacked by corrosive fluids. Available in black (code XB) and brown (code XO).

AlumiPlate℠

Cost $ $ $ $ $
Conductivity + + + + +
Corrosion Resistance ⧗ ⧗ ⧗ ⧗ ⧗

-65 to +175°C

Glenair Code AL, XAL

RoHS Compliant

AlumiPlate provides excellent conductivity and corrosion resistance. 99.99% pure aluminum is electrolytically deposited onto aluminum or composite in a specialized water-free process, followed by a trivalent chromate conversion coating. AlumiPlate has been approved by Boeing and Lockheed as a replacement for cadmium. AlumiPlate has been added to MIL-DTL-38999 and MIL-DTL-83513. Threaded parts require dry lube to prevent galling. AlumiPlate is a service mark of AlumiPlate Incorporated, Minneapolis, Minnesota.

Nickel-PTFE

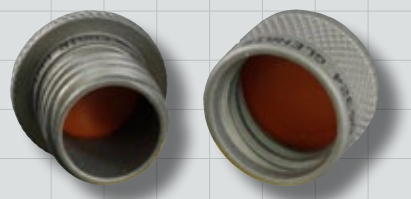
Cost $ $ $ $ $
Conductivity + + + + +
Corrosion Resistance ⧗ ⧗ ⧗ ⧗ ⧗

-65 to +175°C

Glenair Code MT, XMT, ZMT

RoHS Compliant

Now approved for MIL-DTL-38999 and MIL-DTL-83513, Glenair's 1000 Hour Grey™ meets the need for a cadmium replacement with excellent conductivity, wear resistance and corrosion protection. This extremely durable finish is gun-metal gray. A proprietary preliminary undercoat is followed with a composite coating of electroless nickel phosphorus and polytetra-fluoroethylene (PTFE). An organic topcoat provides sealing and added resistance to SO2 salt fog. Ni-PTFE is approved for the Joint Strike Fighter and offers extremely good lubricity.



Hardcoat Anodize

Cost $ $ $ $ $
Conductivity + + + + +
Corrosion Resistance ⧗ ⧗ ⧗ ⧗ ⧗

-65 to +200°C

Glenair Code G

RoHS Compliant

Hardcoat anodized aluminum offers greater wear resistance and better corrosion resistance compared to conventional anodizing. Typically employed when conductivity is not required, hardcoat aluminum offers good corrosion protection for marine and tactical applications. The resulting finish is a matte greenish-gray color. Hardcoat anodizing is an electrolytic process that creates aluminum oxide films by oxidizing the base metal in a sulfuric acid solution. The parts are immersed in a sulfuric acid solution at cold temperature. After anodizing, the parts can be dyed black (code GB).

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